The impact of employment on the health of South African children aged 6 to 60 months

A quantitative analysis of the 2008 National Income Dynamics Study

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ABSTRACT

This study's main aim is to investigate the impact of adult household members' employment on the health of children aged 6 to 60 months, with a particular focus on whether the gender of the employed adults matter. The study uses South African data from the nationally representative National Income Dynamics Study (NIDS), and children's health will be measured using the two anthropometric indicators height-for-age and weight-for-age to indicate stunting and underweight respectively. The sample consists of about 1700 children, and both descriptive and econometric analysis are utilised to show correlations between child health outcomes and employment. The econometric analysis was performed using a logit model, and results show an association between employment in the household and child stunting, while no association is found between employment and child underweight. The main finding of the study is that living in households where one or more women (and no men) have employment reduces the likelihood of children being stunted. No health gain is found for living in households with only employed men, or living in households where both men and women have employment, relative to living in households where no one has employment. These results are robust to controlling for household expenditure per capita and a variety of other household characteristics. Employment thus seems to have a positive impact on children's health, but the effect is only present in households where only females have employment.

PREFACE

The work described in this dissertation was carried out in the School of Development Studies, University of KwaZulu-Natal, Howard College Campus, Durban, in 2011/12, under the supervision of Doctor Daniela Casale.

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. It is being submitted for the degree of Master of Development Studies in the Faculty of Humanities, Development and Social Science, University of KwaZulu-Natal, Durban, South Africa. None of the present work has been submitted previously for any degree or examination in any other University.

Student signature

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1 INTRODUCTION

This study's main aim is to investigate the impact of adult household members' employment on the health of children aged 6 to 60 months, with a particular focus on whether the gender of the employed adults matter. Children's health will be measured using anthropometric data indicating whether a child is stunted or underweight, and the study uses South African data collected in 2008 from the nationally representative National Income Dynamics Study (NIDS) (Southern Africa Labour and Development Research Unit, 2008).

The paper consists of five chapters. The first provides the rationale for the study and a brief presentation of the study's themes and indicators of interest. Chapter 2 presents relevant literature and attempts to contextualise the study, and includes a theoretical framework and debates surrounding different aspects of the study. This chapter will also describe some of the main characteristics of the South African labour market. Chapter 3 presents the methods used to answer the main research objective and the key research questions, while Chapter 4 will present and discuss the findings. Chapter 5 offers the conclusion of the study.

1.1 CHILD MALNUTRITION

The focus on child malnutrition is growing and increasingly moving towards the centre of development discourse. The first of the United Nation's Millennium Development Goals is to eradicate extreme poverty and hunger, and one of the indicators used to monitor progress is prevalence of underweight children under five years of age. Organisations such as the United Nations, the World Health Organisation and the World Bank have all put child nutrition as a main area of focus in the fight against poverty, and there is little doubt about the seriousness of the problem of childhood malnutrition, particularly in the so-called developing world. The World Bank estimated that 27 percent of children under five in these countries are stunted and 23 percent are underweight (World Bank, 2006: 43). In the developed world, the figures are 2.6 and 1.1 percent respectively (Ibid.), numbers that illustrate massive inequalities between countries, and trends reveal that the gap between rich and poor countries is increasing (Stevens et al., 2012: 9). Black *et al.* find that stunting (low height as a result of malnutrition) is among the largest risk factors for global deaths and disability-adjusted life years (DALYs) for children less than five years.

The study of child malnutrition is central to the study of poverty and inequality. It goes beyond ordinary poverty measures like income, which are commonly measured as a household average, and measures individual indicators directly, which can reveal important dynamics in the intrahousehold distribution of resources. It also sheds light on how poverty is reproduced over generations.

> *"The worst damage from malnutrition takes place from conception through the first two years of life, and most of this early damage is irreversible"* (World Bank, 2006: 42).

Young children are particularly vulnerable to the consequences of malnutrition, as the first years of life are the most vital in terms of their physical and cognitive development, and small changes during childhood can have long-term effects (Grantham-McGregor et al., 2007).

Children's health will be measured by two commonly used anthropometric indicators, height-for-age and weight-for-age. Anthropometry is described by the World Health Organisation as "[…] the single most universally applicable, inexpensive, and non-invasive method available to assess the size, proportions, and composition of the human body" (WHO, , 1995: 1). It is also considered a good reflection of the overall health and welfare of individuals and populations (Ibid.).

> *"The best global indicator of children's well-being is growth, because infections and unsatisfactory feeding practices, or more often a combination of the two, are major factors affecting their physical growth and mental development. Poor growth is attributable to a range of factors closely linked to overall standards of living and the ability of populations to meet their basic needs, such as access to food, housing and health care. The assessment of growth not only serves as a means of evaluating the health and nutritional status of children but also provides an excellent measurement of the inequalities in human development faced by populations"* (de Onis, Frongillo and Blössner, 2000: 1222).

1.2 EMPLOYMENT IN SOUTH AFRICA

In South Africa there are extremely high levels of unemployment, and inequalities both in access to employment and wages. This makes the South African labour market an interesting and important subject of analysis.

> *"Given the importance of inequalities in remuneration and access to employment, the labour market should be given centre stage in any analysis of the origins of contemporary poverty and inequality in South Africa"* (Leibbrandt, Berg and Bhorat, 2001: 11).

In relation to child care, however, the perceived impact of employment can be ambiguous, particularly the impact of women's employment. Women's employment can be seen as competition for time spent on childcare, and thus detrimental to a child's health. On the other hand, working women are paid a salary, and increased income might improve their bargaining position within the household, meaning they may be able to translate increased income into their own preferences in consumption. Employment might also have some intrinsic value in that it can improve knowledge or formal or informal networks that might have a beneficial effect on children. While these dynamics are hard to expose, the impact of women's employment on children's health is therefore particularly interesting to investigate, as there are influences that possibly work in opposite directions.

Employment can also be utilised as a tool to shed light on intrahousehold inequalities and intrahousehold allocation of resources. Inequalities within the household are disguised in ordinary measures of poverty and inequality, which assume that the household average represents the welfare of all individuals in the household. Again, women's employment becomes of particular interest. An increasing amount of research (which will be reviewed in Chapter 2) has proven that if women have control over a household's resources, they tend to spend this income differently than men, more to the benefit of the general household welfare and particularly that of children. Central questions for this study will be whether employment can improve women's bargaining power within the household, and can this, in turn, improve the nutritional status of children.

This study aims to add to the knowledge on employment's impact on children's health. Anthropometric indicators ensure a direct measurement of children's nutritional status, and a focus on employment gives promising possibilities of examining intrahousehold dynamics

and decision-making processes. The main aim and key research questions of this study are as follows:

To investigate the impact of adult household members' employment on the health of children aged 6 to 60 months.

> *Key questions:*
>
> *(i) How does employment of household members impact on children's health?*
>
> *(ii) Does the sex of an employed household member make a difference to the impact on children's health, in particular does women's employment increase or decrease child health outcomes?*
>
> *(iii) What insights into understanding the outcomes of children's health from gender inequalities in the labour market can be drawn from these exercises?*

The impact of employment on child health has not been previously covered in the South African literature. Both the impact of the State Old Age Pension (e.g. Duflo, 2003) as well as socioeconomic inequalities in health outcomes (e.g. McIntyre and Zere, 2003) have been given some attention, but the impact of employment has so far been left out of any analysis of child health in South Africa. This study aims to provide some initial insight into this highly relevant area.

I will analyse fairly recent data from the National Income Dynamics Study (NIDS), and both descriptive and econometric analysis will be utilised to show correlations between child health outcomes and employment.

2 LITERATURE REVIEW

In this chapter I draw on a number of different literatures which are relevant to this study. The first part of the chapter tries to contextualise why this study is important. I do this by examining what impact malnutrition in childhood has on future outcomes, which highlights the substantial disadvantage that children who lack adequate nutrition in childhood suffer in later years.

The second and largest section of the chapter focuses on the links between women's access to resources and child outcomes, given that one important aim of this work is to identify the impact of women's employment on children's health. I first describe the two main theoretical approaches to household behaviour and decision-making, the unitary model and collective models of household behaviour. I then refer to the findings of a number of empirical studies which find evidence that, contrary to the predictions of the traditional unitary model of the household, outcomes might vary depending on who controls the resources in the households. More specifically, women's access to and control over resources in the household has been shown to improve child outcomes. I then focus more specifically on the research that looks at the influence of women's employment status in particular on child health, and here the findings are more mixed, as a mother's employment can have both positive and negative effects on child outcomes. At least two contrasting views exist. The first considers employment – more specifically a mother's employment – to have a negative impact on the child by reducing time spent on child care. The second argues that a mother's employment is of benefit to the child. This could come as a consequence of added income to the household; a reflection of women's increased control over resources and their different spending preferences; or simply as an absence of the potential traumas caused by unemployment in the household. Another possibility is that through work (as opposed to receiving income from other sources) women gain access to information that could help improve the wellbeing of their children and they may build formal and informal networks through work that could also benefit their children.

In the last part of the chapter I describe some aspects of the labour market in South Africa that are relevant to this work. In particular, I highlight that women have less access to employment than men in post-apartheid South Africa and that the kinds of jobs they hold are on average less well-paid and more insecure than the jobs that men hold. What effect this labour market

inequality might have for children is not clear, as the link between maternal employment and children's health is contested.

2.1 CHILDHOOD DEVELOPMENT AND LIFE OUTCOMES

Poor health suffered in childhood and early youth is likely to lead to permanent impairment, and studies show that this can lead to disadvantages at later stages in life: at school, in the labour market, and, in the last instance, for future generations (see for example, Agüero, Carter and Woolard, 2007; Grantham-McGregor et al., 2007; McIntyre and Zere, 2003; Paxson and Schady, 2005; Victora et al., 2008). The World Bank (2006) has argued that malnutrition is a serious obstacle for reaching the Millennium Development Goals (MGDs) and believes childhood deprivation to be an important part of the intergenerational reproduction of poverty and inequality. In its 2006 report '*Repositioning nutrition as central to development: a strategy for large scale action',* it stresses the importance of targeting children at an early age and to reduce hunger and malnutrition as one of the top development investments (World Bank, 2006). A wealth of literature has covered the influence of child health on various aspects of children's development. The findings, which are summarised below, show that poor health in early childhood has an adverse effect on numerous aspects of a child's development, as well as their prospects in later life.

Poor health and nutrition in early childhood can negatively affect a child's ability to learn. This can potentially lead to a huge waste of potential among millions of children, and children already living in poverty are particularly vulnerable. Studies from India (Upadhyay, Agarwal and Agarwal, 1989), Guatemala (Brown and Pollitt, 1996; Pollitt et al., 1993), Jamaica (Hutchinson et al., 1997), the Philippines (Mendez and Adair, 1999), Peru (Berkman et al., 2002), Kenya (Mukundi, 2003; Sigman et al., 1989), and Ecuador (Paxson and Schady, 2005) all show an association between various measures of children's health and cognitive performance. The same patterns appear in studies from the United States (reviewed by Taras, 2005), where poor nutritional levels were associated with poorer cognitive functioning, decreased school attendance, or worse academic performance.

The link between malnutrition and cognitive performance was first investigated early in the century. Early theories suggested that malnutrition caused permanent, structural damage to the brain, while later research proposed that other factors, like lack of energy and reduced integration with other people, might have had a negative influence (Brown and Pollitt, 1996:

40). Three different but not mutually exclusive hypotheses can be drawn from this literature. The first argues that malnutrition leads to (a permanent) impairment of a child's ability to learn; the second stresses that children who are insufficiently nourished have less energy and will find it harder to concentrate than well-nourished children, thus impacting learning negatively. The last argues that malnourished children may look younger and more poorly developed than their peers, and are consequently treated as if they were younger than their actual age – they might not be challenged or stimulated intellectually by adults, and school attendance may be delayed as a result (Brown and Pollitt, 1996: 41). All three are plausible explanations for why malnourished children perform worse than their well-nourished peers. It is, however, difficult to isolate the negative effects of possible physical impairments from the effects due to a lack of energy, and none of the studies reviewed make an attempt to distinguish between the three.

In a study of Ecuadorian children (aged 36 to 71 months), Paxson and Schady (2005) use a vocabulary test of language ability as a measure of cognitive ability, while height-for-age and weight-for-age z-scores were used to measure a child's health and nutritional status[1]. They conclude that there exists a strong association between health, socioeconomic status and cognitive ability of pre-school children, and poorer children find themselves at a significant disadvantage at a later age (Paxson and Schady, 2005: 18-19). Similar results are found among rural school children (aged 9 to 13 years) in Jamaica. Hutchinson *et al.* (1997) found a positive and significant association between height-for-age and school performance, and the results were valid when differences in social background were controlled for (Hutchinson et al., 1997). Studies from Kenya (Mukundi, 2003; Sigman et al., 1989) and Ecuador (Paxson and Schady, 2005), also using anthropometric indicators to measure children's health, find significant relationships between nutritional status and cognitive performance. Sigman *et al.* (1989) found that length at 30 months was positively associated with cognitive scores at 5 years, while Mukundi (2003) found weight-for-height to be the second strongest predictor (school attendance was the strongest) of school achievement of 13 and 14 year old Kenyan children. Meeks Gardner *et al.* (1995) looked at Jamaican children from poor neighbourhoods in Kingston, and found that on enrolment, stunted children had a deficit in development, particularly in locomotor development (walking, running, jumping, etc.). There were significant overall group differences at each point (Meeks Gardner et al., 1995: 1790).

[1] In addition, haemoglobin levels and the number of months the child was breast fed were used.

Malnutrition in early childhood has also been proved to have a negative impact in later childhood. In the Philippines, Mendez and Adair (1999) analysed the impact of stunting in the first two years of life on cognitive tests when the child was 8 and 11 years old. Controlling for socioeconomic indicators, they find that children that were stunted between birth and age 2 performed worse than nonstunted children, especially when stunting was severe. An interesting finding this study made is that stunting in the first two years of life was more strongly associated with test performance at age 8 than 11, suggesting that the negative effects of early malnutrition may decline over time (Mendez and Adair, 1999: 1560). Severe stunting did however seem to have a lasting effect at age 11 (Ibid.). This suggests that early childhood malnutrition might not lead to permanently impaired mental development, but rather a delay. A Peru study aimed to find how stunting at infancy impacts cognition in late childhood, and its findings support those from the Philippines: children with severe stunting at 2 years scored lower on cognitive tests at 9 than children without severe stunting, also after controlling for socioeconomic factors and schooling (Berkman et al., 2002). Additionally, the degree of stunting influenced the test scores; children who were severely stunted at 2 years scored much lower than both moderately stunted and nonstunted children during the same period (2002: 568). In a re-analysis of longitudinal data from the Philippines, Jamaica, Peru, and Indonesia, in addition to new data from Brazil and South Africa, Victora *et al.* (2008) showed an association between stunting at a young age and poorer cognitive performance and/or lower school grades in later childhood.

The adverse effect of early malnutrition might even manifest itself well into adult life, but studies of the relationship between malnutrition during childhood and health status in later life are hard to come by. Extensive follow-up studies are needed, and both time and resource constraints make such studies rare. Victora *et al.* (2008) have used data from five long-standing cohort studies from Brazil, Guatemala, India, the Philippines, and South Africa to analyse the relationship between undernutrition in childhood and adult outcomes. They found a strong association between undernutrition at 2 years and various later life outcomes (Victora et al., 2008).

