Cash Transfers and Teen Education: Evidence from South Africa

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Abstract

This paper presents both parametric and nonparametric evidence on the effects of the expansion of the South African Child Support Grant on the educational outcomes of older teenagers. Using the National Income Dynamics Survey, we find that beneficiaries of the unconditional grant have enrolment rates at least ten percent higher than non-beneficiaries, and these effects are higher in certain sub-samples. The non-parametric evidence presented shows that duration of receipt is also an important predictor of enrolment. However grant receipt (present or past) has no impact on actual attainment of years of education. We make use of the exogenous nature of the grant roll-out to identify these effects, and present a number of robustness checks.

1 Introduction

South Africa is one of many developing countries with a large, and relatively recently introduced social security program. Grants exist for the elderly, the disabled, income eligible children, and other groups. The main aim of these grants is poverty alleviation, which in turn may impact on other development outcomes, such as nutrition and education. The program evaluation literature on the topic of cash transfers is large, and many positive impacts have been found. A smaller focus has been placed on the cumulative impact of years of grant receipt, and the impacts of transfers on older children. This paper seeks to bridge this gap.

Many cash transfer programs have been implemented as randomised controlled trials, making evaluation that much easier. This is not the case in South Africa, although it is still possible to estimate causal effects by exploiting the exogenous nature of the roll-out of grants over the years.

This paper makes use of the South African National Income Dynamics Survey (NIDS) to examine the link between receipt of the child support grant (CSG) and school enrolment[1], and educational attainment. We find that older teen CSG beneficiaries have enrolment rates that are at least ten percent higher than non-beneficiaries of similar income levels, and that cumulative duration of receipt is associated with higher enrolment. No impact of current or accumulated receipt on attained education is found. We assume the causal mechanism is mainly through the alleviation of income constraints related to schooling expenses.

This paper is organised as follows. Section 2 presents the theoretical framework. A literature review is presented in Section 3, and Section 4 describes the details of the program roll-out. Section 5 contains descriptive statistics, and Section 6 discusses the methodology and estimation, including the results of this estimation. Section 7 discusses potential confounding effects and reports the result of several robustness checks, important to identification. Section 8 concludes.

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[1]The NIDS does not contain data on current attendance, and most international studies report impacts on enrolment, and not attendance (Baird et al. 2013).

2 Theoretical Framework

The decision to enrol can be viewed as either a current consumption decision, or an investment decision. The investment decision compares the net present benefits and costs of education. One invests if the expected rate of return is greater than some available rate of interest (Becker 1964, Campbell & Siegel 1967, Mincer 1958, Mincer & Polachek 1974). Assuming zero costs to schooling, the individual maximises

$$V_n = a_n \int_n^l (e^{-rt})dt$$

where a_n are annual earnings, V_n is the present value of life earnings before enrolment, r is the discount rate, l is time in years (Mincer 1958). This assumes all individuals can borrow to fund their education if necessary, which in the South African context is possibly unrealistic. Zero costs to schooling accords with the no-fee schools available to CSG recipients (sixty percent attend no fee schools), but this assumption ignores the other costs of school attendance (school fees make up only forty percent of total educational spending in 2011 for older teens). Cash transfers, by lowering the opportunity cost of education (compared to an alternative investment), imply increased demand for education.

From the consumption approach, education can be regarded as a durable good which gives current consumption benefits (which are hard to measure), and future services as well. The demand for education Q_d is dependent on a large number of factors.

$$Q_d = f(X_i, HH_h, S_s)$$

X_i are individual characteristics, such as expected future earnings, education already obtained, motivation, health, innate ability, ethnicity and gender (Schultz 1961, Johnes & Johnes 2004). The S_s include school characteristics such as direct costs of schooling[2], school quality and others (Case & Deaton 1999). The HH_h include family characteristics (including socio-economic factors) (Freeman 1987, Hanushek et al. 2011). Campbell & Siegel (1967) find that education prices and income levels explain eighty seven percent of the variation in tertiary education demand in the United States between 1919 and 1964. In addition, consumer prices positively impact on education demand. From the consumer model we again conclude that the reduction in education costs caused by CSG receipt may increase education demand.

A part of the education literature also focusses on the education production function, which details the factors most important to educational attainment, and regards schools as production units (Becker 1964, Johnes & Johnes 2004, Cohn & Geske 1990). Student demand for education (the decision to enrol) is also examined, although most often regarding the decision to enrol in higher education, and not secondary (Leslie & Brinkman 1987). Examining enrolment implies following the indirect link between the demand for education (i.e. the desire to invest in human capital) which is then evidenced by a desire to be enrolled. Many of the factors which determine educational attainment are also important in the enrolment decision, and may have similar direction effects in both models.

School characteristics (such as cost or quality) cannot enter into enrolment models directly, as those not enrolled have missing data for these variables (although one may infer some information from the characteristics of schools attended by siblings if one is not the eldest). One can also consider average school quality in the surrounding area, but this may be a poor proxy depending on how strongly enrolment is related to household formation and potential migration. When considering truancy rates, and thus in reverse, determinants of enrolment (or attendance, similar but not the same), Johnes & Johnes (2004) cite as important summary factors the characteristics of pupils themselves, schools, peers, family, and location. A truancy model allows one to include direct qualities of schools, as researchers have knowledge of which school the child is playing truant from.

It is important to consider the opportunity costs[3] of school attendance (Becker 1964). These costs are proportional to the number of years of school already attained (Freeman 1987), but the

[2] Including school fees, books, uniforms, transport and others (Becker 1964).

[3] A learner contemplates enrolment or employment, where the prospect of the latter is uncertain. Opportunity cost for teens is lower than that of older workers, given low teen employment rates, and lower expected salaries.

anticipated benefits rise the closer the individual is to school completion. The rates of return to education in South Africa rise steeply after matriculation. The CSG both lowers the opportunity cost (of not working) and the direct cost of attending school. For female learners, it raises the opportunity cost of falling pregnant. When learners do not attend school, they may work on family farms, or in the home (Schultz 1961), thus their enrolment has an opportunity cost to the family, but which may be difficult to estimate or measure (Campbell & Siegel 1967).

The major drop in enrolment does not occur immediately after the age of fifteen (the compulsory school leaving age) in South Africa, but rather occurs after the age limit for the CSG is reached, thus ruling out a potential confounding effect of the legal age requirement (this can be seen in section 3 below).

The causal mechanisms through which the CSG impacts on enrolment may be related to the costs of school attendance. In 2011, fifty percent of potential learners between the ages of fifteen and nineteen were not enrolled for reasons of either not being able to afford to go to school or current engagement in job search. A further thirteen percent were pregnant or had a baby. Only one in ten learners do not enrol because of disinterest[4]. In addition, those households receiving the CSG had equivalent schooling expenditures to non-recipient households, implying that the CSG was instrumental in bringing these households' educational spending up to par with non-beneficiary households. Knowledge of the CSG is high among teens themselves, and adolescent awareness is an important determinant of receipt (Department of Social Development & UNICEF 2012*a*, Department of Social Development & UNICEF 2012*b*).

A caveat is necessary when estimating enrolment or attainment models. One may have only poor measures of many of the determinants, such as ability, family tastes for education, and school characteristics. On balance, including proxies for these variables to prevent omitted variable bias may be better than the possible (due to non-random error) inconsistency, bias and loss of significance associated with measurement error of the true variables, especially if these variables are not the main independent variables of interest. If sufficiently large variation occurs in the true variables, we may be less concerned with the measurement error present. However, if the estimates of variables which are by necessity entered into models as proxies do not emerge as significant, we cannot necessarily conclude that the true variables have no impact on attainment or enrolment (Cohn & Geske 1990).

Many outcome variables are available to measure schooling attainment, and the demand for education. Direct outcomes include enrolment, rate of absenteeism, grade attainment or repetition, attainment of senior certificate, reading and writing scores, and others[5] (Case & Deaton 1999, van der Berg 2008, Lam et al. 2011). Attained education, grade progression, and literacy and numeracy status are cumulative measures, which are path dependent, and are more likely to be related to previous receipt than current. Both absenteeism and attendance or enrolment may be more closely related to current receipt, especially if the CSG finances current school attendance costs. We choose to focus on two outcomes: current enrolment, and number of years of attained education, and relate them to current receipt, and duration of receipt respectively. Attained education is a cumulative measure of achievement, while current enrolment measures current demand for education. There is more variation in attained education for all ages, but it is possibly unlikely that current receipt may be strongly correlated with cumulative attained education. Thus duration of receipt may be better suited as the receipt variable of choice for this analysis, however due to data constraints[6], we are forced to focus on the potential duration of exposure, rather than true duration.

[4]Authors own calculation, National Income Dynamics Survey data, wave 3. A very low percentage of those not enrolled cite current employment in 2012, or having finished education. Other reasons cited for non-enrolment include poor health, and the poor quality of available schools.

[5]Other outcomes potentially related to grant receipt include child labour, reasons for not being enrolled, and risky teen behaviour (including substance abuse and sexual activity).

[6]Duration data is only collected for children under 15 years of age, and the quality of the data is poor.

3 The Child Support Grant: Program Roll-out

3.1 History

Following the Lund Commission in 1996, the state maintenance grant was phased out for 400 000 beneficiaries, and South Africa's child support grant was introduced in 1998. The CSG was intended to work towards removing racial and gender inequality, effectively targeting poor children no matter their household status, improving nutrition in the critical early years, and scaling up to large numbers of recipients (Lund 2008).

