A Small Push Goes a Long Way: An Evaluation of the Cumulative Effects of a Cash Transfer on South African Youth

Tafadzwa Jani

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Faculty of Commerce

School of Economics

Supervisor: Doctor Katherine Eyal

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University of Cape Town

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Abstract

Persistently high poverty rates in developing countries have negatively affected social welfare outcomes, including infant mortality, food security, life expectancy, and educational attainment. In the late 2010s, depressed household incomes endured in many developing countries in the Americas, Africa and Asia. Cash transfer programs were introduced in many low-income countries in the 1990s, often intended to reduce poverty and increase human capital. South Africa launched the child support grant (CSG) in 1998, an unconditional cash transfer for children below the age of seven. By 2017, the program boasted twelve million beneficiaries, with an upper age limit of eighteen. Globally, initial evaluations of cash transfers (including the CSG) focused on children, and the short-term impacts on education, health, and consumption. However, fewer evaluations of the impact of extended receipt have taken place, particularly using older beneficiaries who experience lifelong receipt. This thesis analyses the long-term effect of CSG receipt on youth outcomes. Observing a positive CSG effect on South African youth would be encouraging, given that 3.3 million youth were not involved in any employment, education, or training in 2018. The literature focussing on older youth outcomes and long-term receipt primarily examines educational outcomes, mainly evaluating cash transfer programs in North America. This thesis draws on the National Income Dynamics Survey, a nationally representative longitudinal study conducted in South Africa between 2008 and 2017. Both the irregular expansion pattern of the CSG, and the panel nature of the survey are utilised to estimate grant impact on two cumulative outcomes (educational achievement and physical health, measured by height), and two current outcomes (labour force participation and mental health), using a youth sample aged between fifteen and twenty-seven. Those experiencing a higher duration of CSG receipt display higher educational achievement, higher average height and lower labour force participation. However, no significant effects are found on mental health. These results suggest extended receipt of an unconditional transfer may positively impact human capital accumulation, while current outcomes are less likely to be affected (World Bank 2016).

Dedication

I dedicate this dissertation to my grandmothers, Ancilia Chimhanda and Efrida Jani. I am because you are.

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1 Introduction

To an extent, the global fight against poverty has been successful. This success has been characterised by the decrease in the number of people living in extreme poverty[1] from 1,9 billion people in 1990 to 736 million people in 2015 (World Bank 2016). Despite this success, one in every ten individuals across the world lives in extreme poverty, and of these 385 million are children below eighteen years of age (Wadhwa 2018, UNICEF 2016). Children who grow up in poverty are a major concern for policymakers as the effects of poverty last a lifetime. These children are prone to experiencing inadequate nutrition, sustained high levels of stress, and a lack of cognitive and socioemotional stimulation (World Bank 2015*b*). The consequences of these factors are far-reaching, leading to stunted growth and low skill levels. This limits labour productivity and decrease income earning potential, resulting in the transmission of poverty to the next generation (FAO et al. 2017, UNICEF 2016).

Cash transfers were introduced in the 1990s as a social policy instrument to reduce both short and long-term poverty (Molina-Millan et al. 2018). These instruments were designed to provide direct financial assistance to the poor with the aim of reducing future poverty through increased human capital investment in children (Tabor 2002). Increased human capital investment leads to a raise in lifetime earnings potential, in turn reducing the transmission of poverty to the next generation (Parker & Vogl 2018*a*). This theory of change, which underpins cash transfers, is the reason that 147 developing countries have adopted some type of cash transfer program and these programs have reached approximately 800 million people (World Bank 2015*a*). Given the widespread nature of these programs, and the promise of improved nutrition, education, and health, the evaluation of their success, especially over time, is crucial.

Positive effects have been found on education, health, and consumption in short-term evaluations in the following low to middle-income countries: Honduras, South Africa, Malawi, Colombia, and Mexico, with short-term evaluations ranging from 2004 to 2016 (Glewwe & Olinto 2004, Heinrich et al. 2012, Baird et al. 2013, 2010, Adato & Bassett 2012, Bastagli et al. 2016, Behrman et al. 2008). These short-term evaluations show that these social policy instruments have a positive impact on current poverty alleviation (Molina-Millan et al. 2018). Although a substantial amount of research has been conducted on the short-term impact of cash transfers in developing countries (Glewwe & Olinto 2004, Heinrich et al. 2012, Baird et al. 2013, 2010, Adato & Bassett 2012, Bastagli et al. 2016, Behrman et al. 2008, Agüero et al. 2007, Araujo et al. 2016, Maluccio & Flores 2005, Paxson & Schady 2010), literature on

[1]Measured as the number of people living below the international poverty line of One US Dollar and Ninety cents in 2011 purchasing power parity dollars

the cumulative effects of the cash transfer program is limited.

There is a lack of long-term details on the outcomes and characteristics of beneficiaries as they move into adolescence and adulthood (Molina-Millan et al. 2018). Another reason for the lack of long-term evaluations is the political feasibility, or fairness, of withholding treatment from control groups for prolonged periods of time, in experimental evaluations (Behrman et al. 2010). In addition, the earliest cash transfers programs were initiated in the late 1990s, therefore, by the late 2010s, the child beneficiaries would not have been old enough, for any long-term impact evaluations (Molina-Millan et al. 2018).

An optimal time for program evaluation is as long-term child beneficiaries reach adulthood and form their own households. These households can then be used to examine whether or not beneficiaries have sustainably escaped poverty (Molina-Millan et al. 2018). Therefore, long-term evaluations on most cash transfer programs in developing countries are not possible yet. The limited research that has been conducted on the long-term impacts of cash transfers has observed positive effects on years of education and grade completion in Mexico, Colombia, Nicaragua, and Honduras but no effects were seen on learning[2] (Araujo et al. 2016, Barham et al. 2017, Fernald et al. 2009, Glewwe & Olinto 2004, Maluccio 2005).

Beginning in 1998, the South African child support grant(CSG) is a cash transfer program ideal for long-term evaluation. The South African child support grant began in 1998 with 21,997 beneficiaries[3], expanding to more than twelve million beneficiaries in 2017 (DSD et al. 2012, South African Social Security Agency 2017*a*). In 2017 the value of the grant stood at three-hundred and eighty rand[4] and was not considered particularly large compared to other grants in South Africa (South African Social Security Agency 2017*b*). The grant was initiated as an unconditional cash transfer to children in the poorest thirty percent of households, in order to reduce racial and gender income inequality and to improve child nutrition in South Africa (Agüero et al. 2007, Lund et al. 2009). The first cohort of those receiving the grant from birth is now coming into adulthood in 2017, providing an ideal sample for an evaluation of the long-term impacts of grant receipt on youth outcomes.

This dissertation contributes to the cash transfer literature by analysing the cumulative effects of an unconditional cash transfer program on low-income youth in South Africa. The analysis includes an evaluation of the cumulative effect of the CSG on two cumulative and two current outcomes on the South African youth, continuing into early adulthood. The

[2]Learning is an educational outcome measured by test scores.

[3]Beneficiary refers to the child, for who is the intended recipient of the CSG. Recipient refers to the adult caregiver who receives the CSG on behalf of the child

[4]Equivalent to the value of twenty-eight US dollars in 2018

National Income Dynamics Survey (NIDS) in South Africa is used for the analysis. The NIDS is conducted every two years and is a nationally representative longitudinal household survey that examines the changes in the welfare of South Africans. The NIDS collected data in 2008, 2010, 2012, 2014 and 2017. In 2017, individuals between the ages of fifteen and twenty-five had a large variation in the duration of CSG receipt, thus making this sample ideal for exploration of the long-term impact of the child support grant.

Wave 5 of the NIDS is used to evaluate the cumulative effect of this cash transfer on four areas for young people: education, labour market status physical health, and mental health. In particular the outcomes of interest from these four areas are years of education attained, labour force participation, height, and the presence of depressive symptoms. These outcomes are chosen to represent two cumulative measures: years of education and height (a measure of physical health), and two current outcomes: labour force participation and depressive symptoms (a measure of mental health). As a function of current and cumulative factors, these outcomes allow for an investigation of whether the cash transfer program has been successful in improving human capital accumulation.

This dissertation finds suggestive evidence that the duration of grant receipt increases the years of education attained as well as the height of an individual and reduces labour force participation amongst the youth in the sample. However, no observable, significant effects of the duration of receipt are observed on mental health. The impact of the duration of grant receipt on education may be a reason why labour force participation decreases, as CSG beneficiaries stay in school for longer. The estimates in this text indicate a large cumulative effect of CSG receipt on cumulative outcomes. However, the cumulative effect has no sustained impact on current depressive symptoms.

This dissertation will be structured as follows: Chapter 2 summarises the details of the Child Support Grant program and Chapter 3 presents an overview of the relevant literature of the relationship between cash transfer programs and the four outcomes of interest. Thereafter, Chapter 4 describes the methodology, including data, sample choice, estimation techniques, descriptive statistics and theoretical framework while Chapter 5 contains estimates of the cumulative impact of grant receipt on the cumulative and current outcomes. Chapter 6 gives context to these results and discusses the mechanisms of changes and the limitations of the research. Chapter 7 concludes.

2 The Child Support Grant

2.1 Background

Although a social assistance program for children in South Africa was in operation as early as 1947, this system of grants was unequally distributed from a racial and geographic perspective (Kruger 1998, Delany et al. 2008). White children disproportionately received these grants, as well those in urban areas(Delany et al. 2008). Three types of grants were offered to children, namely, the state maintenance grant, the foster care grant, and the care dependency grant. The care dependency grant was provided to poor children with mental or physical disabilities, while the Foster Care Grant provided support to foster parents (Kruger 1998). The state maintenance grant was subjected to a means test[5] based on a maternal income and was the primary grant for children, offered specifically to widowed mothers for children from birth up until the age of seventeen (Delany et al. 2008). The care dependency grant was also subject to a means test, however, no means test was applied to the foster care grant (Delany et al. 2016).

The state maintenance grant originally excluded African[6] mothers. From the 1970s onwards, the grant had extended in coverage, to include mothers of colour as well as mothers in households where the spouse was absent and did not provide any support towards the family (Kruger 1998). These were households with divorced, abandoned, and/or unwed mothers, and, in some cases, where the mothers were not present, the grants were offered to caregivers instead (Delany et al. 2008). When coverage of the grant was extended to include African mothers, the state maintenance grant targeted those who were located in specific parts of the country and largely excluded African mothers living in rural areas (Lund et al. 2009). By 1987, the total number of grants received by Africans amounted to seventeen percent of the total number of grants received by white people (Kola et al. 2000).

Following the end of Apartheid in 1994, the entire child welfare system in South Africa was examined by the Lund Committee on Child and Family Support (Lund 1996). This committee was headed by Francie Lund, "a respected leader and leading researcher in social security, social welfare and development who was based at the University of Natal" (Patel 2011). The committee was formed by the Minister of Welfare and the Provincial Members of the Executive Council to critically appraise the existing systems of state support to children and families

[5] A means test evaluates the income of the individual applying for the grant in order for the South African Social Security Agency to determine whether an individual's means are below the required level (South African Social Security Agency 2017*b*).

[6] African is used to describe the Black South African race group

(Delany et al. 2008). In addition, this committee was tasked with exploring alternative social security options for children, and investigating the potential of increasing financial support to parents, through the private maintenance system, without a significant increase in the social welfare budget (Lund 1996).

The social protection system needed to be evaluated and remedied, due to major concerns regarding severe racial discrimination in accessibility to the state maintenance grant (Patel 2011). When the grant was first introduced it was accessible only to the poor White families but when grant coverage was extended, Coloured and Indian income-eligible single-parent households were the largest beneficiaries (Lund et al. 2009). White single parents were third in terms of access to the grant and Black South Africans were still largely excluded from the grant (Patel 2011). The committee estimated that fifty per one thousand Coloured children were beneficiaries of the state maintenance grant, while forty per one thousand Indian children were beneficiaries (Lund et al. 2009). However, thirteen in every one thousand White children were beneficiaries of the grant and only one in every one thousand Black South African children having access to the grant (Lund et al. 2009).

It is clear that the majority of the poor population, predominantly Africans, did not have access to the grant despite being income eligible (Kruger 1998). This exclusion was strongly related to household location (Patel & Plagerson 2016). Children in rural areas were excluded due to a lack of awareness of the grant, administrative barriers and the inability to travel to grant application sites (DSD et al. 2012). Furthermore, the state maintenance grant was only targeted towards single parent households. However, most poor households in South Africa do not follow a nuclear family model (Kruger 1998), with more three-generation families compared to nuclear families. In addition, there is a large diversity in family forms, including customary marriages and unwed couples living together (Patel 2011). Due to the failure of the state maintenance grant to reach the majority of the poor, the grant was phased out and finally ceased to exist in April of 2001 (Triegaardt 2005). Simultaneously, the child support grant was introduced in April 1998, on the recommendation by the Lund Committee (McEwen et al. 2009).

2.2 The Child Support Grant Is Born

Policymakers intended the CSG to contribute to the costs of raising children, reducing child poverty, allowing parents to care for their children independently of the labour market, and boosting income (Triegaardt 2005). The Lund Committee recommended that the grant should

"follow the child", meaning the grant would be provided to the primary caregiver of the child regardless of the family structure (Lund 1996). The "follow the child" principle arose after the committee established that only a third of the households in South Africa followed a nuclear family structure (Lund et al. 2009). Children were often left in the care of their grandparents or other older women in the household when parents left to go find work (Triegaardt 2005). In addition, following the child was intended to deal with aspects specific to South Africa, such as customary marriages, polygamy, and fluid and mobile household structures of three generations or more (Lund et al. 2009).

The Lund Committee recommended that CSG should be universal and accessible to all children below the age of nine years and targeted to the poorest households (Delany et al. 2008). Therefore, a means test was applied using household income as the measure of determination (Delany et al. 2008). The CSG had a value of one hundred rand per child and was in the form of a cash transfer that was given to the primary caregiver of the child (Delany et al. 2008). The means test was set at eight hundred rand per month in urban areas and R1,100 per month in rural areas (McEwen et al. 2009). Households in rural areas had a higher threshold for the means test in order to make up for their lack of access to education, health and labour market opportunities (Delany et al. 2008). The CSG was targeted at children in the poorest thirty percent of households in South Africa who were below the age of seven years (DSD et al. 2012). The conditions for a child to benefit from the CSG required the applicant for the grant to provide the child's birth certificate and proof that the child was immunized (Delany et al. 2008). In addition, recipients of the grant had to attend and participate in early childhood development programs (Heinrich et al. 2012).

Initial take-up of the CSG was slow, and the grant had just 21,997 beneficiaries in 1998 (Delany et al. 2008, DSD et al. 2012). The conditions for receipt created barriers for the poorest households that needed the grant the most (Heinrich et al. 2012). Caregivers, particularly those in rural areas, were unable to access the required early childhood development programmes, nor could they afford to get their children immunised as required (Heinrich et al. 2012). Thus, in 1999, the application process and the means test were altered to make the CSG more accessible (McEwen et al. 2009).

Participation in the development programme and immunisation were removed as conditions, as the government realised that the different levels of service provision across South Africa meant that the required services were not readily accessible (DSD et al. 2012). Children and their caregivers were believed to be unfairly penalized for the inequitable access to the services that were required for grant receipt. Applicants for the CSG were now only

required to show the caregiver's identity document and the child's birth certificate, although possession of these two administrative documents was not guaranteed for all caregivers (Delany et al. 2008). The means test was also changed, with grant eligibility now being dependent on caregiver and spousal incomes, as an alternative to household income, as household income may not have been equally distributed among household members (Heinrich et al. 2012). After these changes, there was a large increase in CSG receipt, especially in the poorest areas. By the year 2000, the CSG had 1,111,612 child beneficiaries (DSD et al. 2012).

Table 1: A Summary of the Child Support Grant from 1998 to 2017

Year	Month	Age Limit	Grant Amount	Number of Child Beneficiaries	Single Caregiver Means Test
1998	October	7	R100	21,997	R1,100
1999	July	7	R100	150,366	R1,100
2000	July	7	R100	1,111,612	R1,100
2001	July	7	R110	1,277,396	R1,100
2002	October	7	R140	1,998,936	R1,100
2003	April	9	R160	2,996,936	R1,100
2004	April	11	R170	4,165,545	R1,100
2005	April	14	R180	5,913,719	R1,100
2006	April	14	R190	7,410,760	R1,100
2007	April	14	R200	7,975,847	R1,100
2008	August	14	R230	8,289,787	R2,300
2009	April	15	R240	9,071,862	R2,400
2010	April	16	R250	10,371,950	R2,500
2011	April	17	R260	10,373,613	R2,600
2012	January	18	R280	10,927,731	R2,800
2013	April	18	R290	11,282,308	R2,900
2014	April	18	R310	11,185,361	R3,100
2014	October	18	R320	11,572,790	R3,200
2015	April	18	R330	11,734,986	R3,300
2016	April	18	R350	11,934,065	R3,500
2016	October	18	R360	12,027,321	R3,600
2017	April	18	R380	12,101,127	R3,800

This table contains the details of the child support grant, such as the dates, grant amount, age limit, single caregiver means test amounts and the number of child beneficiaries from 1998 to 2017. The age limit stated in the table is the upper age limit, for example in 2008 children aged thirteen and below were eligible for the grant. As of April of 2017, the yearly single caregiver means test threshold was set R45,600, and for married couples it was set R91,200 (South African Social Security Agency 2017b).This table is replicated and updated from Eyal and Burns (2017). Original Source: The South African Social Security Agency Statistical Reports cited in Eyal and Burns (2017).

Table 1 is a summary of the child support grant with regards to the grant amount, number of beneficiaries, and the age limit. The monthly means test amount remained the same in nominal terms, from 1999 until the beginning of 2008 as seen in Table 1. This resulted in new

potential recipients slowly becoming ineligible for the grant as the income threshold amount for eligibility did not adjust for inflation (Patel 2011). In August 2008, the Department of Social Development changed the means tests threshold to equal ten times the value of the grant (DSD et al. 2012). Thus, in 2010 the grant was equal to two hundred and fifty rand and the monthly means test amount was equal to R2,500. In addition, at the end of 2008, the thresholds' for urban and rural areas equalized, and the means test income threshold for married couples was changed to be exactly double that of single caregivers[7].

When the CSG was first introduced in 1998 the grant was limited to children below the age of seven years. This age limit remained constant until April 2003, when it was changed to nine years of age (see Table 1). In 2004 the age threshold was eleven years of age, and in 2005 it increased to fourteen years. By 2009 the age limit was fifteen and was again increased in 2010 to sixteen. In 2012, the age threshold for the grant was set at the age of eighteen and there have been no further changes to the age limit. The irregular change in the age limit of the grant meant that individuals who had become too old to receive the grant in one year became eligible for the grant in the next year. Nine-year-olds in 2003 were ineligible to receive the grant, however in 2014 became eligible again, because the age threshold had been increased to eleven.

Increases in the age threshold led to an increase in the number of grant beneficiaries (DSD et al. 2012). When the age threshold was increased from seven years to nine years, the number of CSG beneficiaries increased by nearly a million beneficiaries -see Table 1. By 2018, children aged between twelve and seventeen years made up a third of CSG beneficiaries (Hall & Sambu 2018). Access to the grant was often impeded by the lack of necessary documents such as marriage certificates or documents signed by the child's school principal (Samson 2002). Further administrative problems which consisted of, long queues at the grant application sites, extended processing time, and a lack of information with regards to grant applications resulted in low CSG uptake (Samson 2002). The increase in grant access and receipt was not only due to the change in age threshold, but also due to the decrease in the number of documents required, improvements in technology which reduced the long queuing and processing time, and increased awareness of the grant (DSD et al. 2012). The South African Social Security Agency ensured that awareness of the grant and, in particular, the changes in the age threshold were communicated effectively, by contacting eligible caregivers directly and disseminating information through the media, schools and community leaders (DSD et al. 2011).

[7]The means test threshold for married couples before 2008 was the same as that of single caregivers

These effective communication strategies resulted in older children who were potential grant beneficiaries asking their caregivers to apply for the grant on their behalf (DSD et al. 2011). Caregivers stated that the children would argue that they need the money from the CSG to use for their education, or that they were entitled to the money from the CSG (Delany et al. 2008). A respondent, when asked why she re-applied for the CSG in an interview as part of the study conducted by the Department of Social Development, South African Social Security Agency and UNICEF (2011), said the following: "She comes to me and says: 'Mom, I would really love you to go and apply for CSG money for me, so that you can pay for my things at school'." Another respondent said "For my child I always need to apply because he says: 'It is my money, I have a right for it, and my friends are getting it' " (DSD et al. 2011).

2.3 The CSG and Other Grants

The CSG is South Africa's largest social grant and has nine million more beneficiaries than the old age grant[8] (South African Social Security Agency 2017*a*). However, in terms of individual grant amounts, the CSG amount is the lowest compared to the other grants for children. The foster child care grant amount was equivalent to eight-hundred-and-ninety rand per month, while the care dependency grant (also means-tested) offered a grant amount equivalent to R1,510 per month, compared to the three-hundred-and-sixty rand a month the CSG gave in 2016 (Delany et al. 2016). In addition, in March of 2001, the CSG had six-hundred thousand more beneficiaries and a lower grant amount compared to the state maintenance grant, which was phased out later that year (Department of Social Development 2002).

One of the successes of the CSG has been its coverage to the poor, with four-fifths of households in the poorest twenty percent reporting income from the grant (Delany et al. 2016). This is a vast improvement from 1997, where one in eight households reported income from any social grant (Delany et al. 2016). Furthermore, the income from the CSG contributes to sixty percent of the income of households in the poorest twenty percent, making the grant an important tool to alleviate poverty (DSD et al. 2012). The majority of beneficiaries of the grant are Africans and come from households that are likely to have less income, fewer educated household members and are more likely to be located in the rural areas (Delany et al. 2008).

Section 3 explores the relationship between cash transfers and the four outcomes of interest.

[8] Also known as the state's old age pension.

3 Cash Transfers and Beneficiaries

The main goal of cash transfers to the poor is to alleviate short-term poverty while, at the same time, induce households to invest in their children's health, nutrition and education in order to break the intergenerational cycle of poverty (Molina et al. 2018). The extent that households can reduce future poverty is dependent on the amount of human capital that their children can accrue, while receiving transfers (Araujo et al. 2016). A large proportion of transfers are conditional and or are targeted at specific groups of individuals[9], while other transfers are unconditioned (Haushofer & Shapiro 2013). Conditional cash transfers are conditioned on participation in a specific set of education, health, and nutritional services (Adato & Bassett 2012). Most cash transfer programs in Africa are unconditional, while the majority of cash transfers in Latin America are conditional (Gaarder 2012, Baird et al. 2014). This chapter examines the literature on the children who have directly benefited from cash transfers and similar programs to see if the longer-term goal has been met.

3.1 Education

Much of the cash transfer literature focuses on the impact of conditional cash transfers (Glewwe & Muralidharan 2016, Molina-Millan et al. 2018) and is generally based on short term evaluations of children that are of school-going age (Adato & Bassett 2012). One of the short-term goals of cash transfer programs is to improve the educational outcomes of beneficiaries by increasing the immediate returns of households investing in education. Receipt of the cash transfer is conditioned on enrolment and attendance in school (Glewwe & Muralidharan 2016).

Schooling in South Africa begins in the reception year and ends after grade twelve. It is compulsory for children between the ages of seven and fifteen to be enrolled in school (Lomofsky & Lazarus 2001). After the age of fifteen, or completion of grade nine, children may leave school (Fleisch et al. 2012). South Africa has very high levels of enrolment at the primary school level, with ninety-eight percent of children between the ages of seven and thirteen attending school (Statistics South Africa 2010). After the age of fifteen, enrolment drops to fifty-five percent with nearly six out of ten students completing grade ten, eleven, or twelve by the age of eighteen (Statistics South Africa 2010).

However, enrolling in school does not guarantee that children obtain human capital (Glewwe

[9]For example, Ecuador's *Bono de desarollo* makes transfers to women only and Uganda's Youth Opportunities Program requires group applications

& Muralidharan 2016). The average number of years of education in South Africa is 10.5 years and the literacy rate of the youth between the ages of fifteen and twenty-four is ninety-three percent (Statistics South Africa 2017). South Africa's youth literacy rates are lower than other developing countries in Latin America, the Caribbean, and Asia, whose literacy rates sit at ninety-eight percent (UNESCO 2017). In addition, less than ten percent of the youth in South Africa attain fifteen years of education (which is equivalent to a three-year university degree) and this is relatively low compared to the Philippines and Egypt where at least twenty-four percent of youth attain fifteen years of education (Gustafsson 2011).

Despite high enrolment rates for children aged seven to fifteen years, South Africa faces a problem of non-attendance (Branson et al. 2013). Approximately 390,000 children in the compulsory school-going age were not attending school due to late enrolment or school drop-out (Fleisch et al. 2012). Distance from school, health, and costs such as school fees and uniforms were some of the reasons that were stated for not attending school (Strassburg et al. 2010, DSD et al. 2011, Gustafsson 2011, Delany et al. 2016). For those attending school, school performance is affected by race, gender, household size, income, and rural or urban location of the household and other factors (Ardington et al. 2011).