> *"Undernourished children are more likely to become short adults, to have lower educational achievement, and to give birth to smaller infants. Undernutrition is also associated with lower economic status in adulthood"* (Victora et al., 2008: 353).

Case and Paxson (2006) used US and UK data to find an association between height and intelligence, and argue that taller children perform better than their peers from age 3 and all the way through working life. The correlation between height in childhood and adulthood is high, approximately 0.7 for both men and women (Ibid.).

SUMMARY

The reviewed literatures above underline the importance of focusing on poor health and nutrition in childhood. Malnutrition[1] in early life may have serious consequences well into later childhood, adult life and for future generations. Grantham-McGregor *et al.* (2007) estimate that over 200 million children under five years are not fulfilling their developmental potential due to early childhood stunting and poverty, a number that illustrates the magnitude of the problem, as well as showing how malnutrition may act to perpetuate poverty and inequality from one generation to the next. Institutions like the World Bank have fairly recently acknowledged the extent of the adverse effects malnutrition has for development and now ranks it as a one of the top development investments (above for example trade liberalisation) (World Bank, 2006), indicating that the issue of malnutrition and its broader consequences is beginning to get the attention it deserves.

2.2 THE INTRAHOUSEHOLD ALLOCATION OF RESOURCES: WOMEN'S ACCESS TO RESOURCES AND CHILD OUTCOMES

The previous section described how malnutrition (and generally poor health) during childhood might have consequences for an individual's later life. As this paper will attempt to identify differences in child outcomes depending on which household member has employment, I will now look to the household and examine how household allocation decisions might impact on children's health and nutritional status. I will begin by illustrating how economic theory has explained household behaviour. This serves as an introduction to the rest of this paper which will look at the impact of employment, in particular women's employment, on child health. Early economic theory, which will be discussed in more detail below, treats the household as

[1] Malnutrition may also include overweight and obesity. This aspect of malnutrition has not been given attention in this chapter, and as it is of minor importance for this paper, I will only mention it briefly. There exists a growing literature on child overweight related to poverty. This problem is increasing in magnitude among lower income groups and countries, adding another dimension to ordinary measures of malnutrition, and the prevalence of overweight among poor children is expected to grow in the coming years, as well as the subsequent health risk child overweight entails (see for example, Brody, 2002; Jinabhai, Taylor and Sullivan, 2003; Mamabolo et al., 2005; Monteiro et al., 2004; Prentice, 2005).

one, an assumption that is in direct conflict with a perception that income earned by women can have different outcomes (for the household) than income earned by men. Substantial evidence proves that there are important differences depending on who controls a household's resources, meaning that control over resources matter for intrahousehold allocation. Women's income, including both wage and non-wage income, tends to have a larger positive impact on children's health than income in the hands of men. An introduction to different economic models of household behaviour thus serves as a useful introduction to the empirical studies on household behaviour and the impact of women's employment on children's health.

MODELS OF HOUSEHOLD BEHAVIOUR

In most household surveys, data on income and consumption is collected at the household level. Information on individual income and consumption is thus often not directly observed, and researchers need to make assumptions on how the household makes allocation decisions. At least two ways to think about household decision-making are important: the 'classic' unitary model and a competing set of models commonly referred to as collective models.

The unitary model is the simplest model of household behaviour. Often referred to as the 'Beckerian model', as it dates back to Gary Becker's seminal works on the issue (Becker, 1964, 1974, 1981), it is an extension of the neoclassical model of individual consumer demand, and applies individual consumer theory to the household level. The household is considered to be the basic decision-making unit and is, in short, assumed to act as one by pooling all its resources and then reallocating them according to some common rule. Alderman *et al.* (1995: 1) note that this model views the household as "[…] a collection of individuals who behave as if they agreed on how best to combine their time, goods purchased in the market, and goods produced at home", or in more technical terms (from Thomas, 1990: 636), that all members of the household work together to "[…] jointly maximize some household level welfare function and income is allocated so that the marginal rate of substitution between any two goods is the same as for any other pair". This approach has also been extended to include household decisions about child care, crop adoption, education, fertility, health, home production, labour supply, land tenure, and migration (Alderman et al., 1995). It is frequently referred to as the *common preferences* model, the *altruism* model or the *benevolent dictator* model.

The model's simplicity makes it easy to apply to household surveys and its assumptions are in some cases necessary simplifications. Many surveys only offer data aggregated to the household level, which makes the unitary model the most obvious option to use, but its application does come with some important limitations. The assumption of income pooling requires that at least one household member (e.g. the benevolent dictator) has the ability to monitor, control and sanction other household members to make sure they act in the interest of the household, an issue of both information flows and control (Alderman et al., 1995: 3). To explain an inequitable distribution of resources or differing welfare levels within the household, an assumption of rational household behaviour is regularly applied. The distributional within-household inequalities are explained by preferences for inequality shared by household members (Alderman et al., 1995: 3); like providing more food to those with the ability to earn higher incomes or giving priority to boys' education. Thus is it rational for the household to give some members preferential treatment. This household rationality further projects, as Alderman *et al.* (1995) note, that the inequitable allocation of resources within a household represents a "... willing act on the part of all household members" (1995: 4). This assumption, critics argue, fails to meet one of the basic rules of neoclassical microeconomic analysis, namely individualism (Bourguignon and Chiappori, 1992), and creates a conflict between individual and household rationality. Individualism "[…] requires each individual to be characterized by his (her) own preferences, rather than being aggregated within the ad-hoc fiction of a collective decision unit […] it is hardly possible to relate household preferences to each agent's initial tastes" (Bourguignon and Chiappori, 1992: 355-356). By assuming household members have an equal bargaining position within the household, the unitary model also neglects questions of power within the household, and it fails to incorporate important within-household dynamics and differing preferences. For women and children, in particular, such an assumption is problematic, as argued by Folbre (1986: 255):

> *"The suggestion that women and female children "voluntarily" relinquish leisure, education and food would be somewhat more persuasive if they were in a position to demand their fair share. It is the juxtaposition of women's lack of economic power with the unequal allocation of household resources that lends the bargaining power approach much of its persuasive appeal.*"

Alternatives to the unitary model that challenge some of its assumptions have emerged as a result of its shortcomings. These are commonly referred to as collective models of household

behaviour (or bargaining models), and although there exist several formulations of collective models, they share the interest of directly addressing how individual household members reconcile different preferences, and differ from the unitary model in the rules governing the distribution of resources among household members (Alderman et al., 1995). The collective models depart from the common preferences assumption of the unitary model and argue that the household should be described as "… a group of individuals, each of whom is characterized by particular preferences, and among whom a collective decision process takes place" (Bourguignon and Chiappori, 1992: 355). Collective models permit heterogeneity in preferences among household members, but differ in their assumptions about the allocation mechanism (Thomas, 1990: 636). In short, collective models allow for different preferences and power among individuals within the household.

> *"Households […] are recognizably constituted of multiple actors, with varying (often conflicting) preferences and interests, and differential abilities to pursue and realize those interests. They are arenas of (albeit not the sole determinants of) consumption, production and investment, within which both labor and resource allocation decisions are made. And evidence from many regions reveals persistent gender inequalities in the distribution of household resources and tasks."* (Agarwal, 1997: 3).

EMPIRICAL STUDIES OF HOUSEHOLD BEHAVIOUR

Empirical support for the unitary framework is weak. Significant differences in individual outcomes are found depending on who has control over a household's resources. Of particular interest for this study is the gendered aspect of many of these findings.

> *"Under a model of (perfect) altruism (or common preferences of all household members), then the distribution of income within the household should have no impact on expenditure patterns"* (Thomas, 1993: 130).

Lundberg, Pollak and Wales (1997) used changes in the United Kingdom child benefit scheme in the 1970s to test the assumptions of the unitary model. The benefit scheme was switched from a reduction in taxes for the father to a cash payment to the mother, a change that allowed researchers to perform a natural experiment using UK panel data. Under the income pooling assumption, this change should have no effect on expenditure patterns, but the study found evidence to the contrary, showing that the income received by the mother and

father had a substantial and significant differential effect on spending patterns. Although not measuring child welfare directly (they used changes in clothing consumption), the authors argue these findings are consistent with the notion that children do better when their mothers control a larger share of household resources (Lundberg et al., 1997: 480). Phipps and Burton's (1998) study from Canada shows that, while income is pooled for some categories of consumption, the expenditures on child care only increase with women's incomes. They analyse the behaviour of couples in which both partners are full-time, full-year participants in the paid labour market. They reject the hypotheses of the household utility framework, but the results also suggest that it may not be appropriate to assume that couples either pool all resources or pool no resources.

Thomas (1990) has examined how households in Brazil allocate resources among their members. He focused on individual outcomes such as nutrient intake, survival, fertility and child health – indicators that, according to the assumptions of the unitary model, should not be influenced by which household member controls the resources. His data showed clearly that this is not the case; the individual outcomes measured varied significantly depending on who controlled the resources:

> *"The common preference (or neoclassical) model of household resource allocation does not seem to perform well in these health outcome regressions. Relative to fathers (and other household members), mothers appear to be more effective at using the income over which they have control to improve the health of their families"* (Thomas, 1990: 650).

Thomas' findings are particularly strong when it comes to nutrition. He finds that the maternal income effect on nutrient demand is between four and seven times larger than the paternal income effect, something that indicates strongly that women direct more resources than men toward improving household nutrition (1990: 647). In addition, compared to a father's income, a mother's income has a stronger positive effect for both daughters and sons, but this effect is stronger for girl children (1990: 657). Based on his findings, Thomas (1990) rejects the common preference model of the household. He finds that unearned income[1] in the hands of a mother has a bigger effect on her family's health than income under the control of

[1] Unearned income included nonwage income from pensions, social security and workers compensation, rents and income from physical assets, financial assets, gifts and other irregular income (Thomas, 1990: 643).

a father; for child survival probabilities, the effect is almost twenty times bigger (Thomas, 1990: 635). In a later study, in which he included the effects of both wage and nonwage income, he found that women tended to buy more nutritious food than men; that although household food shares declined as women's income rose, the calorie and protein content of the food consumed did, in fact, go up (Thomas, 1993: 111). The results for total (labour and unearned) income were, he argued, very similar to those that examine only the impact of unearned income (1993: 126).

A range of literature has made findings that support those above. Qian (2008) used Chinese data to explore whether changes in relative female income affect survival rates of boys and girls, and finds that an increase in relative female income has a positive effect for girls (2008: 1253). In Côte d'Ivoire, Hoddinott and Haddad (1991) found that increasing women's share of household income increased the budget share of food while budget shares of alcohol and cigarettes fell. The same study found child outcomes (anthropometric status) to improve with women's rising income shares, results that could reflect either differences in preferences among household members or reallocation of expenditure in response to differing allocations of time (1991: 5). In South Africa, Esther Duflo (2000, 2003) has analysed the impact of the Old Age Pension (OAP) on the nutritional status of children aged 6 to 60 months. She finds that the pension received by women significantly improved both height-for-age and weight-for-age z-scores for young girls, while no effects were found for young boys or children in households where the pension was received by a man (2003)[1].

The above section discussed economic models of household behaviour as well as empirical research on how households allocate resources. Now, I will look more specifically at what impact employment has on children's health. This literature is, to a large extent, focused on parental employment.

WOMEN'S EMPLOYMENT AND ITS IMPACT ON CHILDREN'S HEALTH

A large literature covers the relationship between parents' employment status and various indicators of children's health, development and wellbeing, and the vast majority focuses

[1] A more recent paper by Ambler (2011) questions some of Duflo's findings. Ambler found that pension eligibility increased the income of women but not for men (for men, pension eligibility did not "… result in an increase in personal income, personal income as a percentage of total household income, or total household income" (2011: 39)), but Duflo assumes such an increase for both women and men, and that women are directing this increase in income differently than what men do. Ambler do, however, conclude that "[…] robust increases in decision-making power for pension eligible women supports the assertion that changes in who controls household income do affect how households allocate resources" (2011: 40).

primarily – often exclusively – on maternal employment. At least two contrasting views exist on the effect of maternal labour market participation: the first (*traditional*) view argues that an employed mother has an adverse effect on the child, while the second (*non-traditional*) maintains that having a working mother can be of benefit to the child (Horwood and Fergusson, 1999). The main line of argument revolves around a perceived trade-off between time (for childcare) and income (from employment)[1], and has, as argued by Glick and Sahn (1998: 334), an indirect effect on children:

> *"Changes in maternal labour supply and income affect child health not directly but by altering the levels of health inputs such as mother's and other's childcare and food preparation time, the quantity and quality of food consumed by the child, and the use of health services."*

Researchers have examined the effect of parents' employment status on children using both cognitive and physical indicators (and as I have demonstrated earlier in the chapter, these are closely related). The results found largely reflect the trade-off between time and income. In an extensive review of the UK and US literatures, Boca *et al.* (2005) find little consensus on the relationship between maternal employment and a child's cognitive development, but find other short and long-term consequences. Increased early maternal employment manifests itself through worse socioemotional adjustment, while a long-term consequence (of having a working mother) is lower educational attainment for adolescents in their late teens and early twenties (Boca et al., 2005). Two recent US studies found that maternal employment can have a negative effect on children's physical health. Morrill (2011)[2] has studied the relationship between maternal employment and several 'adverse health events'. She found that maternal employment was an important determinant of a child's risk of experiencing such an event, and found it to increase the probability of each of these adverse health events (Morrill, 2011). The results are supported by Gennetian *et al.* (2010)[3], who analysed elementary-school-aged

[1] It has also been found that the health of the child can impact on parents' decision to work, and that having a child with poor health is associated with reduced employment of mothers and fathers (see for example Kuhlthau and Perrin, 2001).
[2] A control for income is included in this study, but family income, according to the author, is poorly measured in the NHIS, by dummy variables for ten salary categories. The study found that "… the estimates of the positive effect are only slightly diminished when family income is included" (Morrill, 2011: 249). Health status was measured by overnight hospitalisations, asthma episodes, injuries/poisonings for children aged between 7 and 17.
[3] The study found that maternal employment without an increase in family income or the probability of health insurance coverage might negatively influence young children's health. Health was measured by the mother's report of the child's general health status.

children from low-income families in the US, and found a modest adverse effect of maternal employment on the general health status of children.

Glick and Sahn (1998) found that the positive effects from mothers' increased income were largely offset by negative time allocation effects, findings that largely support the perception of a trade-off between time and income.

> *"The basic findings are in accord with expectations from the theoretical framework of a tradeoff between negative effects of reductions in the quantity (and perhaps the quality) of childcare and positive effects of additions to income. Additional time devoted by the mother to market work, taken as an inverse proxy for the level and quality of time in household child health-producing activities, is associated with reductions in height-for-age of children under 5. Increases in mother's labour income, on the other hand, led to greater child height, and this effect is a positive function of pre-schooler age, consistent with older children being relatively more dependent on market goods"* (Glick and Sahn, 1998: 351-352).

