C.I.R.P.É.E

Centre Interuniversitaire sur le Risque, les Politiques Économiques et l'Emploi

Cahier de recherche/Working Paper **13-03**

The Economy-wide Impacts of the South African Child Support Grant : a Micro-Simulation-Computable General Equilibrium Analysis

Luca Tiberti

Hélène Maisonnave

Margaret Chitiga

Ramos Mabugu

Véronique Robichaud

Stewart Ngandu

Mars/March 2013

Tiberti : Université Laval, CIRPÉE and PEP network, Canada
Maisonnave : Université Laval, CIRPÉE and PEP network, Canada
Chitiga : (Corresponding author) Human Science Research Council, Private Bag X41, Pretoria, 0001, South Africa. Tel.: +27 12 302 2406
MChitiga@hsrc.ac.za
Mabugu : Financial and Fiscal Commission, South Africa
Robichaud : Human Science Research Council, South Africa
Ngandu : Human Science Research Council, South Africa

Abstract:
We examine the economy-wide impact of the child support grant (CSG) on the South African economy using a bottom-up/top-down approach. This allows us to estimate the potential effects on households' welfare and on the economy following a change in the CSG. Three simulations are presented, in simulation 1 the value of the CSG is increased by 20%; in simulation 2 the number of beneficiaries among the eligible children is increased by two million and simulation 3 combines these two. A positive link between the CSG and the probability of participating in the labour market is found. The positive impacts on the labour market, together with the increase in the transfers received by households, results in an increase in their income. Poverty decreases in comparison with the base year for the whole population and for children. Finally, we can conclude that simulation 1 is the most cost effective of the policies.

Keywords: Child support grant, computable general equilibrium, micro-simulation, poverty, South Africa

JEL Classification: D58, E24, E6, H53, I3, J01, O55

1 INTRODUCTION

The South African Child Support Grant (CSG) was introduced in April 1998 where it replaced the child maintenance grant. The adoption of the CSG contributed to South Africa's progressive realisation of the constitutional right to social security as enshrined in article 27 of the Republic of South Africa Constitution (1996). The grant, which is paid to the child's primary caregiver, is currently the most important form of assistance for children in poor families and offers a potential source of protection against poverty. The CSG has expanded markedly in recent years, until 2008, it was only available to children aged 0-13 years, in 2009, this was extended to include children aged 14 and from 2010 the age of eligibility was increased to include children up to the age of 18 years (South Africa Social Security Agency (SASSA), 2010). Since 1 April 2012, the CSG amounts to R280 per month, with an estimated 10 977 000 beneficiaries as of 31 March 2011 (National Treasury, 2011). Given the importance and scale of the CSG, this study assesses the economy-wide impact of changes in the scheme based on two potential policy changes as well as their combined effect. Firstly, as will be discussed in section 2.1, the number of beneficiaries is likely to increase by 2 million over the next few years. Secondly, the value of the grant itself is also expected to rise over the same period (see section 2.2). Both these two developments will have an impact on the South African economy especially as it relates to changes in poverty severity, incidence and depth.

This paper is structured as follows: Section 2 discusses the CSG in South Africa, looking at coverage in terms of the number of beneficiaries and changes in eligibility over the years. Section 3 briefly reviews literature on the impact of social transfer programmes, while section 4 discusses the methodology and data used for this study. Section 5 discusses the results of the 3 simulations carried out based on the potential changes in the welfare scheme, and then section 6 concludes the paper.

2 OVERVIEW OF SOUTH AFRICA'S CHILD SUPPORT GRANT

This section gives a brief overview of South Africa's CSG. It focuses on its reach, expenditure and the impact it has had on both poverty and the lives of grant recipients.

2.1 Reach of the CSG

At the time of its introduction, the declared goal was for the CSG to reach 3 million children within 5 years. Fourteen years later the CSG has expanded rapidly with over 10 million beneficiaries, making it the largest social assistance programme in South Africa and one of the largest globally. Table 1 shows changes in social grant beneficiaries by type from 2008 with projections to 2015. From the table, it is clear that the CSG has the highest number of beneficiaries growing at 4.9% over the reported period.

Table 1: Social grants beneficiary numbers by type and province, 2008/07 – 2014/15 in 000's

	2008/09	2009/10	2010/11	2011/12	**2012/13***	**2013/14***	**2014/15***	% Growth
Type of grant					**Projections**			per year
Old-age	2,344	2,490	2,647	2724	2,773	2,835	2,881	3.5%
War veterans	2	1	1	1	1	1	1	-10.9%
Disability	1,372	1,299	1,212	1216	1,192	1,196	1,196	-2.3%
Foster care	476	489	490	598	671	769	874	10.7%
Care dependency	107	119	121	126	131	141	147	5.4%
Child support	8,765	9,381	10,154	10,903	11,301	11,549	11,659	4.9%
Total	13,066	13,779	14,625	15,568	16,069	16,491	16,758	4.2%

Source: National Budget Review (2012)
** Projected numbers at fiscal year-end.*

This growth has continued despite many initial challenges with the implementation of the CSG. These included the lack of equipment in many offices, under staffing of welfare offices, lack of uniformity in the application process across provinces and offices, problems with accessing vital registration documents (for example, identity documents and birth certificates) and difficulties in providing postal addresses (Eyal et al, 2011).

Although the number of beneficiaries has increased over the years, there is evidence that a significant number of eligible children are not able to access the grant. More than 600,000 maternal orphans are not receiving any grant, a vastly higher proportion than for any other group (Southern Africa Labour and Development Research Unit's National Income Dynamics Study, 2008). In addition, disproportionately fewer younger children (0-2 years) as well as fewer rural children are accessing the CSG (McEwan et al, 2010). The Department of Social Development acknowledges that not all children eligible for the CSG are receiving it, citing lack of documentation as the biggest barrier alongside some of the challenges mentioned above. According to SASSA (2010), in 2008, 2.1 million children or 27% of those eligible for the CSG did not receive it.

At the regional level, Table 2 indicates that KwaZulu-Natal and Eastern Cape have the highest number of children who are benefiting from the CSG with children under 7 years being the largest age group of CSG beneficiaries. The figures for these two largely rural provinces in particular demonstrate the ability of the CSG to reach large numbers of poor children, including those living in deep rural areas.

Table 2: Number of Child Support Grants by age and province as at 30 June 2011

Ages	EC	FS	GAU	KZN	LIM	MPU	NW	NC	WC	Total
(0-1 yrs)	74 455	30 236	66 160	113 815	73 040	37 870	28 969	11 708	35 164	471 417
(1-2 yrs)	99 812	39 511	92 978	156 402	95 599	57 607	45 572	16 622	52 055	656 158
(2-3 yrs)	108 824	41 170	98 238	168 819	99 788	62 838	51 131	17 886	58 215	706 909
(3-4 yrs)	119 287	43 414	100 194	181 963	104 137	66 804	54 203	17 933	58 527	746 462
(4-5 yrs)	119 881	41 994	96 833	180 604	100 542	65 476	54 576	17 387	56 106	733 399
(5-6 yrs)	123 790	41 794	96 986	187 620	99 603	66 617	53 979	17 332	54 931	742 652
(6-7 yrs)	119 996	41 303	93 689	177 739	94 276	65 991	53 580	16 848	51 396	714 818
Total 0-7	**766 045**	**279 422**	**645 078**	**1 166 962**	**666 985**	**423 203**	**342 010**	**115 716**	**366 394**	**4 771 815**
(7-8 yrs)	112 890	38 618	89 497	166 128	84 294	61 731	50 470	16 253	48 355	668 236
(8-9 yrs)	103 266	34 828	81 714	155 893	77 518	56 869	46 246	15 509	44 852	616 695
Total 7-9	**216 156**	**73 446**	**171 211**	**322 021**	**161 812**	**118 600**	**96 716**	**31 762**	**93 207**	**1 284 931**
(9-10 yrs)	98 578	33 822	77 787	159 740	75 727	54 849	44 767	14 760	43 140	603 170
(10-11 yrs)	95 621	32 806	73 977	152 548	76 129	56 081	43 898	14 200	43 364	588 624
Total 9-11	**194 199**	**66 628**	**151 764**	**312 288**	**151 856**	**110 930**	**88 665**	**28 960**	**86 504**	**1 191 794**
(11-12 yrs)	99 546	31 806	70 234	155 238	76 031	55 910	42 453	14 646	42 083	587 947
(12-13 yrs)	103 749	29 324	65 761	149 619	74 922	53 359	40 013	13 825	39 741	570 313
(13-14 yrs)	103 480	28 646	62 864	143 549	75 175	53 799	38 285	13 274	37 942	557 014
Total 11-14	**306 775**	**89 776**	**198 859**	**448 406**	**226 128**	**163 068**	**120 751**	**41 745**	**119 766**	**1 715 274**
(14-15 yrs)	103 388	29 398	63 840	139 666	76 481	53 763	38 870	13 320	38 606	557 332
(15-16 yrs)	103 458	29 461	60 137	135 218	77 318	52 387	38 049	12 792	35 752	544 572
(16-17 yrs)	94 057	26 366	51 721	116 285	74 904	48 049	33 679	11 399	29 503	485 963
(17-18 yrs)	44 272	13 718	21 709	61 419	44 040	24 919	13 508	5 311	12 185	241 081
Total 14-18	**345 175**	**98 943**	**197 407**	**452 588**	**272 743**	**179 118**	**124 106**	**42 822**	**116 046**	**1 828 948**

Key: EC – Eastern Cape; FS – Free State; GAU – Gauteng; KZN – KwaZulu Natal; Lim – Limpopo; MPU – Mpumalanga; NW –NorthWest; NC – Northern Cape; WC – Western Cape
Source: South African Social Security Agency Third Quarter Indicator Report December 2011

Table 3: Changes in Age Eligibility and Grant Value Progression of the CSG

Year	Age Eligibility	Grant Amount
1998 – 2000	Children under 7 years	R 100
2001	Children under 7 years	R 110
2002	Children under 7 years	R140
2003	Children under 9 years	R 160
2004	Children under 11 years	R 170
2005	Children under 14 years	R 180
2008	Children under 15 years	?
2010	Children under 16 years	?
2011	Children under 17 years	R 270
2012	Children under 18 years	R 280

Source: Eyal et al (2011)

As Table 3 indicates, both the age of eligibility and the value of the CSG have increased gradually over time from covering children less than 7 years (1998-2000), to covering children less than 18 years in 2012 and from a grant amount of R100 to its current value of R280 per month. The *"follow the child"* concept adopted for the implementation of the CSG is unique in that it recognized the varied and fluid nature of the family structure in South Africa and instead of linking the grant to a biological parent it allows the grant to be accessed by a primary caregiver. The primary caregiver is defined as anyone older than 16 years who is taking primary responsibility for the day to day needs of that child whether parent, relative or unrelated carer (Patel et al, 2012).

2.2 **Spending on CSG**

In the 2011/12 fiscal year, spending on social assistance in South Africa was R96,203 billion with a significant amount of that going towards the cost of the CSG as seen in Table 4 which shows social grants expenditure by type and province. It is the size of the CSG expenditure in South Africa's social spending that forms part of the motivation for this paper. All in all, expenditure on social assistance represents approximately 3.5% of Gross Domestic Product (GDP) corresponding to a 1.5% increase since 1994 (Laryea-Adjei et al 2011, Seeking 2007).