One potential pathway through which cash transfers impact enrolment is through alleviation of households' financial constraints. In Zambia, an unconditional cash transfer program[10] increased expenditure on uniforms, shoes, and stationary, resulting in the reduction of social stigma for beneficiaries (Handa et al. 2016). Similarly, the CSG makes it likely that beneficiaries have money for transport to and from school, thus removing another barrier to education (DSD et al. 2011). Caregivers also report using the CSG on school- related expenses such as food for lunch, uniforms, school fees, and pocket money (DSD et al. 2011, Delany et al. 2016).

Positive impacts of the child support grant have been observed in a number of students. Adolescent enrolment rates are higher for grant beneficiaries compared to non-beneficiaries in South Africa (Eyal et al. 2019). CSG beneficiaries were 1.5 times more likely than non-beneficiaries to be attending grade R (Delany et al. 2008). Longer duration of CSG receipt reduced the probability of grade repetition for children aged fourteen and below who had been receiving the CSG for about half their lives (Coetzee 2013). The CSG also impacts other household members despite them not being beneficiaries, as all children in the household are more likely to be enrolled in school if at least one member of the household is a beneficiary of the grant (Case et al. 2005).

[10]The Zambian Child Grant Program

A large number of studies have found a positive impact of conditional cash transfers on enrolment and attendance in Chile, Colombia Ecuador, Honduras, Jamaica, Nicaragua, Cambodia, Pakistan, and South Africa (Fiszbein & Schady 2009, Glewwe & Olinto 2004, Macours & Vakis 2008, Filmer & Schady 2008, Schady & Araujo 2008). Large impacts were seen in Nicaragua, with conditional cash transfers increasing enrolment by thirteen percentage points for children between the ages of six and seventeen (Fiszbein & Schady 2009). Exposure to Oportunidades in Mexico of one and year half years had no impact on the overall number of years of education achieved, although it had a positive impact on enrolment (Behrman et al. 2008).

Although conditional cash transfers increase school enrolment by a larger amount, unconditional cash transfers offer more social protection to vulnerable girls by providing them with income after they drop out of school (Baird et al. 2011). Furthermore, in Morocco, Benhassine et al. (2015) find that labelling an unconditional cash transfer as intended for education achieved the same gains in schooling as conditional cash transfers, without the additional costs of enforcing and monitoring that conditions are met.

Long-term evaluations measured educational outcomes by the total number of years of education achieved. Longer exposure to Oportunidades of five and a half years in Mexico increased the total number of grades achieved by a quarter of a year for male youth and a third of a year for female youth (Behrman et al. 2008). Similar results are observed in Nicaragua, whereby exposure of three years to the conditional cash transfer program led to an additional year of education achieved for youth between the ages of eighteen and twenty years (Barham et al. 2017). Timing of the onset of cash transfer receipt is also considered to be important, as strong impacts of program receipt were observed for youth beneficiaries when the first transfer was received just before the completion of primary school (Behrman et al. 2008, Barham et al. 2017).

In Colombia, conditional cash transfer effects differed by the urban and rural location of the household (Molina-Millan et al. 2018). Youth in rural areas, who had additional exposure of between two to five years to Familias en Acción, had an increase in educational attainment of 0.6 grades, whereas the youth in urban areas observed no significant impact of program receipt on their schooling (Molina-Millan et al. 2018). Similarly, in Mexico, Oportunidades increased the number of years of education achieved by an additional year for male youth and just over two-thirds of a year for female youth in rural areas (Behrman et al. 2010).

Longer duration of cash transfer receipt is associated with high probabilities of completing high school and attending university for program recipients (Baez & Camacho 2011, Parker

et al. 2012, Parker & Vogl 2018*a*). Seven years of exposure to Oportunidades increased the number of years of education by half a year and further increased the probability of attending university for beneficiaries (Parker et al. 2012). Similarly, nine years of receipt of Familias en Acción increased the probability of beneficiaries completing high school by four percentage points as compared to non-beneficiaries (Baez & Camacho 2011). The largest impact on years of education achieved coincided with the longest duration of grant receipt. Thirteen years of grant receipt in Mexico led to an increase of a year and a half of education attained by twenty to twenty-four-year-olds in 2010 (Parker & Vogl 2018*a*).

Long-term impacts on education have been observed for deworming and scholarship programs which have long-term evaluations similar to cash transfers evaluations (Baird et al. 2016, Ozier 2018, Filmer & Schady 2014). These programs are used to show the long-term impacts of program participation on education. A randomised control trial was implemented in Kenya to estimate the effect of giving deworming medicine to primary school children (Baird et al. 2016). Ten years after the program was implemented, beneficiaries were estimated to have achieved an additional 0.8 years of schooling (Ozier 2018). Similarly, a Cambodian scholarship program that paid for the costs of schooling for three years for low-income students who had just completed their primary schooling, found positive effects on educational attainment (Filmer & Schady 2014). Two years after the scholarships had ended, beneficiaries had attained an additional 0.6 years of schooling, although these gains in additional years of education did not translate to improved learning (Filmer & Schady 2014).

3.2 Physical Health

Health is a crucial form of human capital for a productive society (World Health Organisation 2006). Investment in health leads to improved educational attainment and reduced health costs, promoting labour productivity and resulting in higher wages (Saunders et al. 2004). The poor are more likely to work in jobs that rely on strength and good health, and wage variation for the poor often arises from poor health (Strauss & Thomas 1998). Illness results in a loss of income due to days of work missed, and the poor further suffer negative income shocks from the costs of medical treatment. Losses in potential earning power arise from persistent illness in early childhood which have long term impacts on adult health and could lead to disability (World Health Organization 2001).

Generally, anthropometric measures are used as an indication of an individual's health and nutrition status, as any changes in these measures (particularly height) can only take place

after sustained appropriate interventions (Bastagli et al. 2016). The timing of intervention is important, especially in the first thousand days of a child's life, which is the phase in a child's life where rapid physical and mental development occur (de Onis & Branca 2016). Hence, research on cash transfers and health outcomes is generally focused on children because cash transfers act as a sustained intervention that has a greater ability to positively impact anthropometric measures in children compared to adults (Bastagli et al. 2016).

Two anthropometric measures are often used in literature: stunting, and wasting in children. Stunting compares a child's height to the height of children of the same age as well as reflects the cumulative effect of poor nutrition and disease, and is measured using height-for-age Z-scores (Bastagli et al. 2016). Stunting is associated with a variety of long-term factors such as frequent infection, continuous inappropriate feeding habits, and poverty (Agüero et al. 2007). Wasting measures the weight of a child in relation to their height and can measure/represent acute malnutrition from the current inadequate diet (Bastagli et al. 2016).

Studies conducted in Nicaragua and Columbia found a significant effect of cash transfers on stunting (Maluccio 2005, Maluccio & Flores 2005, Macours et al. 2012, Attanasio et al. 2005, Fernald & Hidrobo 2011). The Nicaraguan Red de Protección Social condition cash transfer program reduced the probability of being stunted by five and a half percent (Maluccio & Flores 2005). However, a statistically significant effect of cash transfers height-for-age Z-scores for children under the age of five is not observed, although the small sample could be the reason for this result (Maluccio & Flores 2005). Similarly in Mexico, Oportunidades has no effect on height-for-age Z-scores for urban children below the age of two (Leroy et al. 2008).

The timing of the cash transfer programs is key to observing improvements in child height. The Red de Protección Social protection program improves height-for-age Z-scores for children between the ages of six months and forty-eight months by 0.36 standard deviations (Maluccio 2005). In Mexico, statistically significant increases in height-for-age Z-scores are observed for children below the age of six months. Furthermore, this younger age group had the longest duration of receipt during their critical period of growth (Leroy et al. 2008). Smaller effects of conditional cash transfers are witnessed in Columbia, as the height-for-age Z-scores only increased by 0.161 for children below the age of two years (Attanasio et al. 2005). One reason for the success of these programs is due to the compliance to the growth and development program which gives advice on child nutrition to mothers, leading to an increase in the consumption of protein and vegetables during the critical growth period (Attanasio et al. 2005).

In addition, the size of the cash transfer plays a crucial role in determining the program

effect on child health outcomes. Two studies conducted in Ecuador failed to find a statistically significant impact of the Bono de Desarrollo Humano unconditional cash transfer program on stunting in children below the age of thirty-five months (Fernald & Hidrobo 2011, Paxson & Schady 2010). The lack of impact of the Bono de Desarrollo Humano on stunting may be due to the relatively small cash transfer amounts in the program (Paxson & Schady 2010). Bono de Desarrollo Humano has the lowest cash transfer amount in the region, and this could be one of the reasons why the effects of cash transfers on stunting seen in other countries are not observed in Ecuador (Fernald & Hidrobo 2011).

In South Africa, CSG beneficiaries children who have received the grant for at least half their lives observe the largest increase of their height-by-age Z-scores, which is six percent (Coetzee 2013). Likewise, Agüero et al. (2007) find gains in height-by-age Z-scores for children who received the CSG before the age of two and continued to receive the grant for at least two years before their fourth birthday. However, no gains in child height were detected for those children who received the grant after the age of two years (Agüero et al. 2007), further emphasising the importance of timing of the intervention. Evidence suggests that CSG receipt is associated with increased expenditure on food in the household (Coetzee 2013), and further suggests that, since the grant is overwhelmingly paid to women, the grant income is spent in ways that benefit the children (DSD et al. 2011, 2012). Many female primary caregivers in Kwa-Zulu Natal state that they control how the CSG money is spent, and they know what the child and household needs, with one example of a caregiver saying that "I get the money and go straight to the shops to buy porridge for my child" (DSD et al. 2011).

Adult height is a reflection of the cumulative investments made in an individual during childhood (Strauss & Thomas 1998), making height an ideal measure of the long-term impact of cash transfers on height. Adult height is particularly important, as literature has shown that taller men and women earn higher wages and are more likely to participate in the labour force (Strauss & Thomas 1998). Using data from Brazil, a one percent increase in height is associated with an increase in lifetimes earnings of nearly two and a half percent (Strauss & Thomas 1998). Therefore, a male beneficiary who receives the CSG before the age of one experiences a gain in height of three and a half centimetres, which leads to a two percent increase in adult height which is estimated to increase future earnings by double (Agüero et al. 2007).

Limited literature exists on the cumulative impact of cash transfers on adult height, as much of the literature analysing cash transfers and height focuses on children (Agüero et al. 2007, Attanasio et al. 2005, Fernald & Hidrobo 2011, Adato & Bassett 2012, Paxson & Schady 2010). The studies by Fernald et al. (2009) and Buser et al. (2016) focus on the long-term

impacts of cash transfers on height for older children. A long-term impact evaluation of cash transfers in Mexico found that additional eighteen months of Oportunidades receipt had a small but statistically significant effect on height-by-age Z-scores for older children (Fernald et al. 2009). The largest improvement in height for age was witnessed in children aged ten, who had received the additional eighteen months of Progresa receipt before the age of three and whose mothers had no formal education(Fernald et al. 2009). The fortified food distributed by the Oportunidades programme may have filled the gaps in dietary intake, and the other conditions attached to the program may have led to better feeding practices (Fernald et al. 2009).

One impact evaluation study on Bono de Desarrollo Humano in Ecuador estimated its effect on the height of children who were in households who continued to receive the cash transfer, compared to children who ceased program receipt of the cash transfer after seven years (Buser et al. 2016). The children in the study were below the age of six and were born into the cash transfers. The eligibility criteria of the cash transfer program in Ecuador was determined by a wealth index that changed in 2007 (Buser et al. 2016). This resulted in families who were previously eligible for program receipt before 2007, becoming ineligible for the transfer after changes in the wealth index (Buser et al. 2016). After two years, children who lost cash transfer receipt had a worse height-for-age Z score compared to those who were still receiving the transfers. The authors suggest that lost income impacted food expenditure, coupled with the fact that many children were still in utero when their families lost the cash transfers, making them vulnerable to malnutrition (Buser et al. 2016).

The lack of literature on the long-term impacts of cash transfers on height forces this dissertation to examine other interventions that have long-term evaluations on height. Deworming programs and school feeding programs are examples of other interventions similar to cash transfers that have long-term impact evaluations. A school feeding program between 1959 and 1969 in primary schools in Sweden increased the height of boys by 0.07 centimetres for each year they were exposed to the program (Alex-Pertersen et al. 2017). The program had similar effects for girls, as their height increased by 0.05 centimetres for every year they were exposed to the program. Those children who had the longest exposure to the program experienced the largest gains in height. The boys and girls who were exposed to the feeding program for nine years grew by 0.8 and 0.65 centimetres respectively (Alex-Pertersen et al. 2017).

However, the deworming program in Kenya examined the beneficiaries ten years after the program had ceased and found no effect on the height beneficiaries who were now between the

ages of nineteen and twenty-nine (Baird et al. 2016, Ozier 2018). The timing of the treatment was a reason suggested for the result, as beneficiaries who received the deworming medicine after the age of three missed the critical time period for early childhood development (Baird et al. 2016). Although the school feeding program in Sweden also missed that critical period, the program increased the protein and vitamin intake of its beneficiaries and these two nutrients are an important input in height growth (Alex-Pertersen et al. 2017). The deworming program did, however, have a positive and significant effect on self-reported health, with beneficiaries reporting better health and missing fewer meals as compared to non-beneficiaries (Baird et al. 2016).

This dissertation seeks to add to the cash transfer literature by analysing the cumulative effect of CSG grant receipt on the cumulative outcomes, namely: years of education and height. The following sections present an overview of the relevant literature of the relationship between cash transfers and the two current outcomes: labour force participation, and mental health

3.3 Labour Force Participation

Investments in early childhood should translate to positive outcomes in adulthood, if the components of a cash transfer are implemented correctly (Molina et al. 2018). Labour force participation is an outcome that can be used to measure the cumulative impact of cash transfer programs. The accumulation of human capital (health and education) from investments made in early childhood is a pathway that leads to engagement with the labour market, and, thus, leading to income that can help households escape poverty (Araujo et al. 2016). Participation in the labour force is an indication of the working-age population's engagement with the labour market by either searching for employment or being employed (Bourmpoula et al. 2015). Wage income accounts for seventy percent of the income in households in South Africa (Leibbrandt et al. 2010), thus, labour force participation should prove important in reducing the incidence of poverty.

The global labour force participation rate stood at sixty-three percent as of 2017, while the Sub-Saharan Africa labour market participation rate hovered at sixty-nine percent (ILO 2018). In 2017, the labour force participation rate in South Africa was lower than both the global and Sub-Saharan African rates (Statistics South Africa 2018*a*). In addition, the global labour force participation rate for youth[11] (individuals aged between fifteen and twenty-four years) was forty-six percent (ILO 2017).

[11]The youth in South Africa is generally defined to be individuals aged between fifteen and thirty-four.

Conversely, in South Africa the labour force participation rate of the 10.3 million youth was twenty-six percent in 2018. This age group had a "Not in Education Employment or Training" (NEET) rate of thirty-three percent meaning that 3.3 million individuals between fifteen and twenty-four years of age were not involved in the labour market, education, or any form of training (Statistics South Africa 2018*c*). The NEET rate is a measure of the individuals not in employment,education, or training (ILO 2017). Compared to the rest of the world, South Africa has a higher NEET rate, as the global NEET rate is twenty-two percent and the NEET rate of Sub-Saharan Africa is sixteen percent (ILO 2017).

The NEET rate captures the youth who are not engaged with the labour market for reasons other than education and skill development. One reason the NEET rate in South Africa is high is explained by the high number of youth who do not believe that there are jobs available for their skill level (ILO 2017). Prolonged periods of time spent unemployed can lead to individuals becoming discouraged from seeking work opportunities, and, thus, dropping out of the labour force (Kennedy et al. 2009). Individuals that are highly educated are less likely to withdraw from the labour force due to their ability to shift into less skilled employment for a short period of time after experiencing job loss (Kennedy et al. 2009). Conversely, less educated individuals do not have this ability and experience unemployment for prolonged periods of time (Kennedy et al. 2009).

In 2016, ninety-four percent of the 3.2 million individuals who were not participating in the labour market had a secondary school qualification or less in South Africa (Department of Higher Education and Training 2017). Leibbrandt et al. (2010) find that labour force participation rates increase with educational attainment in South Africa. As a result, the majority of the youth not involved in the labour force have low levels of education. Thus, education is an important determinant of labour force participation in South Africa. The same mechanisms in which cash transfers affect education will also affect labour force participation.

The ultimate goal of cash transfer programs is to reduce the prospective poverty of its beneficiaries. There are few studies that evaluate the long-term impact of cash transfers on labour market outcomes. Long-term impact evaluations of conditional cash transfers in Mexico, Honduras, Ecuador and Malawi find mixed results of the long-term impact of these programs on labour force participation (Molina-Millan et al. 2018). A short-term evaluation of a two-year cash transfer program in Malawi, found no impact of the cash transfer on labour market outcomes, including labour force participation for women between eighteen and twenty-seven (Baird et al. 2019). Behrman et al. (2008) and Adhvaryu et al. (2018) analyse a

cash transfer program in Mexico called Progresa (renamed in 2002 to Oportunidades) which was launched in 1997.

The study by Behrman et al. (2008) follows individuals in Mexico who were between the ages of nine and fifteen years in 1997, examining the outcomes of this cohort in 2003 at fifteen to twenty-one years of age. The authors use an experimental evaluation design, which gave cash transfers to a treatment group in 1998 and to a control group 18 months later, comparing the outcomes of these two groups. Their study shows that labour force participation for males between the ages of fifteen and twenty-one decreased by approximately three percentage points, while the program had an insignificant impact on the labour force participation of women (Behrman et al. 2008).

Again using the experimental design, Adhvaryu et al. (2018) analyse the differential impact of cash transfers on those children born in a year that their family had a negative income shock due to poor rainfall. Their analysis showed that Oportunidades increased labour force participation by eight percentage points per year of exposure to the cash transfer for eighteen-year-olds who experienced negative rainfall shocks in their year of birth (Adhvaryu et al. 2018). However, the authors find that cash transfers have no effect on labour force participation of eighteen-year-olds who did have unfavourable early childhood conditions (Adhvaryu et al. 2018).

The effect of cash transfers on labour force participation differs by gender. Exposure to Progresa/Oportunidades was associated with a decrease in labour force participation of fourteen percentage points for males who were between the ages of fifteen and sixteen a considerable effect (Behrman et al. 2010) . Furthermore, exposure to the program of four to six years increased the labour force participation of female youth between the ages of nineteen and twenty-one years by approximately six percentage points (Behrman et al. 2010). This contrasts results found in Honduras, where a study of a five-year conditional cash transfer program estimated that the program reduced labour force participation of females by twelve percentage points and had no significant effect on male labour force participation (Molina et al. 2018).

Increased exposure to the Oportunidades program of seven years raised labour force participation rates of eighteen to twenty-year-olds by eight percentage points (Parker et al. 2012). Ham & Michelson (2018) find similar results for women in their study of a five-year cash transfer program in Honduras, using 2001 and 2013 Honduran census data with labour force participation rates of women increasing by twenty-five percent. Furthermore, twenty to twenty-four-year-old female youth who were exposed to Progresa/Oportunidades for thirteen years experienced a seven to eleven percentage point increase in labour force participation

(Parker & Vogl 2018*a*). However, in Ecuador, ten years of exposure to the Bono de Desarollo Humano cash transfer program had no significant impact on the labour force participation of women (Araujo et al. 2016). Cash transfers appear to have no effect on male labour force participation, the longer they are exposed to a cash transfer program (Araujo et al. 2016, Parker & Vogl 2018*a*). Further, emphasising that cash transfer may have differential impacts on the labour force participation of different genders.

The mechanisms in which cash transfers affect labour force participation are discussed in Section 4.1.3.

3.4 Mental Health

One in every three South Africans will suffer from a form of mental disorder over the course of their lifetime (Herman et al. 2009), and one in six South Africans will experience the onset of a mental disorder in a current year (Williams et al. 2007). This is of major concern as mental health disorders are a leading cause of disability and other health conditions that include communicable and non-communicable diseases (Gabriel & Harnois 2002, Prince et al. 2007). Mental disorders(or mental illnesses) are characterised by disturbances of thought, emotion, perception, behaviour, and relationships with others that have a significant impact on one or more aspects of life (WHO 2019). Mental disorders include depression, dementia, bipolar disorder, and schizophrenia among other psychoses (Scheid & Wright 2017). The onset of the majority of these mental disorders is between the ages of twelve and twenty-four, and have significant impacts on adolescent and youth health (Patel et al. 2007). A high rate of self harm is observed for the youth who experience the disorders, and suicide, which is often attributed to poor mental health, is the leading cause of death amongst youth (Patel et al. 2007, WHO 2019).

The early onset of mental illness, particularly for young people, can have negative and significant long-lasting impacts on future physical and mental health, and other adult outcomes (Fishbein et al. 2006, Patel et al. 2007, Bhana et al. 2013). Adolescence and the youth stages of life are critical phases in time in the development of social, cognitive, and economic connections and investments that are key for success (Patel et al. 2007). Mental disorders are associated with lower educational achievement (Patel et al. 2007, Ardington & Case 2010), poor physical, reproductive, and sexual health, substance use and abuse, and violence (Patel et al. 2007, Fishbein et al. 2006). These factors contribute to the strong negative association between mental illness and productivity, labour force participation, and affect future wages (Bubonya

et al. 2017, Kessler et al. 2008, Frijters et al. 2014).

Determinants of mental health vary across the different disciplines, such as biology, psychology and sociology literature (Roy & Campbell 2013). The biological literature suggests that neurological and hormonal factors affect mental health, while the psychology literature suggests that individual behaviour and feelings predict an individual's mental health (Roy & Campbell 2013, Rehm 1977). However, social determinants of mental illness include gender, with female adults being twice as likely to experience depression compared to male adults (Compton & Shim 2015). Furthermore, in South Africa, race is a determinant of mental illness, as African adults reported a higher rate of depressive symptoms compared to White adults (Ardington & Case 2010). Adverse early-life outcomes such as parental death are associated with the onset of mental disorders that include depression (Cluver et al. 2007).

The cycle between poverty and mental illness is persistent, with causality often bi-directional (Lund et al. 2011). Poverty is believed to increase the risk of mental illness through increased stress, malnutrition, violence, and decreased social capital (Lund et al. 2011, Flisher et al. 2007, Patel et al. 2007). This theory is called the social causation hypothesis and commonly applies to depression (Lund et al. 2011). However, according to the social drift[12] hypothesis, an individual with mental illness will "drift" into poverty through increased medical expenses, reduced productivity, and a loss of employment and wages (Lund et al. 2011, Saraceno et al. 2005). The social drift hypothesis is often associated with schizophrenia (Lund et al. 2011).

With strong links observed between poverty and mental health, interventions that target poverty have the ability to break the negative cycle between poverty and mental health (Gardner & Oswald 2007). Positive income shocks on the household environment are associated with a decrease in the risk of mental illness in adolescents (Viner et al. 2012). For example, the mental well-being of individuals who won between £1,000 and £120,000 in lottery winnings in Britain improved (Gardner & Oswald 2007). The effects of the lottery winnings on mental well-being were still present two years later (Gardner & Oswald 2007). Furthermore, research on cash transfer programs around the world has shown positive effects of cash transfers on mental health (Baird et al. 2013, Case 2004, Fernald et al. 2009, Fernald & Gunnar 2009, Filmer & Schady 2008, Kilburn et al. 2016, Macours & Vakis 2008, Ozer et al. 2009, 2011, Paxson & Schady 2007, Samuels & Stavropoulou 2016). The old age pension in South Africa reduced household stress levels (Case 2004), and an unconditional cash transfer program in Kenya was associated with increased happiness and life satisfaction for program beneficiaries (Haushofer & Shapiro 2013). Increased stress and low life satisfaction are two factors that are linked to

[12] Also known as the social selection hypothesis.

worsening mental health (Compton & Shim 2015, Haushofer & Shapiro 2013).

Evaluation of the Oportunidades cash transfer program in Mexico found that program receipt reduced child aggressive behaviour (Ozer et al. 2009). Furthermore, other evaluations of Oportunidades show reduced child emotional problems and lower cortisol levels in child beneficiaries, which indicate reduced exposure to stressors (Fernald et al. 2009, Fernald & Gunnar 2009). The effects of Oportunidades were stronger on adolescents who had a parent who was depressed (Fernald & Gunnar 2009). Oportunidades not only affected children and adolescents, but also had an impact on maternal depression, with a significant reduction in depressive symptoms observed in mothers who participated in the program (Ozer et al. 2011). Further effects of cash transfer programs on maternal depression were observed in Ecuador and Nicaragua, where program receipt decreased depressive symptoms and reduced stress (Paxson & Schady 2007, Macours & Vakis 2008). These are important results, as maternal depression is a determinant of adolescent and youth mental health (Garber & Cole 2010).

