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Assessing the Effect of the COVID-19 SRD Grant on Recipients' Mental Health

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Contents

Abstract

The South African government responded to the Covid-19 global pandemic by implementing containment measures (in the form of lockdowns) to mitigate the spread of the Covid-19 virus. This has devastated the economy, put a strain on an already fragile labour market, and deteriorated mental health and poverty. Consequently, the government put together social protection measures and expanded their social grant programme to cover unemployed adults. This study investigates the impact that the Covid-19 Social Relief of Distress (SRD) grant – a measure aimed at reducing the pandemic-induced financial shock on households – has on recipients' mental health. Using the PSM estimation approach, the ATT is assessed over time by analysing waves 2, 3 and 5 of NIDS-CRAM as separate cross sections. Since socio-economic issues cause depression, the study is compelled to ascertain whether receipt of the grant lowers depressive symptoms. The study is further motivated by literature that highlights the increase in poor mental health that is induced by a range of factors brought on by the pandemic. The results for waves 3 and 5 are statistically insignificant thereby creating difficulty in highlighting their implications. Wave 2's results indicate that receipt of the grant lowers the likelihood of displaying depressive symptoms and the result is significant. This positive impact obliges the study to suggest that the government should consider making the policy permanent.

Keywords: mental health, Covid-19 SRD grant, propensity score matching, unemployment, poverty

1 Introduction

The Covid-19 pandemic is a global disruption that has devastated livelihoods and living standards all over the world. The disruptions have taken place in an already struggling South African economy and the economic devastation has had ramifications on an array of socioeconomic factors. These include unemployment, poverty, poor service delivery, poor housing, and gender-based violence (Nguse & Wassenaar, 2021). Given the adverse effects that have been induced by the pandemic, many governments, including the South African government, have put together social protection measures to combat these effects (Köhler & Bhorat, 2021).

The South African government established a national social grant programme (well before the Covid-19 pandemic) to address its plight of poverty (Winchester et al., 2021). The Covid-19 Social Relief of Distress (SRD) grant is the first of its kind to assist the unemployed (Köhler & Bhorat, 2021). Unconditional cash transfers provide social protection and countries in sub-Saharan Africa have used these transfers to reduce poverty and improve households' ability to absorb financial shocks (Winchester et al., 2021). Moreover, they have a significant impact on individual livelihoods and household economies (Winchester et al., 2021). The efficacy of unconditional cash transfers – whether they reduce poverty, improve nutrition or lower labour force participation, for example – is studied widely. Recently for South Africa, Bhorat et al. (2021) assess how cash transfers offset the economic costs of Covid-19 lockdowns while Winchester et al. (2021) investigate how recipients manage limited incomes from unconditional cash transfers.

This study adds to the literature by assessing the effect of the SRD grant on recipients' mental health as proxied by depressive symptoms. It is inspired by literature which shows that poverty can lead to depression (Lund et al., 2011; Hjelm et al., 2017). Currently, the link between the SRD grant and depressive symptoms has not yet been investigated in the South African context. This is despite its relevance for understanding whether its objective of offsetting economic costs of the pandemic can inadvertently improve recipients' mental health.

South African studies by Oyenubi and Kollamparambil (2021) and Posel et al. (2021) show that there has been an increase in individuals who present with depressive symptoms since the

onset of the pandemic. It is also possible that, given South Africa's poverty plight (Meth, 2007), inequality of mental health has been intensified by the pandemic (Oyenubi et al., 2021). Therefore, it is of interest to examine whether the government's efforts to soften the effects of the pandemic on unemployed people by advancing the SRD grant has positively affected the mental health of recipients. The grant partly covers necessities therefore, its impact of reducing depressive symptoms is related to its ability to allow recipients to meet basic needs.

Considering the above, this study has two objectives. First, it assesses whether receipt of the SRD grant improves the mental health of recipients by examining the difference in depressive symptoms between individuals who received the grant and their observably identical counterparts who were eligible but did not apply for the grant. Second, it analyses whether the impact of the SRD grant on recipients' depressive symptoms has changed over time, that is, as lockdown regulations in South Africa evolved from being more stringent to less stringent. South Africa's lockdown is a five-level alert system, and each level is implemented based on the level of Covid-19 infections and whether health facilities are equipped to respond to the disease's burden (Government Gazette, 2020). This study focuses on alert level 3 (wave 2) and alert level 1 (waves 3 and 5). Alert level 1 is the most lenient because the spread of Covid-19 is low, and the healthcare system is not under pressure therefore, the restrictions are lenient (Government Gazette, 2020). Alert level 3 is when the spread of the virus and the pressure on the healthcare system are moderate but there are more restrictions than there are under alert level 1 (Government Gazette, 2020).

This study uses propensity score matching (PSM) techniques and data from three waves of the National Income Dynamics Study: Coronavirus Rapid Mobile Survey (NIDS-CRAM) for its analysis. Waves 2, 3 and 5 are under study - waves 1 and 4 are excluded due to missing information. Using PSM is relevant to examine the causal effect of the SRD grant on depressive symptoms during the Covid-19 pandemic. However, the study is cognisant of the shortfall of not being able to control for unobservable characteristics that affect the willingness to apply for the grant. This extends to a lack of information on respondents' mental health prior to application for the SRD grant. Results of this study should therefore be considered as being suggestive of the underlying causal effect under study. However, they give an indication on whether unconditional cash transfers are a useful policy action for handling current and future crises or are merely symbolic. In the short-run South African context, a finding that the SRD

grant reduced the beneficiaries' depressive symptoms would imply a need for the government to consider making this transfer payment permanent.

The rest of the study is structured as follows. Section 2 provides background to the study by detailing how unemployment and mental health has worsened in South Africa during different Covid-19 lockdown levels. Section 3 provides a review of literature that motivates the present study. Section 4 discusses the methodology and data used for this study. Section 5 presents an analysis of results while section 6 provides a discussion and concludes this study.

2 Background to this study

The Covid-19 global pandemic has had varying effects on all South Africans. The negative effects of the pandemic and its lockdowns on labour markets have been associated with losses in livelihoods that disproportionately affect vulnerable groups, and this has worsened poverty (Köhler & Bhorat, 2020). Apart from losses of livelihood, Covid-19 and its containment measures have been associated with a deterioration of mental health and depressive symptoms (Oyenubi & Kollamparambil, 2020). This is associated with additional stressors (like hygiene protocols, social distancing, food insecurity and unemployment) brought on by the pandemic on vulnerable individuals (Galea et al., 2020).

Given the adverse effects that have been induced by the pandemic, many countries have put together social protection measures (Köhler & Bhorat, 2020). South Africa is among many countries that expanded its social assistance. An unconditional cash transfer, the Covid-19 SRD grant of R350, was initially gazetted to be paid to recipients from May 2020 to October 2020 (Köhler & Bhorat, 2020). Recipients' eligibility is based on residency and refugee status; they have to be above 18 and below 60 years, unemployed and not receiving any income, unemployment benefit, stipend for studying or social grant; and not a recipient of any other support from the government for Covid-19, or a resident in a government funded institution (South African Government, 2021). Additionally, individuals must apply for the grant and only successful applicants participate in the programme. The government reinstated the programme in July 2021 (following domestic unrest in the country) and extended it to April 2022 (Wentzel, 2021). In February 2022, South Africa's president announced that the programme will be extended to March 2023 to protect over 10-million unemployed people who are most vulnerable to the impact of the pandemic (Nkanjeni, 2022).

South Africa's unemployment rate is concerningly high (Mbekeni & Phiri, 2019), poverty is rampant (Cheru, 2001; Meth, 2007) and inequality is extreme (Nattrass & Seekings, 2001). The situation has been worsened by the Covid-19 pandemic. In March 2020, after the first cases of the virus had been reported in the country, a state of national disaster was declared (Köhler & Bhorat, 2020). This saw strict regulations and containment measures, in the form of a national lockdown, imposed by the government (Köhler & Bhorat, 2020). The government then implemented a five-level[1], risk adjusted, reopening of the economy in May 2020 (Köhler & Bhorat, 2020). The initial (alert level 5) national lockdown devastated the economy and the labour market (Duval et al., 2021). Between the first and the second quarter (under alert levels 5, 4, and 3) of 2020, employment and labour force participation fell by 3 percentage points and 13 percentage points, respectively (Duval et al., 2021). When lockdown regulations were eased in the third quarter (under alert levels 2 and 1), employment was 4 percentage points lower than the pre-pandemic levels and the official unemployment rate was 31.3% (Duval et al., 2021). The high unemployment rate further increased to 34.4% during the second quarter (under alert levels 1, 2, and 3) of 2021 (Duval et al., 2021).

Loss of employment has been cited as a contributor to elevated depressive symptoms (Posel et al., 2021). An exogenous shock to unemployment, like COVID-19 related job losses, affects the mental health of South Africans (Posel et al., 2021). Literature indicates that during the (alert level 3) Covid-19 lockdown, higher depression scores were exhibited by adults who lost their jobs and those who retained their employment exhibited lower depression scores (Posel et al., 2021). This association is attributable to the notion that losing a job will negatively impact individual and household economic security (Posel et al., 2021).

There is also evidence that South Africans' depressive symptoms have increased as containment measures became less stringent – when the country went from lockdown alert level 5 towards alert level 1 (Oyenubi & Kollamparambil, 2021). Particularly, as lockdown levels were reduced from alert level 3 to alert level 1, the danger of screening positive for

[1] South Africa's Covid-19 alert system has five levels. Alert level 1 is the lenient level indicating that the spread of the Covid-19 virus is low, and the readiness of the healthcare system is high. The most stringent level is alert level 5 which indicates that the level of Covid-19 infections is high and the healthcare system's readiness for this high spread is low. Alert level 2 and 3 are implemented when the spread of Covid-19 is moderate while alert level 4 is implemented when the spread is moderate to high. When the readiness of the healthcare system is moderate (low to moderate) alert level 3 (alert level 4) is implemented and alert level 2 implemented when the health system's readiness is high (Government Gazette, 2020).

depression increased due to social and economic factors (Oyenubi & Kollamparambil, 2021). In addition to job loss, the factors that increase the risk of experiencing a deterioration in mental health include loss of income and an increase in the probability of experiencing hunger (Oyenubi & Kollamparambil, 2021). These reports of deteriorating mental health corresponded with an increase in food inflation since the increase in the price of food reduced the purchasing power of households consequently conflating the impact of job loss and income loss on depressive symptoms (Oyenubi & Kollamparambil, 2021).

Various mental health disorders may arise because of South Africa's social, psychological, and public biological predispositions (Nguse & Wassenaar, 2021). Thus, a significant proportion of the country's population is afflicted by mental health disorders (Nguse & Wassenaar, 2021). The pandemic's detrimental influence on mental health has highlighted the weaknesses of South Africa's ailing mental health care system (Nguse & Wassenaar, 2021). The government's poor investment in mental health has been detrimental to those living with mental illnesses for many years (Nguse & Wassenaar, 2021). Statistics indicate that only 27% of people living with mental illness receive treatment (Nguse & Wassenaar, 2021). Moreover, only 50% of South African hospitals offering mental health services have psychologists and a measly 5% of the government's national health budget is allocated to mental health (Nguse & Wassenaar, 2021). These statistics indicate that the country is ill equipped for the rise of the Covid-19-induced deterioration of mental health. Thus, as intended, the SRD grant could have reduced triggers of distress for some recipients with impact on their depressive symptoms.

The incidence of depressive symptoms can be protected by social grants (Posel et al., 2021). Social grants have always been an integral part of poor South African households, and evidence suggests that in homes that received social grants (during the second wave of the pandemic) depression scores were lower (Posel et al., 2021). The consensus is that the amount of money received from social grants does not lift people above the poverty line, but it reduces hunger experienced in households (Posel et al., 2021). Thus, based on evidence from the study by Posel et al., (2021), it is plausible to assume that this could be the factor that improves mental health. This is because being able to meet some basic consumption needs is known to improve subjective well-being and mental health (McGuire et al., 2020).

3 A review of literature

3.1 Poverty and mental health

There are two theories that describe the observed relationship between poverty and depression: the social causation hypothesis and the social drift hypothesis (Lund & Cois, 2018). These hypotheses explain the direction of the relationship thereby explaining and providing a framework for this study. Social causation theory implies that the risk of mental illness is increased by conditions of poverty; while the social drift hypothesis claims that an individual might become impoverished if they have a mental illness (Lund & Cois, 2018). Therefore, social causation implies that poverty precedes depression while social drift implies that poor mental health leads to poverty; but the two theories are interlinked and tend to reinforce each other (Lund et al., 2010).

