Social Protection and Perinatal Depression: Evidence from South Africa*

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September 9, 2025

Abstract

We study the intra-household effects of South Africa's Older Person's Grant on the mental health of women who are pregnant or recently gave birth. We first document two stylized facts: First, depression risk declines with increased wealth and women show higher levels of depression risk than men across all wealth deciles. Second, among women, depression risk spikes during pregnancy and only slowly declines in the months after delivery. Next, leveraging the age-eligibility threshold of the Older Person's Grant, we show that the grant reduces risk of depression among co-resident women who are pregnant or recently gave birth. The magnitude of the effect is large enough to eliminate the increased risk of depression associated with pregnancy and childbirth observed in our data. These results demonstrate the possible spillover benefits of social protection programs already operating at scale especially in settings where diagnosing depression and targeting timely interventions can be challenging.

Keywords: Cash transfers, postpartum depression, mental health, South Africa
JEL Codes: I15, I38, J13

*We thank Travis Lybbert, Arman Rezaee, and the participants at the Applied Development Economics Conference (Lahore School of Economics, Pakistan), for their valuable feedback. We have no conflicts of interest to disclose. Data is available to download from the NIDS website; we will provide replication material online. All errors are our own.

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1 Introduction

Depression affects over 300 million adults globally (WHO, 2023), and is one of the largest contributors to disability-adjusted life years worldwide (WHO, 2013; IHME, 2019). Depression is more prevalent among women and over 17 percent of women globally experience postpartum depression—i.e., depression arising after giving birth (Piccinelli and Wilkinson, 2000; DeRubeis, Siegle and Hollon, 2008). Moreover, antenatal depression—i.e., depression arising among pregnant women—tends to be even more prevalent than postpartum depression (Woody et al., 2017; Gopalakrishnan, 2024). In South Africa, our data shows that nearly 28 percent of women report symptoms of perinatal depression—which we define as the onset of depression-like symptoms among women who are pregnant or have recently given birth.[1]

Depression is not inevitable nor irreversible, however. While existing research investigates how carefully targeted interventions can help alleviate postpartum depression (Baranov et al., 2020), there is limited evidence on if or how existing social protection programs, currently running at scale, affect perinatal depression. This is a critical gap in knowledge because depression is challenging to diagnose and timely interventions are difficult to implement and scale, especially in low and middle income countries. Thus, documenting the effect of large-scale social protection programs, that primarily exist to achieve other objectives, on perinatal depression could identify policies that help low-income new mothers especially in contexts where mental healthcare is limited.

In this paper we study how South Africa's Older Person's Grant program influences perinatal depression in inter-generational households. The Older Person's Grant is one of the most well-established social protection programs in the world. It is a means-tested unconditional pension program for recipients who are at least 60 years old. Grant recipients receive a relatively large monthly cash transfer that amounts to nearly twice the national income poverty line.[2] Although the grant is not targeted at pregnant women or new mothers, 25 percent of women who report a pregnancy or have recently given birth in our nationally representative data live with a recipient of the grant.

We estimate the effect of the grant by comparing rates of depression risk among pregnant women and women who recently gave birth living with older household members who are very close in age to the age-eligibility threshold of the Older Person's Grant—applying the local ran-

[1] We use the term "perinatal depression" to refer to the combination of both antenatal and postpartum depression (i.e., depression that occurs during pregnancy or shortly after birth). The term "perinatal" can refer to a very specific and narrow time window around the time of birth (i.e., beginning around the 20th week of pregnancy and ending around the 4th week after birth). Additionally, although terms with the "partum" suffix typically relate maternal health and terms with the "natal" suffix typically relate to child health, we follow recent literature (Woody et al., 2017; WHO, 2023; Gopalakrishnan, 2024), and the call for a "unifying term" (WHO and USAID, 2015), and use the term "perinatal" more generally to refer to the time before and after birth. When we take this definition to our data we define perinatal as including pregnancy though the sixth month after birth.

[2] In 2024, this amounts to 2,180 South African Rands per month.

domization variation of the regression discontinuity design (Cattaneo and Titiunik, 2022). Our core identifying assumption is that living with a member who is slightly older or slightly younger than 60 years old is unrelated to factors that determine depression risk among women who are pregnant or have recently given birth. This assumption implies that the only way having a household member who is just above 60 years old affects depression risk is, at least initially, through eligibility and receipt of the grant. We show balance between grant-eligible and grant-ineligible women and their households to support this assumption. Crucially, we find no differences in the probability of pregnancy, the probability of employment among mothers, or the age of children within households on either side of the age-eligibility threshold which helps us address concerns about endogenous selection into motherhood.

Our results show that the grant plays an important role in reducing perinatal depression in South Africa. We first show that, for households with women who are pregnant or had given birth within the last six months, grant receipt effectively raises household income per capita by 18 to 36 percent. We then find that relative to mothers living in similar households, pregnant women and women who recently gave birth are more likely to be at risk of depression. Specifically, depression risk increases by between 16 and 20 percentage points during the perinatal period. However, those who live with someone who is slightly older than 60 years old are between 12 and 17 percentage points less likely to be a risk of depression relative to similar women who are living with someone who is slightly younger than 60 years old. We conduct a series of robustness checks that include accounting for endogenous household formation, endogenous changes in fertility, the receipt of additional benefits targeting parents, and the death of a child. We also conduct several sensitivity checks that include varying postpartum duration and the threshold defining depression risk. Across each of these checks, we find that the results remain qualitatively similar. Taken together, our results show that the Older Person's Grant effectively eliminates the increased risk of depression associated with pregnancy and childbirth observed in our data.

Addressing perinatal depression is important for at least two main reasons. First, better mental and emotional health is an important end in itself but is often overlooked and left under-diagnosed and untreated, especially in low and middle income countries (WHO, 2013). Additionally, existing evidence points to possible long-term consequences of perinatal depression—see, e.g., reduced probability of employment (McGovern, Rokicki and Reichman, 2022) and increased probability of experiencing poverty (Rokicki et al., 2022). Moreover, treating postpartum depression with targeted psychotherapy reduces depression and improves women's financial empowerment up to seven years post-treatment (Baranov et al., 2020). Second, in many settings, mothers are a primary caregiver and compromised mental health can affect her parenting (Parsons et al., 2012; Dadi, Miller and Mwanri, 2020). Again, psychotherapy interventions for postpartum depression lead to increased parental investments in children and translate to higher levels of socio-emotional skills among children (Baranov et al., 2020; Sevim et al., 2024).

Our analysis in this paper is related to several papers that study the effect of cash transfers on mental health outcomes among women who recently gave birth (Ozer et al., 2011; Macours, Schady and Vakis, 2012; Powell-Jackson et al., 2016; Okeke, 2021). With the exception of Paxson and Schady (2010) these studies each find that conditional cash transfers reduce depressive symptoms among new mothers. Our study, however, is fundamentally different as we analyze a social protection program, already operating at scale, that effectively addresses the challenge of diagnosing depression risk and targeting timely intervention among pregnant women and new mothers. This is important for at least three reasons. First, because the Older Person's Grant primary aims to target older people and households in South Africa tend to be multi-generational, the financial assistance included in the grant can effectively reach pregnant women, not just women who recently gave birth. Critically, antenatal depression tends to be more prevalent than postnatal depression (Yin et al., 2021; Gopalakrishnan, 2024) and experiencing depression during pregnancy can contribute to a higher risk of depression after the birth of a child. Second, most existing studies evaluate a conditional cash transfer program with conditionalities that include attending pre-birth or post-birth visits at healthcare facilities. We study unconditional financial assistance and therefore our estimates do not conflate the financial assistance and the necessary conditional behavior. Third, most of the work in this literature evaluates temporary cash transfers.[3] By contrast, South Africa's Older Person's Grant provides recipient households with a sustained income source, leading to a more certain long-term shift in the household's budget constraint.

These findings contribute to at least three areas of active research. First, we contribute to the literature studying policies and interventions to reduce perinatal depression. Cognitive behavioral therapy is a popular intervention to address perinatal depression—along with other forms of depression, stress, and anxiety (Baranov et al., 2020). In addition to the cash transfer literature discussed above, research shows that maternal mental health also benefits from alternative forms of financial interventions, such as, for example, paid parental leave policies (Bilgrami, Sinha and Cutler, 2020; Heshmati, Honkaniemi and Juárez, 2023). We add to this literature by studying the effect of an existing and well-established social protection program which has primary objectives unrelated to maternal mental health. Our results combined with existing evidence showing positive effects on child health due to in utero exposure to the Older Person's Grant (Alloush and Riaz, 2024), point to the benefits of financial support for both children and parents, and the importance of the timely distribution of this support—specifically before the birth of a child. These results carry implications for existing policies, such as extending South Africa's Child Support Grant to pregnant women (Ohrnberger et al., 2020; Chilonda, 2022) or other large-scale social protection programs especially in settings where targeting psychotherapy programs at scale faces challeng-

[3] Both Powell-Jackson et al. (2016) and Okeke (2021) evaluate one-time cash transfer programs; Macours, Schady and Vakis (2012) study a pilot of a re-occurring cash transfer program that lasted just over one year, and Paxson and Schady (2010) study a re-occurring cash transfer program that ultimately phased out.

ing constraints.

Second, we add to the literature studying the effects of South Africa's Older Persons Grant (Case and Deaton, 1998; Duflo, 2000, 2003; Bertrand, Mullainathan and Miller, 2003; Edmonds, Mammen and Miller, 2004; Hamoudi and Thomas, 2014; Ambler, 2016; Abel, 2019; Alloush, Bloem and Malacarne, 2024). We document spillover effects benefiting non-recipient members of recipient households. These spillover effects are similar to those found by Duflo (2000, 2003) when analyzing child health outcomes within households receiving the Older Person's Grant.

Third, our research contributes to a growing literature documenting the link between economic and psychological well-being (Haushofer and Fehr, 2014; Haushofer, 2019; Alloush, 2024; Ridley et al., 2020). Our paper examines this link in a specific, and particularly vulnerable, subpopulation: pregnant women and women who recently gave birth. Our results highlight that the Older Person's Grant, which improves economic conditions in the household, reduces the risk of depression in a time when women are especially likely to experience depressive symptoms. We discuss several mechanisms through which our results could operate.

The remainder of this paper is organized as follows. In the next section, we briefly introduce the Older Person's Grant and describe the data we use for our analysis. In Section three, we discuss our estimation approach and document the necessary identification assumptions required for our analytical approach. Section four presents our main results; including the effect of grant receipt on household income and the effect of both grant eligibility and grant receipt on perinatal depression. Section five, reports robustness and sensitivity checks. In Section six, we discuss possible mechanisms by which the effects we estimate could operate. Finally, in section seven, we conclude.

2 Data and the Older Person's Grant

We use data from five rounds of the longitudinal National Income Dynamics Study (NIDS) fielded in 2008, 2010, 2012, 2014, and 2017. The survey is nationally representative with a sample of over 28,000 individuals in 7,300 households across South Africa.[4] These rich data include detailed information on poverty and well-being, household composition and structure, fertility and mortality, migration, labor market participation and economic activity, health outcomes, and education attainment. The NIDS includes four questionnaires: a household module, an adult module, a child module, and a proxy module. For our main outcome variable, we use the questions on mental health in the adult module asked of individuals 15 years of age and above.

[4]Normal levels of attrition occur, especially among wealthy households. The sample is refreshed to attempt to keep each wave nationally representative.