A conditional cash transfer in Cambodia, had small positive effects on the mental health of adolescent secondary school students (Filmer & Schady 2008). In Malawi, both conditional and unconditional cash transfer programs had a positive effect on the mental health of female adolescents, as psychological distress decreased for program beneficiaries (Baird et al. 2013). However, the effects of the conditional cash transfer were smaller than of the unconditional cash transfer. The difference in effects between the two programs was attributed to the burden of regular school attendance imposed on female adolescents by the conditional cash transfer (Baird et al. 2013). The effects of cash transfers on mental health differ by gender. Kilburn et al. (2016) observe that a cash transfer program for orphaned and vulnerable youth leads to larger decreases in depressive symptoms for male youth compared to female youth in Kenya. Further differences in the effects of program receipt on mental health are reported by male orphans status, as orphans experience a stronger impact of program receipt compared to non-orphans (Kilburn et al. 2016).

Limited research has been conducted on the long-term impacts of cash transfers on mental health. In Malawi, the effects of conditional and unconditional cash transfer programs on female adolescent mental health had disappeared after two years (Baird et al. 2013). This dissertation seeks to add to the literature on cash transfers and mental health. Chapter 4 below discusses the methodology used in this text.

4 Methodology

This chapter describes the data and estimation techniques to be used in the rest of this dissertation, and the theoretical framework for each outcome, namely: years of education, height, labour force participation and depressive symptoms.

4.1 Theoretical Framework

4.1.1 Education

Much of the cash transfer and schooling literature is focused on the educational outcomes of children and adolescents of school-going age. Enrolment, school attendance, grade progression, and test scores are some of the educational outcomes examined (Molina-Millan et al. 2018, Branson et al. 2013, Fleisch et al. 2012, Fiszbein & Schady 2009). The analysis in this text adds to this literature, by focusing on the years of education completed by the youth in South Africa, who are above the minimum school leaving age[13]. Once the school leaving age is reached, school dropout rates in South Africa start to increase (Branson et al. 2013) and variation increases in the years of education completed amongst individuals of the same age (Statistics South Africa 2017).

The differences in education hint at individual preferences for education, and various factors influence these preferences. Using the framework below, Glewwe & Muralidharan (2016) estimate a causal relationship between the years of education completed and various individual, household and schooling inputs, to indicate educational preferences:

$$S_i = h(\mathbf{Q}, \mathbf{C}, \mathbf{H}, \mathbf{P}) \tag{1}$$

S_i is the individual i's years of schooling completed. $\mathbf{Q}$ includes school and teacher characteristics, and $\mathbf{C}$ includes individual level characteristics such as "innate ability". $\mathbf{H}$ includes characteristics of the household and $\mathbf{P}$ is comprised of prices related to schooling.

Distance to school, teacher quality, teacher to student ratio, school quality, and fee status are school and teacher characteristics that are key determinants of educational achievement (Strassburg et al. 2010, Glewwe & Muralidharan 2016, Angrist & Lavy 1999, Branson et al. 2013). Reducing the distance to school is observed to have a positive and significant effect on years of education attained (Duflo 2001). School quality is an important determinant of

[13]The minimum school leaving age in South Africa is fifteen years of age or after the completion of the ninth grade (Fleisch et al. 2012).

educational achievement in South Africa, as low school quality is associated with higher school drop-out rates (Branson et al. 2013). South African literature on education mentions individual determinants of years of schooling including; gender, race, orphanhood, ability, and mental and physical health (Ardington et al. 2011, Branson et al. 2013, Glewwe & Muralidharan 2016, Fleisch et al. 2012, Baird et al. 2013, Case & Ardington 2006, Delany et al. 2016, Gustafsson 2011).

Household income, parental education achievement, household size, urban or rural location, and province are examples of household characteristics that influence an individual's educational achievement (Ardington et al. 2011, Branson et al. 2013, Behrman 1999). Maternal education in particular is estimated to have large and positive effects on a child's education (Behrman 1999). Household income also affects $\mathbf{P}$, the vector of prices, as the household's ability to meet the schooling costs affects the choice of education level. The prices related to education are not limited to the direct costs of going to school, such as school fees and school supplies, but include indirect costs as well (Delany et al. 2016, Glewwe & Muralidharan 2016). The indirect costs consist of the opportunity costs of education, which is made up of wage income that could have been earned or alternative investments that could have been made (Behrman 1999). Therefore, these costs have a negative effect on educational achievement.

Cash transfers programs affect $\mathbf{P}$ in Model 1 by easing the financial and credit constraints that households face in attempting to decrease the costs of acquiring education (Glewwe & Muralidharan 2016). The added income from these programs can be spent on school fees, uniforms, textbooks and other school-related expenses (Adato & Bassett 2012). Furthermore, cash transfers reduce the opportunity cost of investing in education by providing immediate returns that compensate for the loss of income that could have been earned in the labour market, or income derived from alternative investments (Glewwe & Muralidharan 2016). Lastly, cash transfers are potentially used to buy more nutritious food, which can improve an individual's health and concentration, allowing for better performances in school (Adato & Bassett 2012).

Although educational outcomes can be measured in a number of ways, this text focuses on one youth outcome: the number of school years completed. This outcome is a cumulative measure of initial and continuous investments into human capital (Agüero et al. 2007) and is the outcome of the demand for education related to the above factors. Thus, the cumulative impact of grant receipt is estimated on years of education completed.

4.1.2 Physical Health

Physical health is measured using anthropometric measures of height, weight, body mass index, body circumferences (waist to hip ratio), and skinfold thickness (Perissinotto et al. 2002). Height is used as the main physical health outcome in developing countries (Mwabu 2007, Strauss & Thomas 2007), as it is also considered an indicator of cognitive development and work capacity (Agüero et al. 2007). This dissertation adds to the cash transfer literature on health, as the focus of the analysis is on older youth and height. Youth height is determined by a number of factors that provide a cumulative summary of an individual's childhood dietary and disease environment (OECD 2009, Silventoinen 2003). This makes height a suitable physical health outcome to measure the cumulative effect of the child support grant on the youth in South Africa.

Investments in net nutrition, particularly in the first one thousand days of a child's life are believed to be the main determinant of height (de Onis & Branca 2016, OECD 2009, Silventoinen 2003). Net nutrition is defined as the quantity and quality of gross nutritional intake, less the losses in nutrition from physical activity and disease (OECD 2009, Silventoinen 2003). Child labour is a form of physical activity, that can slow growth, if the quantity and quality of the child's diet lacks nutritional foods, and if there is inadequate medical care (Cortez et al. 2006). Thus, net nutrition could be negative in developing countries where child labour is common. Therefore, Akachi & Canning (2007) model the causal relationship between height and nutrition as follows:

$$h_{it} = f_i + \alpha n_{it} - \beta d_{it} + \gamma y_{it} \tag{2}$$

h_{it} is the height of individual i, born in the year t and n_{it} is childhood nutrition. d_{it} represent the childhood disease environment of individual i, y_{it} includes income, and f_i is unobservable fixed effects (Akachi & Canning 2007). Childhood nutrition can be measured through average protein and calorie intake. Income is used as a measure for socioeconomic status and the associated access to housing, clothing and medical care resources that can mitigate the effects of the disease environment on the child's health (Akachi & Canning 2007).

However, nutrition is not the only determinant of adult height (Strauss & Thomas 2007, Steckel 2009, Ayuda & Puche-Gil 2014, Silventoinen 2003, Deaton 2007). Key health decisions are made for children by their parents. As the child grows older, these health decisions are made independently (Strauss & Thomas 2007). A health production function can be used to model these decisions, with the hope of modelling true causal relationships between health and

its determinants (Strauss & Thomas 2007). The health production function is as follows:

$$H_i = H(N; A, B_h, D, \mu) \tag{3}$$

H_i represents height as the measured health outcome as a function of individual and household characteristics and health behaviours and inputs, N. Health inputs include the use of health care services and nutrition, whereas health behaviours include smoking, drinking alcohol, and stressful lifestyles (Strauss & Thomas 2007). A represents individual characteristics that include age and gender. B_h are household characteristics that affect individual i's height, for example family genetics (Strauss & Thomas 2007). Environmental factors such as the disease environment, health care practices, and health-related infrastructure are captured in D. The μ are individual time-invariant factors that are unobservable to the researcher, such as innate healthiness (Strauss & Thomas 2007).

Income, race, orphan status, migrant status, and education are individual characteristics that are key determinants of height (Ayuda & Puche-Gil 2014, Steckel 2009, Akachi & Canning 2007, Silventoinen 2003). Furthermore, income can be used as a proxy for nutrition through its ability to influence the quantity and quality of available nutritious food (Deaton 2007). Household income, parental education (in particular maternal education), household size, urban or rural location of the household, and province are household characteristics that are determinants of height (Deaton 2007, Steckel 2009, Strauss & Thomas 2007, Silventoinen 2003). In addition, food prices, taxes, access to land, early childhood health, and height attainment as a child are further determinants of height (Ayuda & Puche-Gil 2014, Strauss & Thomas 2007, Steckel 2009).

Cash transfers may affect an individual's height, through the increase in household income that arises from these programs (Adato & Bassett 2012). The additional income allows households to increase their expenditure on nutritious food and this impacts the quality and quantity of food consumed (Adato & Bassett 2012, Agüero et al. 2007). Improved nutritional status is believed to be positively associated with adult height (de Onis & Branca 2016, OECD 2009, Silventoinen 2003, Steckel 2009, Strauss & Thomas 2007, Akachi & Canning 2007). Therefore, social assistance to the poor can influence height through improved nutrition (Adato & Bassett 2012, Agüero et al. 2007, Fernald et al. 2009, Buser et al. 2016). In addition, if the cash transfers are received at birth or in early childhood, the cumulative impact of cash transfer programs on height can be estimated (Bastagli et al. 2016).

4.1.3 Labour Market Outcomes

The youth make an important decision to leave school and join the labour market, or to remain in school, and this decision is dependent on a number of factors (Garcia & Jean 2008). Joining the labour force is a potential pathway to escaping poverty. Accumulated human capital can affect an individual's ability to engage with the labour market (Araujo et al. 2016). Using the standard participation model derived from the neoclassical theory of labour supply, Sprague (1994) postulates that the decision to participate in the labour market is dependent on wages. The theory states that an individual will participate in the labour market if the expected market wage exceeds their reservation wage (Sprague 1994, Ntuli & Wittenberg 2013). The reservation wage W_r is shown to be equal to:

$$W_r = W(M_i, \eta_i) \tag{4}$$

where M_i includes observable characteristics and η_i represents unobservable tastes (Sprague 1994). The reservation wage reflects the value of non-market related activities in time, which is determined by non-labour income and individual characteristics (Ntuli & Wittenberg 2013). These characteristics include race, age, gender, and marital status, whereas non-labour income could be income from grants or other household members (Sprague 1994). Tertiary education and other post-secondary education raise the value of non-labour-market time and increase the reservation wage (Ntuli & Wittenberg 2013).

The expected market wage W_i can be written as follows:

$$W_i = W(Z_i, \xi_i) \tag{5}$$

where Z_i represents human capital characteristics and the ξ_i are unobservable individual parameters such as innate ability (Sprague 1994). Human capital characteristics that influence the expected wage offer include years of education, age, race, experience, urban or rural location, occupation industry, and health outcomes including height and nutrient intake (Sprague 1994, Ntuli & Wittenberg 2013, Strauss & Thomas 1995, Altonji & Blank 1999, Schultz 1988). Therefore, an individual will only participate in the labour market if:

$$W_i > W_r \tag{6}$$

However, expected wage offers and the reservation wage may not always be measurable in surveys. Thus, Yun (2004) suggest that labour force participation is a function of individual

and market-related characteristics, which can be written as below:

$$Y_i = F(X\beta) \tag{7}$$

Y_i is labour force participation and X captures the individual determinants of labour force participation. β represents the vector of estimated coefficients (Yun 2004, Contreras et al. 2011). The individual determinants of labour force participation include educational attainment, age, gender, health, experience, race, urban or rural location, household income, and occupational industry (Contreras et al. 2011, Strauss & Thomas 1995, Altonji & Blank 1999, Schultz 1988). Health is a particularly important determinant of labour force participation in South Africa, with the country experiencing a high burden of disease, such as HIV/AIDS, diabetes, and malnutrition (Nwosu & Woolard 2017). Furthermore, marriage status, number and age of children, and the presence of other women in the household, affect a women's ability to engage with the labour market (Ntuli & Wittenberg 2013, Joll et al. 1993, Wong & Levine 1992). The individual determinants of labour force participation are similar to the determinants of the expected market wage offer in Model 5.

Cash transfers can influence an individual's labour force participation through a number of channels. The added income that arises from cash transfers increases the reservation wage W_r by raising the non-labour income and household income. Furthermore, the additional income can reduce the cost of education, thus, allowing an individual to increase their education levels, and to raise the value of their non-labour-market time (Ntuli & Wittenberg 2013). Thus, the increase in household income and decrease in the cost of education raises the reservation wage and decreases labour force participation. However, cash transfers can improve an individual's health and productivity through the increase in the quality and quantity of nutritious food consumed (Adato & Bassett 2012). Therefore, the rise in accumulated human capital, through education and health, can increase labour force participation through Model 7.

4.1.4 Mental Health

Mental disorders can be measured using a variety of outcomes (Scheid & Wright 2017), and this dissertation uses depression as the main measure of mental health and disorders. Depression is one of the most common mental disorders and affects over 264 million individuals globally (WHO 2019). Methods of modelling depression vary across the different

disciplines, such as biological, psychological and sociological literature on depression (Roy & Campbell 2013). Numerous biological and cognitive models of depression exist (Roy & Campbell 2013, Rehm 1977). The biological models of depression focus on neurological and hormonal factors, while cognitive models focus on an individual's behaviour and feelings to predict the onset of depression (Roy & Campbell 2013, Rehm 1977). Similar to physical health, negative shocks and interventions in early childhood have a long lasting impact on youth depression and mental health. Individuals born during a time when a household experiences negative income shocks experience higher risks of severe mental distress (Adhvaryu et al. 2019).

The social causation hypothesis discussed in Chapter 3 provides an appropriate framework to estimate the cumulative impact of the CSG receipt on mental health. By taking into account other genetic, cumulative, current, and environmental factors, the mental health literature suggests an individual's mental health can be estimated as follows (Gardner & Oswald 2007, Christensen et al. 1999, Thompson 2014, Eyal & Burns 2019, Adhvaryu et al. 2019):

$$d_i = h(u(y_i, x_i, m_i, pd_i, c_i)) + \mu_i \tag{8}$$

d_i represents the mental health of individual i, which is measured in this text, as the presence of depressive symptoms, using the CES-D 10 score. $u(...)$ is the individual i's true mental well-being and $h(...)$ is a function relating to the reported or observed mental well-being (Gardner & Oswald 2007). y_i includes all forms of income such as, wages, money from grants, household income, and other forms of income. All income shocks are captured by y_i (Gardner & Oswald 2007).

x_i represents individual characteristics that include age, race, gender, marital status, nutrition, self-esteem, level of stress, years of education, and orphan status (Gardner & Oswald 2007, Christensen et al. 1999, Atkins 2014, Roy & Campbell 2013, Valàs 1999, Compton & Shim 2015, Kilburn et al. 2016, Ardington & Case 2010, Hjelm et al. 2017). Household characteristics are captured by m_i and consists of household location, size, housing quality, deaths, and physical health in the household (Eyal & Burns 2019, Compton & Shim 2015). pd_i refers to the mental health of individual i's parents (Eyal & Burns 2019).

c_i represents access to healthcare and transportation, neighbourhood deprivation, exposure to crime and violence and other community-level factors (Tomita & Burns 2013, Compton & Shim 2015). μ_i is the error term that contains time constant individual effects. It is further assumed that $u(...)$ is only observable to individual i (Gardner & Oswald 2007). Other factors

that are not captured in Model 8 but are determinants of depression are anger, adverse early life experiences, relations between the police and community, pollution of the air, water and environment, exposure to war, and perceived racism (Compton & Shim 2015, Atkins 2014, Adhvaryu et al. 2019, Singhal 2019).

There are many pathways that cash transfers can improve mental health. Self-esteem is believed to be negatively associated with depression or depressive symptoms, with higher self-esteem often observed to lead to lower rates of depression (Atkins 2014). In addition, education is theorized to raise self-esteem and as mentioned in Section 4.1.1, education can be positively affected by cash transfer programs. Positive reinforcement of academic achievement can increase self-esteem and improve mental health in youth (Patel et al. 2007). The income from these programs decreases the cost of education, increasing years of education attained. This rise in education can positively impact an individual's self-esteem and reduce the presence of any depressive symptoms (Patel et al. 2007). Furthermore, cash transfers improve household income, which could allow for an increase in the consumption of goods such as clothes, which also improve self-esteem (Baird et al. 2013).

The additional funds from cash programs can be used to upgrade housing quality (depending on the size of the transfer) and improve an individual's mental health. Cash transfers can also provide a positive income shock, which could potentially reduce depression in orphans by offsetting the economic losses of losing a parent (Kilburn et al. 2016). These programs may mitigate the intergenerational transmission of depressive symptoms (Ozer et al. 2011). Cash transfers can decrease depressive symptoms in parents by reducing the stress levels that arise due to a lack of available finances, which, in turn, may reduce the young adult's depressive symptoms (Conger et al. 1994, Baird et al. 2013, Eyal & Burns 2019).

In addition, cash transfers can affect mental health through physical health. Poor physical health is associated with poor mental health (Patel et al. 2007), and, thus, cash transfer programs can decrease psychological distress by reducing the risk of suffering from other illnesses through improved nutritional intake (Baird et al. 2013). The effect of cash transfers on nutritional intake is discussed above in Section 4.1.2. Section 4.2 presents the data used in this text.

4.2 Data

This thesis uses the South African National Income Dynamics Study (NIDS), a longitudinal household study containing information on welfare in South Africa (Chinhema et al. 2016). The NIDS began in 2008 with a nationally representative sample of 28,226 individuals in more than 7,300 households. Waves 1 to 5 took place in 2008, 2010/2011, 2012, 2014/2015 and 2017 respectively. The sample size has increased due to both children born to continuing sample members and an increase in the number and size of households (Chinhema et al. 2016). In 2017, 39,429 individuals and 13,719 households were successfully interviewed.

The NIDS collects data on adults, children, households and proxy data for household members who are not present at the time of the interview. Children are defined as individuals younger than fifteen years of age. The NIDS gathers data on the four outcomes of interest to this study, namely, individual years of education achieved, labour force participation, height, and mental health. Employment status in the NIDS is coded using the International Labour Organisations definitions of employed, not economically active (not a labour force participant) or unemployed using either the strict or broad definition (Chinhema et al. 2016). Participants in the study are asked about qualifications and years of education achieved. Furthermore, respondents to the NIDS have their height, weight, and waist size recorded, providing the anthropometric measures needed to evaluate physical health outcomes (Chinhema et al. 2016).

In the NIDS, The Center for Epidemiological Studies Short Depression Scale (CES-D 10) is used to screen for the presence of depressive symptoms (Irwin et al. 1999). The CES-D 10 is calculated from ten questions about different aspects of mental health in respondents (Radloff 1977). The scale has a score range of zero to thirty and individuals who have a score greater or equal to ten, are considered to exhibit mild to moderate depressive symptoms. The ten-question version of the CES-D is considered to be as efficient as the full-length twenty question version (Andresen et al. 1994). The CES-D 10 is shown to be internally consistent and reliable in many household surveys, and has been used in South Africa and other Sub-Saharan African countries (Eyal & Burns 2019, Kilburn et al. 2016, Tomita & Burns 2013, Andresen et al. 1994, Ardington & Case 2010).

Data on CSG receipt is collected for both children and adults who are below the age of eighteen years (Chinhema et al. 2016). There are 45,421 CSG beneficiaries across all five waves in the NIDS. However, data on the reported duration of CSG receipt is poor. Information is collected on child support grant beneficiaries, including the date the CSG was first received on

behalf of the child. However, the NIDS only collects data on whether or not an adult respondent is a CSG beneficiary and not the duration of receipt, thus making the reported duration data unreliable, and not suitable for analysis. Therefore, different measures of the duration of grant receipt will be used -see Section 4.3.

4.3 Measuring Duration

As this dissertation focuses on cumulative receipt and not current receipt, it is important to examine how the duration of CSG receipt is calculated. NIDS participants report their duration of receipt and exposure to the CSG can be calculated according to the program roll-out. The first measure of duration is collected for current child CSG beneficiaries only using the month and year of initial receipt. However, not all beneficiaries report the month of initial receipt, opting for only the year. There are 32,389 CSG beneficiaries who report the year of initial receipt, while 13,062 are missing data on the year and month of the first receipt in all five waves of NIDS. The data from the previous waves are used to impute the duration of receipt for older CSG beneficiaries, who cease to report receipt.

Another measure, CSG exposure[14] (potential duration of receipt) refers to the number of years that an individual is eligible to receive the CSG, and is a function of birth year and age in each wave. This measure does not take into account reported CSG receipt and is calculated for all individuals. Figure 1 below compares the two measures of grant duration, illustrating the similarities between the two.

Figure 1 plots both measures of duration by age in Wave 5. Both exposure and reported duration follow a similar pattern, increasing with age until sixteen years. Both measures flatten out and begin to fall after the age of eighteen years. The average reported duration of receipt is lower at every age than the average potential duration. At the age of eighteen, the potential duration is equal to eighteen years, however, the average reported duration is equal to eight years. Although the grant may be available from birth, most parents delay in applying for the CSG (Delany et al. 2008), hence actual duration is not equal to the potential duration. Using these two measures, the following section discusses the sample that is ideal for the evaluation of the cumulative effects of the CSG.

[14]In this text, exposure to the grant as determined by year of birth will also be referred to as the potential duration of grant receipt. Potential duration is calculated following other literature as age plus one (Parker et al. 2012). This is a rough approximation and results do not differ if potential duration is equal to age. Thus, an infant that is less than a year old is given the age zero and is assumed to have been exposed to the grant for one year

Figure 1: Measures of Duration of Receipt

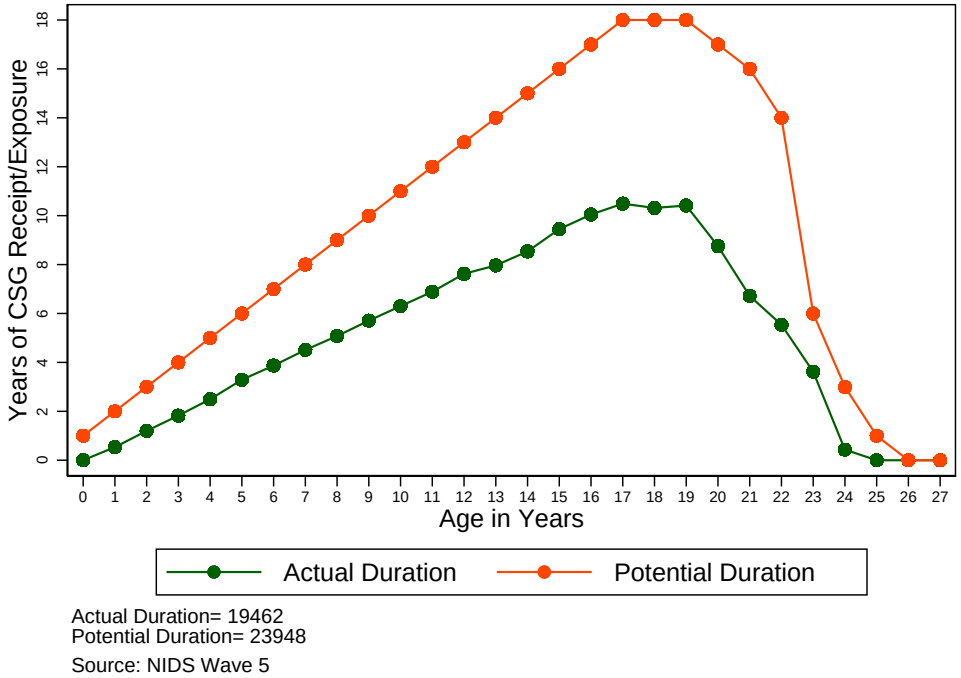


Figure 1 uses a connected scatter plot to graph the average number of years of potential exposure and the mean duration of actual receipt by age. The sample used is Black South African and Coloured youth between the ages of zero and twenty-seven in Wave 5 of the NIDS.

4.4 Sample Choice

The sample chosen for analysis in this dissertation is Black African and Coloured youth. These race groups have the largest rates of CSG receipt (McEwen et al. 2009) and account for over ninety percent of the population that receives social welfare (Statistics South Africa 2018*b*). The sample is restricted to those aged fifteen to twenty-seven for a number of reasons. The NIDS collects information on mental health and labour force participation for adults aged fifteen and up. In addition, height and years of education achieved continue to change into early adulthood (Meghir & Rivkin 2010).