Blau, Guilkey and Popkin (1996), on the other hand, find little evidence that maternal employment has an impact on a child's health status. They conclude that "[t]he fear that increased maternal employment and the associated decline in breastfeeding that usually accompanies it will have adverse consequences for infant health seems unfounded" (1996: 129). Horwood and Fergusson (1999) came to similar conclusions in the analysis of a sample of New Zealand children. They found a small positive association between mothers' employment and the academic achievement of children, but their results were reduced to insignificance when a range of family and child factors were added. No effect was found of fathers' work choices. They conclude that 'any effects of maternal labour market participation on academic achievement are relatively small or inconsequential' (Horwood and Fergusson, 1999: 1013).

Other research has analysed the effect of unemployment in the family on children's health. Ström (2003) reviews literature on unemployment and children's physical health, and finds that parental unemployment correlates with worse outcomes in different aspects of children's physical health, like lower birthweight, shorter stature, or increased risk of infant mortality. Sleskova *et al.* (2005; 2006) find, looking at Slovakian adolescents, that the long-term unemployment of mother, father, or both were negatively associated with adolescents'

subjective health[1]. Their results remained significant when indicators of social class and the financial strain of unemployment were controlled for. In a different study of five Nordic countries, Pedersen and Madsen (2002) analysed data on 10 000 children aged 2-17 years and their parents, and concluded that children with no parents employed had a higher prevalence of ill health and lower wellbeing than children with at least one employed parent. An association between parents' labour market participation and children's health and wellbeing was found in all five of the Nordic countries (Pedersen and Madsen, 2002: 866). In a later paper, Pedersen, Madsen and Köhler (2005) found, using 1996 data from Denmark and Sweden, that financial strain associated with non-employment does not explain the increase in health problems among children in families affected by non-employment. The study suggests that family labour market participation is linked to children's health, also when controlling for social status, family type, and immigrant status. The authors do, however, point out that the relationship is complex and might go both ways: a child's illness may, especially in families with few financial constraints, influence a parent's ability and/or desire to work (Pedersen et al., 2005: 320). I will refer to this issue of reverse causality again in the methodology section.

SUMMARY

As has been shown, different spending preferences have consequences for children in the household, and research strongly suggests that income in the hands of women (in most cases the mother) has a positive impact on children's health relative to income controlled by men. This demonstrates that the identity of who earns the income does have an effect on household outcomes. The average wellbeing of the household is not necessarily a precise indicator of the wellbeing of the individuals in the household.

The assumption of equivalence between individual and household wellbeing does also have other consequences for policy and analysis. It can lead to large understatements of inequality (Haddad and Kanbur, 1990), and it incorrectly suggests that what matters for public policy is the amount of income (through for example grants) the household receives, not the identity of the recipient (or the target of a public programme) (Alderman et al., 1995: 2). Data from several and very different contexts show that this is not the case, that it does matter who controls additional resources. What seems particularly clear is that women and men have different preferences. Women tend to spend income in a way that benefits individuals in the

[1] The study controlled for perceived economic situation of respondents by measuring perceived financial stress and family affluence (Sleskova et al., 2005: 529). The 2006 study does not control for family income.

household, notably the health of children, which provides a strong argument for transferring income 'from the wallet to the purse'.

However, due to the trade-off between time and income, there exists potentially conflicting effects of maternal employment on child health and wellbeing, a conflict that is reflected in the international empirical literature. For this study, it is clearly problematic that the majority of these studies focus on nuclear families in Western countries, contexts that are very different from that of South Africa, both when it comes to labour market dynamics and household formation. Even between reasonably similar countries, like those studied above, generalising across borders must be done with caution. Institutions, welfare regimes and parental behaviour vary greatly, giving large variations in how parents' employment status might impact on children. Whether the effect of women's employment on child health in South Africa is a positive or negative one, is largely an empirical question which this paper seeks to address.

In the final part of this chapter I highlight some key aspects of the post-apartheid labour market in South Africa, and particularly women's employment prospects. If a positive link is found between women's employment and child health, a woman's disadvantaged position, both in access to employment and wages, might also be a disadvantage for children in the household. If the assumption that women spend money more 'wisely' while they face stronger constraints in their ability to earn income, the negative effect for children can thus be intensified by women's inability to find decent employment.

2.3 THE SOUTH AFRICAN LABOUR MARKET

The South African labour market is characterised by high unemployment, as well as stark inequalities in access to employment, wages and worker's rights. When investigating the labour market in South Africa there are (at least) two main areas that need to be considered. The first area, the one that attracts the most attention from researchers and policy makers, is the unemployment rate. The number of unemployed individuals of working age is extremely high, and the challenge of creating enough employment has not been successfully addressed by post-apartheid policies. Second, there is the issue of quality of employment, or more specifically the wages paid in the lower end of the income scale. The working poor constitute a significant group of the South African labour market, and many do, despite having a job, earn less than what is needed to even cover basic necessities for themselves and their families.

A household's wage income has been proven to be the primary determinant of household poverty and inequality (Leibbrandt, Berg, et al., 2001: 17-18). This underlines the importance of including labour market dynamics into an analysis of wellbeing.

CHANGING PARTICIPATION PATTERNS IN THE POST-APARTHEID PERIOD

The end of apartheid brought with it considerable changes in the dynamics of the South African labour market. In the post-apartheid period, the labour force grew rapidly, especially among Africans and women. From 1995 to 2008, South Africa's working age population, defined as individuals aged 16 to 64, increased from 23 to 29 million, and the percentage of individuals participating in the labour market went up from 49 to 55 percent (Leibbrandt, Woolard, McEwen, et al., 2010: 4). The rate of job creation was, however, lower than the growth of the labour force, leading to a net increase in unemployment (see for example, Banerjee et al., 2008; Casale, 2004; Casale, Muller and Posel, 2005; Casale and Posel, 2002; Kingdon and Knight, 2005). The individuals that entered the labour force were mainly low-skilled people who entered a labour market that went through a skill-biased technical change, and labour demand could not keep up with supply (Leibbrandt, Woolard, McEwen, et al., 2010: 4). These developments followed global trends, where a more and more skilled labour force has left the unskilled more prone to unemployment (Banerjee et al., 2008: 738). In South Africa, the economy experienced stagnation in the overall demand for labour, in particular demand for less-skilled labour in the primary sector (i.e. mining and agriculture), while some gains were made in sectors like finance, retail and services (Banerjee et al., 2008). The development favoured more skilled workers, leaving displaced low-skilled workers unable to relocate to sectors where jobs were available (Banerjee et al., 2008: 724). More recent trends show signs that unemployment rates have started to drop. Leibbrandt et al. (2010: 10) found an increase from 13.6 to 28.9 percent[1] in the period 1993 to 2001, and a fall to 23.4 percent in the 2008 NIDS data. Kingdon and Knight attribute this fall to an increase in economic growth and lower population and labour force growth (2008, in Leibbrandt, Woolard, McEwen, et al., 2010: 9). The highest unemployment rates are currently found among women (30.1 percent), Africans (27 percent) and people aged 16 to 24 (39.4 percent), many of whom have never had a job and/or are long-term unemployed (Leibbrandt, Woolard, McEwen, et al., 2010).

[1] These statistics are based on the narrow (official) definition of unemployment, which includes only those who have actively searched for work in the last four weeks and are able to accept a job within the next week.

Although being fairly successful in increasing the number of jobs, the South African labour market has not been able to keep up with the increasing labour force. Over the past 20 years, employment trends show a decline in the labour absorption capacity of the South African economy (Leibbrandt, Bhorat and Woolard, 2001: 83).

POVERTY AND INEQUALITY

Poverty and inequality in South Africa are intimately linked with the labour market. The 2008 NIDS data show that the proportion of income derived from wages increased linearly by income decile (Leibbrandt, Woolard, McEwen, et al., 2010: 22), indicating the importance of wage income as a determinant of a household's position in the income distribution. For households in the poorest five deciles, wage income accounted for a relatively small part of total household income, and high unemployment rates were found in data from 1993, 2000 and 2008 (Leibbrandt, Woolard, McEwen, et al., 2010). The unemployment situation, especially among households in the lower deciles, worsened in this period (Ibid.). The labour market has also been identified as a leading driver of the increase in income inequality. Leibbrandt *et al.* (2010: 24) and Banerjee *et al.* (2008) show that wage inequality has increased in the post-apartheid period as the top deciles have experienced a growth in real wages while the poorest have not. These results are mirrored in findings by Carter and May (2001) and May and Woolard (2007), who have found that upward mobility in the post-apartheid period has been largely reserved for wealthier households, while the poorest cohorts have experienced little of this. The bottom decile's real income has actually been nearly halved (Leibbrandt, Woolard, McEwen, et al., 2010: 24). Most workers have experienced a growing economic precariousness and an inability of employment to provide stable livelihoods above poverty levels (Barchiesi, 2008), observations that are supported by Leibbrandt *et al.* (2010), who find that the presence of an employed person in the household is not at all a guarantee for not being poor. Still, lack of access to employment is a strong marker of poverty, meaning households with no employed members are very likely to be poor (Ibid.). Even the presence of an unemployed individual seems to have a negative impact on the household in which they live. Bhorat (2004) finds that, within African households, those with one or more unemployed individuals are worse off than households with no unemployed members. African households are also disproportionately burdened relative to other race groups, he observes, as the high unemployment rates within the African population group

mean that more zero-income individuals need to be sustained by these households (2004: 964).

> *The […] data provides strong evidence […] that not only are jobless individuals disadvantaged by being zero earners, but that the households they attach themselves to are invariably poorer across the income distribution than those with no jobless individuals resident* (Bhorat, 2004: 966).

When it comes to the gains made in poverty reduction, these have had little to do with the labour market. People in the lower deciles have actually found it increasingly difficult to find work, and the improvements seen in poverty reduction have been driven mainly by social policy. Cash grants like the Child Support Grant and the Old Age Pension have been the most effective interventions in reducing poverty rates (Leibbrandt, Woolard, McEwen, et al., 2010). The labour market has thus been underperforming quite severely in employment creation and poverty reduction. It has been particularly disadvantageous for low-skilled people, typically Africans and in particular African women.

GENDER DYNAMICS

Employment equity legislation, higher education among women and an increasing proportion of women living in households without men are major drivers of women's growing participation in the South African labour market (see Casale and Posel, 2002; Kingdon and Knight, 2005). This development has largely been associated with an increase in female unemployment, significant gender inequalities and a feminisation of low-paid insecure forms of employment. Casale and Posel (2002) find that much of the increase in female employment comes from a growth of self-employment in the informal sector; a sector associated with low earnings, little protection and insecure working conditions. Bhorat and Leibbrandt (2001) also find significant gender inequalities, in particular among the working poor. Using 1995 data, they draw a bleak picture of the situation of many African women:

> *Females make up 57% of poor labour market participants and African females alone constitute 50% of this total. This is not only because of the much higher incidence of unemployment. When we focus only on the employed, African females make up 53% of the working poor by straight head-count and 68% when the depth of poverty is considered. Given that African women make up 30.5% of the labour force and 23.3%*

> *of the employed, their poverty 'contributions' are seen to be far in excess of their representation. This is a stark illustration of the special vulnerability of this section of the labour force* (Bhorat and Leibbrandt, 2001: 100).

Looking at the more recent 2008 NIDS data, Leibbrandt and Girdwood (2009) find high wage inequality between mothers and fathers, indicating that there still exists significant gender inequalities in the South African labour market.

SUMMARY

The South African labour market has been through major changes in the post-apartheid period, and a major consequence was the 'feminisation' of the labour force, in which large numbers of women entered the labour market. During this period, changes in the dynamics of the labour market have not worked in these women's favour. Women thus occupy a disadvantaged position in the South African labour market, both when it comes to access to employment and wages.

2.4 CONCLUSION

This chapter has attempted to describe three important areas or research and illustrate why they are relevant for this study. I have demonstrated that child nutrition should be a vital area of focus for both policy and research, as malnutrition during childhood can have serious consequences for an individual's health and prospects in later life, and is most efficiently targeted at an early age.

The intrahousehold distribution of resources may have important consequences for children's health and nutritional status. Understanding how these dynamics manifest themselves in individual outcomes in general, and child nutrition in particular, is key to helping decrease the prevalence and severity of various forms of child malnutrition. The majority of studies prove that income in the hands of women tend to benefit children more than income in the hands of men. This association is more controversial when it comes to employment, particularly maternal employment. There is the possibility of a time/money trade-off, and the effect of maternal employment on children's health in the international empirical literature is mixed as to which effect is stronger.

In the last section of the paper, I highlighted some of the key features of the South African labour market in the post-apartheid period. I have found that the South African labour market

disfavour women, both in access to employment and wages. If this study finds a positive association between women's employment and children's health, this is of central importance, and would suggest, as argued by Hoddinott and Haddad below, a reason for mitigating women's disadvantaged position in the labour market.

> *"[W]omen face greater constraints in their ability to generate income […] if increasing women's income improves outcomes such as child health, then this would suggest a further, powerful reason for mitigating these constraints"* (Hoddinott and Haddad, 1991: 2).

3 METHODOLOGY

This chapter will present the methodology of the study. I will begin by introducing the data, the 2008 National Income Dynamics Study, and this study's sample. Then I will go through the methods which will be used to answer the main research objective and the key questions, which are reproduced below:

To investigate the impact of adult household members' employment on the health of children aged 6 to 60 months.

> *Key questions:*
>
> *(i) How does employment of household members impact on children's health?*
>
> *(ii) Does the sex (gender) of an employed household member make a difference to the impact on children's health, in particular does women's employment increase or decrease child health outcomes?*
>
> *(iii) What insights into understanding the outcomes of children's health from gender inequalities in the labour market can be drawn from these exercises?*

The anthropometric indicators, which are the dependent variables, and their attributes and use will be presented in some detail, after which I will go through the employment status variables and controls that will be used in the econometric analysis. The chapter will be concluded by summarising some of the limitations of the study.

3.1 DATA AND SAMPLE

This study will analyse data from the baseline wave of the National Income Dynamics Study (NIDS). NIDS was conducted by the Southern African Labour and Development Unit (SALDRU) based at the University of Cape Town's School of Economics and is South Africa's first national panel study (Leibbrandt, Woolard and Villiers, 2009: 1). Data for the baseline wave were collected in 2008, and contain information on more than 7300 households and nearly 30 000 individuals. Following waves are planned at two-year intervals and data from the second wave was released at the beginning of 2012. NIDS includes rich data on a wide range of areas; including income, expenditure, assets, access to services, education, health and other dimensions of wellbeing, as well as a physical examination of the height and weight of children.

NIDS targeted private households in all nine provinces of South Africa, as well as residents in workers' hostels, convents and monasteries (Leibbrandt et al., 2009: 9). A stratified, two-stage cluster sample design was employed in sampling the households to be included in the base wave. In the first stage, 400 Primary Sampling Units (PSUs) were selected from Statistics South Africa's (SSA) 2003 Master Sample of 3000 PSUs[1]. The questionnaires were based topics like agriculture; shocks, assets and credit; demography; intrahousehold, social networks and social cohesion; health; education; and migration and remittances (Leibbrandt et al., 2009: 3). Four questionnaires were administered: household, adult, child and a proxy questionnaire. All were translated into all of the eleven official languages of South Africa (Leibbrandt et al., 2009: 4). The total response rate was 69 percent, but varied greatly between population groups. Whites had the lowest response rate, only 36 percent, while Indian, Coloured and African response rates were 66, 73 and 76 percent respectively (Leibbrandt et al., 2009: 23).