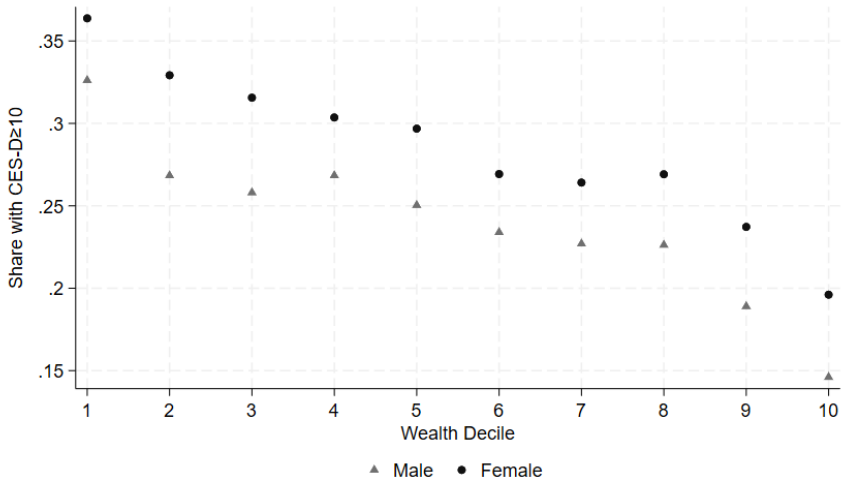


FIGURE 1: Depression Risk and Wealth by Gender—Proportion of those at risk of depression (i.e. those with the CESD-D score of ten and above) across wealth deciles for men and women show two clear patterns: Risk decreases with wealth and women consistently have a higher probability of a high CES-D score when compared to men.

2.1 Descriptive Statistics

The NIDS measures the mental health of an individual via the ten-item Center for Epidemiological Studies Depression (CES-D) scale. The questionnaire asks individuals to report if they felt or behaved a certain way in the past one week by indicating the frequency with which a feeling or behavior occurred. The frequency includes four response categories ranging from (i) rarely/none of the time, (ii) some/little of the time or occasionally, (iii) a moderate amount of time, or (iv) all of the time. The CES-D score is constructed by assigning each frequency a value from zero through three such that the sum total score of the ten questions is at most 30 and a higher score corresponds to more depressive symptoms. A threshold score of ten is typically used to screen for depression (Andresen et al., 1994), and several studies validating the use of the CES-D in South Africa suggest that threshold scores of ten through 12 are appropriate (Baron, Davies and Lund, 2017; Hamad et al., 2008; Johnes and Johnes, 2004; Myer et al., 2008).[5] To measure depression risk, we define our dependent variable as a binary variable taking the value one if the score equals or exceeds ten, and zero otherwise.[6]

In the NIDS data, pooled across all years, the average CES-D score is 6.99 with a standard deviation of 4.53, and 26.69 percent are at risk of depression with a CES-D score of ten or higher. Depressive symptoms have declined over time with the average CES-D score starting at 8.06 in wave one in 2008 and falling to 6.54 in wave five in 2017, and the proportion of the sample at risk

[5]The specific questions used to measure depressive symptoms in the NIDS data are displayed in Table A.1 in the Supplemental Appendix.

[6]The use of a binary dependent variable allows us to avoid challenges relating to the point identification of estimated effects with an ordinal dependent variable (Bloem and Oswald, 2021). We check the robustness of our results to other common cut-offs such as 11 and 12.

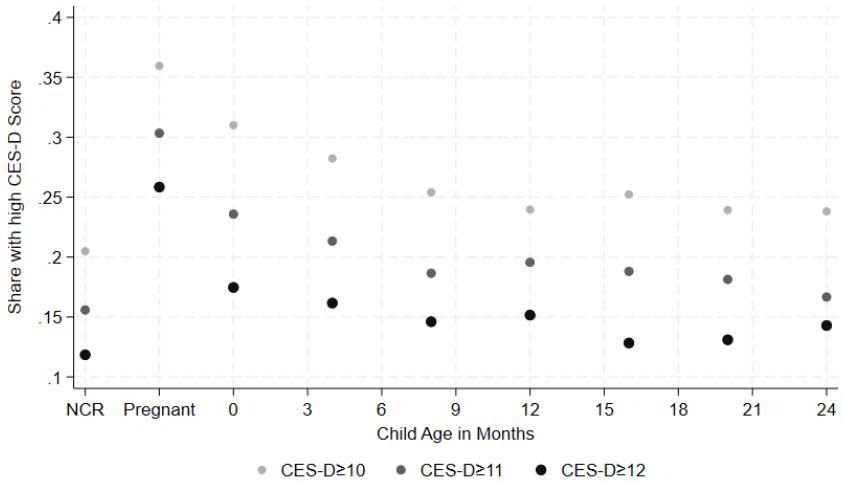


FIGURE 2: Mothers' Depression Risk Relative to their Child's Birth—Depressive symptoms spike during pregnancy and decline slowly after the birth of their child. "NCR" is not currently pregnant or gave birth recently (although still a mother).

of depression has decreased by about ten percentage points between 2008 and 2017. In Figure 1, we show how the share of individuals with CES-D scores above ten differs by wealth decile. We see a clear decline with wealth for both men and women. The share of individuals with a CES-D score above ten is almost double among those in the poorest wealth decile compared to those in the richest. A similar pattern can be observed when using other measures of economic well-being, including household income per capita and food expenditure per capita, motivating the hypothesis that better economic environments might play a role in alleviating depressive symptoms. Additionally, we also observe that women are consistently more likely to have CES-D scores above ten than men across all wealth deciles—a result that is documented in many other contexts (Bracke, 2000; Piccinelli and Wilkinson, 2000; DeRubeis, Siegle and Hollon, 2008).[7] Moreover, the average CES-D score of new mothers is seven and about 28 percent have a CES-D score of ten or above, which increases by eight percentage points to 35 percent in the poorest households. These statistics show that mothers in poverty are at a higher risk of depression than mothers with access to additional financial resources.

In addition to a disproportionate burden of depression risk on women in general, the period just before and after childbirth is a particularly vulnerable time when the risk of depression is more pronounced. In Figure 2 we show how the share of CES-D scores above a given threshold vary relative to childbirth. Just over 12 percent of mothers who are not pregnant or who have

[7]Figure A.1 in the Supplemental Appendix shows that the mean of the CES-D score is also higher among women than among men.

not given birth within the previous two years report CES-D scores of ten or above. For pregnant women, this share more than doubles. As time progresses beyond the time of childbirth, this share declines slowly. However, up to 24 months post-childbirth the share of women who report CES-D scores of ten or above still remains higher than among mothers who are not pregnant or who have not given birth recently.

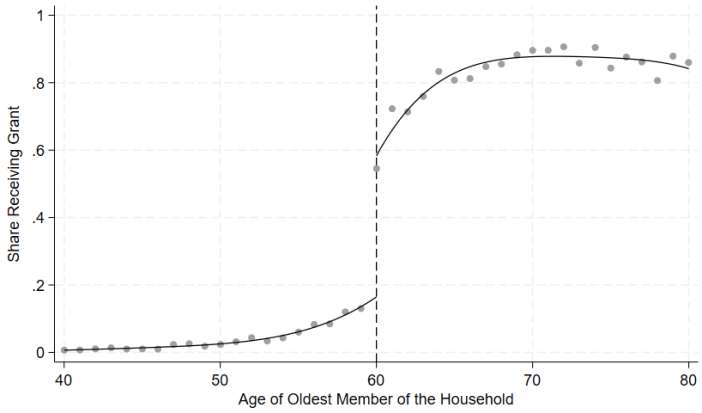
2.2 South Africa's Older Person's Grant

We focus on the Older Person's Grant—South Africa's flagship social protection program. It is a means-tested non-contributory pension scheme paid out to older people every month after the age of 60.[8] While the current value of the grant is 2,180 South African Rands per month—between 2008 and 2017, during the span of our panel, the monthly transfer was between 1,200 and 1,800 South African Rands per month. This is a relatively large transfer which equates to nearly 140 percent of the median per capita income in South Africa and is almost double the national income per capita poverty line. The reach of the program is large with nearly four million direct beneficiaries and nearly four times as many indirect beneficiaries typically living in the same inter-generational households including mothers and their children. In our data, we find that over 25 percent of women who are either pregnant or have recently given birth live with an Older Person's Grant beneficiary. With nearly one million live births per year in South Africa, the grant indirectly affects nearly a quarter of a million women a year during perinatal stages.

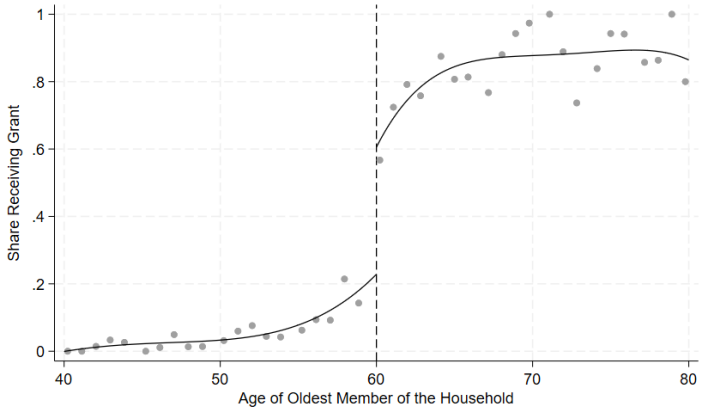
Existing research documents the important effects of the Older Person's Grant among recipient individuals and households. For example, in early work, Case and Deaton (1998) show increases in food expenditure due to the grant and Duflo (2000) shows that the grant has important spillover effects on the health of children within recipient households. Receipt of the grant leads to small changes in household composition (Hamoudi and Thomas, 2014; Edmonds, Mammen and Miller, 2005) and can influence labor supply although with important heterogeneity including a reduction in labor supply at the extensive margin among women with children (Ranchhod, 2006; Abel, 2019; Jensen, 2004). More recently, Alloush, Bloem and Malacarne (2024) show increases in several household-level measures of economic well-being including a sharp reduction in reported hunger during the COVID-19 pandemic among grant recipients. These changes within the household, including strong reductions in hunger and improvements in child outcomes, suggest strong resource sharing norms, especially in poorer households.

The Older Person's Grant has a sharp age-based eligibility criterion where eligibility starts at age 60. There is also an income and wealth-based means test which nearly 80 percent of the elderly satisfy. The age eligibility criterion creates a jump in the probability of grant receipt at age 60, a

[8]The age-eligibility was changed between waves 1 and 2 for men and the age eligibility was lowered from 65 to 60. We account for this change by centering the running variable using the different cut-off ages.



(A) Grant Receipt Among all Households.



(B) Grant Receipt Among Households with Pregnant Women or a New Mother.

FIGURE 3: Discontinuity in Grant Receipt—Grant receipt jumps when the age of the oldest member of the household turns 60 years old. This observation holds for all households and the subset with a pregnant woman or a mother who gave birth within the previous six months.

discontinuity we leverage in our analysis.[9] Households with an eligible older person see a large increase in the probability of grant receipt—we can see this clearly in Panel A of Figure 3 where among all households in our data the probability that the household reports receiving the Older Person's Grant increases sharply when the age of the oldest member of the household reaches 60. Panel B of Figure 3 shows a similar jump in the share receiving the grant when we restrict our sample to only include households that have a pregnant women or a mother who has given birth in the previous six months.