There is a positive relationship between poverty and poor mental health. Poverty is rampant in low- and middle-income countries and many studies examine its burden on mental health (Lund et al., 2010). A review of epidemiological studies by Lund et al. (2010) found that majority of community-based studies expressed a positive and significant relationship between various poverty measures and common mental disorders. Lund and Cois (2018) examine whether social causation and social drift are present in South Africa. They find evidence of the existence of both social causation and social drift, and they claim that they reinforce poverty and depressive cycles (Lund & Cois, 2018). The presence of social causation in South Africa is a problem because the high prevalence of poverty (Meth, 2007) may result in rising incidence of poor mental health. Moreover, social drift may worsen poverty. Since the Covid-19 pandemic imposed an exogenous shock on individuals' livelihoods irrespective of whether they became unemployed before or during the pandemic, this study is explained by the social causation theory.

3.2 Mental health during the Covid-19 era

The state of mental health during the Covid-19 era has been documented extensively. South African literature shows that mental health has worsened since the pandemic began. This is

because of the adverse effects on income and job security that are associated with the lockdown (Oyenubi & Kollamparambil, 2020). Oyenubi and Kollamparambil (2020) compare how likely it is for survey respondents to display depressive symptoms before and during the Covid-19 pandemic. Their results indicate that the incidence of poor psychological health has risen since the onset of the pandemic (Oyenubi & Kollamparambil, 2020).

In addition, Posel et al. (2021) assess how loss of employment affects mental health using ordered logit models (Posel et al., 2021). They find that the economic fallout triggered by the pandemic and consequent containment measures resulted in a loss of employment and these newly unemployed individuals experienced an impairment in their mental health (Posel et al., 2021). Additionally, retaining a job meant that an individual would have lower depression scores (Posel et al., 2021). Results indicate that living with a chronic illness and being from an urban area increased one's vulnerability to depression (Posel et al., 2021). Moreover, the African demographic exhibited lower depression scores than other South African demographics (Posel et al., 2021). The authors argue that this may be because Africans have acquired resilience to adversity because they have always experienced high levels of poverty and unemployment (Posel et al., 2021).

South Africa is not alone in experiencing a decline in mental health and an increase in individuals who display depressive symptoms in the Covid-19 era. The pandemic is documented as negatively impacting mental health all over the world. Adams-Prassl et al. (2020) assess how Covid-19 containment measures have impacted the mental health of Americans. The study found that the pandemic created inequality in mental health among men and women (Adams-Prassl et al., 2020). Moreover, following the emergence of economic and social restrictions due to the pandemic, Kalil et al. (2020) survey the effects on low-income families in Chicago. They find that income loss is strongly associated with the depressive symptoms experienced by parents (Kalil et al., 2020). They argue that this relationship exists because job loss and lower income results in the perception that they will not be able to make ends meet (Kalil et al., 2020).

Other global studies on the impact of Covid-19 on mental health include those by Davillas and Jones (2021) and Lindley and Rienzo (2021) for the United Kingdom; and Oducado et al. (2021) for the Philippines. The socioeconomic inequality in deteriorating psychological well-being during the first wave of the Covid-19 pandemic is examined by Davillas and Jones

(2021). The authors find that mental health worsened during the peak. Lindley and Rienzo (2021) study how individual mental health was impacted by repeated Covid-19 lockdowns. Findings indicate that women reported higher levels of anxiety and depression when compared to men. Moreover, mental health was worsened by financial difficulties (Lindley & Rienzo, 2021). Oducado et al. (2021) assess graduate students' resilience to stress, anxiety, and fear considering the pandemic. Findings indicate that reports of stress, fear and anxiety were moderate to high and attributable to uncertainty and health related fears (Oducado et al., 2021).

3.3 Mental health and cash transfers

The relationship between mental health and financial security is negative in South Africa (Oyenubi & Kollamparambil, 2021; Posel et al., 2021). Individuals with high economic resource endowments have consumption opportunities that increase their quality of life which may improve mental health and this relationship is very robust for developing countries (Handa et al., 2014). This means that impoverished people's quality of life can be improved by allowing them to satisfy their basic needs and public policy plays an important role in achieving this (Handa et al., 2014). This notion is supported by studies that indicate that cash transfers can significantly improve incidence of household poverty, child poverty and health, the level of education attained and labour market participation (Adato & Bassett, 2009; Eyal & Burns, 2018; Köhler & Bhorat, 2021). Other studies find that cash transfers are important for improving maternal depressive symptoms (Ozer et al., 2011); and for the welfare of adolescent girls by delaying pregnancy and marriage (Baird et al., 2014).

Individual income and well-being are positively related (Stevenson & Wolfers, 2013) particularly when income is low (McGuire et al., 2020). Generally, there is a shortage of literature that investigates the causal relationship between income (through receipt of cash transfers) and mental health (McGuire et al., 2020). Nevertheless, there is growing interest on this causal relationship in low- and middle-income countries. Studies by McGuire et al. (2020), Ozer et al. (2011), Garman et al. (2022), and Eyal and Burns (2018) are among the few that examine this relationship in those countries.

McGuire et al. (2020) assess the causal relationship between cash transfers and psychological health in low- and middle-income countries. The authors employ a systematic review and meta-

analysis of randomised controlled trials and quasi-experimental studies to examine this relationship. Their findings show that cash transfers are significant and have a lasting impact on mental health, and the authors argue that the transfers may be the most efficient way of improving lives (McGuire et al., 2020). Ozer et al. (2011) assesses whether maternal depressive symptoms are alleviated by an antipoverty (conditional cash transfer) programme in Mexico. They use ordinary least squares regressions to assess the treatments' effect and find that the treated groups' depressive symptoms are lower (by 10%) than those of the untreated (Ozer et al., 2011). They argue that the programme had modest yet clinically significant effects on maternal depressive symptoms even though the antipoverty programme did not directly target maternal mental health (Ozer et al., 2011). The programme also had consequential benefits on the treated groups' children's development, nutrition, school attendance and physical growth (Ozer et al., 2011).

Furthermore, Garman et al., (2022) use an instrumental variable approach to evaluate how South Africa's child support grant (an unconditional cash transfer) impacts adolescents and young adults' risk of psychological distress. Their study indicates that the psychological health of adolescents and young adults is not improved by the receipt of the child support grant (Garman et al., 2022). As such, they argue that the mental health of young people will only be improved if social policies that are implemented address the large inequalities that cause youth poverty and disadvantages (Garman et al., 2022). Eyal and Burns (2018) estimate how depression is transmitted from one generation to another in South Africa and sub-Saharan Africa. Their results indicate that a third of children who have at least one parent that is living with depression will also have the condition (Eyal & Burns, 2018). Therefore, a parent's mental health will determine a child's mental health (Eyal & Burns, 2018). They also assess how intergenerational transmission of depression is affected by cash transfers (Eyal & Burns, 2018). As such, there is a 40% reduction in the intergenerational transmission of poor mental health among teenagers due to the receipt of a child support grant (Eyal & Burns, 2018).

3.4 Social protection programmes in times of crisis

Social protection in times of crisis is not unheard of. Braun and Ikeda (2020) study the impact of cash transfers in Japan during the pandemic. Japan issued cash transfers to address consumption inequality caused by a reduction in economic activity and the study assesses

whether their objective is achieved (Braun & Ikeda, 2020). Argentina implemented a social policy to respond to an economic crisis that took place in 2002. Galasso and Ravallion (2003) find that the programme protected targeted households from extreme poverty while Iturriza et al. (2008) assesses the effect of participation on exiting unemployment. These studies are examples of the kind of research that is conducted following the implementation of social protection programmes. Other studies address how proper implementation can be deterred by a lack of clearly defined objectives. Petit and Tedds (2021) address how failure to give a universal definition for the six-month temporary cash transfer during the Covid-19 pandemic in Canada led to lack of agreement on eligibility and confusion among beneficiaries. Social protection programmes are implemented to mitigate the impact of a shock on society. Therefore, it is extremely important that social protection measures do not disincentivise the desire to work, are targeted at those who are eligible and, are able to achieve a desired outcome. This study will be focusing on the latter by inferring that dampening the loss of income through a grant may positively impact the mental health of recipients. Moreover, it will contribute to the vast literature on the impact of the pandemic on mental health, and the impact of an unconditional cash transfer on recipients' mental health.

3.5 PSM as a useful method for examining causality of treatment effects

Analysis of the effect of the SRD grant on screening positive for depressive symptoms is possible through PSM. PSM is commonly used to estimate causal treatment effects and it is applicable in studies that have a treated group and an untreated one (Caliendo & Kopeinig, 2005). To meet methodological objectives, this study has consulted the handbook on impact evaluation by Khandker et al. (2010) for guidance on the steps to follow. Steps include estimating the propensity score, deciding on the matching algorithm that will establish a common support region and finally, assessing the matching quality.

4 Methodology and Data

4.1 Methodology

This study ascertains whether receipt of the Covid-19 SRD grant has a statistically significant impact of reducing the chances of screening positive for depressive symptoms among

recipients. Consequently, the study assesses the difference in depressive symptoms between individuals who received the grant and observably identical individuals who were eligible but did not apply. Eligibility of the grant is based on residency and refugee status; recipients had to be aged above 18 and below 60 years; they had to be unemployed and not receiving any income, unemployment benefit, stipend for studying or social grant; and not a recipient of any other support from the government for Covid-19, or a resident in a government funded institution (South African Government, 2021). Individuals had to apply for the grant and only successful applicants would participate in the programme. This study also questions whether the effect of the SRD grant on recipients' depressive symptoms changes over time as the lockdown regulations evolved from being more stringent to less stringent.

Using the Stata software program, the PSM estimation approach has been used to test for the causality of the treatment – the Covid-19 SRD grant. For matching studies, the evaluation problem of selection bias must be overcome (Caliendo & Kopeinig, 2005). The problem arises when the mean outcome of the control group (not receiving the treatment) is approximated without a counterfactual (Caliendo & Kopeinig, 2005). Thus, the selection problem is overcome by estimating a counterfactual. This is done by determining a group of untreated individuals whose pre-treatment characteristics are similar to those in the treatment group (Caliendo & Kopeinig, 2005). Consequently, variances in outcomes are solely attributable to the treatment (Caliendo & Kopeinig, 2005).

There are two major assumptions for PSM. The first is the conditional independence assumption which requires the outcome to be unaffected by treatment assignment when observable covariates (which are unaffected by treatment) are considered (Caliendo & Kopeinig, 2005). Therefore, selection into the programme is solely due to observable characteristics (Caliendo & Kopeinig, 2005). Unfortunately, this means that there can be no selection on unobservable factors. This is a problem because matching on observed characteristics limits the study since it cannot control for the unobservable characteristics that may explain non-participation consequently creating bias in the study (Khandker et al., 2010). The assumption of conditional independence is strong, but the datasets used for this study meet the burden. This study used the variables available in the datasets to create a control and treatment group that meet the eligibility conditions of the SRD grant. The second assumption that underpins PSM is the common support. A common support requires a large enough overlap in propensity scores for the treated and untreated groups (Khandker et al., 2010). Therefore,

the common support condition ensures that treated observations have control observations that have similar propensity scores – meaning that the propensity scores of the untreated group are near those of the treated group in the propensity score distribution (Khandker et al., 2010). The average difference in outcomes (which gives the treatment effect) is found within the common support area.

4.2 Estimating the Propensity Score

To test the causality of the SRD grant on recipients' depressive symptoms, a control group that is like the treatment group when considering their observed characteristics is necessary (Rosenbaum & Rubin, 1983; Khandker et al., 2010). This is what is required for matching. For a given vector of observed covariates, the conditional probability of being assigned treatment is the propensity score (Rosenbaum & Rubin, 1983). Matching between members in the treatment group (SRD grant recipients) and control group (eligible but did not apply for the grant) is achieved through a propensity score (Caliendo & Kopeinig, 2005). Almost everyone receiving the SRD grant is matched with at least one member from the control group.

The control group is chosen based on equation **1** which illustrates the probability of participation and receiving the treatment, **T**, based on observable characteristics, $\boldsymbol{\gamma}$ (Khandker et al., 2010). Thus, the propensity score is given by:

$$\mathbf{P(\gamma) = Pr(T=1|\gamma)} \qquad \mathbf{(1)}$$

Where $\mathbf{P\gamma}$ is the probability of receiving the SRD grant which is estimated as a logistic model for a binary variable for whether an individual receives the grant or not. This captures adults who are aged 18 to 59 who applied for the SRD grant and received it at the time of the interview, and those who did not apply but qualify for the grant. Those who did not apply but qualify for the grant are unemployed individuals who did not receive any other grant or unemployment insurance benefit and have no other source of income. $\boldsymbol{\gamma}$ is the vector of explanatory variables defined in Table 4.1. Following literature and available data these are gender, age intervals, marital status, education level attained, race, location, food insecurity, household size and household income loss/not.