This study will use anthropometric indicators to measure children's health. The World Health Organization recommends the analysis of height and weight measures to be restricted to children aged 0 to 5 years (WHO Working Group, 1986). For this reason and following earlier studies (Case and Deaton, 1998; Duflo, 2003; McIntyre and Zere, 2003), the sample for this study is restricted to children aged 6 to 60 months. NIDS includes data on around 3000 children in this age group, and roughly 80 percent of these are African. South Africa has a history of social and economic stratification by race, and race is an important marker of both poverty and inequality. To avoid the results being obscured by 'the racial effect', this study will be restricted to only African children. The issues of race must be carefully considered in all empirical analysis of South African data, and my decision to focus on African children largely follows the convention in other empirical analyses of South African data. In addition, the samples of children with valid anthropometric data from the other three population groups are too small for any meaningful comparison, leading to their unavoidable exclusion from this study. It is also among African households that the highest prevalence of poverty is found (Leibbrandt, Woolard, Finn, et al., 2010), making African children the most likely to suffer from the effects of undernutrition. The high rates of missing anthropometric data in the NIDS constitute a challenge as nearly one third of African children aged 6 to 60 months have

[1] This is the same sample that was used for SSA's Labour Force Surveys and General Household Surveys between 2004 and 2007 and for the 2005/06 Income and Expenditure Survey (Leibbrandt et al., 2009: 9).

missing or biologically implausible data on anthropometry (see Appendix 1). Although there are some variations in key socioeconomic indicators and household employment status, most notably per capita expenditure, between the sampled children and those with missing anthropometry, none of these variations are statistically significant and should not constitute a major bias in the results.

The anthropometric indicators will be expressed by z-scores (these will be explained in more detail below). Following WHO recommendations (2007), children with biologically implausible z-scores were excluded according to the following cut-off points: height-for-age z-scores (HAZ) lower than -6 or higher than 6; and weight-for-age z-scores (WAZ) lower than -6 or higher than 5. 62 children in the weight-for-age sample and 121 children in the height-for-age sample were excluded due to biologically implausible z-scores. Children who were reported to have any serious illnesses or disabilities were also excluded from my sample, 73 from the height-for-age sample and 78 from the weight-for-age sample. This is done for two main reasons: (i) if the child fails to follow normal growth as a result of its illness or disability, this will obscure my results, and (ii) a range of research have shown that parents' labour market decisions can be affected by having a sick child at home (see for example Breslau, Salkever and Staruch, 1982; Kuhlthau and Perrin, 2001; Salkever, 1982; Thyen, Kuhlthau and Perrin, 1999). To remove disabled and sick children from the sample will thus help avoid an obvious source of endogeneity. This leaves a sample of 1698 African children with valid height-for-age data and 1714 African children with valid weight-for-age data.

3.2 METHODS

I will use both descriptive and econometric analysis to show correlations between child health outcomes and employment. I will give an overview of the relevant data through descriptive analysis, including household composition and participation in the labour market, income, and household size. For the anthropometric data, I will show the means and prevalence levels of the full sample, as well as their relation to a selection of key variables.

The second stage of the analysis will consist of developing an econometric model and running a set of regressions with child health data as the dependent variable with household labour market variables disaggregated by gender as independent variables. Controls will include a set of relevant variables, i.e. household income, education, province, urban/rural residence and household composition. A set of logit regressions will be run using a binary z-score variable,

examining the likelihood of a child having an abnormal z-score or not, depending on the employment status of household members. The variables for indicating employment will be (i) no one in the household is employed; (ii) only male(s) employed in the household; (iii) only female(s) employed in the household and; (iv) both male(s) and female(s) employed in the household.

All descriptive and regression analyses were weighted using population weights supplied by NIDS. NIDS uses weights derived from the Stats SA midyear population estimates for 2008.

DEPENDENT VARIABLES

Anthropometric indicators are considered effective indicators of children's health and overall wellbeing (WHO Working Group, 1986), and are increasingly utilised in research as more and better data become available. This study will employ two anthropometric indicators to measure children's health and wellbeing; height-for-age z-scores (HAZ) and weight-for-age z-score (WAZ). Low height-for-age indicates stunting, defined as a 'failure to reach linear growth potential as a consequence of inadequate nutrition or poor health' (World Bank, 2006: xviii). Low weight-for-age indicates undernutrition and may result in underweight (World Bank, 2006: xviii). The two indicators are, to some extent, similar, as both can be used to indicate malnutrition, but their attributes differ somewhat. Height-for-age is considered the more long-term indicator, where a low score might imply long-term malnutrition and a poor general health status. *Shortness* is the descriptive term for low height-for-age, while *stunting* refers to the underlying pathological process. In this regard, it is important to note that an abnormal anthropometric score does not necessarily translate to a health deficit. In areas of low prevalence, most children with a low height-for-age score are genetically short and it would be inappropriate to assume that they are stunted (WHO Expert Committee, 1995: 164). In high-prevalence areas, on the other hand, it may be safely assumed that most short children are stunted (Ibid.). This is no different when it comes to low weight-for-age, where *lightness* has been suggested as the descriptive term and *underweight* is used to refer to the pathological process (WHO Expert Committee, 1995: 170). Conventional cut-off points for abnormal anthropometry are -2 standard deviations (SD) below the mean of a reference population for (moderate) stunting or underweight, and -3SD for severe stunting or underweight (WHO Working Group, 1986).

Although both indicators used in this study may imply malnutrition, the World Health Organization does not recommend using the term malnutrition to refer to low height-for-age or low weight-for-age. Obesity and overweight also indicate forms of malnutrition, meaning that malnutrition does not necessarily equate to hunger or inadequate dietary intake (WHO Expert Committee, 1995: 163). It is therefore recommended to qualify the term malnutrition depending of which indicator one uses, e.g. 'malnutrition based on low height-for-age'. I will attempt to use this throughout this paper. Table 1 describes how anthropometric data may be interpreted on the individual level.

TABLE 1: DESCRIPTION OF ANTHROPOMETRIC INDICATORS AND THEIR OUTCOMES

Anthropometric indicator	Terms describing outcomes	Terms describing process	Explanation
Low height-for-age	Shortness	---	Descriptive
	Stunted	Stunting (gaining insufficient height relative to age)	Implies long-term malnutrition and poor health
Low weight-for-age	Lightness	---	Descriptive
	Underweight	Gaining insufficient weight relative to age, or losing weight	Implies stunting and/or wasting

Source: Adapted from WHO Expert Committee (1995: 163).

The z-scores are reported in relation to the 2006 WHO international child growth standards (World Health Organization, 2006), and represent the difference between the value for an individual and the median value of a reference population. The growth standards provide, according to the World Health Organization, "… a technically robust tool that represents the best description of physiological growth for children under five years of age. The standards depict normal early childhood growth under optimal environmental conditions and can be used to assess children everywhere, regardless of ethnicity, socioeconomic status and type of feeding" (World Health Organization, 2006: xx).

Following conventional cut-off points of z-scores (WHO Working Group, 1986), I consider a child stunted if its height-for-age z-score (HAZ) is less than or equal to -2 standard deviations (SD) lower than the reference population. To indicate severe stunting, the cut-off point is set to -3SD. Similarly, for underweight, measured by weight-for-age z-scores, the cut-off points are set to -2SD for underweight and -3SD for children who are severely underweight. Severe

underweight and stunting are included in the analysis to examine whether the severity of malnutrition is in any way relevant. This means that for each specification of the equation, four estimations will be run, i.e. where the dependent variables are stunting, severe stunting, underweight, and severe underweight.

EXPLANATORY VARIABLES

EMPLOYMENT STATUS OF HOUSEHOLD MEMBERS

Given my research objectives, the main variables of interest are those that capture the employment status of household members. The majority of studies which analyse the relationship between a household's (or a family's) attachment to the labour market and children's health, focus on the labour market status of parents. In contexts where the nuclear family is the norm, or at least fairly common, such a strategy is preferable, but this is not the case for most South African children. The dynamics of household formation are complex and are likely to be strongly influenced by, among others, migration, social welfare and the employment status of individuals; many children live in multi-generational households and with extended families, and few grow up with both parents present. The unclear role of fatherhood[1] and in many cases the absence of fathers means that many children grow up with single mothers, grandparents or other family members as the main caregiver. Findings based on the 1993 PSLSD survey showed that only one-third of African children were growing up with both parents in the household (Le Roux, 1994 in Woolard and Leibbrandt, 2001: 55) and in the 2002 General Household Survey (GHS), less than 40 percent of children aged 15 years and younger live with their father[2] (Posel and Devey, 2006). In this study's sample of African children aged 6-60 months, only one out of four children lives with both parents. South African households are thus a heterogeneous unit of analysis, and to apply a framework designed for a 'Western' context is unlikely to capture the diversity of households South African children reside in. Thus, without the empirical luxury of a high prevalence of nuclear families, other ways of capturing a household's attachment to the labour market are needed, and as a consequence, this analysis is extended to include the employment of all adult household members. A household's attachment to the labour market was calculated as

[1] See Linda Richter and Robert Morrell's (eds.) book '*Baba: Men and fatherhood in South Africa*' (2006) for a comprehensive and diverse account of fatherhood and the roles of fathers in South Africa.
[2] The authors argue this might underrepresent the presence of fathers in the lives of children, as absent fathers may continue to retain contact with their children (Posel and Devey, 2006: 49).

follows: first, all adult household members[1] were assigned a 1 if they were employed and a 0 otherwise. At this point, no distinction was made between types of employment or non-employment. Second, a dummy set was created to indicate whether a child lived in a household with (i) no employed individuals; (ii) one or more men employed; (iii) one or more women employed; or (iv) at least one woman and one man employed. This way of measuring a household's attachment to the labour market is subject to some inaccuracy, particularly as it does not explicitly include the number of employed individuals. However, in combination with other control variables such as household expenditure, the number of adults in the household and the presence of mothers and fathers, which will be described below, it should capture a household's attachment to the labour market in a satisfactory manner.

OTHER CONTROLS IN THE REGRESSIONS

A range of control variables were included. Some are based on studies similar to this (see for example Agüero et al., 2007; Duflo, 2003; McIntyre and Zere, 2003; Pedersen and Madsen, 2002; Thomas, 1990), while others are specific to the South African context (largely following Leibbrandt and Woolard (2001)).

Per capita expenditure: Expenditure (consumption) is the most commonly used indicator of welfare, and is preferred over income as a measure of a household's overall welfare. Expenditure is believed to be less tied to short-term income fluctuations, as households or individuals can perform consumption smoothing by for example saving or going into debt, thus making it more stable over time (see for example, Rio Group, 2006). A household's socioeconomic position has a significant impact on stunting and underweight among children (see , Grantham-McGregor et al., 2007; McIntyre and Zere, 2003; Paxson and Schady, 2005; Victora et al., 2008). In South Africa, McIntyre and Zere (2003) have found significant inequalities in the distribution of stunting and underweight favouring those at the top of the income distribution, and that poor African children bear the greatest burden of malnutrition. I have included the log value of per capita expenditure to control for a household's socioeconomic position. Using the log value helps deal with the skewness of income.

Household composition and characteristics: Poor households are typically larger than better-off households and have more children, therefore I have included a full set of household

[1] Adults are defined as women aged 16 to 59 and men aged 16-64 (inclusive). The cut-off point for pensioners follow those of eligibility for the OAP in the first half of 2008.

composition variables: children aged 0-5; children aged 6-15; adult females (16-59); adult males (16-64); and pensioners (women aged 60 or older and men aged 65 and older). All values are expressed as numbers.

Education level: To control for education levels in households, a variable indicating the highest level of education obtained by a household member (measured in number of years of schooling) is included. The household average and the household head's education were other commonly used options I considered, but were left out due to an increase in missing values.

Remittances: South African household composition was highly disrupted by apartheid policies. High numbers of labour migrants, particularly from African households, left their families for work elsewhere. This is a legacy that is still very much present, and many households receive remittances from migrants. I have thus included a variable capturing the number of remitters to the household to allow for the impact of migrant labour.

Social welfare receipt: Social welfare in South Africa is extensive, and for many poor households, represents a substantial[1] (and increasing) proportion of their total income (Leibbrandt, Woolard, Finn, et al., 2010: 26-27). To capture the impact of child-related grants[2] and the old age pension (OAP), these are marked by dummy variables indicating whether someone in the household receives a grant on behalf of the child, or a pension.

Even though per capita household expenditure is controlled for, including this latter set of variables (i.e. receipt of remittances, child-related grants and the OAP) allows me to identify whether specific sources of income have differential effects on child outcomes and also controls to some extent for the specificity of households that have migrant workers or receive social grants.

Locational effects: Incidence of poverty is higher in rural areas than in urban areas (Leibbrandt and Woolard, 2001), so an urban-rural dummy variable is included to account for this, as well as for the differences between urban and rural labour markets. In addition, living in a rural area may provide the opportunity to grow food for subsistence, altering nutritional outcomes. Provincial dummies were not included, as they were all insignificant and did not increase the model's explanatory power.

[1] Approximately 73 percent for the bottom decile in 2008 (Leibbrandt, Woolard, Finn, et al., 2010: 26).
[2] Child related grants include the Child Support Grant, the Foster Care Grant and the Care Dependency Grant.

3.3 LIMITATIONS OF STUDY AND SENSITIVITY TESTING

Some compromises were required as a consequence of a limited sample size. Previous studies of a similar nature, in particular those from Western countries, tend to focus on parental employment in nuclear families. This proved too unwieldy with the South African data, and required that this analysis include the employment of all household members. I will attempt to explore the issue of parenthood further by including this in alternative specifications.

The same goes for headship, which will not be included in the main analysis. Headship represents an alternative way of measuring intrahousehold dynamics and power. This will be explored to some extent in alternative specifications of the main model. These alternative specifications will also serve as sensitivity tests to check the robustness of the main models.

Another source of concern is the way employment is measured. It is reduced to a binary variable which does not take into account the type and length of employment or non-employment. This was a necessary simplification that disguises important aspects of the labour market. Length and type of employment are two aspects that ideally would have been included in the analysis. This proved difficult as the employment status variable potentially included more than one individual. This is, however, an area that needs further examination.

Lastly, I am unable to control for unobserved heterogeneity in the cross-sectional data I use and the methods required for such an analysis are beyond the scope of this paper. For example, if women who are employed are also different in other unobservable ways that are positively related to child health, the estimated effect of women's employment will be biased upwards.

4 FINDINGS

This chapter will present and discuss the findings of this study. I will begin by presenting a descriptive analysis of the dependent variables in this study, the two anthropometric indicators. I will show prevalence levels of stunting and underweight as well as the mean values of the two indicators, and how prevalence levels in combination with means can be used to assess the health status of entire populations. The results found for this study will be compared to and discussed in relation to prevalence levels in other areas. Next, I will present basic statistics of the key independent variables which will be used in the regression analysis. Means and standard errors of all independent variables will be presented, and possible correlations with child health outcomes will be discussed.