Before we discuss our identification strategy in the next section, we present a simple descriptive comparison of women's incidence of depression risk in grant eligible and ineligible households taking into account time since their youngest child's birth. In Figure 4, we show the share of

[9]Many other studies leverage this discontinuity to study the effect of the grant including Ranchhod (2006), Abel (2019) and Ambler (2016).

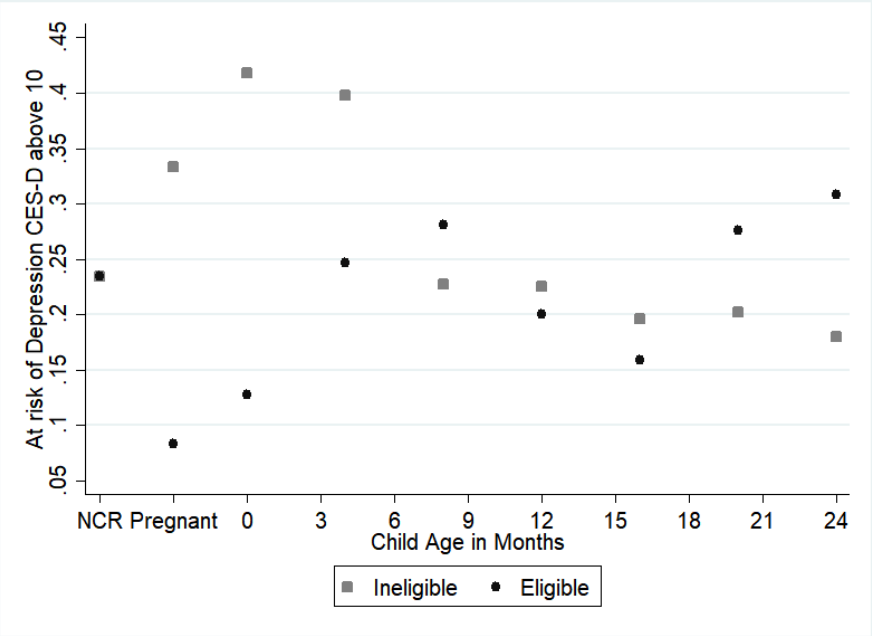


FIGURE 4: Mothers' Depression Risk Relative to Child's Birth by Grant Eligibility—Share of women of child-bearing age (i.e., aged 18–40) with CES-D Scores above ten relative to their child's birth by eligibility for the grant.

women of child-bearing age (i.e., aged 18–40 years old) who have high CES-D scores (i.e., above ten) and are thus considered at risk for depression. This figure is similar to Figure 2, however, the sample is restricted to pregnant women or mothers who currently live with an older person near the age-eligibility threshold. In addition, we split the sample into women in households with a grant eligible older person (just above 60) and yet-to-be-eligible older people (just below 60). Our comparison group (noted as NCR) are mothers between 18 and 40 who have not given birth in the last two years. The overall pattern indicates that mothers and pregnant women living with an eligible older person have better mental health as they are less likely to report enough depressive symptoms in the CES-D scale to have a score above ten. This difference is most stark during pregnancy and in the first few months after their child's birth when women are especially at risk of depression. Among women who are pregnant, there is a 25 percentage point difference in the share who report a CES-D score of ten or higher based on whether they live with someone who is age-eligible for the Older Person's Grant. This gap persists until six to nine months after birth. In the next section, we more formally describe how we identify the effect of the grant on perinatal depression.

3 Estimation Approach

We leverage the age-eligibility threshold of the Older Person's Grant at age 60 which creates a discontinuous jump in grant receipt. The running variable in our analysis is age (in years) of the

oldest member of the household which takes discrete integer values making the *local randomization* approach from the regression discontinuity literature more suitable. With this approach, instead of estimating the treatment effect *at the limit*, the identifying assumption is that units in a window (a term similar to *bandwidth*) around the cutoff are as-if randomly assigned to treatment (Cattaneo, Frandsen and Titiunik, 2015). This approach follows that used in Alloush, Bloem and Malacarne (2024) to look at the effect of the Older Person's Grant. Here, we focus on similar households with elderly near the cutoff age who also live with women who are pregnant or recently gave birth.

Two assumptions must hold for all units in this window around the cut-off. The first assumption is that the assignment mechanism of the score is known inside the window; for example, this condition holds when all units have the same probability of receiving all score values in the window. The second assumption is an exclusion restriction that prevents the potential outcomes (or their distributions, if assumed to be random variables) from being a function of the score inside the window (Cattaneo and Titiunik, 2022). The main challenge in the local randomization approach is, therefore, the choice of this window—a narrow window will improve balance between treatment and control but comparisons within this narrow window may not be adequately statistically powered. A wider window leads to challenges to the exclusion restriction assumption. We show results for a range of windows around the eligibility cutoff age.

Given our interest in studying perinatal depression, the onset of which is either before or after a women gives birth, we identify both pregnant women and new mothers in our data. Pregnant women are identified directly in our data.[10] We identify new mothers in our data as those who have a child aged six months or less. For this exercise, we identify the youngest child of each woman and identify her as a new mother if her youngest child's age is six months or less.[11] While postpartum depression can start within a few weeks after childbirth, it can occur up to one year after giving birth (Okeke, 2021), and we check the robustness of our results to several modifications of this definition, such as increasing the time frame from six months to one and two years. Our choice of six months to define postpartum duration is motivated by studies that find the risk and intensity of depression to peak between three and six months after birth (Andrews-Fike, 1999; Cooper and Murray, 1997).

In order to avoid bias due to self-selection into motherhood, we include in our analysis women who have already given birth (and thus are already mothers) but did so more than six months ago. We also impose a limit of three years on how long ago the delivery was for mothers in our sample and restrict it to women in the age range of 18 to 40 in our analysis. The sample consists then of women who are pregnant, gave birth recently, or mothers who gave birth more than 6 months ago but no later than 3 years ago.[12] Moreover, as we discuss below, we directly account

[10] These are women who know they are pregnant and disclose it during the individual interview.

[11] At this stage, we do not distinguish between women who experienced the death of a child from those who have not, but we check the sensitivity of our results to this in Section 5.

[12] As discussed in Section 5, we check the robustness of our results to removing the restriction on how long ago the

for possible endogeneity of fertility in two ways. First, we examine balance in variables such as the probability of pregnancy, the probability of employment among mothers, and the age of children for grant-eligible and grant-ineligible households within a given window around the age-eligibility threshold to more directly address possible endogenous self-selection into motherhood. Second, we test for changes in fertility among women within households on either side of the age-eligibility threshold. Both of these tests reveal that our main results are unlikely to be driven by endogenous self-selection into motherhood or changes in fertility. More generally, to address concerns about endogenous household formation, we re-estimate our main specification with a restricted sample of respondents who have been living in the same household for at least two years and find qualitatively similar results.

We estimate treatment effects for five age range windows, starting from two years around the age-eligibility threshold and extending to six years. We compare the depression risk of pregnant women and new mothers (i.e., those with a child aged six months and less) around the age-eligibility threshold by estimating equation (1) for each of the five age range windows. The stability of coefficients across these windows support the credibility of our research design. We estimate the following equation:

$$\begin{aligned} Y_{iwd} = \alpha + \beta_1 1_{oldestage_{iwd} \geq 60 \ years} + \beta_2 1_{youngestage_{iwd} \leq 180 \ days} + \\ \beta_3 1_{youngestage_{iwd} \leq 180 \ days} \times 1_{oldestage_{iwd} \geq 60 \ years} + \mathbf{X}_{iwd}\Theta + \delta_w + \gamma_d + e_{iwd} \end{aligned} \tag{1}$$

where Y_{iwd} is a measure of psychological well-being related to depression risk (i.e., a binary variable for having a CES-D score at or above ten) for woman i in wave w and district d. Additionally, the variable $1_{oldestage_{iwd} \geq 60 \ years}$ indicates if oldest member of the household is 60 years old or older and the variable $1_{youngestage_{iwd} \leq 180 \ days}$ indicates if the youngest member of the household is 180 days old or younger. The coefficient β_1 captures the effect of living in a grant eligible household on depression risk (for women who gave birth more than six months ago), whereas β_2 measures perinatal changes (i.e., being pregnant or having given birth within the past six months) in depression risk in grant ineligible households. The coefficient of interest is β_3 on the interaction term which estimates the differential effect of residing with a person eligible for the Older Person's Grant on a pregnant women or new mother's depressive symptoms. In addition to controlling for wave and district fixed effects, we control for other variables included in the vector $\mathbf{X}_{iwd}$ that can potentially affect mental health: the child's and mother's age, mother's race, marital status, education, employment, along with several household characteristics including the age of the oldest household member.

In this specification, we aim to capture the added depression risk that women experience during perinatal stages and if the cash transfer program helps alleviate some of these risks. We also

birth experience was for mothers in our sample.

show results that focus solely on the sample of women who are pregnant or recently gave birth and show the effect of the program among these women using the following specification:

$$Y_{iwd} = \delta_0 + \delta_1 1_{oldestage_{iwd} \geq 60 \ years} + \mathbf{X}_{iwd}\Psi + \psi_w + \gamma_d + \mu_{iwd} \tag{2}$$

In this specification, δ_1 captures the difference in depression risk within this sample for women living in households with an age-eligible member compared to those in age-ineligible members conditional on observed characteristics that we control for.

Equations (1) and (2) estimate results that are akin to intent-to-treat estimates because the regression specification only considers age-eligibility for the Older Person's Grant and does not incorporate receipt of the grant. To more precisely estimate the effect of receiving the Older Person's Grant we use an instrumental variable approach to account for endogeneity in grant receipt. More specifically, we estimate a two-stage regression and instrument grant receipt with a binary variable indicating if the oldest member of the household is 60 years old or older (and therefore is age-eligible to receive the Older Person's Grant). We do this within similar narrow windows around the age-eligibility threshold estimating the following two-stage regression specification:

$$G_{iwd} = \alpha_0 + \alpha_1 1_{oldestage_{iwd} \geq 60 \ years} + \mathbf{X}_{iwd}\Theta + \delta_w + \gamma_d + e_{iwd} \tag{3}$$

$$Y_{iwd} = \beta_0 + \beta_1 \hat{G}_{iwd} + \mathbf{X}_{iwd}\Psi + \psi_w + \gamma_d + \mu_{iwd} \tag{4}$$

where G_{iwd} is a binary variable indicating if the household reports receiving the Older Person's Grant and Y_{iwd} is one of two outcome variables of interest: (i) the log of monthly household income per capita and (ii) a binary variable indicating the individual is at risk of experiencing depression. The variable $\hat{G}_{iwd}$ in equation (3) is the predicted value of G_{iwd} from equation (2). The indicator variable representing eligibility for the Older Person's Grant is defined as discussed above and we continue to control for wave and district fixed effects as well as household and individual characteristics as discussed above.