Twenty-seven is chosen as the upper limit, as individuals who are twenty-six and twenty-seven have no exposure to the grant (see Figure 1 and 2) and, thus, would never receive the grant. Additionally, twenty-six and twenty-seven-year-olds are close enough in age to the older cohort of CSG beneficiaries(aged twenty-five and below), that their characteristics should be similar and, therefore, could be considered a potential control group. Furthermore, the timing of the CSG rollout ensures that it is within this age sample that a great deal of variation in the potential duration of receipt can be found (Figure 1 and 2). Thus, opportunities exist to exploit exogenous variation in duration of receipt for estimation.

Figure 2: Potential Duration of the Child Support Grant by Age

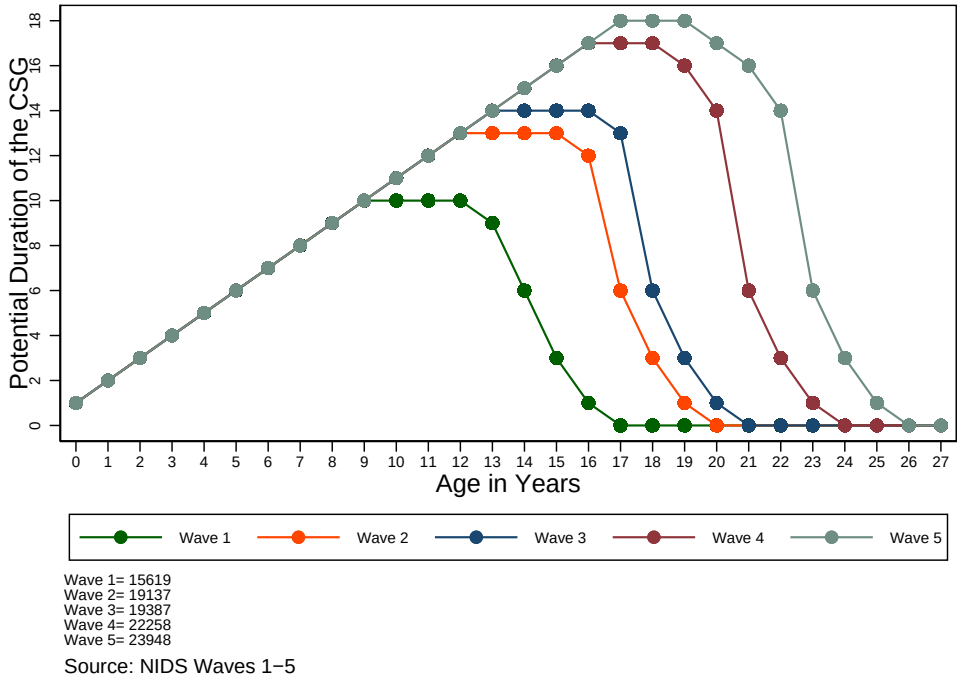


Figure 2 uses a connected scatter plot to graph the number of years of exposure to the Child Support Grant as a function of age in each wave of the NIDS. The sample used is African and Coloured youth between the ages of zero and twenty-seven years in each of the Waves 1 to 5 of the NIDS.

Figure 2 follows the sample of Black South African and Coloured youth below the age of twenty-seven years and graphically presents the patterns of grant exposure in each of the five waves from the NIDS. Exposure to the CSG increases linearly with age until age ten in Wave 1, twelve in Wave 2, thirteen in Wave 3, sixteen in Wave 4, and seventeen in Wave 5. The irregular expansion in the age threshold of the CSG mentioned in Table 1 resulted in the uneven pattern of exposure for older children and adolescents. The variation in CSG exposure is observed in each wave and between waves in Figure 2. For example, an individual who is fifteen in Wave 1 would have two years of exposure to the grant. However, a fifteen-year-old would have potential duration of CSG receipt of thirteen years in Wave 2, and fourteen years in Wave 3, whereas all fifteen-year-olds in Waves 4 and 5 would have been exposed to the CSG for sixteen years.

Wave 5 contains the most recent information on the CSG in this sample and it is in this wave, with the age group of fifteen to twenty-seven-year-olds, that the greatest exogenous variation in exposure is witnessed. For instance, twenty-two and twenty-three-year-olds in 2017 would have exposure to the grant of fourteen and six years each, which can be considered a large difference. The overall exposure to the CSG ranges from zero to eighteen years for fifteen to twenty-seven-year-olds in Wave 5. Therefore, the base sample (unless otherwise stated) used for analysis in this dissertation consists of African and Coloured youth between the ages of

fifteen to twenty-seven years in Wave 5. Using the base sample discussed above, the following section analyses the differences in characteristics between CSG beneficiaries.

4.5 Descriptive Statistics

In order to accurately measure the long-term impact of the grant, it is necessary to calculate the number of individuals who fall into different exposure and duration of receipt categories. Table 2 examines the measures of CSG duration over time, using both reported receipt and exposure.

Table 2: Duration of Child Support Grant Receipt Over Time

Measure of CSG Duration:	**Exposure**			**Reported Duration**		
	Wave 1	**Wave 3**	**Wave 5**	**Wave 1**	**Wave 3**	**Wave 5**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Number of years of duration:						
0 years	16%	22%	18%	35%	28%	25%
1 to 4 years	15%	20%	17%	26%	28%	23%
5 to 8 years	22%	20%	17%	33%	24%	21%
9 to 12 years	47%	15%	14%	5%	17%	17%
13 to 16 years	0%	23%	19%	0%	3%	11%
17 to 18 years	0%	0%	15%	0%	0%	2%
Total	7,926	19,387	27,301	3,955	12,371	18,456

The proportion of the number of years of exposure or actual duration of CSG receipt in Waves 1, 3 and 5 are shown above. The sample consists of African and Coloured youth born between 1990 and 2002. Columns 1 to 3 use exposure as the measure of CSG duration and Columns 4 to 6 use the actual reported duration of receipt.

Table 2 reports the percentage of individuals and grant beneficiaries in each of the different years of duration categories. The base sample is used in Table and is followed through Waves 1, 3 and 5. In Wave 1, sixteen-percent of the sample has had no exposure to the CSG. As time progresses, the proportion of individuals with no exposure increases to twenty-two-percent in Wave 3. However, in Wave 5 the proportion of the base sample with no exposure to the grant decreases to eighteen-percent. Waves 1 and 3, have no individuals with seventeen or eighteen years of potential CSG duration. By Wave 5, fifteen percent of the sample has been exposed to the CSG for over sixteen years. Table 2 confirms that there is sufficient variation in the number of individuals in each year of exposure category in Wave 5.

Over time, reported duration follows a similar pattern to exposure. The percentage of

individuals reporting no CSG receipt [15] declines over time, and the number of people with duration data increases, with the highest number of individuals with duration data equal to 18,456 observed in Wave 5. Over 5,000 (thirty-percent) of these individuals with duration data report nine years of grant receipt. The following table illustrates the differences in individual characteristics by the reported duration of receipt.

Using the base sample, Table 3 compares the weighted[16] mean values of individual and household characteristics for those with either above-average or below-average duration of grant receipt. The average duration of CSG receipt in the full sample is 5.5 years. CSG beneficiaries with above average duration of receipt are statistically significantly younger than those beneficiaries with below-average duration of receipt(18.6 vs 23.4). Beneficiaries with longer periods of grant receipt have younger parents (45.8 years vs fifty-one years) and mothers who display more depressive symptoms (0.33 vs 0.27). As the average age of CSG beneficiaries with a longer duration of receipt is eighteen years, and the average age of beneficiaries with a lower duration is twenty-three years, it is expected that there would be significant differences in education and labour force participation relating to age.

Individuals with a higher duration of CSG receipt have completed fewer years of education (ten years vs 10.8 years), are less likely to have a matric (0.19 vs 0.45) and are shorter (163 centimetres vs 164.2 centimetres). In addition, due to the age differences these individuals are less likely to be part of the labour force (0.19 vs 0.54), and to be employed (0.53 vs 0.70). Past beneficiaries with a longer duration of receipt are less likely to express depressive symptoms (0.17 vs 0.21) and have lower CES-D scores (6.04 vs 6.38). Furthermore, those beneficiaries stay in larger households, which are less likely to be in the urban areas (0.54 vs 0.72). Their households earn less (R6,461 vs R10,278), and receive more income from government grants than households with individuals below the average number of years of CSG receipt.

[15]Individuals with zero years of CSG receipt, includes: income and age-eligible youth that have never received the grant, individuals born in 1990 and 1991, who have never been age-eligible for the grant and CSG beneficiaries who started receiving the grant in the same year they were interviewed for the NIDS. Although the latter group of individuals only account for 276 beneficiaries in Wave 1, 507 beneficiaries in Wave 3 and 371 beneficiaries in Wave 5 have zero years of reported duration.

[16]Wave 5 sample weights are used

Table 3: Individual Descriptive Statistics by Duration of CSG receipt

Youth Sample Divided By:	Reported Duration of CSG Receipt				
	All		Above Average	Below Average	
	Mean	S.D	Mean	Mean	Star
	(1)	(2)	(3)	(4)	(5)
Youth Demographics	*Panel A: Means of Individual Characteristics*				
Age in Years	21.2	(0.08)	18.6	23.4	***
Female (%)	0.49	(0.01)	0.49	0.49	
Coloured (%)	0.11	(0.03)	0.08	0.14	***
African (%)	0.89	(0.03)	0.92	0.86	***
Years of Education	10.3	(0.05)	10	10.8	***
Labour Force Participation (%)	0.38	(0.01)	0.19	0.54	***
CES-D >= 10 (%)	0.19	(0.01)	0.17	0.21	*
Height in cm	164	(0.25)	163	164.2	***
Years of CSG Exposure	11.1	(0.15)	16.4	6.55	***
Duration of CSG Receipt	5.50	(0.15)	8.87	0.15	***
Employed (%)	0.66	(0.02)	0.53	0.70	***
Monthly Income	4,311	(246)	2,516	4,740	***
Has a Matric? (%)	0.33	(0.01)	0.19	0.45	***
CES-D 10 Score	6.22	(0.13)	6.04	6.38	*
Life Satisfaction (1-10)	5.49	(0.08)	5.38	5.59	*
Weight in kilograms	62.1	(0.35)	58.4	65.6	***
Mother is Resident	0.68	(0.02)	0.79	0.57	***
Mother Years of Education	8.40	(0.16)	8.25	8.57	
Mother Age	48.3	(0.29)	45.8	51.0	***
Mother Labour Force Participation (%)	0.57	(0.02)	0.60	0.55	*
Mother Height	158	(0.22)	158	158	**
Mother CES-D >= 10 (%)	0.30	(0.02)	0.33	0.27	**
Father is Resident	0.41	(0.02)	0.39	0.43	
Father Years of Education	8.33	(0.29)	7.96	8.61	
Father Age	53.9	(0.40)	51.9	55.4	***
Father Labour Force Participation (%)	0.68	(0.03)	0.67	0.68	
Father Height	169	(0.88)	169	169	
Father CES-D >= 10 (%)	0.24	(0.02)	0.26	0.22	
	Panel B: Means of Household Characteristics				
Household Size	4.51	(0.09)	5.38	3.63	***
Household's Monthly Income	8,358	(391)	6461	10,278	***
Income from Government Grants	1,607	(49.0)	1,665	1,500	**
Located in an Urban Area (%)	0.63	(0.03)	0.54	0.72	***
Number of Observations	6,774		3,312	3,462	

The table above reports the mean values of the individual and household characteristics for those with above average duration and below average duration, and tests for significant differences, using the base sample in Wave 5. Sample weights from Wave 5 are used to present weighted estimates. Standard deviations are reported in parentheses and presented in Column 2. Significant differences are reported with stars. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

The results from Table 3 illustrate that the differences in individual and household characteristics by duration of receipt are related to differences in age. Table 3 confirms the endogenous nature of duration of grant receipt, as past and present CSG beneficiaries with more than the average number of years of receipt are significantly different in key characteristics compared to those with lower duration of receipt. Appendix Item 1 shows individual and household characteristics by exposure status and age effects are also observed for the base sample, split by whether an individual has been exposed to the grant or not.

The following section describes the techniques used to estimate the effect of duration of receipt and to eliminate the issues arising from the endogeneity of this measure.

4.6 Estimation

In Section 4.6, ordinary least squares, instrumental variables and fixed effects models are described with the appropriate specifications.

4.6.1 Ordinary Least Squares

Model 9 is estimated using ordinary least squares, as follows:

$$Y_i = \beta_0 + \beta_1 CSG_i + \alpha X_i + \gamma HH_h + \epsilon G_g + u_i \tag{9}$$

Multiple linear regression is used to estimate the impact of duration of CSG receipt on Y_i, which is either a cumulative or current outcome for individual i, in geographical area g and in household h. CSG_i is the reported duration of CSG receipt, or the duration of exposure to the CSG. X_i includes individual-level characteristics such as age, gender, race, parental characteristics, education level and others. HH_h includes household-level characteristics such as household income and household size. G_g includes geographical controls such as the province the individual is located in, and a binary variable indicator for whether individual i lives in an urban area or not. u_i is an idiosyncratic error term (Wooldridge 2013, Hutcheson 1999).

Model 9 is used to estimate the CSG effect while controlling for the key characteristics mentioned in Section 4.1. If all the ordinary least squares assumptions hold, causality can be inferred by the model (Wooldridge 2013). However, this is unlikely given the endogenous nature of duration of CSG receipt. OLS is used as a baseline for the following estimates, and as a comparison to estimates found in the literature.

4.6.2 Instrumental Variables Estimation

The endogenous nature of extended grant receipt is observed in Table 3. Beneficiaries with above-average duration of receipt are significantly different to those with below-average duration, in key determinants that affect both the cumulative and current outcomes. This endogeneity will bias any estimates of the impact of the duration of CSG receipt. However, the irregular expansion of age eligibility of the CSG allows for a quasi-experiment method of evaluation of the duration effect.

Exposure to the grant is determined by year of birth and decreases non-linearly with age[17]. Grant exposure for individuals in the base sample ranges from zero to eighteen years. Reported CSG duration of receipt has a similar range and follows almost identical patterns to exposure, as illustrated earlier in Figure 1. Using Two-Stage Least Squares (2SLS) estimation, this text exploits the available exogenous variation, using exposure as an instrument for duration of CSG receipt. The Two-Stage Least Squares model is as follows:

$$Y_i = \beta_0 + \beta_1 CSG_i + \alpha X_i + \gamma HH_h + \epsilon G_g + u_i \tag{10}$$

$$CSG_i = \phi_0 + \phi_1 Z_i + \phi_2 Q_i + v_i \tag{11}$$

Model (10) is similar to Model 9, where Y_i is either a cumulative or current outcome for individual i in geographical area g and in household h. However, CSG_i is reported duration of CSG receipt rather than exposure. X_i, HH_h and G_g are defined the same as in Model (9). Model 11 represents the first stage, with CSG_i as the dependent variable. Z_i is the number of years of exposure to the grant, used as the instrument for CSG_i. Q_i is a linear combination of the control variables X_i, HH_h and G_g. v_i is the idiosyncratic error term.

The estimation strategy used above is not unique to the cash transfer literature, where quasi-experiments with instrumental variables are commonly used (Fiszbein & Schady 2009). Many similar evaluations have taken place in Chile, Ecuador, Jamaica, Mexico, and South Africa that have utilized these quasi-experimental methods (Galasso 2011, Schady & Araujo 2008, Levy & Ohls 2007, Parker & Vogl 2018*a*, Agüero et al. 2007, Duflo 2003). Evaluations of cash transfers in South Africa have used age eligibility, changes in age eligibility, and potential duration of receipt (exposure) as instruments for duration of CSG receipt (Eyal & Burns 2019, Duflo 2003, Abel 2013).

The validity of an instrument variable (IV) is dependent on three conditions. The first is an exclusion restriction, which ensures the IV is uncorrelated with the error term u_i i.e.

[17] See Figure 2 and Appendix Item A.2

$Cov(Z_i, u_i) = 0$, and in addition, Z_i should have no effect on Y_i (Angrist & Pischke 2008, Wooldridge 2013). Exposure is a function of year of birth and cannot be influenced by individuals in the sample. Therefore, after controlling for age, the instrument should have no effect on any of the outcomes except through its influence on the duration of CSG receipt. The second condition requires the monotonicity assumption to hold, wherein individuals cannot be excluded from grant receipt by being exposed to the grant.

Monotonicity requires the instrument to affect all the individuals in the same way (Angrist & Pischke 2008). As exposure is a function of year of birth and is determined by age eligibility for the grant, any individual with exposure to the grant automatically meets the age eligibility condition for CSG receipt. Thus, longer exposure to the grant increases the probability of a longer duration of CSG receipt. The last condition that is required for the validity of an instrument is instrument relevance, which assumes that the instrument is strongly related, either positively or negatively, to the endogenous variable (Angrist & Pischke 2008). Table 7 reports the first stage results of Model 10, showing that $Cov(Z_i, CSG_i) \neq 0$, and proving that the exclusion restriction condition has been met.

4.6.3 Fixed Effects Estimation

All five waves of the NIDS are combined and used to create a pooled panel sample, which allows the estimation of a standard fixed effects model, as shown in Model 12 below:

$$Y_{it} = \delta_0 + \beta_1 CSG_{it} + \alpha X_{it} + \gamma HH_{ht} + \epsilon G_{gt} + \tau T_t + a_i + u_{it}, \quad t = 1, 2, \cdots, 5 \tag{12}$$

Model 12 is a standard linear regression model, where Y_{it} is either a cumulative or current outcome for individual i in time period t, geographical area g and in household h. t refers to either wave 1, 2, 3, 4, or 5. CSG_{it}, X_{it}, HH_{ht} and G_{gt} are defined in Model 9. τT_t are time dummies, a_i refers to unobserved, person-specific fixed characteristics, which do not change over time, and u_i is an idiosyncratic error term. For Model 12 to produce unbiased estimates of the impact of the duration of CSG receipt, a_i is assumed to be uncorrelated with CSG_{it}, X_{it}, HH_{ht} and G_{gt}. However, the unobserved a_i are likely to be correlated with the duration of CSG receipt (Heinrich et al. 2017). Therefore, Model 12 could suffer from heterogeneity bias, and this bias could be a possible cause of endogeneity.

An estimation technique to correct heterogeneity bias is a fixed effects estimation. Two methods are used for fixed effects estimation: first differencing and demeaning the data, both of which yield similar results (Wooldridge 2013). Model 13 shows the demeaned equation,

where the demeaned a_i are equal to zero and thus are omitted from the model. This fixed effects model controls for time-invariant and unobserved individual characteristics eliminating any heterogeneity bias.

$$\ddot{Y_{it}} = \beta_1 C\ddot{S}G_{it} + \alpha\ddot{X}_{it} + \gamma H\ddot{H}_{ht} + \epsilon\ddot{G_{gt}} + \ddot{u_{it}} \tag{13}$$

Model 13 is a fixed effects regression model used to estimate the impact of the duration of CSG receipt using multiple linear regression. The variation in exposure and duration of CSG receipt due to the exogenous change in age eligibility will allow this empirical model to identify the impact impact of the duration of CSG receipt on the outcomes of interest. The variation in exposure for the base sample is shown in Figure 2. Chapter 5 presents the results of the estimation techniques discussed in this chapter

5 Results

5.1 Ordinary Least Squares Estimation

This section presents multiple linear regression estimates of the impact of the duration of CSG receipt on the two cumulative and two current outcomes of interest. The base sample used in this analysis consists of African and Coloured youth between the ages of fifteen and twenty-seven years, as described in Section 4.

Table 4 reports on the OLS estimates of the effect of duration of grant receipt on the two cumulative outcomes, namely, years of education completed and height measured in centimetres. Columns 1, 3, 5 and 7 use reported duration of receipt as the CSG measure, whereas in Columns 2, 4, 6 and 8, exposure is the measure of duration of CSG receipt. The base sample is used in Wave 5, Columns 1 to 4, and in all waves, Columns 5 to 8. In Wave 5, an extra ten years of CSG receipt[18] is estimated to increase years of education achieved by 0.4 years (Column 1), all else equal. Across all five waves of the NIDS, an extra ten years of CSG receipt increases years of education achieved by 0.3 years in Column 5. Both coefficients are significant at the one percent level. However, reported duration of CSG receipt has no significant impact on height, in neither Wave 5 nor in all five waves.

Exposure (potential duration of CSG receipt) is associated with years of education achieved and height. In Wave 5, an extra ten years of CSG exposure is predicted to increase completed years of schooling by 1.2 years (Column 2), and the height of an individual by 1.4 centimetres (Column 4). All exposure estimates with years of education as the outcome are statistically significant at the one percent level. Compared to the average number of years of education of the base sample of 10.3 years, seen in Table 3, this estimated effect of an extra ten years of exposure represents a twelve percent increase in years of education relative to the mean. When all waves of the NIDS are pooled together, an extra ten years of exposure is predicted to increase height by 0.3 centimetres, although this effect is only significant at the ten percent level.

[18]Following Eyal & Burns (2019), all estimates of the duration of receipt (whether exposure or reported duration) are multiplied by ten. According to Heinrich et al. (2017), this allows for a realistic measurement of the cumulative effect of grant receipt given average levels of exposure and reported duration. Average reported duration in the base sample is 5.50 years and average exposure is 11.1 years in Wave 5

Table 4: CSG Receipt and the Cumulative Outcomes

	Wave 5				All Waves			
Dependent Variable	Education		Height		Education		Height	
Duration of CSG measured by:	Duration	Exposure	Duration	Exposure	Duration	Exposure	Duration	Exposure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CSG Measure:	0.04***	0.12***	0.03	0.14***	0.03***	-0.04***	0.02	0.02
	(0.01)	(0.01)	(0.03)	(0.03)	(0.01)	(0.01)	(0.02)	(0.02)
Age	0.26***	0.44***	0.21***	0.45***	0.33***	0.17***	0.26***	0.29***
	(0.01)	(0.01)	(0.05)	(0.07)	(0.01)	(0.01)	(0.05)	(0.03)
Female	0.56***	0.53***	-11.20***	-11.24***	0.52***	0.53***	-10.14***	-10.13***
	(0.06)	(0.05)	(0.26)	(0.22)	(0.05)	(0.04)	(0.23)	(0.17)
African	0.34***	0.43***	1.05	1.36***	0.28***	0.29***	0.84*	0.75**
	(0.11)	(0.10)	(0.66)	(0.51)	(0.11)	(0.11)	(0.49)	(0.36)
Mother's Years of Education	0.11***	0.10***	0.01	0.03	0.11***	0.11***	0.03	0.05**
	(0.01)	(0.01)	(0.05)	(0.04)	(0.01)	(0.01)	(0.04)	(0.03)
Mother's Age	0.02***	0.02***	-0.00	0.00	0.02***	0.02***	0.01	0.03**
	(0.00)	(0.00)	(0.02)	(0.02)	(0.00)	(0.00)	(0.02)	(0.01)
Household Size	-0.08***	-0.06***	-0.02	-0.03	-0.06***	-0.05***	-0.00	-0.01
	(0.01)	(0.01)	(0.05)	(0.03)	(0.01)	(0.01)	(0.04)	(0.02)
Log (Household Income)	0.37***	0.31***	0.46**	0.47***	0.25***	0.26***	0.32**	0.21**
	(0.03)	(0.03)	(0.22)	(0.17)	(0.02)	(0.02)	(0.14)	(0.10)
Urban	0.17**	0.14*	0.39	0.02	0.13	0.08	0.23	-0.04
	(0.08)	(0.07)	(0.38)	(0.31)	(0.08)	(0.07)	(0.31)	(0.25)
Years of Education			0.41***	0.30***			0.48***	0.37***
			(0.09)	(0.07)			(0.07)	(0.04)
Mother LFP	-0.05	-0.05	0.19	0.41	0.03	0.04	0.39*	0.44***
	(0.06)	(0.06)	(0.30)	(0.25)	(0.05)	(0.04)	(0.20)	(0.15)
Constant	-0.90**	-5.17***	154.82***	148.93***	-0.20	2.27***	151.86***	152.93***
	(0.45)	(0.46)	(2.09)	(2.18)	(0.34)	(0.26)	(1.48)	(1.10)
Observations	3,824	5,532	3,431	4,964	11,210	23,648	9,855	20,174
R-squared	0.32	0.29	0.41	0.42	0.31	0.25	0.33	0.33

The table above presents ordinary least squares estimates of the impact of the duration of child support grant receipt on two cumulative outcomes: years of education and height (measured in centimetres). In Columns 1, 3, 5 and 7, duration of CSG receipt is measured using the reported duration of receipt by CSG beneficiaries (past or current). In Columns 2, 4, 6 and 8, grant receipt is measured using exposure to the grant (potential duration of receipt). The base sample is used in Wave 5 of the NIDS (Columns 1-4) or in all five waves of the NIDS (Columns 5-8). A full set of province and wave indicators is included in all the specifications but are not reported. Standard errors are in parentheses and are corrected for clustering in each primary sampling unit. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

The other independent variables are also important for this analysis. As expected, age is significant and positively associated with years of education in Wave 5 and all five waves. Large coefficients of 0.26 (Column 1), 0.44 (Column 2), 0.33 (Column 5) and 0.17 (Column 6) are observed for age and are significant at the one percent level. Other significant determinants of number of years of schooling achieved include: maternal education, household size, household income, gender and race, all statistically significant at the one percent level (Column 1). An extra year of in maternal education and a one percentage change in household income increase an individual's years of education by 0.11 years and 0.37 years (Column 1), respectively in Wave

5. On average, female youth have 0.56 more years of education compared to male youth and Africans have 0.34 more years of education compared to Coloureds (Column 1), all else equal. Older females, who are African, with older mothers, and stay in smaller households with higher household income, have more years of education on average in Wave 5. These determinants have similar effects on years of education in all waves of the NIDS, as seen in Columns 5 and 6 of Table 4.

