ASSESSING THE GENERAL EQUILIBRIUM EFFECT OF SOCIAL GRANTS IN SOUTH AFRICA

By

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EXECUTIVE SUMMARY

South Africa has one of the largest cash transfer systems in Africa, which benefited about 16 million people in 2012/13. Social grants have significantly expanded since 1998 - with 2.5 million beneficiaries - and are considered important instruments with which to fight poverty in South Africa. Previous studies on the impact of social grants in South Africa made a strong assumption of the absence of a general equilibrium effect. Social grants investment growth increased by more than 9 per cent in 2012, reaching a total amount of R158 billion over the same period. Because of their huge budget and their contribution to the lives of the poor, the main contribution of this study is to attempt to quantify the overall direct and indirect effect of the major social grants. This paper is one in a series of papers attempting to quantify the impact of these grants. The novelty in these studies is in the methodology used to quantify the impact. The papers use an estimation system with a micro and a macro analysis working together. A recursive micro-macro modelling is developed to quantify the impact of the social grant on the South African economy. The framework is used to simulate a hypothetical South African economy without social grantees. The aggregate changes in labour supply and employment status, and total consumption expenditure and consumption by products are simulated at the macro level along with alternative government revenue adjustment (Macro-Modelling). Then the induced prices, unemployment, income and output affect households' consumption patterns. At this stage, a sample re-weighting technique (nonparametric) is used to assess the second order effects of the social grant shock (Micro-Modelling). The current paper contributes to the literature on the effects of a combination of grants on households and the economy in a general equilibrium framework. The paper thus has two distinct contributions. First, the framework used to analyse the effects of grants is both state of the art and comprehensive in considering both macro and micro effects. Second, the paper considers several grants at the same time to get an overall picture of their effect. These two contributions are the first such attempt in South African literature and, to our knowledge, on the African continent. The results show direct differences between the beneficiaries and non-beneficiaries of the programme in terms of their observed outcomes. Beneficiaries of the programme increased their supply of labour for

agricultural activities and reduced labour supply in the non-agricultural sector. Beneficiaries of the social grant spend less on most of the consumption items, in particular health services and agriculture and food products relative to if they were not a beneficiary.

Looking at the general equilibrium results, we found a positive contribution of the grant programme to the economic performance in South Africa, as measured by the level of GDP. The absence of the programme in a counterfactual setting leads to a 0.9% decline in GDP. Inequality measures are also shown to decline as a result of the programme. However, poverty indexes remain higher under the social grant programme compared to the counterfactual scenario, i.e. absence of the programme.

We found a decline in households' saving which was attributed to a reduction in their purchasing power. Indeed, household consumption prices increase in the counterfactual scenario triggered by increasing demands for health service and agriculture and food products. Thus, our analysis shows a contribution of the social grant programme in lowering the cost of health service as well as agriculture and food products. The social grant beneficiary households are more involved in subsistence agriculture and, therefore, purchase less food. They also spend less on health services compared to their matched non-beneficiaries. Consequently, households' extra income is spent on other consumption products or on investment products. While fiscal prudence and consolidation are pursued in the medium term, the analysis shows that social security spending fosters economic growth and reduces inequality in South Africa.

1. INTRODUCTION

South Africa has one of the largest cash transfer systems in Africa, which benefited about 16 million people in 2012/13 according to the National Treasury (2013), i.e. 31 per cent of the population. More than half of the households benefit from some form of social assistance with 22 per cent relying on it as a main source of income. Social grants have significantly expanded from 2.5 million beneficiaries in 1998, and are considered an important instrument in fighting poverty in South Africa.

Previous studies on the impact of social grants in South Africa made a strong assumption of the absence of a general equilibrium effect. The question still remains of the value/benefit to the society at large, especially with the R158 billion invested in the programme in 2012 (representing 9% of the budget in 2012). As a result, it remains uncertain whether the government is making the best use of its money according to a well-defined set of goals. Assessing the effectiveness of the South African social grants system is especially important given the various assistance programmes and subsidies offered by the government in an economic situation where funding is becoming scarce and there is need to efficiently direct these scarce resources to alleviate poverty and aid economic growth.

The grant system is an important component of South African's overall social security architecture. The social protection system as defined within the fiscal framework has two separate but interrelated entities, one that deals with social assistance and another with social insurance. Social assistance is represented by the grants system, through which the state provides basic minimum protection to relieve poverty. On the other hand, social insurance refers to mandatory employee contribution schemes. Government is responsible for three primary social insurance mechanisms: the Unemployment Insurance Fund, the Compensation Fund and the Road Accident Fund (National Treasury, 2010).

The particular area of interest for the purposes of this study is the Comprehensive Social Security Programme, which incorporates the two entities with both social assistance and social insurance components. The specific purpose of this programme is to alleviate and reduce poverty, vulnerability, social exclusion and inequality through a comprehensive social protection system. The system prevents vulnerability and destitution as a result of loss of income through offering social assistance. The social insurance component also contributes to poverty alleviation and helps mitigate the impact of vulnerability. The Comprehensive Social Security Programme strategically facilitates effective and efficient implementation of social policies and procedures and ensures compliance through regular appraisals and reviews of implementation options. This is often achieved through the payment of cash transfers in line with the Social Assistance Act. Social assistance is provided in the form of social grants (for adults who are 18 years and older), children's grants (for those younger than 18 years) and a special award or the social relief of distress grant. Social grants for adults are: old age grant, disability grant, war veterans' grant and

grant-in aid. Social grants targeted to benefit children are: care-dependency grant, foster child grant and child support grant.

A state of the South African economy without beneficiaries of the social grant system is built to serve as a counterfactual simulation scenario. The latter provides useful insights on the biases introduced by the social grant into the South African economy and enables us to assess its overall impact. Results drawn from the counterfactual scenario are compared to those from the reference scenario, i.e. the actual performance of the economy with the social grant scheme. The main hypothesis of the study is that social grants have significant and important indirect effects through labour market participation and households' total consumption patterns, consumption budget shares and saving-investment behaviour.

A recursive micro-macro modelling is developed to quantify the impact of social grants on the South African economy. The framework is used to simulate a hypothetical South African economy without child support grantees. As sampling weights are readjusted across the survey, it is likely that the aggregate labour supply and consumption outcomes will change (Counterfactual Scenario Building). Therefore, the aggregate changes in labour supply and employment status, and total consumption expenditure and consumption by products are simulated at the macro level along with alternative government revenue adjustment (Macro-Modelling). Then, the induced prices, unemployment, income and output affect households' consumption patterns. At this stage, a sample re-weighting technique (nonparametric) is used to assess the second order effects of the social grant shock (Micro-Modelling).[1]

The review of studies on South Africa and other countries in section 2 provides evidence of the impact of various social grants. The methodological framework is detailed in section 3. Results from the counterfactual scenario experiment are presented and discussed in section 4. The document concludes by summarising the key findings, the limitation and the future extension of the analysis in section 5.

2. IMPACT OF THE SOCIAL GRANTS: A REVIEW OF THE LITERATURE

The literature on impact assessment of social grants in South Africa and around the world is extensive. These studies have covered issues such as labour participation, poverty, inequality, education, health and nutrition. The impact of cash transfers (CTs) on welfare depends on how the recipients use the cash. Since cash is fungible, there are concerns that the poor might be tempted to use the money on non-essential goods including alcohol and drugs. This argument has sometimes been used to advocate 'in-kind' transfers rather than CTs. Another question is on the sustainability of CTs. As described by Devereux (2002), there is a difference between 'livelihood protection' and 'livelihood promotion' impacts of interventions meant to reduce poverty.

[1] One can use a parametric micro-simulation modelling and estimate the income and prices elasticities, as well as the modelling of employment status and labour supply.

Livelihood protection leads to maintenance of minimum living standards and allows for smoothing of consumption, whereas livelihood promotion allows for a longer term and more sustainable improvement in living standards. In the past, CTs were seen as a livelihood protection measure especially when people faced crises. However, recent studies have begun to show that CTs can also lead to livelihood promotion (Devereux, 2002). Hence, it has become important to understand, via various methods, the impacts of various social grants on economies. The sections below give brief reviews of international and South African evidence of the impact of social grants.

Many of the studies found a positive impact of social grants on various socio-economic outcomes. With respect to the empirical evidence, DFID (2011) notes that cash transfers are one of the more thoroughly researched forms of development intervention. Furthermore, over the past 15 years, a 'quiet revolution' has seen governments in the developing world invest in increasingly large-scale cash transfer programmes. Their findings indicate that while the evidence base for cash transfers is better than for many other policy areas, it is also uneven. Less is known about some instruments (public works) and outcomes in certain regions (sub-Saharan Africa). However, they acknowledge that there is convincing evidence from a number of countries that cash transfers can reduce inequality and the depth or severity of poverty. Furthermore, there is an increasing volume of research into how cash transfers might support 'graduation' from poverty for those of working age.