We present balance tests for the two-year window (i.e., for the oldest household member age ranges of 58 to 61) in Table 1 and we show a similar table for the widest six-year age window (i.e., for the older person age ranges of 54 to 65) in Supplemental Appendix Table A.3. In support of our identification assumptions, Table 1 shows the means of relevant observable characteristics of women and their households in eligible versus ineligible households. Comparing the means across the age-eligibility threshold, we see balance in this narrow window, but as we expand the age range, some imbalance emerges: women in the grant eligible households are on average a year older, and they have a bigger household size including the number of children.[13] While we show

[13]This finding is consistent with existing studies of the Older Persons' Grant showing that receipt leads to an increase in the number of people co-residing with the recipient (Edmonds, Mammen and Miller, 2005; Ardington, Case and Hosegood, 2009; Hamoudi and Thomas, 2014). However, since the oldest member is older, other members will also on

TABLE 1: Balance Across Eligibility Status

Variable	(1) 0 Mean/SE	(2) 1 Mean/SE	T-test P-value (1)-(2)
Mother's Age	26.042	26.181	0.761
	(0.307)	(0.340)	
Child's Age Mos	22.209	21.832	0.844
	(1.244)	(1.474)	
Black African	0.829	0.835	0.868
	(0.022)	(0.023)	
Married	0.153	0.189	0.271
	(0.021)	(0.025)	
Mother Works	0.230	0.217	0.709
	(0.025)	(0.026)	
Mother's Schooling - Grade 0	0.000	0.000	N/A
	(0.000)	(0.000)	
- Primary	0.038	0.016	0.111
	(0.011)	(0.008)	
- Middle	0.122	0.091	0.240
	(0.019)	(0.018)	
- Secondary	0.676	0.689	0.746
	(0.028)	(0.029)	
- Diploma	0.136	0.181	0.150
	(0.020)	(0.024)	
- Tertiary	0.007	0.008	0.903
	(0.005)	(0.006)	
Rooms per person	0.703	0.741	0.269
	(0.023)	(0.026)	
Toilet type - Flush	0.446	0.441	0.906
	(0.029)	(0.031)	
- Latrine	0.449	0.441	0.842
	(0.029)	(0.031)	
- No Toilet	0.035	0.031	0.829
	(0.011)	(0.011)	
Number of children in HH	3.181	3.185	0.981
	(0.105)	(0.121)	
Household Size	7.948	7.917	0.914
	(0.186)	(0.213)	
Probability of Pregnancy	0.106	0.093	0.578
	(0.016)	(0.016)	
N	287	254	

Notes: The value displayed for t-tests are p-values. We compare all women in the regression sample to the left and right of the cutoff in a 2-year window that is for the elderly age range of 58 to 61. Note that "Black African" is a the majority ethnic group in South Africa and includes sub-groups such as Zulu, Xhosa, Sotho, and Tswana.

average be older and further into their life cycle which means likely more children and larger households.

results with no controls and a more parsimonious control vector in the Supplemental Appendix, our preferred specification includes control variables. As we show when we discuss our results, however, our main finding is robust to the choice of window and the inclusion of control variables.

An additional threat to our identification strategy is some form of manipulation around the age-eligibility threshold. That is, if individuals can influence their eligibility then treatment status will be, in some part, a choice and our results will be biased. In our case, this form of manipulation will be present if there is a non-random sorting of pregnant women and new mothers around the age-eligibility threshold. We show in the balance tables that grant eligibility does not affect the probability of pregnancy (which is calculated as a ratio of pregnant women to women of reproductive age in the household) as it is balanced and very similar across the two groups. In Figure A.2, we plot the histogram of the running variable for the sample of pregnant women and new mothers and find no evidence of bunching (i.e., there is no spike in mass just to the right of the age-eligibility threshold). As a formal test, we also implement the McCrary density test and find no statistical evidence of manipulation of the running variable with a test statistic of -0.136 and a *p-value* of 0.892.

Finally, it is important to note that our definition of women who recently gave birth refers specifically to their youngest children who are still alive. We exclude women whose youngest child died. This can be problematic as women in our comparison group are selected on child survival whereas for women who are pregnant or recently gave birth, the outcome of child mortality is yet to be determined. In as much as poverty and destitution is correlated with child mortality, this means the sample of women who are pregnant or recently gave birth are likely poorer and more destitute on average than women whose child is alive and older than six months. In Section 5, we test the influence of child mortality and do not find a meaningful difference in the main results of our analysis.

4 Results

In this section we present our results. First, we show estimates of the effect of the grant on economic well-being. We show that receipt of the Older Person's Grant at the household level leads to an increase in household income per capita within our sample of households that include pregnant women and mothers. Next, we show that depression risk increases for pregnant women and for mothers in the first few months after childbirth but that living in a household that receives the Older Person's Grant effectively eliminates the increased risk of depression associated with pregnancy and childbirth.

TABLE 2: Older Person's Grant and Household Income

	(1) (58-61)	(2) (57-62)	(3) (56-63)	(4) (55-64)	(5) (54-65)
Panel A: Log Income Per Capita					
Household Grant Receipt	0.179	0.302	0.308*	0.350**	0.364***
	(0.192)	(0.195)	(0.167)	(0.150)	(0.125)
Panel B: Household Grant Receipt					
Eligible	0.530***	0.466***	0.459***	0.464***	0.479***
	(0.058)	(0.053)	(0.047)	(0.042)	(0.040)
F-statistic	83.99	77.46	97.54	122.68	145.89
N	541	808	1057	1276	1497

Notes: *** p<0.01, ** p<0.05, * p<0.1: Standard Errors clustered at the district level are in parenthesis. We cluster all our regression specifications at the district level. The dependent variable is log (monthly) income per capita with the top one percent winsorized. The regressions control for race, region (rural), number of children, older people, age of the oldest person, and the total household size.

4.1 Household Income

We first estimate the effect of the Older Person's Grant on household income. For this analysis, we use our instrumental variable estimation approach to specifically estimate the effect of *receiving* the Older Person's Grant on the log of household income. Other studies document a positive shift in economic well-being as a result of the Older Person's Grant. For example, Alloush and Wu (2023) find that grant receipt boosts household income per capita in the range of 14 to 20 percent among households with recipients who were economically inactive before and after receipt of the grant. In Panel A of Table 2, we present similar evidence for our sample of households with women between ages 18 and 40 who are pregnant or have children and find that household income increases by between 18 and 36 percent due to receipt of the grant. The estimates are statistically significant in columns (3) through (5), and are similar magnitude for all window sizes except for the narrowest window in column (1).

Results from the first stage regression in Panel B of Table 2 show that our instrument (i.e., an indicator for the household with an oldest household member just above 60 years old) is relevant and predicts household-level grant receipt. In particular, the presence of an age-eligible older person significantly increases the likelihood of household-level grant receipt by at least 46 percentage points in our restricted samples.[14]

We note two important details that are relevant for interpreting these results. First, the NIDS does not include information on how income is shared within the household. Other studies show

[14]We use this same first stage regression in the analysis presented below when we implement this instrumental variable approach to estimate the effect of grant receipt on perinatal depression.

that, among households receiving the Older Person's Grant, overall food consumption increases (Case and Deaton, 1998), reported hunger decreases among non-recipient members (Alloush, Bloem and Malacarne, 2024), and life satisfaction of non-recipient members improves (Alloush and Wu, 2023). Each of these results suggest some sharing of grant income with other household members. Such grant income sharing could extend to women who are pregnant or recently gave birth and could lead to intra-household spillover effects that influence the risk of perinatal depression. Second, focusing on pregnant women and the first six months after birth allows us to differentiate the effects of the Older Person's Grant from the Child Support Grant, which the latter requires the birth of a child as an eligibility criteria. In practice, most mothers do not receive Child Support Grant funds until several months after the birth of their child (Luthuli et al., 2022). By contrast, the oldest person in the household might share their grant income with the mother before she starts to receive the Child Support Grant.

4.2 Perinatal Depression

We now present our main results and show estimates using five different window sizes for our specification with all controls, as discussed in Section 3. These results show the effect of grant eligibility, perinatal status, and the interaction of these two variables on depression risk as outlined in equation (1). With this approach, we compare four different groups of women based on the intersection of the following two criteria: (i) "perinatal" status defined as women who are pregnant or have given birth in the previous six months and (ii) Older Person's Grant eligibility defined by whether the oldest person within the household is at least 60 years old. Additionally, we impose two restrictions on women in the comparison group. First, a restriction to include only women who have a biological child so that we only consider mothers in our analysis. Second, an upper limit restricting the time since their last birth to be only three years. Defining the comparison group in this way means that the comparison group excludes mothers who may have given birth many years ago and therefore could be quite different than women in our perinatal group[15]

In Panel A of Table 3, we find that women who are pregnant or have had a recent birth are more likely to be at risk of depression. In particular, women who are pregnant or have given birth in the previous six months are between 16 and 20 percentage points more likely to report depressive symptoms beyond the typical threshold used to screen for depression. This result is consistent across all window sizes and the difference is statistically significant. However, pregnant women and new mothers residing with an older person who is at least 60 years old, and therefore eligible for the Older Person's Grant, are around 13 percentage points less likely to report depression symptoms exceeding this threshold. The magnitude of this result is similar across the five age range windows, ranging between 12 and 17 percentage points. These estimates are statistically

[15]For example, mothers who have recently given birth in full our sample have an average age of 26 whereas those who gave birth more than six months ago are, on average, 29 years old in our unrestricted sample.

TABLE 3: Older Person's Grant and Perinatal Depression

Dependent variable:	CES-D Score≥ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Panel A: Main Results					
Eligible	-0.075	-0.013	-0.020	0.002	0.041
	(0.077)	(0.058)	(0.047)	(0.043)	(0.041)
Perinatal	0.171***	0.203***	0.171***	0.168***	0.164***
	(0.050)	(0.043)	(0.042)	(0.041)	(0.037)
Eligible × Perinatal	-0.123*	-0.146**	-0.136**	-0.149***	-0.170***
	(0.072)	(0.058)	(0.057)	(0.051)	(0.048)
Observations	541	808	1057	1276	1497
Panel B: Sample Limited to the Bottom 2/3 of Wealth Distribution					
Eligible	0.001	0.040	0.023	0.039	0.061
	(0.097)	(0.080)	(0.063)	(0.055)	(0.052)
Perinatal	0.247***	0.242***	0.212***	0.218***	0.198***
	(0.077)	(0.064)	(0.053)	(0.049)	(0.044)
Eligible × Perinatal	-0.203**	-0.233***	-0.213***	-0.226***	-0.222***
	(0.097)	(0.072)	(0.059)	(0.053)	(0.052)
Observations	398	594	765	916	1074
Panel C: Instrumental Variable Results					
Household Grant Receipt	-0.824*	-0.414	-0.397**	-0.230	-0.125
	(0.444)	(0.257)	(0.192)	(0.172)	(0.149)
Observations	148	227	303	367	425
Panel D: Comparing Pregnant and New Mothers Around the Cutoff					
Eligible	-0.324*	-0.186	-0.195**	-0.112	-0.061
	(0.177)	(0.130)	(0.096)	(0.090)	(0.079)
Observations	148	227	303	367	425
District & Year Fixed Effects	✓	✓	✓	✓	✓
Age Controls	✓	✓	✓	✓	✓
Mother Controls	✓	✓	✓	✓	✓
Household Controls	✓	✓	✓	✓	✓

Notes: *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis.

significant at conventional levels. We find that co-residence with an eligible elderly has an inconclusive effect on the depression risk of non-perinatal women. In the narrower bandwidths, there is weak evidence for a decrease in this risk which aligns with the effect that extra income from the grant can have. However, we interpret this coefficient with caution given the lack of statistical significance and sign-switching across bandwidths.[16]

Our specification controls for survey wave and district fixed effects, mother characteristics

[16]This coefficient is more stable (and negative) across bandwidths in the sub-sample of households where older person-mother dyads have been living together for at least 2 years from the survey date, and when we restrict the sample to mothers with one child or pregnant with their first, and when we redefine depression thresholds to 11 and 12. These results are presented in Appendix Tables A.7 A.8, and A.10.