Table 1

The South African Child Support Grant
Dates and Amounts of Receipt and Eligibility

Date	Amount	Age Limit	Means Test
October 1998	R 100	7	R800 in
July 1999	R 100	7	Rural Areas
July 2000	R 100	7	R1,100 in
July 2001	R 110	7	Urban Areas
April 2002	R 130	7	
October 2002	R 140	7	No change in
April 2003	R 160	9	Means Test
April 2004	R 170	11	Until 2008
April 2005	R 180	14	
April 2006	R 190	14	
April 2007	R 200	14	
April 2008	R 210	14	
October 2008	R 230	14	R 2,300
January 2009	R 240	15	R 2,400
April 2010	R 250	16	R 2,500
April 2011	R 260	17	R 2,600
January 2012	R 280	18	R 2,800
April 2013	R 290	18	R 2,900
April 2014	R 310	18	R 3,100
October 2014	R 320	18	R 3,200

Source: National Treasury Reports. The Age Limit referred to is the upper age limit, for e.g. in 2011, those aged 16 and under received the grant. In 2008, the means test was changed to 10 times the grant amount, i.e. in 2009 when the monthly grant amount was R240, the means test was R2400. For married couples, the means test amount is exactly double, i.e. R4800 per month.

Roll-out began in April 1998, and despite a slow start, by 2000 the grant was effectively being distributed to eligible children below the age of seven, to the child's primary caregiver. Receipt was subject to a means test of 800 rand in urban areas, and 1,100 rand in rural areas. Initial take-up was low, estimated at only ten percent in 2000, but increased significantly a few years post introduction. The grant amount itself is modest - 280 rand per child in 2012 (approximately twenty six US dollars). It is not large in comparison to the old age pension (approximately 1,200 rand in

2012), disability and foster grants, or relative to per capita income. The number of beneficiaries is high - expected to be above 11.5 million in 2014 (SA Treasury Budget Report 2011), and has grown at a rate of approximately 7.5 percent a year.

By 2012, the age threshold had been increased to age eighteen, at irregular intervals, and the means test set at ten times the grant amount (after remaining unchanged from 1998 to 2008). This amount is doubled for married caregivers, and proof of non-support from fathers is required if this is claimed. Table 1 contains a summary of extension and amount details from 1998 to current.

Initially many infrastructure problems plagued the CSG roll-out (Hunter 2004, Hunter & Adato 2007*b*, Budlender et al. 2005, Aguero et al. 2009, Goudge et al. 2009, Delany et al. 2008). Knowledge was widespread regarding the grant's existence, but the exact details of how to apply, and who could apply were not widely known (Hunter & Adato 2007*a*, Hunter & Adato 2007*b*). Non biological caregivers found it difficult to successfully apply for the grant (Delany et al. 2008). The majority of caregivers are recorded as the mother, even if the mother is non resident, possibly due to fear of an unsuccessful application (Aguero et al. 2009). Many cited lack of documentation as the reason for unsuccessful application (Goudge et al. 2009, Leibbrandt et al. 2010, Woolard et al. 2009, Delany et al. 2008). The time cost of an application was estimated at 8 full hours (Budlender et al. 2005, Hunter 2004), and a successful applicant in 2003 could wait for 3 months or more until receipt began.

In addition, many suitable applicants may not have applied for receipt, due to the artificially low and non inflation-adjusted means test amount prior to 2008 (Budlender et al. 2005).

3.2 Conditionality

Apart from the age and income requirements, initially the CSG was tied to the child having a Road to Health clinic card[7], or to school enrolment for children aged 6 and above. These restrictions were inconsistently applied, and were later abandoned. As of January 2010 however, grant receipt was formally conditioned on school enrolment, with new applicants required to bring report cards of children to the Department of Social Development (DSD) offices on application (Department of Social Development & UNICEF 2012*a*).

Regular proof of school enrolment needs to be submitted to the DSD along with school reports (although alternative document provision is allowed). Failure to do so is intended to result in a social worker being sent to the household to put in place steps to ensure the child is enrolled, and to provide necessary support to the household to ensure this happens. Actual discontinuation of receipt however is viewed as a last resort, and anecdotally, this condition is not being checked for existing recipients, only new applicants (generally younger children) (Department of Social Development & UNICEF 2012*a*). The data does not show this to be a binding constraint for receipt, and effectively the CSG is considered an unconditional grant by researchers.

3.3 Patterns in Receipt

Receipt after birth is usually low (just over forty percent in 2012 for children under a year), but climbs after the first year. Rates of receipt are lower for orphans, and for maternal orphans in particular (Leibbrandt et al. 2010, Woolard et al. 2009, Case & Ardington 2006), and are higher among the very poor (Case et al. 2005). Boys and girls receive the grant in equal measure.

In 2004, Budlender et al. (2005) estimated that two thirds of age-eligible children in KwaZulu-Natal were also income eligible. This figure has climbed, due to the increase in the means test threshold. Calculations using the three waves of NIDS reveal that approximately eighty three percent of age eligible children are income eligible as well.

Grant receipt has risen, and by 2008, reported receipt was approximately sixty percent of all age-eligible children under the age of fifteen (Woolard et al. 2009), implying even higher take-up among children who are both age and income eligible. Patterns of receipt by age can be seen in Figure 1.

[7] A card given at birth to all South African children, and updated at each clinic visit with vaccination and growth information.

Figure 1

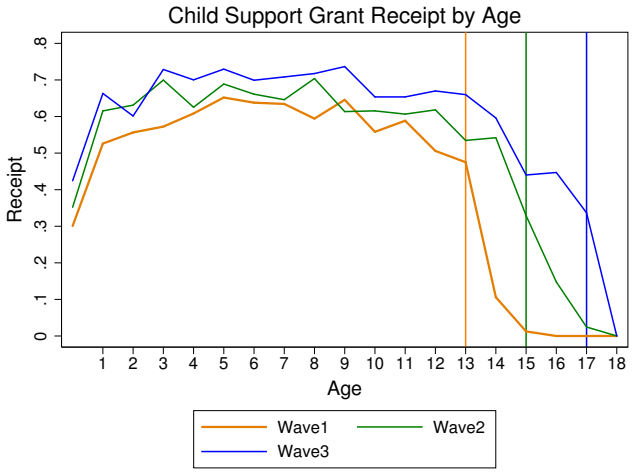


Figure 1 shows average child support grant receipt by age category, in each wave of the NIDS, for children from birth to eighteen years of age. For example, we can see that nine year old children in wave three have average rates of receipt of seventy percent. The vertical lines show the age cut-off relevant to each wave. In wave two, the maximum age of receipt is fifteen, and we can see that receipt drops after this age (although not completely to zero due to inclusion and data errors). Averages are calculated using the sample weights for each wave. It is possible to see the increase in receipt in the older ages from wave one to wave three.

The changes of interest to this paper occurred over the years 2008 to 2012, where the age threshold was increased from fourteen in 2008, to sixteen in 2010, and to eighteen in 2012. The increase in receipt among older children affected by the change can be clearly seen in Figure 1[8]. For example, eleven percent of fourteen year olds in 2008 claim receipt[9], compared to sixty percent in 2012.

Some of these older children have never received the grant, or may have only received it for some small proportion of their lives, and thus we do not expect to see take-up as high as for those in the younger age brackets. The pattern of expansion is unlikely to create many new or late entries into receipt[10]. Those that simply age through the system should have similarly large means for receipt as younger children in 2012, and they do (for example sixty six percent of thirteen year olds are receiving the grant in 2012, compared to sixty five percent of ten year olds).

Receipt predictably declines the closer one approaches to the age limit, and there is a sharp cut-off on either side of the age limit, seen in each year.

3.4 Relationship to Enrolment

Although enrolment is initially lower at ages six and seven in South Africa, it climbs steeply thereafter, and there is extremely little variation in enrolment for children under fifteen (Case

[8]Figure 1 is replicated for both African and Coloured children only (as per the sample used in later analysis), and for those in this group who pass the means test (i.e. are also income eligible). Similar patterns are seen. Receipt is higher among the African and Coloured sample than all races, and higher still for those who pass the means test.

[9]Non-zero figures for receipt for children above the age threshold are seen in both 2008 and 2010. Potential administrative error or age recollection errors are one explanation. Data for wave two was collected in two phases, in 2010 and 2011, where the age limit was sixteen and seventeen respectively. This is a partial explanation for the non-zero percentage of sixteen year olds reporting receipt in wave two, although inclusion errors among this age group are reported in phase one (2010) as well. Investigating past receipt shows similar patterns to present receipt. A fuzziness is present around the age cut-off limit for receipt of the CSG in the past (possibly due to recollection error).

[10]The parents of older children may not bother to register for only one or two potential years of receipt.