Table 4: Social grants expenditure by type and province, 2007/08– 2013/14

	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	% Growth
				Revised				
R million	*Actual*			*estimate*	*Projected*			per year
Old-age	25,934	29,826	33,751	37,318	39,323	42,526	45,823	10.0%
War veterans	20	17	14	12	13	10	11	-9.8%
Disability	16,474	16,567	16,840	17,834	19,152	20,410	21,992	4.9%
Foster care	3,934	4,434	4,616	5,245	5,952	6,216	6,697	9.3%
Care dependency	1,292	1,434	1,586	1,948	1,857	2,107	2,270	9.9%
Child support	22,348	26,670	30,342	34,036	38,237	41,553	44,774	12.3%
Grant-in-aid	90	146	170	192	188	203	219	15.9%
Social relief of distress	623	165	174	118	165	183	197	-17.5%
Total	**70,715**	**79,260**	**87,493**	**96,703**	**104,888**	**113,208**	**121,982**	**9.5%**
Province								
Eastern Cape	12,557	13,914	15,281	16,761	18,119	19,556	21,073	
Free State	4,573	5,055	5,530	6,234	6,698	7,229	7,790	
Gauteng	8,289	9,390	10,539	11,871	13,030	14,063	15,153	
Kw aZulu-Natal	17,590	19,454	21,308	23,507	25,301	27,307	29,424	
Limpopo	9,656	10,855	11,986	12,318	14,111	15,231	16,410	
Mpumalanga	4,943	5,567	6,024	7,431	7,558	8,157	8,790	
Northern Cape	5,711	2,227	2,497	2,816	3,021	3,260	3,514	
North West	1,962	6,366	6,869	7,241	7,851	8,474	9,131	
Western Cape	5,434	6,432	7,460	8,524	9,199	9,930	10,698	
Total	**70,715**	**79,260**	**87,493**	**96,703**	**104,888**	**11,3208**	**121,982**	

Source: National Budget Review (2012)

Seeking (2007) argues that this is unique in that no other developing country redistributes as large a share of its GDP through social assistance programmes as South Africa is doing. More importantly, according to National Treasury (2011) projections, these costs are going to continue rising as the size and cost of the CSG is driven in the main by the progressive increases in the age limit and the means test threshold adjustments as seen in Table 5.

Table 5: Child Grant Cost Projections (millions of Rand's)

Year	Child Support Grant Cost
2005/06	14 143
2006/07	17 559
2007/08	19 625
2008/09	22 348
2009/10	26 670
2010/11	30342
2011/12	34 036
2012/13*	38 237
2013/14*	41 553
2014/15*	44 774

Source: National Budget Review 2009, 2011, 2012
**Projections*

3 LITERATURE REVIEW

The impact of cash transfers (CTs) on poverty ultimately depends on how poor people use the money. Because cash is fungible, there are fears that recipients may misuse CTs on “sin goods” and other luxuries. This has, in the past led to policy makers preferring in-kind transfers to CTs. Another crucial distinction pertains to differentiating between what Devereux (2002) refers to as "livelihood protection" and "livelihood promotion" effects of anti-poverty interventions. The former refers to consumption smoothing and maintenance of minimum living standards while the latter refers to sustainable poverty reduction (a longer horizon concept). CTs have long been regarded as measures of livelihood protection during times of crisis although recent research has started questioning this traditional view (Devereux, 2002). Yet another important strand of the literature has pointed to the importance of making a distinction between "direct" and "indirect" effects of CTs (Sadoulet et al (2001)). Direct effects are the intended impact of the program without taking into account any spillover or general equilibrium effects. Indirect effects arise from the outcomes of the direct effects. These can either enhance the direct impacts or create unintended consequences that lead to other undesirable outcomes. Whilst the intended direct impact of both conditional and unconditional cash transfers such as the CSG are meant to improve the income of the beneficiaries, the direction of impact for the indirect effects are not always easily predictable. To illustrate the interaction of direct and indirect effects of CTs, Sadoulet et al (2001) make an example of credit as well as cash transfer programs. The former is shown to have the direct effects of loosening up liquidity constraints and expectedly boosting the incomes of borrowers. It can also have the indirect outcome of increased school attendance by children as a result of the children being relieved from work that competes with school.

This section discusses the findings of studies that have explored the impact of grant income on the spending patterns of recipient households, with particular emphasis on the nutrition, incentive effects on savings and the labour market and poverty.

Effects of Cash Transfers on Nutrition

There are a number of papers discussing the nutritional benefits to children of increases in food expenditure resulting from receipt of CSG and social pensions. Agüero et al (2007) use children's height-for-age ratios as *ex post* indicators of nutritional inputs and find that KwaZulu-Natal children benefitted significantly in the first 3 years of their lives from CSG. The Department of Social Development conducted an evaluation to assess the impact of the

CSG on children, adolescents and their households. Using survey data from five provinces[2] and propensity score matching the study found that the CSG increases the probability of monitoring the growth of a child in the first two years of life by 7.7 percentage points which was found to be statistically significant at 10% level. This also led to an improvement of height-for-age scores for children whose mothers had more than eight grades of schooling. Yamauchi (2005) uses three rounds of the KwaZulu-Natal Income Dynamics Study (KIDS) to show that grant financed nutritional improvements resulted in positive educational outcomes for children such as reducing age of commencing school and school grade repetition while the grade reached increased at the early stage of schooling. Williams (2007) shows that grants reduced significantly the probability of childhood hunger.

With regard to old-age pensions, Duflo (2003) used ordinary least squares and two stage least squares to measure the impact of the old-age pension program on the anthropometric status of African children (ages 6-60 months). It emerged from the results that the gender of the grant recipient has a big influence on anthropometric status of the recipient. When the recipient of the pension is female there is a greater impact on girls than on boys with no impact when the recipient is male. Findings of Samson et al. (2004) and Lund (2006) corroborate these observations by verifying that the probability of nutrition improvements was higher in families with female pension recipients than those with male recipients. It appears that most evidence suggests that receipt of the CSG and old-age pensions encouraged school attendance among recipient children (Case et al, 2005; Budlender and Woolard, 2006; Leibbrandt et al, 2010) with the only exception being the Community Agency for Social Enquiry (CASE) (2008) that reported no discernible difference between children receiving the grant and those not receiving the grant when aged between seven and 13 years. While there is overwhelming evidence of the positive effect on attendance from receipt of a grant in absolute terms, this must be nuanced by the fact that there is already high school enrolment and attendance rates in South Africa even in the absence of grants. Thus, as pointed out by Budlender and Woolard (2006), the evidence suggests that grant receipt implied significant reductions in school non-attendance.

Effects of Cash Transfers on Savings and Investment

Most of the international evidence on cash transfers indicates that both the marginal propensity to save and the rate of return of investing out of this source of income are relatively high. Martinez (2005) found that pension transfers that were being invested in smallholder agriculture in Bolivia had the impact of increasing food consumption by twice the amount of the transfer received. By enhancing the ability of recipients to save and invest, cash transfers therefore reduce detrimental risk coping strategies such as the selling of productive assets. The evidence for South Africa of the incentive effect of grants on savings is less clear and complicated by the fact that the means test imposes an onerous effective marginal tax rate of 50 percent on non-pension incomes exceeding R606 per month (Van der Berg and Siebrits, 2010). This suggests that the means-tested nature of the social old-age pension reduces the incentive for low-income earners to save for retirement (National Treasury, 2004). The actual impact of this disincentive on the savings decisions of lower-income workers behaviour remains unresolved. Nonetheless, there is, however, some scant evidence of a positive effect of grants on savings. Using pension transfers as an example, Duflo (2003) found that in South Africa old age unconditional pension recipients, both male and female, on average, saved 67.5% of the transfer. With respect to investment the evidence is equally compelling with highly positive rates of return that households obtain on investing out of their cash transfers.

Effects of Cash Transfers on Labour Market Behaviour

[2] Eastern Cape, Gauteng, KwaZulu-Natal, Limpopo and Western Cape

The main instrument used to provide unemployment benefits in South Africa is the Unemployment Insurance Fund which is a contribution-based social insurance institution. Grants are thus only given to people with disabilities among the working-age population (subject to the means test). Despite this, the social assistance system still has some impact on labour-market participation although the channels are different from those predicted by conventional theory (distortion of the relative prices of work and leisure) (van der Berg and Siebrits, 2010). A survey carried out by the Human Sciences Research Council under the South African Social Attitudes Survey revealed that the poor prefer labour-market income to that from grants (Noble et al, 2008). The grant system instead influenced labour supply through direct and induced effects on retirement decisions, household formation and job search activities (van der Berg and Siebrits, 2010). Direct effects, covering incentives actually faced by recipients, are largely influenced by the means test that discourages the elderly people from working after reaching eligibility age (by imposing an effective marginal tax rate of 50 percent on non-pension incomes referred to earlier). Disability grants also are subject to means test hence suffer similar discouraging effects. The situation is worsened by the high levels of unemployment and other labour-market disadvantages faced by elderly and disabled South Africans – according to van der Berg and Siebrits (2010), many members of these groups have limited skills and reside in rural areas where job opportunities are scarce. There is thus a small difference between the disability grant and available market wages implying little incentive for persons with disability to seek or take up paid work. Johannsmeier (2007) suggests that this is even more so for casual and temporary jobs.

There are a number of studies exploring the induced or indirect labour market effects of the South African social assistance system and the results are rather mixed. A number of studies conclude that social pensions have become a main source of support for working age unemployed South Africans especially residing in rural areas (see for example Case and Deaton, 1998; Keller, 2004; Klasen and Woolard, 2008). Channels through which social pensions delay labour market participation postulated delays in new household formation by younger adults or discouraged job search by individuals now residing with families with pension income (Klasen and Woolard, 2008; Bertrand et al, 2003). Studies that have included migrant absentees in the definition of households have found that pension income access does in fact stimulate job search (see for example Posel et al, 2006; Sienaert, 2008), particularly for women. Eyal and Woolard (2011) found a positive effect for Black mothers aged 20 to 45 of the CSG on the labour force participation, employment probability and unemployment (conditional on being a participant). With respect to the old-age pension, Ardington et al (2009) uses longitudinal data to assess the labour supply responses of adults to changes in the old-age pensioners in the household. In order to analyse unobservable household and individual characteristics that might influence labour market behaviour, households and individuals are compared before and after pension receipt, and pension loss. The results of this study show the strategic role that cash transfers can play in facilitating job search. Following the receipt of the transfer, the study found an increase in employment amongst adults in the household. The findings indicate that the cash transfer was used to finance the cost involved in job search as seen in the increase of labour migration upon pension arrival. Furthermore, migration in the case of prime-aged households with children was made possible by the fact that the pensioners were able to take care of children whilst their parents looked for work. Similarly, Williams (2007) concludes that CSG influences positively labour-force participation by caregivers (but not their search behaviour or actual employment). All in all, CASE (2008) and Noble et al (2008) conclude that it is unlikely that there will be significant labour-supply effects given the small value of the CSG.

Effects of Cash Transfers on Poverty

Although not all cash transfer programs succeed in reducing poverty there is a significant body of international evidence to show that both conditional and unconditional cash transfers have had a positive impact (see Arnold et al, 2011; Fiszbein and Schady, 2009; Grosh, 2008;

and Rawlings, 2005). Devereux (2002) conveniently identifies three causes that facilitate the discussion of the effects of CTs on poverty. That is, chronic poverty is often associated with low productivity (due largely to unemployment or underemployment). Transitory poverty is often due to vulnerability to temporary shocks and an inability to cope with such shocks. Finally, dependency is often a major cause of poverty and related to personal characteristics such as old age, childhood or disabilities. Conventional wisdom is that CTs are best designed to address dependency related poverty.

The South African social assistance system was designed to mitigate dependency-related poverty focusing on vulnerable groups falling outside the labour force (children, elderly and disabled people). A number of studies have shown that the grants system is effective at dependency related poverty largely because the grants are well targeted and have significant mitigating impacts on poverty. Studies by Woolard (2003), Armstrong et al (2008) and Armstrong and Burger (2009) have compared the actual incidence of poverty to the incidence that would have obtained if all households had earned zero income from social grants and find that social grants are effective at reducing poverty.

Other pieces of work focusing on the effects of specific grants, (see for example Case and Deaton, 1998; Barrientos, 2003) and the social grants system as a whole (see for example Samson et al, 2004) come up with a similar conclusion. Yet some other indirect corroborating evidence of the poverty-reducing impact of social grants is provided in van der Berg et al (2008), The Presidency (2009), Van der Berg et al (2009) and Leibbrandt et al *(*2010). Armstrong and Burger (2009) show that poverty reduction effects of grants is sensitive to the poverty line chosen, with higher poverty reductions of social grants being associated with lowest poverty lines. While these studies provide compelling evidence, they are based on a very strong assumption that there are no general equilibrium effects of social grants, that is, there is no effect at all household behaviour in terms of labour supply, saving, household formation patterns and so on. As a result, it remains uncertain as to whether issues related to utilisation and incentive effects of grants would pen out.