(i.e., her age, race, education level, and employment status), and household characteristics (i.e., number of children, household size, and the age of the oldest household member). In addition to the sensitivity and robustness checks we discuss below, we show results from more parsimonious regression specifications with fewer (or no) controls in Supplemental Appendix Table A.4 and find qualitatively similar results.[17]

Effects of Grant Receipt—In the results discussed so far, we estimate results that are akin to an intention-to-treat effect of grant eligibility on perinatal depression. As we note above, approximately 80 percent of older persons in South Africa qualify for the grant based on the means test and among those who qualify take-up is between 75 and 90 percent (see Figure 3). In order to more specifically estimate the effect of *receiving* the Older Person's Grant we employ the following two approaches. First, we show results from our main specification, shown in equation (1), for the bottom two-thirds of our sample in terms of household wealth where take-up of the grant after the oldest person in the household turns 60 years old is approximately 90 percent. Second, we use the instrumental variable estimation approach shown in equations (3) and (4). With this instrumental variable approach, we cannot use full interaction specification because the regression would be under-identified. Instead, we restrict our sample to only include pregnant women and mothers who have had a birth in the past six months. This approach allows us to estimate the effect of being in a household receiving the grant on perinatal depression risk.

In Panel B of Table 3, we first re-estimate our main interaction term specification, shown in equation (1), for the sub-sample of households where take-up of the grant is nearly universal. We again find that women who are pregnant or have given birth in the previous six months are more likely to be at risk of depression, but that eligibility for the Older Person's Grant effectively eliminates the increased risk of depression associated with pregnancy and childbirth. Next, we report instrumental variable results in Panel C of Table 3 with the restricted sample including only pregnant women and mothers who recently gave birth. As expected, given that these results estimate effects among compliers (i.e., households that are age-eligible for the grant and receive it), the estimated effect of receiving the grant on perinatal depression is larger than the estimates of grant eligibility shown in Panel A. For this same sample of perinatal women, we estimate equation (2), in Panel D of Table 3, and continue to find evidence that grant eligibility reduces depression risk among the pregnant women and new mothers. While the sample size for the perinatal-only analysis is relatively small, it serves as an important robustness check for our main results presented in Panel A.

[17] Waves four and five of the NIDS includes an additional question identifying the spouse/partner of an individual. We check the sensitivity of these results to the inclusion of spouse/partner characteristics (i.e., their age, education level, and employment status) using these two waves of data. When we account for these spouse/partner characteristics, the sample size is sufficiently small such that we do not observe statistically significant results, however, we continue to find qualitatively similar results in terms of effect magnitude. Results are presented in Table A.5 in the Supplemental Appendix.

Components of the CES-D Scale—To help contextualize the results presented so far, we now investigate if there are certain depression symptoms that drive the effects the Older Person's Grant on perinatal depression risk. As described above, the CES-D scale is a composite measure of ten questions that record how frequently an individual experiences specific feelings and emotions. We treat each of these ten sub-components as a separate outcome variable and present results, among both the full sample and the limited sample of the bottom two-thirds of the wealth distribution, using the largest window of five years around the cut-off in Supplemental Appendix Figure A.3.[18] Although each of the estimates are not statistically significant, some interesting results emerge. First, among the full sample, it appears that the Older Person's Grant reduces the prevalence of each of the negative symptoms (except for a lack of sleep) and increased each of the positive symptoms. Second, we observe a similar, but more pronounced, pattern among the limited sample of the bottom two-thirds of wealth distribution. Finally, and reassuringly, we see an improvement in the CES-D components across the board. This demonstrates that our main results are not driven by a potentially spurious change in just one of the sub-components of the CES-D score.

5 Sensitivity and Robustness Checks

In this section, we test the sensitivity and robustness of our results to different specification choices and address possible sources of bias. First, we remove the restriction on the comparison group of mothers to include all mothers between ages 18 and 40. Second, we show results that account for endogenous household formation by restricting the analysis to women and older people who have lived together for at least two years. We also discuss effects of grant eligibility on fertility to directly account for possible endogeneity in fertility. Third, we further account for possible effects of South Africa's Child Support Grant by restricting the sample to only include women who are pregnant with their first child or only have one child. Fourth, we report results that vary postpartum duration period from six months to one year and two years. Fifth, we show results for different CES-D thresholds defining depression risk and show results for the full CES-D score. Finally, we account for effects driven by child mortality by excluding women from our sample whose child died after birth. Each of these sensitivity and robustness checks support our main qualitative finding that the Older Person's grant reduces the risk of perinatal depression.

Before we discuss each of these checks in detail, we summarize the results in Figure 5 by plotting the coefficient on the interaction term, β_3, from equation (1). We find that our main result that grant eligibility is effective in reducing depression risk among pregnant women and new mothers is robust to these robustness and sensitivity checks. The figure reports the coefficient from the widest window but, as can be seen in the supporting tables in the Supplemental Appendix, the results are qualitatively similar for other, more narrow windows around the age-eligibility

[18] Estimates using smaller windows are qualitatively similar.

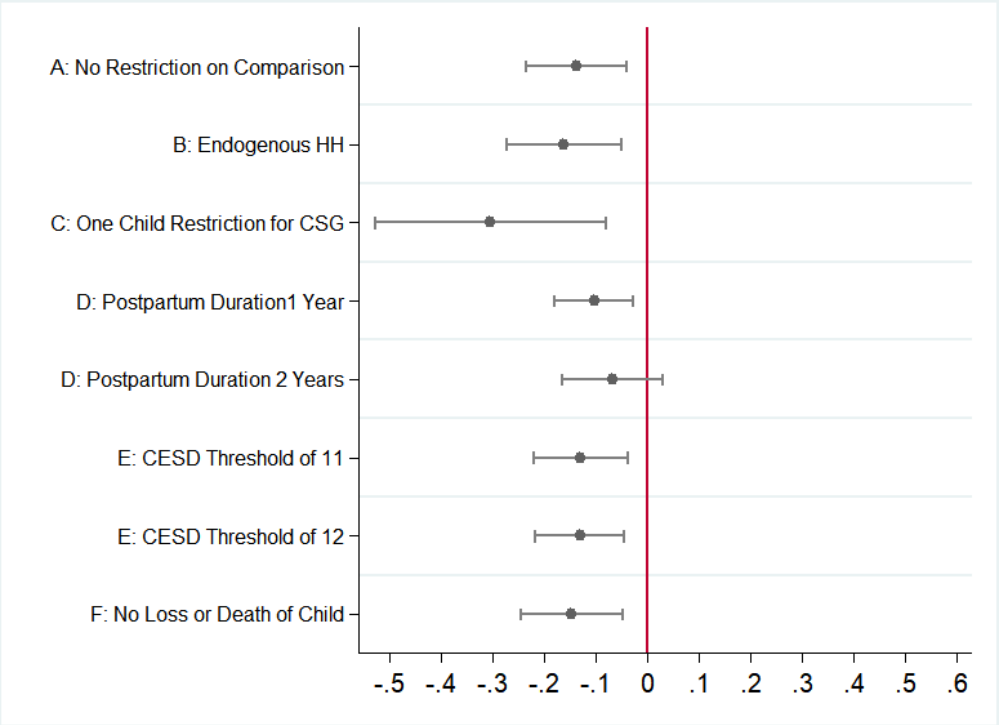


FIGURE 5: Estimated coefficient on interaction term (β_3) is plotted for the 5 year bandwidth around the cutoff. Detailed tables and results for each robustness check are presented in the Supplemental Appendix. We find the consistent result that grant eligibility lowers depressive symptoms among pregnant women and new mothers. The coefficients are numbered in accordance with the section numbers below.

threshold.

A. Comparison Group Restrictions

In the main results discussed above we restrict the comparison group to only include mothers who have had a birth in the previous three years (but not within the previous six months). This restriction helps ensure we are comparing women who are at similar stages in life and motherhood, however, we show here that our main qualitative finding is not sensitive to this restriction. We report these results in Table A.6 in the Supplemental Appendix. Despite the larger sample size, the results are qualitatively similar to those presented in Panel A of Table 3. Additionally, these results are not sensitive to the choice of maximum time after birth. We find qualitatively similar results if we restrict the comparison group to only include mothers who have had a birth in the previous two, five, or eight years.

B. Endogenous Household Formation

Previous studies on South Africa's Older Person's Grant show that grant receipt might encourage other family members to live with the older person and fundamentally change the composi-

tion of the household (Edmonds, Mammen and Miller, 2005; Hamoudi and Thomas, 2014). Our estimation strategy relies on the assumption that grant receipt is dictated by the age eligibility of the oldest person within the household, not endogenous behavior of expecting or new mothers. That is, if the decision to choose where to live when pregnant is influenced by grant eligibility, then our main approach may lead to biased results. The McCrary test discussed above suggests that there is no sorting of new mothers around the age-eligibility threshold which partly alleviates this concern. Additionally, the ratio of pregnant women in households with and without a grant-eligible older person in a bandwidth of 2 years around the age-cutoff is 6.1 percent and 6.4 percent, respectively, suggesting that grant eligibility is not affecting fertility in ways that could lead to bias. Moreover, Figure A.4 in the Supplemental Appendix shows that there is no evidence that the fertility rate among women changes when the oldest person within a household turns 60 years old.

We can, however, directly test the robustness of our results to possible endogenous household formation by re-estimating our main specification with a restricted sample of mothers and relevant older person who have been living in the same household for at least two years prior to the survey observation. This restricted sample, therefore, only includes households with a stable set of household members for the two years prior to survey enumeration (except for, of course, the birth of a child). We find qualitatively similar results with this restricted sample and present these results in Supplemental Appendix Table A.7 We find that our results continue to hold in the restricted sample with a reduction in depression risk ranging from 12 percentage points to 16 percentage points.

C. Child Support Grant

As we highlight earlier, South Africa has an existing program that aims to provide financial support to households with children. The presence of this program potentially confounds our analysis if our estimates of the effect of the Older Person's Grant are biased by correlated effects of the Child Support Grant. Two factors, however, lead us to believe that the potential for bias from the Child Support Grant is likely to be small and indistinguishable from zero. First, Table 1 shows that the number of children, household size, and probability of pregnancy are balanced across the age-eligibility threshold. This indicates that any additional financial support coming from the Child Support Grant is also likely to be balanced across the age-eligibility threshold for the Older Person's Grant. Second, as noted above, since the Child Support Grant requires the birth of a child as an eligibility criteria there are practical administrative delays in processing this information that lead to a lag in receipt of the Child Support Grant in the first few months after the birth of a child (Luthuli et al., 2022). Therefore, focusing our analysis on pregnant women and mothers who have had a birth just six months prior limits the possible overlap with financial support from the Child Support Grant.

If a woman has multiple children, however, then support from the Child Support Grant will interfere with the estimated effect of the Older Person's Grant. In the results presented so far, we control for Child Support Grant receipt at the household level and find that the results are not sensitive to the inclusion or exclusion of this variable. To further ameliorate concerns, we also show results for the sub-sample of mothers who only have one child or are pregnant with their first child in Supplemental Appendix Table A.8. Despite this one-child restriction, the comparison group is made up of mothers who gave birth no more than three years ago and only have one child. Thus, these comparison mothers are more likely to be receiving the Child Support Grant than the new mothers in the "treated" group. Assuming that the financial support provided as part of the Child Support Grant helps mothers avoid experiencing depression symptoms, then this will attenuate our resulting estimates of the effect of the Older Person's Grant. Nevertheless, we continue to find qualitatively similar results in the sub-sample of women who are either pregnant with their first child or only have one child.