Figure 2

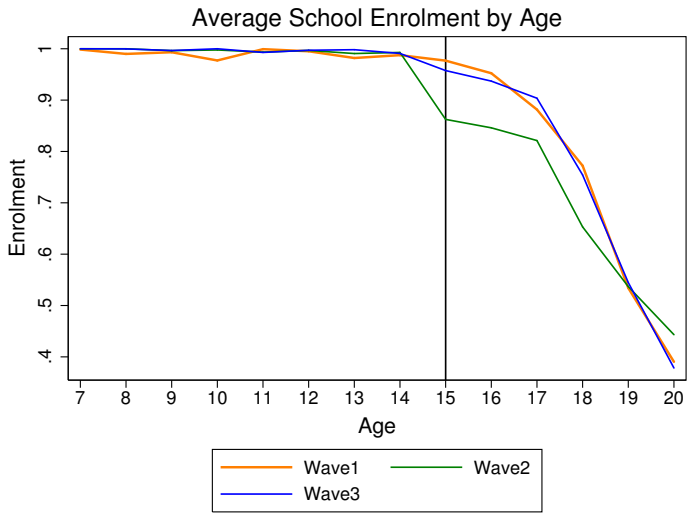


Figure 2 shows average school enrolment by age category, in each wave of the NIDS, for African and Coloured learners between the ages of seven and twenty. For example, we can see that fifteen year old children in wave two have average rates of enrolment which are just under ninety percent. The vertical line shows the compulsory minimum school leaving age of fifteen. Averages are calculated using the sample weights for each wave.

& Deaton 1999). In South Africa, children are required to begin school in the year they turn seven, and may leave in the year they turn fifteen, or reach the ninth grade, whichever comes first (Fleisch et al. 2012*a*). This can be seen in Figure 2. Enrolment is more variable after age fifteen, where enrolment also refers to post-school education. In 2012, thirteen year olds have close to a hundred percent enrolment, while only seventy five percent of eighteen year olds are enrolled. This is a pattern which has remained largely unchanged in South Africa, as seen in the SALDRU data set from 1993 (Case & Deaton 1999).

Enrolment dips between wave one and two for older teens, and rises back to its original levels in wave three. This result has been documented in other research papers (Branson et al. 2013), and implies caution should be taken in any dynamic analysis of enrolment between waves (as no specific systemic reason is present to support this change between waves).

African and Coloured teenagers have lower enrolment than Whites and Indian/Asian teens. Other lower enrolment groups include Coloured boys, maternal orphans, foreign born children, children in households which have migrated, children in some rural areas, and disabled children (Fleisch et al. 2012*b*), older teenage girls, and unexpectedly, children in the wealthier South African provinces.

Teen enrolment reflects the preferences of both parents *and* teens. Enrolment is a choice, and so is grant receipt. Both are age determined - by both compulsory enrolment and by age eligibility thresholds respectively.

In wave three CSG beneficiaries have enrolment rates seven percentage points higher than non-beneficiaries of similar income levels. These patterns of enrolment by receipt status can be seen in Figure 2 and Figure 3 below, where the vertical lines represent the age cut-off (and the dotted line the compulsory school leaving age). The effect is much clearer in wave three, where receipt has climbed to higher levels due to the expansion. This effect is invariant to the inclusion of other controls[11].

[11]For example in 2010, fifteen year old recipients had enrolment rates of ninety one percent vs. eighty five percent for non-recipients, and eighty three percent for non-recipients who were sixteen

Figure 3

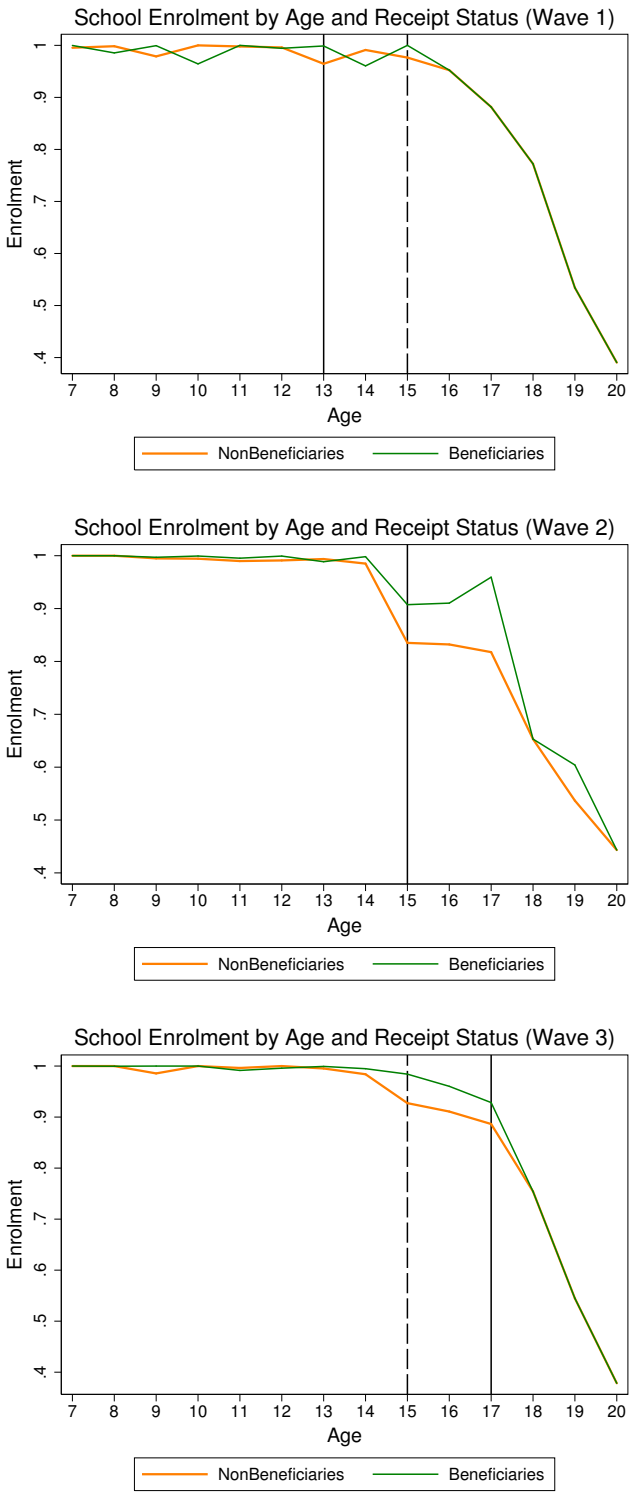


Figure 3 shows average school enrolment by age category and beneficiary status, in each wave of the NIDS, for African and Coloured learners between the ages of seven and twenty. The solid vertical line shows the last age at which learners are eligible for the grant. For example, in wave one, those thirteen and under are eligible. The dashed vertical line at fifteen shows the compulsory minimum school leaving age. Fifteen year old non-beneficiaries have average enrolment of just over eighty percent in wave two. Enrolment figures should be identical after the age of eligibility is reached, as no-one is eligible at that point, but wave two shows receipt above the age cut-off, due to data and inclusion errors. Averages are calculated using the sample weights for each wave.

3.5 Exogenous Variation in Roll-out

There is great variation in both actual and potential duration of receipt between older and younger children, due to the un-anticipated changes in the age threshold. While actual duration data reflects the extension of the threshold over the waves[12], the poor quality[13] of the data suggests a focus on the calculated potential duration variable. Some children have had the potential to receive the grant for a large percentage or a hundred percent of their lives, while older children may have only been eligible for a small portion of their lives, and their receipt may have been interrupted.

Figure 4 shows potential duration of receipt by age, in wave 3. Potential duration of receipt increases linearly with age until age thirteen[14], hitting a maximum of fourteen years of exposure, and then declines rapidly for children older than sixteen. Sixteen year olds have had fourteen potential uninterrupted years of exposure in 2012 (eighty eight percent of their lives), while nineteen year olds in 2012 have had potential interrupted exposure for only three years (sixteen percent). This variation in potential exposure reflects the exogenous nature of the roll-out of the grant to older children.

Figure 4

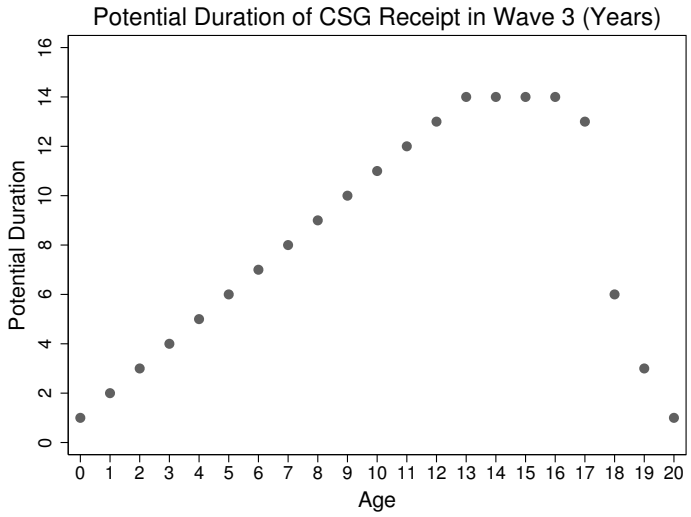


Figure 4 shows years of potential duration of receipt to the child support grant by age category, in wave three of the NIDS, for individuals from birth to age twenty. For example, we can see that sixteen year old children in wave two have a maximum of fourteen years of exposure to the grant, and older learners, due to the pattern of expansion, see lower and lower numbers of years of exposure (which are also interrupted). For example, nineteen year olds have had three years of exposure, in 1999, 2005, and 2006. Potential duration is calculated as age plus one for the younger ages who have been covered their entire lives, i.e. a six year old has had seven years of exposure to the CSG.