There has been mixed evidence of the effects of cash transfers on health and nutrition. Brazil's health and nutrition CCT, Bolsa Alimentação, 2001, was aimed at providing eligible households with a monthly cash transfer on condition that they complied with a range of compulsory programme activities. The programme was targeted at pregnant women, breast feeding mothers with children below 6 months, and children from 6 months to 7 years of age (Bassett, 2008). Morris et al. (2004) conducted a study that assessed the impact of Bolsa Alimentação on anthropometric status in four municipalities in northeast Brazil. The study used a random effects regression model to compare programme beneficiaries with matched individuals from households that were originally selected to receive the benefit but were later excluded due to quasi-random administrative errors. A total of 472 beneficiary and 158 excluded children under three years of age were included in the analysis. The results showed that for each additional month of exposure to the programme the weight of beneficiary children was 31 grams lower than that observed in excluded children of the same age. These results were relatively startling and Morris et al. (2004) attributed the failure to respond to the programme to the possible perception that benefits would be discontinued if the child's health and nutrition status improved.

Agüero et al. (2007) observed that the child height-for-age data indicates that the child support grant payments, which are assigned to women, boost early childhood development. The study uses the 1998 KwaZulu-Natal Income Dynamics Study (KIDS) data to measure the nutritional impact of the child support grant received in the first three years of a child's life. A continuous treatment method was used to estimate how child nutrition, as measured by height-for-age, is

affected by receipt of the child support grant (CSG). Similar to these findings, DSD et al. (2012) observe that receipt of the child support grant in early life improves height-for-age scores for children whose mothers attained schooling beyond grade eight. Yamauchi (2005) used several rounds of the KwaZulu-Natal Income Dynamics Study (KIDS) to show that grant financed nutritional improvements induced positive educational outcomes for children; for example reducing repetition in school and allowing for early schooling. Williams (2007) noticed that the probability that any child goes hungry falls by 8-14% for each child support grant a household receives.

The majority of the studies in South Africa concur that CSG promotes school attendance among beneficiary 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) which reported that there was no major difference on children (between the ages of seven and 13 years) receiving the grant and those not receiving the grant. However, it is important to qualify these results by pointing out that even in the absence of grants, there are already high enrolment and attendance rates in South Africa. Therefore, the evidence suggests that receiving grants is very important for reducing school non-attendance (Budlender and Woolard, 2006).

Eyal and Woolard (2011) observed, on average, a 15% increase in employment probability and a 9% increase in labour force participation of mothers in their twenties who became recipients (on their children's behalf). Broad labour force participation of mothers who had a child that receives a CSG was associated with an increase of 7-14% (Williams 2007). This impact was found to be most positive among mothers and household heads who did not complete their matric and among mothers who lived in informal residences. The study indicated that provision of the CSG did not have any identifiable negative impact on labour supply, but Williams (2007) suggested that the complex dynamics between social grants, poverty, and reproductive and remunerated labour needed to be further researched.

Haarmann (2000) investigated the potential effects of social assistance (CSG and Old Age Grant (OAG)) on poverty alleviation in South Africa using a micro-simulation model. Using the Southern Africa Labour and Development Research Unit (SALDRU) data, updated to 1996 with 1996 census data, the study observed that the CSG has the potential to effectively alleviate extreme poverty as it reaches some of the poorest households. However, Haarmann (2000, p. 190) commented that 'the current support, both in terms of coverage and quality, is far from being able to break the poverty cycle effectively', On average, only 36.8% of the poverty gap in the first two quintiles will be closed by transfers if the system is to work with 100% efficiency (Haarmann, 2000). The possibility of an introduction of other forms of social assistance, namely a Basic Income Grant, an Unemployment Benefit, and a Household Grant, in addition to the OAG and the CSG, was analysed and Haarmann (2000) found that the Basic Income Grant would effectively reduce poverty across the various household types.

Samson et al. (2004) carried out a study, commissioned by the Department of Social Development (DSD), on the social and economic impacts of South Africa's social security system. Specifically, the OAG, CSG, disability grant (DG), care dependency grant (CDG), foster care grant (FCG) and grant-in aid (GIA) were evaluated. Micro-simulation modelling was used to assess the impact of social grants on poverty alleviation. According to Samson et al. (2004, p. 1), even though the magnitudes of the results are sensitive to methodological issues '*South Africa's system of social security successfully reduces poverty, regardless of which methodology is used to quantify the impact measure or identify the poverty line*'. The measurement of poverty as well as the evaluation of the impact of social grants was done at the household level. The analysis focused on the OAG, the CSG and the DG. The measures of poverty lines used in the analysis are the poverty headcount, the average poverty gap, the poverty gap ratio and the rand poverty gap. The results indicate that extending the eligibility age of CSG receipt has the greatest potential of reducing poverty. Samson et al. (2004) found that if the extension of CSG to age 14 is combined with full uptake of state old age pension (SOAP) and DG, the total rand poverty gap will be reduced by 29%. However, the measurement of the quantitative impact was found to be greatly affected by the choice of the poverty line. Samson et al. (2004) observed that the measured impact is consistently greatest when employing the total rand poverty gap and consistently smallest when the poverty headcount measure is used as an indicator.

In order to highlight the role of social assistance in providing income support to the poorest households Woolard et al. (2010) disaggregated household income sources by income quintile. They found that two-thirds of the income to the bottom quintile comes from social assistance grants, with most of this income coming from child grants (the CSG, the FCG and the CDG combined).

According to the Studies in Poverty and Inequality Institute (SPII) (2012), social grants are beneficial to society, but they are often diverted into areas other than their intended purpose given the conditions faced by the poor. Some of the benefits come from the CSG which increases the labour force participation rates amongst woman, state old age pension (SOAP) which leads to about a half years' growth for children aged 0--6 and also leads to higher school enrolment rates of girls because it is spent on education in poor households. SPII (2012) claims that a huge proportion of social grant income is often diverted to repayments of debts. Because of high rates of unemployment the dependency ratio for grandparents who receive the SOAP is said to be high, especially in rural areas. The social grant income does not necessarily support the qualifying recipient (child or adult) only, but the entire household. The welfare of recipients as well as that of the households in which they reside improves because of social grants. SPII (2012) further asserts that investment in productive capital is supported as the social grant money left over from food and fuel purchases is used for education expenditure.

Social grants are a significant injection of resources into poor households which can have, according to Williams (2007), negative or positive impacts on working-age individuals' incentive to work. 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 per cent on non-pension incomes).

The 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 labour 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.

Receipt of the OAG lowers the labour market participation of working-age adults, according to an empirical study by Bertrand et al. (2003). Posel et al. (2006) found a similar result but only for male household members, especially if the grant recipient is female. Using data from a panel designed to investigate the household impact of the epidemic, Booysen (2004) observed that the child support, disability and foster care grants have the potential to mitigate the impact of HIV/AIDS, reducing morbidity or mortality for households affected by the pandemic.

In summary, previous studies generally indicate that social grants, and the CSG in particular, have had positive impacts on recipients and households. In the short run the CSG leads to improvements in beneficiary children's health and nutrition (DSD et al. 2012) as well as in their educational outcomes in form of reducing repetition in school, allowing for early schooling and reducing the probability of a school-age children not attending school (Case et al. 2005; Yamauchi, 2005 and Williams, 2007). However there are mixed results when it comes to other grants such as OAG and the DG. Not enough has been done on the combined grants, and in a general equilibrium manner. This is a contribution of this paper.

3. THE ANALYTICAL FRAMEWORK

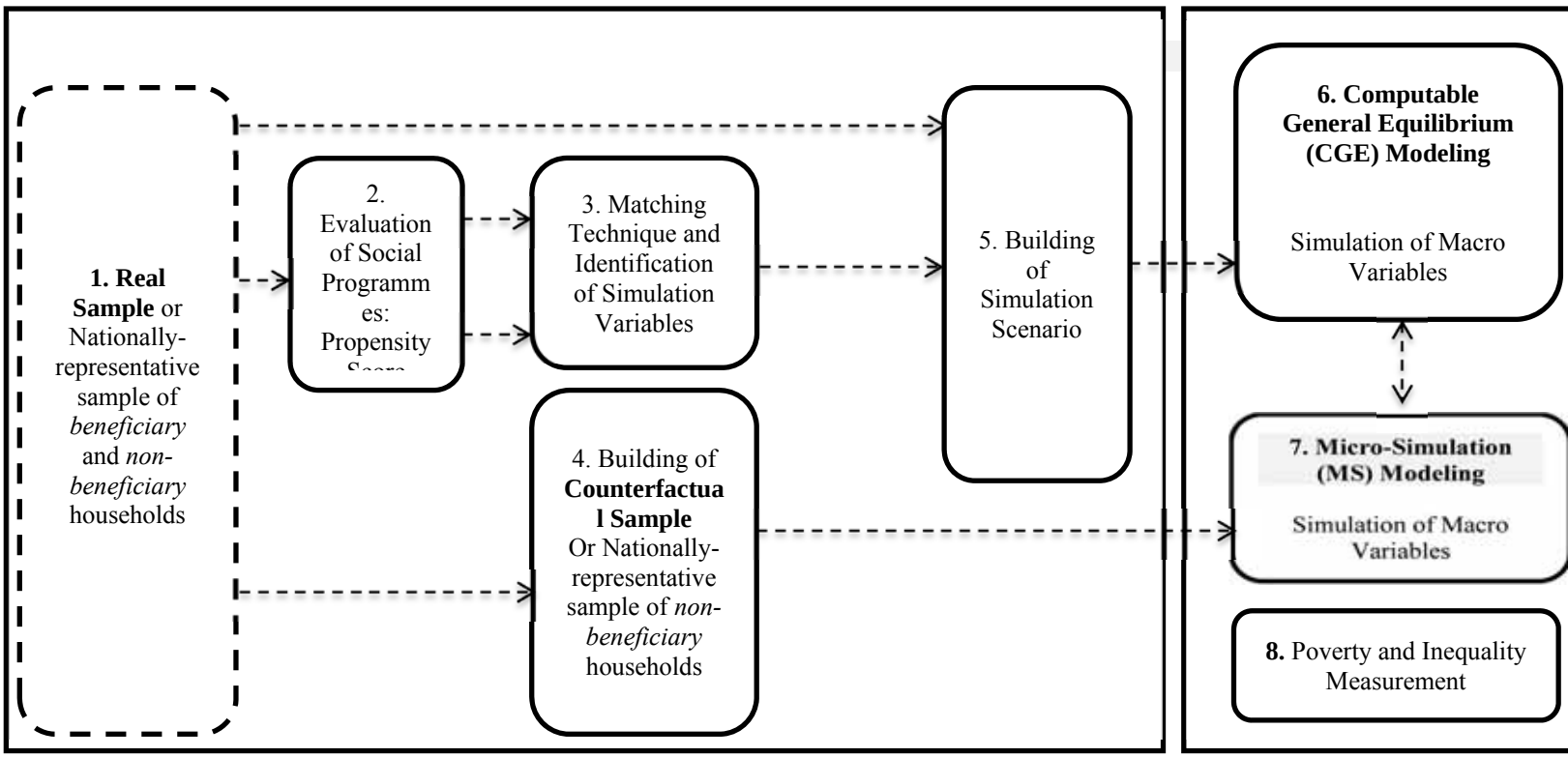
The analytical approach integrates the following three methods into a single framework: the Propensity Score Matching (PSM) Technique, the Computable General Equilibrium (CGE) Modelling, and the Micro-Simulation (MS) Modelling. The approach developed in eight steps is presented in Figure 1.