Results from the econometric models, using logit regressions, will be presented in the second part of the chapter. These results indicate that children who live in households with one or more employed woman have a smaller probability of being stunted than children living in households with no one employed or with only men in employment. Part three will discuss the results in greater detail and in light of existing literature reviewed in Chapter 2. A conclusion and thoughts on future research will close the chapter.

4.1 DESCRIPTIVE DATA

I will begin this chapter by giving a short review of the characteristics of the anthropometric indicators used in this study, as well as how they are commonly used in research, both at the individual and population levels. Key population statistics from my sample of children will be presented along with these.

ANTHROPOMETRIC INDICATORS

Anthropometric data are considered good measures of children's general health status. In this study, two indicators – height-for-age and weight-for-age – are employed to determine the health status of children. Recall that height-for-age is considered the more long-term indicator, where a low score might imply long-term malnutrition and a poor general health status. *Shortness* is the descriptive term for low height-for-age, while *stunting* refers to the underlying pathological process. For low weight-for-age, *lightness* is suggested as the descriptive term and *underweight* is used to refer to the pathological process (WHO Expert Committee, 1995: 170). Conventional cut-off points for abnormal anthropometry are -2

standard deviations (SD) below the mean of a reference population for (moderate) stunting or underweight, and -3SD for severe stunting or underweight (WHO Working Group, 1986).

Anthropometric data can also be used to assess the health status of a population. Population values for height-for-age are said to represent the cumulative effect of socioeconomic health and nutrition problems, and can be used to verify the existence and magnitude of a nutritional problem (WHO Expert Committee, 1995). The World Health Organization (1995) has recommended prevalence ranges which may be used to decide the severity of malnutrition in a population (see Table 2).

TABLE 2: CLASSIFICATION OF WORLDWIDE PREVALENCE RANGES AMONG CHILDREN UNDER 5 YEARS OF AGE

Indicator	Severity of malnutrition by prevalence ranges (percent of children below -2SD)			
	Low	Medium	High	Very high
Low height-for-age	<20	20-29	30-39	≥40
Low weight-for-age	<10	10-19	20-29	≥30

Source: WHO Expert Committee (1995: 208).

Table 3 (below) shows population data for this study's sample, which can be compared against the cut-off values in Table 2. 17.34 percent of children are moderately stunted and 11.74 percent fall below the threshold for moderate underweight. Compared to the WHO classification table, my sample is located in the low and medium severity level for height-for-age and weight-for-age respectively. It is, however, far above what is expected in a well-nourished population, where only 2.3 percent[1] of children are expected to fall below the -2SD cut-off. This is regardless of whether they are malnourished or not. 2.3 percent can thus be regarded as the baseline of expected prevalence but is rarely subtracted from the observed value (de Onis and Blössner, 1997: 50). Considering the substantial prevalence levels of low height-for-age and weight-for-age found in South Africa, it is reasonable to assume that most children in the sample with abnormal z-scores are stunted or underweight.

[1] The z-scores follow a normal distribution. 2.3 percent can be considered the baseline of expected prevalence.

TABLE 3: PREVALENCE OF STUNTING AND UNDERWEIGHT AMONG SAMPLED CHILDREN

Height-for-age (n=1698)			Weight-for-age (n=1714)		
Mean z-score	Pct. stunted (z≤-2SD)	Pct. severely stunted (z≤-3SD)	Mean z-score	Pct. underweight (z≤-2SD)	Pct. severely underweight (z≤-3SD)
- 0.658***	17.34***	6.81***	-0.259***	11.74***	5.13***
(0.064)	(1.40)	(0.99)	(0.067)	(1.21)	(0.73)

Weighted data. Standard errors in parentheses. Significance levels indicate whether the **mean values** are significantly below zero or whether **prevalence ranges** are significantly below the baseline of a well-nourished population (2.3 percent) *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's calculations, NIDS (SALDRU, 2008)

Table 4 (below) shows total prevalence levels for Southern Africa, Eastern Asia and South America. Compared to the findings in Table 3, it is clear that South Africa has a lower prevalence of stunting than what is found in the rest of the region. The prevalence of underweight is roughly the same in South Africa as in Southern Africa more generally. Both Eastern Asia and South America have lower prevalence levels of stunting and underweight than what I find in NIDS. Prevalence levels of stunting in South Africa are closer to those found in Eastern Asia and South America than they are to those in its own region. This might not be surprising as major countries in East Asia and South America are considered to be in a similar economic position as South Africa.

TABLE 4: CHILDHOOD STUNTING AND UNDERWEIGHT ACROSS REGIONS

Area	Percentage stunted (≤ -2SD)	Percentage underweight (≤ -2SD)
Southern Africa	30.2 [25.4-35.6]	11.4 [8.0-15.7]
Eastern Asia	14.5 [13.5-15.5]	5.1 [4.8-5.4]
South America	13.8 [6.9-26.3]	4.1 [2.5-6.7]
All developing countries	32.0 [29.3-34.6]	20.2 [17.9-22.6]

[95 percent confidence intervals]
Source: Estimates from 2005 based on The WHO Child Growth Standards by UN regions and subregions (Black et al., 2008: 7).

Prevalence levels in the NIDS are lower than what was found by McIntyre and Zere using 1993 data (2003), and are also lower than what WHO estimates in the period 1993 to 2008 (World Health Organization, 2012). This might indicate that the prevalence levels of stunting

and underweight in South Africa are decreasing. However, comparing data from different sources comes with a risk of some inaccuracy, as data quality, samples, and analysis might differ substantially from study to study. As a general conclusion, it is fair to assume that South Africa seems to be doing better than the rest of the Southern African region, and that the situation appears to be improving. These findings are supported by Ardington and Case (2009), who make similar conclusions.

In addition to prevalence levels, z-score means may be used to measure a population's nutritional status. Table 3 presents the means for this study's sample, and both the mean of height-for-age and of weight-for-age are significantly below zero. This tells us that the whole distribution is shifted downward. I will get back to what this may tell us about a population's nutritional status below. Mean z-scores are considered to be better population level indicators than prevalence levels. According to the World Health Organization, mean z-scores describe:

> *"[…] the nutritional status of the entire population directly, without resorting to a subset of individuals below a set cut-off. As an index of severity for malnutrition, it also addresses the conceptual shortcomings that 'standardized prevalence' and 'minimum prevalence' are intended to overcome by not assuming that only those individuals below the cut-off are affected"* (WHO Expert Committee, 1995: 221).

Mean z-scores also provide a more accurate estimate of poor anthropometric status of a population than observed prevalence does, and differences in means provide greater statistical power than differences in prevalence in discriminating across target groups (Yip, 1993 in, WHO Expert Committee, 1995: 25).

Mean z-scores significantly below zero, as is the case in this study's sample, indicate a downward shift of the entire distribution and suggest that most – if not all – individuals are affected. The mean z-scores seen in Table 3 strongly suggest that there is a health and nutrition problem that is likely to affect the whole population of African children, not only those below the set cut-off points – those considered stunted or underweight.

> *"On a population basis, both the prevalence of abnormal anthropometry and the mean Z-score serve as useful indicators of the health and nutrition problems of the community. A high prevalence of low height-for-age indicates poor nutrition, high*

morbidity from infectious disease, or – most often – both" (WHO Expert Committee, 1995: 181).

The combination of prevalence levels and mean z-scores is a useful backdrop for the rest of this chapter. They demonstrate that there exist considerable levels of malnutrition – measured by height-for-age and weight-for-age – in the population of African children aged 6 to 60 months. The means suggest that this is likely to affect the whole population of children, not only those that fall below the cut-off points.

INDEPENDENT VARIABLES

Table 5 and 6 present means and standard errors of all the independent variables used in this study, as well as the percentage of children who live in urban areas and in households that receive welfare or remittances. Per capita expenditure is included as an overall measure of a household's welfare level, which has a proven impact on children's health. The log value is preferred as it is less sensitive to the highly skewed distribution of income in South Africa. Education level is indicated by the number of years of education for the highest educated household member, and serves to control for the level of education in the household. A full set of household composition variables are also included in the model to ensure that the effect of different household types is taken into account. Controlling for urban/rural differences may pick up some of the effects that come from access to health care facilities, education, and the difference between urban and rural labour markets. The tables also show the percentage of children who lives in households that receive child related grants[1], the State Old Age Pension, or remittances. These controls are included to identify whether specific sources of income might have an impact on child outcomes, and they also control to some extent for the characteristics of households that have migrant workers or receive social grants. Table 5 presents the values for the height-for-age sample and Table 6 the values for the weight-for-age sample.

[1] This includes the Child Support Grant, the Foster Care Grant, or the Care Dependency Grant.

TABLE 5: MEANS AND S.E.'S OF INDEPENDENT VARIABLES (HEIGHT-FOR-AGE SAMPLE)

	Not stunted	Stunted (z≤-2SD)	Severely stunted (z≤-3SD)	Full sample
Per capita expenditure	499.30 (40.38)	436.13 (49.13)	603.03 (112.25)	488.34 (38.70)
PCE log	5.76 (0.05)	5.69 (0.06)	5.92 (0.11)	5.74 (0.05)
Max years of education	10.49 (0.12)	10.06 (0.22)	10.26 (0.41)	10.42 (0.12)
Household size	6.75 (0.23)	6.64 (0.27)	6.37 (0.39)	6.73 (0.21)
Children 0-5	1.87 (0.06)	1.97 (0.08)	1.87 (0.11)	1.89 (0.05)
Children 6-15	1.58 (.08)	1.62 (0.11)	1.61 (0.16)	1.59 (0.07)
Women 16-59	2.09 (0.08)	1.97 (0.10)	1.76 (0.14)	2.07 (0.07)
Men 16-64	1.39 (0.07)	1.26 (0.07)	1.08 (0.11)	1.36 (0.07)
Female pensioners 60+	0.22 (0.02)	0.20 (0.03)	0.23 (0.05)	0.21 (0.02)
Male pensioners 65+	0.10 (0.01)	0.10 (0.02)	0.11 (0.04)	0.10 (0.01)
Urban (pct.)	43.62 (0.04)	38.11 (0.05)	37.55 (0.08)	42.66 (4.17)
Child related grant (pct.)	68.80 (0.22)	63.81 (0.04)	53.39 (0.07)	67.93 (2.00)
Old Age Pension (pct.)	22.46 (0.02)	19.14 (0.03)	21.22 (0.06)	21.89 (1.62)
Remittances (pct.)	20.20 (0.02)	20.29 (0.32)	22.58 (0.05)	20.22 (1.55)
n	1391	307	99	1698

Weighted data. Standard errors in parentheses.
Source: Author's calculations, NIDS (SALDRU, 2008)

TABLE 6: MEANS AND S.E.'S OF INDEPENDENT VARIABLES (WEIGHT-FOR-AGE SAMPLE)

	Not underweight	Underweight (z≤-2SD)	Severely underweight (z≤-3SD)	Full sample
Per capita expenditure	488.90 (37.02)	466.20 (52.42)	434.44 (82.19)	486.23 (35.27)
PCE log	5.74 (0.05)	5.72 (0.08)	5.67 (0.12)	5.74 (0.05)
Max years of education	10.50 (0.10)	9.86 (0.26)	10.00 (0.37)	10.43 (0.10)
Household size	6.65 (0.24)	6.58 (0.25)	6.59 (0.35)	6.64 (0.22)
Children 0-5	1.88 (0.06)	1.84 (0.08)	1.70 (0.12)	1.87 (0.05)
Children 6-15	1.52 (0.08)	1.69 (0.12)	1.81 (0.16)	1.54 (0.07)
Women 16-59	2.08 (0.08)	1.99 (0.12)	1.98 (0.18)	2.07 (0.08)
Men 16-64	1.35 (0.07)	1.20 (0.10)	1.23 (0.16)	1.33 (0.07)
Female pensioners 60+	0.21 (0.02)	0.23 (0.04)	0.23 (0.07)	0.21 (0.02)
Male pensioners 65+	0.09 (0.01)	0.14 (0.04)	0.14 (0.06)	0.10 (0.01)
Urban (pct.)	42.22 (0.04)	39.60 (0.06)	43.35 (0.08)	41.92 (4.11)
Child related grant (pct.)	69.41 (0.02)	59.29 (0.04)	64.22 (0.07)	68.23 (1.97)
Old Age Pension (pct.)	22.07 (0.02)	22.00 (0.04)	20.02 (0.06)	22.06 (1.60)
Remittances (pct.)	20.97 (0.02)	16.26 (0.03)	18.90 (0.05)	20.42 (1.53)
n	1516	198	77	1714

Weighted data. Standard errors in parentheses.
Source: Author's calculations, NIDS (SALDRU, 2008)

Except for the high value of average per capita expenditure for children who are considered severely stunted[1] (Table 5), the values show the expected results. Children who are underweight and children who are stunted ($z \leq -2SD$) seem to live in households which are poorer than the full sample. Concerning household size and composition, there is some indication that children who are stunted live in households with slightly more children than average and less adults. Children who are considered underweight ($z \leq -2SD$) seem to live in households with lower education than what is average for the full sample. The table also shows that children in my sample are more likely to live in rural areas than urban. Almost 60 percent lives in rural households.

The Child Support Grant (CSG) and State Old Age Pension (OAP) are two of the most important parts of the South African welfare scheme, and this is evident in the sample. Almost 70 percent of children live in households where someone receives a child related grant – a Child Support Grant, Foster Care Grant or Care Dependency Grant. In comparison, only just above 20 percent of the children live in households where a pensioner receives the Old Age Pension, and roughly the same percentage of children live in households which receive some form of remittances. The substantial shares of households which receive various forms of external support demonstrate the importance of controlling for the impact of these on children's health.

Table 7 presents what percentage of children live in the different household employment categories and the prevalence levels of stunting and underweight in each of these. These are the categories that were presented in the methods chapter and which will be used in the regression analyses below.

[1] This may be due to the small sample (n=99) and a couple of outlier cases: A few children who live in high-income households are stunted but they tend to be overweight too.

TABLE 7: PERCENTAGE OF CHILDREN WHO ARE STUNTED OR UNDERWEIGHT IN EACH OF THE EMPLOYMENT CATEGORIES

	Height-for-age			Weight-for-age		
	Stunted	Severely stunted	**Full sample**	Underweight	Severely underweight	**Full sample**
(i) no one in the household is employed	20.36 (2.04)	8.98 (1.59)	42.12 (2.21)	13.24 (1.84)	5.95 (1.18)	42.17 (2.27)
(ii) only male(s) employed in the household	18.97 (3.49)	7.13 (2.69)	18.86 (1.72)	13.58 (2.70)	7.04 (2.14)	18.30 (1.60)
(iii) only female(s) employed in the household	12.83 (1.94)	3.54 (1.10)	26.48 (1.72)	8.95 (1.82)	3.25 (1.02)	27.24 (1.72)
(iv) both male(s) and female(s) employed in the household	14.26 (3.58)	5.98 (2.41)	12.53 (1.35)	10.06 (3.12)	3.63 (2.46)	12.29 (1.32)
Total	17.34 (1.40)	6.81 (0.99)	100.00	11.74 (1.21)	5.13 (0.73)	100.00

Weighted data. Standard errors in parentheses.
Source: Author's calculations, NIDS (SALDRU, 2008)

Roughly 58 percent of children live in households with at least one household member employed, revealing that nearly half of the children in this study live in households where no one is employed. 18-19 percent lives with only one or more men employed and around 26-27 percent in households with only one or more women in employment. Children who live in households where individuals of both genders with employment reside comprise the smallest groups, only 12 percent of children live in these households. This underlines the problem of unemployment in South African, and particularly the high levels of unemployment among African households. The prevalence of both stunting and underweight are highest in household where no one has employment and lowest in households where only female(s) are employed.