As discussed above under incentive effects pertaining to labour market and saving, there does not seem to be widespread evidence that grants are used to finance undesirable consumption patterns or other undesirable behavioural effects. Instead, the CSG and old-age pension have been used to enhance the nutrition and schooling of children. These are likely to enhance human capital and productivity in later years of these children. Similarly, allowing for migrant members in definition of households resulted not only in grants impacting on chronic poverty through sharing the proceeds and acting as a safety net but also facilitated labour-market participation particularly of females and caregivers[3].

There is also growing evidence to show that the CSG played an important role in mitigating the impacts of economic shocks on South African households. Jacobs (2010) looked at how the most recent food price crisis and global economic downturn might have affected the food security status of low-income households. The results of this analysis not only showed that female-headed households in traditional huts and informal backyard shacks were severely

[3] Seyisi and Proudlock (2009) assessed the impact on children and families of stopping the CSG at the age of 15 using testimonies collected from caregivers of children aged 14 to 18 years. It emerged from the testimonies that families had been able to meet the nutritional needs of their children and the CSG was also playing an important role toward educational needs. Families where using the grant to buy school uniforms, lunch, stationary, transport to and from school and books. What is also interesting to note is that although most of the caregivers qualified for school fees exemption a significant number of them reported that they were not able to get the exemption and were therefore using the CSG for school fees. In meeting the transport needs of some of the children, especially in winter and the rainy season, the CSG ensured that children did not miss too many days from school. It was also clear that in cases were the primary caregivers were the grandparents of the child, the CSG offered relief to their Old Age Pension (OAP) which allowed them to continue meeting their own needs, such as medical care.

affected by the twin crisis but also highlighted the fact that households with CSGs fared better than households without. In terms of South Africa's CSG contribution toward poverty reduction, a number of studies have found that it has contributed to reducing poverty as well as shielding children from adverse effects, particularly from the financial and economic crisis of 2008 and 2009 (Chitiga et al 2010; Ngandu et al 2010). According to SASSA (2011), in 2007 there was a 9% drop in child poverty because of the CSG.

These poverty impacts strengthen the case for at least maintaining the existing targeted social grants as an anti-poverty measure. What is less clear would be the developmental effects of existing coverage along the lines discussed in section 2.1 and 2.2, given that cash transfer schemes in South Africa were not really initially intended for such large numbers and less so at addressing these type of effects.

As for the methodologies used to analyse some of the above impacts, with the exception of Samson et al (2004), very few studies use an economy-wide model to assess the impact of the CSG on the South African economy. Samson et al used a micro-simulation model to analysis the role of social assistance in reducing poverty and promoting household development. The study focused on effects on health, education, housing and vital services and used three different poverty measures to assess the extent of poverty in South Africa, the poverty headcount measure, the relative poverty gap measure and the rand poverty gap measure. Three data sources were used to calibrate the model, the September 2000 Income and Expenditure Survey, the September 2000 Labour Force Survey and administrative data from the Department of Social Development. The study identified 11 scenarios of possible social security reform which were then modelled using 7 different poverty lines. The authors find that the reduction in the poverty headcount ranges from 2% for the full take-up of the CSG among eligible children aged 0-7 to, 5.6%, for the full take-up of the CSG among eligible children aged 0-18 reforms. Focusing on the latter the results show that nearly 12 million additional grants, which represent an increase of over 2500% from baseline, are created. This has the impact of freeing over 1.4 million individuals from poverty approximately 1 million more individuals than the CSG 0-7 reform. Consistent with the poverty headcount the CSG 0-18 produces the greatest impact on both destitution and the aggregate poverty gap, reducing them by 35.6% and 58.7% respectively. Unlike the Samson et al (2004) study, this paper goes beyond simply using a micro-simulation model by adopting a bottom-up/top-down modelling approach which utilises both a micro-simulation and computable general equilibrium models[4]. The rest of this paper discusses the merits of such interventions from a South African perspective using this more sophisticated tool.

4 MODELLING FRAMEWORK

There are several channels for the household-level impacts of social grants:

(1) changes in labour supply of different household members,
(2) investments of some part of the funds into productive activities that increase the beneficiary household's revenue generation capacity, and

[4] As an illustration of the importance of incorporating such general equilibrium features, a study by Davies and Davey (2007) used a social accounting matrix approach to analyse the impact on the local economy of an emergency cash transfer programme in rural Malawi. This approach was used to try and capture the economy wide impacts of the cash transfer on the local economy. Using the minimum requirements method to compute the multipliers the study found multiplier estimates between 2.02 and 2.45. The cash transfer program was found to have extensive multiplier effects on employment and local economic activities. Specifically, small farmers and businesses together with health and education also benefited from the secondary effects of the transfers. The ability of this type of economy-wide framework to pick up second round effects of transfers highlights the role that computable general equilibrium models can play in assessing the full impact of changes the transfer.

(3) prevention of detrimental risk-coping strategies such as distress sales of productive assets, children school drop-out, and increased risky income-generation activities such as commercial sex, begging and theft.

Research has also documented three types of local economy impacts:

(1) transfers between beneficiary and ineligible households,
(2) effects on local goods and labour markets and
(3) multiplier effects on income and/or welfare.

This study focuses on the multiplier effects of CSG and the methodology developed which is described below will help with estimation of potential effects on South African households' welfare and on the economy following a change in the CSG scheme.

In particular, three simulation scenarios are presented as follows:

1) Simulation 1 (sim1): A 20% increase in the value of the CSG for people already benefiting from the transfer.
2) Simulation 2 (sim2): An increase in the number of beneficiaries by two million among the eligible children – (for more details on the selection of the new beneficiaries Appendix 1).
3) Simulation 3 (sim3): Combines simulation 1 and simulation 2 with the additional beneficiaries from sim2 also benefiting from a 20 percent increase of the CSG from sim1.

As mentioned earlier, there are two main justifications for the proposed simulations in South Africa. The first is that there is relatively little awareness of the economy-wide impact of social protection instruments such as the CSG. The second justification is that there is a strong possibility that plans are underway to accelerate reaching some 2 million eligible children who are not currently receiving the CSG for mainly administrative reasons.

Conceptually, the modelling process starts with **Step 1** which consists of micro-simulation modelling. Here the following variables will be estimated and fed into the Computable General Equilibrium (CGE) model:

i. Estimation of consumer prices and income elasticities and simulation of the effect of a change in CSG on consumption patterns
ii. Estimation of a model for labour force participation and simulation of the effect of a change in the CSG on labour force participation

Once the relevant changes are estimated, they are then transmitted to the macro (CGE) model. This constitutes **Step 2** of the modelling process. This model simulates changes in different variables (e.g. volumes of consumption and production, prices, employment) which will then be inserted into the micro module in order to produce changes in poverty and inequality following the reform in the CSG scheme (**Step 3**).

4.1 The micro model and the linking variables to the CGE module (bottom-up):

The micro-economic module identifies two main channels through which the change in the CSG affects the economy: *labour force participation* and *household consumption pattern*. The models described hereafter are estimated based on the National Income Dynamic Study (NIDS) from 2008.

Labour force participation

With regards to the *labour force participation*, the change in the incentive to participate in the labour market due to a variation in the social transfer is estimated. Knowing whether labour force participation or employment are affected by CSG receipt is not obvious due to the endogeneity of the CSG variable. In South Africa, as in most other contexts, the grant is not randomly assigned but its receipt is likely to be correlated to e.g. income, education, place of residence and bureaucratic restrictions. It follows that, if some modelling precautions are not taken into account, the CSG coefficient risks being biased. In order to check for and to take into account the endogeneity problems, we will follow, with major modifications Bertrand et al. (2003) and Eyal and Woolard (2011).

We use an instrumental variable probit model (with the standard errors corrected for geographic clusters' correlation), where the binary (dependant) variable is the labour force participation and the per household amount linked to the grant (continuous variable) is instrumented by the number of age eligible children residing in the household. The estimations follow the procedure described in Wooldridge (2002, pg. 472-477) and are computed by maximum likelihood estimation[5].

Formally, we estimated the following recursive model:

$$\begin{cases} \Pr(y_{1,i}=1|X)=\beta y_{2,i}+\sum_{j,i}\alpha_{1,j}x_{1,j,i}+u_i \\ y_{2,i}=\eta_2 x_{2,i}+\sum_{j,i}\gamma_{1,j}x_{1,j,i}+v_i \end{cases} \tag{1}$$

Where, (u_i, v_i) has a zero mean and bivariate normal variance, and is independent of J regressors **x**. $y_{1,i}$ and $y_{2,i}$ are our endogenous variables for individual *i* taking binary and continuous values respectively. Regressors x_1 enter both equations, while regressor x_2 (vector of the additional instrument – number of age eligible children in the household, in our model) enters only the equation for y_2.

All kinds of workers (for wage, self-employed and casual) and short-term unemployed are taken as participating in the labour force (following the definition reported in the Labour Force Survey reports in South Africa). The estimates are run on a sample of individuals not enrolled in school at the time of the survey and aged between 15 and 64 years old. Although we are aware that the CSG is more likely to affect mothers in the younger tail of the population, we used the entire working age population, as defined by Statistic South Africa and consistent with the definition of workers in the Social Accounting Matrix (SAM) used in the CGE. This model is then used to predict the change in the proportion (or probability) in labour force participation following the extension of the CSG.

In order to check for coefficients' robustness, the model was rerun only on individuals aged 22 to 50 years old (not enrolled in school at the time of the survey). Finally, the sample was restricted only to people whose youngest child they live with, is aged between 12 and 15 (that is, just around the age eligibility threshold[6]), again, leaving those enrolled in school out of the analysis. By restricting the age group of beneficiary children, the heterogeneity of children's needs is reduced, and labour supply behaviour (especially for women) is less likely to be affected by the presence of young children.

Consumption

The effect on household's consumption behaviour (and on the aggregate demand for different goods) due to a change in the grant, is evaluated using the Exact Affine Stone Index (EASI) system (Lewbel and Pendakur, 2009; Pendakur, 2008). The EASI system has the advantages of the Almost Ideal Demand (AID) System but none of its limitations. The AID System, just like the EASI has budget shares that are linear in parameters given real expenditures. However, unlike the AID System, EASI demands can have any rank and its Engel curves can

[5] *ivprobit* Stata command was used to run these estimations.

[6] By the time of the survey we used, the age eligibility was set at 14.

have any shape over real expenditures. EASI error terms equal random utility parameters which account for unobserved preference heterogeneity. The EASI demand system in this study is estimated by an iterated three stage least squares model. The estimate provides prices, income and other variables (including the CSG) elasticity of different consumption categories.

Consider the following cost function in the EASI class:

$$\ln C(p,u,z,\varepsilon) = u + \sum m^j(u,z)\ln p^j + \frac{1}{2}\sum\sum a_{jk}\ln p^j \ln p^k + \sum \varepsilon^j \ln p^j \qquad (2)$$

where u is the implicit utility[7], p is the J-vector of prices p=[p_1 , p_J], and z demographic characteristics[8]. By Shepard's Lemma, the Hicksian budget-share functions are:

$$w^j(p,u,z,\varepsilon) = m^j(u,z) + \sum a_{jk}\ln p^k + \varepsilon^j \qquad (3)$$

where $a_{jk} = a_{kj}$ for all j, k. Implicit utility is given by :

$$y = u = \ln x - \sum w_j \ln p^j + \frac{1}{2}\sum\sum a_{jk}\ln p^j \ln p^k \qquad (4)$$

where $\ln x - \sum w_j \ln p^j$ is the log of stone-index deflated nominal per capita expenditures. By substituting $m^j(u,z)$ by $m^j(y,z)$ where :

$$m^j(y,z) = \sum b_r^j y^r + \sum g_t^j z_t \qquad (5)$$

we finally get the implicit Marshallian Demand system :

$$w_j = \sum b_r^j y^r + \sum g_t^j z^t + \sum a_{jk}\ln p^k + \varepsilon^j \qquad (6)$$

The selected consumption categories are meat, fish, fruit and vegetables, dairy products, rice and grains, starches, bakery, beverages and tobacco, other food, education and other non-food goods and services. Since the NIDS does not contain any direct and indirect information to construct the unit prices associated with each consumption category, we will use primary price data collected by Statistics South Africa (StatsSA) (2008) at the provincial and regional levels. Apart from prices, other explanatory variables are gender and age of the household head, population group, household size, education level of the household head, total amount of CSG per household, total per capita household expenditure, and geo-type (rural formal, urban formal, urban informal and tribal authority). The CSG variable was instrumented as discussed above.