The handling of a sample that is representative of the population of South Africa is covered in Step 1. This is a nationally representative sample of social grants beneficiary and non-beneficiary households. Given the data in Step 1, the propensity score matching technique is applied in Step 2. The impact of the programme is estimated by modelling the probability of been in the programme given the observed characteristics of the household. This probability or propensity score is in turn used in Step 3 to match households to a counterfactual and at the same time identify *simulation variables*.

However, building the simulation scenario in step 5 requires a selection of the simulation variables in Step 3 using the available matching techniques and the building of a counterfactual sample in Step 4. The counterfactual sample is a nationally-representative sample of non-beneficiary households built from the nationally-representative sample of beneficiary and non-beneficiary households or real sample in Step 1 and the results of the propensity score estimation in Step 2. The simulation scenario compares the outcomes of the simulation variables (identified in step 3) from the real sample (organised in step 1) and the counterfactual sample (built in step 4). In Step 5, a *simulation scenario is built* and used as input in the CGE model.

Steps 6 and 7 use a *macro-micro simulation technique* integrated in a recursive fashion (top-down/bottom-up). The macro results generated by the CGE simulation in Step 6 are used in the MS model (Step 7) which, in turn, produces the micro results for the CGE model. The process is repeated until a convergence is reached. Finally, poverty and inequality figures are computed in Step 8. The methodological aspects are discussed in detail in the next sections.

Figure 1: Simplified Presentation of the Analytical Framework



3.1 Building of the Simulation Scenario

The analytical framework includes building of a simulation scenario which compares the outcomes of the simulation variables from the real and the counterfactual samples. The changes in the values of the simulation variables are interpreted as the DIRECT impact of the grant programme which then serves as simulation shocks in the CGE model. The analysis of the real and the counterfactual samples enables us to compare between what actually happened and what would have happened to the population without the social grants. The counterfactual sample builds a *representative household*s *sample* which does not show any beneficiary of the social grants. While the changes in government grant expenses are modelled at the macro-level, a suited technique is required to build the counterfactual scenario at the household level.

First, a propensity score is estimated for the beneficiaries and the non-beneficiaries of the social grants. Second, the matching techniques are used to estimate the direct impact of the program on key variables of interest and to identify the simulation variables. Third, the matching method is used to find, for each beneficiary household, a matched non-beneficiary household; then the sample representativeness (weighted) of the beneficiaries and their matched non-beneficiaries are adjusted to reflect their new share in the counterfactual sample. Fourth, the changes in the values of the simulation variables are computed by comparing the real and the counterfactual samples; these changes are used as the CGE simulation shocks (bottom-up).

3.1.1 Data

We apply our framework to data from the National Income Dynamic Survey (NIDS) covering questions related to access of eligible individuals and their households to the social grant scheme. The NIDS is used for the analysis of the general equilibrium impact of the social grant. The NIDS project is implemented by the SALDRU based at the University of Cape Town's School of Economics. The first NIDS survey was carried out across the country in 2008 with a nationally representative sample of over 28,000 individuals in 7,300 households. NIDS examines the livelihoods of individuals and households over time. It also provides information about how households cope with positive or negative shocks, such as a death in the family or an unemployed relative obtaining a job. Other themes include changes in poverty and well-being; household composition and structure; fertility and mortality; migration; labour market participation and economic activity; human capital formation, health and education; and vulnerability and social capital. The survey captures the dimensions of the well-being of South Africans, which includes access to cash transfers and social services; wealth creation in terms of income and expenditure dynamics and asset endowments; dynamics in relation to household composition and migration; social heritage which includes education and employment dynamics; social capital and intergenerational developments. The NIDS frame included private households in all nine provinces of South Africa and residents in workers' hostels, convents and monasteries but excluded such collective living quarters as student hostels, old age homes, hospitals, prisons and military barracks.

The next section discusses access of eligible children and their caregiver to the child support grant, senior members of the household to the old age grant, and disability grant (DG) for disabled person.

- *The Child Support Grant (CSG)*

The main criteria of eligibility to the CSG are the age of the beneficiary, the income of the applicant or caregiver, of the spouse or partner, and of the beneficiary, and the citizenship or the residency status of the applicant. Successive increases in the age threshold for CSG eligibility occurred over the 14 years of implementation of the programme. An active campaign of communication was organised to inform on the changes in the age threshold through letters, pamphlets and road shows. This criterion considers the income of the applicant or caregiver, the spouse or partner, and the beneficiary. The annual income threshold in 2012 was established to R32 700 for a single caregiver and R70 000 for a married caregiver and spouse. The employment status, in particular government employment, has been an important element of application because of misperception of the eligibility criteria. South African citizenship or permanent resident status of the applicant or caregiver is the third criterion. The status of the beneficiary does not determine the eligibility.

To be eligible for the FCG requires the applicant and child to be resident in South Africa; a court order indicating foster care status; the foster parent to be a South African citizen, permanent resident or refugee; and the child to remain in the care of the foster parent (s). A closer examination of the 2008 NIDS data highlighted the main reasons cited by poor caregivers for not having applied for the CSG (DSD et al. 2012): the lack of documents (parent identification document, child's birth certificate, child's clinic card, marriage certificate, proof of address), the lack of time, and the income being too high. 'Refusals of fathers to support the mothers' applications for the grant on behalf of the child' (marital status) have been cited as one barrier to grant access according to the report. Misunderstanding of the application process, such as the caregiver not being the child's mother (relationship between the child and the caregiver), process being too time-consuming or costly, and past experience with social grant applications are all cited as important barriers to applying for the programme (DSD et al. 2012). There is a high correlation between the CSG and other grants received as '*households receiving the child support grant are more likely to receive another grant than households who receive no CSG*.' (DSD et al. 2012, p. 30). High transport costs reduce the likelihood of applying by rural caregivers (urban and rural location, and access to road).

Being African and a female-headed household increases the likelihood of receiving social grants as compared to other population groups and male-headed households (Geldenhuys, 2008). The author finds that households that receive grants tend to be larger than non-grant receiving households. Most of the indicators were also found to be higher in grant recipient households than in non-grant recipient households. These include the mean total dependency ratio, child dependency ratios and aged dependency ratios. This was also the case for both the unemployed

and not employed ratios. The results show that school attendance ratios (ages 5--24) were significantly higher in the grant recipient population than amongst households not receiving grants.

- *The Old Age Grant (OAG)*

The main eligibility criterion for the OAG is age. A beneficiary must be 60 years old and above, South African citizen or permanent resident living in South Africa, and must not be in receipt of any other social grant for themselves or cared for in a state institution. In addition, there are asset and income thresholds. In 2013 a beneficiary was supposed to earn not more than R49 200 per year or own assets worth more than R831 600 if single; and if married earn not more than a combined income of R99 840 per year or own assets worth more than R1 663 200.

Before 2007 most households were dependent on income from the old age grant (OAG). This has since changed with the scaling up of the CSG over the years, resulting in a decreased dependency on the OAG. Table 10 in appendices shows that the percentage of households receiving the OAG decreased from 17.5% to 15.9%, whilst the percentage of households receiving the CSG increased from 16.8% to 29.1% between 2003 and 2007. The largest contribution increase from grant income was found amongst OAG recipient households who were also receiving the CSG, from 24.2% to 40.4%. Between 2003 and 2007, the relative contribution of the OAG towards household grant income decreased from 47% to 31%, whilst the mean contribution of the CSG towards household grant income increased from 37% to 52%, (StatsSA, 2009, p. 7).