Turning to height, it can be observed that in Wave 5 and in all five waves, when reported duration of receipt is the CSG measure, age has no significant impact on height. However, a year increase in grant exposure leads to a 0.14 centimetre increase in height in Wave 5 (Column 4), significant at the one percent level. Exposure to the grant has no significant effect on height observed in all five waves (Column 8). Large and significant coefficients of age on height is observed in Wave 5 and all five waves. A one-year increase in age leads to a 0.21 centimetre increase in height in Wave 5 (Column 3), and a 0.26 centimetre increase in height in all five waves (Column 6), significant at the one percent level.

Gender, household income, and years of education are other significant determinants of height. Female youth are reported to be 11.2 centimetres (Column 3) and 10.14 centimetres (Column 7) shorter than males in Wave 5, and in all five waves - see in Table 4. A one percentage increase in household income leads to a 0.47centimetre increase in height in Wave 5 (Column 4), and a 0.21 centimetre increase in height in all five waves (Column 8), significant at the one and five percent levels respectively. Household income is used as a proxy for nutrition, hence large coefficients are observed on income. An extra year of education is associated with a 0.41 centimetre and a 0.48 centimetre increase in Wave 5 and in all five waves respectively, all else equal. All estimates on education and gender are significant at the one percent level.

Table 5 presents estimates of the impact of duration of receipt on current outcomes. Table 5 uses a OLS linear probability model to estimate the effect of duration of grant receipt on the current outcomes of labour force participation and the presence of depressive symptoms. Using the base sample in Wave 5 and all five waves, it is observed that reported duration of receipt has no significant impact on either the probability of depressive symptoms (Columns 1 and 6), or labour force participation (Columns 3 and 7). Similarly, exposure to the grant has no significant impact on the mental health outcome. One significant effect is found: an extra ten years of exposure reduces labour force participation by ten percentage points, all else equal. This is a large effect, significant at the one percent level and is observed in both Wave 5 and all waves.

Results from Table 5 indicate that gender, race, years of education, household size, and

household income are determinants of labour force participation in Wave 5 (Column 4). On average, women are nine percentage points less likely to be labour force participants compared to men, and Africans are fourteen percentage points less likely to be labour force participants compared to Coloured youth, in Wave 5 (Column 4). An extra year of education increases labour force participation by one percentage point (Column 4), and an increase in the household size of individual decrease labour force participation by one percentage point. The correlation between age and household size could be one reason for the significant effect of household size on labour force participation. Younger individuals tend to stay in larger households and older youth, on average, tend to live in smaller households, as they would have moved out of their childhood homes. Similar estimates of these effects are observed in all waves, all significant at the one percent level.

Age, life satisfaction, and maternal depressive symptoms are significant determinants of the presence of depressive symptoms, seen in Column 1. An extra year of age increases the probability of depressive symptoms by one percentage point in both Wave 5 (Column 1) and all five waves (Column 5). Individuals who are more satisfied with life are eight percentage points less likely to express depressive symptoms compared to those individuals not satisfied with life, in both Wave 5 (Column 1) and in all five waves (Column 5) These effects are observed in Wave 5 and all waves and are significant at the one percent level. The large effects of maternal mental health on an individual's mental health were also observed by Garber & Cole (2010), who also find that maternal depressive symptoms increase the probability of the presence of depressive symptoms in the child. However, gender, race, and years of education do not a have significant impact on the presence of depressive symptoms, which is unexpected, given the emphasis on these determinants in the literature.

The results from Tables 4 and 5 indicate the impact of duration of CSG receipt on one outcome: years of education, through both reported duration and exposure. Exposure is observed to have a significant effect on education, height, and labour force participation in Tables 4 and 5, with no significant impacts observed for exposure and reported duration of receipt on the presence of depressive symptoms. These results are explored further in the section below, using 2SLS estimates.

Table 5: CSG Receipt & Current Outcomes

	Wave 5				All Waves			
Dependent Variable	CES-D>=10		LFP		CES-D>=10		LFP	
Duration of CSG measured by:	Duration	Exposure	Duration	Exposure	Duration	Exposure	Duration	Exposure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CSG Measure:	0.00	0.00	0.00	-0.01***	-0.00	0.00	0.00	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age	0.01***	0.01**	0.07***	0.05***	0.01***	0.01***	0.07***	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Female	0.00	0.01	-0.08***	-0.09***	0.01	0.02***	-0.06***	-0.08***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
African	-0.04	-0.01	-0.15***	-0.14***	0.03*	0.04***	-0.10***	-0.09***
	(0.02)	(0.02)	(0.04)	(0.03)	(0.02)	(0.01)	(0.02)	(0.02)
Mother's Years of Education	0.00	0.00	-0.01***	-0.01***	0.00	0.00	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Mother's Age	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00***	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Household Size	-0.00	0.00	-0.01***	-0.01***	-0.00	-0.00	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log (Household Wage)	-0.01	-0.02**	0.03***	0.04***	0.00	0.00	0.03***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Urban	0.03*	0.03	0.02	0.03**	0.02*	0.02**	0.01	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Years of Education	-0.00	-0.00	0.01*	0.01***	-0.00	-0.00***	-0.00	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Mother LFP	-0.01	-0.01			-0.01	-0.01		
	(0.01)	(0.01)			(0.01)	(0.01)		
Life Satisfaction	-0.08***	-0.08***			-0.09***	-0.08***		
	(0.02)	(0.01)			(0.01)	(0.01)		
Mother's CES-D >=10	0.21***	0.20***			0.25***	0.26***		
	(0.02)	(0.02)			(0.01)	(0.01)		
Constant	0.10	0.05	-1.11***	-0.63***	0.05	0.06	-1.02***	-0.69***
	(0.11)	(0.11)	(0.09)	(0.10)	(0.06)	(0.04)	(0.05)	(0.04)
Observations	3,366	4,866	3,814	5,510	9,632	19,684	11,123	23,279
R-squared	0.11	0.11	0.39	0.36	0.13	0.13	0.36	0.33

The table above presents ordinary least squares estimates of the impact of the duration of child support grant receipt on the two current outcomes: depressive symptoms and labour force participation, using the base sample in Wave 5 and in all five waves. Duration of receipt is measured using reported and potential duration of receipt (exposure). A full set of province and wave indicators is included in all the specifications but are not reported in the table. Standard errors are in parentheses and are corrected for clustering in each primary sampling unit. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

5.2 Instrumental Variable Estimates

The endogenous nature of duration of grant receipt discussed in Section 4, as well as the poor data quality, may have biased the OLS estimates in Section 5.1. In order to deal with the

endogeneity of duration of receipt, this section uses 2SLS estimation with instrumental variables to analyse the impact of the duration of grant receipt. Exposure is used as an instrument for duration of grant receipt. As discussed earlier in Section 4, the validity of an instrument is dependent on three conditions. This section motivates that in the sample of choice, these three conditions are met.

5.2.1 Balancing Tests

The exclusion restriction requires that the instrument be randomly assigned, meaning that the instrument should be uncorrelated with the error term in Model 10. To test the exclusion restriction, the patterns of key individual and household characteristics over years of grant exposure are examined, similar to Heinesen (2018). If the instrument is exogenous, then exposure must not be related to any of the key characteristics included in Model 10, after controlling for the differences due to age. Figure 3 tests for balancing across exposure for certain individual and household level variables.

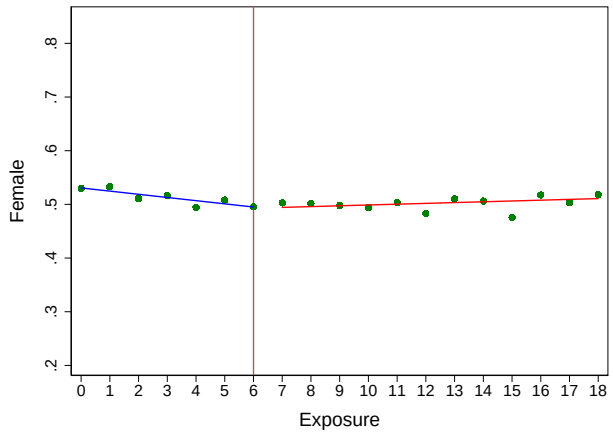
These characteristics are chosen as significant determinants of either years of education, height, labour force participation or the presence of depressive symptoms - see Tables 4 and 5. Female, African, and Urban (Figures 3(a), 3(b) and 3(c)) are binary outcomes, while maternal education, household income and household size (Figures 3(d), 3(e) and 3(f)) are continuous outcomes. The sample used consists of African and Coloured individuals below the age of twenty-seven[19] in Wave 5. Six years of grant exposure is selected as the cut off in Figure 3, as five or more years of program exposure (or treatment by the invention) have had effects on education, health, and labour force participation in the cash transfer literature (Behrman et al. 2010, Parker et al. 2012, Araujo et al. 2016, Ham & Michelson 2018, Molina-Millan et al. 2018).

Figures 3(a), 3(b) and 3(c) show that the proportions of females and Africans below the age of twenty-seven do not vary with the different values of exposure. Differences are observed for maternal education and household income (see Figure 3(d) and 3(e)), however, the trend lines exhibit only minor differences over years of grant exposure. Figure 3(f) shows a constant downward trend in household size over years of exposure. This result is not surprising, given that younger children tend to stay in large households with extended families in South Africa (Hall & Sambu 2018). Thus, it is an age effect that is observed with household size. Overall, no significant changes in trends are observed in Figure 3 over exposure (the instrument) and

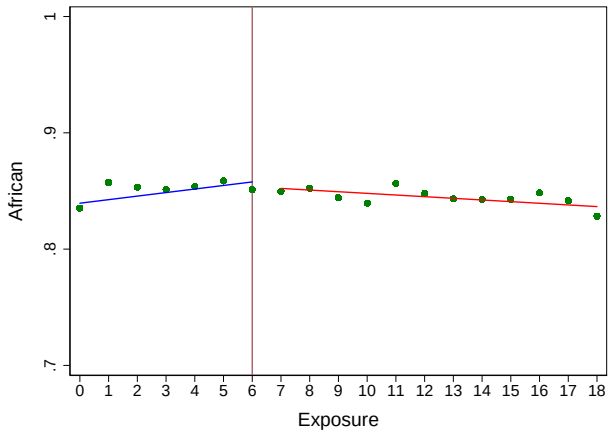
[19]The sample could not be limited to individuals between the ages of fifteen and twenty-seven, as this would have resulted in a large gap in exposure on the x-axis. Twenty-two-year-olds have grant exposure equal to fourteen years and twenty-three-year-olds have grant exposure equal to six.

Figure 3: Individual and Household Characteristics by Exposure

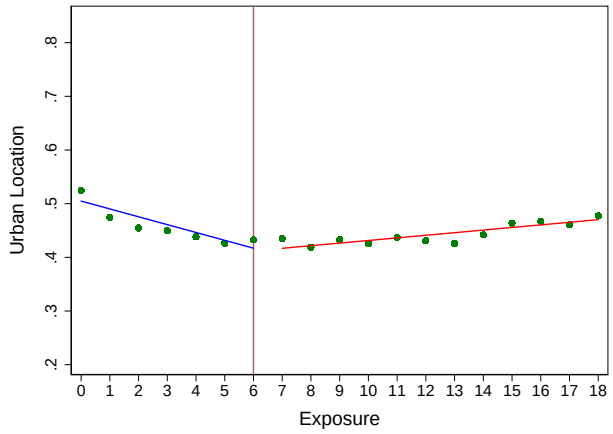
(a) Female



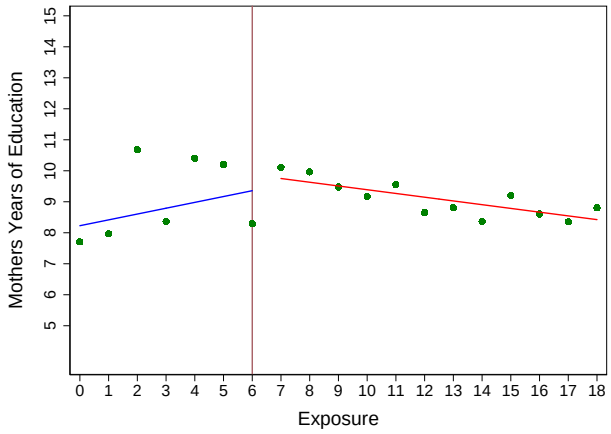
(b) African



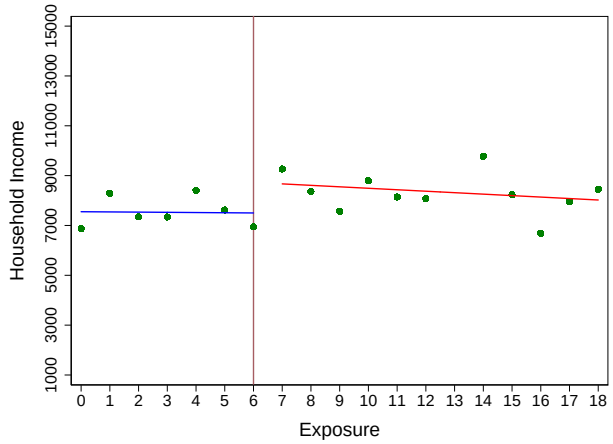
(c) Urban



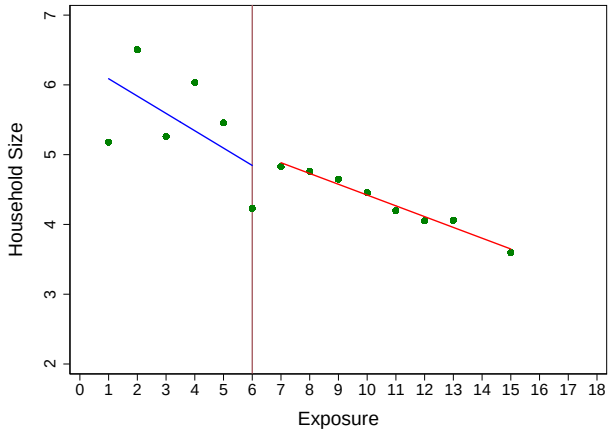
(d) Maternal Education



(e) Household Income



(f) Household Size



Individual and household characteristics graphed over exposure to the child support grant. The sample consists of African and Coloured youth below the age of twenty-seven in Wave 5.

which provides some evidence that the exclusion restriction holds.

Table 6 presents the balancing tests for significant differences in key characteristics, by comparing the weighted[20] mean values of individual and household characteristics for those with either greater or equal to six years of exposure and those with less than six years of exposure. The base sample is used in Wave 5. Similar to Figure 3, no significant differences are expected in key characteristics with the different durations of exposure to the grant, except for those related to age. Many significant differences in characteristics observed in Table 6 can be attributed to age. Individuals with six or more years of exposure are, statistically significantly younger than those with less than six years of exposure (19.4 vs 24.8)

The average age of those with six or more years of exposure suggests that a large proportion of them are still completing their education and have not fully transitioned into the labour market. Significant differences between those with six or more years of exposure and those with less than six are observed for years of education (10 vs 11), labour force participation(0.72), and probability of employment(0.54 vs 0.68) and are due to differences in age. Furthermore, differences in parental characteristics can be attributed to age, as older parents are more likely to have children that are older than the children of younger parents. Thus, those with six or more years of exposure are expected to have younger parents compared to those with less than six years of exposure, as significant differences in maternal (46.5 vs 53.3) and paternal age (52.3 58.9) are observed.

Those with less than six years of exposure live in smaller households (3.05 vs 4.84) and this result is expected, as they are more likely to have moved out of their childhood home due to age. Further evidence of this is observed in Table 6, as individuals with six or more years of exposure are more likely to have either their mother (0.71 vs 0.52)or father (0.41 vs 0.34) as a resident of the household. Differences in grant income are likely to be caused by CSG receipt, as those with less than six years of exposure cannot be granted due to age, and a proportion of individuals with six or more years are still age-eligible for grant receipt. Table 6 provides further evidence that the exclusion restriction holds.

[20]Wave 5 sample weights are used

Table 6: Tests of Significant Differences in Characteristics by Exposure

Youth Sample Divided By:	Exposure				
	All		>= 6 Years	< 6 Years	
	Mean	S.D	Mean	Mean	Star
	(1)	(2)	(3)	(4)	(5)
Youth Demographics	*Panel A: Means of Individual Characteristics*				
Age in Years	20.7	(0.05)	19.4	24.8	***
Female (%)	0.51	(0.01)	0.50	0.54	
Coloured (%)	0.09	(0.02)	0.09	0.09	
African (%)	0.91	(0.02)	0.91	0.91	
Years of Education	10.2	(0.05)	10	11.0	***
Labour Force Participation (%)	0.35	(0.01)	0.24	0.72	***
CES-D >= 10 (%)	0.19	(0.01)	0.18	0.22	**
Height in cm	164	(0.22)	163	164.3	**
Years of CSG Exposure	12.0	(0.12)	15.4	1.47	***
Duration of CSG Receipt	7.28	(0.13)	8.43	0.19	***
Employed (%)	0.61	(0.02)	0.54	0.68	***
Monthly Income	3,962	(234)	3,273	4,550	**
Has a Matric? (%)	0.32	(0.01)	0.27	0.49	***
CES-D 10 Score	6.16	(0.12)	6.07	6.47	**
Life Satisfaction (1-10)	0.48	(0.02)	0.48	0.47	
Weight in kilograms	61.5	(0.34)	59.9	66.8	***
Mother is Resident	0.66	(0.01)	0.71	0.52	***
Mother Years of Education	8.38	(0.16)	8.72	7.28	***
Mother Age	48.1	(0.28)	46.5	53.3	***
Mother Labour Force Participation (%)	0.58	(0.02)	0.61	0.47	***
Mother Height	158	(0.20)	158	158	
Mother CES-D >= 10 (%)	0.32	(0.02)	0.31	0.34	
Father is Resident	0.39	(0.02)	0.41	0.34	***
Father Years of Education	8.37	(0.24)	8.68	7.32	***
Father Age	53.8	(0.45)	52.3	58.9	***
Father Labour Force Participation (%)	0.68	(0.03)	0.72	0.55	***
Father Height	169	(0.74)	169	167	**
Father CES-D >= 10 (%)	0.24	(0.02)	0.24	0.23	
	Panel B: Means of Household Characteristics				
Household Size	4.48	(0.08)	4.84	3.05	***
Household's Monthly Income	8,887	(440)	9153	7,816	**
Income from Government Grants	1,573	(41.6)	1,627	1,258	***
Located in an Urban Area (%)	0.64	(0.02)	0.61	0.76	***
Number of Observations	8,854		6,913	1,941	

The table above reports the mean values of the individual and household characteristics for those with above six years exposure and below six years exposure, and tests for significant differences, using base sample in Wave 5. Sample weights from Wave 5 are used to present weighted estimates. Standard deviations are reported in parentheses and presented in Column 2. Significant differences are reported with stars. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

5.2.2 Estimates

Table 7 reports the first stage results of the 2SLS instrumental variable estimates of the impact duration of CSG receipt on both cumulative outcomes. Exposure to the grant is used as an instrument for reported duration of receipt, using the same base samples as in Table 4 and 5. The coefficients on exposure are large and significant at the one percent level in Wave 5 and in all five waves of the NIDS. An extra year of exposure to the grant is associated with an increase in reported duration of CSG receipt of 0.4 years in Wave 5, and 0.32 years in all five waves, all else equal. Table 7 shows that there is a large and positive relationship between exposure and duration of receipt, implying a strong first stage[21].

[21]When a different set regressors is used, similar results to Table 7 are observed in Appendix Item

Table 7: First Stage (Instrumental Variable Analysis)

Dependent Variable:	Reported Duration of Receipt	
Time Period	Wave 5	All Waves
	(1)	(2)
Exposure	0.40***	0.32***
	(0.03)	(0.02)
Age	-0.42***	-0.52***
	(0.06)	(0.04)
Female	-0.22	-0.23***
	(0.17)	(0.09)
African	1.01***	0.82***
	(0.34)	(0.17)
Mother's Years of Education	-0.16***	-0.13***
	(0.03)	(0.01)
Mother's Age	-0.09***	-0.07***
	(0.01)	(0.01)
Household Size	0.18***	0.10***
	(0.03)	(0.01)
Log (Household Income)	-1.30***	-0.92***
	(0.11)	(0.05)
Urban	-0.49**	-0.27**
	(0.22)	(0.11)
Years of Education	0.18***	0.17***
	(0.06)	(0.03)
Mother LFP	-0.34*	-0.23**
	(0.18)	(0.09)
Constant	23.85***	16.92***
	(1.73)	(0.76)
Observations	3,431	9,855
R-squared	0.50	0.56

This table reports the first stage estimates, using the base sample in Wave 5 (Column 1) and in all five waves (Column 2). A full set of province and wave indicators is included in all specifications but are not reported here. Standard errors are in parentheses. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

Table 8 reports the second stage results of the instrumental variable estimates of the long-term impact of duration of CSG receipt on the cumulative outcomes[22]. In Wave 5, an extra year of CSG receipt is predicted to increase years of education by 0.34 years and height by 0.46 centimetres[23], significant at the one percent level. However, in all waves, the corresponding effect sizes in Table 8 are smaller than those in Wave 5. An extra year of CSG receipt is associated with an increase of 0.12 years of education, and 0.19 centimetres in height. These estimates of the impact of the duration of receipt on the cumulative outcomes are larger than expected and warrant further inspection.

The estimates of the duration of CSG receipt are expected to be smaller in all five waves compared to Wave 5. Majority of the base sample would have little to no duration of receipt in previous waves, thus diluting the effect of the CSG. These IV estimates of the determinants of years of education are larger than the OLS estimates reported in Table 4 in Wave 5 and in all Waves. In Wave 5, women have 0.62 more years of education on average compared to men, significant at the one percent level, all else equal. Surprisingly, race is only a significant determinant of years of education in all five waves and is insignificant in Wave 5. Africans have 0.23 more years of education on average compared to Coloureds in all five waves, significant at one percent level (Column 3).

In contrast to the OLS estimates of the determinants of height, household income, and urban location are large and significant predictors of height in Table 8. A percent increase in household income is associated with 1.09 centimetres and 0.34 centimetres increases in height in Wave 5 (Column 2) and in all five waves (Column 4), significant at the one percent level. This large effect of household income further emphasises the importance of nutrition in determining height, as household income is a proxy for nutrition. On average, individuals living in an urban area are 0.62cm taller than individuals in living in a rural area in Wave 5, all else equal, significant at the ten percent level (Column 2). However, in all five waves, this effect of living in an urban area is an insignificant determinant of height Table 9 reports the IV estimates of the two current outcomes.

[22]The R-squared in Column 1 is not reported as it is negative. The negative R-squared is not of concern, as the model's residuals are calculated over a set of independent variables different from those used to fit the model(Sribney et al. 1999).

[23]A reason for the large estimates observed in Table 8, is that any bias that is present due to the endogeneity around duration of receipt is removed. If the ten-year interpretation is used the results are very large. An extra ten years of grant receipt is associated with an increase of 3.4 and 1.2 years of education (Columns 1 and 3), and an increase in height of 4.6cm and 1.9cm (Columns 2 and 4).