D. Postpartum Duration

The timeline of postpartum depression is not definitive and may vary from case to case. To ensure that our results are not sensitive to the definition of six months after childbirth, we expand our definition of a new mother to include a woman who had a child in the past year and two years, respectively. Table A.9 in the Supplemental Appendix reports these results and shows that the main results are concentrated in the first six months after the birth of a child. Although the sign on the results are robust, the magnitude of the effect estimates are attenuated and (with the exception of the widest window around the age-eligibility threshold within the first year after the birth of a child) these estimates are not statistically significant at conventional levels. However, we also note that, with these expended definitions of the postpartum period, the increase in depression risk associated with childbirth is less pronounced.

These results indicate that the first six months after childbirth is a critical period both for the possible development of depression symptoms and increased depression risk for new mothers and for the provision of financial support. One implication of these results is that existing social protection programs that directly aim to support child care-giving—such as South Africa's Child Support Grant—might be able to improve their effectiveness if they find ways to extend and distribute financial support as early in the child's life as possible, and perhaps even prior to birth when the mother is pregnant.

E. Depression Risk

In our main results we use a binary indicator of depression risk identifying if the respondent reported a CES-D score that is equal to ten or above. This definition follows previous research that aims to validate a critical threshold in the CES-D score to screen for depression and finds that a threshold of ten effectively satisfies a trade-off between sensitivity and specificity in detecting

major depressive disorder (Andresen et al., 1994)[19] Another possible critical thresholds discussed in the literature are either 11 or 12 (Baron, Davies and Lund, 2017). We present the results for these alternative threshold values defining depression risk in Table A.10. For both these alternative threshold values, we find qualitatively similar results that continue to show that the Older Person's Grant reduces depression risk among perinatal women.

We also re-estimate our main specification with the full CES-D scale as the dependent variable, instead of the binary indicator for depression risk. While these results are limited in that they treat the ordinal CES-D scale as if it were a cardinal measure of depression symptoms, an assumption that might lead to biased estimates (Bloem, 2021), these results allow us to estimate how the Older Person's Grant influences the overall CES-D score. We report these results in Table A.12, and although we observe estimates with less statistical significance than our main results, the core qualitative finding remains. That is, pregnant women and mothers who recently gave birth have a higher scores on the full CES-D scale, however, residing in a household with an eligible older person lowers this score substantially. The magnitude of this estimated effect is a 0.58 point reduction on the CES-D scale, which is about 0.25 standard deviation reduction. Unlike the inconsistency with the binary outcome variable, the coefficient on *Eligible* is negative for all bandwidths denoting a decrease in the depression score for non-perinatal mothers residing with a potential grant beneficiary.

F. Child Mortality

In our main results, we do not distinguish women who have lost their child either during pregnancy or in the first few months after childbirth. These women might be more prone to depressive symptoms than other women. For example, in our data, women who have experienced a death of a child have an average CES-D score of 8.4 compared to an average score of 7.1 for women who did not experience such a loss. Additionally, we find that 10.3 percent of the women in our data have experienced death of a child. To test whether child mortality influences our results, we re-estimate our main results by excluding women who report that they have experienced a death of one of their children. In Table A.11 we find that our main findings are unchanged when restricting our sample by child mortality.

6 Possible Mechanisms

While there is a growing literature studying depression among pregnant women and new mothers, the ultimate causes are not well understood, complicating analysis of the specific mechanisms

[19]Sensitivity of screening using CES-D is based on the ability of the test to misdiagnose depression risk—i.e., getting a score below ten when the person has a major depressive disorder. A test with high sensitivity has high negative predictive value such that getting a score below the threshold is a good indication a person is not depressed. Specificity relates to the positive predictive value of a test—the more specific a threshold, the more likely it is that someone with a score above the threshold is actually suffering from depression.

at play in alleviating depressive symptoms. Despite these challenges, several existing studies point to possible mediators for the effect of transfer programs on perinatal depression. First, studying mothers in Nigeria, Okeke (2021) suggests birth outcomes as a mechanism by showing that cash transfers increase the frequency of healthcare visits during pregnancy, which improve birth outcomes and reduce reported depression symptoms. Second, Powell-Jackson et al. (2016) show that cash transfers provided to new mothers in India lead to a reduction in medical debt from hospital births and, in turn, reported depression symptoms. Third, in a review article on the link between transfers and mental health more generally, Machado, Alves and Patel (2024) list the following possible mechanisms: (i) financial stability, (ii) enhanced nutritional intake, (iii) reduced morbidity, (iv) better schooling outcomes, and (v) improved social contact between the individual and the state as potential mechanisms through which cash transfers improve their recipients' mental health. While each of these possible mechanisms might seem plausible in our setting, it is important to note that the discussions about these mechanisms in the literature to date is largely descriptive and exploratory, as there is an absence of both necessary data and analytical tools to identify the specific mechanisms mediating the relationship between cash transfers and measures of mental health—especially among pregnant women and recent mothers.

We next shift our focus to the Older Person's Grant specifically. The following mechanisms are both well-documented and plausible: First, several studies clearly show that the Older Person's Grant increases overall economic well-being of households with direct recipients. Both Case and Deaton (1998) and Alloush, Bloem and Malacarne (2024) show that the Older Person's Grant increases food expenditures and reduces reported levels of hunger by nearly 50 percent.[20] This improvement in both the level of household income and its stability may be important factors leading to better mental health outcomes among household residents including pregnant women and recent mothers who have elevated levels of depression risk.

There are other non-financial mechanisms through which this particular grant could act. For example, several studies find evidence of grant receipt leading to shifts in labor market participation, with (Ranchhod, 2006) finding increased employment among working-age men, but others finding either reductions in hours worked (Abel, 2019; Bertrand, Mullainathan and Miller, 2003) or null effects (Jensen, 2004). An ability to reduce labor supply as needed may be a mechanism through which the Older Person's Grant (and other transfer programs) may affect perinatal depression.[21] Moreover, a reduction in the labor supply of the elderly direct recipient could allow

[20] Alloush and Riaz (2024) study the in-utero health effects of the Older Person's Grant and find that these previously reported effects on food expenditures and hunger persist in the sub-set of households with pregnant women. Food insecurity has been associated with poor mental health and improvement in the former has been shown to alleviate depressive symptoms - for example, Bergmans et al. (2018) and Evans et al. (2024) find a positive effect of the Supplemental Nutrition Assistance Program (SNAP) on maternal mental health.

[21] Related to labor supply reduction among parents, a systematic review of parental leave policies suggest strong effects on mental health especially among women Heshmati, Honkaniemi and Juárez (2023). A recent study on the impact of state paid family leave policies on perinatal and postpartum health in the United States found evidence in

them to shift their time use and help co-resident women during late pregnancy and after delivery Aguiar and Hurst (2005); Tanskanen et al. (2021).[22] Furthermore, Edmonds, Mammen and Miller (2005) find evidence that households receiving the Older Person's Grant change the composition of their household and Ambler (2016) identifies changes in bargaining power.[23]

The results discussed here from the existing literature combined with the finding in Figure A.3 of a significant reduction in feeling fearful due to Older Person's Grant, helps illustrate the likely factors that play a role in facilitating the relationship between household receipt of the grant and reduced depression symptoms among pregnant women and new mothers. That is, it seems plausible that the following takes place: the additional financial resources from the Older Person's Grant allow the older person the freedom to both take care of themselves and others within their household, in large part, by purchasing more food and reducing the risk that members of their household experience hunger. These effects, in part, reduce fear and uncertainty pregnant women and new mothers might feel when considering how they will effectively care for the needs of their child. This mechanism is further supported by the findings of Carias et al. (2024), who study measures of maternal mental health amid the COVID-19 pandemic in rural Pakistan. Their findings suggest that increased uncertainty in the mother's economic environment might lead to adverse changes in measures of mental health. We show that financial support, provided via an ongoing social protection program, can limit—and possibly eliminate—these adverse changes in mental health.

7 Conclusion

In this paper, we estimate the effect of a well-established and large social protection program targeted specifically to support older people in South Africa on perinatal depression of co-resident women. We first document that, in our data, women who are either pregnant or have had a birth in the last six months report higher levels of depression risk than comparable mothers. When these women happen to be living with an older person who is age-eligible for the Older Person's Grant, however, we find that the increased risk of perinatal depression associated with childbirth is effectively eliminated. These results add to the growing literature on the intra-household spillover effects of the Older Person's Grant and demonstrate that social protection programs, that are al-

favor of decreased depressive symptoms (Wells et al., 2025), a finding also found in a paper specific to California's paid family leave (Bullinger, 2019). This improvement in maternal mental health may be attributed to parents getting more time to cope with the demands of parenting and for increased engagement with children (Bullinger, 2019).

[22] Labor supply among elderly just below the cutoff age of 60 is quite low in South Africa, especially among women. This is an important plausible mechanism, however, the observed reductions in labor supply at age 60 are quite small given that grant receipt is not directly dependent on retirement.

[23] The estimated average household compositional changes are small, however, additional adults in the household could potentially lead to increased contributions to household public goods and taking care of other children. Increased bargaining power among the elderly recipients of the Older Person's Grant may lead to household dynamics that improve the living conditions of the relevant women.

ready operating at scale, can play an important role in supporting maternal mental health both during pregnancy and in the first few months after the birth of a child.

To estimate these results we leverage the age-eligibility rule of the Older Person's Grant which allows individuals over the age of 60 to qualify for the grant. Specifically, we compare measures of depression risk of women living in households where the oldest member of the household is close to the age-eligibility threshold of the grant using the local randomization variation of the regression discontinuity design. We apply two key restrictions to our data when estimating our main results to ensure our comparisons between women in the perinatal stage of motherhood and not, and who live within households on either side of the age-eligibility threshold are valid. First, we restrict our comparison group of women to only include women who have a biological child so that our results are not biased by self-selection into motherhood. Second, we restrict our comparison group to only include mothers who have had a birth in the last three years so that we ensure our comparisons are between mothers of a similar age and are at similar stages of motherhood. We find that our results are robust to different windows around the age-eligibility threshold, inclusion of a host of control variables, as well as to a litany of sensitivity and robustness checks that aim to alleviate concerns regarding endogenous household formation and fertility choices. While the idiosyncrasies of this specific program may limit its generalizability to other cash transfer programs, our results at least shed light on additional benefits of the Older Person's Grant on perinatal depression affecting nearly a quarter of a million women in South Africa per year.

These results are important because understanding how to best address and reduce depression risk is important, especially among women who are pregnant and have recently given birth. Moreover, learning about how existing social protection programs that are currently operating at scale and primarily existing to address other objectives is critical from a public policy perspective for at least two reasons. First, while existing research clearly demonstrates how carefully targeted interventions can help alleviate postpartum depression, depression is challenging to diagnose and timely interventions are difficult to implement at scale, especially in low- and middle-income countries. Thus, limitations in existing healthcare systems that constrain our ability to provide access to targeted psychotherapy interventions motivates alternative ways that may represent effective means to reduce depression risk among vulnerable populations. Second, the typical policy approach to provide financial resources to support the care of children targets parents of children and requires the birth of a child as a critical eligibility criteria, often adding to a long list of administrative demands in the first few weeks after the birth of a child. For example, South Africa's Child Support Grant often does not reach households until several months after the birth of a child. Our results indicate that providing this support immediately after the birth of a child, and perhaps also before birth into pregnancy, can lead to meaningful benefits in limiting—an even eliminating—increased risk of perinatal depression. Taken together, these results carry implica-

tions for social protection policies, such as South Africa's Child Support Grant or other large-scale social protection programs, especially in settings where targeting and implementing psychotherapy programs effectively at scale face challenging—and perhaps restrictive—constraints.