The choice of covariates is critical; and omitting variables can increase bias (Heckman et al., 1997). Covariates must be unaffected by participation to ensure that the potential outcome does not depend on assignment into treatment (Caliendo & Kopeinig, 2005). To ensure this, most of the variables chosen for this study such as age, gender, marital status, and geographic location are predetermined and of similar values as those from the first wave of NIDS-CRAM (before the introduction of the SRD grant). As such, none of the variables are in anticipation of participation. For this study, economic theory and previous research have informed the choice of covariates. The waves of data used in this study do not have information on past mental health that could potentially influence participation. This will possibly induce some hidden bias in the analysis[2]. Therefore, depending on the findings of the study, a bounds test can be necessary (Rosenbaum, 1992).

Hidden bias is assessed using the Rosenbaum bounds test which examines the strength of an unmeasured variable on the selection process (Becker & Caliendo, 2007). Therefore, the degree to which a significant association between observed variables being due to unobserved confounding is assessed (Becker & Caliendo, 2007). Sensitive results will prompt an assessment of the validity of the study's identifying assumption and require reconsidering its estimation strategies.

The outcome variable for this study is mental health as proxied by depressive symptoms. This study follows Oyenubi and Kollamparambil (2020) in its measure of depressive symptoms. These depressive symptoms provide an indication of the overall mental health of grant recipients and their observably identical counterparts. NIDS-CRAM captures the two-question version of the Patient Health Questionnaire (PHQ-2) and the cut-offs that ascertain whether an individual screens positive for depressive symptoms (Oyenubi & Kollamparambil, 2020). The PHQ-2 scores range from 0 to 6 and the recommended cut-off for analysis is PHQ-2≥3 (Oyenubi & Kollamparambil, 2020). This study uses the cut-off of PHQ-2≥ 3 for its main analysis and a cut-off of PHQ-2≥ 2 when testing for robustness of the main analysis. PHQ-2≥ 2 is used to test for robustness because the cut-off of 2 may be preferrable due to the low threshold which allows capturing more individuals with depressive symptoms (Oyenubi &

[2] However, lagged depression from wave 5 of NIDS data (pre-COVID) could have been used for wave 2, while the depression measure from wave 2 could have been used for wave 3, and that for wave 3 could have been used for wave 5 analysis. These lagged depression variables suggested for wave 3 and wave 5 did not satisfy the balancing property hence the study proceeded by excluding them from the analysis.

Kollamparambil, 2020). The outcome variable, which is an indicator for screening positive for depressive symptoms, has been generated based on existing literature and information from the following questions in NIDS-CRAM:

i. *Over the last 2 weeks, have you had little interest in doing things? 1. Not at all, 2. Several days, 3. More than half the days, 4. Nearly every day.*
ii. *Over the last 2 weeks, have you been feeling down, depressed, or hopeless? 1. Not at all, 2. Several days, 3. More than half the days, 4. Nearly every day.*

The above questions have been effectively used to elicit individuals' depression.

The treatment variable the main analysis uses is a dummy variable = 1 for individuals who applied for and received the grant and 0 if they did not apply, don't receive unemployment insurance or any grant for themselves. To check for robustness, the treatment variable includes those who applied and were approved for the grant but had not yet received the money. The choice for the main analysis follows literature which suggests that the positive effect of a cash transfer on mental health is based on the recipient actually receiving the money not the anticipation of receiving the money (McGuire, et al., 2020; Eyal & Burns, 2018).

Table 4.1: Variable definitions

Variable	Definition
Mental Health	Dummy variable = 1 if an individual screens positive for depressive symptoms (PHQ-2≥ 3), 0 otherwise.
	Dummy variable = 1 if an individual screens positive for depressive symptoms (PHQ-2≥ 2), 0 otherwise.
SRD Grant	Dummy variable = 1 if an individual applied for and receives the SRD grant, 0 if they did not apply but they are eligible for the grant following criteria described above.
	Dummy variable = 1 if an individual applied for and receives the SRD grant or applied for and was approved for the grant but has not yet received it, 0 if they did not apply but they are eligible for the grant following criteria described above.
Gender	Dummy variable = 1 if individual is male, 0 if female.
Age intervals	An individual's age in years. Age intervals include ages 20-24[3], 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, and 55-59.

[3] The age interval 20-24 years includes adults aged 18 and 19.

Race	Dummy variable = 1 if individual is Black, 0 if non-Black (White, Coloured, and Indian).
Marital status	Dummy variable = 1 if individual is married or cohabiting with partner, 0 otherwise.
Food insecurity	Dummy variable = 1 if anyone in the household has gone hungry due to a lack of food, 0 otherwise[4].
Household size intervals	Number of individuals in the household. The intervals include individuals in a household = 1, 2-4, 5-7, 8-11, and 12-25.
Household income loss/not	Dummy variable = 1 if household income increased or stayed the same and = 0 if household income decreased.
No matric	Dummy variable = 1 if individual's schooling is in the range grade 0 to 11.
Matric	Dummy variable = 1 if individual's schooling is grade 12.
Post-matric	Dummy variable = 1 if individual has successfully completed any tertiary qualifications.
Location	Dummy variable = 1 if urban resident, 0 if rural.

4.3 Estimation

The outcome for this study is the average treatment on the treated (ATT) and it is used to examine the mean difference in depressive symptoms between recipients of the SRD grant and their observably identical counterparts in the control group. The mathematical expression of the ATT used in this study is expressed in equation **2**:

$$\tau_{ATT} = E_{P(\gamma)|D=1}\left[E\left(Y_1|D=1, P(\gamma)\right) - E\left(Y_0|D=0, P(\gamma)\right)\right] \quad \textbf{(2)}$$

4.4 Matching Algorithms

There are several methods of matching treated individuals and untreated individuals. Nearest-neighbour, radius caliper, kernel and local linear, and stratification matching are used in this study to assess how sensitive the results are to the choice of algorithm. Nearest-neighbour matching bases its matching on the closest propensity score (Khandker et al., 2010). Radius caliper matching enforces a threshold on the propensity score distance consequently matching

[4] This, along with household size and household income loss/not, have been used as a measure of household socioeconomic status since some of the datasets at use do not present information on household income.

propensity scores within a given distance (Khandker et al., 2010). Kernel matching and local linear matching are nonparametric estimators that create a control group outcome (Khandker et al., 2010). Then, they make use of a weighted average of all individuals who are not receiving the treatment to create a control group match for each treated individual (Khandker et al., 2010). Stratification matching will divide the common support region – which allows for formulating inferences about causality – into intervals and calculate the impact of the programme within each interval (Khandker et al., 2010).

4.5 Balancing test

Following each matching method of the propensity score, a model and covariate balance test is conducted to assess the matching quality. This is because exact matching on propensity scores should balance observable covariates in the matched and unmatched groups (Rosenbaum & Rubin, 1985). Thus, the balancing test assesses whether there are differences in the covariate distribution after conditioning on the propensity score by comparing the situation before and after matching (Caliendo & Kopeinig, 2005). Differences indicate that matching on the propensity score has not been successful (Caliendo & Kopeinig, 2005). Metrics used for the balancing tests are discussed in the results section.

4.6 Data and descriptive statistics

Three waves of NIDS-CRAM data have been employed in this study. These are waves 2, 3 and 5 that are analysed as separate cross sections and results are compared to assess changes in the ATT over time. The NIDS-CRAM is a nationally representative survey whose sample is drawn from the fifth wave of the National Income Dynamics Study, and it was conducted via Computer Assisted Telephone Interviewing of adult South Africans (Köhler & Bhorat, 2021). It is a panel survey featuring a short questionnaire for South African households and it aims to ascertain the socioeconomic effects and the economic consequences of the pandemic on households (NIDS-CRAM, 2020). NIDS-CRAM is advantageous for this study because the survey's questions refer to a reference month thereby allowing an analysis linked to the country's lockdown levels. It also contains pivotal information that is useful for this study. The Southern Africa Labour and Development Research Unit collected the survey data which was sourced from the DataFirst resource unit of the University of Cape Town for this study.

The first wave was collected at the beginning of May 2020 and the fifth wave was collected almost a year later at the beginning of April 2021. The raw data for wave 1 shows that 7,073 individuals were successfully interviewed. Subsequent waves had fewer respondents – 5,676, 5,046, and 4,996 individuals were successfully interviewed in waves 2, 3, and 5, respectively. Section A of the appendix to this study displays the before matching descriptive statistics for waves 2, 3 and 5. Each table displays the mean (proportion), standard errors, and p-values for the treated, control and total sample across all waves. This study's analysis is restricted to recipients of the SRD grant and their observably identical counterparts in the control group. Consequently, the total samples (of treated and control groups) are 632, 808, and 639 for waves 2, 3, and 5, respectively. There are not a lot of beneficiaries of the SRD grant hence the significant decline in observations for each wave when compared to the raw sample. The total sample sizes for each wave correspond with those in the logit models used for matching. By analysing the p-values across all waves, most variables display a significant difference in the treated and control groups before matching. Therefore, matching is required to ensure that the analysis is restricted to the treated group and its observably identical counterparts in the control group through overlapping propensity scores. As a result, bias in the ATT is reduced because PSM minimises the bias that is created by unobservable confounding factors through matching.

The depressive symptoms of the treated and control groups are not equally distributed. Before matching, statistics show that 30% (23%) of the control (treated) group displays depressive symptoms in wave 2. For wave 3, the proportion of individuals who exhibit depressive symptoms increase to 31.58% and 24.38% for the control and treated groups, respectively. Moreover, wave 5 statistics indicate that 33.75% (29.17%) of the control (treated) group displays depressive symptoms. These statistics encourage an analysis on whether receipt of the SRD grant reduces the depressive symptoms of recipients.

5. Results and Discussion

5.1 Balancing Property and Common Support

Results for the balancing property (for all the waves under study) and select logit regressions are presented in section B of the appendix while complementary graphs for common support are in section C. The analysis of results focusses on ATT estimates from nearest neighbour, caliper radius, kernel, local linear and stratification matching. The ATT expresses the causal impact of the SRD grant on recipients' chances of screening positive for depressive symptoms.

It is reiterated that for each wave under study, there is a main analysis of the ATT and two robustness checks of the main result. The main analysis is based on the SRD grant variable (treatment) that is limited to those who applied for and received the grant and the depressive symptoms variable (outcome) with a cut-off of PHQ-2≥3. The first robustness check maintains the definition of the SRD grant variable in the main model but changes the depressive symptom cut-off to PHQ-2≥ 2. The second robustness check maintains the depressive symptom variable cut-off in the main model but broadens the SRD grant variable to capture everyone who applied for the grant and was successful regardless of whether they received the grant or not.

The balancing property requires that there be no statistically significant difference in the mean (proportion) of each covariate across the control and treated groups after matching. The t-statistic of each covariate, the p>chi2 of the joint model, the variance ratio, and the standardized difference in means are considered. If the t-statistic is less than the rule of thumb value of |2|, then there is insignificance. This condition holds for most of the covariates at the 5% level of significance. This is supported by the p>chi2 statistic which is greater than 10% implying that the matched models (for waves 2 and 5) satisfy the balancing property. The models further exhibit good balance due to the absolute standardized mean difference being ≤ 0.25, and the variance ratio is between 0.5 and 2 (Rubin, 2001). There are few instances where the p>chi2 is less than 10% for some age, race, and education variables for waves 3 and 5. Additionally, the model for wave 3 did not satisfy the balancing property. The common support graphs show that there is a reasonable degree of overlap in propensity scores of treated and control groups after matching. Therefore, the common support condition is satisfied. Since most of the models satisfy the covariate balancing and common support properties, proceeding with the analysis and interpretation of results is warranted.

5.2 Wave 2 Analysis

Table 5.1 displays the sample size of the treated, the ATT, the standard error, and the t-statistic for each matching algorithm. Wave 2 was collected during the most stringent lockdown under study, alert level 3. This means that at the time, Covid-19 infections were moderate, and pressure on the healthcare system was also moderate. Results from the main analysis indicate that for all matching estimators, the treated (control) group has a 17.4% (25.4% - 27.3%) chance of screening positive for depressive symptoms. The ATT is negative, and it ranges from

-9.8% to -7.9%. At the 5% level of significance, only 3 matching estimations - radius caliper, kernel, and stratification - produced statistically significant results. Therefore, there is evidence that receiving the grant reduced chances of screening positive for depressive symptoms by 8.9% (from radius caliper and kernel matching) and 9.2% (from stratification matching). For nearest neighbour and local linear matching, there is no significant statistical evidence (at the 5% level) that receiving an SRD grant had an impact of reducing the chances of screening positive for depressive symptoms among recipients.