After the estimation of coefficients in (6), we simulate the changes in consumption patterns (i.e. changes in the average consumption shares for all the categories) following the reform in the CSG scheme as proposed in the three simulation scenarios. These changes, together with those simulated for the labour force participation, are then plugged into the macro model (*bottom-up*). The new additional 2 million children benefiting from the CSG are estimated as described in Appendix 1.

4.2 The Computable General Equilibrium model and the linking variables to the micro module (top-down):

The Social Accounting Matrix (SAM) used is based on the 2005 Supply and Use (SU) Tables obtained from StatsSA and other national data sets from various sources such as the Reserve

---

[7] This utility is implicitly defined in terms of observables, namely expenditures x, prices p1, ..., pJ and budget-shares in w1, ...wj.

[8] The first element of z is 1.

Bank of South Africa. The original SAM[9] had 85 activities and commodities. For the purpose of this study, we aggregated this SAM into 12 activities and 12 commodities. We wanted to have the best possible match between the micro and macro models. Therefore, the sectors/commodities are as follows: Meat, Fish, Fruit and vegetables, Dairy, Grain milling, Starches, Bakery, Other foods, Beverages and tobacco, Non alimentary products, Education, other products[10].

The SAM has two broad factors (labour and capital); four institutional sector accounts (households, enterprises, government and the rest of world); and two saving and investment accounts (change in inventories and gross fixed capital formation (GFCF)).

For the trade parameters, we use Gibson (2003) for the low-bound export supply.

In terms of modelling, we use the static Poverty and Economic Policy (PEP 1-1) standard model by Decaluwé et al (2009), changing several assumptions to better reflect the South African economy and to better fit with the micro-model. First, we introduced unemployment. Indeed, South Africa faces high unemployment, but unions are very strong. As a result, wages and salaries are relatively rigid downwards. To take this rigidity into account, we assume that wages cannot decline. Thus, if production decreases, producers will not be able to decrease their wages below initial levels, and will therefore have to retrench some workers.

To introduce the changes in households' consumption shares, we assume that the households' utility is a Cobb Douglas function, rather than a LES function as in PEP1-1.

In terms of closure rules, the numeraire is the nominal exchange rate. As South Africa is a small country, world prices are assumed fixed. Labour is mobile across sectors whereas capital is sector specific. Public transfers and government spending are fixed. The rest of the world's savings is fixed meaning that we do not allow South Africa to borrow from the rest of the world.

The CGE will generate new prices and volumes after a change in the social transfer (as described above) and these changes will be transmitted to the micro module (*top-down*) in order to estimate changes in monetary poverty and inequality. In particular, the changes in consumer and producer prices, as well as of intermediate consumption prices and revenues from capital are integrated into the micro module and used to estimate the new real household expenditure per capita incorporating the multiplier effect in the economy that was generated by a change in the social grant. More specifically, we estimated the changes of employment status and its associated revenue, revenues from agriculture and non-agriculture sectors in comparison with the base year, and then obtained the total per capita change of household revenues associated with the two simulation scenarios. Due to the hypothesis that there are no savings, changes in revenues were fully transmitted into the consumption vector and used to estimate the equivalent income.

The change in the employment status is carried out by using a multinomial logit model. For people aged between 15 and 64 years old who were not enrolled in school at the time of the survey, we first identified four possible statuses: wage worker, unemployed, self-employed and not participating in the labour market (i.e. not working or discouraged). After the model was estimated, we predicted the individual probability associated with each of the four categories. The relevant estimated changes produced by the CGE model – namely wage workers and unemployed – are then fed into the micro analysis. More specifically, an "x per cent" increase (decrease) in the rate of wage workers is transmitted to the micro data by changing accordingly the employment status among unemployed or people not participating in the labour market (wage workers) that showed the highest (lowest) probability of being wage workers. Similarly, when an "x per cent" increase in the unemployment rate is simulated, the corresponding absolute increase of people who were not participating in the

[9] Davies R. and J. Thurlow (2011) A 2005 Social Accounting Matrix for South Africa. Washington DC, USA: International Food Policy research Institute.

[10] Note that this last category contains all the durable goods that are not taken into account in the micro model.

labour market and who showed the highest probability of being unemployed were moved to the pool of unemployed. If a decrease in the unemployment rate was simulated, the people who were initially unemployed and that showed the lowest probability of being unemployed were moved out of unemployment. Here it is assumed that the self-employed are not affected by changes in the employment status.

Changes in the employment status are reflected in changes in wage income. People losing their wage jobs, experience a reduction in wage incomes equal to their observed wage; while those finding a wage job, have an increase in wage income equal to their predicted wage (calculated by estimating a Heckman selection model on some individual and household characteristics). For simplicity, it is assume that unemployed people do not benefit from South African unemployment subsidies if they become unemployed. In addition, the wage rate does not decrease as its initial value is initialised at the minimum value, which is imposed in the macro model.

The change in the revenue from self-employment activities ($\Delta\pi_h$) in the agriculture (food and non-food) sector, for household *h* is defined as:

$$\Delta\pi_h = \sum_{k=1}^{K} Y_k \Delta p_{Y,k} - I_k \Delta p_{I,k} \tag{7}$$

where Y_k is the production value of good *k* at the base year, $\Delta p_{Y,k}$ is the change in producer price of good *k* (pre and after simulation), I_k is the value of inputs purchased for the production of good *k* and $\Delta p_{I,k}$ is the change in price of inputs for the production of good *k* (the simulated changes in the price of intermediary goods are used). Note that self-consumption is included in this income component, but its change is calculated by using changes in consumer prices, rather than in producer prices.

Income from self-employment activities ($\Delta\varphi_h$) in the non-agricultural sector, for household *h* is defined as:

$$\Delta\varphi_h = \sum_{j=1}^{J} Y_j \Delta\left(p_j VA_j\right) \tag{8}$$

where Y_j is the production value of good *j* at the base year and $\Delta\left(p_j VA_j\right)$ is the change in the value of the value-added good *j* (pre and after simulation).

Changes in total household revenue (ΔY_h) relative to the base year for each scenario can thus be written as:

$$\Delta Y_h = \sum_{i \in h} \Delta w \Delta E_i + \Delta\pi_h + \Delta\varphi_h \tag{9}$$

where the change in revenues from the wage sector comes from the variation in the wage rate (Δw) as well as in individual employment status (ΔE_i), for all household members aged 15 and older.

Finally, the approach we used to evaluate the effect on households' welfare following the simulated reforms of the CSG scheme is the one introduced by King (1983), referred to as equivalent income. According to this approach, for a given budget ($\mathbf{p_c}$, $x_{c,h}$), the equivalent income, $e_{c,h}$, is defined as the value of income ensuring the same utility level that would have been obtained with the budget ($\mathbf{p^r}$, $e_{c,h}$). We derived $e_{c,h}$ starting from the EASI model as follows (for more details, see in Appendix 2):

$$e_{c,h} = \exp\left(\ln x_{c,h} - \sum_{j=1}^{J} w^j \left(\ln p_c^j - \ln p_r^j \right) + \frac{1}{2} \sum_{j=1}^{J} \sum_{k=1}^{K} a_{j,k} \left(\ln p_c^j \ln p_c^k - \ln p_r^j \ln p_r^k \right) \right) \qquad \textbf{(10)}$$

Where $\ln x_{c,h}$ is the log of per capita expenditure after simulation (i.e. per capita expenditure at base year plus the change in per capita revenue, as estimated before).To measure the poverty effects of the reform in the CSG scheme, the popular Foster-Greer-Thorbecke (1984) (FGT) family of poverty indices is used. The FGT family of indices is defined as:

$$P_\alpha(z) = \frac{1}{\mathbf{N}} \sum_{h=1}^{H} \rho_{c,h} n_{c,h} \left(\frac{z - e_{t,h}(\mathbf{p}_{0,C,k}, \mathbf{p}_{t,c,k}, y_{t,c,h})}{z} \right)_+^\alpha \qquad (11)$$

Where z is the national monthly poverty line at the base year (equal to R502 (see Argent et al., 2009)), $f_+ = \max(0, f)$, **N** is the number of households in the survey, $n_{c,h}$ is the size of the household h, $\rho_{c,h}$ is the sampling weight of h, α is a parameter that captures the "aversion to poverty" or the distribution sensitivity of the poverty index, and $e_{t,h}$ is the per capita equivalent income (as defined in 9) at time t (t corresponds the different scenarios we have – base year, sim1, sim2 and sim3 respectively). Here we report figures for α = 0, 1 and 2, measuring the incidence of poverty (headcount ratio), poverty gap and the severity of poverty respectively.

To measure the inequality effects of the reform in the CSG, we use the well-known Gini index. Starting from the class of single-parameter Gini (see Duclos and Araar, 2006) indices

$$I(\rho) = \int_0^1 \left(p - L(p) \right) \kappa(p; \rho) dp \qquad (12)$$

for $\rho=2$, we get the standard Gini index, with ρ being an ethical parameter, $L(p)$ being the cumulative percentage of total income held by the cumulative proportion p of the population (ranked according to increasing consumption values) and $\kappa(p, \rho)$ being the percentile-dependent weights to aggregate the distances $p-L(p)$.

5 RESULTS AND DISCUSSION

Results of the labour force participation model are shown in Table 6. We present three specifications of the model differing only in the sample on which they are run, as described above. The coefficient associated with the total amount received by the household through the CSG is fairly robust across the three specifications. We always find a positive link between the CSG and the probability of participating in the labour force, although, as expected, the coefficient's value is slightly higher when only people whose youngest children are around the age eligibility threshold are included (model 3). Estimates from specification (1) are finally retained for the simulation analysis.

Table 6: Results of the labour force participation model

	(1)	(2)	(3)
CSG_amount_hh	0.000548**	0.000504*	0.00307*
Age	-0.00205	0.00691***	0.0280***
ln_pcincome	0.0857***	0.104***	0.214***
Hhsize	-0.0521***	-0.0568***	-0.0474
Geo-type: rural formal (comparison modality)			
tribal authority areas	-0.452***	-0.522***	0.192
urban formal	-0.267***	-0.284**	0.469
urban informal	-0.148	-0.186	0.184
Province: Western Cape (comparison modality)			
Eastern Cape	0.217*	0.306**	0.21
Northern Cape	0.0977	0.153*	0.555
Free State	0.296***	0.296**	-0.137
KwaZulu-Natal	0.107	0.0987	0.255
North West	0.330***	0.370***	0.431
Gauteng	0.294***	0.294***	0.173
Mpumalanga	0.329***	0.381***	0.586**
Limpopo	-0.00593	0.0138	-0.109
Education: less than 7th (comparison modality)			
less than 12th	0.147***	0.161***	0.211
12th or more	0.357***	0.312***	0.202
Marital status: married/living with partner (comparison modality)			
widow/divorced	0.0332	0.214**	0.502**
never married	-0.226***	-0.0959**	0.253
_cons	-0.326	-0.636***	-3.251***
total amount of CSG per hh (instrumented variable)			
n_child	106.5***	104.7***	64.93***
Rho	-0.0636	-0.0531	-0.222
N	15911	10944	784

Source: authors' estimation based on NIDS 2008
*Note: *p<0.10,**p<0.05,***p<0.01; amount of CSG instrumented by n_child (the number of age eligible children); model (1) is estimated on the entire sample of working age people 15-64 (not currently enrolled in school), model (2) on people aged 22-50 (not currently enrolled in school), model (3) on people aged 22-50 (not currently enrolled in school) and living with children aged 12-15 (without younger children)*

Table 7 reports the quantity elasticities with respect to own price, expenditure and CSG for each category. They all take the expected sign, revealing an interesting heterogeneity across categories. Fruit and Vegetables, rice, starches and beverages are more responsive to a percent change in their price (more than proportionate reduction), while the own price elasticity for other non-food items is -0.84. Education and other non-food items are found to be superior goods as their demand increase by 1.70 and 1.17% respectively after a percent increase in household expenditure, whereas demand for rice and starches only rise by around 0.60%. Finally, only education and other food categories are found to have a statistically significant CSG elasticity, 1.17 and 1.11 respectively.