Characteristics of grant recipients from 2003 to 2007 shown in Table 10 could be explained by several factors which include the following: changes could have been a function of an expansion of the social grant beneficiary definitions, especially in relation to the child support grant for the period 2003 and 2007; changes could have been brought up by more efficient identification and uptake of grant benefits by qualifying households; and changes in access to basic services that have taken place in South Africa over the same period may also have influenced observed differences.

- *The Disability Grant (DG)*

A DG beneficiary must be aged between 18 and 59 years if female or 18 and 60 years if male; is required to undergo a medical examination where a doctor appointed by the state will assess the degree of disability; must bring along any previous medical records and reports when making the application and when the assessment is done (medical assessment must not be older than 3 months at date of application); and must not be in receipt of another social grant for themselves. As discussed under OAG above, a recipient must be a South African citizen or permanent resident (or refuge in the case of the disability grant) living in South Africa, must not be in receipt of any other social grant for themselves or cared for in a state institution. The asset and income thresholds required a beneficiary (in 2013) to earn not more than R49 200 per year or

own assets worth more than R831 600 if single; and if married earn not more than a combined income of R99 840 per year or own assets worth more than R1 663 200.

The DG is also subject to means test hence suffers similar discouraging effects as mentioned earlier. 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.

3.1.2 Propensity Score Estimation

Evaluation of the impacts of social programmes, predicting their effects in a different state of the world, and predicting the effects of policies never tried are important tasks to economists, and of use to policy makers. One of the most popular methods of tackling this task is the treatment effect literature. The term 'treatment effect' refers to the causal effect of a binary (0–1) variable on an outcome variable of scientific or policy interest. According to Heckman and Vytlacil (2005), the treatment effect literature as currently developed focuses on the first task - evaluating the impact of a policy in place - in the special case where there is a 'treatment group' and a 'comparison group', i.e. a group of non-participants. For the purpose of our study it will be the effect of participating (treated) or not participating in the social grant programme on certain economic outcomes such as labour supply and consumption patterns of household.

The estimation of the impact of these programmes (treatment effects) is complicated for economists because of the problem of selection bias.[2] The previous section provided some reasons why a number of people do not apply for the CSG, the OAG or the DG even though they are eligible for it. These highlight some of the differences between participants and non-participants that can bias the estimation of the impact. The most common methods of estimating these effects are typically using social experiments, regression models, matching estimators, and instrumental variables. Although social experiments are gaining popularity especially because of the low cost of carrying them out in developing countries, most economic research still uses secondary data relying on a variety of statistical control strategies and/or natural experiments to reduce the selection bias. The most commonly used statistical techniques in this context are regression, matching, and instrumental variables. All the three methods are relatively linked in practice. For example, regression estimates can be understood as a type of weighted matching

[2] Selection bias arises from the fact that treated individuals differ from the non-treated for reasons other than treatment status per se.

estimator. Matching estimator is similar to regression in that it argues that the source of selection bias can be traced to the set of observed covariates of the representative agents.

In this study, we will focus primarily on the matching estimators for two reasons. First, because treatment effects are constructed by matching individuals with the same covariates instead of through a linear model for the effect of covariates, it fits in very well with our framework. Second, given our vast understanding of the process determining the eligibility of the social grant programme, it makes the assumption of conditional independence valid and amenable to the use of the matching estimator.[3]

Given that it becomes computationally difficult if we have to match the treated and the control when the covariates take on many values and dimensions, a propensity score was proposed that gives the conditional probability of treatment given covariates. 'Propensity score matching (PSM) constructs a statistical comparison group that is based on a model of the probability of participating in the treatment using observed characteristics' (Khandker, Koolwal, and Samad, 2009). The key conditions of applying a PSM method are the conditional independence, and the sizable common support. Omitting key variables that determine participation leads to biased estimation of the propensity score. The selection of relevant variables is context-specific and driven by available data; limited guidance is provided by statistical tests (Khandker, Koolwal, and Samad. 2009).

The propensity score estimation is based on a model of probability of being a beneficiary of a specific social grant (T) conditional on household's observed covariates (X).

$$P(X) = \Pr(T = 1 \mid X)$$

The model is specified over twenty-four (24) variables that respect the conditional independence and the sizable common support conditions (Table 8 – Annex 1).

It is important to explain how our treatment is defined in this study before describing the simulation model and scenarios. Given that there are multiple treatments – CSG, FC, OAG, and DG, etc. – we had to combine them into one treatment. While we recognise that there are other grants in South Africa, the largest and important grants are OAG, CSG, and DG. FCG eligibility is similar to that of the CSG, so we include it as a treatment to ensure identification of the treated. The information on eligibility for other grants is useful and included in the prediction of the probability of been treated as indicator of experience with government grants and used as part of the propensity score estimation.

[3] The conditional independence implies the selection of key variables that are more likely to affect participation but not the outcomes.

3.1.3 Identification of Simulation Variables

Matching techniques are used to assess the direct impact of the social grant and to select relevant variables to be considered in the simulation experiment. First, a set of outcomes are pre-selected from an exhaustive review of the literature. Only outcomes that are likely to be affected in the short run by the CSG programme are considered.

The available matching techniques[4] – Nearest Neighbour, Stratification, Radius, and Kernel – are used to assess the direct impact of the social grant on the identified outcomes of interest. We consider the impact of the social grant scheme on nine (9) categories of consumption by purpose: food, personal, transport, energy and water, household, clothes and footwear, health, education, and miscellaneous. The analysis of labour participation and time allocation includes six (6) types of work: agricultural wage, non-agricultural wage, self-employed, personal subsistence agriculture activities, casual, and business.

Previous studies have highlighted important labour market implications with access to the social grant programme. The ratio of the number of employed household members to household size was substantially higher in non-grant receiving households than in households that receive some form of social grants (Geldenhuys, 2008). Furthermore, the ratio of the number of those unemployed to household size was found to be lowest for non-granted households according to the author. Altman & Boyce (2008) pointed out significant increases in the number of households engaged in personal subsistence agriculture activities - such as keeping chickens, growing vegetables, raising livestock - among the grant recipients.

According to Altman and Boyce (2008), grant recipients spend most of their income on food, with over half of the grant being spent on this commodity item. Both food items acquired through market transactions and own production increase with household access to grant. Grant recipients payments for municipal services account for the second-largest grant expenditure item. It appears that grant recipients might have low levels of indebtedness, with the common creditors being schools (17%) and the local authorities (13%) - according to Altman and Boyce (2008). However, debt related to the purchase of essentials stood at 40%. In addition, Geldenhuys (2008) found that households that receive grants have lower welfare levels (based on spending and asset index scores).

[4] Refer to Khandker, Koolwal, and Samad (2009) for further discussion on the matching techniques.

3.1.4 Generating the Simulation Scenario

The analysis uses the common support blocks as clusters to generate the counterfactual sample.[5] A binary variable (α) is generated to highlight the grant recipients (modality 0) and the non-recipients (modality 1) over the common support. Also, households outside the common support zone are covered by the counterfactual sample (modality 1). Then, the sample weights are uniformly adjusted within each common support block through the following equation:

$$wgt^{adj} = \frac{\sum_{h=1}^{n} wgt_h^i}{\sum_{h=1}^{n} \alpha_h \cdot wgt_h^i}$$

with $\alpha \in \{0, 1\}$ and wgt^{adj} equal to one when outside the common support area. Within each block of the common support, counterfactual sample weights are calculated by the equation:

$$wgt_h^f = wgt_h^i \cdot wgt^{adj} \cdot \alpha_{\mathrm{h}}$$

Outside the common support block wgt^{adj} and α are both equal to one; then wgt^f is equal to wgt^i. In the counterfactual sample, beneficiary households are substituted with their matched non-beneficiary households within each block. Thus, recipients' weights are adjusted to zero while non-recipients weights are (uniformly) adjusted upward to account for the replacement. The changes in the values of the simulation variables '*simvar'* (labour supply and consumption spending) are computed using the real and counterfactual samples of households:

$$\Delta sim\,\mathrm{var}_k = \frac{\sum_{h=1}^{m} wgt_h^f \cdot sim\,\mathrm{var}_{h,k}}{\sum_{h=1}^{m} wgt_h^i \cdot sim\,\mathrm{var}_k}$$

The above equation is used to compute the aggregate labour supply – total hours allocated – to the agricultural and the non-agricultural sectors, and the aggregate spending on consumption items identified as the set of simulation variables *k* (*simvar*). These simulation variables are used in the CGE model described in the next section.

[5] Alternatively, one can generate a cluster variable that couples the beneficiary and their matched non-beneficiary households over the common support using the nearest-neighbourhood method without replacement and compute a single weight for a beneficiary and its matched non-beneficiary.