Table 5.1: Comparison of ATT Results for Wave 2

Main Analysis: *SRD Grant received, depression score cut-off of* ≥ 3						
Matching Algorithm	**Sample Size of the treated**	**Treated**	**Control**	**ATT**	**SE**	**t-statistic**
Nearest Neighbour	258	0.174	0.254	-0.079	0.045	-1.770
Radius Caliper	258	0.174	0.264	-0.089	0.039	-2.280
Kernel	258	0.174	0.264	-0.089	0.039	-2.260
Local Linear	258	0.174	0.273	-0.098	0.055	-1.790
Stratification	258	-	-	-0.092	0.039	-2.364
Robustness 1: *SRD Grant received, depression score cut-off of* ≥ 2						
Nearest Neighbour	258	0.318	0.422	-0.105	0.052	-1.990
Radius Caliper	258	0.318	0.422	-0.105	0.045	-2.350
Kernel	258	0.318	0.431	-0.113	0.045	-2.510
Local Linear	258	0.318	0.438	-0.120	0.062	-1.930
Stratification	258	-	-	-0.104	0.044	-2.343
Robustness 2: *SRD Grant approved and either received/not, depression score cut-off of* ≥ 3						
Nearest Neighbour	377	0.204	0.261	-0.057	0.044	-1.310
Radius Caliper	377	0.204	0.272	-0.068	0.036	-1.910
Kernel	377	0.204	0.271	-0.067	0.036	-1.860
Local Linear	377	0.204	0.274	-0.070	0.052	-1.340
Stratification	377	-	-	-0.070	0.035	-1.982

** Stratification results for treated and control groups have not been produced.*

When considering SRD grant recipients and a more lenient indicator of depressive symptoms – a depression score cut-off of PHQ-2≥ 2 (robustness check 1) – the probability of displaying depressive symptoms is higher. Particularly, there is a 31.8% (42.2% - 43.8%) probability of screening positive for depressive symptoms if you are treated (not treated). The ATT is also negative, and it ranges from -12% to -10.4% which suggests that the treatment reduces depressive symptoms. The t-statistics show that the results are statistically significant at the 5% level, except for nearest neighbour and local linear matching thereby indicating the robustness of the main analysis. However, all results for the second robustness check are statistically insignificant.

5.3 Wave 3 Analysis

Table 5.2 shows results for wave 3 which was collected during the most lenient lockdown level – alert level 1. Unlike results for wave 2, they mostly indicate that the treated group is more likely to exhibit depressive symptoms when compared to the untreated group. In the main analysis, being in the treatment group (control group) is associated with a 24.4% (21.6% - 23.9%) probability of screening positive for depressive symptoms. The ATT ranges from 0.5% to 2.9% but is statistically insignificant at conventional levels. This finding is sustained by the two robustness checks. In the first check, the ATT ranges from 1.8% to 8.1% while it ranges from 0.7% to 4% in the second robustness check; in both cases, the ATT is statistically insignificant. These outcomes are surprising as intuition suggests that treatment should diminish the probability of screening positive for depressive symptoms.

Table 5.2: Comparison of ATT Results for Wave 3

Main Analysis: *SRD Grant received, depression score cut-off of* ≥ 3						
Matching Algorithm	**Sample Size of the treated**	**Treated**	**Control**	**ATT**	**SE**	**t-statistic**
Nearest Neighbour	495	0.244	0.234	0.010	0.055	0.180
Radius Caliper	495	0.244	0.239	0.005	0.046	0.120
Kernel	495	0.244	0.217	0.027	0.051	0.530
Local Linear	495	0.244	0.216	0.029	0.065	0.450
Stratification	509	-	-	0.019	0.040	0.473

Robustness 1: *SRD Grant received, depression score cut-off of* ≥ 2						
Nearest Neighbour	495	0.404	0.337	0.067	0.061	1.090
Radius Caliper	495	0.404	0.373	0.031	0.051	0.600
Kernel	495	0.404	0.336	0.068	0.055	1.230
Local Linear	495	0.404	0.325	0.080	0.069	1.140
Stratification	509	-	-	0.045	0.049	0.914
Robustness 2: *SRD Grant approved and either received/not, depression score cut-off of* ≥ 3						
Nearest Neighbour	511	0.254	0.219	0.035	0.054	0.660
Radius Caliper	511	0.254	0.241	0.013	0.046	0.290
Kernel	511	0.254	0.219	0.036	0.050	0.710
Local Linear	511	0.254	0.218	0.037	0.061	0.600
Stratification	525	-	-	0.031	0.042	0.731

* *Stratification results for treated and control groups have not been produced*

5.4 Wave 5 Analysis

Table 5.3 presents results for wave 5. Wave 5 was collected when the country was under the alert level 1 lockdown. The ATT in the main analysis ranges from -3.4% to 5.3% which is small and statistically insignificant. As such, there is no evidence that the SRD grant reduces depressive symptoms among recipients. The first check for robustness shows that (for all matching algorithms) the treated group has a 44.1% probability of screening positive for depressive symptoms compared to 32.1% to 49% for the control group. The ATT is positive, it ranges from 0.6% to 12%. However, it is statistically insignificant implying that receiving the grant does not reduce the probability of experiencing depressive symptoms. Results from the second robustness check also show that the ATT is statistically insignificant.

Table 5.3: Comparison of ATT Results for Wave 5

Main Analysis: *SRD Grant received, depression score cut-off of* ≥ 3						
Matching Algorithm	**Sample Size of the treated**	**Treated**	**Control**	**ATT**	**SE**	**t-statistic**
Nearest Neighbour	358	0.282	0.229	0.053	0.059	0.890
Radius Caliper	358	0.282	0.316	-0.034	0.048	-0.720

Kernel	358	0.282	0.295	-0.013	0.051	-0.240
Local Linear	358	0.282	0.288	-0.006	0.066	-0.090
Stratification	393	-	-	-0.032	0.055	-0.582
Robustness 1: *SRD Grant received, depression score cut-off of* ≥ 2						
Nearest Neighbour	358	0.441	0.321	0.120	0.064	1.880
Radius Caliper	358	0.441	0.431	0.010	0.051	0.200
Kernel	358	0.441	0.412	0.029	0.055	0.520
Local Linear	385	0.441	0.490	0.032	0.072	0.450
Stratification	393	-	-	0.006	0.059	0.109
Robustness 2: *SRD Grant approved and either received/not, depression score cut-off of* ≥ 3						
Nearest Neighbour	410	0.278	0.298	-0.020	0.056	-0.35
Radius Caliper	410	0.278	0.318	-0.040	0.047	-0.840
Kernel	410	0.278	0.294	-0.016	0.051	-0.310
Local Linear	410	0.278	0.278	0.000	0.063	-0.010
Stratification	443	-	-	0.012	0.039	0.317

* *Stratification results for treated and control groups have not been produced*

In summary, the results for the main analysis of wave 2 (lockdown alert level 3) differ from those for waves 3 and 5 (lockdown alert level 1) in different ways. The ATT for waves 2 and 5 indicates that receiving the SRD grant reduces depressive symptoms and the opposite is true for wave 3. Moreover, most of the results for the main analysis for wave 2 are statistically significant but this is not the case for waves 3 and 5. This study finds that under the alert level 3 lockdown, the treated group is less likely to display depressive symptoms. Therefore, during a stricter lockdown (alert level 3 compared to alert level 1) the SRD grant reduces the depressive symptoms experienced by recipients. However, under a more lenient lockdown, the effect is inconclusive because the ATT is positive for all the matching estimators for wave 3 and mostly negative for wave 5. Therefore, the study cannot ascertain the impact of the SRD grant during a more lenient lockdown level.

Since majority of the results are statistically insignificant, the study proceeded to investigate the effect of hidden bias in the results. There is no hidden bias for waves 2 and 3. Wave 5 exhibited sensitivity to a bias that equals the odds of exposure to the treatment, but it showed

insensitivity to a bias that would double or triple the odds. This result is robust across post estimations of the main analysis and its checks for robustness.

6. Conclusion and Discussion

This study investigates whether the Covid-19 SRD grant has a causal impact of reducing depressive symptoms among recipients using PSM and NIDS-CRAM data for waves 2, 3 and 5. The lockdown levels under study are alert level 3 and 1. Wave 2 was conducted during the most stringent lockdown that this study covers - alert level 3. The temporal analysis has been prompted by the finding in Oyenubi and Kollamparambil (2021) that depressive symptoms of South Africans increased as lockdown levels declined. Therefore, this study aimed to assess whether the SRD grant as a policy action to partly reduce some unemployed South Africans' economic hardships during the Covid-19 pandemic could have had an influence on their depressive symptoms. The results of the impact of the SRD grant on depressive symptoms of recipients are not statistically significant for waves 3 and 5. Some of the results for wave 2 are insignificant – the only significant results are the ATT for the radius caliper, kernel, and stratification matching. Given the statistical significance of these results, there is evidence that recipients of the SRD grant are less likely to display depressive symptoms (and poor mental health) than their observably identical counterparts who do not receive the grant. When considering the results across all waves, this study cannot conclusively conclude that the SRD grant reduced recipients' chances of screening positive for depressive symptoms.

Although (mostly) insignificant, the ATT results for waves 3 and 5 are odd (for the main analyses and robustness checks). According to theory and past literature (specifically, by McGuire et al., (2020)) treated individuals should have a lower probability of screening positive for depressive symptoms than the control group. This peculiarity requires further enquiry to ascertain why the recipient of a grant, who is receiving an income they might not otherwise have had, may be more likely to display depressive symptoms. For the time being, speculation points to the notion that R350 is not enough to meet basic needs required to alleviate depressive symptoms. This echoes the sentiments expressed in the study by Winchester et al. (2021) wherein respondents from Mpumalanga stated that they barely make ends meet even with the government's assistance. This is a problem.

This study has not proven that the SRD grant improves mental health for all waves under study. The SRD grant was not meant to improve the mental health of recipients. But it was designed to address poverty and improve households' ability to absorb financial shocks. Thus, by extension and in accordance with social causation theory, meeting basic consumption needs should have improved mental health. The results for wave 2 highlight that there is a possibility that a cash transfer has the capacity to improve recipients' mental health. The government should consider making this cash transfer permanent and explore increasing the amount. This will allow further study that can ascertain whether a cash transfer for the unemployed can significantly improve mental health over time. Such a study will contribute to discussions on how meeting basic consumption needs improves mental health in South Africa.

This study has had a few shortcomings. The first is that PSM inadequately accounts for unobservable characteristics that may influence participation or non-participation. Moreover, prior knowledge of respondents' mental health was unknown. This highlights that while PSM works to minimise bias in the estimation of treatment effects, it does not eliminate it completely. Consequently, results are adversely affected. This was exhibited in the insignificant results for most waves under study as well as the few variables and models that did not satisfy the balancing property. Second, the sample size of the control group for wave 2 was smaller than the sample size of the treated group. Khandker et al. (2010) state that good matching is facilitated through a larger sample of untreated members. Unfortunately, this was difficult to control for, but the study still had a large enough sample size of untreated members. Lastly, the study was unable to use household income quintiles because NIDS-CRAM did not capture this variable in all the waves that were studied. Therefore, the study could not capture this observable covariate thereby increasing the potential for bias in the study. Regardless, it managed to use food insecurity, household size intervals, and household income loss/not as proxies to combat this downside.