Table 7: Quantity elasticities with respect to own price, expenditure and CSG (with t-stat) evaluated at the sample mean

	Own Prices		**Expenditures**		**CSG**	
Category	**Elasticity**	**t-stat**	**Elasticity**	**t-stat**	**Elasticity**	**t-stat**
Meat	**-0.95**	-21.22	**0.78**	43.98	0.86	-1.42
Fish	-1.11	-1.79	**0.73**	16.40	0.91	-0.19
Fruit & Vegetables	**-1.15**	-2.06	**0.89**	38.53	0.96	0.50
Milk	-0.96	-1.37	**0.98**	27.13	0.92	-0.14
Rice	**-1.20**	-3.76	**0.58**	35.43	0.95	0.45
Starches	**-1.09**	-3.96	**0.60**	24.84	0.97	0.74
Bread	**-0.94**	-4.43	**0.74**	29.88	0.84	-1.62
Beverages	**-1.02**	-9.28	**0.82**	43.51	0.93	-0.09
Education	**-0.96**	-16.07	**1.70**	34.45	**1.17**	2.33
Other Food	**-0.98**	-30.35	**0.82**	38.11	**1.11**	3.27
Other non-Food	**-0.84**	-2.58	**1.17**	42.45	0.88	0.79

Source: authors' estimation based on NIDS 2008
Note: Calculation of elasticities is shown in Appendix 3. Standard errors are calculated with the Delta method. Elasticities values in bold are statistically significant at 5 percent.

Both simulations represent three different shocks that are integrated into the macro model. The shocks only differ by their magnitude between the three simulations. Table 8 summarizes the results of the shocks:

Table 8: Results from the micro model used for the macro model

	(Micro) sim1	(Micro) sim2	(Micro) sim3
(Macro) Shock1: change in labour supply (in %, variation)			
	1.429	1.581	3.342
(Macro) Shock2: change in government transfer received by households (in %, variation)			
(Macro) Shock3: Change in consumption shares (absolute difference)			
Meat	-0.00031	-0.00015	-0.00048
Fish	0.00011	0.00005	0.00018
Fruit & Vegetables	-0.00007	-0.00004	-0.00012
Milk	0.00002	0.00001	0.00005
Rice	-0.00057	-0.00027	-0.00094
Starches	-0.00007	-0.00003	-0.00010
Bread	-0.00011	-0.00005	-0.00015
Beverages	0.00014	0.00009	0.00031
Education	0.00169	0.00064	0.00234
Other Food	0.00011	0.00009	0.00023
Other non-Food	-0.00096	-0.00035	-0.00133

Source: authors' estimation based on NIDS 2008

As mentioned earlier, there are three shocks that are applied to the CGE model at the same time. Each one of them will have a different impact on the economy. Ceteris paribus, an increase in the labour force would have an impact on unemployment, as it is not feasible for firms to lower wages below the minimum wage. In the same way, an increase of the transfer households receive from government will increase their income and increase government's deficit[11]. Finally, the changes in households' consumption shares will have impacts on final demand.

Volumes of households' consumption follow the new repartition of the budget shares Table 9. Indeed, education and fish shares are increasing in households' budget. Ceteris paribus, we expect their volume to increase. On the contrary, meat and rice's shares are decreasing, so we expect their corresponding demand from households to decrease.

Table 9: Impact on consumption volumes (in%)

	sim1	sim2	sim3
Meat	-0.91	-0.41	-1.4
Fish	1.09	0.53	1.8
Fruit & Vegetables	-0.54	-0.24	-0.83
Milk	0.19	0.13	0.4
Rice	-1.57	-0.72	-2.59
Starches	-0.65	-0.25	-0.91
Bread	-0.34	-0.13	-0.44
Other food	0.28	0.22	0.57
Beverages	0.23	0.17	0.48
Education	4.95	1.93	6.93
Other non-Food	-0.04	0.04	0.02

Source: Results from CGE model

[11] Indeed, we assume that there is no fiscal policy adjustment to finance the increase of the CSG, and thus this increase, ceteris paribus, will increase government's deficit

These changes in households' consumption patterns will have an impact on the production of these sectors. For the alimentary products such as meat and fish commodities, final demand represents between 75 and 95% of the composition of total demand for commodities. Thus, this change in households' consumption will have a large impact on their production. In contrast, the non-alimentary commodity rely more on intermediate demand from other sectors.

Table 10: Impact on production volumes (in %)

	sim1	sim2	sim3
Meat	-0.92	-0.42	-1.43
Fish	0.75	0.36	1.24
Fruit & Vegetables	-0.28	-0.11	-0.40
Milk	0.19	0.14	0.41
Rice	-1.24	-0.58	-2.08
Starches	-0.69	-0.27	-0.97
Bread	-0.82	-0.35	-1.24
Other food	-0.04	0.03	0.00
Beverages	0.13	0.10	0.28
Education	4.48	1.75	6.27
Other non-Food	-0.01	0.00	-0.01

Source: Results from the CGE model

As seen in Table 10 production increases, notably in the education sector. The labour intensive educational and diary sectors have to hire more workers for them to increase their production. This can be done in two ways; by hiring workers from other sectors whose production is decreasing or from the increase in the labour supply due to the cash transfer. The overall effect on labour is an increase by 0.04% and 0.05% respectively in the first and second scenarios. In the third scenario, where the two policies are combined, labour increases by 0.08%.

This impact on the labour market, together with the increase in the transfer they receive, results in an increase in households' income. Since consumption, direct taxes and savings are a proportion of agents' income, they logically increase in all scenarios.

Government's income increases, due to the increase in direct taxes receipts, as well as on indirect taxes (as consumption increases) and production taxes. However, given the increase in its transfers (i.e. the increase of the CSG), government's savings are decreasing. This drop has an impact on total investment which decreases. This drop in investment will have an impact on non-alimentary and other food commodities, as they are the only ones which are consumed for investment purposes. The impact on price is hardly perceptible as seen in Table 10. The consumer price index increases very slightly respectively by 0.022%, 0.014%, and 0.03% in the three scenarios.

Table 11: Impact on consumer prices (in %)

	sim1	sim2	sim3
Meat	-0.15	-0.06	-0.22
Fish	0.25	0.12	0.42
Fruit & Vegetables	-0.10	-0.05	-0.16
Milk	0.02	0.02	0.06
Rice	-0.30	-0.13	-0.50
Starches	-0.12	-0.04	-0.16
Bread	0.04	0.03	0.09
Other food	-0.02	0.01	0.00
Beverages	0.06	0.05	0.13
Education	1.34	0.53	1.86
Other non-Food	0.00	0.00	0.00

Source: Results from the CGE model

Before going into the poverty and inequality results, it is noteworthy to discuss briefly the budget cost of the different simulations proposed in this study. Simulation 1 would cost the Government 1.11% of GDP (in 2008 terms), while Simulation 2 and Simulation 3 would cost 1.15% and 1.38% respectively. All the scenarios would call for a significant (probably unrealistic in the case of sim3) effort by the Government in terms of budget increase, as in 2008 the CSG programme cost 0.93% of GDP.

Table 12 to Table 18 report the results for poverty gaps and the inequality Gini index, by different groups. Table 12 and Table 13 show that P0 (Poverty Incidence), P1 (Poverty gap) and P2 (Poverty severity) decrease in comparison with the base year for the whole population and for children respectively. The improvement is particularly strong for poverty severity. As expected from the small changes in the relevant variables discussed above, the multiplier effects on the economy (namely changes in prices, incomes and employment) – other than the direct effect brought by the change in the CSG – have practically no further effects on households' welfare. This is consistent with the fact that incomes for households living in poverty come primarily from grants and wages. In particular, for households around the poverty line, grants represent around 30% of total incomes while wages account for around 45% (see Figure 1 in Finn, Leibbrandt and Woolard, 2009). In this model, the wage component does not change as the minimum wage binds, and the labour market results are impacted only through unemployment, without significantly affecting the employment rate. The remaining household income share is mostly represented by remittances and rental incomes, which are both unaffected in the short-run of these models. Other incomes and investments only account for a minimal part.

In addition, for the national population, simulations 1 and 2 do not differ substantially, with poverty incidence under sim2 (+ two million beneficiaries) decreasing from 0.532 (base year) to 0.526 (versus 0.528 under sim1 (+20% of CSG value). This is not the case for P1 and P2, for which the two scenarios do not differ in terms of effectiveness of poverty reduction; P1 and P2 go respectively from 0.261 and 0.156 (base year) to 0.250 and 0.145 (under both sim1 and sim2). The Gini index decreases from 0.687 (base year) to 0.682 (under both sim1 and sim2). Interestingly, when we look at results for children only, the effectiveness of sim1 and sim2 in terms of poverty reduction varies according to the poverty measure. Sim2 is found to be more effective in reducing poverty incidence among children as the new 2 million CSG beneficiaries live in households relatively less poor than current beneficiaries, thus being closer to the poverty line. When this group is targeted, a larger reduction in P0 is thus reached, as this measure is sensitive to the density function of the group around the poverty line. Inversely, targeting children already benefiting from the CSG (sim1) allows a greater reduction in poverty depth and poverty severity, as this group – at the base year – is relatively poorer than non-beneficiary children and, thus, further from the poverty line. As well-know, indeed, P1 and, even more, P2 are particularly sensitive to the distributive function of the poor and the poorer tail in particular.

As expected, under sim3, poverty and inequality decrease substantially. According to our simulations, P0 would decrease by 1.3 percentage points, while P1, P2 and Gini by 2.4, 2.3 and 1.1 respectively. *If the multiplier effects are not taken into account, poverty incidence, poverty gap, poverty severity as well as the Gini index, do not change.*

Poverty and inequality effects primarily depend on the distribution of CSG across the different population groups; the distribution of CSG beneficiaries observed in the base year will affect the results associated with sim1, while the simulated increase in the number of beneficiaries by 2 million will be reflected on the results for sim2. As for sim1, Limpopo, together with Eastern Cape, as expected, show the largest poverty reduction as they are the provinces with the largest share of CSG beneficiaries at the base year (see Table 18). This will be the case also for households living in tribal authorities and for the African population group. Concerning sim2, Northern Cape is the province where the largest increase in the number of additional beneficiaries (in percent and in percentage points) is simulated, as well as for the African population group (see Table 18, au-dessous). Of course, the final results on the incidence of poverty will critically depend on the distribution of CSG (observed and simulated) of those around the poverty line, while changes in Gini inequality index will be affected primarily by the changes occurring for those in the middle of the expenditure distribution.

Results by provinces (as shown in Table 14) reveal a heterogeneous impact linked to the CSG reform. In most cases, the same trends as in the national figures are observed, except for Northern Cape where under sim2, there is a deterioration – although small – in inequality when multiplier effects are included. As expected, African and Coloured households benefit the most from the CSG proposed reforms, while Whites are not affected (see Table 15 in Appendix 4). Interestingly, Indians largely benefit from a 20 percent increase in the value of the CSG in terms of headcount poverty reduction as a large part of households receiving the CSG are around the poverty line (see Figure 2 in Appendix 4). Rural formal, tribal authority and urban informal improve their households' welfare under both simulation scenarios; poverty is not affected for households living in formal urban areas under sim1 but is reduced under sim2 (see Table 16 in Appendix 4). However, in sim2, contrary to what is observed elsewhere, results are less effective than sim1 in reducing P0 as a large part of new beneficiaries under sim2 are too far from the poverty line. Finally, poverty among beneficiary (at the base year) children is so widespread that the proposed policy reforms are not capable of substantially impacting child poverty and welfare in general (see Table 17 in Appendix 4). Under sim2 children living in households who were not CSG beneficiaries at the base year substantially improve their welfare. This is reflected in the change in P0, which moves from 0.300 to 0.279.