3.2 The Macro-Micro Model

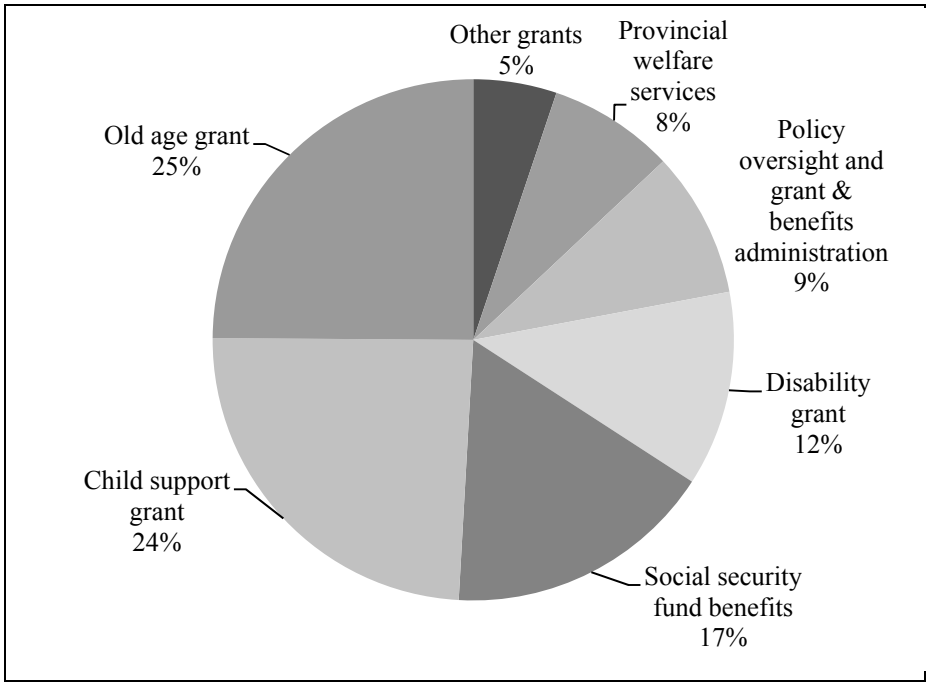
The scenario with an absence of social grant beneficiaries (Counterfactual Scenario) is simulated using a combined Computable General Equilibrium (CGE) model and a Micro-Simulation (MS) model linked in a recursive (top-down/bottom-up) fashion. The changes in income by sources - i) agricultural employment income ii) non-agricultural employment income iii) capital income iv) the unemployment rate, and v) the changes in real consumption expenses - are assessed by the CGE model and used as input in the MS model. Aggregate income and consumption results are distributed among surveyed households using the MS model. In turn, results on micro variables are used to compute the poverty and inequality indicators.

3.2.1 The CGE Model

A static-comparative CGE model is built with exogenous labour supply and a linear expenditure system specifying households' consumption of goods and services. Household's total consumption is initially equalised to its minimum consumption. The counterfactual scenario simulation is performed through exogenous shocks on the labour supply and the minimum consumption variables. The marginal income gain or loss (net of taxes, transfers, and saving) is allocated to consumption items given the income elasticities of consumption. A neutrality of government budget is assumed, and its income and expenses are balanced through a uniform compensatory tax on household gross income. The model is investment driven, that is, households' aggregate saving is adjusted to an exogenous investment volume level. The direct impact of the social grant is simulated by cancelling out the changes in labour supply to the agricultural and non-agricultural sectors, on the one hand, and the changes in expenses on consumption items (Table 4). The above mentioned changes in labour supply (to agricultural and non-agricultural sectors) and consumption expenses are imposed to the CGE model. This shock is the direct impact of the social grant and is interpreted as what would have happened without the programme.

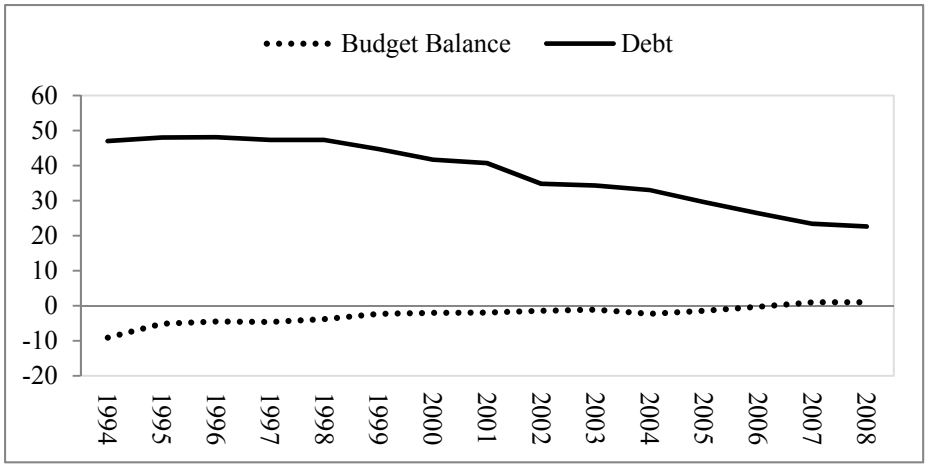
A state of the South African economy without the social grant programme means less transfers income to households from the government and more income to the government. The CSG programme covers 10.8 million children receiving R280 every month as of April 2012 (DSD, SASSA & UNICEF, 2012). The government spending on the AOG, the CSG, and the DG programmes was estimated at R36.6 billion, R35.6 billion and 17.8 billion respectively in 2011, representing in total 61.3% of the social protection spending (Figure 2). We assume that the extra income of the government is used to reimburse its domestic debt (best spending opportunity). Figure 3 shows a positive relation between government deficit reduction and its debt reduction.

Figure 2: Share of CSG in the Social Protection Spending for 2011



Source: National Treasury (2011)

Figure 3: Government budget balance and debt (Per cent of GDP)



Source: The Presidency (2009)

3.2.2 The Micro-Simulation Model

A Micro-Simulation (MS) model is developed to assess the distributional impact among households and individuals of the social grant shock. The adopted method builds upon the non-behavioural micro-simulation approach which consists of adjusting the survey household's

weights to create consistency between the macro and the micro outputs. Therefore, the method does not allow individuals and households to adjust their behaviour in response to the shock.

Under additional information provided by the macro model, household weights in the survey are readjusted using the cross-entropy estimation procedure (Golan, et al. 1996). The approach minimises the Kullback-Leibler cross-entropy measure of the distance between the sets of initial (x) and final (y) surveyed-household weights transformed into probability measures:

$$Min\ \Omega = \sum_{h=1}^{n} y_h \ln \cdot \frac{y_h}{x_h}$$

subject to a consistency with the additional information:

$$A_j = \sum_{h=1}^{n} y_h \cdot a_{h,j}$$

The constraint equations (j) include - in addition to the adding-up normalisation constraint - unemployment rate, agricultural labour earning, non-agricultural labour earning, capital earning, government transfer revenue, private transfer revenue, and total consumption spending (or macro variables). A_j are simulated macro data (averages) that are consistent with the set of final weights.[6] The counterfactual sample of households is used in the MS model. This sample does not show any OAG, CSG, and DG beneficiary and requires prior upward adjustments of the weights.

The cross-entropy method calculates new weights for the counterfactual sample of households which are consistent with the changes in the macro variables. The unemployment rate (30.5%)[7] computed in the MS model is imposed to the CGE model for consistency. The changes in values are used for the labour supply and the consumption variables and do not require a reconciliation procedure between the CGE and the MS models.

The changes in aggregate earnings and real consumption income, and the new employment rate are generated from the CGE model and constitute the new constraint for the MS model. The latter is run and the new weights that satisfy the constraints on these aggregate outputs are collected for the poverty and inequality analysis. The previous paper in this series elaborates on the methodology in order to offer readers enough information to be able to use such a methodology on other studies. The reader is referred to that paper for details on methodology. That particular paper tests the methodology on the case of the child support grant.

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[6] Robillard and Robinson (1999) discuss the cross-entropy method and its use to balanced macro and survey data.
[7] This rate is higher than the official (narrow) rate of 23.5% but closer to the unofficial (broad) rate of 31.5% in March 2008 (Presidency, 2009).

3.2.3 Poverty and Inequality Analysis

The poverty impact is assessed using the Foster, Greer, and Thorbecke (1984) measure of poverty or FGT, where: n is the number of individuals in the population, y_p *is* the per capita consumption expenditure of the person p, z is the per capita consumption threshold; α is the weight of the individuals with consumption expenditure below the threshold z:

$$FGT = \frac{1}{n} \cdot \sum_{p=1}^{n} \left(\frac{z - y_p}{z} \right)^{\alpha}$$

The measure of the inequality indicators uses the Theil index (Theil, 1967) with n and y_p keeping their above definitions, μ is the population average per capital consumption expenditure:

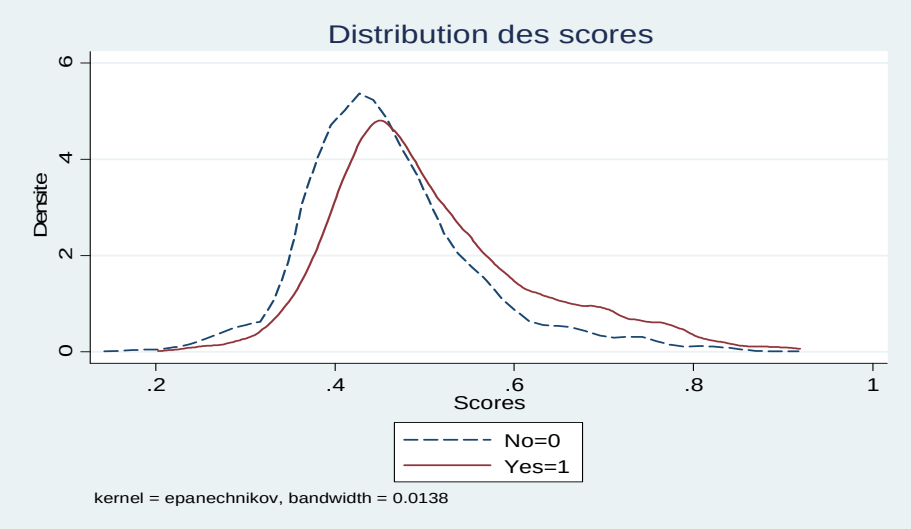
$$THEIL = \frac{1}{n} \cdot \sum_{p=1}^{n} \frac{y_p}{\mu} \cdot \log \frac{y_p}{\mu}$$