Table 8: Second Stage Instrumental Variable Estimates of Cumulative Outcome

Dependent Variable:	Wave 5		All waves	
	Education	Height	Education	Height
	(1)	(2)	(3)	(4)
Duration of CSG Receipt:	0.34***	0.46***	0.12***	0.19**
	(0.03)	(0.11)	(0.02)	(0.09)
Age	0.59***	0.71***	0.43***	0.46***
	(0.03)	(0.13)	(0.02)	(0.11)
Female	0.62***	-11.05***	0.53***	-10.10***
	(0.07)	(0.26)	(0.03)	(0.16)
African	0.06	0.68	0.23***	0.71**
	(0.15)	(0.51)	(0.07)	(0.33)
Mother's Years of Education	0.15***	0.09**	0.12***	0.05**
	(0.01)	(0.04)	(0.01)	(0.03)
Mother's Age	0.05***	0.04*	0.03***	0.03*
	(0.01)	(0.02)	(0.00)	(0.01)
Household Size	-0.13***	-0.10**	-0.07***	-0.02
	(0.01)	(0.05)	(0.01)	(0.03)
Log (Household Income)	0.79***	1.09***	0.34***	0.48***
	(0.06)	(0.23)	(0.03)	(0.13)
Urban	0.33***	0.62*	0.15***	0.28
	(0.10)	(0.34)	(0.04)	(0.20)
Years of Education		0.24***		0.45***
		(0.09)		(0.05)
Mother LFP	0.04	0.31	0.04	0.43**
	(0.08)	(0.27)	(0.04)	(0.17)
Constant	-14.45***	136.29***	-2.89***	147.15***
	(1.35)	(4.87)	(0.59)	(2.68)
Observations	3,823	3,431	11,205	9,855
R-squared		0.35	0.28	0.33

This table reports second stage IV estimates, with exposure used as the instrumental variable for duration of receipt. The base sample is used in Wave 5 of the NIDS (Columns 1-2) and in all five waves of the NIDS (Columns 3-4). A full set of province and wave indicators is included all in specifications but are not reported here. Standard errors are in parentheses. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

Table 9: Second Stage Instrumental Variable Analysis of Current Outcomes

	Wave 5		All waves	
Dependent Variable	CES-D >=10	LFP	CES-D >=10	LFP
	(1)	(2)	(3)	(4)
Duration	0.00	-0.02***	0.00	-0.02***
	(0.01)	(0.01)	(0.00)	(0.00)
Age	0.01	0.05***	0.01**	0.05***
	(0.01)	(0.01)	(0.01)	(0.00)
Female	0.00	-0.09***	0.01	-0.07***
	(0.01)	(0.01)	(0.01)	(0.01)
African	-0.04	-0.14***	0.03*	-0.09***
	(0.03)	(0.03)	(0.02)	(0.01)
Mother's Years of Education	0.00	-0.01***	0.00	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Mother's Age	-0.00	-0.00***	-0.00	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Household Size	-0.00	-0.01***	-0.00	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Log (Household Wage)	-0.01	0.00	0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Urban	0.03**	0.01	0.02**	0.00
	(0.02)	(0.02)	(0.01)	(0.01)
Years of Education	-0.00	0.01***	-0.00*	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Mother LFP	-0.01		-0.01	
	(0.01)		(0.01)	
Life Satisfaction	-0.08***		-0.09***	
	(0.01)		(0.01)	
Mother's CES-D >=10	0.21***		0.25***	
	(0.01)		(0.01)	
Constant	0.04	-0.20	-0.00	-0.36***
	(0.24)	(0.24)	(0.13)	(0.12)
Observations	3,366	3,814	9,632	11,123
R-squared	0.11	0.34	0.125	0.30

This table reports second stage IV estimates, with exposure used as an instrumental variable for duration of receipt. The base sample is used in Wave 5 of the NIDS (Columns 1-2) or in all five waves of the NIDS (Columns 3-4). A full set of province and wave indicators is included all in specifications but are not reported here. Standard errors are in parentheses. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

In Table 9, no significant CSG duration impacts are observed on the presence of depressive symptoms in either Wave 5, or in all five waves. In contrast, the estimates of the impact of duration of CSG receipt on labour force participation are negative, and significant at the one percent level in Wave 5 and all in five waves. An extra ten years of CSG receipt reduces the

probability of labour force participation by twenty percentage points. Using the mean labour force participation rate of the base sample observed in Table 3 of thirty-eight percent, CSG receipt reduces labour force participation by fifty-two percent.

Unexpectedly, no significant impact is observed of age on mental health in Wave 5, however, in all five waves, age is a significant determinant of depressive symptoms at the five percent level in Table 9. A year increase in age is associated with a one percentage point increase in depressive symptoms in all five waves, all else equal. Individuals who are satisfied with life are eight percentage points and nine percentage points, less likely to express depressive symptoms compared to those individuals who are not satisfied with life, in Wave 5 (Column 1) and in all five waves (Column 3). Youth with mother's who have depressive symptoms experience increases in the probability of having depressive symptoms by twenty-one and twenty-five percentage points in Wave 5 (Column 1) and in all five waves (Column 3), all else equal.

Household income is expected to be a determinant of labour force participation as per the OLS estimates. However, the IV estimates of household income are observed to be insignificant in Wave 5 and in all five waves, respectively. Furthermore, an extra year of maternal education reduces the probability of labour force participation by one percentage point in both Wave 5 and in all five waves. Increases in household size of one member also reduces the probability of labour force participation by one percentage point in both Wave 5 and in all five waves.

The section below presents the fixed effects estimates.

5.3 Fixed Effects

Table 10 reports individual fixed effects estimates of the impact of reported duration of CSG receipt on years of education and height, using the base sample in Waves 3 to 5 and in all five waves. There are five years in between Wave 3 and Wave 5 (2012 and 2017 respectively), and there are nine years between Wave 1 (2008) and Wave 5 (2017). The sample is not limited to individuals between the ages of fifteen and twenty-seven in each wave, but rather follows the individuals in the base sample back in time through each wave[24]. The large period of time between waves allows for variation in the duration of grant receipt.

[24]For example, individuals in the base sample are between the ages of fifteen and twenty-seven in Wave 5, and are included in Wave 3, despite their age (ten to twenty-two years)

Table 10: Fixed Effects Estimates (Cumulative Outcomes)

	Wave 3 & 4 & 5				All Waves			
Dependent Variable:	Education		Height		Education		Height	
Duration of CSG measured by:	Duration	Exposure	Duration	Exposure	Duration	Exposure	Duration	Exposure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CSG Measure:	0.31***	0.48***	0.83***	1.75***	0.24***	0.42***	0.89***	2.26***
	(0.01)	(0.02)	(0.09)	(0.13)	(0.01)	(0.01)	(0.07)	(0.07)
Age	-0.01	0.15***	-0.39	0.29	-0.02	0.11***	-0.19	0.59**
	(0.03)	(0.03)	(0.24)	(0.20)	(0.03)	(0.02)	(0.26)	(0.23)
Female	-	-	-	-	-	-	-	-
African	-	-	-	-	-	-	-	-
Mother's Years of Education	-0.02	-0.03**	-0.13	-0.13	-0.00	-0.01	-0.11	-0.12
	(0.02)	(0.01)	(0.12)	(0.11)	(0.02)	(0.01)	(0.12)	(0.10)
Mother's Age	0.05	0.11***	-0.28	0.03	0.04	0.10***	0.07	0.48**
	(0.03)	(0.03)	(0.23)	(0.19)	(0.03)	(0.02)	(0.26)	(0.22)
Household Size	-0.00	-0.01*	0.03	0.01	0.00	-0.01	-0.00	-0.03
	(0.01)	(0.01)	(0.04)	(0.03)	(0.01)	(0.00)	(0.05)	(0.04)
Log (Household Income)	-0.02	-0.02	0.18	0.18	-0.04**	-0.01	0.00	0.14
	(0.02)	(0.02)	(0.13)	(0.12)	(0.02)	(0.01)	(0.14)	(0.12)
Urban	-0.10	-0.02	-0.34	-0.05	-0.36***	-0.10	-1.19*	-0.47
	(0.07)	(0.06)	(0.47)	(0.36)	(0.08)	(0.06)	(0.62)	(0.46)
Years of Education			2.62***	1.70***			3.17***	1.62***
			(0.10)	(0.11)			(0.09)	(0.09)
Mother LFP	0.03	-0.00	-0.12	-0.04	0.13***	0.04**	0.55***	0.48***
	(0.03)	(0.02)	(0.20)	(0.17)	(0.02)	(0.02)	(0.21)	(0.18)
Constant	3.44**	-3.87***	143.06***	116.36***	2.18**	-3.04***	118.79***	88.80***
	(1.42)	(1.20)	(10.00)	(8.51)	(1.10)	(0.95)	(10.54)	(9.08)
Observations	13,087	17,560	11,949	15,921	20,551	27,818	17,915	24,144
R-squared	0.73	0.75	0.54	0.53	0.81	0.85	0.61	0.63
Number of Individuals	5,416	7,750	5,282	7,485	5,968	8,568	5,812	8,270

The table above reports individual fixed effects estimates of the strength of the relationship between duration of receipt and two cumulative outcomes: years of education and height. The base sample is used in either Wave 3, 4 and 5 of the NIDS (Columns 1-4) and in all five waves of the NIDS (Columns 5-8). A full set of province and wave indicators is included all in the specifications but are not reported here. Robust standard errors are in parentheses. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

The results in Table 10 differ from the OLS results in reported in Table 4. Duration of receipt is predicted to increase years of education and height in both samples. A year of reported CSG receipt is associated with a 0.31 year increase in the years of education achieved, and an increase in height of 0.83 centimetres, (see Columns 1 and 3). In addition, using all five waves where most individuals appear approximately three times in the fixed effects regressions, an extra year of duration of receipt is associated with a 0.24 increase in the years of education

achieved, and a 0.89 centimetre [25] increase in height (Columns 5 and 7). All coefficients on the measure of CSG duration are significant at the one percent level.

No other characteristics have a statistically significant relationship with years of education in Waves 3 to 5 when reported duration of receipt is the CSG measure (Columns 1 and 3). Surprisingly, a year increase in age and maternal age is negatively associated with height, as coefficients of -0.47 and -0.42 are observed on age and maternal age in Waves 3 to 5 respectively (see Column 3). However, these estimates are insignificant at the ten percent level. Years of education have the largest effect on height, as an extra year of education is associated with an increase in height of 2.62cm and 3.17cm in Waves 3 to 5 (Column 3) and all five waves (Column 7), respectively. Turning to years of education as an outcome, it can be observed that changes in household income and the urban location of the individual are associated with fewer years of education in Waves 3 to 5 (Columns 1 and 2) and in all Waves (Columns 5 and 6). Only the estimates in all five waves in Column 5 show any significance at the five percent level. This is an interesting result, as positive associations between changes in household and education, and urban location and education are expected.

[25] A reason for the large estimates observed in Table 10, is that any heterogeneity bias that is present due to unobservable individual fixed effects is removed. If the ten-year interpretation is used the results are very large. An extra ten years of grant receipt is associated with an increase of 3.1 and 2.4 years of education (Columns 1 and 5), and an increase in height of 8.3cm and 8.9cm (Columns 3 and 7). These fixed effects estimates are very similar to the IV estimates of grant receipt, meaning the OLS estimates were impacted by negative bias

Table 11: Fixed Effects Estimates (Current Outcomes)

	Wave 3 & 4 & 5				All Waves			
Dependent Variable	CES-D >=10		LFP		CES-D >=10		LFP	
Duration of CSG measured by:	Duration	Exposure	Duration	Exposure	Duration	Exposure	Duration	Exposure
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CSG Measure:	0.01	0.01	-0.04***	-0.02***	-0.00	0.01	-0.03***	-0.01*
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
Age	0.02	0.00	0.03**	0.03**	0.01	0.00	0.02*	0.02
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Female	-	-	-	-	-	-	-	-
African	-	-	-	-	-	-	-	-
Mother's Years of Education	-0.01	-0.01	-0.01	-0.01	-0.02*	-0.02**	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Mother's Age	-0.02	-0.02	-0.00	0.00	-0.04**	-0.03**	0.01	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Household Size	0.00	0.00	-0.01***	-0.01***	-0.00	0.00	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log (Household Wage)	-0.02	-0.01	0.07***	0.07***	-0.00	-0.01	0.06***	0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Urban	0.06	0.06**	0.05	0.07**	0.04	0.04*	0.05*	0.05**
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)
Years of Education	-0.01	0.00	0.02***	0.01**	0.00	0.00	-0.01	-0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
Mother LFP	-0.01	-0.00			-0.01	-0.01		
	(0.02)	(0.01)			(0.01)	(0.01)		
Life Satisfaction	-0.09***	-0.09***			-0.08***	-0.08***		
	(0.01)	(0.01)			(0.01)	(0.01)		
Mother's CES-D >=10	0.25***	0.23***			0.26***	0.24***		
	(0.02)	(0.01)			(0.01)	(0.01)		
Constant	1.08	1.27	-0.55	-0.76	1.63**	1.57**	-0.67	-1.05**
	(0.90)	(0.80)	(0.78)	(0.67)	(0.70)	(0.61)	(0.56)	(0.46)
Observations	7,931	11,615	9,054	13,310	9,648	14,540	11,142	16,819
R-squared	0.13	0.12	0.19	0.18	0.12	0.11	0.33	0.32
Number of Individuals	4,365	6,475	4,615	6,889	4,544	6,827	4,759	7,192

The table above reports individual fixed effects estimates of the strength of the relationship between duration of receipt and two current outcomes: depressive symptoms and labour force participation. The base sample is used inWave3, 4 and 5 of the NIDS (Columns 1-4) and in all five waves of the NIDS (Columns 5-8). A full set of province and wave indicators is included all in the specifications but are not reported here. Robust standard errors are in parentheses. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

Table 11 reports the individual fixed effects estimates of the impact of reported duration of CSG receipt on the presence of depressive symptoms and labour force participation. The base sample is used in Waves 3 to 5 and in all five waves. The fixed effects estimates of the impact of duration of receipt on the presence of depressive symptoms are not significant (Columns 1, 2, 5 and 6.) A negative relationship is observed between the CSG measures and labour force

participation. All CSG fixed effects estimates on labour force participation are significant at the one percent level, except the exposure estimates in Column 8, which is significant at the ten percent level. An extra year of CSG receipt is predicted to reduce the probability of labour force participation by four percentage points in Column 3, and by three percentage points[26] in Column 7. Similarly, one year of exposure is predicted to lower the probability of labour force participation by two percentage points in Column 4 and by one percentage point in Column 8.

If depressive symptoms are more influenced by current conditions rather than past conditions, such as duration of receipt, this may explain the lack of significant impact observed of duration of CSG receipt on depressive symptoms. Significant determinants of depressive symptoms in Table 11 are maternal mental and life satisfaction, which are both measures of current conditions. Maternal depressive symptoms are associated with a higher probability of depressive symptoms by twenty-five and twenty-six percentage points in Waves 3 to 5 (Column 1) and in all five waves (Column 5), all else equal. Life satisfaction is associated with a lower probability of depressive symptoms by nine and eight percentage points in Waves 3 to 5 (Column 1) and in all five waves (Column 5), all else equal. Beneficiaries with high duration of receipt may stay in school longer and, thus, may enter the labour force later than those with lower duration of receipt, explaining the negative relationship observed between labour force participation and duration of CSG receipt observed.

5.4 Non-Parametric Estimation

This text makes use of non-parametric regressions similar to those used by Duflo (2000). Non-parametric regressions describe the relationship trend between the dependent variable and independent variables by localising the estimation of the regression function (Hazelton 2015). Unlike parametric regressions, no assumptions are made about the shape of the relationship between the variables (Hazelton 2015). The sole assumption in non-parametric regressions is that the dependent variable is a smooth function of the independent variable, approximated by the polynomials (Hazelton 2015, Seifert & Gasser 2006). Thus, non-parametric methods are used to allow for the unrestricted relationship between the outcome and variable of interest (Seifert & Gasser 2006). The non-parametric regressions are

[26]Using the ten-year interpretation, an extra ten years of CSG decreases labour force participation by forty and thirty percentage points in Waves 3 to 5 and in all five waves, respectively. These are very large effects and could be a result of the majority of individuals appearing multiple times in the fixed effects regressions, while completing secondary and post-secondary education.

estimated as follows:

$$Y_i = r(X_i) + \epsilon_i \tag{14}$$

Y_i is the outcome of interest for individual i and X_i is an individual characteristic of individual i, such as age (Seifert & Gasser 2006). ϵ_i is an independently and identically distributed error term with mean zero and standard deviation equal to σ_ϵ. r() is an unrestricted regression which makes use of Epanechnikov kernel weighted local regression (Cameron & Trivedi 2009). Unlike a parametric regression this method allows for a nonlinear functional model relating to duration of receipt and to any of the outcomes' interest (Seifert & Gasser 2006).

The estimates of Model 14 can be observed in Figure 4. The unrestricted relationship between the cumulative outcomes and the level of exposure over age is presented in Figure 4(a) and 4(c). Figure 4(b) and 4(d) differentiate individuals by mean reported duration. The base sample in all five waves is used with each function displayed with ninety-five percent confidence intervals.

Figure 4(a) compares years of education of those exposed to the grant against years of education of those with no exposure, over age. Between the ages of sixteen and eighteen years, individuals with no exposure to the grant have significantly more years of education at the five percent level. At age twenty, both groups of individuals have approximately ten years of education. After twenty years of age, those exposed to the grant have approximately 0.4 more years of education than those with zero exposure. This difference in years of education is significant at the five percent level.

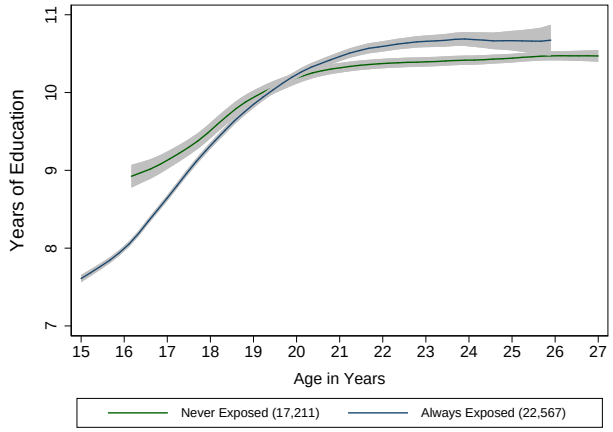
Figure 4(b) illustrates the differences in years of education of those reporting durations above and below the mean duration of receipt[27]. Due to the extremely low number of past beneficiaries aged twenty-four and up, with duration of receipt longer than 4.3 years, the sample of individuals with above mean duration is limited to individuals between fifteen and twenty-three. The only significant differences can be observed between the ages of fifteen and seventeen, where beneficiaries with below average duration of receipt have more education. The gap between these two groups at those ages in Figure 4(b) is less than 0.3 years of education. Figure 4(b) implies that longer duration of grant receipt has no impact on years of education, as no significant differences in education is observed between the two groups.

Figure 4(c) illustrates the differences in height by exposure status. Individuals exposed

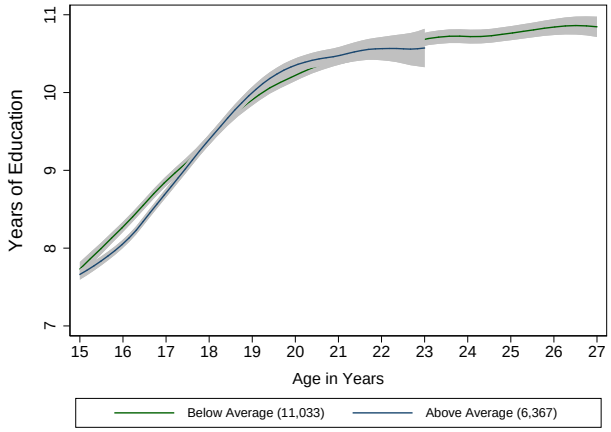
[27]Average duration of receipt is 4.3 years in all five waves.

Figure 4: Cumulative Outcomes by Grant Exposure and Reported Duration, Over Age

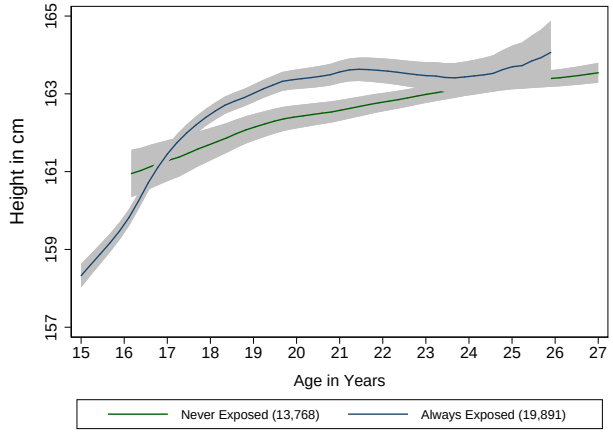
(a) Years of Education by Exposure Status



(b) Years of Education by Reported Duration



(c) Height by Exposure Status



(d) Height by Reported Duration

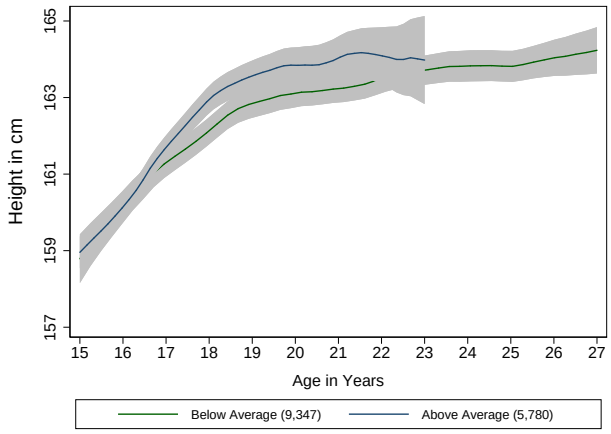


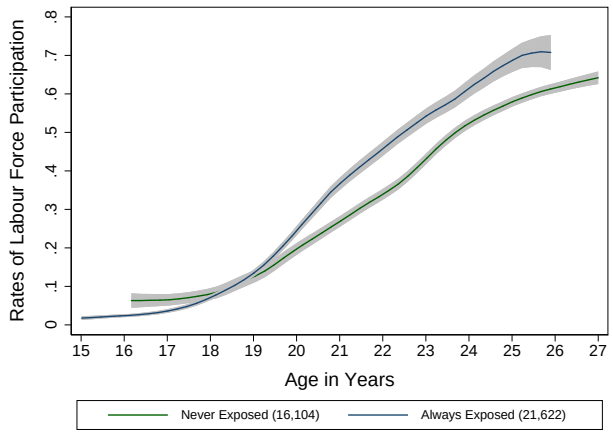
Figure 4 uses local polynomial estimation with an epanechnikov kernel, with ninety-five percent confidence intervals. The years of education and height are graphed as a function of exposure over age and the duration of receipt of the grant over age. The sample in Figure 4(a) and 4(c) is split by exposure status and the sample in Figure 4(b) and 4(d) is allocated according to average duration of receipt. Data: National Income Dynamics Study.

to the grant between the ages of seventeen and twenty-three are significantly taller than those with zero exposure. The differences in height between these ages range from 0.8 centimetres to 1.4 centimetres. At other ages, there are no significant differences in height between the two groups. The results from Figure 4(c) suggest that there may be a duration effect on height for the younger sample between the ages of seventeen and twenty-two years. However, Figure 4(d) shows there are no observable differences in height between those with above or below mean duration, except at eighteen years. Beneficiaries with above-average duration of receipt are 0.6cm taller than beneficiaries with lower duration of receipt. This difference is significant at the five percent level. Further estimates of current outcomes are shown in Figure 5 below.

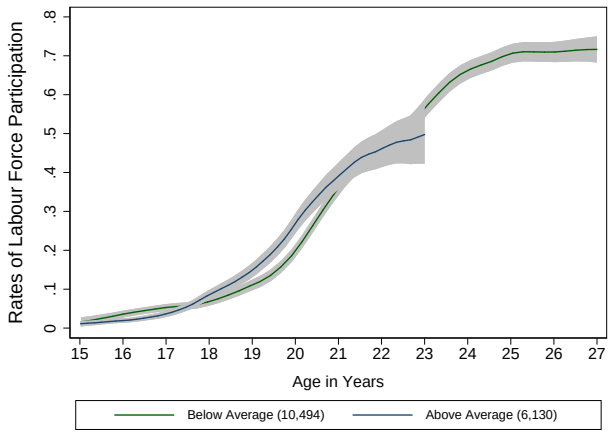
Figure 5(a) compares rates of labour force participation between those exposed and not exposed to the grant, over age. Sixteen and seventeen-year-olds with no grant exposure have

Figure 5: Current Outcomes by Grant Exposure and Reported Duration, Over Age

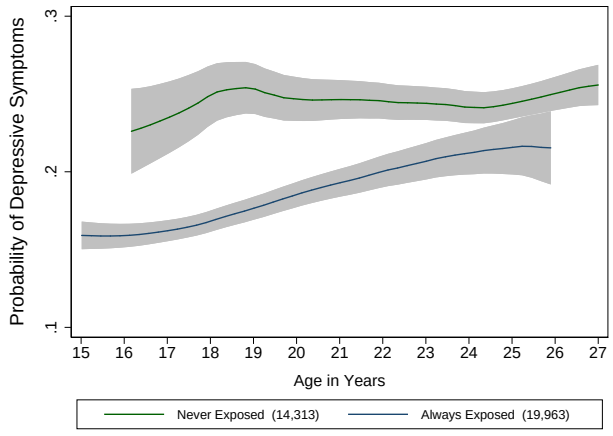
(a) Labour Force Participation by Exposure Status



(b) Labour Force Participation by Reported Duration



(c) Depressive Symptoms by Exposure Status



(d) Depressive Symptoms by Reported Duration

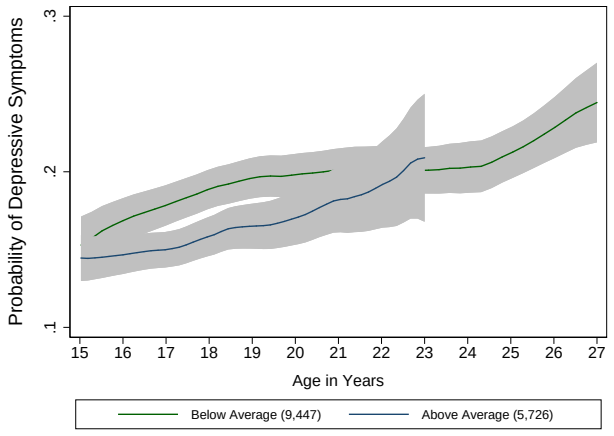


Figure 5 uses local polynomial estimation with an epanechnikov kernel, with ninety-five percent confidence intervals. Labour Force Participation and the presence of depressive symptoms are graphed as a function of exposure over age and the duration of receipt of the grant over age. The sample in Figure 5(a) and 5(c) is split by exposure status and the sample in Figure 5(b) and 5(d) is divided by average duration of receipt. Data: National Income Dynamics Study.

significantly higher rates of labour force participation than those exposed. However, individuals aged nineteen or older who have been exposed to the grant, have significantly higher labour force participation rates compared to those with zero exposure. For example, seventy-two percent of twenty-four-year-olds with exposure to the grant are labour force participants, compared to the sixty-two percent of twenty-four-year-olds with no exposure. Similar patterns are observed in Figure 5(b), when the sample is split by mean duration of receipt. Beneficiaries with higher duration of receipt have significantly lower labour force participation rates between the age of sixteen and seventeen. However, between the ages of eighteen and twenty-one, the pattern reverses and beneficiaries with higher duration of receipt have higher rates of labour force participation. The difference between the groups is significant at the five percent level.