The monthly cost of 1 percentage point reduction in poverty gap (P1) amongst children is: for sim1, R204 950 019; for sim2, R234 965 035 and for sim3, R222 991 915. From these results, we can conclude that Sim1 is the most cost effective of the policies.

Table 12: Poverty Incidence, gap and severity and Gini index for base year, sim1, sim2 and sim3, whole population

		Sim 1		Sim2		Sim 3	
	Reference Situation	**with multiplier effect**	without multiplier effect	**with multiplier effect**	without multiplier effect	**with multiplier effect**	without multiplier effect
P0	0.532	**0.528**	0.528	**0.526**	0.526	**0.518**	0.518
P1	0.261	**0.250**	0.250	**0.250**	0.250	**0.237**	0.237
P2	0.156	**0.145**	0.145	**0.145**	0.145	**0.133**	0.133
Gini	0.687	**0.682**	0.682	**0.682**	0.682	**0.676**	0.676

Source: authors' estimation based on NIDS 2008
Note: figures in bold indicates the cases where the difference between the reference situation is statistically different from zero. As for figures not including the multiplier effect, the difference is calculated with respect to the corresponding scenario including the multiplier effect. Statistical tests, as well as P0, P1, P2 and Gini figures, are run with the DASP statistical package (Araar and Duclos, 2007).

Table 13: Poverty Incidence, gap and severity and Gini index for base year, sim1, sim2 and sim3, children

		Sim 1		Sim2		Sim 3	
	Reference Situation	**with multiplier effect**	without multiplier effect	**with multiplier effect**	without multiplier effect	**with multiplier effect**	without multiplier effect
P0	0.655	**0.649**	0.649	**0.647**	0.647	**0.634**	0.634
P1	0.338	**0.321**	0.321	**0.320**	0.320	**0.299**	0.299
P2	0.206	**0.188**	0.188	**0.190**	0.190	**0.170**	0.170
Gini	0.681	**0.672**	0.672	**0.672**	0.672	**0.662**	0.662

Source: authors' estimation based on NIDS 2008
Note: figures in bold indicates the cases where the difference between the reference situation is statistically different from zero. As for figures not including the multiplier effect, the difference is calculated with respect to the corresponding scenario including the multiplier effect. Statistical tests, as well as P0, P1, P2 and Gini figures, are run with the DASP statistical package (Araar and Duclos, 2007).

Table 14: Poverty Incidence and Gini index for base year, sim1, sim2 and sim3 (by province), whole population

	Reference situation		sim1 with multiplier effect		sim1 without multiplier effect		sim2 with multiplier effect		sim2 without multiplier effect		sim3 with multiplier effect		sim3 without multiplier effect	
	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini
Western Cape	0.324	0.634	0.323	0.633	0.323	0.633	0.322	0.633	0.322	0.633	0.320	0.631	0.320	0.631
Eastern Cape	0.731	0.679	0.727	0.669	0.727	0.669	0.724	0.670	0.724	0.670	0.714	0.658	0.714	0.658
Northern Cape	0.428	0.561	0.423	0.557	0.423	0.557	0.420	0.554	0.420	0.555	0.413	0.549	0.413	0.549
Free State	0.517	0.618	0.510	0.612	0.510	0.612	0.516	0.613	0.516	0.613	0.508	0.606	0.508	0.606
KwaZulu Natal	0.700	0.771	0.692	0.765	0.692	0.765	0.697	0.766	0.697	0.766	0.688	0.758	0.688	0.758
North West	0.493	0.638	0.486	0.633	0.486	0.633	0.487	0.633	0.487	0.633	0.481	0.627	0.481	0.627
Gauteng	0.319	0.605	0.318	0.603	0.318	0.603	0.312	0.602	0.312	0.602	0.303	0.599	0.303	0.599
Mpumalanga	0.462	0.651	0.461	0.647	0.461	0.647	0.451	0.647	0.451	0.647	0.448	0.642	0.448	0.642
Limpopo	0.692	0.648	0.688	0.638	0.688	0.638	0.683	0.640	0.683	0.640	0.672	0.628	0.672	0.628

Source: authors' estimation based on NIDS 2008
Note: Here we do not show statistical test for the difference of P0 and Gini figures as we took as the primary sampling unit variable (used to set the complex data survey) corresponds to the province variable. P0 and Gini figures are run with the DASP statistical package (Araar and Duclos, 2007).

6 SUMMARY AND CONCLUSIONS

The paper set out to assess the impact of the CSG on the South African economy. The rationale for this study arose from the fact that although the positive impacts of the CSG on recipients are widely acknowledged very little is known about the economy-wide impacts of the grant.

To quantify the impact of the CSG on the South African economy a bottom up/top-down modelling approach was employed. A micro-simulation model was used in the first instance to estimate consumer prices and income elasticities and the simulation of the effect of a change in CSG on consumption patterns. This was followed by estimation of a model for labour force participation and a simulation of the effect of a change in the CSG on labour force participation. In the second stage the relevant changes were estimated and then transmitted to the macro (CGE) model. The simulated changes in different variables were then inserted into the micro module in order to produce changes in poverty and inequality following the reform in the CSG scheme.

Three simulations were conducted based on two potential policy developments regarding the CSG; an increase in the value of the grant and an increase in the number of grant recipients, in line with current policy discussions around extending coverage to 2 million children who are currently not being covered. Simulation 1 (sim1) simulated an increase in the value of the CSG by 20% for people already benefiting from the transfer. Simulation 2 (sim2) saw an increase in the number of beneficiaries by 2 million and then finally, a third simulation (sim3) combined the two simulations.

The results of the labour force participation model found that there was a positive link between the CSG and the probability of participating in the labour force. With respect to the responses of the 12 products to own and cross price, expenditure and the CSG, the results showed the lack of uniformity across product categories. Fruit and vegetables, rice, starches and beverages are more responsive to a percent change in their price while the own price elasticity for other non-food items is -0.84. The results seem to suggest that increases in the CSG will have a profound impact on education and other non-food items. Not only are these found to be superior goods since their demand increases by 1.70% (education) and 1.17% (non-food) after a percent increase in household expenditure, but they are the only ones with a statistically significant elasticity with respect to the CSG, 1.17% (education) and 1.11% (non-food).

The results from the CGE model are encouraging as they showed that there is an increase in the consumption and production of education and the nutritious fish product. The positive impact on the labour market, together with the increase in the transfers received by households, results in an increase in their income. There is an increase in government's income due to the increase in direct taxes, consumption and production taxes. However, given the increase in its transfers (i.e. the increase of the CSG), government's savings decrease which leads to a decrease in total investment. Given that the 2008 CSG programme cost 0.93% of GDP all three simulations impose a significant cost on government with sim1 costing 1.11% of GDP (in 2008 terms), while sim2 and sim3 would cost 1.15% and 1.38% respectively. This means that from a cost perspective sim1 would be the better of the three policies.

When it comes to poverty measures and inequality, the results show that, other than the direct effects brought by the change in the CSG, the multiplier effects (captured via changes in prices and volumes) have no further impacts on household welfare. This is consistent with the fact that incomes for households living in poverty come prevalently from grants and wages; in the model the latter component does not change as the minimum wage binds, and the labour market reacts to shocks uniquely through unemployment. Relative to the base year there is a strong improvement in the poverty incidence, gap, severity and Gini index for the whole population and for children. Although poverty incidence differs slightly under sim1 and sim2 for the national population in the two scenarios, reduction in poverty gap and severity as well as in inequality is the same under both simulations. Finally, as expected, under sim3, poverty and inequality decrease substantially.

Poverty and inequality effects were primarily influenced by the distribution of CSG across the different population groups; the distribution of CSG beneficiaries observed in the base year affected the results associated with sim1, while the simulated increase in the number of beneficiaries by 2 million was reflected on the results for sim2. The results showed that, as expected, for sim1, Limpopo, together with Eastern Cape, show the largest poverty reduction as they are the provinces with the largest share of CSG beneficiaries at the base year.

At a regional level, the results showed heterogeneous impacts linked to the CSG reform with the same trends as in the national figures being observed, except for Northern Cape where, under sim2, there is a deterioration, although small, in inequality when multiplier effects are included.

The results also showed that in terms of race, African and Coloured households benefit the most from the CSG proposed reforms, while Whites were not affected. Indians largely benefited from the 20 percent increase in the value of the CSG in terms of headcount poverty reduction as a large part of households receiving the CSG are around the poverty line.

Based on geographical zones the results showed that rural formal, tribal authority and urban informal improve their households' welfare under both simulation scenarios; poverty is not affected for households living in formal urban areas under sim1 but is reduced under sim2. However, in sim2, contrary to what is observed elsewhere, results were less effective than sim1 in reducing poverty incidence as a large part of new beneficiaries under sim2 are too far from the poverty line.

Finally, poverty among beneficiary (at the base year) children is so widespread that the proposed policy reforms are not capable of substantially impacting child poverty and welfare in general. Under sim2 children living in households who were not CSG beneficiaries at the base year substantially improve their welfare. This is reflected in the change in poverty incidence, which moved from 0.545 to 0.532. The cost of 1 percentage point reduction in poverty gap amongst children is: for sim1, R204 950 019; for sim2, R234 965 035 and for sim3, R222 991 915. From these results, we can conclude that Sim1 is the most cost effective of the policies.

7 References

Agüero, J.M., Carter, M.R. and Woolard, I., (2007). The impact of unconditional cash transfers on nutrition: the South African child support grant. *IPC Working Paper No 39*. Brasilia: International Poverty Centre.

Armstrong, P., Lekezwa, B. and Siebrits, F.K. 2008. Poverty in South Africa: A Profile Based on recent Household Surveys. Stellenbosch Economic Working Papers No 04/08. Stellenbosch: University of Stellenbosch (Department of Economics & Bureau for Economic Research).

Armstrong, P. and Burger, C. 2009. Poverty, Inequality and the Role of Social Grants: An Analysis Using Decomposition Techniques. Stellenbosch Economic Working Papers No 15/09. Stellenbosch: University of Stellenbosch (Department of Economics & Bureau for Economic Research).

Araar, A and Duclos J.Y., 2007. "DASP: Distributive Analysis Stata Package", PEP, World Bank, UNDP and Université Laval.

Ardington, C., Case A., and Hosegood V., 2009."Labor Supply Responses to Large Social Transfers: Longitudinal Evidence from South Africa." American Economic Journal: Applied Economics, 1(1): 22–48.

Argent, J., Finn A., Leibbrandt M., and Woolard I., 2009. "Poverty: Analysis of the NIDS Wave 1 Dataset", National Income Dynamics Study, NiDS Discussion Paper No.12

Arnold C., Conway T. and Greenslade M., 2011. Cash Transfers Literature Review, Policy Division, Department for International Development (DFID), UK

Barrientos, A. 2003. What is the Impact of Non-Contributory Pensions on Poverty? Estimates from Brazil and South Africa. Manchester: University of Manchester (Institute for Development Policy and Management).

Bertrand, M., Mullainathan S., and. Miller D., 2003. "Public Policy and Extended Families: Evidence from Pensions in South Africa." World Bank Economic Review, 17(1): 27–50.

Budlender, D. and Woolard, I. 2006. The Impact of the South African Child Support and Old Age Grants on Children's Schooling and Work. *TECL Paper No. 43*. Geneva: International Labour Office.

Case, A. and Deaton, A. 1998. Large cash transfers to the elderly in South Africa. Economic Journal, 108: 1330–63.

Case, A., Hosegood, V., and Lund, F., 2005. The reach and impact of Child Support Grants: evidence from KwaZulu-Natal, Development Southern Africa Vol. 22, No. 4, CASE., 2000. Phasing in the child support grant, A social impact study prepared for the Department of Welfare by the Community Agency for Social Enquiry (CASE) (July 2000)

Chitiga, M., Decaluwé B., Mabugu R., Maisonnave, H., V. Robichaud, Sheppard, D., Von Fitel, D. and Van der Berg S., 2010. "The impact of the international crisis on child poverty in South Africa", Stellenbosch Economic Working Papers:13/10, available at www.ideas.repec.org/p/sza/wpaper/wpapers112.htlm

Community Agency for Social Enquiry (CASE) 2008. Review of the Child Support Grant: Uses, Implementation and Obstacles. Report compiled for the Department of Social Development, the South African Social Security Agency (SASSA) and the United Nations Children's Fund (UNICEF). Johannesburg.