4.2 REGRESSION RESULTS

The second part of the statistical analysis was performed as logit regressions run separately for each of the dependent variables. Regression results are presented in five columns and controls are introduced in stages. For simplicity, the household employment categories described earlier are referred to as (i) *none employed;* (ii) *employed men;* (iii) *employed*

women, and; (iv) *employed men and women*. The households with employed members could have one or more employed men or women.

Each model was run in five steps, where controls for household characteristics, household composition, and welfare receipt and remittances were included in stages. This is done as an attempt to isolate the impact of employment on the different dependent variables, and to illustrate how the coefficients might change as new controls are introduced. This will ensure that any association found in the univariate function (Column 1) is not a result of, for example, the effect of added income of employment or the higher education of a household member. Controls for income, education, as well as an urban dummy, are introduced in column 2. Column 3 introduces controls for household composition, and in column 4 the full model is presented without the household composition controls. This is performed to test the robustness of the findings, as there is the likelihood that there exists collinearity between household composition and household members' employment status. Another possible source of collinearity is between household composition and welfare receipt, e.g. receipt of the OAP and the number of pensioners in the household. Column 5 presents the model with all controls included.

(I) HEIGHT-FOR-AGE

Two sets of regressions were run for the height-for-age variable: one with a dependent variable indicating (moderate) stunting (height-for-age z-score $\leq$ -2SD), and another with severe stunting as the dependent variable (HAZ $\leq$ -3SD).

MODEL 1: MODERATE STUNTING AND EMPLOYMENT

Column 1 in Table 8 shows the result of the univariate function. The dependent variable indicates whether a child is moderately stunted and the independent variable is a dummy set indicating whether the child lives in a household where (i) no individuals are employed (the base category); (ii) one or more men are employed (and no women); (iii) one or more women are employed (and no men), and; (iv) at least one man and one woman in the household have employment.

The five different specifications show consistent results for the *household employment status* variable. All suggest a negative and significant (95 percent or higher) association between childhood stunting and the women employed category. Neither the *men employed* nor the

female and men categories show a significant effect on childhood stunting compared to households with no employed members.

TABLE 8: MODERATE STUNTING

	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	-0.0880	-0.0102	0.00107	-0.0539	-0.0127
	(0.239)	(0.237)	(0.247)	(0.235)	(0.245)
Only female(s) employed	-0.552***	-0.490**	-0.573**	-0.518**	-0.585***
	(0.208)	(0.215)	(0.227)	(0.210)	(0.220)
Both male(s) and female(s) employed	-0.430	-0.339	-0.280	-0.375	-0.291
	(0.330)	(0.338)	(0.363)	(0.334)	(0.358)
Household characteristics:					
Log of per capita expenditure		-0.00702	0.0205	-0.0446	-0.00949
		(0.111)	(0.123)	(0.106)	(0.117)
Urban dummy		-0.156	-0.165	-0.228	-0.214
		(0.209)	(0.208)	(0.219)	(0.217)
Max years of education		-0.0449	-0.0367	-0.0434	-0.0396
		(0.0328)	(0.0379)	(0.0335)	(0.0384)
Household composition:					
Children 0-5			0.162**		0.152*
			(0.0758)		(0.0780)
Children 6-15			0.0140		0.0111
			(0.0556)		(0.0553)
Women 16-59			-0.0437		-0.0318
			(0.0780)		(0.0782)
Men 16-64			-0.103		-0.105
			(0.0766)		(0.0762)
Female pensioners 60+			-0.238		0.0420
			(0.190)		(0.336)
Male pensioners 65+			0.0446		0.176
			(0.296)		(0.337)
External financial support:					
Child related grant				-0.286	-0.289
				(0.199)	(0.199)
Remittances				0.0457	0.0288
				(0.203)	(0.210)
Old age pension				-0.289	-0.404
				(0.204)	(0.397)
Constant	-1.364***	-0.839	-1.129*	-0.350	-0.699
	(0.126)	(0.583)	(0.649)	(0.581)	(0.639)
Observations	1,698	1,698	1,698	1,698	1,698
P	0.0598	0.0557	0.0709	0.0497	0.0390

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculations, NIDS (SALDRU, 2008)

The log of expenditure, education and urban variables all have the expected signs but the relationships are not significant. Among the control variables only *children aged 0-5* shows a significant association with moderate stunting. A positive and significant association exists between the *no. of children age 0-5* in the household and the likelihood of a child being moderately stunted (see columns 3 and 5). This is not unexpected, as having more children in the household is likely to increase competition for a household's (limited) resources. None of the other controls show a significant association with the dependent variable.

The model consistently shows a negative and significant association between moderate stunting and living in a household with at least one woman employed (and no men). None of the other employment variables show any significant association. This association is consistent after controlling for expenditure, so the result is not just picking up that households with employed people have more money. This is a strong indication that it matters who has employment.

MODEL 2: SEVERE STUNTING AND EMPLOYMENT

The second set of regressions (Table 9) examines the relationship between acute stunting (defined as HAZ≤-3SD) and employment. As this reflects a more acute form of malnutrition, it is not surprising that the results from this model show a stronger association with the employment categories than was found for moderate stunting.

TABLE 9: SEVERE STUNTING

	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	-0.251	-0.313	-0.199	-0.336	-0.219
	(0.441)	(0.452)	(0.481)	(0.444)	(0.469)
Only female(s) employed	-0.990***	-1.055***	-1.091***	-1.079***	-1.107***
	(0.354)	(0.358)	(0.390)	(0.358)	(0.385)
Both male(s) and female(s) employed	-0.438	-0.508	-0.306	-0.548	-0.337
	(0.486)	(0.493)	(0.541)	(0.497)	(0.534)
Household characteristics:					
Log of per capita expenditure		0.434***	0.466***	0.362**	0.396**
		(0.161)	(0.175)	(0.164)	(0.176)
Urban dummy		-0.474	-0.436	-0.604*	-0.564
		(0.327)	(0.340)	(0.347)	(0.354)
Max years of education		-0.0150	0.00910	-0.0118	0.00708
		(0.0577)	(0.0692)	(0.0551)	(0.0643)
Household composition:					
Children 0-5			0.180*		0.169
			(0.102)		(0.113)
Children 6-15			0.135		0.121
			(0.0827)		(0.0847)
Women 16-59			-0.152		-0.136
			(0.149)		(0.149)
Men 16-64			-0.267		-0.272*
			(0.165)		(0.163)
Female pensioners 60+			-0.148		0.135
			(0.282)		(0.635)
Male pensioners 65+			0.194		0.337
			(0.447)		(0.500)
External financial support:					
Child related grant				-0.676**	-0.675**
				(0.293)	(0.299)
Remittances				0.194	0.151
				(0.272)	(0.289)
Old age pension				-0.0967	-0.378
				(0.329)	(0.760)
Constant	-2.317***	-4.465***	-4.883***	-3.621***	-3.987***
	(0.195)	(0.855)	(0.872)	(0.955)	(0.971)
Observations	1,698	1,698	1,698	1,698	1,698
P	0.0518	0.00872	0.000397	0.0247	0.00124

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008)

The results in Table 9 show a negative and significant association between severe stunting and *employed women*. No significant effect is found for the other employment categories. The coefficients are stronger than what was found in the moderate stunting regressions, regardless of the inclusion or exclusion of controls, suggesting that the negative association between *employed women* and the likelihood of being severely stunted is stronger than the association between moderate stunting and *employed women.*

As was the case with the *moderate stunting* model, few of the controls show a significant association with the dependent variable. This model suggests that child related grants have a positive effect on children's health – the *grant* variable is negatively associated with severe stunting. This association is not found in the *moderate stunting* model, suggesting that child grants are particularly useful in attenuating the most severe forms of stunting, but do not have a significant effect on reducing more moderate cases of the problem. This might be related to the very low value of the child support grants in South Africa, which may be just sufficient to prevent children from the worst type of malnutrition, but not to reduce the problem altogether.

In this model, the unexpected value of the per capita expenditure variable seen in Table 5 remains. A positive association is shown between severe stunting and a household's expenditure. The likely explanation might be that a few severely stunted children live in very wealthy households. These children are also obese (i.e. with high weight-for-height) and it is not implausible that their stunting is related to overnutrion, although research is unclear on the possible relationship between stunting and overweight (see for example, Jinabhai et al., 2003; Mamabolo et al., 2005; Popkin, Richards and Montiero, 1996).

A range of different specifications have been tested for the relationship between stunting and employment, and the results have consistently shown a positive association between stunting (moderate and severe) and the *employed women* category. The results remain stable as controls for household characteristics, household composition, and welfare are included or excluded in the model.

(II) WEIGHT-FOR-AGE

The *weight-for-age* models were arranged the same way and with the same controls as the *height-for-age* models.

MODEL 3: MODERATE UNDERWEIGHT

Table 10 shows the results from the first set of weight-for-age regressions, with moderate underweight as the dependent variable. There seems to be no association between a child's probability of being moderately underweight and any of the *household employment categories*. The models show no association between the *female employed* category and a child's probability of being moderately underweight, in contrast to what was found for *height-for-age*. No significant association is found between moderate underweight and the *male employed* category or the *female/male employed* category. These results are consistent across all five specifications.

TABLE 10: MODERATE UNDERWEIGHT

	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	0.0295	0.110	0.251	0.0644	0.210
	(0.278)	(0.282)	(0.298)	(0.280)	(0.298)
Only female(s) employed	-0.440	-0.345	-0.400	-0.351	-0.424
	(0.269)	(0.270)	(0.292)	(0.275)	(0.295)
Both male(s) and female(s) employed	-0.311	-0.162	-0.0375	-0.192	-0.0607
	(0.387)	(0.392)	(0.438)	(0.409)	(0.448)
Household characteristics:					
Log of per capita expenditure		0.0429	0.114	-0.0161	0.0787
		(0.148)	(0.160)	(0.152)	(0.162)
Urban dummy		-0.0283	0.0743	-0.112	-0.0256
		(0.277)	(0.287)	(0.290)	(0.297)
Max years of education		-0.0902***	-0.106***	-0.0825**	-0.107***
		(0.0347)	(0.0404)	(0.0349)	(0.0409)
Household composition:					
Children 0-5			-0.0375		-0.0369
			(0.0988)		(0.0988)
Children 6-15			0.133*		0.138*
			(0.0714)		(0.0717)
Women 16-59			0.0415		0.0684
			(0.0985)		(0.0994)
Men 16-64			-0.123		-0.135
			(0.121)		(0.125)
Female pensioners, 60+			-0.101		0.210
			(0.264)		(0.319)
Male pensioners, 65+			0.586*		0.754**
			(0.317)		(0.328)
External financial support:					
Child related grant				-0.471**	-0.464**
				(0.212)	(0.210)
Remittances				-0.249	-0.310
				(0.262)	(0.273)
Old age pension				-0.0350	-0.488
				(0.278)	(0.318)
Constant	-1.880***	-1.250*	-1.678**	-0.585	-1.088
	(0.161)	(0.693)	(0.826)	(0.790)	(0.856)
Observations	1,714	1,714	1,714	1,714	1,714
P	0.256	0.0889	0.0224	0.0219	0.000880

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculations, NIDS (SALDRU, 2008)

The weaker coefficients in the *weight-for-age regressions* compared to the *height-for-age regressions* are not surprising. Weight-for-age is considered a more short-term indicator that measures short-term consequences of (periods) of inadequate nutrition (World Bank, 2006: xviii). And, as the results in Table 3 demonstrate shown, the prevalence of moderate underweight in the sample is lower than the prevalence of stunting.

Looking at the rest of the model, some of the controls show significant coefficients. *Education level* seems to reduce the likelihood of underweight, as do *child related grants*. The other welfare variables do also have negative coefficients, although not significant.

MODEL 4: SEVERE UNDERWEIGHT

In this model (Table 11), column 1 shows an association between female(s) employed and severe underweight, but this effect falls away once income and other household characteristics are included. The Old Age Pension shows a negative and significant association with severe underweight, but no effect is found for the receipt of child related grants or remittances. In addition, the model's overall significance levels are low. In sum, no relationship between employment and childhood underweight can be shown.

TABLE 11: SEVERE UNDERWEIGHT

	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	0.180	0.243	0.423	0.215	0.413
	(0.398)	(0.408)	(0.407)	(0.406)	(0.408)
Only female(s) employed	-0.634*	-0.571	-0.537	-0.588	-0.571
	(0.379)	(0.389)	(0.404)	(0.392)	(0.410)
Both male(s) and female(s) employed	-0.520	-0.414	-0.237	-0.442	-0.237
	(0.737)	(0.736)	(0.797)	(0.785)	(0.813)
Household characteristics:					
Log of per capita expenditure		-0.113	-0.0887	-0.142	-0.0913
		(0.212)	(0.219)	(0.220)	(0.225)
Urban dummy		0.194	0.328	0.148	0.269
		(0.365)	(0.397)	(0.380)	(0.402)
Education level		-0.0551	-0.0688	-0.0529	-0.0745
		(0.0503)	(0.0566)	(0.0512)	(0.0578)
Household composition:					
Children 0-5			-0.289		-0.307
			(0.184)		(0.190)
Children 6-15			0.211**		0.210**
			(0.0963)		(0.0970)
Women 16-59			0.0452		0.0719
			(0.145)		(0.147)
Men 16-64			-0.117		-0.127
			(0.161)		(0.164)
Female pensioners, 60+			-0.0600		0.452
			(0.334)		(0.387)
Male pensioners, 65+			0.602		0.847*
			(0.495)		(0.497)
External financial support:					
Child related grant				-0.215	-0.158
				(0.334)	(0.327)
Remittances				0.00551	-0.0276
				(0.366)	(0.388)
Old age pension				-0.151	-0.830**
				(0.457)	(0.384)
Constant	-2.760***	-1.672	-1.627	-1.323	-1.382
	(0.211)	(1.120)	(1.267)	(1.310)	(1.341)
Observations	1,714	1,714	1,714	1,714	1,714
P	0.288	0.444	0.187	0.726	0.0706

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008)

4.3 DISCUSSION

The two sections above have summarised the results of this study. What kind of conclusions can be drawn from these findings? In the discussion below, my primary focus will be on the indicator which did show an association between employment and children's health, namely height-for-age, but I will nonetheless begin with a brief discussion of the (lack of) weight-for-age results, and why the two health indicators perform differently. Secondly, I will look at the gendered nature of the findings. Particular attention will be given to how these findings relate to what was examined in Chapter 2, notably theories of household behaviour and the conclusions made by similar studies. The gendered nature of my findings will be discussed in some detail, and I will look at possible explanations for why female employment seems to improve the health of children. Finally I will discuss some potential limitations of this study before concluding the chapter.