Figure 5(c) graphs the rates of depressive symptoms by exposure status over age. At every age, individuals exposed to the grant have significantly lower rates of depressive symptoms compared to those with no exposure. The largest difference is observed at age eighteen years, where seventeen percent of individuals with grant exposure exhibit depressive symptoms, while twenty-five percent of individuals with no grant exposure exhibit depressive symptoms. The differences between these two groups at every age is significant at the five percent level.

Figure 5(d) shows that lower rates of depressive symptoms are observed for individuals with above-average duration of receipt until the age of twenty-three. However, significant differences are only seen for individuals between the ages of seventeen and twenty-one. Again, the largest differences in rates of depressive symptoms are observed at eighteen, as fourteen percent of individuals with above average duration exhibit depressive symptoms compared to eighteen percent of individuals with below average duration. Therefore, Figure 5 shows the positive impact of longer duration of grant receipt on current outcomes for individuals between the ages of seventeen and twenty-one years.

The results from this section contrasts the parametric results observed in Section 5.1 to 5.3. The parametric results show a positive relationship between duration of grant receipt and years of education and height, while showing a negative relationship between grant duration and labour force participation. No significant relationship is observed between duration of grant receipt and the presence of depressive symptoms However, the non-parametric results in this section show only a limited effect of the duration of receipt on years of education and height for individuals below the age of eighteen.

5.5 Robustness Checks

This section discusses the robustness of the results in Sections 5.1 to 5.4, observed on the outcomes of interest. Table 12 presents OLS (Panel A), 2SLS (Panel B), and fixed effects (Panel C) estimates of the duration of grant receipt on different youth and adolescent samples. The early adolescent sample consists of eleven to fourteen-year-olds, the late adolescent sample contains seventeen to twenty-one-year-olds and the youth sample consists of twenty-one to twenty-five-year-olds. These samples are used as a robustness check as smaller samples allow for a low bandwidth and compares individuals similar in characteristics. The early adolescent sample is a sample in which significant impacts of grant receipt are expected, as this sample consists of current CSG beneficiaries. Late adolescents are selected as a robust check, based on the results of Section 5.4, as they were the age group where the largest significant effects of

duration of receipt were observed. Therefore, similar effects of duration of receipt are expected in this sample. The youth sample is selected to observe the effects of the duration of grant receipt, as grant exposure ranges from one to sixteen years, however, average duration of receipt in this sample is 2.87 years (see Appendix Item A.4). No significant effects of the duration of receipt on the outcomes is expected as average duration is low in this age range.

Table 12: Robust Checks & Different Samples

	Wave 5				All Waves			
Dependent Variable	Education	Height	LFP	CES-D=>10	Education	Height	LFP	CES-D=>10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	*Panel A: OLS Estimates*							
Early Adolescent	0.02***	-0.04	--	--	0.01***	-0.05*	--	--
	(0.01)	(0.04)			(0.00)	(0.03)		
Late Adolescent	0.02**	0.02	0.00*	-0.00	0.02**	0.02	0.00	-0.00
	(0.01)	(0.03)	(0.00)	(0.00)	(0.01)	(0.03)	(0.00)	(0.00)
Youth Sample	-0.00	0.05	0.01	-0.00	-0.00	0.04	0.00	0.00
	(0.01)	(0.05)	(0.00)	(0.00)	(0.01)	(0.05)	(0.00)	(0.00)
	Panel B: Second Stage IV Estimates							
Early Adolescent	0.77***	1.61**	--	--	0.12***	0.49	--	--
	(0.17)	(0.71)			(0.03)	(0.32)		
Late Adolescent	0.18***	0.03	-0.02	-0.01	-0.07	-0.01	-0.03***	-0.00
	(0.07)	(0.26)	(0.02)	(0.02)	(0.05)	(0.18)	(0.01)	(0.01)
Youth Sample	0.09	0.28	-0.05	0.02	0.04	0.11	-0.02**	0.01
	(0.11)	(0.44)	(0.03)	(0.02)	(0.04)	(0.17)	(0.01)	(0.01)
	Panel C: Fixed Effects Estimates							
	Wave 3 & 4 & 5				All Waves			
Early Adolescent	0.01**	-0.02	--	--	0.01	-0.07	--	--
	(0.01)	(0.05)			(0.01)	(0.05)		
Late Adolescent	0.09***	0.50***	-0.03***	0.01	0.02***	0.27***	-0.03***	0.01
	(0.01)	(0.15)	(0.01)	(0.01)	(0.01)	(0.09)	(0.01)	(0.01)
Youth Sample	0.35***	0.56*	-0.03*	-0.01	0.12***	0.66***	-0.03***	-0.01
	(0.04)	(0.32)	(0.01)	(0.01)	(0.02)	(0.18)	(0.01)	(0.01)

The OLS, IV and fixed effects estimates from Section 5.1 to 5.3 are replicated in the table above with three different samples and the duration coefficient are reported from each estimate. The samples consists of African and Coloured adolescents and youth in either the early adolescent, late adolescent and youth sample in Wave 5 and all five waves. Panel A shows the OLS estimates, and Panel B shows the second stage IV estimates. Panel C shows the fixed effect estimates in Waves 3 to 5 (Columns 1 to 4) and in all five waves (Columns 5-8). Standard errors are in parentheses and are corrected for clustering in each primary sampling unit. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

Table 12 only contains the duration of grant receipt coefficients. Estimates of duration of grant receipt in Table 12 for the early adolescent sample are observed for the cumulative outcomes only, as measures for the current outcomes are collected only for those aged fifteen and older. As expected, significant grant receipt effects for the early adolescent sample are observed in Panel A in Wave 5 (Column 1) and in all Waves (Column 5), significant at the one percent level. An extra year of grant receipt for early adolescents decreases height by 0.05cm in all five waves (Column 6), given the effects of current outcomes on nutrition observed in

the literature. This effect is significant at the ten percent level, however, it is not practically significant, given the average height of the early adolescent sample of 149 centimetres.

Effects on education for the late adolescent age group are significant at the five percent level. Ten years of grant receipt increases years of education by 0.2 years in Wave 5 and in all five waves respectively for seventeen to twenty-one-year-olds. In the same sample of individuals, grant effects are observed on height (0.05) and labour force participation (0.00), significant at the ten percent level and are not practically significant. As expected, in the youth sample, duration of grant receipt has an insignificant impact on the two current and two cumulative outcomes due to low duration of receipt. Similar to the OLS estimates in Table 5, no significant impact of duration of receipt on mental health is observed for any sample.

Panel B in Table 12 reports the second stage IV estimates. Similar to the IV estimates in Table 8, large coefficients are observed on the education and height estimates. In early and late adolescent samples, one year of grant receipt increases education by 0.77 and 0.18 years in Wave 5 respectively, and these effects are significant at the one percent level. However, in all five waves, only the estimate for early adolescents (0.12) on education is significant (Column 5). Furthermore, an extra year of grant receipt can increase height by 1.61 centimetres in Wave 5 for early adolescents, significant at the one percent level. This is a large effect, as an extra ten years of grant receipt leads to a 16.1 centimetre increase in height.

These results are plausible, given that the early adolescent sample consists of current beneficiaries and those who experience both the cumulative and current impact of grant receipt. Similar to the IV estimates in Table 9, significant impacts of duration of receipt are only observed for labour force participation. This impact is observed in both samples late adolescent and youth samples in all waves. An extra year of grant is associated with a three and two percentage point decrease in labour force participation for late adolescent and youth samples, significant at the one and five percent respectively. The effect on late adolescents is expected, as grant receipt is associated with higher years of education achieved, meaning this sample trades labour force participation for education. No impacts of grant duration on mental health are observed.

Panel C in Table 12 presents the fixed effects estimates of the impact of duration of receipt on the four outcomes. Effects of duration of grant receipt are observed on education, height and labour force participation similar to Table 10 and 11. Fixed effects estimates show strong effect grants in all adolescent and youth samples. These effects are significant at the five percent level for early adolescents, and significant at the one percent levels for both late adolescent and youth samples respectively. Large significant effects on height are observed for late adolescents

in Waves 3 to 5 and in all five waves in Panel C, as expected. Despite the low levels of duration of grant receipt in the youth sample, a year of grant receipt is associated with an increase in height of 0.56cm in Waves 3 to 5 and 0.66cm in all five waves, significant at the ten and one percent levels respectively.

The effects discussed above show that even at low levels of duration, grant receipt can affect height, once youth height becomes stable and individuals stop growing taller. In the growth phase that takes place in early adolescence, no significant effects of height are observed in Panel C. Similar to Table 11, duration of grant receipt is negatively associated with labour force participation. An extra year of grant receipt reduces labour force participation by three percentage points for late adolescent and youth samples in all time periods.

The results from Table 12 accord with expectations stated earlier and the results in Section 5 for the base sample in different waves of the NIDS. The coefficients in Table 12 for the different age samples are similar in size and significance to the OLS, IV, and fixed effects coefficients presented in Section 5. Strong grant effects were observed for the late adolescent sample, the sample with the longest duration of grant receipt and weak grant effects observed in OLS and IV results of the youth sample[28]. Table 13 tests the robustness of the results discussed in Section 5, using different specifications and measures of duration of receipt.

Table 13 reports random effects, logit and probit reported duration of grant receipt estimates on the four outcomes in Panel A using the base sample. Panel B presents the OLS estimates, IV estimates (Panel B(ii)) and fixed effects (Panel B(iii)) using a different measure of duration of receipt. The random effects model in Panel A is estimated in Waves 3 to 5 (Columns 1 to 4) and in all waves Columns 5 to 8. Significant effects are observed for education and height in Waves 3 to 5 and in all Waves similar to the fixed effects in Table 10. The estimates of grant effects on education are 0.10 and 0.19 years in Waves 3 to 5 and in all Waves, significant at the one percent level. Furthermore, duration of grant estimates on height of 0.2 centimetres and 0.33 centimetres are observed in Waves 3 to 5 and in all Wave, ands are significant at the one percent level.

[28] A sample with the shorted duration of grant receipt.

Table 13: Robust Checks & Different Specifications

	Wave 5				All Waves			
Dependent Variable	Education	Height	LFP	CES-D=>10	Education	Height	LFP	CES-D=>10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	*Panel A: Alternative Specifications*							
Random Effects	0.10***	0.20***	0.00	-0.00	0.13***	0.33***	0.00	-0.00
	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)
Logit Marginal Effects	--	--	0.00***	0.00	--	--	0.00**	-0.00
			(0.00)	(0.00)			(0.00)	(0.00)
Probit Marginal Effects	--	--	0.00***	0.00	--	--	0.00*	-0.00
			(0.00)	(0.00)			(0.00)	(0.00)
	Panel B (i): Other Measures of Receipt							
Actual duration								
Early Adolescent	0.01	-0.01	--	--	0.01**	0.01	--	--
	(0.01)	(0.06)			(0.00)	(0.05)		
	Panel B(ii): Second Stage IV Estimates							
Early Adolescent	0.70***	1.32*	--	--	0.10***	0.80	--	--
	(0.18)	(0.79)			(0.03)	(0.50)		
	Panel B(iii): Fixed Effects Estimates							
Early Adolescent	0.01	0.03	--	--	-0.00	-0.02	--	--
	(0.01)	(0.05)			(0.01)	(0.05)		

The OLS, IV and fixed effects estimates from Section 5.1 to 5.3 are replicated in the table above with different specifications in Panel A and different measures of duration of receipt in Panel B. Panel B is split into three with Panel B(i) reporting the OLS Estimates, Panel B(ii) the second stage IV estimates and Panel B(iii) the fixed effects estimates. The base sample in Wave 5 and in all five waves is used in Panel A. The sample in Panel B consists of African and Coloured adolescents between the ages of eleven and fourteen years. The random effects (Panel A) and fixed models (Panel B(iii)) are run in Waves 3 to 5 (Column 1 to 4) and all five waves (Column 5 to 8). Only the coefficient of the reported duration of receipt is reported. The logit and probit estimates are the average partial effects. Standard errors are in parentheses and are corrected for clustering in each primary sampling unit. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

Compared to the fixed effects estimates of duration of grant receipt on education and height in Table 10, the random effects show the same results as the fixed. However, the random effect estimates are smaller in size compared to the fixed effects estimate. The labour force participation results of the random effects differ from the fixed effects results, as duration of receipt has an insignificant impact on labour force participation in the random effects in Table 13. The fixed effects results show a negative and significant impact at the one percent level in Table 11 on labour force participation. Thus, the differences in results between the models shows that removing the individual fixed effects removes negative (or downward) bias from the random effects estimates. No significant impacts of grant receipt are observed on the presence of depressive symptoms in both the fixed effects and random effects models[29].

[29] A Hausman test was run on the random and fixed effects models, using the base sample and the outcomes and controls used in Table 10 and 11, to test which of the models is appropriate to run with the data. The results of the test produced a p value equal to 0.00 for all outcomes, meaning that the unique errors (u_i) are correlated with each set of regressors Wooldridge (2013), and that the fixed effects model is the appropriate model to run with the data used to create Table 10 and 11.

Panel A in Table 13 reports logit and probit estimates as the average partial effects. The results on individual mental health are similar to the OLS results in Table 5, the IV results in Table 9, and the fixed effects results in Table in 11. No significant duration of grant receipt effects are observed on mental health in both the logit and probit marginal effects, which is consistent in OLS, IV, and fixed effects estimates. However, the results differ between the logit and probit marginal effects estimates and the OLS, IV, and fixed effects estimates. The coefficients for duration of receipt on labour force participation are significant at the one percent level in Wave 5 (Column 3) for both the logit and probit marginal effects however, these effects are not practically significant. The OLS estimates in Table 5, the IV estimates in Table 9, and the fixed effects estimates in Table in 11 are larger in size and are negative.

Panel B(i), B(ii) and B(iii) uses actual duration as an alternative measure of duration of receipt. Actual duration is collected for current child CSG beneficiaries only, using the year of initial receipt. Previous waves data were used to calculate duration of receipt if an individual ceased to report CSG receipt. This measure of duration is recorded as is from the NIDS data with no imputations. As this actual duration is only measured for current beneficiaries who report their duration of receipt in that wave[30], the sample consists of early adolescents between the ages of eleven and fourteen. The results from Table 13 are compared to the results of the same sample which use reported duration as the measure of duration of CSG receipt in Table 12.

The OLS estimates in Panel B(i), IV estimates B(ii), and fixed effects are similar between the two measures. For example, the IV estimates of the impact of duration of receipt on education in Wave 5 (0.77 vs 0.70) and in all five waves (0.12 vs 0.10) are similar in size and significance. Furthermore, similar sized fixed effects coefficients are observed between actual duration and reported duration (-0.02 vs -0.07) in all five waves. The robustness checks in this section correspond in size and significance to the results in Section 5.

5.5.1 Sample Selection

Non-random sample selection could be a potential source of bias that could reduce the validity of the results in Section 5. Non-random sample selection could arise from either exogenous or endogenous sample selection (Wooldridge 2013). If the latter is the case, the OLS estimates become biased and inconsistent, thereby invalidating of the results. The former type of sample selection yields unbiased and consistent OLS and 2SLS estimators (Wooldridge 2013). In this

[30]Duration of CSG data is only available for children (zero to fourteen years).

analysis, non-random sample selection takes place, as selection into the sample is dependent on whether an individual has duration data caused by an exogenous variable. However, this is considered an exogenous sample selection, as the no-nrandom sample selection is on an explanatory variable in the models shown in Section 4.6. If the sample selection had been based on the outcomes, then endogenous sample selection would have taken place and a Heckman correction would been required to remove the bias (Wooldridge 2013).

As sample selection in this paper is based on whether or not an individual has duration data, it is important to examine who reports their duration of grant receipt. Table 14 presents OLS estimates of a binary measure of whether an individual reports duration of CSG receipt[31] regressed on the usual controls. The base sample is used in Wave 5 and in all five waves. Age, maternal education, and household size are the only significant determinants of whether an individual has duration data or not. In Wave 5, age and household size reduce the probability of having reported duration data. An increase in age of year reduces the probability of having reported duration data by three and four percentage points in Wave 5 and all five waves, significant at the one percent level. However, these effects are not practically significant, as mean probability of having reported duration data is eighty-three percent.

Similar results are observed when a binary measure of whether a current beneficiary reports actual duration is used (see Appendix Item A.5). Therefore, the non-random sampling is not an issue in this text, as it is exogenous sample selection and there is no endogeneity around the reporting of duration data.

[31]The binary outcome is measured as follows: 1 if an individual has reported duration data and zero if otherwise

Table 14: Who has Duration Data

Dependent Variable	Who Reports Reported Duration	
	Wave 5	All Waves
Age	-0.03***	-0.04***
	(0.00)	(0.00)
Female	-0.01	-0.01
	(0.01)	(0.02)
African	-0.03	-0.05
	(0.03)	(0.04)
Mother's Years of Education	0.01***	0.01***
	(0.00)	(0.00)
Mother's Age	0.00	0.00
	(0.00)	(0.00)
Household Size	-0.01***	-0.01**
	(0.00)	(0.00)
Log (Household Wage)	0.01	-0.01
	(0.01)	(0.01)
Urban	-0.02	0.01
	(0.02)	(0.02)
Mother LFP	0.01	0.01
	(0.02)	(0.01)
Constant	1.37***	0.88***
	(0.11)	(0.15)
Observations	2,894	6,788
R-squared	0.06	0.08

The table above presents the OLS estimates of individual and household characteristics on a binary outcome on whether or not the individual has reported duration data pr not. The base sample is used in Wave 5 (Column 1) and in all five waves (Column 2). A full set of province and wave indicators is included in all the specifications but are not reported in the table. Standard errors are in parentheses and are corrected for clustering in each primary sampling unit. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

The following chapter discusses the external validity of these results and the potential mechanisms.

6 Discussion

Findings from the analysis in Chapter 5 show a cumulative effect of grant receipt on years of education, height, and labour force participation for the youth in the sample. Similar results are observed when exposure to the grant is used as the measure of CSG duration of receipt. Instrumental variable analysis and fixed effects estimation supports these sets of results and also estimate both larger cumulative effects of grant receipt on the cumulative outcomes, as well as similar sized effects on labour force participation as compared to OLS. These results are further corroborated in different age sub-samples.

The IV estimates in Table 8 and the individual fixed effects estimates in Table 9 show a significant impact of the duration of CSG receipt on years of education and height. On the other hand, OLS estimates only find a significant effect on years of education and not height. In Wave 5, an extra year of CSG receipt is predicted by IV estimates to increase height by 0.46 centimetres in Wave 5. Similar results were observed in Mexico as Progresa receipt was associated with increases in height of one and half centimetres (Fernald et al. 2009). The individual level fixed effects results in Table 11 are similar to the OLS results in reported in Table 5 and the IV regression results in Table 9. For example, the estimated impact of the duration of receipt on labour force participation is -0.03 in the fixed effects model, -0.02 in the IV model, and -0.01 in the OLS model in all five waves. All three estimates are significant at the one percent level. These effects are similar to the effects of cash transfers observed in Mexico and Honduras (Araujo et al. 2016, Molina-Millan et al. 2018, Parker & Vogl 2018*b*).

One reason that significant effects were observed in the fixed effects estimation and IV estimation and not in the OLS estimation could be due to omitted variable bias. Fixed effects and IV estimation remove some of the negative omitted variable bias, which could have been either a time constant individual fixed characteristic in the error term or another characteristic, which had no data available and affected the OLS estimates more than the other two methods. For years of education, this negative bias could have been caused by the unobserved family preferences for towards education. Low-income households tend to underinvest in children's education because a trade-off exists for low incomes households where they have to choose between current consumption and investments in their children's human capital (Björklund & Salvanes 2011). Therefore, household preferences for education are going negative for poorer households as they sacrifice a child's education for current consumption. This produces a negative omitted variable bias if household preferences are not controlled for.

6.1 External Validity

External Validity is important as it indicates the generalisability of a set of results. The analysis of the long-term effect of CSG receipt on the youth was performed using a nationally representative dataset rather than a randomised control trial, with which cash transfers usually evaluate current receipt (Fiszbein & Schady 2009, Glewwe & Muralidharan 2016, Molina-Millan et al. 2018). Furthermore, the base sample selected in this analysis consists of African and Coloured youth who have the largest rates of CSG receipt and account for ninety percent of social welfare beneficiaries in South Africa. In addition, these race groups constitute roughly ninety percent of the South African population (Statistics South Africa 2018*b*). Changes in age eligibility of CSG receipt provide a quasi-experiment that allows for a rigorous identification strategy (Molina-Millan et al. 2018) using instrumental variables for the credible estimation of the long-term impacts of grant receipt.

The IV estimates that are observed in Section 5.2.2 provide further support to the generalisability of the results observed in this dissertation. Given that the conditions for a valid instrument hold, the estimates reported in Table 8 and 9 can be interpreted as the local average treatment effect[32]. However, Angrist & Pischke (2008) argue that the local average treatment effect can be interpreted as the average treatment effect if the instrument allows no "always-takers" or no "never-takers"[33]. Due to the implementation systems of the child support grant, it is not possible for an individual who has zero exposure[34] to the grant to have CSG receipt. This is visible in Table A1, where individuals that have never been exposed to the grant have no recorded years of CSG receipt equal to zero. Therefore, grant exposure that is equivalent to zero prevents grant receipt with certainty and removes the possibility of having a group of CSG "always-takers".

According to Angrist & Pischke (2008), the IV estimates in Section 5.2.2 can then be interpreted as both the local average treatment effect and the average treatment effect, on all past and present grant beneficiaries. This result supports the claim of the external validity of the results in this dissertation. Therefore, a number of factors indicate the results in Chapter 5 may be generalisable. Implying the results of the unconditional cash transfer in South Africa may also be observed in other developing countries with similar contexts and settings to South

[32] I.e the causal effect of the duration of grant receipt on those individuals who are exposed to the grant for any portion of their lives, and report CSG receipt for any period of time (Angrist & Pischke 2008).

[33] "Always-takers" are individuals who are in the control group, that gain access to the treatment. Whereas "never-takers" are individuals that are randomly assigned to take the treatment and choose not to (Angrist & Pischke 2008).

[34] An individual who would have been age ineligible for the grant for their entire life.

Africa. A discussion of the potential mechanisms that lead to the results reported earlier is in the section below.

6.2 Mechanisms

The positive long-term impact of the child support grant on the cumulative outcomes are significant and observable. Changes in the cumulative outcomes reflect the results of early life and continuous investments in human capital (Agüero et al. 2007). With the availability of the CSG from birth, a number of potential pathways emerge that could explain why long-term duration of grant receipt leads to an increase in height and years of education achieved. Investments into human capital are increased at the onset of CSG receipt, as the added income is used in a number of different ways (Adato & Bassett 2012).

The additional income from cash transfers is believed to reduce the household's financial burden of sending a child to school when the cost of schooling is the largest factor in the demand for education (Kilburn et al. 2017). The money from the cash transfers could be spent on school fees, uniforms, stationary, and other school related supplies (Kilburn et al. 2017, Delany et al. 2016, Glewwe & Muralidharan 2016, Adato & Bassett 2012, Handa et al. 2016). In households that received the CSG, school fees, transport and uniforms were the household's largest expenditures after food (Agüero et al. 2007, DSD et al. 2012, Delany et al. 2016). As a result, either school dropout decreases with grant receipt (Baird et al. 2010, Filmer & Schady 2014, Gustafsson 2011) or enrolment increases with grant receipt (Glewwe & Muralidharan 2016, Fiszbein & Schady 2009, Glewwe & Olinto 2004, Macours & Vakis 2008, Filmer & Schady 2008, Schady & Araujo 2008) and, therefore, educational attainment rises with grant receipt (Behrman et al. 2010, Barham et al. 2017, Filmer & Schady 2014, Eyal et al. 2019, Parker et al. 2012, Parker & Vogl 2018*b*).