[12]See Figure 7 in the Appendix.

[13]Only a moderate number of beneficiaries report their receipt, in years, and even fewer report receipt in years and months. In addition, duration data is only collected for those under fifteen in the NIDS.

[14]Potential duration equals age plus one in this framework. A child under the age of one is considered to have been exposed for 1 year, and so on.

4 Literature Review

Many social security programs have been introduced in developing countries in recent years, including Brazil, Pakistan, Columbia, Ecuador, Mexico and others (Adato et al. 2000, Filmer & Schady 2011, Baird et al. 2009, De Brauw & Hoddinott 2011). A large number of program evaluations (mainly randomised controlled trials) have found positive impacts of cash transfers on poverty, education, health and nutrition (especially for girls) (Adato et al. 2000, 2003; 2012, Attanasio and Lechene 2002, Baird et al 2014, others), and mothers' bargaining power (Ambler 2013, Richards et al. 2013). Ambiguous effects have been found on labour supply (Leibbrandt et al. 2013).

South Africa has seen a similar growth in the reach of its social security programs. A great deal is known about the nature of South African child support grant beneficiaries and recipients (Budlender et al. 2007, Aguero et al. 2009, Hunter & Adato 2007*a*, Delany et al. 2008). Recipient households are likely to be larger, have lower income but higher levels of grant income, have members who are less educated, have fewer assets and employed members, and are more likely to be situated in rural areas. Recipients are overwhelmingly African and female (Delany et al. 2008). Household receiving the CSG are more likely to be receiving other grants, in particular the old age pension (Department of Social Development & UNICEF 2012*b*, Department of Social Development & UNICEF 2012*a*).

No large scale randomised controlled trials have been conducted in South Africa to evaluate grant impacts. Researchers have attempted to deal with the endogeneity of grant receipt in various ways. Many controls are usually included in estimations, in a bid to reduce omitted variable bias. Other studies use matching methods, constructed control groups, or regression discontinuity methods, to identify the effect of receipt (Samson et al. 2008, Aguero et al. 2009, Case et al. 2005, Ranchhod 2006, Williams & Samson 2007). Samson et al. (2008) create a panel data set from General Household Survey waves 2002 to 2004. They compare children who were age eligible, but did and did not receive the child support grant. Aguero et al. (2009) use continuous treatment estimation strategies during the first three years of life, conditioning on a measure for "eagerness" of the mother. Case et al. (2005) use a control group of older siblings, but no attempt is made to control for imbalanced treatment and control groups, or the eagerness of mothers. Ranchhod (2006) uses a discontinuity approach in the 2000 Labour Force Survey and Income and Expenditure Survey data around the age threshold. These effects may reflect a simultaneity problem and it is not clear that households on either side of the discontinuity point are similar in characteristics. The South African literature must be evaluated with care before concluding that true causal impacts have been measured.

The grant has been seen to be related to many outcomes. Non-schooling related outcomes discussed include child hunger, weight and height z scores, incidences of illness, and child labour (Budlender et al. 2007, Samson et al. 2008, Williams & Samson 2007, Aguero et al. 2009, Budlender & Woolard 2006, Boler 2007, Samson et al. 2004). Grant receipt does have positive poverty alleviating effects (e.g. Samson et al. 2004, Triegaardt 2005, Leibbrandt et al. 2010). Mostly positive impacts are found in most of the above literature on the outcomes mentioned (and even of non-beneficiary household members in recipient households (Budlender & Woolard 2006)), although it cannot be assumed de facto that these effects are causal.

Concerns exist regarding unforeseen negative impacts of grant receipt. Unfortunate household formation (an influx of unemployed members) is a worry (Hamoudi & Thomas 2014), and evidence has been found to support this hypothesis (Samson et al. 2004, Klasen & Woolard 2009) although the authors note that grants may also be used to fund job search, and in addition Djebbari & Mayrand (2011) find evidence that CSG receipt results in more children staying with their biological parents rather than being fostered out. Hunter & Adato (2007*a*) note a drop in remittances to households after receipt begins, which may imply households become less reliant on external funds, and thus is not necessarily a negative outcome. Another concern exists regarding a potential relationship between teen fertility and receipt. Makiwane et al. (2006) use many datasets, but find no association between fertility and grant receipt. Rough calculations using the NIDS show that teen recipients have statistically significant lower rates of pregnancy than non-recipients.

Mothers receiving a grant may increase their bargaining power in the household, as they are less reliant on spousal income, and thus have a better fall back position (Quisumbing &

Maluccio 2003). Female grant receipt may positively impact children, as empirically women spend more on children's health, nutrition and education, and men spend more on personal consumption (Lundberg & Pollak 1996, Quisumbing & de La Brière 2000, Case & Deaton 1998, Duflo 2003, Rogan 2013, Alderman et al. 1995, Thomas 1990, Quisumbing & Maluccio 2003). The strength of grant impact depends on the degree of income pooling in households. Delany et al. (2008) find that the CSG is found is pooled with other household income in about half of all cases. The authors find increased spending on food for recipients compared to eligible non recipients, as well as uniforms and school fees (which implies a lesser degree of income pooling, as female grant recipients tend to spend more money on children than male). Receipt is also correlated with better nutritional status among younger children in Kwazulu-Natal (Yamauchi 2006).

Turning to the literature on education, we find that the determinants of schooling performance in South African and internationally are many and varied. These include gender, race, household socio-economic status, cost of school fees, uniforms and books, parental educational outcomes, home language and proficiency in English, household size and expenditure, and province (Case & Deaton 1999, van der Berg 2008, Lam et al. 2011). Others less frequently cited include foreign born status, orphanhood, domestic migration, and disability status (Fleisch et al. 2012*a*). School level determinants are school quality, distance to school, pupil teacher ratios, no fee status, class size, and the age distribution of one's peers (Cascio & Schanzenbach 2007, Angrist & Lavy 1999) and others.

Many studies exist which examine the impact of transfers on enrolment in particular, in countries such as Brazil, Pakistan, Columbia, and many others (Adato et al. 2000, Filmer & Schady 2011, Baird et al. 2009, De Brauw & Hoddinott 2011). Using a randomised experiment in Ecuador, Schady & Araujo (2006) find that cash transfers have a large positive impact on school attendance, of approximately ten percentage points. Analysing the PROGRESA program in Mexico, using random variation in administrative monitoring of school enrolment, De Brauw & Hoddinott (2011) find that unconditional cash transfer programs are not as good as those with conditions at improving enrolment, especially at the transition to lower secondary school. Using a regression discontinuity design in Cambodia, Filmer & Schady (2011) find that even a very modest cash transfer raises enrolment rates substantially.

In South Africa, Budlender & Woolard (2006) find the CSG is associated with increased grade repetition, although a small positive effect of receipt on attendance is found, even for co-resident non-recipient children, although Williams & Samson (2007) do not find these co-resident effects. Using Kwazulu-Natal data, Boler (2007) finds pension or CSG receipt does not affect primary school completion rates, but it does appear to protect boys from drop-out (Department of Social Development & UNICEF 2012*a*). Most studies find increased daycare attendance among beneficiaries (Budlender & Woolard 2006, Boler 2007). Cash grants can mitigate or entirely cancel the negative effect of being an orphan on educational outcomes (Boler 2007, Case & Ardington 2006, Timaeus & Boler 2007). Fleisch et al. (2012*b*) note higher enrolment rates in both recipients and non-recipients in grant receiving households.

Turning to older teens, one finds a much smaller literature. Baird et al. (2010) find that cash transfers were successful both at preventing school drop-out[15], and teen marriage and pregnancy (a key issue which impacts school attendance) in a Malawian RCT. Conditional cash transfers in Columbia were associated with higher rates of enrolment for teenagers (Barrera-Osorio et al. 2011). In Mexico, the Opportunidades program is associated with higher enrolment for teens, and higher educational attainment for those with longer exposure to the program (Behrman et al. 2009). Similar results are found in Brasil for teenagers (Schaffland 2014). No such effects are found in Uruguay however (Amarante, Ferrando & Vigorito 2011). In South Africa, a recent survey by the Department of Social Development (Department of Social Development & UNICEF 2012*a*) found that the grant is associated with higher grade attainment, particularly for girls, and lower absenteeism among boys.

Around the world, an inability to meet schooling costs is associated with drop-out, particularly in developing countries (Naong 2013), and South Africa is no exception. A question is whether the CSG can realistically have any impact given the modest grant amount. In 2011, mean annual educational expenditure for the bottom three household income quintiles was approximately 1,350

[15]Conditional cash transfers had a larger impact on attendance than unconditional (Baird et al. 2010).

rand (Branson et al. 2013). In contrast, the total CSG amount received per child was 3,120 rand. Our own calculations show that for all children who are income eligible for the grant, total average education costs per child are 820 rand in 2011. Grant income may have a significant effect on school enrolment if the costs of schooling are an important factor in the enrolment decision. It has been seen that as developing countries become more industrialised, socio-economic factors become more important in predicting academic success (Cohn & Geske 1990).

de Kadt et al. (2014) find that though children in Johannesburg have schools which on average are only 0.4 kilometres away, many children choose to travel to further away schools, at a high cost of transport and school fees. A quarter of grade twelve learners travel further than ten kilometres to school, usually to better quality schools than local alternatives. The grant may be financing enrolment at better schools, by covering transport costs[16].