STUNTING IS ASSOCIATED WITH EMPLOYMENT, UNDERWEIGHT IS NOT

I could not find a significant relationship between either of the two weight-for-age indicators and employment. This stands in contrast to what I found for the height-for-age indicators, which showed highly consistent results. It is likely to be the different nature of the two indicators that can explain the divergent results. A child's weight-for-age is subject to greater short-term variations than height-for-age, and external factors will show a more immediate impact on weight-for-age than height-for-age. For this study, a short-term change in the employment status of adults might show more quickly in children's weight-for-age than it will for height-for-age. As my study does not take into account the length of employment and I do not have data from several (and frequent) observations over time, these short-term fluctuations will not be picked up. In sum, this makes weight-for-age a less reliable indicator than height-for-age. Victora *et al.* (2008) claim that stunting is a better indicator of undernutrition than underweight, and find that height-for-age at two years was more closely related to outcomes for human capital than weight-for-age.

For the two height-for-age indicators, moderate and severe stunting, I found a consistent association with employment. Recall that stunting is defined as 'failure to reach linear growth potential as a consequence of inadequate nutrition or poor health', and that it is considered a good indicator of long-term undernutrition (World Bank, 2006: xviii). This makes it less sensitive to short-term changes of the employment status of individuals in the household, and

a better indicator of children's overall health status. In a statistical sense, it is both a more reliable and convenient indicator, as it is less subject to the time aspect of the data collection. It is thus not surprising that I find the most consistent and robust results for moderate and severe stunting.

FEMALE EMPLOYMENT REDUCES THE RISK OF STUNTING

As the regression results demonstrate, a child who lives in a household where one or more women have employment is significantly less likely to be moderately or severely stunted than one who lives in households where none are employed. To live with an employed man does not seem to reduce the likelihood of stunting. Children who live in households where one or more men (and no women) have employment are no better off than those who live in households with no employed individuals. In other words, there is no apparent difference in the probability of a child being stunted – moderately or severely – whether the child lives in a household with no employed members and having only male(s) employed in the household. Curiously, to live in a household where both women and men have employment does not reduce the likelihood of being moderately or severely stunted compared to living in households with no one employed. This might be due to questions of power within the household. Even if a woman is employed, if a man in the household is employed too, he might have greater power over decision-making, especially if he earns more. A limitation of the study is that it does not control for relative income share between men and women in these dual earner households. These results are consistent over a range of different specifications of the model, and, importantly, after the expenditure level of the household is controlled for.

There seems to be no nutritional gain for children from male employment – i.e. there is no significant difference for children between residing in a household with no one employed relative to living in a household with only men, once controlling for per capita expenditure and other household attributes. This result is consistent across all specifications of the models, and for both dependent variables.

FEMALE EMPLOYMENT INCREASES WOMEN'S DECISION-MAKING POWER WITHIN THE HOUSEHOLD: A POSSIBLE EXPLANATION

In the reviewed literature, I found evidence that there are important differences in child outcomes depending on who controls a household's resources. Women's income, including both wage-income and income from other sources, such as grants, tend to have a greater positive impact on children's health and wellbeing than income in the hands of men. In short, women having control over resources seem to have a positive impact on children's health and wellbeing. The results of this study provide some evidence in favour of this theory, conditional on the assumption that being employed increases a woman's control over the household's resources or increases her negotiating power concerning household decision-making. What can be assumed with a high degree of certainty is that employment increases a woman's income, and on this matter the literature is quite clear: children tend to do better when their mothers control a larger share of household resources (e.g. Duflo, 2003; Lundberg et al., 1997; Phipps and Burton, 1998; Thomas, 1990). In particular Duncan Thomas' (1990) and Esther Duflo's (2003) studies are relevant to mine. They both used data from countries with substantial poverty and child undernutrition (Brazil and South Africa), and used height-for-age as one of the outcome variables. Thomas (1990: 647) finds that mothers' income has an effect on nutrient demand that is between four and seven times larger than fathers' income, while Duflo (2003) discovered that pensions received by women decreased the likelihood of child stunting. Both studies' findings indicate that women direct more resources than men toward improving children's nutrition. A similar dynamic may explain the results in this study: Employment increases women's decision-making power within the household, and increases their ability to allocate more resources towards children's nutrition. These findings go to the core of household behaviour and the intrahousehold allocation of resources.

As this study does not take into account the size or share of income of women relative to men, this process seem to happen regardless of how much a woman earns in households where only women are employed. In dual-earner households, income shares might matter for allocation decisions. Another possibility is that through work (as opposed to income from other sources), women gain access to information that could help improve the wellbeing of their children and that they may build formal or informal networks that may also benefit their children. Within the framework of this study, I cannot be certain which dynamic drives my results, as I cannot distinguish between these two possible mechanisms.

Earlier studies do, however, offer some evidence in favour of the impact of increased income as the main driver of women's increased decision-making power. Several of the reviewed studies have used various measures of unearned income (Duflo, 2000, 2003; Lundberg et al., 1997; Thomas, 1990), while Qian (2008) examines changes in relative income between women and men. This does not offer evidence against the network story, but underlines that added income does increase women's decision-making power within the household.

EVIDENCE OF HETEROGENEITY IN PREFERENCES AMONG HOUSEHOLD MEMBERS

The unitary model of household behaviour assumes common preferences of all household members. Under this assumption, the distribution of income within the household should have no impact on expenditure patterns, or in the case of this study, should have no impact on children's health outcomes. I do control for the effect of income (expenditure), meaning that the positive relationship between women's employment and child health is independent of a household's position in the income distribution. This is hardly compatible with the assumption of income pooling, and is more in line with collective models of household behaviour, which allow for different preferences and power among household members. Employment definitively increases the income share of women, but it also seems to increase their negotiating power when it comes to matters of consumption, and this will in turn have a positive health outcome for children.

The wellbeing of a household is often measured as an average – frequently by per capita income – which is in line with the assumption of income pooling and where consumption decisions are assumed to follow a household rationality. This is referred to as the *benevolent dictator* model, where a household jointly maximises a unified welfare function. The results of the regression analysis show that children's welfare varies across the same income levels depending on which household member earns an income. This provides evidence against the unified household welfare theory, and proves that the average wellbeing of the household is not a precise indicator of the wellbeing of the different individuals in the household. Although I have not taken into account the income level of employed individuals in the households in question, the results give a clear indication that if a woman earns the income, this positively affects the health of young children by reducing the likelihood of them being stunted.

TIME/INCOME TRADE-OFF: AN UNANSWERED QUESTION

The claim that female employment improves children's health is somewhat controversial, and to an extent contended in the literature. The time/money trade-off is the source of debate, where the main argument revolves around a trade-off between time (for childcare) and income (from employment). Recall Glick and Sahn's argument (1998: 334):

> *"Changes in maternal labour supply and income affect child health not directly but by altering the levels of health inputs such as mother's and other's childcare and food preparation time, the quantity and quality of food consumed by the child, and the use of health services."*

This study cannot conclude on this issue, as parenthood was not taken into account. The complex nature of household formation, high prevalence of extended families, and somewhat ambiguous parental relations made such an exercise difficult. It does not, however, find any evidence that female employment has an overall adverse effect on a children's health. Any negative effect from the absence of women is compensated for by increased income and power over household consumption decisions, and possibly other social network and information sharing benefits of employment.

LIMITATIONS TO THE STUDY

The small sample size was a source of some concern, which made several compromises necessary. Previous studies, in particular those from Western countries, tend to focus on parental employment in nuclear families. To restrict my sample to include only nuclear families would have left me with an unacceptably low sample size and a highly biased sample of children as only 32.6 percent of my sample lives with both parents (Appendix 2).

The importance of parental status was tested to some extent by adding variables for mother and father resident in the earlier models (see appendix 2-6). These models show, while controlling for household employment status, the somewhat unexpected result that a child living with its mother increases the likelihood of being stunted. Appendix 2 shows that few children live in different households from their mothers (16.5 percent), but it is hard to say why the height-for-age models show a positive association. Nonetheless the results on the employed women variables remain robust, i.e. it has a significant negative effect. The complexity of households and the role of parents and parenting made it difficult to isolate the effects of employed (biological) parents from other adults. The complexity and range of

household types also complicated the parent issue, both in terms of child care and the effect of employment. All attempts to classify household types were constrained by the small sample size – an attempt to restrict the sample to nuclear families would result in an unacceptably low sample size as well as a potentially highly biased sample. Missing fathers also constituted a challenge for such attempts. Roughly 65 percent of the sampled children lived without their fathers in the household, another substantial proportion of children had no information whatsoever on fathers. It is not controversial to assume that many of these fathers were also not living in the household. The effect of parenthood is thus left unanswered.

Headship was left out of this analysis, but is normally regarded as important when analysing South African data. A common assumption is that female headed and male headed households are different. The possible effects of headship were tested in this analysis, but did not show any association between children's health status and headship (see appendix 7-10). Again the relationship between women's employment and child stunting remains robust. Headship might serve as an alternative measure of decision-making power or control over household resources.

Another source of concern is the way employment was measured. It was reduced to a binary variable which did not take into account the type and length of employment and non-employment. This was a necessary simplification that, sadly, disguises important aspects of the labour market, notably different types of participation and non-participation. Length and type of employment are two aspects that ideally would have been included in the analysis. This proved difficult as the employment status variable potentially included more than one individual. This is, however, an area that needs further examination.

Length of residence of children was not included in the analysis. Studies have found that children are highly mobile and might move across households, towns and provinces (Ford and Hosegood, 2005; Madhavan et al., 2012; Richter et al., 2006). Stunting in particular, as an indicator of long-term undernutrition, might be affected by the length of time children are residents in a particular household. This constitutes another limitation to the study.

This study says nothing about the proportion of income earned by different members of households. If I was to look at this more closely, I might find the effect of women's income to have an even larger effect on child outcomes than the income of men, but this is pure speculation. This aspect is particularly important in households in which both men and

women have employment. To take this aspect further, future studies might look at how consumption patterns change depending on who earns an income, and thus get closer to the source of how this impacts on children's health. A small sample size and missing data would constitute a major challenge using my dataset. Lastly, I was unable to control for unobserved heterogeneity in the cross-sectional data I used and the methods required for such an analysis are beyond the scope of this paper. For example, if women who are employed are also different in other unobservable ways that are positively related to child health, the estimated effect of women's employment will be biased upwards.

4.4 CONCLUSION

To summarise briefly the findings in this chapter: The prevalence of malnutrition based on height-for-age and weight-for-age is substantial among this sample of children. Both prevalence ranges and means of the two indicators show that there exists a nutritional problem that is likely to affect a large portion of African children aged 6 to 60 months.

The regression results show an association between employment in the household and stunting, but not between employment and being underweight. Employment seems to have a positive impact on child health, but only if there are only females in the household with employment. No positive effect is found for living in a household where only men are employed, or both men and women are employed compared to no one employed. Living with an employed woman reduces the likelihood of children being stunted and the effect strengthens for severe stunting.

Even when income is controlled for, who has employment can affect child outcomes. The reasons for why female employment is of benefit to children might be found in the literature. Earlier research suggests that women tend to spend money differently than men, putting a larger proportion of their income into the wellbeing of their children and to improving the general nutrition of the household. Employment both increases women's income and might strengthen their negotiating power over consumption decisions within the household. Women who work have better access to and control over resources, and there might be information and social network gains from employment. On the downside, they might have less time to spend caring for their children. However, the results of this study suggest that the positive effects outweigh the negative effects in households where only women are employed.

5 CONCLUSION

This study's main aim was to investigate the impact of adult household members' employment on the health of children aged 6 to 60 months, with particular focus on whether the gender of the employed adult(s) matter. I have used South African data from the 2008 National Income Dynamics Study (SALDRU, 2008), and children's health was measured using two anthropometric indicators, height-for-age and weight-for-age, to indicate stunting and underweight respectively. Employment was measured by indicating whether children lived in households where: (i) no one in the household was employed; (ii) only male(s) employed in the household; (iii) only female(s) employed in the household and; (iv) both male(s) and female(s) employed in the household.

The descriptive analysis show that the prevalence of stunting and underweight among South African children aged 6 to 60 months is well above what is expected in a well-nourished population, 17.34 percent for stunting and 11.74 for underweight. Prevalence levels are, however, lower than what is found in the rest of the Southern African region, and there are indications that prevalence levels in South Africa have been decreasing over the past decades. The mean z-scores are lower than what is expected in a well-nourished population, which suggests that the whole distribution is shifted downwards. This means that there exists a health and nutrition problem that is likely to affect a large part of the population of African children in this age cohort. The combination of the mean z-scores and prevalence levels gives a clear indication that there exist considerable levels of malnutrition in South Africa.

The econometric analysis was performed using a logit model. These models demonstrate an association between employment in the household and child stunting, but no association is found between employment and child underweight. One explanation for these (lack of) results might be that weight-for-age is more sensitive to short-term fluctuations in external factors, which makes it a less reliable indicator. Height-for-age, on the other hand, is considered more reliable and a good indicator of long-term undernutrition which can predict outcomes better than weight-for age. The different performance of the two indicators is thus unsurprising.

To summarise the main findings of the study: Living in households where one or more women (and no men) have employment reduces the likelihood of children being stunted. No health gain is found for living in households with only employed men, or living in households where both men and women have employment, relative to living in households where no one

has employment. These results are robust to controlling for household expenditure per capita and a variety of other household characteristics. The model is thus not only picking up the effect of increased income from employment.

Employment seems to have a positive impact on children's health, but the effect is only present in households with only female employment. In other words, it does matter what sex the employed household member has, and living with employed female(s) is more beneficial to child health than living in other household types.

The above findings are largely in line with earlier research, which suggests that women tend to spend money differently than men, putting a larger proportion of their income into the wellbeing of their children and improving the general welfare of the household. This study's findings show that there exists heterogeneity of preferences between household members and that women somehow improve their power over decision-making by being employed. Employment increases women's income and in turn might strengthen their negotiating power over consumption decisions within the household, as women who work have better access to and control over resources and they are able to translate this into their preferences in expenditure decisions, which in turn benefits children. Alternatively, it can be imagined that, through employment, women gain access to information that could help improve the wellbeing of their children and may build formal or informal networks that benefit their children. In short, there might be information and social network gains from employment.

Which of these dynamics is the most important for children's health is not possible to know within the framework of this study. Earlier studies however, have explored the effect of other sources of income on child outcomes. These studies have made discoveries that are largely similar to mine, which strengthens the notion that access to income is an important driver of women's bargaining power within the household. This does not offer evidence against the network story, networks may still play an important role, but it underlines that added income does increase women's decision-making power within the household, and in this case, income from employment specifically.

The association between female employment and children's health is somewhat controversial due to the perceived time/money trade-off. This is particularly the case for maternal employment. The main argument revolves around the trade-off between time (for childcare) and income (from employment). In this study, I find no evidence in favour of the theory that

women's employment is detrimental to children's health. Any negative effect (less time for child care) is outweighed by the positive influence female employment has on children's health.

How do these findings relate to the nature of the South African labour market? In Chapter 2, the dynamics of the labour market were given some attention, and I found that women were in a more precarious position than men, both in terms of access to employment and wages. This study has found that women's employment has a positive effect on young children's health, and the positive effect seems to outweigh the negative effect of less time for child care. These findings therefore highlight the importance of increasing women's access to employment and mitigating gender inequalities in the labour market.