Behrman et al. (2010), Parker et al. (2012), Parker & Vogl (2018*b*) find similar sized effects of longer Progressa exposure on years of education in Mexico, compared to the CSG effects on education observed in Chapter 5. Longer program participation or grant receipt increases the marginal benefit of schooling to a point that these benefits exceed the marginal cost of schooling (Behrman et al. 2010). The marginal benefit of schooling includes the returns to education and the marginal cost of schooling (leisure time and wages forgone (Behrman 1999)). The added income acts as a substitute for wages that the child or adolescent could have earned (Adato & Bassett 2012, Glewwe & Muralidharan 2016). As long as grant receipt continues to keep the marginal benefit of education above the marginal costs, investments into education

will continue and grant effects on education will be observed.

One pathway that positively affects youth education is through investment in child health. Child health is a determinant for education, and is mainly affected through nutrition. CSG receipt improves nutrition (Agüero et al. 2007, Coetzee 2013, DSD et al. 2012, Delany et al. 2016), as food and food-related expenses compromise most of grant income use and the remainder is spent on education and other expenses (Kilburn et al. 2017, Adato & Bassett 2012). The increase in food expenditure leads to a rise in the quality and quantity of nutrients consumed in the household. With better food, grant beneficiaries can concentrate for longer, perform better and stay healthier, which, in turn, helps beneficiaries academic performance (Adato & Bassett 2012, Case et al. 2005, Schubert 2005).

Nutrition not only affects education but also has an obvious effect on youth height (de Onis & Branca 2016, OECD 2009, Silventoinen 2003). The results in Chapter 5 show the positive impact of long-term duration of CSG receipt on youth height. One main channel that CSG receipt affects height is through nutrition (Agüero et al. 2007, Coetzee 2013, DSD et al. 2012). Rapid physical and cognitive development occur in the first one thousand days of an individuals' life and it is in this phase of life, that nutrition has the greatest effect on adult height (de Onis & Branca 2016, OECD 2009, Silventoinen 2003). As child support grant receipt is available from birth, additional income from CSG is used to buy nutritious food to be consumed by the child in this critical phase of their physical growth (Agüero et al. 2007, Coetzee 2013, DSD et al. 2012). Thus, through nutrition, cash transfers positively impact child height (Maluccio 2005, Macours et al. 2012, Attanasio et al. 2005, Fernald et al. 2009, Fernald & Hidrobo 2011, Paxson & Schady 2010), which is a key determinant of youth height (Ayuda & Puche-Gil 2014, Strauss & Thomas 2007, Steckel 2009).

If cash transfers are not received at birth grant receipt may affect youth height through other channels. Improved nutritional status is believed to be positively associated with adult height (de Onis & Branca 2016, OECD 2009, Silventoinen 2003, Steckel 2009, Strauss & Thomas 2007, Akachi & Canning 2007), and as stated previously, CSG receipt has positive impact on nutritional status. Furthermore, grant receipt can have an impact on youth height through the reduction of the risk of disease and improvement in health care practices (Strauss & Thomas 2007). Diseases and inadequate health care cause loss in nutrition which slow down physical growth (Cortez et al. 2006, OECD 2009, Silventoinen 2003). Cash transfers were designed by nature to cover negative income shocks associated with poor health by covering health-related expenses and encouraging participation in preventive healthcare (Fiszbein & Schady 2009). These expenses consists of transportation to healthcare centres and medical expenses, and the

opportunity cost of the time spent receiving medical attention (Adato & Bassett 2012). Thus, grant receipt can encourage good health practices, that reduce the risk of disease and ensure that there is no loss of nutrition that could affect future height.

A negative relationship between duration of CSG receipt and labour force participation was observed in Chapter 5. Similar grant effects were observed for the youth in Mexico and Honduras (Behrman et al. 2010, Molina et al. 2018), while no grant effects were witnessed in Ecuador (Araujo et al. 2016). The samples used in those studies ranged in age from fifteen to twenty-six years (Behrman et al. 2010, Araujo et al. 2016, Molina et al. 2018), similar to the age in the sample used in this dissertation. One suggested reason for the negative relationship between grant receipt and labour force participation is that grant beneficiaries in the samples have yet to fully transition into the labour market (Molina-Millan et al. 2018). As grant beneficiaries stay in school longer and obtain more years of education, they trade labour force participation for education (Molina-Millan et al. 2018). As a result, grant receipt is associated with lower labour force participation.

Another reason for the negative relationship between grant receipt and labour force participation, may be the effect of grants on reservation wages. Individuals will only participate in the labour market for as long as the expected wage offer exceeds the reservation wage (Ntuli & Wittenberg 2013). Current grant receipt increases the reservation wage by raising non-labour income and household income and keeps the reservation wage above the expected wage offer. For past grant beneficiaries, this effect may not be present, however, grant receipt leads to higher educational attainment which raises the value of non-labour-market time and increases the reservation wage (Ntuli & Wittenberg 2013). As a result, grant receipt may reduce labour force participation.

No significant impacts of CSG receipt on depressive symptoms were observed in this dissertation. The findings in this dissertation are different to the findings in Kilburn et al. (2016) that show that program effects in Kenya reduced the presence of depressive symptoms for orphans between the ages of fifteen and twenty-four. In Malawi, Baird et al. (2013) find that unconditional cash transfer programs improve the mental health of female adolescents. The difference between these studies and this dissertation is that the studies analysed the impact of current receipt, whereas this dissertation studies the cumulative effect of past receipt. Although current receipt may have a positive impact on mental health, cash transfer effects are fleeting once grant receipt ceases (Baird et al. 2019). Therefore, one can conclude that mental health is mainly affected by current conditions such as current grant receipt and that past receipt has no effect on an individual's mental health.

6.3 Limitations

One limitation of the analysis in this dissertation is related to the data. Improved data quality on the duration of CSG receipt for beneficiaries and non-beneficiaries would have been ideal for this evaluation. 5,743 out of 45,432 CSG beneficiaries have no duration data in all waves. Furthermore, the duration of CSG receipt data suffers from measurement error. Some CSG beneficiaries report different years of initiation of CSG receipt in each wave of the NIDS, while other beneficiaries reported a start date of grant receipt which was before the inception of the child support grant. In addition, NIDS data on the duration of receipt for CSG beneficiaries who were older than fourteen was lacking, and logical assumptions were made to deal with this inconsistency. Although imputations and other corrections were made to the data to correct these errors, the poor data quality could have had an effect on the results through sample selection.

Another limitation of the models used in Chapter 5 is the potential of omitted variable bias. Some variables considered to be key determinants of the outcomes used in this dissertation were not collected in the NIDS. Tests scores and other measures of the innate ability of youth would have been useful to differentiate the education grant effects in students with different abilities. Missing information on adverse early experiences, and individual self-esteem, could be a reason that grant effects were not observed for individual mental health. It is hoped that the econometric techniques employed have mitigated the bias, especially the fixed effects estimates.

6.4 Policy Recommendations

The results have shown the positive effect of grant receipt on the cumulative outcomes, however the grant effect on the current outcomes is mixed. The grant effects observed on the cumulative outcomes could have been due to the early life investments made with grant income, which last a lifetime. Compared to the other grants, the CSG is relatively modest in size. The foster child care grant amount is double in size compared to the CSG, while the care dependency grant amount is almost five times larger than the CSG amount as of 2016 (Delany et al. 2016). Approximately fifty-seven percent of the grant is spent on food and ten to thirty percent is spent on education and health (Adato & Bassett 2012, DSD et al. 2011), thus, an increase in the CSG amount could lead to greater grant effects on education, height and nutritional status. Furthermore, an increase in the grant amount would help push the thirty percent of children in South Africa who are below the food poverty line above it (Delany et al. 2016). Therefore,

the policy recommendation is to increase the CSG amount to be on par with the foster care child grant and the care dependency grant. This could further improve the grant effects already observed and lead to a healthy and high skilled labour force.

Current outcomes appear to rely on current conditions and not on past receipt, as cash transfer effects for current outcomes disappear within a short period of time when grant receipt ceases (Baird et al. 2019). One recommendation is that the age limit be increased so as to see positive grant receipt impacts on current outcomes. The age limit should be increased to early twenties to ensure that beneficiaries are covered until the end of tertiary and other post-secondary education, similar to the foster child care grant. This is to ensure that by the time program receipt ceases and the effects disappear, past CSG beneficiaries would further increase their years of education[35] and would be more likely to be a labour force participant.

[35]Education has been shown to be a significant determinant of labour force participation. IV and fixed effects estimates in Table 9 and 11 show that an extra year education leads to one and two percentage point increases the probability of being a labour force participant. Furthermore, grant receipt has been shown in this dissertation to increase years of education.

7 Conclusion

Cash transfer programs were introduced in the late 1990s in many developing countries to combat short-term and long-term poverty and other pressing development issues. Initial evaluations of cash transfers were focused on young children and the short-term impacts of these programs. A few evaluations focus on the long-term impacts using older beneficiaries who experience lifelong receipt. This dissertation examines the long-term impact of the child support grant in South Africa on two cumulative and two current outcomes, using a sample of African and Coloured youth between the ages of fifteen and twenty-seven. It is within this age sample that exogenous variation in cumulative receipt exists and is used to identify the cumulative effect of grant receipt on years of education and height (the two cumulative outcomes), and labour force participation and depressive symptoms (the two current outcomes).

The results from this analysis show a significant cumulative effect of grant receipt on years of education, height and labour force participation. OLS, instrumental variables, and fixed effects estimate that a higher duration of grant receipt increases years of education attained, as well as height of an individual, and reduces labour force participation amongst the youth in the sample. No cumulative effect of grant receipt is observed on depressive symptoms. The evidence from this thesis suggests strong and positive overall cumulative effects of grant receipt on outcomes that rely on early childhood and adolescent investments. However, past grant receipt appears to have no significant effect on current outcomes particularly with regards to mental health, as these outcomes are highly dependent on current outcomes.

There are scenarios where cumulative effects of grant receipt can be observed on current outcomes. For example, past grant receipt affects labour force participation possibly through education, as beneficiaries delay entry into the labour market by staying in school for longer. However, more long-term evaluations are needed to evaluate cash transfers on the first cohort of CSG beneficiaries, who, in the next five years, would have completed their transitions into the labour market. A potential area of future research would be to replicate this study when the first cohort of CSG beneficiaries reach their late twenties and have completed their transitions into the labour market. This study could further explain whether or not cash transfers have been successful in helping individuals escape intergenerational transmission of poverty. This research is beyond the scope of this thesis at this current moment.

So far, the results from this dissertation are encouraging, as they suggest that cash transfers are on the right path to reducing long-term poverty for beneficiaries. These grant effects

on education and physical health bode well for future labour market outcomes for youth in South Africa. A healthier and more educated labour force will have positive effects on labour productivity and the earning potential of beneficiaries may rise. If the grant effects persist, poverty in South Africa may start to decrease. As reduction in poverty has been seen with the old-age pension in South Africa (Woolard & Leibbrandt 2010), the child support grant may help in reducing child poverty.

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Appendix

A.1 Individual Descriptive Statistics by Exposure

Table A1 presents the mean values of key individual and household characteristics, testing for significant differences between those with exposure to the grant and those never exposed.[36] The base sample of African and Coloured youth, between the ages of fifteen and twenty-seven years in Wave 5 make up the sample used in Table A1. Individuals older than twenty-five years have no exposure to the CSG as illustrated in Figure 2. Therefore, one reason for the differences in characteristics between those exposed to the CSG and those without any exposure, is the significant difference in age [37] (20.4 years vs 26.5 years).

Further differences in characteristics are clear and statistically significant at the one percent level unless stated otherwise. Individuals with exposure to the grant are significantly more likely to be African (0.91 vs 0.88), have younger parents and be a resident of a household with at least one of their parents. As a result of the significant difference in age, those with exposure to the grant have completed less years of education (10.2 years vs 11.1 years) and are shorter (163cm vs 164.6cm). Further differences are observed in the labour market, as individuals with grant exposure less likely to be a part of the labour force (0.33 vs 0.76) and have lower proportion of individuals employed (0.59 vs 0.73).

[36] Sample weights are used together with t-tests to test whether the differences between the means are significant or not.

[37] Similar results are found when a sample closer in age of twenty-one to twenty-year-old Black South African and Coloured youth in Wave 5, is used instead of the large sample of fifteen and twenty-seven-year-olds (see Appendix Item A4).

Table A1: Individual Descriptive Statistics by Exposure

Youth Sample Divided By:	Exposure				
	All		Exposed	Never	
	Mean	S.D	Mean	Mean	Star
	(1)	(2)	(3)	(4)	(5)
Youth Demographics	*Panel A: Means of Individual Characteristics*				
Age in Years	21.5	(0.05)	20.4	26.5	***
Female (%)	0.50	(0.01)	0.51	0.50	
Coloured (%)	0.10	(0.02)	0.09	0.12	**
African (%)	0.90	(0.02)	0.91	0.88	**
Years of Education	10.3	(0.05)	10.2	11.1	***
Labour Force Participation (%)	0.41	(0.01)	0.33	0.76	***
CES-D >= 10 (%)	0.20	(0.01)	0.19	0.25	***
Height in cm	164	(0.21)	163	164.6	***
Years of CSG Exposure	10.4	(0.10)	12.8	0.00	***
Duration of CSG Receipt	5.50	(0.15)	8.40	0.00	***
Employed (%)	0.64	(0.02)	0.59	0.73	***
Monthly Income	4,272	(236)	3,800	5,009	***
Has a Matric? (%)	0.35	(0.01)	0.31	0.52	***
		0.00			
CES-D 10 Score	6.24	(0.12)	6.13	6.72	***
Life Satisfaction (1-10)	5.48	(0.07)	5.51	5.38	
Weight in kilograms	62.6	(0.30)	61.1	69.2	***
Mother is Resident	0.64	(0.01)	0.68	0.43	***
Mother Years of Education	8.24	(0.16)	8.46	7.07	***
Mother Age	48.8	(0.27)	47.8	54.0	***
Mother Labour Force Participation (%)	0.56	(0.02)	0.59	0.43	***
Mother Height	158	(0.20)	158	157	***
Mother CES-D >= 10 (%)	0.31	(0.02)	0.32	0.29	
Father is Resident	0.38	(0.02)	0.39	0.29	***
Father Years of Education	8.23	(0.27)	8.49	6.83	***
Father Age	54.3	(0.42)	53.3	59.4	***
Father Labour Force Participation (%)	0.66	(0.03)	0.69	0.51	***
Father Height	169	(0.72)	169	169	
Father CES-D >= 10 (%)	0.24	(0.02)	0.24	0.24	
	Panel B: Means of Household Characteristics				
Household Size	4.27	(0.08)	4.57	2.63	***
Household's Monthly Income	8,694	(414)	8,978	7,112	***
Income from Government Grants	1,550	(40.7)	1,597	1,152	***
Located in an Urban Area (%)	0.65	(0.02)	0.63	0.75	***
Number of Observations	9,954		8,423	1,531	

The table above reports the mean values of the individual and household characteristics for those exposed and never exposed to the child support grant, and tests for significant differences, using the base sample in Wave 5. Sample weights from Wave 5 are used to present weighted estimates. Standard deviations are reported in parentheses and presented in Column 2. Significant differences are reported with stars. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

Conversely, grant exposure is associated with fewer depressive symptoms (0.19 vs 0.25) and a lower CES-D score (6.13 vs 6.72). In addition, those with CSG exposure live in larger households (4.57 vs 2.63), as they are more likely to be young and stay with their parents, whereas those with zero grant exposure are older and would be more likely to have moved out to start their own families. Furthermore, individuals with grant exposure receive more income from government grants R1,597, compared to those without any grant exposure R1,152. Turning from calculated exposure, differences in characteristics by reported duration of receipt are shown in Table 3.

A.2 Exposure by Age and Year of Birth

Table A2: Exposure by Age and Year of Birth

Year of Birth	Age	Exposure
2017	0	1
2016	1	2
2015	2	3
2014	3	4
2013	4	5
2012	5	6
2011	6	7
2010	7	8
2009	8	9
2008	9	10
2007	10	11
2006	11	12
2005	12	13
2004	13	14
2003	14	15
2002	15	16
2001	16	17
2000	17	18
1999	18	18
1998	19	18
1997	20	17
1996	21	16
1995	22	14
1994	23	6
1993	24	3
1992	25	1
1991	26	0
1990	27	0

This Table shows the variation in exposure to the grant as well as age and year of birth for individuals below the age of twenty-eight in 2017. Exposure is equal to the number of years that an individual is age eligible to receive the CSG

In table A2 the patterns of exposure to the grant by age and year of birth can be observed. The pattern of exposure to the grant is irregular and varies in a non-linear fashion with year of birth. For individuals born after the year 1999, their potential duration to the grant is equal to their age plus one, although exposure to the grant is dependent on the year birth for anyone born in 1997 and before. Individuals born in 1991 and 1990 were twenty-six and twenty-seven years old respectively in Wave 5, and have had no exposure to the grant. However adults born two years later in 1993 and 1994 have three and six year of exposure to the grant. Those born in the later years, for example 2000, are seventeen in 2017 would have potentially received the child support grant for eighteen years, and thus have the longest potential duration of receipt as shown in Table A2.

A.3 Instrumental Variables

Table 9 reports the second stage results results of the instrumental variable estimates of the long-term impact duration of CSG receipt.

Table A3: First Stage Estimates (Current Outcomes)

Dependent Variable:	Reported Duration of Receipt	
Time Period:	Wave 5	All Waves
	(1)	(2)
Exposure	0.39***	0.32***
	(0.03)	(0.02)
Age	-0.43***	-0.53***
	(0.06)	(0.04)
Female	-0.26	-0.22***
	(0.17)	(0.09)
African	0.97***	0.72***
	(0.34)	(0.18)
Mother's Years of Education	-0.16***	-0.13***
	(0.03)	(0.01)
Mother's Age	-0.09***	-0.07***
	(0.01)	(0.01)
Household Size	0.18***	0.10***
	(0.03)	(0.01)
Log (Household Wage)	-1.25***	-0.90***
	(0.11)	(0.05)
Urban	-0.45**	-0.27**
	(0.22)	(0.11)
Years of Education	0.20***	0.17***
	(0.06)	(0.03)
Mother LFP	-0.35*	-0.22**
	(0.18)	(0.09)
Life Satisfaction	-0.21	-0.06
	(0.17)	(0.09)
Mother's CES-D >=10	0.07	0.13
	(0.19)	(0.10)
Constant	23.81***	17.03***
	(1.75)	(0.77)
Observations	3,366	9,632
R-squared	0.50	0.56

This tables reports the first stage estimates , using the base sample in Wave 5 (Column 1) and in all five waves (Column 2). A full set of province and wave indicators is included in all specifications but are not reported here. Standard errors are in parentheses. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

No significant impacts are observed for duration of receipt in either Wave 5 or in all five waves, on the probability of expressing depressive symptoms. Whereas, the estimates of the impact of duration of CSG receipt on labour force participation are negative and significant at the one percent level, in Wave 5 and all in five waves. An extra year of CSG receipt reduces the probability of labour force participation by two percent points. Compared to the OLS results in table 5, the IV estimates provide similar results and conclusions.

These strong results show that the instrument relevance condition holds and as explained

in section 5.2.2 the results in table 9 can be interpreted as the average treatment effect on all the treated. Therefore, the IV estimates of the impact of duration of receipt in this sample on the current outcomes can be apply to all grant beneficiaries. Table 9 reports the second stage results of the instrumental variable estimates of the long-term impact duration of CSG receipt.

A.4 Descriptive Statistics by Exposure for an Older Sample

Table A4: Individual and Household Descriptive Statistics by Exposure

Youth Sample Divided By:	All		Age 21-23	Age 24-25	
	Mean	S.D	Mean	Mean	Star
	(1)	(2)	(3)	(4)	(5)
Youth Demographics	*Panel A: Means of Individual Characteristics*				
Age	23.6	(0.04)	22.3	24.8	***
Female (%)	0.51	(0.01)	0.49	0.54	
Coloured (%)	0.09	(0.02)	0.09	0.09	
African (%)	0.91	(0.02)	0.91	0.91	
Years of Education	11.0	(0.06)	10.9	11.0	
Labour Force Participation (%)	0.60	(0.02)	0.49	0.72	***
CES-D >= 10 (%)	0.22	(0.01)	0.21	0.22	
Height in CM	164	(0.32)	165	164.3	
Years of CSG Exposure	6.1	(0.18)	10.9	1.47	***
Duration of CSG Receipt	2.87	(0.17)	5.20	0.19	***
Employed (%)	0.64	(0.02)	0.58	0.68	**
Monthly Income	4,219	(263)	3,654	4,550	
Has a Matric? (%)	0.50	(0.02)	0.51	0.49	
CES-D 10 Score	6.50	(0.15)	6.53	6.47	
Life Satisfaction (1-10)	5.42	(0.08)	5.45	5.39	
Weight in KGs	65.3	(0.40)	63.7	66.8	***
Mother is Resident	0.55	(0.02)	0.58	0.52	**
Mother's Years of Education	7.60	(0.20)	7.93	7.28	***
Mother's Age	51.7	(0.33)	50.0	53.3	***
Mother's Labour Force Participation (%)	0.51	(0.02)	0.55	0.47	**
Mother's Height	158	(0.22)	158	158	
Mother's CES-D >= 10 (%)	0.33	(0.02)	0.32	0.34	
Father is Resident	0.37	(0.02)	0.40	0.34	**
Father's Years of Education	7.76	(0.27)	8.19	7.32	***
Father's Age	56.7	(0.58)	54.5	58.9	***
Father's Labour Force Participation (%)	0.62	(0.03)	0.70	0.55	***
Father's Height	168	(0.60)	169	167	
Father's CES-D >= 10 (%)	0.25	(0.03)	0.28	0.23	
	Panel B: Means of Household Characteristics				
Household Size	4.43	(0.12)	4.85	3.95	***
Household's Monthly Income	8,627	(433)	8528	8,741	
Income from Government Grants	1,510	(52.4)	1,608	1,386	***
Located in an Urban Area (%)	0.67	(0.02)	0.63	0.71	***
Number of observations	3,921		1,980	1,941	

The table above reports the mean values of the individual and household characteristics for twenty-one to twenty-three-year-olds and twenty-four to twenty-five-year-olds and tests for significant differences. The sample consists of Black South African and Coloured youth, between the ages of twenty-one and twenty-five years in Wave 5. The sample is divided by exposure. Sample weights from Wave 5 are used to present weighted estimates. Standard deviations are in parentheses and presented in Column 2. Significant differences are reported with a star. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

A.5 Who Reports Actual Duration

Table A5: Who has Duration Data

Dependent Variable	Who Reports Actual Duration	
	Wave 5	All Waves
Age	-0.00***	-0.01***
	(0.00)	(0.00)
Female	0.00	-0.00
	(0.00)	(0.00)
African	0.01	0.02
	(0.01)	(0.01)
Mother's Years of Education	0.00	0.00***
	(0.00)	(0.00)
Mother's Age	-0.00	-0.00
	(0.00)	(0.00)
Household Size	-0.00	-0.00
	(0.00)	(0.00)
Log (Household Wage)	0.00	-0.00
	(0.00)	(0.00)
Urban	0.01	0.01*
	(0.01)	(0.01)
Mother LFP	-0.00	-0.00
	(0.00)	(0.00)
Constant	0.98***	0.90***
	(0.03)	(0.02)
Observations	9,000	33,783
R-squared	0.01	0.07

The table above presents the OLS estimates of individual and household characteristics on a binary outcome of whether an individual reports actual duration or not. The sample consists of African and Coloured current CSG beneficiaries below the age of fifteen in Wave 5 (Column 1) and in all five waves (Column 2). A full set of province and wave indicators is included in all the specifications but are not reported in the table. Standard errors are in parentheses and are corrected for clustering in each primary sampling unit. * implies a p value < 0.10, ** implies a p value < 0.05, *** implies a p value <0.01.

Table A5 presents OLS estimates of a binary measure of whether an individual reports actual duration of CSG receipt[38] regressed on the usual controls. A sample of individuals below the age of fifteen is used in Wave 5, and in all five waves. Age, is the only significant determinants of whether an individual has duration data or not. In Wave 5, age and household size reduce the probability of having reported duration data. An increase in age of year reduces the probability of having reported duration data by zero and one percentage points in Wave 5 and all five 5, significant at the one percent level. However these effects are not practically significant, as mean probability of having reported duration data is eighty-three percent.

[38]The binary outcome is measured as follows: 1 if an individual has reported duration data and zero if otherwise