Three datasets are used for the poverty and inequality analysis: the 2008 NIDS survey including 7301 households (Real Sample); a sample composed by the original 7301 households less the 3761 beneficiaries of the social grant (OAG, CSG, DG) with adjusted weights (Counterfactual Sample); and a reweighted counterfactual sample (Reweighted Sample) consistent with the new macro outputs. FGT indexes (headcount, gap, and severity) are computed for each of the three samples given a poverty line of $2/Day or R260/Month (Leibbrandt et al. 2010. p. 17). Theil inequality measures are also calculated using the average per capita consumption expenses in each sample.

4 SIMULATION RESULTS AND DISCUSSION

To assess the general equilibrium effect of the social grants (CSG, OAG, and DG) programme in South Africa, we first estimate the Propensity Score (PS) over a series of observed variables. Figure 4 presents the Kernel density distribution function of the social grant beneficiary and non-beneficiary groups resulting from the PS estimation. It identifies a large common support (0.202 to 0.919) and seven blocks that satisfy the balancing property. Table 1 shows for each block the inferior score and the number of beneficiary and non-beneficiary groups.

Figure 4: Kernel density function of the PSM



Source: Authors, from the estimation results
Note: No = Not a recipient of a social grant; Yes= Recipient of a social grant

Table 1: Common support block

Inferior Score	Non-beneficiary	Beneficiary	All
0.00	2	0	2
0.20	700	469	1169
0.40	976	747	1723
0.45	796	849	1645
0.50	702	961	1663
0.60	326	632	958
0.80	38	103	141
Total	**3540**	**3761**	**7301**

Source: Authors, from the estimation results

After the propensity scores are estimated, we turn to comparing the outcomes of the beneficiary group with those of the matched non-beneficiary group for our pre-selected[8] variables of interest (Tables 2 and 3). The matching methods aim at providing evidences that the social grants programme affect the variables of interest. However, only variables that show a statistically significant effect are selected as *simulation variables*.

The results from the available matching methods – nearest neighbourhood, stratification, radius, and kernel – show statistically significant differences in per capita spending on all consumption items except '*Household*', and '*Education*' (Table 2). We found no evidence that per capita spending on the latter two items is different between the beneficiary and the non-beneficiary.

[8] The variables are pre-selected according to the objective of the analysis. We have selected the labour supply and consumption variables as we are interested in the short run impact of the CGS programme.

Table 2: Effect on Consumption Spending

Consumption Item	Average monthly per capita consumption(in Rand)
Food products	-50.3***
Personal	-58.1***
Transport services	-67.0***
Energy and water	-20.2***
Household	-23.4
Clothes and footwear	-12.6**
Health services	-48.8***
Education	-2.8
Miscellaneous	-63.4***

Source: Authors, from the simulation results
Note: *** significant at 1%; ** significant at 5%

Table 3 shows differences in the labour supply outcomes between the two groups. Recipients of the social grants reduce their participation as well as their average number of hours worked in the non-agricultural activities, especially for the wage workers. On the other hand, agricultural wage work is observed to drop in favour of personal subsistence agriculture when households access the social grants programme. Labour force participation and average hours worked are reduced by the social grant while involvement in subsistence agriculture activities increases and not necessarily the number of hours spent in these activities. This implies that social grant beneficiaries reduce their wage labour hours but tend to spend more time in subsistence agricultural activities. One explanation for this can be because most of the agricultural activities at that level of income will be at the subsistence level; income from those activities may not necessarily count towards social grant eligibility. This provides extra income for the household without it being disqualified for the grant.

Table 3: Effect on Labour Supply

Type	Participation	Time Allocation	
	Average number of individuals	Average annual hours per worker	Average annual hours, all workers
All non-agricultural work	**-0.045****	**-62.3*****	**-109.0*****
Non-agricultural wage work	-0.038**	-26.0	-101.6***
Self-employment	0.015	-11.4*	3.6
Casual work	-0.012	-20.9	-9.3
Help in others' business	0.002	24.2	1.3
All agricultural work	**0.016**	**-217.4*****	**-50.8****
Agricultural wage work	-0.022**	-96.5***	-58.1**
Personal subsistence agriculture	0.034**	17.2	7.3**

Source: Authors, from the simulation results

Note: *** significant at 1%; ** significant at 5%; * significant at 10%

The estimation of the participation effects to the social grant programme using the matching methods in the previous step identifies seven simulation variables for the consumption items and three simulation variables for the labour supply (Table 4). At the end, we consider the aggregated agricultural work and non-agricultural work variables for consistency with the macro model.

Therefore, the **simulation scenario** is built around nine simulation variables and the changes in the outputs between the real and the counterfactual samples of households. The matching technique and the sample comparison show consistent results for all selected variables.[9]

Table 4: Changes in Simulation Variables

Variable of interest	Change (in %)
Labour Supply	
1) Non-agricultural work	-1.5
2) Agricultural work	3.8
Consumption Spending	
3) Food	-3.2
4) Personal	-0.8
5) Transport	-10.3
6) Energy and Water	-4.8
7) Clothes and shoes	-4.6
8) Health	-27.3
9) Miscellaneous	-5.2

Source: Authors, from the simulation results

Figure 5 presents the FGT poverty indexes and the Theil inequality indexes for the Reference and the Simulations Scenarios. The latter represent the elimination of the social grant programme in South Africa and is divided into the Direct and the Indirect impacts.

In the reference scenario, the values of the indexes are computed using the nationally representative sample of households (National Incomes Dynamics Study (NIDS) 2008), hereon, the real sample. We use a per capita monthly consumption spending of R260 as the poverty line[10] and compute the FGT poverty indexes (headcount, gap, and severity).

The counterfactual sample of households replaces the grant beneficiaries with their matched non-beneficiaries resulting in a hypothetical representative sample of households with no social grant beneficiaries. The counterfactual sample is used to estimate the direct impact of the programme. The results show small differences in poverty indexes between the real sample and the counterfactual sample. Poverty indexes are slightly lower in the counterfactual sample (including only non-beneficiary households) compared to the real sample (including beneficiary and non-beneficiary households). On the other hand, inequality is lower under the social grant programme. That is, inequality is lower in the real sample compared to the counterfactual sample.

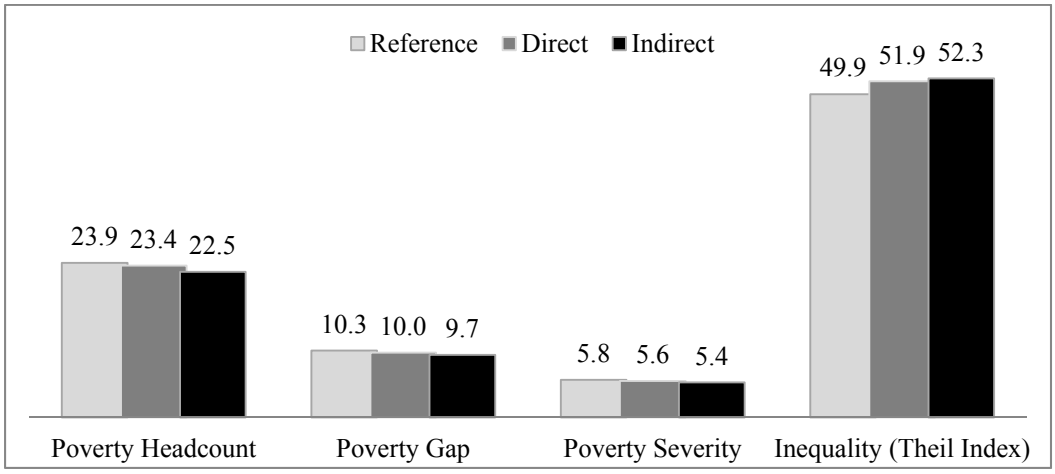
The simulated aggregate results are distributed among the categories of households using a re-weighted technique. Comparison of results from the re-weighted and the original counterfactual

[9] Tables 2 and 3 are expressed in average hour worked annually per household and per capita rand consumption expenses, respectively. On the other hand, Table 4 is expressed in percentage change of the aggregation hour worked and per capita consumption spending. Thus, only the directions of the changes for the variables of interest are meaningful for analysis.