Much of the academic literature which seeks to measure the impact on child grants has focussed on younger children, while a much smaller part places focus on older children, and mothers. In addition, a large part of the literature focusses on short term effects, and has ignored the cumulative effects of grant receipt (Baird et al. 2014). We seek to add to the limited pool of literature regarding the impact of *unconditional* cash transfers in both of these regards.

5 Data and Descriptive Statistics

This paper makes use of the first three waves of the National Income Dynamics Survey (Brown et al. 2013, SALDRU 2013). The data is a national representative panel undertaken to measure welfare over time, through the survey of wealth creation in terms of changes in income, expenditure and assets, demographic dynamics, social heritage and access to cash transfers and social services (Brown et al. 2013). The NIDS is the first panel survey of this kind in South Africa. It is collected every two years, and 10,241 households were surveyed in wave three (2012), comprising over 38,000 individuals.

Data sets collected prior to the NIDS struggled with issues of poor data quality on caregiver relationships to recipients, and individual receipt (Budlender & Woolard 2006, Budlender et al. 2005, Williams & Samson 2007). The rich and precise nature of the data collected on child support grant beneficiaries and recipients, and the fortuitous timing of data collection over periods of change in the grant's eligibility rules make this an ideal data set to answer the key questions above.

Table 2 presents descriptive statistics for all children aged eighteen or under in wave three, and in addition for child support grant beneficiaries and non-beneficiaries. Average age in the sample is 9.1, attained education is 3.47 years, 82 percent of mothers are resident in the household, and average maternal education is 9.73 years. 59 percent of this sample are CSG beneficiaries***[17] (with an average number of beneficiaries per household of 1.38). Average duration of receipt (collected for those under 15) is 5.43 years. Mean household size is 4.88, and mean household grant income is 1,216 rand.

Previous patterns discussed in the literature are confirmed in Table 2 regarding differences by beneficiary status. Similar results are also found for waves one and two (not presented here), and a significant increase over the waves is seen in the numbers of recipients, and average grant income.

[16] Transport costs made up a fifth of total education costs in 2011.

[17] Children below fifteen have data on grant receipt which has been asked of the mother or other caregiver. Those aged fifteen and above however have the grant receipt question asked directly to the individual. Data comparability and quality does not seem to suffer for this slight difference - as seen in Figure 1, the pattern of receipt recorded for older teens agrees with the patterns seen in younger teens in the previous waves.

Table 2

Individual Descriptive Statistics (Children Aged 18 and under) by CSG Beneficiary Status in Wave 3

Variable	All	CSG Beneficiary		Non Beneficiary
Age	9.1	8.0	***	10.5
Female	0.50	0.50		0.50
Total Spending on Education (2011)	2,123	837	***	3,956
Income Eligible for the CSG	0.74	0.89	***	0.5
Mother's Education	9.73	9.16	***	10.57
Mother is Resident in the HH	0.82	0.81	*	0.83
Rural	0.46	0.53	***	0.35
Enrolled	0.96	0.99	***	0.92
Years of Completed Education	3.47	2.63	***	4.66
African	0.84	0.92	***	0.72
Coloured	0.09	0.06	***	0.12
Indian/Asian	0.02	0.01	***	0.04
White	0.06	0.01	***	0.12
CSG Beneficiary	0.59	1.00	***	0.00
Duration of CSG Receipt	5.43	5.43		--
Household Size	4.88	5.15	***	4.52
Household Income	8,135	4,265	***	13,275
Household Grant Income	1,216	1,192		1,306
Number of Children in HH	2.22	2.47	***	1.90
Number of Adults	2.39	2.40		2.38
Number of Pensioners	0.40	0.43	***	0.36
Number of CSG Recipients in Household	1.38	2.16	***	0.35
# Observations	15,490	9,249		6,241

Notes: Descriptive Statistics of Child Support Grant Beneficiaries and Non-Beneficiaries. National Income Dynamics Survey Data. Estimates presented are weighted using the sample weights from each wave. The sample consists of children aged 0 to 18. Significant differences are starred. * implies p value < 0.10, ** implies p value < 0.05, and *** implies p value < 0.01.

In 2012, CSG beneficiaries were significantly younger than non beneficiaries, correspondingly have lower attained education levels, live in households with more children, and significantly lower household income, and are much more likely to be located in rural areas. Household grant income is slightly lower for beneficiaries than non-beneficiaries, implying that possibly clustering of social support beneficiaries into households (such as pensioners and children) cannot be assumed automatically. Enrolment is higher for child support grant beneficiaries. The majority of these differences are significant at the one percent level.

The sample used in the remainder of the analysis is that of African and Coloured learners between the ages of fifteen and nineteen. This group makes up nearly ninety percent of all learners, and has the highest rate of CSG receipt. When the analysis is also performed for Africans alone, similar results are found. In addition, we present results from wave three only. In 2008 the age limit of fourteen precludes the examination of grant impact for this sample, as there are no recipients aged above fourteen. In 2010, not enough variation in reported receipt is present in this age group. However when the data analysis is replicated for wave two, similar direction, but insignificant coefficients are found to those of wave three. Pooled regressions with both waves yield similar coefficients to the wave three estimates.

6 Methodology and Estimation

6.1 Parametric Estimation

It is possible to use the panel and fixed effects to identify the grant effect between waves two and three, although not advisable. As mentioned previously, the unexplained large differences in mean enrolment values between waves one, two and three indicate dynamic analysis is unwise. In addition, sample sizes are very small[18]. Approximately fifty individuals report changes in both enrolment status and CSG beneficiary status over wave two and three, which does not yield enough variation for a successful fixed effects estimation.

Table 3 contains the result of three specifications, estimated with enrolment and years of education as dependent variables. These models are estimated using a sample of means test eligible teens between fifteen and nineteen years of age. The first specification is multiple linear regression (columns (1) and (4) of Table 3), with the main determinant of interest being reported child support grant receipt for children. Model (1) is as follows:

$$Y_{ih} = \beta_0 + \beta CSG_{ih} + \alpha X_{ih} + \gamma HH_h + \epsilon G_{ih} + u_{ih} \tag{1}$$

Y_{ih} reflects the enrolment or attainment outcome variable for individual i, in household h. CSG_{ih} reflects receipt, X_{ih} includes age, gender, years of completed education, mother's education, a binary variable for Coloured, maternal presence in the household and other individual characteristics. HH_h is a vector of household characteristics including household income and size. G_{ih} includes geographical controls, including binary variables for the provinces, and an indicator of living in a rural area, and u_{ih} is an error term.

When estimating a regression where the probability of CSG receipt varies sharply with age eligibility (having controlled for income eligibility), we are in effect measuring a regression discontinuity, around the age eligibility limit, using the eligibility dummy as an instrument for CSG receipt. This is a fuzzy regression discontinuity, and measures the average treatment effect in the populations (presuming it is homogeneous), using only the variation in CSG receipt caused by those who responding to the age eligibility condition. This fact suggests the use of model (2). Model (2) contains the results of a 2SLS estimation, where CSG_{ih} is instrumented for by an age eligibility dummy $Elig_i$. These results are shown in columns (2) and (5) in Table 3. In wave three, $Elig$ is one for those aged below eighteen in 2012, and is zero otherwise.

Model (2) is valid only if certain assumptions are met, and certain checks are made. The first is that $Cov(CSG_{ih}, Elig_i) \neq 0$, which is is[19]. Secondly after controlling for age[20], $Cov(Elig_i, u_{ih}) = 0$. This exclusion restriction is justified by the assumption that the roll-out of the CSG to older teens was unexpected, and random. In addition, individuals are unable to manipulate the age variable which determines eligibility. Allowing for heterogeneous treatment effects, we need to check the monotonicity condition, which is that no individual is excluded from grant receipt by being eligible - a trivial assumption given the program allocation rules (Angrist & Pischke 2008). The exclusion restriction for heterogeneous treatment effects presupposes that there is one unique channel through which eligibility operates on enrolment. For this to be the case, it is inadvisable to examine the IV results around the age of fifteen, as reaching the legal leaving age will also impact on enrolment. In wave three, as fourteen year olds are excluded and the age threshold at eighteen is far from the compulsory age, it may be safe to assume a unique channel, after having inserted other suitable controls.

If the above restrictions are met, the IV coefficient can be interpreted as the local average treatment effect (LATE), i.e. the causal effect of grant receipt on those who do respond to age eligibility (those who if age eligible would make sure to receive the grant, with certainty). It is important to note that (excepting inclusion errors), there cannot be what Angrist & Pischke (2008)

[18] Of the sample of fifteen to nineteen-year-olds in waves two and three, the fifteen and sixteen-year-olds in 2010 appear again as seventeen and eighteen-year-olds in 2012 and thus are the only potential observations in a fixed effects analysis.

[19] Age eligibility is associated with a sixty four percent higher probability of receipt in wave three.

[20] The assumption is that assignment to treatment is random, conditional on age. We have to account for age differences in enrolment, in particular the downward trend in enrolment for older children.

refer to as "always takers" for the CSG (receipt is impossible for those above the age threshold). Thus the average treatment effect (ATE) on the treated is also the LATE in this case (as the ATE is a weighted average of the effects on always takers and compliers).