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8. Appendix

8.1 Appendix A: Summary Statistics Before Matching

A1: Wave 2

	Total Sample		Treatment Group		Control Group		P-value
	Mean/Prop	**SE**	**Mean/Prop**	**SE**	**Mean/Prop**	**SE**	
Mental Health	0.271	0.018	0.232	0.026	0.302	0.024	0.000
Male	0.439	0.020	0.567	0.031	0.336	0.024	1.000
Female	0.561	0.020	0.433	0.031	0.664	0.024	0.000
Urban	0.716	0.018	0.700	0.020	0.728	0.023	0.017
Married	0.394	0.019	0.349	0.030	0.430	0.026	0.698
Black	0.895	0.012	0.962	0.012	0.841	0.019	1.000
Ages 20-24[5]	0.244	0.017	0.276	0.028	0.219	0.021	0.999
Ages 25-29	0.129	0.013	0.154	0.022	0.109	0.016	0.864
Ages 30-34	0.149	0.014	0.111	0.020	0.180	0.020	0.040
Ages 35-39	0.157	0.014	0.153	0.022	0.160	0.019	0.141
Ages 40-44	0.091	0.011	0.089	0.018	0.092	0.015	0.086
Ages 45-49	0.081	0.011	0.072	0.016	0.088	0.015	0.076
Ages 50-54	0.055	0.009	0.054	0.014	0.056	0.012	0.770
Ages 55-59	0.094	0.012	0.091	0.018	0.096	0.015	0.601
Food Insecurity	0.234	0.017	0.292	0.028	0.187	0.020	0.728
Size 1[6]	0.069	0.101	0.091	0.018	0.047	0.011	0.977
Size 2 - 4	0.388	0.019	0.399	0.030	0.379	0.025	0.100
Size 5 - 7	0.348	0.019	0.282	0.028	0.401	0.025	0.592
Size 8 - 11	0.154	0.014	0.177	0.023	0.137	0.018	0.455
Size 12 - 25	0.040	0.008	0.046	0.013	0.036	0.010	0.668
Household income loss/not	0.823	0.015	0.834	0.023	0.814	0.020	0.468
No matric	0.505	0.020	0.536	0.031	0.480	0.026	0.909
Matric	0.307	0.018	0.302	0.029	0.311	0.024	0.491
Post matric	0.188	0.016	0.162	0.023	0.209	0.021	0.055
N	632		259		373		

A2: Wave 3

	Total Sample		Treatment Group		Control Group		P-value
	Mean/Prop	**SE**	**Mean/Prop**	**SE**	**Mean/Prop**	**SE**	
Mental Health	0.272	0.016	0.244	0.019	0.316	0.027	0.024
Male	0.424	0.017	0.546	0.022	0.232	0.024	1.000
Female	0.576	0.017	0.454	0.022	0.768	0.024	0.000
Urban	0.730	0.016	0.684	0.021	0.802	0.023	0.008
Married	0.370	0.017	0.299	0.020	0.481	0.029	0.000
Black	0.881	0.011	0.956	0.009	0.763	0.025	1.000

[5] Ages in years
[6] Household size intervals

Ages 20-24	0.266	0.016	0.363	0.021	0.113	0.018	1.000
Ages 25-29	0.187	0.014	0.157	0.016	0.233	0.024	0.170
Ages 30-34	0.113	0.011	0.098	0.013	0.137	0.020	0.036
Ages 35-39	0.104	0.011	0.090	0.013	0.126	0.019	0.011
Ages 40-44	0.105	0.011	0.094	0.013	0.121	0.019	0.001
Ages 45-49	0.078	0.009	0.062	0.012	0.102	0.018	0.000
Ages 50-54	0.062	0.008	0.048	0.010	0.083	0.016	0.516
Ages 55-59	0.086	0.010	0.086	0.012	0.084	0.016	0.945
Food Insecurity	0.264	0.016	0.280	0.020	0.239	0.025	0.232
Size 1	0.065	0.009	0.068	0.011	0.060	0.013	0.722
Size 2 - 4	0.384	0.017	0.397	0.022	0.363	0.028	0.258
Size 5 - 7	0.341	0.017	0.303	0.020	0.401	0.028	0.659
Size 8 - 11	0.160	0.013	0.189	0.017	0.113	0.018	0.494
Size 12 - 25	0.051	0.008	0.43	0.009	0.062	0.014	0.498
Household income loss/not	0.651	0.017	0.671	0.021	0.618	0.028	0.999
No matric	0.496	0.018	0.523	0.022	0.454	0.029	0.420
Matric	0.263	0.015	0.279	0.020	0.238	0.025	0.994
Post matric	0.241	0.015	0.198	0.018	0.308	0.027	0.007
N	808		509		299		

A3: Wave 5

	Total Sample		**Treatment Group**		**Control Group**		**P-value**
	Mean/Prop	**SE**	**Mean/Prop**	**SE**	**Mean/Prop**	**SE**	
Mental Health	0.309	0.018	0.292	0.023	0.337	0.030	0.112
Male	0.452	0.020	0.552	0.025	0.286	0.029	1.000
Female	0.548	0.020	0.448	0.025	0.714	0.029	0.000
Urban	0.767	0.017	0.735	0.022	0.819	0.025	0.027
Married	0.354	0.019	0.335	0.024	0.384	0.031	0.007
Black	1.232	0.024	1.177	0.027	1.323	0.046	0.000
Ages 20-24	0.043	0.008	0.068	0.013	0.002	0.003	1.000
Ages 25-29	0.230	0.017	0.268	0.022	0.168	0.024	1.000
Ages 30-34	0.167	0.015	0.132	0.017	0.223	0.027	0.034
Ages 35-39	0.133	0.013	0.136	0.017	0.127	0.021	0.124
Ages 40-44	0.1343	0.014	0.131	0.017	0.140	0.022	0.000
Ages 45-49	0.093	0.012	0.082	0.014	0.111	0.020	0.020
Ages 50-54	0.067	0.010	0.054	0.011	0.090	0.018	0.188
Ages 55-59	0.057	0.009	0.049	0.011	0.071	0.016	0.415
Food Insecurity	0.251	0.017	0.316	0.023	0.143	0.022	0.973
Size 1	0.096	0.117	0.079	0.014	0.124	0.021	0.723
Size 2 - 4	0.414	0.019	0.418	0.025	0.407	0.031	0.091
Size 5 - 7	0.327	0.019	0.334	0.024	0.315	0.030	0.890
Size 8 - 11	0.116	0.013	0.128	0.017	0.096	0.019	0.530
Size 12 - 25	0.047	0.008	0.040	0.010	0.058	0.015	0.319
Household income loss/not	0.858	0.014	0.853	0.018	0.867	0.022	0.810

No matric	0.500	0.020	0.550	0.025	0.419	0.032	0.879
Matric	0.248	0.017	0.246	0.022	0.252	0.028	0.826
Post matric	0.252	0.017	0.205	0.020	0.329	0.030	0.005
N	639		393		246		

8.2 Appendix B: Select Logit and Balance Tests

B1: Wave 2

Main Analysis

Logistic regression Number of obs = 632

LR chi2(19) = 97.63

Prob > chi2 = 0.000

Log likelihood = -378.91552 Pseudo R2 = 0.1141

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 25-29	-0.269	0.313	-0.860	0.391	-0.883	0.345
Ages 30-34	-1.127	0.291	-3.880	0.000	-1.696	-0.557
Ages 35-39	-0.913	0.318	-2.870	0.004	-1.535	-0.290
Ages 40-44	-0.981	0.353	-2.780	0.005	-1.672	-0.290
Ages 45-49	-1.056	0.363	-2.910	0.004	-1.768	-0.344
Ages 50-54	-0.478	0.442	-1.080	0.279	-1.343	0.387
Ages 55-59	-0.514	0.413	-1.240	0.213	-1.324	0.295
Gender						
Female	-1.149	0.189	-6.070	0.000	-1.520	-0.778
Race						
Black	1.822	0.470	3.880	0.000	0.901	2.742
Marital Status						
Married	0.403	0.205	1.960	0.050	0.001	0.805
Socioeconomic Status						
Food Insecurity	0.120	0.214	0.560	0.575	-0.300	0.540
Household size 2-4	-0.701	0.419	-1.670	0.095	-1.523	0.121
Household size 5-7	-0.484	0.421	-1.150	0.250	-1.309	0.341
Household size 8-11	-0.603	0.448	-1.350	0.178	-1.481	0.274
Household size 12-25	-0.436	0.533	-0.820	0.413	-1.480	0.608

Household income loss	-0.005	0.258	-0.020	0.984	-0.512	0.501
Education						
Matric	-0.063	0.220	-0.290	0.775	-0.495	0.369
Post-matric	-0.336	0.239	-1.400	0.160	-0.804	0.133
Location						
Urban	-0.326	0.190	-1.720	0.086	-0.698	0.046
Constant	-0.031	0.707	-0.040	0.965	-1.416	1.354

**Base categories for categorical variables: age interval 20 – 24, male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	t	p>t	V(C)
Ages 25-29	0.140	0.124	4.700	0.520	0.603	.
Ages 30-34	0.147	0.103	11.800	1.530	0.126	.
Ages 35-39	0.128	0.138	-2.800	-0.320	0.746	.
Ages 40-44	0.089	0.081	2.500	0.310	0.753	.
Ages 45-49	0.085	0.087	-0.600	-0.080	0.938	.
Ages 50-54	0.062	0.066	-1.700	-0.180	0.858	.
Ages 55-59	0.070	0.079	-3.900	-0.420	0.676	.
Female	0.500	0.533	-7.100	-0.750	0.455	.
Black	0.977	0.981	-1.600	-0.300	0.761	.
Married	0.380	0.401	-4.400	-0.500	0.620	.
Food Insecurity	0.244	0.198	11.000	1.270	0.204	.
Household size 2 - 4	0.322	0.339	-3.700	-0.420	0.674	.
Household size 5 - 7	0.364	0.378	-2.800	-0.320	0.750	.
Household size 8 - 11	0.182	0.159	6.000	0.700	0.483	.
Household size 12 - 25	0.062	0.058	1.700	0.180	0.853	.
Household income loss	0.860	0.828	9.500	1.030	0.303	.
Matric	0.279	0.250	6.500	0.750	0.455	.
Post matric	0.182	0.207	-6.200	-0.720	0.471	.
Urban	0.624	0.651	-5.700	-0.640	0.522	.

** if variance ratio outside [0.84; 1.19]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.012	8.31	0.983	5.0	4.4	25.4*	1.49	.

**if B>25%, R outside [0.5; 2]*

First check for robustness

Logistic regression

Number of obs = 632

LR chi2(19) = 97.63

Prob > chi2 = 0.000

Log likelihood = -378.91552

Pseudo R2 = 0.1141

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 25-29	-0.269	0.313	-0.860	0.391	-0.883	0.345
Ages 30-34	-1.127	0.291	-3.880	0.000	-1.696	-0.557
Ages 35-39	-0.913	0.318	-2.870	0.004	-1.535	-0.290
Ages 40-44	-0.981	0.353	-2.780	0.005	-1.672	-0.290
Ages 45-49	-1.056	0.363	-2.910	0.004	-1.768	-0.344
Ages 50-54	-0.478	0.442	-1.080	0.279	-1.343	0.387
Ages 55-59	-0.514	0.413	-1.240	0.213	-1.324	0.295
Gender						
Female	-1.149	0.189	-6.070	0.000	-1.520	-0.778
Race						
Black	1.822	0.470	3.880	0.000	0.901	2.742
Marital status						
Married	0.403	0.205	1.960	0.050	0.001	0.805
Socioeconomic Status						
Food Insecurity	0.120	0.214	0.560	0.575	-0.300	0.540
Household size 2-4	-0.701	0.419	-1.670	0.095	-1.523	0.121
Household size 5-7	-0.484	0.421	-1.150	0.250	-1.309	0.341
Household size 8-11	-0.603	0.448	-1.350	0.178	-1.481	0.274
Household size 12-45	-0.436	0.533	-0.820	0.413	-1.480	0.608
Household income loss	-0.005	0.258	-0.020	0.984	-0.512	0.501

Education						
Matric	-0.063	0.220	-0.290	0.775	-0.495	0.369
Post-matric	-0.336	0.239	-1.400	0.160	-0.804	0.133
Location						
Urban	-0.326	0.190	-1.720	0.086	-0.698	0.046
Constant	-0.031	0.707	-0.040	0.965	-1.416	1.354

**Base categories for categorical variables: age interval 20 – 24, male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	t	p>t	V(C)
Ages 25-29	0.140	0.124	4.700	0.520	0.603	.
Ages 30-34	0.147	0.103	11.800	1.530	0.126	.
Ages 35-39	0.128	0.138	-2.800	-0.320	0.746	.
Ages 40-44	0.089	0.081	2.500	0.310	0.753	.
Ages 45-49	0.085	0.087	-0.600	-0.080	0.938	.
Ages 50-54	0.062	0.066	-1.700	-0.180	0.858	.
Ages 55-59	0.070	0.079	-3.900	-0.420	0.676	.
Female	0.500	0.533	-7.100	-0.750	0.455	.
Black	0.977	0.981	-1.600	-0.300	0.761	.
Married	0.380	0.401	-4.400	-0.500	0.620	.
Food Insecurity	0.244	0.198	11.000	1.270	0.204	.
Household size 2 - 4	0.322	0.339	-3.700	-0.420	0.674	.
Household size 5 - 7	0.364	0.378	-2.800	-0.320	0.750	.
Household size 8 - 11	0.182	0.159	6.000	0.700	0.483	.
Household size 12 - 25	0.062	0.058	1.700	0.180	0.853	.
Household income loss	0.860	0.828	9.500	1.030	0.303	.
Matric	0.279	0.250	6.500	0.750	0.455	.
Post matric	0.182	0.207	-6.200	-0.720	0.471	.
Urban	0.624	0.651	-5.700	-0.640	0.522	.