Davies R. and Thurlow, J., 2011. A 2005 Social Accounting Matrix for South Africa. Washington DC, USA: International Food Policy research Institute.

Davies, S., and Davey, J., 2007. A regional multiplier approach to estimating the impact of cash transfers on the market: The Case of Cash Transfers in Rural Malawi, MPRA Paper No. 3724, http://mpra.ub.uni-muenchen.de/3724/

Decaluwé, B, Lemelin, A, Maisonnave, H. and Robichaud, V., 2009. The PEP Standard Computable General Equilibrium Model Single-Country, Static Version PEP-1-1, Poverty and Economic Policy Network, available on line at http://www.pep-net.org/uploads/media/PEP-1-1_v1_1.pdf.

Department of Social Development (DSD), South African Social Security Agency (SASSA) and the United Nations Children's Fund South Africa (UNICEF)., 2012. The South African Child Support Grant Impact Assessment: Evidence from a survey of children, adolescents and their households. Pretoria, South Africa

Devereux, S., 2002. "Can social safety nets reduce chronic poverty?" Development Policy Review 20(5): 657-675.

Duclos, J.-Y. and A. Araar .2006. Poverty and Equity Measurement, Policy, and Estimation with DAD, Berlin and Ottawa: Springer and IDRC.

Duflo, E., 2003. Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa, World Bank Economic Review, June, 17 (1), 1:25.

Eyal, K. and Woolard, I., 2011. Throwing the Book at the CSG, South African Labour and Development Research Unit, Working Paper series 53.

Finn A., Leibbrandt M., and Woolard I., 2009. "Income and Expenditure Inequality: Analysis of the NIDS Wave 1 Dataset", National Income Dynamics Study, NiDS Discussion Paper No.5

Fiszbein, A. and Schady, N., (2009), Conditional cash transfers: reducing present and future poverty. World Bank, Washington DC.

Foster, J., Greer,J., and Thorbecke E., 1984. A Class of Decomposable Poverty Measures., Econometrica, 52, 761-766

Gibson, K.L., 2003. Armington Elasticities for South Africa: Long- and Short-Run Industry Level Estimates, Trade and Industrial Policy Strategies, Working Paper 12-2003

Government Communication and Information System, 1996) Constitution of the Republic of South Africa, Government of South Africa, http://www.info.gov.za/documents/constitution/1996/index.htm, Accessed: 04/12/2012

Grosh M., del Ninno C., Tesliuc E., and Ouerghi A. (2008) The Design and Implementation of Effective Safety Nets For Protection and Promotion, The World Bank, Washington DC

Jacobs, P., 2010. Household food insecurity, rapid food price inflation and the economic downturn in South Africa. Agenda, Volume 24, Issue No. 86, p. 38 – 51

Johannsmeier, C. 2007. The Social and Economic Effects of the Disability Grant for People with Disabilities and their Households – A Qualitative Study in KwaZulu Natal Province. Research Report No. 74. Durban: University of KwaZulu-Natal (School of Development Studies).

Keller, S. 2004. Household Formation, Poverty and Unemployment – The case of Rural Households in South Africa. South African Journal of Economics, 72(3): 437-483.

King, M.A., 1983. "Welfare analysis of tax reforms using household data" Journal of Public Economics, 21, 183–214.

Klasen, S. and Woolard, I. 2008. Surviving Unemployment Without State Support: Unemployment and Household Formation in South Africa. Journal of African Economies, 18(1): 1-51.

Laryea-Adjei, G., Devereux, S. and Motepe, M., 2011. Impact evaluation of South Africa's Child Support Gant on Child Protection: A Qualitative Review

Leibbrandt, M., Woolard, I., Finn, A. and Argent, J. 2010. Trends in South African Income Distribution and Poverty since the fall of Apartheid. OECD Social, Employment and Migration Working Papers No 101. Paris: Organisation for Economic Co-operation and Development.

Lewbel, A. and Pendakur, K., 2009. "Tricks with Hicks: The EASI Demand System", The American Economic Review 99(3. 827-863

Lund, F.J., 2006. Gender and social security in South Africa. In V. Padayachee (Ed.): *The Development Decade? South Africa, 1994-2004*. Cape Town: HSRC Press: 160-179.

Martinez, S., 2005. "Pensions, Poverty and Household Investments in Bolivia." Unpublished Draft. Berkeley, CA: University of California at Berkeley, Department of Economics.

McEwan, H. and Woolard, I., 2010. The Changing Dynamics of Child Grants in South Africa in the Context of High Adult Mortality, Presentation made to Overcoming Inequality and Structural Poverty in South Africa: Towards inclusive growth and development, September 2010

National Treasury 2004. Retirement fund reform: a discussion paper. Pretoria: National Treasury.

National Treasury., 2009. Budget review. Pretoria: Department of Finance.

National Treasury., 2011. Budget review. Pretoria: Department of Finance.

National Treasury., 2012. Budget review. Pretoria: Department of Finance.

Ngandu S., Altman M., Cross C., Jacobs P., Hart P., and Matshe I., (2010) The Socio-Economic Impact of the Global Economic Crisis on South Africa: Responses and Policy Implications, A research report prepared for Oxfam South Africa

Noble, M., Ntshongwana, P. and Surender, R. 2008. Attitudes to Work and Social Security in South Africa. Pretoria: Human Sciences Research Council.

Patel, L., Hochfeld, T., Moodley, J., and Mutwali, R., 2012. The Gender Dynamics and Impact of the Child Support Grant in Doornkop, Soweto CSDA Research Report. Johannesburg: Centre for Social Development in Africa, University of Johannesburg, CSDA Research Report. Johannesburg

Pendakur, K., 2008. "EASI made Easier". www.sfu.ca/pendakur/EASI made Easier.pdf

Posel, D, Fairburn J.A., and Lund F., 2006. "Labour Migration and Households: A Reconsideration of the Effects of the Social Pension on Labour Supply in South Africa." Economic Modelling, 23(5): 836–53.

Rawlings, L., 2005. "A new approach to social assistance: Latin America's experience with conditional cash transfer programmes". International Social Security Review 58(2/3): 133-161.

Sadoulet, E., De Janvry A., and Davis B., 2001. Cash Transfer Programs with Income Multipliers PROCAMPO in Mexico, World Development, Vol. 29, No. 6, pp. 1043-1056

Samson, M., Lee, U. , Ndlebe, A., MacQuene, K., van Niekerk, I., Gandhi, V., Harigaya, T. and Abrahams, C. 2004. The Social and Economic Impact of South Africa's Social Security System. Report Commissioned by the Economics and Finance Directorate of the Department of Social Development. Cape Town: Economic Policy Research Institute (EPRI).

Seeking, J., 2007. Deserving individuals and groups: Justifying the shape of South Africa's Welfare State; Centre for Social Science Research (CSSR), Social Surveys Unit, Working Paper 193, May 2007

Seyisi K., and Proudlock P., 2009. When the grant stops, the hope stops. The impact of the lapsing of the Child Support Grant at age 15: Testimonies from caregivers of children aged 15 to 18. Report for Parliament. Children's Institute (University of Cape Town), Black Sash and the Alliance for Children's Entitlement to Social Security (ACESS)

Sienaert, A. 2008. The Labour Supply Effects of the South African State Old Age Pension: Theory, Evidence and Implications. Southern Africa Labour and Development Research Unit (SALDRU) Working Paper No 20. Cape Town: University of Cape Town.

Southern Africa Labour and Development Research Unit (SALDRU). National Income Dynamics Study (NIDS)., 2008. Wave 1 and 2 [dataset]. Cape Town: Southern Africa Labour and Development Research Unit [producer], 2012

South African Social Security Agency (SASSA),. 2011. Third Quarter Indicator Report October to December 2011

South African Social Security Agency (SASSA)., (2010). Fact Sheet Issue No 1: A statistical summary of social grants transfers in South Africa (June)

Statistics South Africa., 2008. Consumer price index, (Various publications), available at http://www.statssa.gov.za/cpi/index.asp

Van der Berg, S., Louw, M. and Yu, D., 2008. Post-Transition Poverty Trends Based on an Alternative Data Source. South African Journal of Economics, 76(1): 58-76.

Van der Berg, S., Louw, M. and du Toit, L., 2010. Poverty Trends Since the Transition: What We Know. Stellenbosch Economic Working Papers No 09/09. Stellenbosch: University of Stellenbosch (Department of Economics & Bureau for Economic Research).

Van der Berg, S., and Siebrits, F.K., 2010. Social assistance reform during a period of fiscal distress. Paper prepared for the Financial and Fiscal Commission. Midrand: South Africa.

Williams, M.J., 2007. The social and economic impacts of South Africa's child support grant. *EPRI Working Paper No. 39*. Cape Town: Economic Policy Research Institute.

Woolard, I. 2003. Impact of Government Programmes Using Administrative Data Sets: Social Assistance Grants. Project 6.2 of the Ten Year Review Research Programme. Online: http://www.sarpn.org.za.

Wooldridge, J., 2010. Econometric Analysis of Cross Section and Panel Data, MIT Press

Yamauchi, F., 2005. Early childhood nutrition, schooling and within-sibling inequality in a dynamic context: Evidence from South Africa. *FCND Discussion Paper No. 203*. Washington, D.C.: International Food Policy Research Institute (Food Consumption and Nutrition Division).

TECHNICAL APPENDIX

A. SELECTION OF THE NEW 2 MILLION CSG BENEFICIARIES

We first estimated among age eligible children the probability of receiving the CSG through a probit model.

$$probit(\pi_i) = \alpha + \beta_v X_i + \varepsilon_i \qquad \text{Eq. (A.1)}$$

with

$$\pi_i = E\left(Y_i \middle| X_i\right) \qquad \text{Eq. (A.2)}$$

Where Y_i is a binary variable taking value 1 if the child receives the grant, 0 otherwise. Vector X_i identifies a group of *V* individual and household characteristics affecting the effective reception of the grant, namely child's age (and its square value), his/her gender, the education level of his/her household head, the log of the per capita income, his/her household size, the geo-type, the province, whether he/she has a birth certificate, his/her ethnicity, whether his/her mother is alive and whether she lives with the child.

The estimated coefficients are then used to predict the probabilities of receiving the CSG. The new two million beneficiaries are finally chosen among age eligible children, not receiving the grant at the base year, and showing the highest probability to receive it. Only children up to 13 years old (included) have been retained for this simulation. Although the current age eligibility is up to 14 included, once reached the age of 14 years old, a child is very unlikely to become a new beneficiary.

B. CALCULATION OF THE EQUIVALENT INCOME

The equivalent income $e_{c,h}$ is the level of income, at the reference price p_r, ensuring the same utility level than that obtained with the income level $x_{c,h}$ and the price system p_c:

$$v\left(p_c, x_{c,h}\right) = v\left(p_r, e_{c,h}\right) \qquad \text{Eq. (B.1)}$$

where *v (.)* is the indirect utility function and p_r is the reference price system. By reversing the indirect utility function, we obtain the equivalent income in terms of expenditure function:

$$e_{c,h} = e\left(p_r, p_c, x_{c,h}\right) \qquad \text{Eq. (B.2)}$$

where $e_{c,h}$ is the equivalent income of household *h* living in stratum *c*, facing the p_c system prices, and enjoying a level of nominal income per capita (or per adult equivalent) $x_{c,h}$. The function $e_{c,h} = e\left(p_r, p_c, x_{c,h}\right)$ is increasing with respect to p_r and $x_{c,h}$, decreasing with respect to p_c, concave and homogeneous of degree one with respect to the reference price, and is continuous with first and second derivatives for all arguments (King, 1983).