[10] The value is equivalent to the international poverty line of US $2 per day (Leibbrandt et al. 2010. p. 17).

samples gives the indirect impact of the social grant programme. Poverty indexes are lower when we account for the indirect impact compared to the direct impact. Theil index of inequality is higher when one considers the indirect effect of cancelling the programme compared to the direct effect. In the short run, our results show that there is little evidence to support the fact that an alternative use of the resources invested in social grants in South Africa such as an alternative grant to a counterfactual sample in the economy will yield lower poverty head count, poverty gap and poverty severity. This implies that while social grants in South Africa contribute to poverty reduction as found in earlier studies, a similar level of poverty alleviation strategy can be achieved if the resources are injected into the economy as other forms of capital. . There is, however, some evidence that the programme does a better job at reducing inequality than other uses of the resources in the economy, even though the evidence in support of this is also weak.

Figure 5: Poverty and Inequality Indexes



Source: Authors, from the simulation results

Using other economic measures, the analysis shows a positive contribution of the grant programme to economic performance as measured by the level of GDP. Indeed, South African GDP level is lower (by 0.9 per cent) under the counterfactual scenario, i.e. absence of the social grant programme, compared to the reference scenario (Table 5). This result is driven by less investment from households (-26.1 per cent) as their consumption spending increases (5.6 per cent) in the counterfactual scenario. Government earning does not change significantly (0.2 per cent) but government saving increases (17.7 per cent) because of a cut of social grant transfers. Government extra revenue is assumed to cover its internal debt and contribute in reducing the decline of the overall investment.

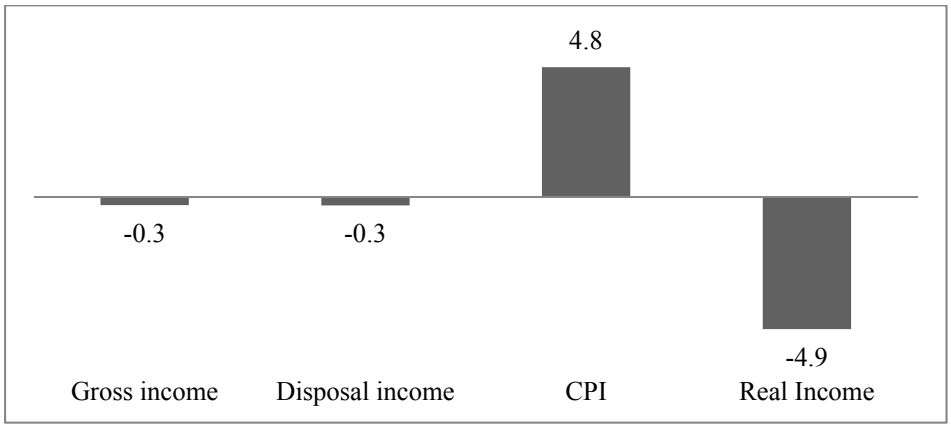
Table 5: Changes in Macro Variables (Per cent)

	GDP	Public Final Consumption	Private Final Consumption	Fixed Capital Formation	Change in Inventories	Exports	Imports
Share	100.0	19.5	64.6	16.8	1.2	24.5	26.4
Change	-0.9	0.0	5.6	-26.1	0.0	-3.3	-3.4

Source: Authors, from the simulation results

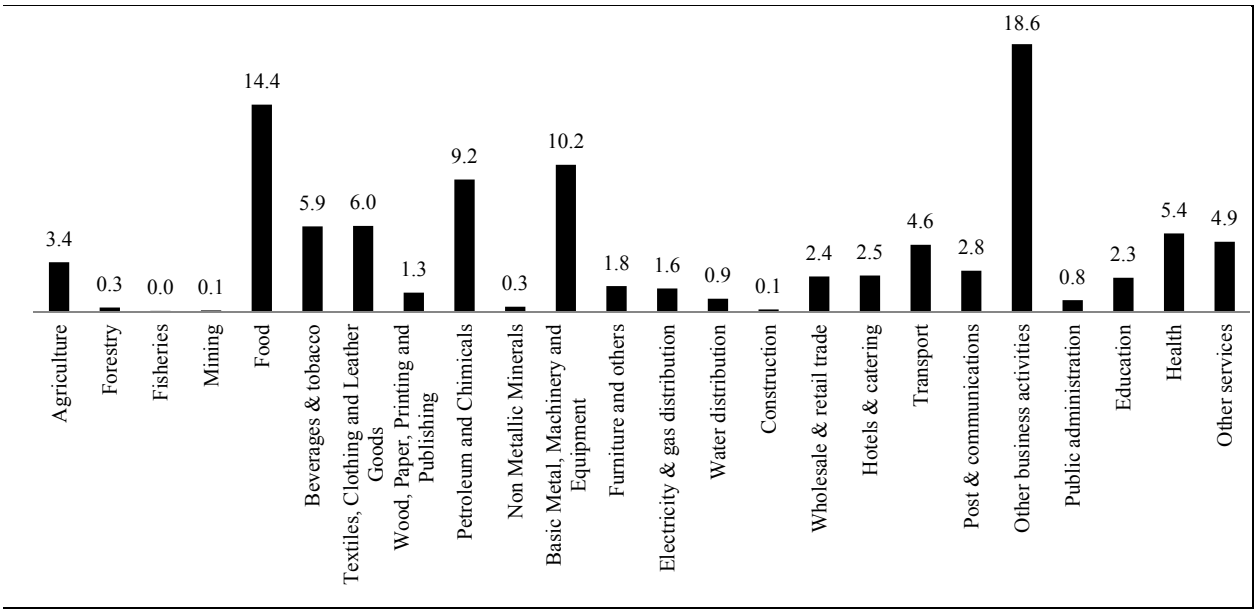
Households' consumption price index increases by 4.8 per cent and, consequently, their purchasing power or real income declines by 4.9 per cent (Figure 6). Higher consumption prices contribute to reducing households' saving. Under the counterfactual scenario, household demand increases for most of the consumption products, putting an upward pressure on the consumption prices. The price increase is particularly important for health (Figure 8) contributing in a large part to the increase of the household consumption prices. Health expenses contributed 5.4 per cent of the household consumption spending in 2008 (Figure 7). The results show that social grant beneficiary households spend less on health services than their matched non-beneficiary households. Therefore, the demand for health services is higher in the counterfactual scenario (with no beneficiary households) compared to the reference scenario (with both beneficiary and non-beneficiary households). Agriculture and food prices also increase under the counterfactual scenario compared to the reference scenario. Agriculture and food products represent 18 per cent of the household consumption budget (Figure 7) and their prices increase as households spend less time in the subsistence agriculture activities and, therefore, purchased more food from the market. The largest declines in prices appear among investment-oriented products – construction and non-metallic minerals, as well as basic metal, machinery and equipment (Figure 8).

Figure 6: Household Income and Consumption Price Effects (Per cent)



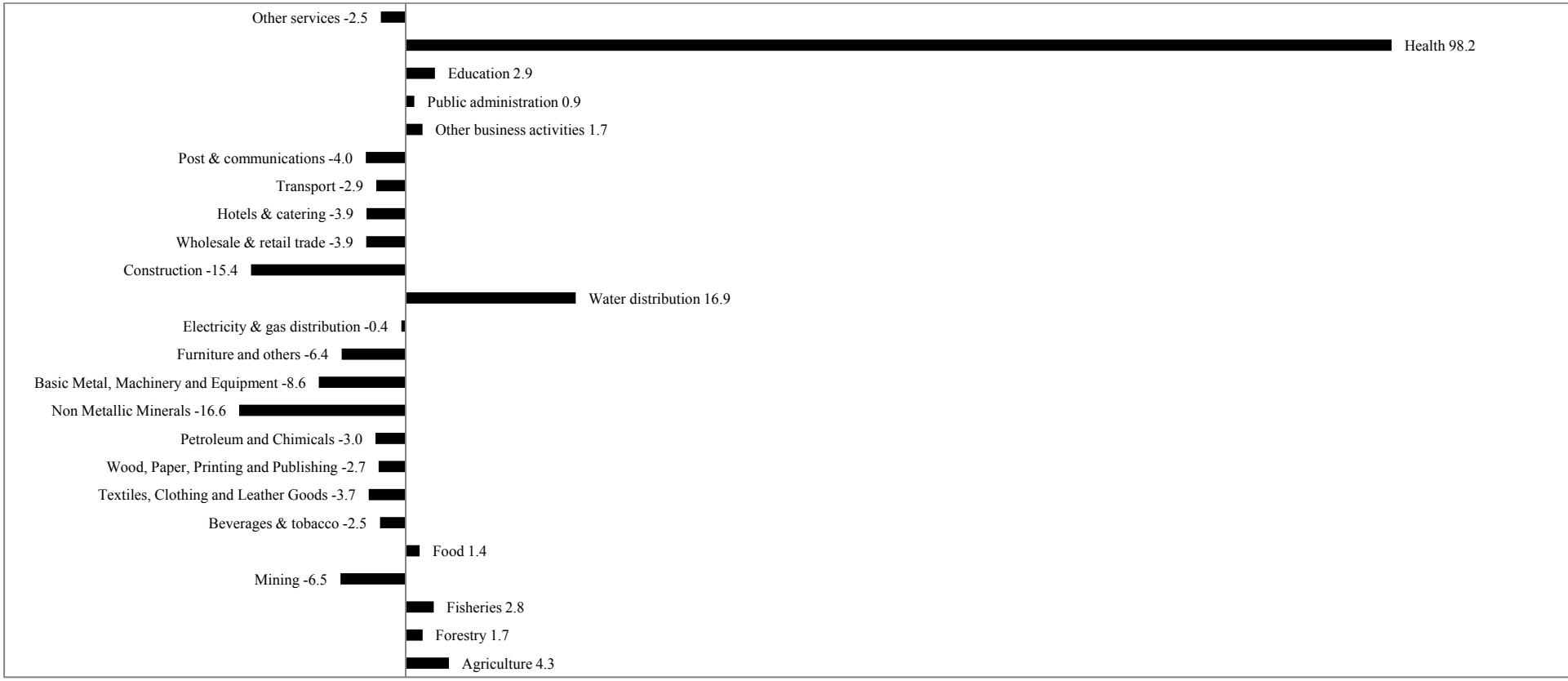
Source: Authors, from the simulation results