** if variance ratio outside [0.84; 1.19]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.012	8.31	0.983	5.0	4.4	25.4*	1.49	.

**if B>25%, R outside [0.5; 2]*

Second robustness check

Logistic regression

Number of obs = 751

LR chi2(19) = 88.85

Prob > chi2 = 0.000

Log likelihood = -476.11211

Pseudo R2 = 0.0853

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 25-29	-0.289	0.280	-1.030	0.302	-0.838	0.260
Ages 30-34	-1.117	0.261	-4.270	0.000	-1.629	-0.605
Ages 35-39	-0.937	0.284	-3.300	0.001	-1.493	-0.381
Ages 40-44	-0.870	0.309	-2.810	0.005	-1.475	-0.264
Ages 45-49	-0.785	0.311	-2.520	0.012	-1.395	-0.175
Ages 50-54	-0.255	0.389	-0.660	0.511	-1.017	0.507
Ages 55-59	-0.589	0.370	-1.590	0.111	-1.313	0.136
Gender						
Female	-1.046	0.170	-6.150	0.000	-1.380	-0.713
Race						
Black	0.874	0.309	2.830	0.005	0.269	1.480
Marital Status						
Married	0.311	0.181	1.720	0.086	-0.044	0.666
Socioeconomic Status						
Food Insecurity	0.192	0.190	1.010	0.314	-0.181	0.565
Household size 2-4	-0.299	0.393	-0.760	0.447	-1.069	0.471
Household size 4-7	-0.228	0.395	-0.580	0.564	-1.001	0.546
Household size 8-11	-0.241	0.417	-0.580	0.563	-1.059	0.576
Household size 12-25	-0.138	0.492	-0.280	0.778	-1.103	0.826

Household income loss	-0.314	0.221	-1.420	0.155	-0.746	0.119
Education						
Matric	-0.074	0.194	-0.380	0.703	-0.455	0.307
Post-matric	-0.168	0.208	-0.810	0.419	-0.577	0.240
Location						
Urban	-0.390	0.170	-2.290	0.022	-0.723	-0.057
Constant	1.140	0.583	1.960	0.051	-0.003	2.283

**Base categories for categorical variables: age interval 20 – 24, male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	t	p>t	V(C)
Ages 25-29	0.141	0.141	0.000	0.000	1.000	.
Ages 30-34	0.135	0.114	5.700	0.880	0.378	.
Ages 35-39	0.122	0.097	7.300	1.110	0.268	.
Ages 40-44	0.093	0.094	-0.400	-0.060	0.950	.
Ages 45-49	0.103	0.113	-2.900	-0.410	0.682	.
Ages 50-54	0.066	0.052	6.300	0.850	0.396	.
Ages 55-59	0.064	0.068	-1.600	-0.220	0.826	.
Female	0.530	0.562	-6.800	-0.880	0.381	.
Black	0.950	0.944	1.900	0.320	0.746	.
Married	0.374	0.349	5.200	0.720	0.472	.
Food Insecurity	0.247	0.244	0.600	0.080	0.933	.
Household size 2 - 4	0.334	0.374	-8.300	-1.140	0.254	.
Household size 5 - 7	0.363	0.342	4.400	0.610	0.543	.
Household size 8 - 11	0.186	0.166	5.100	0.720	0.474	.
Household size 12 - 25	0.064	0.064	0.000	0.000	1.000	.
Household income loss	0.833	0.804	8.100	1.040	0.299	.
Matric	0.271	0.263	1.800	0.250	0.805	.
Post matric	0.207	0.229	-5.400	-0.750	0.454	.
Urban	0.618	0.614	0.800	0.110	0.911	.

** if variance ratio outside [0.82; 1.22]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.008	8.77	0.977	3.8	4.4	21.6	1.24	.

** if B>25%, R outside [0.5; 2]*

B2: Wave 3

Main Analysis

Logistic regression Number of obs = 808

LR chi2(19) = 224.00

Prob > chi2 = 0.000

Log likelihood = -420.45745 Pseudo R2 = 0.2103

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 25-29	-1.437	0.301	-4.770	0.000	-2.028	-0.846
Ages 30-34	-1.768	0.316	-5.600	0.000	-2.387	-1.150
Ages 35-39	-1.683	0.324	-5.190	0.000	-2.319	-1.047
Ages 40-44	-1.965	0.344	-5.700	0.000	-2.640	-1.290
Ages 45-49	-1.856	0.350	-5.300	0.000	-2.543	-1.170
Ages 50-54	-1.076	0.414	-2.600	0.009	-1.887	-0.264
Ages 55-59	-0.560	0.457	-1.230	0.221	-1.456	0.336
Gender						
Woman	-1.669	0.197	-8.460	0.000	-2.055	-1.282
Race						
Black	1.807	0.350	5.160	0.000	1.121	2.494
Marital Status						
Married	-0.142	0.189	-0.750	0.453	-0.512	0.229
Socioeconomic Status						
Food insecurity	-0.012	0.196	-0.060	0.951	-0.396	0.372
Household size 2-4	0.547	0.435	1.260	0.208	-0.305	1.398
Household size 5-7	0.642	0.438	1.460	0.143	-0.217	1.501
Household size 8-11	0.400	0.448	0.890	0.372	-0.478	1.278

Household size 12-25	0.282	0.525	0.540	0.592	-0.748	1.311
Household income loss	0.390	0.176	2.210	0.027	0.044	0.735
Education						
Matric	0.090	0.220	0.410	0.682	-0.341	0.521
Post matric	-0.257	0.224	-1.150	0.251	-0.695	0.182
Location						
urban	-0.394	0.185	-2.140	0.033	-0.756	-0.032
Constant	0.876	0.614	1.430	0.154	-0.328	2.079

**Base categories for categorical variables: age interval 20 – 24, male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	t	p>t	V(C)
Ages 25-29	0.149	0.150	0.000	0.000	0.998	.
Ages 30-34	0.125	0.181	-15.900	-2.440	0.015	.
Ages 35-39	0.105	0.094	3.400	0.590	0.555	.
Ages 40-44	0.081	0.085	-1.300	-0.240	0.810	.
Ages 45-49	0.077	0.091	-4.400	-0.800	0.426	.
Ages 50-54	0.063	0.077	-5.800	-0.860	0.391	.
Ages 55-59	0.065	0.054	5.000	0.720	0.470	.
Female	0.489	0.502	-2.900	-0.400	0.688	.
Black	0.966	0.928	13.400	2.660	0.008	.
Married	0.315	0.322	-1.400	-0.230	0.816	.
Food Insecurity	0.242	0.255	-3.000	-0.470	0.637	.
Household size 2 - 4	0.335	0.347	-2.500	-0.400	0.688	.
Household size 5 - 7	0.329	0.319	2.300	0.360	0.719	.
Household size 8 - 11	0.216	0.198	4.400	0.700	0.485	.
Household size 12 - 25	0.069	0.049	8.000	1.330	0.182	.
Household income loss	0.628	0.646	-3.600	-0.570	0.566	.
Matric	0.307	0.333	-5.800	-0.870	0.387	.
Post matric	0.194	0.220	-6.100	-0.990	0.321	.
Urban	0.638	0.646	-1.700	-0.260	0.793	.

** if variance ratio outside [0.84; 1.19]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.025	34.03	0.018	4.8	3.6	37.5*	1.35	.

** if B>25%, R outside [0.5; 2]*

First check for robustness

Logistic regression

Number of obs = 808

LR chi2(19) = 224.00

Prob > chi2 = 0.000

Log likelihood = -420.45745

Pseudo R2 = 0.2103

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 25-29	-1.437	0.301	-4.770	0.000	-2.028	-0.846
Ages 30-34	-1.768	0.316	-5.600	0.000	-2.387	-1.150
Ages 35-39	-1.683	0.324	-5.190	0.000	-2.319	-1.047
Ages 40-44	-1.965	0.344	-5.700	0.000	-2.640	-1.290
Ages 45-49	-1.856	0.350	-5.300	0.000	-2.543	-1.170
Ages 50-54	-1.076	0.414	-2.600	0.009	-1.887	-0.264
Ages 55-59	-0.560	0.457	-1.230	0.221	-1.456	0.336
Gender						
Woman	-1.669	0.197	-8.460	0.000	-2.055	-1.282
Race						
Black	1.807	0.350	5.160	0.000	1.121	2.494
Marital status						
Married	-0.142	0.189	-0.750	0.453	-0.512	0.229
Socioeconomic status						
Food insecurity	-0.012	0.196	-0.060	0.951	-0.396	0.372
Household size 2-4	0.547	0.435	1.260	0.208	-0.305	1.398
Household size 5-7	0.642	0.438	1.460	0.143	-0.217	1.501
Household size 8-11	0.400	0.448	0.890	0.372	-0.478	1.278
Household size 12-25	0.282	0.525	0.540	0.592	-0.748	1.311
Household income loss	0.390	0.176	2.210	0.027	0.044	0.735

Education						
Matric	0.090	0.220	0.410	0.682	-0.341	0.521
Post-matric	-0.257	0.224	-1.150	0.251	-0.695	0.182
Location						
Urban	-0.394	0.185	-2.140	0.033	-0.756	-0.032
Constant	0.876	0.614	1.430	0.154	-0.328	2.079

**Base categories for categorical variables: age interval 20 – 24, male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	t	p>t	V(C)
Ages 25-29	0.149	0.150	0.000	0.000	0.998	.
Ages 30-34	0.125	0.181	-15.900	-2.440	0.015	.
Ages 35-39	0.105	0.094	3.400	0.590	0.555	.
Ages 40-44	0.081	0.085	-1.300	-0.240	0.810	.
Ages 45-49	0.077	0.091	-4.400	-0.800	0.426	.
Ages 50-54	0.063	0.077	-5.800	-0.860	0.391	.
Ages 55-59	0.065	0.054	5.000	0.720	0.470	.
Female	0.489	0.502	-2.900	-0.400	0.688	.
Black	0.966	0.928	13.400	2.660	0.008	.
Married	0.315	0.322	-1.400	-0.230	0.816	.
Food Insecurity	0.242	0.255	-3.000	-0.470	0.637	.
Household size 2 - 4	0.335	0.347	-2.500	-0.400	0.688	.
Household size 5 - 7	0.329	0.319	2.300	0.360	0.719	.
Household size 8 - 11	0.216	0.198	4.400	0.700	0.485	.
Household size 12 - 25	0.069	0.049	8.000	1.330	0.182	.
Household income loss	0.628	0.646	-3.600	-0.570	0.566	.
Matric	0.307	0.333	-5.800	-0.870	0.387	.
Post matric	0.194	0.220	-6.100	-0.990	0.321	.
Urban	0.638	0.646	-1.700	-0.260	0.793	.

** if variance ratio outside [0.84; 1.19]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.025	34.03	0.018	4.8	3.6	37.5*	1.35	.

** if B>25%, R outside [0.5; 2]*

Second check for robustness

Logistic regression Number of obs = 824

LR chi2(19) = 222.25

Prob > chi2 = 0.000

Log likelihood = -428.63456 Pseudo R2 = 0.2059

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 25-29	-1.415	0.298	-4.740	0.000	-2.000	-0.830
Ages 30-34	-1.777	0.313	-5.670	0.000	-2.391	-1.162
Ages 35-39	-1.625	0.322	-5.050	0.000	-2.255	-0.995
Ages 40-44	-1.977	0.342	-5.780	0.000	-2.648	-1.307
Ages 45-49	-1.826	0.345	-5.290	0.000	-2.502	-1.150
Ages 50-54	-1.040	0.410	-2.540	0.011	-1.843	-0.237
Ages 55-59	-0.582	0.454	-1.280	0.200	-1.472	0.307
Gender						
Woman	-1.645	0.195	-8.430	0.000	-2.027	-1.262
Race						
Black	1.698	0.338	5.020	0.000	1.035	2.361
Marital Status						
Married	-0.154	0.187	-0.820	0.410	-0.520	0.212
Socioeconomic Status						
Food insecurity	-0.009	0.193	-0.050	0.961	-0.388	0.370
Household size 2-4	0.357	0.433	0.820	0.410	-0.492	1.205
Household size 5-7	0.461	0.437	1.060	0.291	-0.395	1.318
Household size 8-11	0.218	0.447	0.490	0.626	-0.658	1.095
Household size 12-25	0.100	0.523	0.190	0.849	-0.925	1.124
Household income loss	0.376	0.174	2.160	0.031	0.035	0.718

Education						
Matric	0.074	0.219	0.340	0.736	-0.355	0.502
Post-matric	-0.249	0.223	-1.120	0.262	-0.686	0.187
Location						
Urban	-0.377	0.183	-2.060	0.039	-0.736	-0.019
Constant	1.159	0.598	1.940	0.053	-0.013	2.331

**Base categories for categorical variables: age interval 20 – 24, male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	T	p>t	V(C)
Ages 25-29	0.151	0.151	-0.100	-0.020	0.985	.
Ages 30-34	0.123	0.177	-15.400	-2.420	0.016	.
Ages 35-39	0.106	0.099	1.900	0.340	0.734	.
Ages 40-44	0.078	0.084	-1.900	-0.350	0.727	.
Ages 45-49	0.078	0.094	-4.900	-0.890	0.376	.
Ages 50-54	0.065	0.078	-5.500	-0.830	0.409	.
Ages 55-59	0.065	0.053	5.500	0.810	0.418	.
Female	0.489	0.499	-2.100	-0.300	0.766	.
Black	0.963	0.923	14.100	2.780	0.006	.
Married	0.315	0.320	-1.100	-0.180	0.854	.
Food Insecurity	0.247	0.257	-2.500	-0.400	0.691	.
Household size 2 - 4	0.335	0.341	-1.400	-0.220	0.828	.
Household size 5 - 7	0.329	0.317	2.500	0.400	0.690	.
Household size 8 - 11	0.213	0.194	4.700	0.760	0.448	.
Household size 12 - 25	0.070	0.048	8.800	1.500	0.135	.
Household income loss	0.628	0.648	-4.100	-0.660	0.506	.
Matric	0.307	0.325	-4.100	-0.620	0.534	.
Post matric	0.192	0.219	-6.400	-1.060	0.289	.
Urban	0.638	0.647	-2.000	-0.320	0.752	.