Model (3) is a replication of model (1), with the CSG variable of interest here potential duration of receipt. The coefficient reported shows the impact of an extra ten years of exposure. These estimates are seen in columns (3) and (6).

Table 3

Determinants of Education and Enrolment in Wave 3						
Dependent Variable	Enrolment			Education		
	(1)	(2)	(3)	(4)	(5)	(6)
Actual Receipt	0.08 ***			0.13		
Age Eligibility (IV)		0.15 **			0.22	
Potential Duration X 10			0.16 ***			0.16
Age in Years	-0.08 ***	-0.07 ***	-0.05 ***	0.69 ***	0.71 ***	0.71 ***
Female	-0.02	-0.02	-0.01	0.63 ***	0.63 ***	0.63 ***
Mother's Education	0.01 ***	0.01 ***	0.01 ***	0.08 ***	0.08 ***	0.08 ***
Coloured	-0.17 ***	-0.17 ***	-0.18 ***	-0.24	-0.23	-0.24
Mother Resident in HH	0.00	-0.01	0.00	-0.12	-0.14	-0.11
Household Income	0.00	0.00	0.00	0.00	0.00	0.00
Household Size	0.00	0.00	0.00	-0.01	-0.01	-0.01
Rural	0.01	0.01	0.01	-0.10	-0.10	-0.10
Dependent Variable Mean		0.81			8.75	
Number of Observations	1,836	1,836	1,836	1,839	1,839	1,839
F stat	22.9	21.9	22.4	50.3	49.3	49.2
Adjusted R Squared	0.19	0.18	0.19	0.32	0.32	0.32

Notes: 3 specifications are used to estimate the impact of CSG receipt on enrolment and years of education in wave 3 of NIDS. In column (1) and (4), actual receipt is used as the CSG variable of interest. In columns (2) and (5), instrumental variables estimates are presenting, using age eligibility as an instrument for actual receipt. In columns (3) and (6), the impact of potential duration of CSG receipt is shown. African and Coloured learners between the ages of 15 and 19 make up the sample. A full set of province dummies is included in each specification. Robust standard errors are reported, corrected for clustering. * implies p value < 0.10, ** implies p value < 0.05, and *** implies p value < 0.01.

From Table 3 we can see that older learners and Coloured learners are less likely to be enrolled, ceteris paribus. This indicating analysis by race group may be necessary. To ensure consistency with the estimates in columns (4) to (6), attained education is omitted from the enrolment estimates (when included, we see those students with higher levels of attained education are more likely to be enrolled, but importantly, the coefficients of interest do not change). Maternal education has a small but significant impact on enrolment. Province dummies are included but not reported, but the main conclusion we gain from them is that the Western Cape has the lowest rates of enrolment.

From column (1) we see that CSG receipt is associated with enrolment that is higher by eight percentage points. Mean enrolment is eighty one percent in this sample, thus this is a ten percent effect. The instrumental variables estimates in column (2) show receipt due to age eligibility raises enrolment by fifteen percentage points, a very large effect. An extra ten years of exposure raises the probability of enrolment by sixteen percentage points.

For education, we see that older learners have significantly higher education (as expected), as do females, and those with higher maternal education. However none of the CSG receipt variables emerge significant in these regressions. This is possibly to be expected for models (1) and (2), but potential duration of exposure as a cumulative measure seemed possibly more likely to be associated with attained education, but these estimates indicate we should reject that hypothesis.

When estimated for younger children below the age of fifteen (not reported here), a small impact is found - for example fourteen year olds covered by birth can expect education levels seven percent higher than those not covered at all.

The inclusion or exclusion of other controls does very little to change its sign, magnitude or significance of these coefficients in all three models. That the controlled and uncontrolled coefficients are similar in size in the instrumental variables estimates provides further evidence to imply the instrument is acting through only one channel. The first stage estimates show age eligibility raises the probability of receipt by forty eight percentage points. The coefficient found can be interpreted as the average treatment effect of receipt, on those who respond to the offer, i.e. all those who will obtain receipt, when age eligible. Unfortunately potential duration cannot be used as an instrumental variable for actual duration, as in the younger sample, potential duration increases linearly with age.

These models are significant overall, but do not explain more than twenty percent of the variation in enrolment, and thirty two percent of that of education. Clearly other factors are also important in determining enrolment for this sample. It may be helpful to incorporate average school quality variables in the immediate vicinity, as this gives a measure as to what students are choosing when deciding to enrol. Average teen wages in the immediate vicinity may also be useful data to include, though this may have to come from an external data set (if available), as rates of teen employment are not high in the NIDS.

Following the discussion in the Descriptive statistics, we re-estimate the models in Table 3 for different sub-samples, and the results are shown in Table 4.

Table 4

Determinants of Education and Enrolment in Wave 3 (Selected Sub-Samples)												
Dependent Variable	Enrolment						Education					
Samples	Actual Receipt		Instrumental Variables		Potential Duration		Actual Receipt		Instrumental Variables		Potential Duration	
All	0.09	***	0.24	***	0.22	***	0.01		0.01		0.01	
Mean, Sample Size	0.82	2,331					8.86	2,331				
Coloured	0.48	***	-0.44		-0.09		0.05	**	-0.06		-0.01	
	0.62	219					8.81	219				
Female	0.13	***	0.11		0.18	**	0.02		0.07	*	0.04	
	0.79	955					9.07	955				
Means Test Eligible	0.10	***	0.18	**	0.20	***	0.01		0.03		0.02	
	0.81	1,836					8.75	1,836				
16 and 17 Year Olds	0.12	***	--		0.75	***	0.00		0.00		-0.82	***
	0.88	768					8.48	768				
Western Cape	0.34	**	-7.54		0.14		0.05	**	-1.00		0.00	
	0.61	147					8.97	147				
Gauteng Province	0.17		0.45		0.45	*	-0.04	*	-0.05		-0.03	
	0.74	111					9.21	111				
KwaZulu-Natal	0.09	**	0.29	***	0.31	***	0.03		0.05		0.01	
	0.84	620					8.73	620				

Notes: The main estimates in the previous table are replicated in specific sub samples. The four elements reported are percentage change and significance, mean level of enrolment or education, and number of observations. For e.g., The entire sample has 2,331 observations, the effect of receipt on enrolment is 9%, the mean level of enrolment in this sample is 82%, and this coefficient is significant at the 1% level. Effects reported differ slightly from the previous table, which reports percentage points. * implies p value < 0.10, ** implies p value < 0.05, and *** implies p value < 0.01.

In Table 4, percentage changes, significance, average enrolment or education level in the sub-sample, and number of observations are reported. The means test eligible sample is that used in Table 3, and the four numbers reported are the percentage change due to receipt, the significance level, the mean of the dependent variable (mean enrolment for this sample is eighty one percent), and the number of observations in the sample. We see that Coloured learners have very low enrolment of sixty two percent. In this sub-sample, receipt is associated with enrolment that is

forty eight percent higher. This is a very large effect, but the the instrumental variables results do not yield a similar result (small sample size is a potential problem).

Receipt is highly important for those in the Western Cape, and Gauteng province (thirty four and seventeen percent respectively). Receipt is also associated with higher enrolment for sixteen and seventeen year olds (twelve percent in wave three), girls (thirteen percent), and those in the entire sample (not just means test eligible) (nine percent). Those covered for an extra ten years by the grant have associated enrolment that is eighteen percent higher (for girls), thirty one percent higher in KwaZulu-Natal, and twenty two percent higher in the full sample. In some of these samples the instrumental variables estimates do not yield similar conclusions, and small sample sizes can possibly be blamed in some of the instances (the Western Cape or Gauteng for instance have 147 and 111 observations respectively), but for some, for example girls, we have a sample size of 955. This implies we should be cautious when estimating in these samples, especially if the instrumental variables estimates do not accord with the basic OLS. Taking the effect size of potential duration for the full sample, which is twenty two percent (for an extra ten years) (see Table 4) we can compare similar seventeen and eighteen year olds in this sample, who have thirteen and six years of potential exposure respectively. After controlling for other differences we expect to see enrolment that is fifteen percentage points higher for seventeen year olds (0.022 multiplied by seven) compared to eighteen year olds.

For attained education, very few significant coefficients are found. As seen in Table 3, it seems safe to conclude that CSG receipt, as measured in these three ways, has no impact on attained education.

To provide support for these conclusions, certain robustness checks are performed in section seven. We now turn to non-parametric estimation.

6.2 Non-Parametric Estimation

Following Duflo (2000), non-parametric regressions are estimated as follows:

$$Y_i = g(Age_i) + \epsilon_i$$

Where Y_i is average enrolment, Age_i is the age of the child in either months or years. ϵ_i is an error term, where $\epsilon_i \sim i.i.d[0, \sigma_\epsilon^2]$, and $g()$ is the un-specified regression function[21]. These methods allow the most un-restricted implementation of any model relating enrolment and receipt. The results can be seen in Figure 5 and 6. In Figure 5, the predicted probability of enrolment is graphed for learners in wave one and three. For those under fifteen, these probabilities are identical, as expected, but those between seventeen and nineteen in wave 3 have higher probability of being enrolled than those in wave one. We know seventeen and eighteen year olds in wave one have had no exposure to the grant, whereas seventeen and eighteen year olds in wave three have had thirteen and six years of potential receipt respectively. In addition, seventeen year olds in wave one do not have receipt, while seventeen year olds in wave three are current grant beneficiaries. The size of the difference is similar to that predicted by the parametric models in Section 6.1.