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Supplemental Appendix

Figures

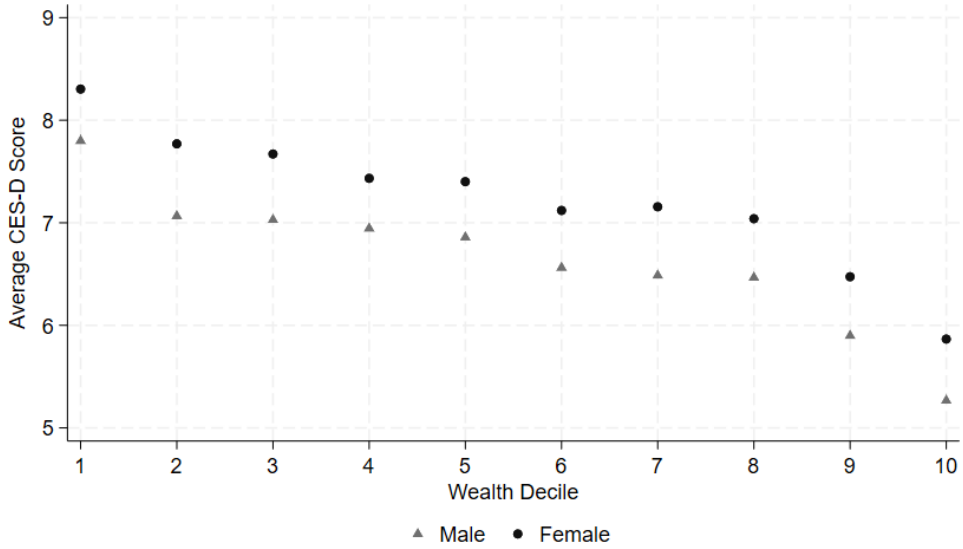


FIGURE A.1: Total CESD-10 Score averaged across wealth deciles for men and women

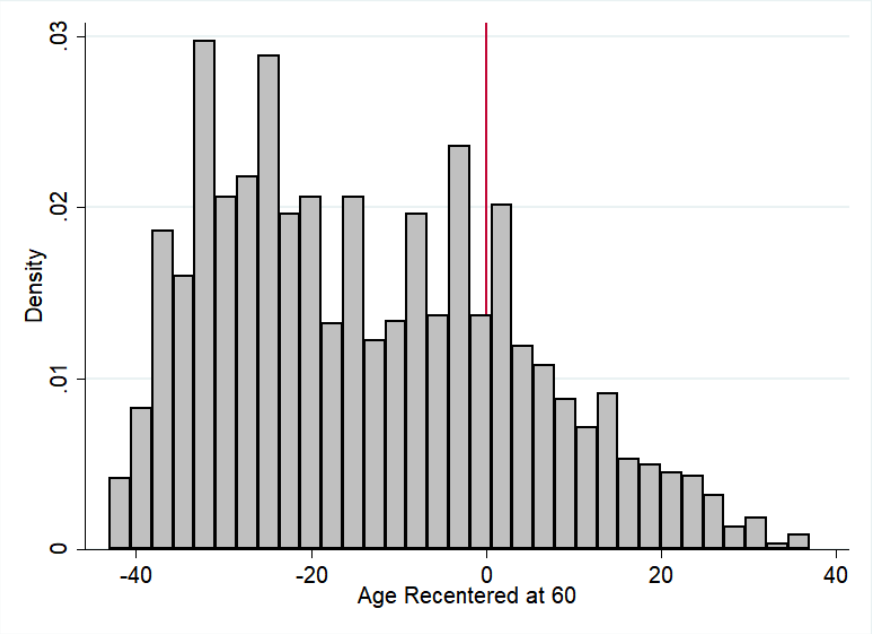
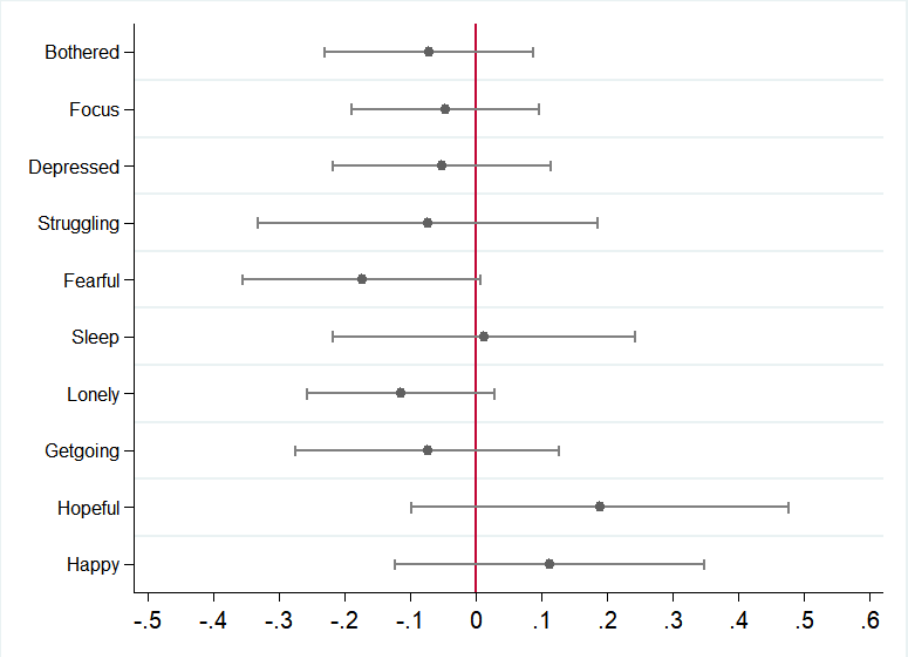
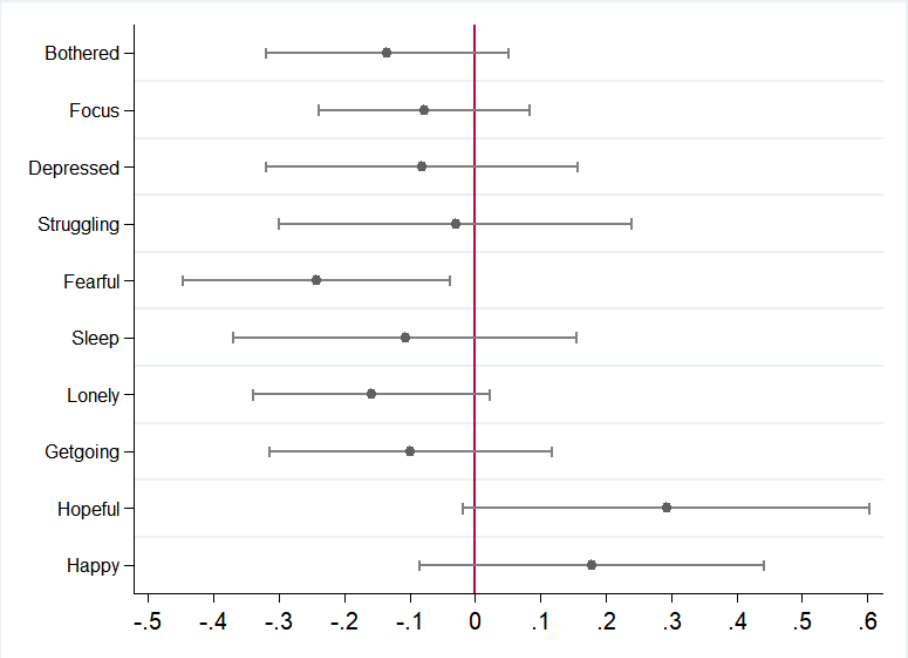


FIGURE A.2: There is no evidence of manipulation around the cutoff.



(A) Whole Sample.



(B) Bottom two thirds of wealth in our sample.

FIGURE A.3: β_3 is plotted to show the differential impact of the grant on each dimension of the depression score. The last two variables are positive emotions.

FIGURE A.4: No Evidence that Fertility increases when the Oldest member turns 60.

Tables

TABLE A.1: CESD-10 Questionnaire. The table shows the ten questions asked in the NIDS Survey to calculate the CESD-10 Score. For each emotion, individuals are asked how often they felt or experienced it in the past one week and a scoring has been assigned to the frequency such that a higher score corresponds to a more frequent experience of negative and difficult emotions. Two out of the ten emotions are positive for which the scoring is reversed.

In the past week	Rarely or none of the time	Some or little of the time	Occasionally	Most or all of the time
I was bothered by things that usually dont bother me	0	1	2	3
I felt depressed	0	1	2	3
I felt lonely	0	1	2	3
I was bothered by things that usually dont bother me	0	1	2	3
I felt that everything I did was an effort	0	1	2	3
I felt hopeful about the future	3	2	1	0
I felt fearful	0	1	2	3
My sleep was restless	0	1	2	3
I was happy	3	2	1	0
I could not get going	0	1	2	3

TABLE A.2: Proportion of depressed i.e. Depression Score of ten and above for different groups.$^{+}$ also includes the currently pregnant, as well mothers who gave birth in the past 1 year. * = not enough observations in this category.

	All Women	Never Gave Birth	New Mothers+	Not New Mothers
All	0.286	0.219	0.267	0.306
Age in years 15-19	0.196	0.187	0.251	0.236
- 20-29	0.258	0.239	0.268	0.262
- 30-39	0.275	0.306	0.273	0.272
- 40-49	0.311	0.301	0.267	0.312
- 50-59	0.346	0.325	*	0.345
- 60-69	0.338	0.344	*	0.332
Married / Living with partner	0.268	0.234	0.242	0.271
Not Married	0.294	0.218	0.278	0.327
Wealth Quintile - First	0.348	0.251	0.300	0.374
- Second	0.310	0.238	0.263	0.335
- Third	0.282	0.211	0.255	0.306
- Fourth	0.267	0.209	0.256	0.287
- Fifth	0.217	0.193	0.249	0.222
Rural	0.301	0.216	0.276	0.325
Urban	0.275	0.221	0.260	0.292
Black African	0.305	0.230	0.281	0.328
Other Race	0.201	0.170	0.185	0.210

TABLE A.3: Balance across eligibility in our sample in the 6-year window

Variable	(1) 0 Mean/SE	(2) 1 Mean/SE	T-test P-value (1)-(2)
Mother's Age	25.870	26.671	0.005
	(0.185)	(0.217)	
Child's Age Mos	23.413	21.406	0.107
	(0.903)	(0.834)	
Black African	0.853	0.858	0.797
	(0.013)	(0.013)	
Married	0.172	0.184	0.542
	(0.013)	(0.015)	
Mother works	0.204	0.219	0.502
	(0.014)	(0.016)	
Mother's Schooling - Grade 0	0.000	0.000	N/A
	(0.000)	(0.000)	
- Primary	0.027	0.019	0.265
	(0.006)	(0.005)	
- Middle	0.125	0.119	0.757
	(0.012)	(0.012)	
- Secondary	0.693	0.682	0.640
	(0.016)	(0.018)	
- Diploma	0.127	0.158	0.085
	(0.012)	(0.014)	
- Tertiary	0.011	0.010	0.829
	(0.004)	(0.004)	
Rooms per person	0.737	0.723	0.544
	(0.016)	(0.016)	
Toilet Type - Flush	0.413	0.381	0.216
	(0.017)	(0.018)	
- Latrine	0.481	0.494	0.637
	(0.018)	(0.019)	
- No Toilet	0.041	0.035	0.505
	(0.007)	(0.007)	
Number of children in HH	3.050	3.591	0.000
	(0.063)	(0.089)	
Household Size	7.650	8.413	0.000
	(0.109)	(0.142)	
Probability of Pregnancy	0.108	0.100	0.585
	(0.010)	(0.010)	
N	802	695	

Notes: The value displayed for t-tests are p-values. We compare all women in the regression sample to the left and right of the cutoff in a 6-year window. Note that "Black African" is a the majority ethnic group in South Africa and includes sub-groups such as Zulu, Xhosa, Sotho, and Tswana.