** if variance ratio outside [0.84; 1.19]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.026	37.40	0.007	4.7	4.1	38.8*	1.31	.

** if B>25%, R outside [0.5; 2]*

B3: Wave 5

Main Analysis

Logistic regression Number of obs = 639

LR chi2(20) = 153.86

Prob > chi2 = 0.000

Log likelihood = -348.93104 Pseudo R2 = 0.1806

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 20-24	-1.946	1.059	-1.840	0.066	-4.021	0.130
Ages 25-29	-3.310	1.055	-3.140	0.002	-5.379	-1.242
Ages 30-34	-3.257	1.057	-3.080	0.002	-5.330	-1.185
Ages 35-39	-3.751	1.061	-3.530	0.000	-5.831	-1.671
Ages 40-44	-3.491	1.071	-3.260	0.001	-5.590	-1.391
Ages 45-49	-3.194	1.077	-2.970	0.003	-5.306	-1.083
Ages 50-54	-2.769	1.085	-2.550	0.011	-4.895	-0.642
Ages 55-59	-2.448	1.103	-2.220	0.027	-4.610	-0.285
Gender						
Woman	-1.492	0.211	-7.070	0.000	-1.906	-1.078
Race						
Black	-0.581	0.216	-2.680	0.007	-1.005	-0.157
Marital Status						
Married	-0.044	0.210	-0.210	0.836	-0.455	0.368
Socioeconomic Status						
Food insecurity	0.360	0.219	1.640	0.101	-0.070	0.790
Household 2-4	0.107	0.399	0.270	0.789	-0.674	0.888
Household size 5-7	0.269	0.405	0.670	0.506	-0.524	1.063

Household size 8-11	0.065	0.430	0.150	0.880	-0.778	0.907
Household size 12-25	-0.505	0.529	-0.960	0.339	-1.542	0.531
Household income loss	0.278	0.259	1.080	0.282	-0.229	0.785
Education						
Matric	0.018	0.228	0.080	0.938	-0.429	0.465
Post-matric	-0.289	0.250	-1.160	0.247	-0.780	0.201
Location						
Urban	-0.330	0.205	-1.610	0.107	-0.731	0.071
Constant	4.953	1.157	4.280	0.000	2.685	7.220

**Base categories for categorical variables: male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	t	p>t	V(C)
Ages 20-24	0.279	0.341	-16.300	-1.780	0.076	.
Ages 25-29	0.142	0.142	0.000	0.000	1.000	.
Ages 30-34	0.142	0.112	8.700	1.230	0.218	.
Ages 35-39	0.109	0.087	6.300	1.010	0.315	.
Ages 40-44	0.095	0.103	-2.700	-0.370	0.708	.
Ages 45-49	0.081	0.092	-4.000	-0.530	0.596	.
Ages 50-54	0.075	0.074	0.500	0.070	0.943	.
Ages 55-59	0.061	0.046	6.800	0.910	0.363	.
Female	0.520	0.536	-3.700	-0.450	0.654	.
Black	1.084	1.080	0.800	0.150	0.881	0.990
Married	0.335	0.345	-2.000	-0.280	0.783	.
Food Insecurity	0.285	0.284	0.300	0.040	0.967	.
Household size 2 - 4	0.355	0.381	-5.500	-0.740	0.462	.
Household size 5 - 7	0.338	0.351	-2.700	-0.350	0.724	.
Household size 8 - 11	0.179	0.162	4.400	0.600	0.552	.
Household size 12 - 25	0.056	0.050	2.300	0.330	0.739	.
Household income loss	0.860	0.899	-11.200	-1.610	0.108	.
Matric	0.321	0.335	-3.100	-0.400	0.691	.
Post matric	0.179	0.243	-15.900	-2.110	0.035	.
Urban	0.679	0.739	-12.900	-1.770	0.077	.

** if variance ratio outside [0.81; 1.23]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.022	21.92	0.345	5.5	3.9	35.0*	1.41	0

** if B>25%, R outside [0.5; 2]*

First check for robustness

Logistic regression Number of obs = 689

LR chi2(20) = 166.47

Prob > chi2 = 0.000

Log likelihood = -365.78248 Pseudo R2 = 0.1854

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 20-24	-1.844	1.058	-1.740	0.081	-3.918	0.231
Ages 25-29	-3.213	1.054	-3.050	0.002	-5.279	-1.147
Ages 30-34	-3.234	1.057	-3.060	0.002	-5.306	-1.162
Ages 35-39	-3.699	1.060	-3.490	0.000	-5.777	-1.622
Ages 40-44	-3.467	1.070	-3.240	0.001	-5.565	-1.369
Ages 45-49	-3.091	1.075	-2.880	0.004	-5.197	-0.985
Ages 50-54	-2.692	1.083	-2.480	0.013	-4.815	-0.568
Ages 55-59	-2.280	1.099	-2.080	0.038	-4.434	-0.127
Gender						
Woman	-1.549	0.208	-7.450	0.000	-1.957	-1.141
Race						
Black	-0.579	0.209	-2.760	0.006	-0.990	-0.168
Marital status						
Married	-0.101	0.207	-0.490	0.625	-0.506	0.304
Socioeconomic Status						
Food insecurity	0.399	0.215	1.850	0.064	-0.024	0.821
Household size 2-4	0.148	0.389	0.380	0.703	-0.614	0.911
Household size 5-7	0.264	0.397	0.670	0.506	-0.514	1.042
Household size 8-11	-0.049	0.423	-0.120	0.907	-0.878	0.780

Household size 12-25	-0.540	0.516	-1.050	0.295	-1.552	0.472
Household income loss	0.286	0.253	1.130	0.259	-0.211	0.782
Education						
Matric	0.050	0.223	0.230	0.822	-0.387	0.488
Post-matric	-0.224	0.242	-0.920	0.355	-0.699	0.251
Location						
Urban	-0.370	0.200	-1.840	0.065	-0.762	0.023
Constant	5.044	1.150	4.390	0.000	2.789	7.298

**Base categories for categorical variables: male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	T	p>t	V(C)
Ages 20 -24	0.278	0.282	-1.000	-0.120	0.907	.
Ages 25-29	0.144	0.180	-10.000	-1.420	0.156	.
Ages 30-34	0.137	0.120	4.900	0.730	0.465	.
Ages 35-39	0.107	0.088	5.500	0.940	0.347	.
Ages 40-44	0.088	0.071	5.500	0.900	0.366	.
Ages 45-49	0.080	0.100	-7.000	-0.970	0.330	.
Ages 50-54	0.071	0.067	1.400	0.210	0.836	.
Ages 55-59	0.071	0.060	4.600	0.640	0.525	.
Female	0.515	0.515	0.000	0.000	1.000	.
Black	1.083	1.117	-6.800	-1.210	0.225	0.71*
Married	0.320	0.338	-3.900	-0.560	0.578	.
Food Insecurity	0.285	0.294	-2.000	-0.270	0.788	.
Household size 2 - 4	0.378	0.373	1.000	0.140	0.885	.
Household size 5 - 7	0.334	0.360	-5.400	-0.770	0.442	.
Household size 8 - 11	0.159	0.152	1.600	0.240	0.810	.
Household size 12 - 25	0.056	0.039	7.200	1.150	0.251	.
Household income loss	0.856	0.867	-3.100	-0.450	0.650	.
Matric	0.324	0.323	0.300	0.040	0.970	.
Post-matric	0.185	0.252	-16.500	-2.330	0.020	.
Urban	0.676	0.729	-11.500	-1.680	0.093	.

** if variance ratio outside [0.82; 1.21]*

Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.018	20.06	0.454	5.0	4.8	31.5*	1.05	100

** if B>25%, R outside [0.5; 2]*

Second check robustness

Logistic regression

Number of obs = 689

LR chi2(20) = 166.47

Prob > chi2 = 0.000

Log likelihood = -365.78248

Pseudo R2 = 0.1854

SRD Grant	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
Age Intervals						
Ages 20-24	-1.844	1.058	-1.740	0.081	-3.918	0.231
Ages 25-29	-3.213	1.054	-3.050	0.002	-5.279	-1.147
Ages 30-34	-3.234	1.057	-3.060	0.002	-5.306	-1.162
Ages 35-39	-3.699	1.060	-3.490	0.000	-5.777	-1.622
Ages 40-44	-3.467	1.070	-3.240	0.001	-5.565	-1.369
Ages 45-49	-3.091	1.075	-2.880	0.004	-5.197	-0.985
Ages 50-54	-2.692	1.083	-2.480	0.013	-4.815	-0.568
Ages 55-59	-2.280	1.099	-2.080	0.038	-4.434	-0.127
Gender						
Woman	-1.549	0.208	-7.450	0.000	-1.957	-1.141
Race						
Black	-0.579	0.209	-2.760	0.006	-0.990	-0.168
Marital Status						
Married	-0.101	0.207	-0.490	0.625	-0.506	0.304
Socioeconomic Status						
Food insecurity	0.399	0.215	1.850	0.064	-0.024	0.821
Household size 2-4	0.148	0.389	0.380	0.703	-0.614	0.911
Household size 5-7	0.264	0.397	0.670	0.506	-0.514	1.042
Household size 8-11	-0.049	0.423	-0.120	0.907	-0.878	0.780
Household size 12-25	-0.540	0.516	-1.050	0.295	-1.552	0.472

Household income loss	0.286	0.253	1.130	0.259	-0.211	0.782
Education						
Matric	0.050	0.223	0.230	0.822	-0.387	0.488
Post-matric	-0.224	0.242	-0.920	0.355	-0.699	0.251
Location						
Urban	-0.370	0.200	-1.840	0.065	-0.762	0.023
Constant	5.044	1.150	4.390	0.000	2.789	7.298

**Base categories for categorical variables: male, non-black, unmarried, no matric*

Balancing test results

Variable	Treated	Control	%bias	t	p>t	V(C)
Ages 20 -24	0.278	0.282	-1.000	-0.120	0.907	.
Ages 25-29	0.144	0.180	-10.000	-1.420	0.156	.
Ages 30-34	0.137	0.120	4.900	0.730	0.465	.
Ages 35-39	0.107	0.088	5.500	0.940	0.347	.
Ages 40-44	0.088	0.071	5.500	0.900	0.366	.
Ages 45-49	0.080	0.100	-7.000	-0.970	0.330	.
Ages 50-54	0.071	0.067	1.400	0.210	0.836	.
Ages 55-59	0.071	0.060	4.600	0.640	0.525	.
Female	0.515	0.515	0.000	0.000	1.000	.
Black	1.083	1.117	-6.800	-1.210	0.225	0.71*
married	0.320	0.338	-3.900	-0.560	0.578	.
Food Insecurity	0.285	0.294	-2.000	-0.270	0.788	.
household size 2 - 4	0.378	0.373	1.000	0.140	0.885	.
household size 5 - 7	0.334	0.360	-5.400	-0.770	0.442	.
household size 8 - 11	0.159	0.152	1.600	0.240	0.810	.
household size 12 - 25	0.056	0.039	7.200	1.150	0.251	.
household income loss	0.856	0.867	-3.100	-0.450	0.650	.
Matric	0.324	0.323	0.300	0.040	0.970	.
Post matric	0.185	0.252	-16.500	-2.330	0.020	.
Urban	0.676	0.729	-11.500	-1.680	0.093	.