Consider the cost function of the EASI class:

$$\ln C(p,u,z) = u + \sum m^j(u,z)\ln p^j + \frac{1}{2}\sum\sum a_{jk}\ln p^j \ln p^k \qquad \text{Eq. (B.3)}$$

where u is the implicit utility[12], p is the J-vector of prices p=[p_1 , p_J], and z demographic characteristics[13]. By Shepard's Lemma, the Hicksian budget-share functions are:

$$w^j(p,u,z) = m^j(u,z) + \sum a_{jk}\ln p^k \qquad \text{Eq. (B.4)}$$

where $a_{jk} = a_{kj}$ for all j, k. Implicit utility is given by :

$$y = u = \ln x - \sum w_j \ln p^j + \frac{1}{2}\sum\sum a_{jk}\ln p^j \ln p^k \qquad \text{Eq. (B.5)}$$

Where $\ln x - \sum w_j \ln p^j$ is the log of stone-index deflated nominal expenditures. From B.4, we have :

$$m^j(u,z) = w^j(p,u,z) - \sum a_{jk}\ln p^k \qquad \text{Eq. (B.6)}$$

By substituting B.6 in B.3, we have:

$$\ln C(p,u,z) = u + \sum\left(w^j(p,u,z) - \sum a_{jk}\ln p^k\right)\ln p^j + \frac{1}{2}\sum\sum a_{jk}\ln p^j \ln p^k \qquad \text{Eq. (B.7)}$$

With total per capital nominal expenditures $x_{c,h}$ and prices p_c we enjoy a level of utility u_0:

$$u_{c,h} = \ln x_{c,h} - \sum w^j \ln p_c^j + \frac{1}{2}\sum\sum a_{jk}\ln p_c^j \ln p_c^k \qquad \text{Eq. (B.8)}$$

We finally get the equivalent income $e_{c,h}$ by solving :

$$\ln C(p_r,u,z) = \ln e_{c,h} = u_{c,h} + \sum\left(w^j(p_r,u,z) - \sum a_{jk}\ln p_r^k\right)\ln p_r^j + \frac{1}{2}\sum\sum a_{jk}\ln p_r^j \ln p_r^k \qquad \text{Eq. (B.9)}$$

from where:

$$e_{c,h} = \exp\left(\ln x_{c,h} - \sum_{j=1}^{J} w^j\left(\ln p_c^j - \ln p_r^j\right) + \frac{1}{2}\sum_{j=1}^{J}\sum_{k=1}^{K} a_{j,k}\left(\ln p_c^j \ln p_c^k - \ln p_r^j \ln p_r^k\right)\right) \qquad \text{Eq. (B.10)}$$

C. CALCULATION OF ELASTICITIES

C.1. Calculation of price elasticities in the EASI system

Consider the EASI implicit marshallian demand system:

$$w^j = \sum b_r^j y^r + \sum g_t^j z_t + \sum a_{jk}\ln p^k \qquad \text{Eq. (C.1.1)}$$

where :

[12] This utility is implicitly defined in terms of observable variables, namely expenditures x, prices p_1, ..., p_J and budget-shares in w_1, ...w_j.

[13] The first element of z is 1.

$$y = \ln x - \sum w^j \ln p^j + \frac{1}{2}\sum\sum a_{jk} \ln p^j \ln p^k$$ Eq. (C.1.2)

and

$$w^j = \frac{p_j q_j}{x}$$ Eq. (C.1.3)

we have :

- p_j = nominal price of good j,
- q_j = amount of good j,
- x= total expenditure.

So, we have:

$$\frac{\partial Q_j}{\partial p_i} = \frac{\partial \frac{x w_j}{p_j}}{\partial p_i} + \frac{x}{p_j}\frac{\partial w_j}{\partial p_j}$$ Eq. (C.1.4)

Moreover:

$$\frac{\partial w_j}{\partial p_i} = \left(-\frac{w_j}{p_i} + \frac{\sum a_{jk} \ln p_k}{p_i} \right) \sum r b_r^j y^{r-1} + \frac{a_{ji}}{p_i}$$ Eq. (C.1.5)

This allows us to write:

$$\frac{\partial Q_j}{\partial p_i} = \frac{Q_j}{p_i}\left(\frac{\partial \left(\frac{x w_j}{p_j} \right)}{\partial p_i} + \frac{\partial w_j}{\partial p_i}\frac{p_i}{w_j} \right)$$ Eq. (C.1.6)

Hence, the elasticity of good j with respect to income e_j^i is:

$$e_j^i = -1 * (i = j) + \left(\frac{\sum a_{jk} \ln p_k}{w_j} - \frac{w_i}{w_j} \right) \sum r b_r^j y^{r-1} + \frac{a_{ji}}{w_j}$$ Eq. (C.1.7)

C.2. Calculation of income elasticities in the EASI system

If we consider C.1.1, C.1.2 and C.1.3 we have:

$$\frac{\partial Q_j}{\partial x} = \frac{1}{p_j} w_j + \frac{x}{p_j}\frac{\partial w_j}{\partial x}$$ Eq. (C.2.1)

Moreover:

$$\frac{\partial w_j}{\partial x} = \frac{\sum r b_r^j y^{r-1}}{x}$$ Eq. (C.2.2)

It follows that:

$$\frac{\partial Q_j}{\partial x} = \frac{1}{p_j} w_j + \frac{x}{p_j}\frac{\sum r b_r^j y^{r-1}}{x}$$ Eq. (C.2.3)

Hence, the elasticity of good j with respect to income e_j^x is:

$$e_j^x = 1 + \frac{\sum r b_r^j y^{r-1}}{w_j}$$ Eq. (C.2.4)

D. ADDITIONAL TABLES

Table 15: Poverty Incidence and Gini index for base year, sim1 and sim2 (by main ethnicity), population

	Reference situation		sim1 with multiplier effect		sim1 without multiplier effect		sim2 with multiplier effect		sim2 without multiplier effect		sim3 with multiplier effect		sim3 without multiplier effect	
	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini
African	0.625	0.597	**0.621**	**0.588**	0.621	0.588	**0.618**	**0.589**	0.618	0.589	**0.610**	**0.579**	0.610	**0.579**
Coloured	0.315	0.566	**0.314**	**0.564**	0.314	0.564	**0.309**	**0.563**	0.309	0.563	**0.306**	**0.560**	0.306	0.560
Asian/Indian	0.173	0.526	**0.135**	**0.525**	0.135	**0.525**	0.173	0.526	0.173	**0.526**	**0.135**	**0.525**	0.135	0.525
White	0.029	0.456	0.029	0.456	0.029	0.456	0.029	0.456	0.029	0.456	0.029	**0.456**	0.029	0.456

Source: authors' estimation based on NIDS 2008
Note: figures in bold indicates the cases where the difference with the reference situation is statistically different from zero. As for figures not including the multiplier effect, the difference is calculated with respect to the corresponding scenario including the multiplier effect. Statistical tests, as well as P0 and Gini figures, are run with the DASP statistical package (Araar and Duclos, 2007).

Table 16: Poverty Incidence and Gini index for base year, sim1, sim2 and sim3 (by geo-type zone), population

	Reference situation		sim1 with multiplier effect		sim1 without multiplier effect		sim2 with multiplier effect		sim2 without multiplier effect		sim3 with multiplier effect		sim3 wihout multiplier effect	
	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini
Rural formal	0.601	0.593	0.584	**0.587**	0.584	0.587	**0.592**	**0.586**	0.592	0.586	**0.574**	**0.578**	0.574	0.578
Tribal Authority	0.815	0.499	**0.809**	**0.484**	0.809	0.484	**0.808**	**0.488**	0.808	0.488	**0.797**	**0.471**	0.797	**0.471**
Urban formal	0.305	0.635	0.304	**0.633**	0.304	0.633	**0.301**	**0.633**	0.301	0.633	**0.300**	**0.631**	0.300	0.631
Urban informal	0.626	0.488	0.619	**0.479**	0.619	0.479	**0.616**	**0.479**	0.616	**0.479**	**0.598**	**0.469**	0.598	**0.469**

Source: authors' estimation based on NIDS 2008
Note: figures in bold indicates the cases where the difference with the reference situation is statistically different from zero. As for figures not including the multiplier effect, the difference is calculated with respect to the corresponding scenario including the multiplier effect. Statistical tests, as well as P0 and Gini figures, are run with the DASP statistical package (Araar and Duclos, 2007).

Table 17: Poverty Incidence and Gini index for base year, sim1, sim2 and sim3 (by recipient households), children

	Reference situation		sim1 w/ multiplier effect		sim1 w/o multiplier effect		sim2 w/ multiplier effect		sim2 w/o multiplier effect		sim3 w/ multiplier effect		sim3 w/o multiplier effect	
	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini	P0	Gini
Non-CSG Recipient	0.300	0.622	**0.300**	**0.622**	0.300	0.622	**0.279**	**0.614**	0.279	0.614	**0.274**	**0.612**	0.275	0.612
CSG Recipient	0.816	0.445	**0.807**	**0.428**	0.807	0.428	**0.814**	**0.435**	0.814	0.435	**0.798**	**0.416**	0.797	**0.416**
Total	0.655	0.681	**0.649**	**0.672**	0.649	0.672	**0.647**	**0.672**	0.647	0.672	**0.634**	**0.662**	0.634	0.662

Source: authors' estimation based on NIDS 2008
Note: figures in bold indicates the cases where the difference with the reference situation is statistically different from zero. As for figures not including the multiplier effect, the difference is calculated with respect to the corresponding scenario including the multiplier effect. Statistical tests, as well as P0 and Gini figures, are run with the DASP statistical package (Araar and Duclos, 2007).

Table 18: Distribution of CSG (observed at the base year and simulated according to sim2)

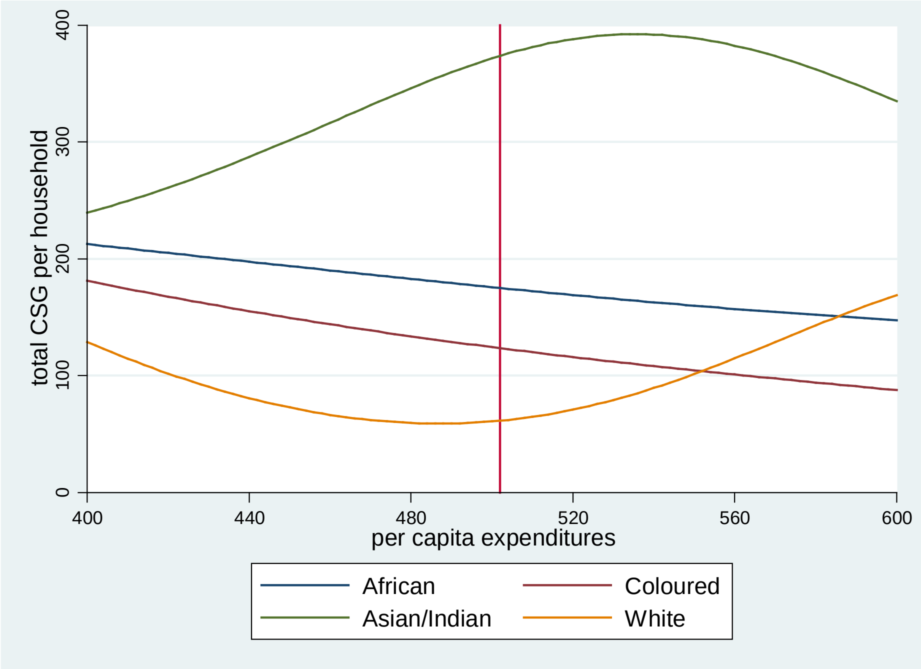
	base year	sim2
Province		
Western Cape	0.267	0.345
Eastern Cape	0.627	0.777
Northern Cape	0.512	0.688
Free State	0.521	0.667
KwaZulu-Natal	0.572	0.697
North West	0.562	0.719
Gauteng	0.433	0.569
Mpumalanga	0.521	0.633
Limpopo	0.646	0.796
geo-type zone		
Rural Formal	0.572	0.721
Tribal Authority	0.665	0.813
Urban Formal	0.362	0.468
Urban Informal	0.636	0.805
population group		
African	0.638	0.800
Coloured	0.319	0.394
Asian/Indian	0.160	0.160
White	0.026	0.026
National	0.532	0.666

Source: authors' estimation based on NIDS 2008

Figure 19 about here

Figure 1: Non-parametric distribution of total CSG (in Rand) per household (by population groups)

Description: Household distribution of the Child Support Grant



Source: authors' estimation based on NIDS 2008
Note: the figure was constructed with the DASP statistical package (Araar and Duclos, 2007).