TABLE A.4: Results of Equation 1 - Without the full control vector

Dep var	Depression Score ≥ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
	Panel A: Parsimonious Specification				
Eligible	-0.061	-0.018	-0.015	0.004	0.042
	(0.069)	(0.051)	(0.044)	(0.043)	(0.040)
Perinatal	0.170***	0.196***	0.165***	0.161***	0.158***
	(0.051)	(0.043)	(0.042)	(0.041)	(0.037)
Eligible × Perinatal	-0.128*	-0.141**	-0.138**	-0.150***	-0.168***
	(0.072)	(0.061)	(0.057)	(0.050)	(0.047)
Observations	547	815	1068	1290	1515
District & Year Fixed Effects	✓	✓	✓	✓	✓
Age Controls	✓	✓	✓	✓	✓
	Panel B: Adding Mother Controls				
Eligible	-0.061	-0.012	-0.013	0.006	0.043
	(0.070)	(0.051)	(0.043)	(0.043)	(0.039)
Perinatal	0.172***	0.199***	0.166***	0.159***	0.155***
	(0.051)	(0.043)	(0.041)	(0.042)	(0.038)
Eligible × Perinatal	-0.141**	-0.150**	-0.137**	-0.148***	-0.166***
	(0.070)	(0.061)	(0.057)	(0.051)	(0.048)
Observations	547	815	1068	1290	1515
District & Year Fixed Effects	✓	✓	✓	✓	✓
Age Controls	✓	✓	✓	✓	✓
Mother Controls	✓	✓	✓	✓	✓

Notes: Perinatal is defined as those who are currently pregnant and gave birth in the past 6 months. *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis.

TABLE A.5: Main Results with the Addition of Spouse Controls

Dep var	Depression Score$\geq$ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Eligible	N/A	N/A	-0.006	0.163	0.290
			(0.561)	(0.306)	(0.252)
Perinatal	N/A	N/A	0.918*	0.449	0.497*
			(0.494)	(0.299)	(0.273)
Eligible $\times$ Perinatal	N/A	N/A	-1.080	-0.218	-0.744*
			(1.565)	(0.416)	(0.408)
Observations			60	76	93
District & Year Fixed Effects			✓	✓	✓
Age Controls			✓	✓	✓
Mother Controls			✓	✓	✓
Household Controls			✓	✓	✓
Spouse Controls			✓	✓	✓

Notes: Perinatal is defined as those who are currently pregnant and gave birth in the past 6 months. The sample size shrinks greatly because the spouse identifying information is only present in two waves. *** p$<$0.01, ** p$<$0.05, * p$<$0.1: Cluster robust standard errors in parenthesis.

TABLE A.6: Results - Grant Eligibility on Perinatal Depression with No Upper Limit on Comparison Group

Dep var	CES-D Score$\geq$ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Eligible	-0.012	0.012	0.009	0.018	0.030
	(0.047)	(0.038)	(0.035)	(0.032)	(0.030)
Perinatal	0.157***	0.167***	0.136***	0.133***	0.134***
	(0.047)	(0.044)	(0.040)	(0.038)	(0.034)
Eligible $\times$ Perinatal	-0.094	-0.117*	-0.110*	-0.114**	-0.137***
	(0.067)	(0.063)	(0.057)	(0.050)	(0.048)
Observations	1064	1596	2076	2537	2998
District & Year Fixed Effects	✓	✓	✓	✓	✓
Age Controls	✓	✓	✓	✓	✓
Mother Controls	✓	✓	✓	✓	✓
Household Controls	✓	✓	✓	✓	✓

Notes: Perinatal comprises of pregnant and new mothers (who gave birth in the last 6 months), and non-Perinatal now comprises of mothers who gave birth more than 6 months ago, but no restriction on how long it has been. *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis.

TABLE A.7: Endogenous Household Formation

Dep var	CES-D Score ≥ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Eligible	-0.087	-0.048	-0.057	-0.019	0.032
	(0.090)	(0.061)	(0.047)	(0.050)	(0.046)
Perinatal	0.176***	0.210***	0.169***	0.153***	0.158***
	(0.064)	(0.056)	(0.051)	(0.051)	(0.046)
Eligible $\times$ Perinatal	-0.160	-0.160**	-0.126*	-0.136**	-0.161***
	(0.098)	(0.072)	(0.065)	(0.061)	(0.056)
Observations	427	645	850	1023	1202

Notes: *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis. All specifications include controls shown in Table 3. But the sample is restricted to older person-mother dyads that have been living together for at least 2 years from the survey date.

TABLE A.8: Mothers with One Child or Pregnant with their First

Dep var	CES-D Score $\geq$ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Eligible	-0.099	-0.021	-0.047	-0.072	-0.021
	(0.167)	(0.120)	(0.108)	(0.094)	(0.089)
Perinatal	-0.097	0.060	0.206	0.164	0.209*
	(0.258)	(0.161)	(0.145)	(0.108)	(0.112)
Eligible $\times$ Perinatal	-0.183	-0.294**	-0.254*	-0.290***	-0.304***
	(0.252)	(0.146)	(0.137)	(0.105)	(0.111)
Observations	206	309	408	488	583

Notes: *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis. All specifications include controls shown in Table 3. But the sample is restricted to mothers who only have one child or are pregnant with their first.

TABLE A.9: Time Since Childbirth

Dep var	CESD Score ≥ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Panel A: Currently Pregnant & Birth in the last 1 year					
Eligible	-0.110	-0.013	-0.018	0.001	0.038
	(0.082)	(0.060)	(0.051)	(0.049)	(0.044)
Perinatal	0.085	0.152***	0.119***	0.119***	0.107***
	(0.052)	(0.041)	(0.041)	(0.040)	(0.032)
Eligible $\times$ Perinatal	-0.008	-0.094**	-0.097**	-0.096**	-0.103***
	(0.061)	(0.044)	(0.043)	(0.043)	(0.038)
Observations	541	808	1057	1276	1497
Panel B: Currently Pregnant & Birth in the last 2 years					
Eligible	-0.148*	-0.012	-0.013	-0.003	0.040
	(0.076)	(0.052)	(0.045)	(0.046)	(0.049)
Perinatal	0.010	0.098**	0.074*	0.073*	0.051
	(0.068)	(0.046)	(0.043)	(0.041)	(0.040)
Eligible $\times$ Perinatal	0.043	-0.066	-0.071	-0.057	-0.067
	(0.073)	(0.050)	(0.048)	(0.047)	(0.049)
Observations	541	808	1057	1276	1497
District & Year Fixed Effects	✓	✓	✓	✓	✓
Age Controls	✓	✓	✓	✓	✓
Mother Controls	✓	✓	✓	✓	✓
Household Controls	✓	✓	✓	✓	✓

Notes: *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis. All specifications include controls shown in Table 3.

TABLE A.10: Alternative Thresholds Defining Depression Risk

	(1) (58-61)	(2) (57-62)	(3) (56-63)	(4) (55-64)	(5) (54-65)
Dependent variable:	CESD Score $\geq$ 11				
Eligible	-0.123*	-0.049	-0.031	-0.013	0.027
	(0.071)	(0.050)	(0.040)	(0.039)	(0.039)
Perinatal	0.124**	0.156***	0.120***	0.106***	0.105***
	(0.057)	(0.043)	(0.039)	(0.037)	(0.034)
Eligible $\times$ Perinatal	-0.114	-0.150***	-0.129**	-0.121**	-0.129***
	(0.072)	(0.056)	(0.053)	(0.046)	(0.045)
Observations	541	808	1057	1276	1497
Dependent variable:	CESD Score $\geq$ 12				
Eligible	-0.090	-0.040	-0.026	-0.012	0.018
	(0.063)	(0.041)	(0.039)	(0.038)	(0.036)
Perinatal	0.055	0.100**	0.081**	0.071**	0.073**
	(0.056)	(0.047)	(0.038)	(0.035)	(0.031)
Eligible $\times$ Perinatal	-0.092	-0.144***	-0.124**	-0.126***	-0.131***
	(0.067)	(0.051)	(0.048)	(0.044)	(0.043)
Observations	541	808	1057	1276	1497
District & Year Fixed Effects	✓	✓	✓	✓	✓
Age Controls	✓	✓	✓	✓	✓
Mother Controls	✓	✓	✓	✓	✓
Household Controls	✓	✓	✓	✓	✓

Notes: *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis.

TABLE A.11: Women who did not experience the loss of a child

Dep var	Depression Score$\geq$ 10				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Eligible	-0.038	0.003	-0.008	0.007	0.052
	(0.086)	(0.063)	(0.053)	(0.047)	(0.046)
Perinatal	0.153***	0.191***	0.160***	0.159***	0.155***
	(0.055)	(0.046)	(0.047)	(0.043)	(0.040)
Eligible $\times$ Perinatal	-0.078	-0.122*	-0.107*	-0.121**	-0.147***
	(0.076)	(0.068)	(0.062)	(0.054)	(0.049)
Observations	483	724	943	1141	1341
District & Year Fixed Effects	✓	✓	✓	✓	✓
Age Controls	✓	✓	✓	✓	✓
Mother Controls	✓	✓	✓	✓	✓
Household Controls	✓	✓	✓	✓	✓

Notes: Perinatal defined as those who are currently pregnant and gave birth in the past 6 months. Mothers who experienced death of the child are excluded from the results shown in this table. *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis.

TABLE A.12: Full CES-D Score

Dep var	CES-D Score Out of 30				
	(1)	(2)	(3)	(4)	(5)
	(58-61)	(57-62)	(56-63)	(55-64)	(54-65)
Eligible	-1.468*	-0.898	-0.705	-0.425	-0.101
	(0.778)	(0.584)	(0.553)	(0.483)	(0.485)
Perinatal	0.953	1.181**	1.190***	1.061***	1.056***
	(0.589)	(0.446)	(0.368)	(0.359)	(0.339)
Eligible × Perinatal	-0.140	-0.341	-0.582	-0.623	-0.886*
	(0.831)	(0.698)	(0.527)	(0.529)	(0.503)
Observations	541	808	1057	1276	1497

Notes: *** p<0.01, ** p<0.05, * p<0.1: Cluster robust standard errors in parenthesis. All specifications include controls shown in Table 3. Results are stronger when restricting the sample to the poorer two thirds as in Panel B of Table 3.