** if variance ratio outside [0.82; 1.21]*

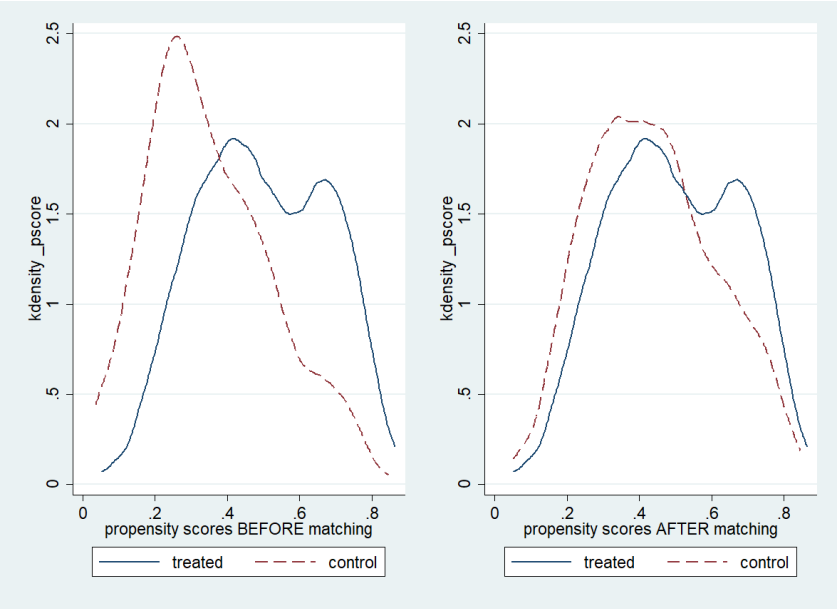
Ps R2	LR chi2	p>chi2	Mean Bias	Median Bias	B	R	%VAR
0.018	20.06	0.454	5.0	4.8	31.5*	1.05	100

** if B>25%, R outside [0.5; 2]*

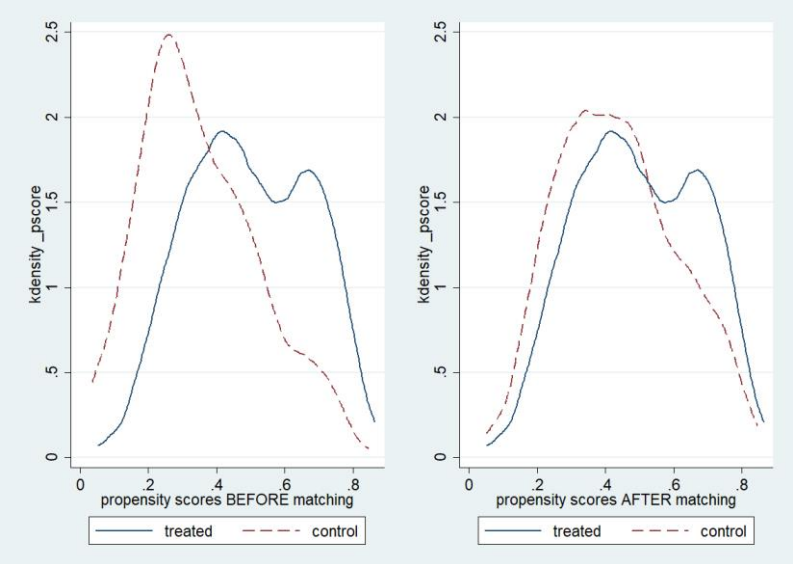
8.3 Appendix C: Common Support graphs

C1: Wave 2

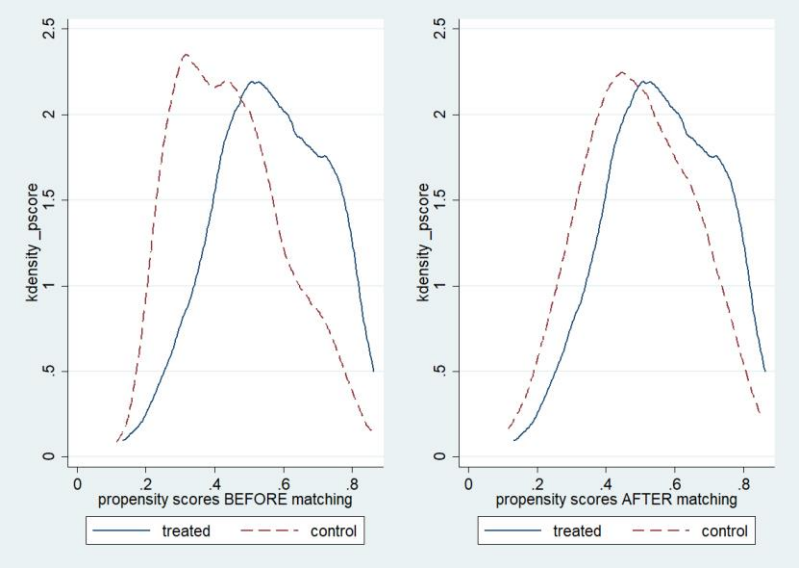
Main analysis



First check for robustness

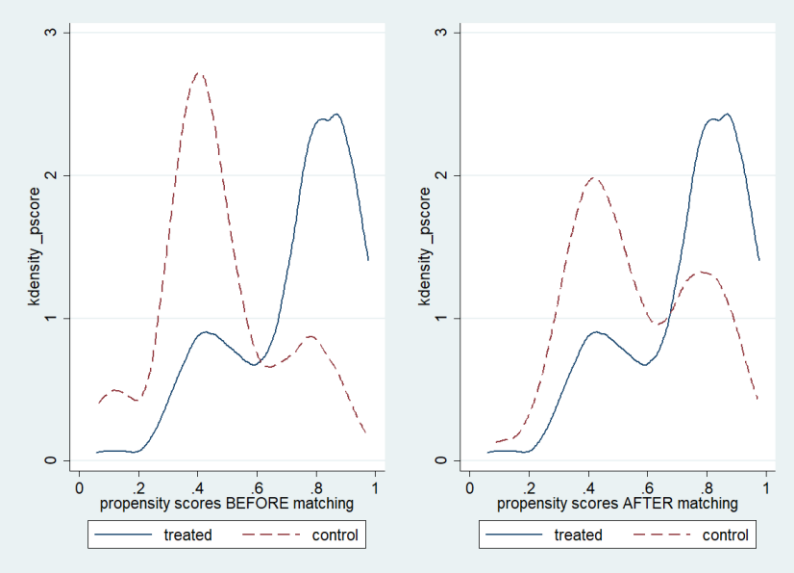


Second check for robustness

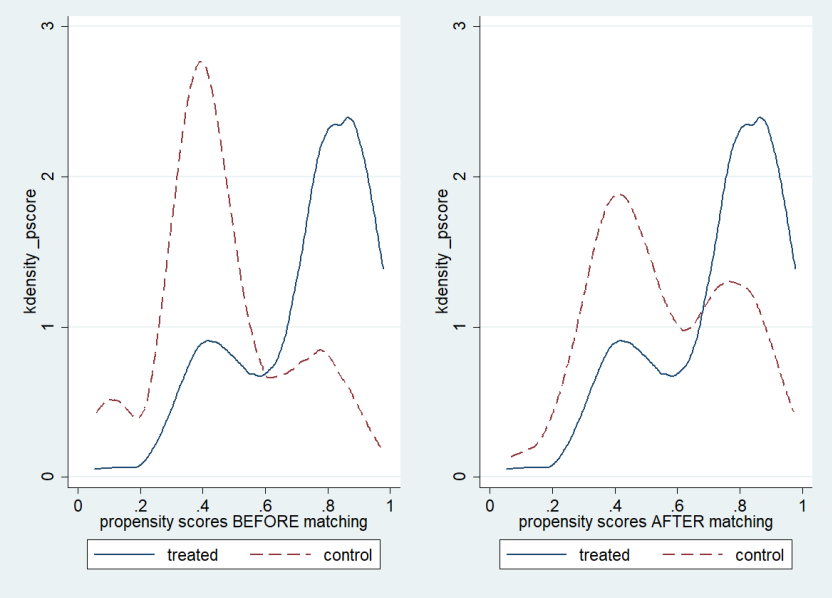


C2: Wave 3

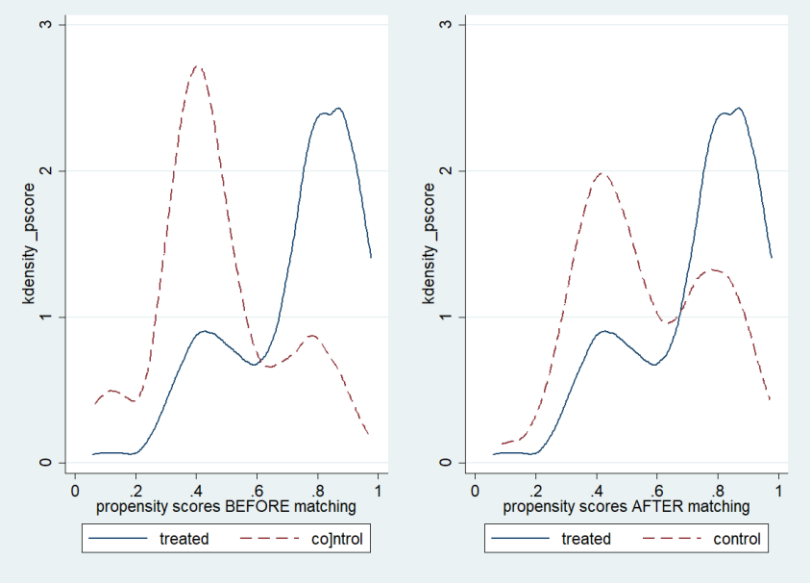
Main Analysis



First check for robustness

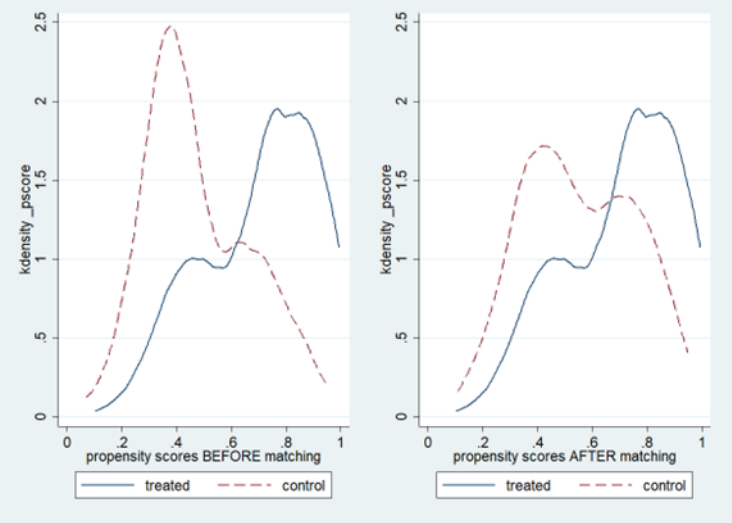


Second check for robustness

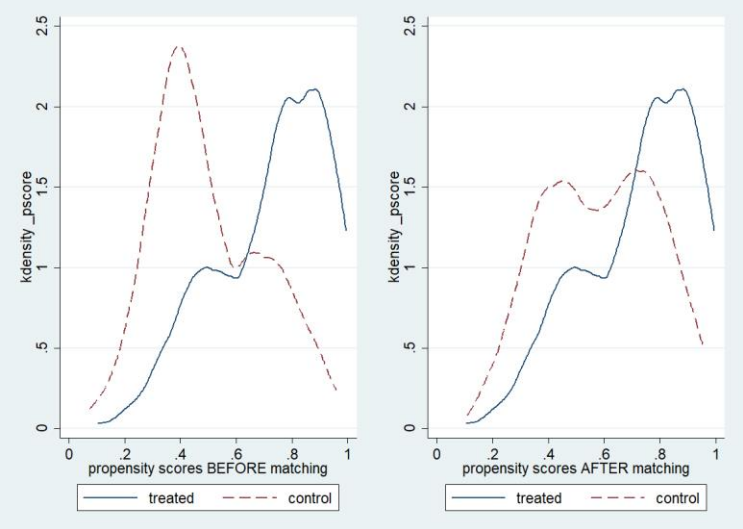


C3: Wave 5

Main Analysis



First check for robustness



Second check for robustness