In Figure 6, we graph the probability of enrolment by proportion of life exposed, for those with less than or more than half of their lives exposed. Those with more exposure have much higher probability of being enrolled, and these differences are significant. These patterns continue for other representations. In the Appendix, Figures 8,9 and 10 show that whether receipt was interrupted or not matters, as those with un-interrupted receipt (those born after 1995), have a significantly higher probability of enrolment than those whose receipt was interrupted. Breaking the data up into terciles according to proportion of life exposed, we see that higher exposure is associated with a higher probability of enrolment.

[21] Different methods are used, including a kernel weighted local polynomial regression, using the epanechnikov kernel, and a locally weighted smoothing estimator (lowess) (Cameron & Trivedi 2009). We report the local polynomial regression results.

Figure 5

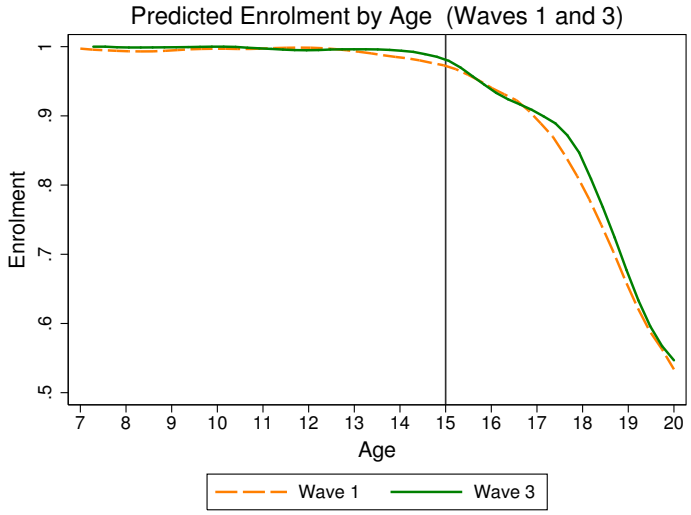
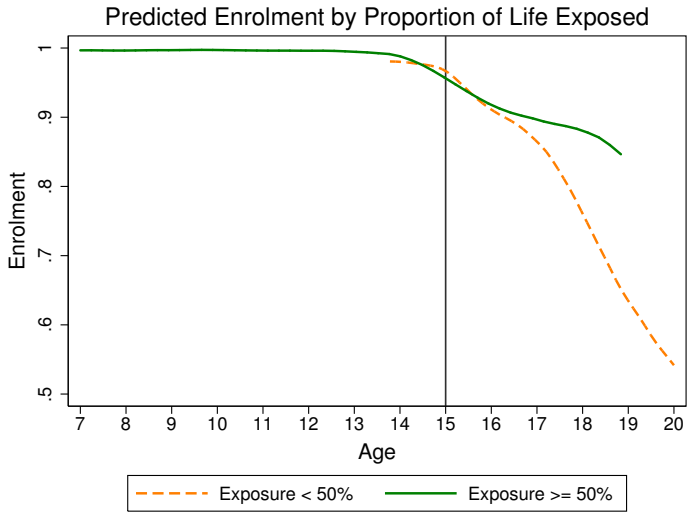


Figure 6



Figures 5 and 6 show the results of a kernel weighted local polynomial regression, using the Epanechnikov kernel. The vertical line shows the compulsory school leaving age of fifteen. In Figure 5, predicted enrolment is graphed as a function of age for learners in wave one wave three. In Figure 6, predicted enrolment is graphed for those who have had exposure to the CSG for more than half their lives, and for less than half their lives. Similar age learners in wave three (who have had higher exposure) have higher predicted enrolment than those in wave one, and those who have had exposure for more than half of their lives have a higher probability of being enrolled.

7 Confounding Effects and Robustness Checks

The identification of the grant receipt coefficient comes from two comparisons, in the income eligible sample. Teens just above and below the age threshold are compared, and recipients and non recipients of the same age are compared. The first comparison is undoubtedly valid, as except for an expected one year difference in age, those above and below the threshold should not differ in individual characteristics. Simple t tests (not reported) show this to be the case.

It is the latter case that is more concerning. Receipt among teens of the same age may well be endogenous. Controlling for individual and household characteristics may eliminate some of this endogeneity, but a concern may still arise that these individuals are different from other same-age non-recipients. A thorough comparisons of means shows that this is not a concern[22].

Why might both types of individuals not differ in their characteristics? Firstly, the unanticipated extension of the age limit adds a high degree of exogenous variation to receipt along the age eligibility margin. Secondly, concerns of endogeneity may be lower for older children. Low rates of receipt for younger infants may well be due to a lack of maternal "eagerness" (Aguero et al. 2009), and mothers who delay may also impact negatively on their children's school enrolment or performance. However older children have much higher rates of receipt, and enrolment, and it is possible that by this time, the eagerness effect may have receded as an important factor, as no extra effort is needed to ensure grant receipt of older children. Children simply age through the system and continue as recipients[23]. Eagerness could however be a proxy for family preferences regarding education, which may confound estimation. We thus control for parental education.

We also investigate the impact of some measures of maternal eagerness on enrolment and receipt. One measure for maternal eagerness is whether or not the child has a road to health clinic card (which records the child's growth, vaccinations and clinic visits). We find beneficiaries and non-beneficiaries both possess the card at the same rates. Another measure is reported duration of receipt. Duration is not a predictor of current receipt, and its inclusion not change the sign or size of the CSG coefficient, implying again that early CSG receipt (a sign of eagerness) does not impact on enrolment for older teens (although according to the literature it may well in the earlier years).

Reasons for non-receipt such as administrative issues, or lack of information about the process tend to be an issue for mothers of very young children obtaining receipt for the first time, and not for those of older children. Previous data collection (Department of Social Development & UNICEF 2012*a*) shows that some incorrect beliefs are present regarding who can apply, and that lack of documentation has lowered access rates. However focus groups conducted by the DSD in 2012 seem to imply that educational campaigns to alert potential older recipients have been successful - individuals receiving notification through school, letters, pamphlets, road shows, tribal leaders and others. Participants also report a large improvement in the ease of application compared to earlier years.

Investigating stated reasons for non-receipt in the data is also important. However remarkably few individuals report their grant application being refused - fifty four individuals in wave three, forty two in wave one, sixty nine in wave one. For age eligible African and Coloured children, only eleven percent over the waves have never had anyone apply for a child support grant for them. For those who have not applied, the main reasons are split fairly evenly between lack of correct documentation and indifference (with too high costs of application, and lack of knowledge making up the remainder of significant reasons). This distribution of reasons remains fairly constant over the age distribution. These may be cause for concern if we wish to assume that recipients are no different from non-recipients. A dummy variable for both these states jointly (indifference and documentation problems), and separately, are included in the enrolment regressions to determine if these are significant factors in predicting enrolment. They are found not to be significant in

[22]Comparing means by grant receipt of household income, for fifteen and sixteen year olds respectively, there is no significant difference in household income (for those with household income up to twice the means threshold), gender, location, and household grant income. Grant recipients do have a fifth of a year more education than non recipients, but this is only significant at the ten percent level.

[23]This is evidenced by a very similar pattern of receipt in learners as they age. 13-year-olds in wave one are fifteen in wave two, and seventeen in wave three. Their respective rates of receipt are fifty five percent, fifty four percent and forty six percent, which implies no large changes in receipt occurred for older children.

enrolment regressions for the younger ages, and for older teens (when using data from previous waves).

A model investigating the impact of actual receipt may be assumed to be flawed due to omitted variable bias. That the coefficient differs only very slightly with or without the inclusion of controls challenges this hypothesis[24].

When household fixed effects are included in the specification in Table 3, the child support grant variable becomes insignificant. However average household enrolment is approximately ten percent higher if a household contains a CSG beneficiary. It appears that individual CSG receipt matters. Number of CSGs in the household has the same sign and significance, but the impacts are smaller. In wave three, an additional CSG in the household is associated with a one percent higher probability of being enrolled. This appears to imply that earlier research showing a positive spillover from beneficiaries to non-beneficiaries may no longer apply. This does lend weight to the identification strategy used, as spillover is a potential concern in any experimental or quasi-experimental study.

A number of placebo regressions and consistency checks are performed. Receipt in the past two years is substituted for current receipt, and a similar effect is found. Estimation (where applicable) of the models above in individual age groups, i.e. fourteen year olds, fifteen year olds, etc., show that the effect comes primarily from older children, as expected given close to a hundred percent enrolment for younger learners.

The estimates in Table 3 are also replicated using the 2012 General Household Survey, and similar size coefficients are reported. Small sample size and CSG receipt levels for White and Asian children unfortunately preclude the use of this sample in placebo regressions, as a zero coefficient would be expected. The estimates are replicated using the sample of children who do not pass the means test, and coefficients are small, and insignificant. Predictably in these samples CSG receipt is low, however in wave three it approaches thirteen percent (potential inclusion errors, or being close to the means test threshold), and in this sample the CSG coefficient approaches significance, and a similar size to the coefficient seen in Table 3. The attainment estimates are replicated using an education deficit variable, which measures the difference between actual grade and expected grade. These estimates are not reported, but yield similar results.