Figure 7: Households' Consumption Budget Share (Per cent)



Source: Authors, from the simulation results

Figure 8: Effects on Consumption Prices (Per cent)



Source: Authors, from the simulation results

CONCLUSION

Comprehensive social security programmes such as the old age grant, child support grant, disability grant, and foster care grant are introduced to serve as safety nets to the poor in South Africa. While a number of studies have looked at the impact the programme has on the beneficiaries, no research has been done on the impact of the programme on the society at large, particularly on non-beneficiaries. This becomes important as the size of the programme continues to increase in South Africa. Social grant increased in size and reach in 2012, with a growth rate of 9.1% from the previous year and R157.9 billion invested, amounting to more than what was spent on basic education in the same year (R152.1 billion). The amount invested in the old age grant, child support grant, disability grant, and foster care grant together is equivalent to about 62% of the total social protection budget (more than R90 billion).

This study is the first attempt to study the general equilibrium effect of a combination of social grants in South Africa by using an analytical framework that combines state of the art techniques on evaluation of social programmes including matching techniques. The framework builds a counterfactual scenario (absence of the programme) which is fed into a combined macro and micro simulation model to calculate the impact of the programme on outcomes of interest, such as poverty and inequality in the country.

The results show direct differences between the beneficiaries and non-beneficiaries of the programme in terms of their observed outcomes. Beneficiaries of the programme increased their supply of labour for agricultural activities and reduced labour supply in the non-agricultural sector. There is also strong evidence that the consumption level of the beneficiaries of social grants is lower relative to if they were not a beneficiary, expect for education and household products.

Looking at the general equilibrium results, we found a positive contribution of the grant programme to the economic performance in South Africa as measured by the level of GDP. The absence of the programme in a counterfactual setting leads to a 0.9% decline in GDP. Inequality is also shown to decline as a result of the programme. However, the results show that poverty indexes are lower in the counterfactual scenario, i.e. the absence of the social grant programme.

We found a decline in households' saving which was attributed to a reduction in their purchasing power in the counterfactual scenario. Indeed, household consumption prices increase in the counterfactual scenario, triggered by increasing demands for health service and agriculture and food products. Thus, our analysis shows a contribution of the social grant programme in lowering the cost of health service as well as agriculture and food products. The social grant beneficiary households are more involved in subsistence agriculture and, therefore, purchase less food. They also spend less on health services compared to their matched non-beneficiaries. Consequently, households' extra income is spent on other consumption products or on investment products.

While fiscal prudence and consolidation are pursued in the medium term, the analysis shows that social security spending contributes to faster economic growth and to reducing inequality in South Africa.

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Annex 1: Other Tables and Figures

Table 8: Variables used in the Propensity Score Estimation

Variables	Observation	Modalities
1. Recipient of CSG, OAG, and/or DG	7301	No (0) Yes (1)
2. Recipient of other grants***	7301	No (0) Yes (1)
3. Presence of children less than 16 years old	7301	No (0) Yes (1)
4. Presence of children less than 7 years old	7301	No (0) Yes (1)
5. Child has birthday certificate	7301	No (0) Yes (1)
6. Clinic card	7301	No (0) Yes (1)
7. Source of information for the child's date of birth	7301	Not applicable (0) Card (1) Recall (2)
8. Child living with a parent	7301	No (0) Yes (1)
9. Caregiver	7301	Not applicable (0) Mother, Father (1) Great, Grand Parent (2) Other (3)
10. Mother completed higher education	7301	Not applicable (0) Yes (1) No (2)
11. Mother is occupied economically	7301	Not applicable (0) Yet (1) No (2)
12. Father completed higher education	7301	No (0) Yes (1)
13. Presence of member more than 60 years old**	7301	No (0) Yes (1)
14. Biological children currently living with the senior member*	7301	Not applicable (0) Yet (1) No (2)
15. Biological children not living with the senior member**	7301	Not applicable (0) Yet (1) No (2)
16. Marital status of the senior	7301	Not applicable (0) Married (1) Living with partner (2) Widow/Widower (3) Divorced/Separated (4) Never Married (5)
17. School grade completed by the senior	7301	Not applicable (0) Not educated (1) Lower than grade 5 (2) Between grade 5 and 9 (3) Grade 10 and more (4)
18. Senior hold a driver's license	7301	Not applicable (0) Yes (1)

		No (2)
19. Senior is computer literate*	7301	Not applicable (0) Yes highly literate (1) Yes basic use (2) No (3)
20. Senior reading level in English	7301	Not applicable (0) Very well (1) Fair (2) Not well (3) Not at all (4)
21. Senior writing level in English	7301	Not applicable (0) Very well (1) Fair (2) Not well (3) Not at all (4)
22. Perception of health status	7301	Not applicable (0) Excellent (1) Very Good (2) Good (3) Fair (4) Poor (5)
23. Health consultation	7301	Not applicable (0) In the last 30 days (1) One to five months ago (2) Six to twelve months ago (3) More than one and less than two years ago (4) Two or four years ago (5) Five to ten years ago (6) More than ten years ago (7)
24. Location that the consultation took place in	7301	Not applicable (0) Public hospital (1) Private hospital (2) Public health clinic (3) Private clinic (4) Private doctor (5) Nurse or chemist (6) Traditional healer (7)
25. Smoke cigarette**	7301	No (0) Yes (1)
26. Household size*	7301	1-26
27. Number of children less than 14 years old	7301	0-14
28. Average number of year of education	7301	0-25
29. Average age of the household, number of year	7301	14-99
30. Population group	7301	Others (0) African (1) Coloured (2) Asian (3) White (4)
31. Gender of household head	7301	Female (0) Male (1)
32. Household head's number of years of education	7301	0-25
33. Age of household head, number of years	7301	14-99
34. Marital status of household head**	7301	Never Married (0)

		Married (1) Living with partner (2) Widow/Widower (3) Divorced/Separated (4)
35. Type of dwelling	7301	1-10 (see questionnaire for details)
36. Number of rooms	7301	1-35
37. Distance of water source	7301	Not applicable/Water on site (0) Less than 100m (1) 100m - less than 200m (2) 200m - less than 500m (3) 500m - less than 1km (4) 1km and more (5)
38. Access to electricity*	7301	No (0) Yes (1)
39. Time to reach the public transport services	7301	0-300
40. Existence of street lighting near dwelling	7301	No (0) Yes (1)
41. Household member owns the dwelling	7301	No (0) Yes (1)

Source: Authors, from the PSM estimation

Table 9: Products-to-Consumption Mapping (Per cent)

Industry	Food	Personal	Transport	Energy & water	Household	Clothes & Shoes	Health	Education	Miscellaneous
Agriculture	18								
Forestry	1								
Fisheries	0								
Mining									
Foods	74								
Beverages & tobacco		50							
Weaving & finishing of fabrics					10	86			
Wood products		1						29	
Petroleum products			62	37					
Glass products		1							1
Basic iron & steel					53				19
Furniture					9				3
Electricity & gas distribution				39					
Water distribution				22					
Construction					2				
Wholesale & retail trade					8	14			3
Hotels & catering	6	11							
Transport			38						
Post & communications		24							
Financial services									68
Public administration				2			1	16	
Education								56	
Health							99		
Other services		14			17		0		6
All Industry	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors, from the simulation results

Table 10: The relative contribution of the CSG and OAG to household income from grants and earnings for grant recipient households

Characteristic	2003	2007
% of households receiving OAG	17.5 (16.9--18.0)	15.9 (14.4--16.5)
% of households receiving CSG	16.8 (16.9--17.4)	29.1 (28.3--29.8)
% of households receiving both OAG and CSG	4.2 (3.9--4.5)	6.4 (6.1--6.8)
% of OAG recipient households also receiving CSG	24.2 (22.6--25.8)	40.4 (38.7--42.2)
Mean % of total household grant derived from OAG (in rand and inflation- adjusted to 2007 values)	47 (46.1--48.0)	31 (30.6--31.9)
Mean of the % of total household grant money derived from CSG (in rand and inflation- adjusted to 2007 values)	37 (36.4--38.5)	52 (51.3--52.8)
Mean of the % of the combined household earning and grant money derived from OAG (In rand and inflation adjusted to 2007 values)	39 (37.8--39.6)	25 (24.5--25.8)
Mean of the % of the combined household earning and grant money derived from CSG (In rand and inflation adjusted to 2007 values)	22 (21.2--22.6)	29 (28.7--29.8)

Source: StatsSA GHS (2009)