Multicollinearity concerns motivated the exclusion of certain variables in the appropriate models (such as number of children, adults and pensioners in the household, household grant income, potential duration, attained education, education deficit). Their removal improved precision, but does not impact on the coefficients of interest. Spending on educational expenses is included in the regressions and is not a significant predictor of either enrolment or attainment.

[24]In addition, if the main omitted variable is socio-economic status, the size of the bias would be expected to be negative, and the coefficient we see could be regarded as a lower bound. In fact, when controls are included, the coefficient rises slightly, supporting this hypothesis. However given the likely correlation of socio-economic status with other controls, like other researchers we cannot be sure of the direction of the bias.

8 Conclusion

Using the National Income Dynamics Survey in South Africa, we find that receipt of an unconditional cash transfer, the child support grant, is associated with higher levels of enrolment for older teens. These results imply that by introducing the CSG, the South African government has raised enrolment of eligible children by at least ten percent. The impact is much higher in certain groups. Coloured learners, and those in Gauteng and the Western Cape, see CSG impacts of above fifteen percent in 2012. Non-parametric estimates show a cumulative effect of receipt on enrolment; those exposed to the grant for longer have significantly higher rates of enrolment. From survey data and anecdotal evidence, it appears that the strongest channel by which the CSG impacts on enrolment is through the alleviation of the costs of school attendance.

However neither current receipt nor potential duration of receipt is associated with any changes in attained education. We see that other factors are more important as determinants of attainment in this sample, such as gender, race and maternal education.

The results found above accord with those seen in other parts of the world, and with previous research in South Africa on early enrolment. In many countries, cash transfers, whether conditional or unconditional, are associated with higher levels of enrolment (Baird et al. 2013, Schady & Araujo 2006, Adato et al. 2000, Filmer & Schady 2011, Baird et al. 2009, De Brauw & Hoddinott 2011). Baird et al. (2013) perform a meta study of program evaluations in 35 experimental and quasi experimental studies, and find overwhelmingly positive impacts on enrolment (as well as attainment and test scores).

Were South Africa to introduce some measure of monitoring and conditionality of grant receipt on enrolment, the literature suggests even higher impacts might be found (Baird et al. 2013, De Brauw & Hoddinott 2011). However the costs of this monitoring might outweigh the benefits, especially as for the younger sample, monitoring is largely un-needed given high rates of enrolment[25].

It is important to interpret these results carefully. We measure the impact of receipt on enrolment, for those who acquire receipt, given age and income eligibility. Can these results be generalised to all those who might acquire receipt? Given high rates of receipt among those eligible, it is possible that they might. This sample may not differ too much from the sample of those eligible who do not report receipt - as seen in the robustness checks. In addition, given the nature of the program, as discussed in the instrumental variables estimation, the coefficient can be interpreted as an average treatment effect for all those who seek receipt if they are eligible.

These results pass a number of robustness and consistency checks, and balancing tests imply the endogeneity problem may have been resolved in this sample. The effect is invariant to the inclusion of many controls. Both ordinary least squares and instrumental variables estimations yield the same conclusions, using different measures of receipt, and non-parametric estimates yield the same conclusions.

It is a pity that the panel nature of the data cannot be exploited more, although the timing of changes across the waves has been exploited fully. In addition, due to the unexplained differences in enrolment between waves one, two and three, it is not advisable to use a simple difference in difference methodology. This is a pity as a DID does not require us to compare the same participants across the waves.

More variation exists which has not been fully exploited in this paper. Further work could include exploiting the variation in receipt generated by the doubling of the means threshold value in 2008.

[25]Some research has shown that unconditional cash transfers are more effective than conditional at preventing other outcomes such as teen pregnancy and marriage (Baird et al. 2013)

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9 Appendix

Figure 7

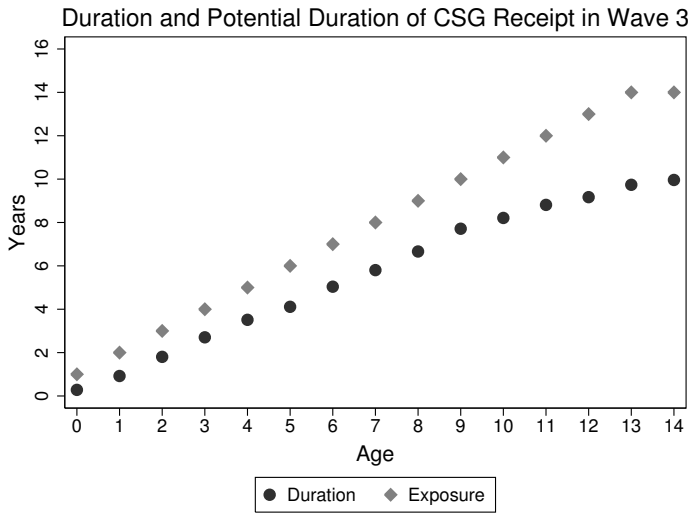


Figure 7 plots years of exposure (potential duration of receipt), and mean of actual reported duration of CSG receipt, by age category, in wave 3 of the NIDS, for learners between the ages of 0 and 14. No duration data is recorded for learners aged 15 and above.

Figure 8

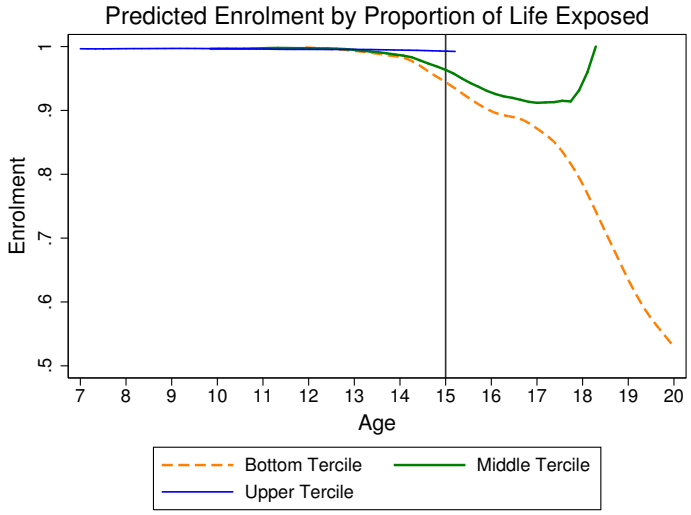


Figure 9

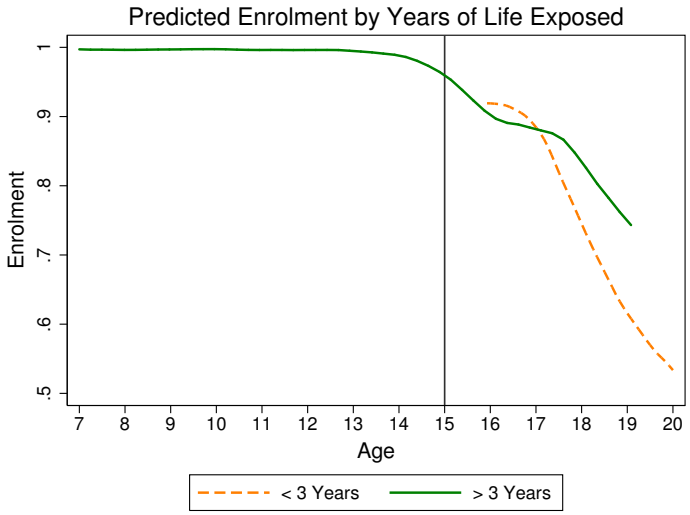
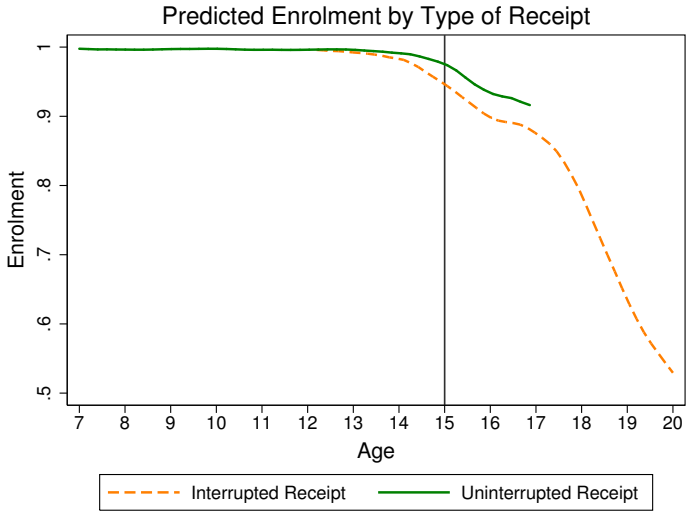


Figure 10



Figures 8, 9 and 10 show the results of a kernel weighted local polynomial regression, using the Epanechnikov kernel. The vertical line shows the compulsory school leaving age of 15. In Figure 8, predicted enrolment is graphed as a function of age for those in the bottom, middle and upper terciles of potential duration of receipt (measured as a proportion). In Figures 9 and 10, predicted enrolment is graphed for those who have had exposure to the CSG for more than 3 years, and for less than 3 years, and for those who have had either interrupted (born before 1995) or un-interrupted receipt. Similar age learners who are in a higher tercile have higher probability of being enrolled, as do those who are exposed for longer than 3 years, and those who have had un-interrupted receipt.