The main limitations of the study are that I do not take into account the length and type of employment, or the proportion of income earned by women and men within the household. Although interesting and important aspects of the impact of employment on children's health, further investigation is beyond the scope of this paper and with the data currently available to me.

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APPENDIX

APPENDIX 1: MISSING ANTHROPOMETRIC DATA FOR AFRICANS AGED 6 TO 60 MONTHS COMPARED TO SAMPLED CHILDREN

	Height-for-age		Weight-for-age	
Proportion of children missing anthropometric data	**30.24** (1.92)		**30.11** (1.82)	
	Sampled children	Missing data	Sampled children	Missing data
Employment categories:				
(i) no one in household is employed	42.12 (2.21)	48.39 (3.62)	42.17 (2.27)	48.30 (3.50)
(ii) only male(s) employed in the household	18.86 (1.72)	12.14 (1.85)	18.30 (1.60)	13.41 (2.03)
(iii) only female(s) employed in the household	26.48 (1.72)	25.80 (2.85)	27.24 (1.72)	24.04 (2.71)
(iv) both male(s) and female(s) employed in the household	12.53 (1.35)	13.67 (2.17)	12.29 (1.32)	14.25 (2.18)
Total	100.00	100.00	100.00	100.00
Key household characteristics:				
Per capita expenditure	488.34 (38.72)	572.71 (68.16)	486.23 (35.29)	577.99 (73.56)
Max years of education	10.42 (0.12)	10.30 (0.16)	10.43 (0.10)	10.27 (0.20)
Household size	6.73 (0.22)	6.27 (0.29)	6.64 (0.22)	6.47 (0.28)
Children 0-5	1.89 (0.05)	1.75 (0.06)	1.87 (0.05)	1.79 (0.06)
Children 6-15	1.59 (0.07)	1.32 (0.10)	1.54 (0.07)	1.44 (0.11)
Women 16-59	2.07 (0.07)	2.00 (0.11)	2.07 (0.08)	2.01 (0.10)
Men 16-64	1.36 (0.67)	1.18 (0.08)	1.33 (0.07)	1.26 (0.08)
Female pensioners 60+	0.22 (0.02)	0.21 (0.03)	0.22 (0.02)	0.21 (0.03)
Male pensioners 65+	0.10 (0.01)	0.10 (0.02)	0.10 (0.01)	0.10 (0.02)
Urban (pct.)	42.66 (4.17)	54.63 (5.00)	41.92 (4.11)	56.42 (4.87)
Child related grant (pct.)	67.94 (2.00)	62.53 (3.37)	68.23 (1.97)	61.77 (3.54)
Old age pension (pct.)	21.89 (1.61)	21.84 (2.60)	22.06 (1.60)	21.44 (2.60)
Remittances (pct.)	20.22 (1.55)	14.65 (2.26)	68.23 (1.97)	61.77 (3.54)
				n = 2306

Weighted data. Standard errors in parentheses.
Source: Author's calculations, NIDS (SALDRU, 2008)

APPENDIX 2: PARENTS' RESIDENCE (HEIGHT-FOR-AGE SAMPLE)

		Father resident		
		No	Yes	Total
Mother resident	No	14.90 (1.32)	1.60 (0.45)	16.50 (1.33)
	Yes	50.89 (2.13)	32.60 (2.49)	83.50 (1.33)
	Total	65.79 (2.51)	34.21 (2.51)	100.00
				n = 1513

Weighted data. Standard errors in parentheses.
Source: Author's calculations, NIDS (SALDRU, 2008)

APPENDIX 3: PARENTS' RESIDENCE, MODERATE STUNTING

Moderate stunting	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	-0.0319	0.0502	0.0257	0.0538	0.0303
	(0.249)	(0.240)	(0.254)	(0.239)	(0.254)
Only female(s) employed	-0.561**	-0.497**	-0.541**	-0.511**	-0.548**
	(0.230)	(0.236)	(0.240)	(0.231)	(0.234)
Both male(s) and female(s) employed	-0.386	-0.273	-0.248	-0.284	-0.255
	(0.360)	(0.364)	(0.380)	(0.352)	(0.368)
Mother resident	0.471**	0.554**	0.569**	0.576**	0.608**
	(0.239)	(0.246)	(0.249)	(0.247)	(0.256)
Father resident	-0.150	-0.176	-0.180	-0.221	-0.215
	(0.259)	(0.276)	(0.294)	(0.273)	(0.287)
PCE (log)		0.0580	0.119	0.0125	0.0724
		(0.128)	(0.137)	(0.124)	(0.133)
Urban dummy		-0.222	-0.204	-0.269	-0.248
		(0.209)	(0.214)	(0.220)	(0.222)
Maximum education		-0.0678*	-0.0613	-0.0674*	-0.0627
		(0.0378)	(0.0422)	(0.0378)	(0.0419)
Children 0-5			0.178**		0.174**
			(0.0801)		(0.0827)
Children 6-15			0.0682		0.0592
			(0.0660)		(0.0665)
Women 16-59			-0.0903		-0.0867
			(0.0953)		(0.0930)
Men 16-64			-0.0590		-0.0558
			(0.0823)		(0.0808)
Female pensioners, 60+			-0.149		0.0219
			(0.202)		(0.373)
Male pensioners, 65+			0.0696		0.141
			(0.329)		(0.381)
Child related grant				-0.385*	-0.388*
				(0.205)	(0.205)
Remittances				0.156	0.124
				(0.211)	(0.221)
Old age pension				-0.122	-0.228
				(0.217)	(0.440)
Constant	-1.735***	-1.381**	-1.970***	-0.859	-1.445**
	(0.200)	(0.658)	(0.723)	(0.643)	(0.713)
Observations	1,513	1,513	1,513	1,513	1,513
p	0.126	0.0926	0.150	0.126	0.116

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculations, NIDS (SALDRU, 2008)

APPENDIX 4: PARENTS' RESIDENCE, SEVERE STUNTING

Severe stunting	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	-0.136	-0.131	-0.0442	-0.0996	-0.0430
	(0.435)	(0.425)	(0.489)	(0.422)	(0.479)
Only female(s) employed	-0.966***	-1.017***	-0.957**	-1.034***	-0.980**
	(0.371)	(0.371)	(0.395)	(0.378)	(0.394)
Both male(s) and female(s) employed	-0.308	-0.316	-0.105	-0.332	-0.126
	(0.509)	(0.498)	(0.546)	(0.493)	(0.531)
Mother resident	0.704*	0.786*	0.894**	0.872**	0.977**
	(0.409)	(0.429)	(0.427)	(0.437)	(0.451)
Father resident	-0.192	-0.319	-0.383	-0.414	-0.482
	(0.321)	(0.338)	(0.379)	(0.350)	(0.373)
PCE (log)		0.484***	0.534***	0.405**	0.446**
		(0.186)	(0.202)	(0.191)	(0.204)
Urban dummy		-0.570*	-0.511	-0.706**	-0.657*
		(0.339)	(0.356)	(0.357)	(0.368)
Maximum education		-0.0452	-0.0134	-0.0424	-0.0143
		(0.0618)	(0.0763)	(0.0579)	(0.0696)
Children 0-5			0.268**		0.266**
			(0.108)		(0.119)
Children 6-15			0.182*		0.169*
			(0.0943)		(0.0974)
Women 16-59			-0.317*		-0.311*
			(0.174)		(0.172)
Men 16-64			-0.219		-0.215
			(0.172)		(0.169)
Female pensioners, 60+			-0.0680		0.124
			(0.284)		(0.649)
Male pensioners, 65+			0.283		0.387
			(0.467)		(0.521)
Child related grant				-0.889***	-0.896***
				(0.291)	(0.300)
Remittances				0.205	0.145
				(0.271)	(0.291)
Old age pension				0.0948	-0.228
				(0.355)	(0.826)
Constant	-2.856***	-4.995***	-5.719***	-4.087***	-4.657***
	(0.351)	(0.975)	(1.051)	(1.006)	(1.117)
Observations	1,513	1,513	1,513	1,513	1,513
P	0.104	0.0151	5.25e-05	0.0144	6.33e-05

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's calculations, NIDS (SALDRU, 2008)

APPENDIX 5: PARENTS' RESIDENCE, MODERATE UNDERWEIGHT

Moderate underweight	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	0.0796	0.172	0.216	0.184	0.222
	(0.290)	(0.295)	(0.319)	(0.296)	(0.320)
Only female(s) employed	-0.408	-0.337	-0.410	-0.349	-0.436
	(0.274)	(0.280)	(0.296)	(0.285)	(0.300)
Both male(s) and female(s) employed	-0.202	-0.0385	-0.0239	-0.0421	-0.0343
	(0.409)	(0.413)	(0.456)	(0.423)	(0.463)
Mother resident	0.355	0.481*	0.482*	0.554*	0.543*
	(0.294)	(0.280)	(0.272)	(0.297)	(0.285)
Father resident	-0.322	-0.426	-0.299	-0.563**	-0.464
	(0.264)	(0.279)	(0.282)	(0.282)	(0.291)
PCE (log)		0.105	0.201	0.0534	0.163
		(0.156)	(0.164)	(0.159)	(0.167)
Urban dummy		-0.0407	0.0619	-0.106	-0.0246
		(0.281)	(0.293)	(0.298)	(0.306)
Maximum education		-0.110***	-0.128***	-0.106***	-0.129***
		(0.0355)	(0.0408)	(0.0355)	(0.0407)
Children 0-5			0.0482		0.0552
			(0.104)		(0.104)
Children 6-15			0.134*		0.132*
			(0.0748)		(0.0759)
Women 16-59			0.0353		0.0423
			(0.108)		(0.109)
Men 16-64			-0.0800		-0.0807
			(0.119)		(0.122)
Female pensioners, 60+			-0.0688		0.122
			(0.285)		(0.359)
Male pensioners, 65+			0.564*		0.696**
			(0.331)		(0.344)
Child related grant				-0.562**	-0.553**
				(0.221)	(0.223)
Remittances				-0.239	-0.298
				(0.278)	(0.291)
Old age pension				0.0596	-0.315
				(0.298)	(0.365)
Constant	-2.093***	-1.678**	-2.439***	-1.012	-1.773**
	(0.301)	(0.748)	(0.883)	(0.823)	(0.892)
Observations	1,527	1,527	1,527	1,527	1,527
P	0.417	0.0236	0.00591	0.0168	0.000546

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008)

APPENDIX 6: PARENTS' RESIDENCE, SEVERE STUNTING

Severe underweight	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	0.122	0.165	0.270	0.170	0.299
	(0.421)	(0.434)	(0.449)	(0.438)	(0.452)
Only female(s) employed	-0.698*	-0.666	-0.677	-0.687	-0.698
	(0.404)	(0.416)	(0.435)	(0.420)	(0.445)
Both male(s) and female(s) employed	-0.509	-0.422	-0.332	-0.449	-0.337
	(0.872)	(0.884)	(0.919)	(0.935)	(0.944)
Mother resident	0.363	0.394	0.349	0.409	0.368
	(0.413)	(0.406)	(0.428)	(0.427)	(0.434)
Father resident	-0.469	-0.506	-0.401	-0.563	-0.471
	(0.416)	(0.454)	(0.423)	(0.425)	(0.419)
PCE (log)		-0.0657	-0.00847	-0.101	-0.0251
		(0.240)	(0.241)	(0.249)	(0.250)
Urban dummy		0.213	0.354	0.174	0.316
		(0.412)	(0.453)	(0.435)	(0.460)
Maximum education		-0.0505	-0.0632	-0.0493	-0.0681
		(0.0491)	(0.0562)	(0.0496)	(0.0567)
Children 0-5			-0.193		-0.215
			(0.190)		(0.198)
Children 6-15			0.245**		0.239**
			(0.102)		(0.101)
Women 16-59			0.0286		0.0425
			(0.159)		(0.160)
Men 16-64			-0.0971		-0.0987
			(0.159)		(0.162)
Female pensioners, 60+			-0.165		0.356
			(0.363)		(0.452)
Male pensioners, 65+			0.552		0.814
			(0.582)		(0.588)
Child related grant				-0.296	-0.234
				(0.363)	(0.362)
Remittances				0.148	0.110
				(0.399)	(0.417)
Old age pension				-0.204	-0.848*
				(0.536)	(0.459)
Constant	-2.934***	-2.170	-2.475*	-1.744	-2.121
	(0.372)	(1.355)	(1.481)	(1.553)	(1.538)
Observations	1,527	1,527	1,527	1,527	1,527
P	0.322	0.344	0.218	0.594	0.171

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008)

HEADSHIP TESTS

APPENDIX 7: HEADSHIP TEST, MODERATE STUNTING

Moderate stunting	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	-0.0585	0.0208	0.0357	-0.0181	0.0272
	(0.253)	(0.243)	(0.253)	(0.240)	(0.252)
Only female(s) employed	-0.559**	-0.488**	-0.598**	-0.521**	-0.610***
	(0.217)	(0.225)	(0.237)	(0.217)	(0.228)
Both male(s) and female(s) employed	-0.399	-0.298	-0.238	-0.336	-0.252
	(0.340)	(0.345)	(0.365)	(0.339)	(0.358)
Female head	0.0884	0.0853	0.162	0.119	0.189
	(0.220)	(0.218)	(0.260)	(0.222)	(0.258)
PCE (log)		-0.0128	0.0341	-0.0515	0.00292
		(0.115)	(0.126)	(0.108)	(0.121)
Urban dummy		-0.140	-0.146	-0.222	-0.202
		(0.217)	(0.217)	(0.227)	(0.227)
Maximum education		-0.0534*	-0.0507	-0.0522	-0.0537
		(0.0317)	(0.0374)	(0.0328)	(0.0383)
Children 0-5			0.202**		0.190**
			(0.0796)		(0.0816)
Children 6-15			0.00481		0.00154
			(0.0563)		(0.0561)
Women 16-59			-0.0486		-0.0366
			(0.0829)		(0.0821)
Men 16-64			-0.0881		-0.0873
			(0.0840)		(0.0828)
Female pensioners, 60+			-0.362*		-0.0678
			(0.201)		(0.326)
Male pensioners, 65+			0.250		0.410
			(0.344)		(0.396)
Child related grant				-0.314	-0.322
				(0.197)	(0.197)
Remittances				0.0724	0.0383
				(0.214)	(0.222)
Old age pension				-0.337	-0.437
				(0.216)	(0.401)
Constant	-1.397***	-0.759	-1.205*	-0.247	-0.758
	(0.179)	(0.624)	(0.689)	(0.616)	(0.688)
Observations	1,587	1,587	1,587	1,587	1,587
P	0.137	0.0611	0.0278	0.0372	0.0157

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008).

APPENDIX 8: HEADSHIP TEST, SEVERE STUNTING

Severe stunting	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	-0.210	-0.248	-0.125	-0.264	-0.126
	(0.446)	(0.446)	(0.479)	(0.441)	(0.473)
Only female(s) employed	-0.933***	-0.994***	-1.079***	-1.022***	-1.101***
	(0.354)	(0.360)	(0.398)	(0.360)	(0.395)
Both male(s) and female(s) employed	-0.371	-0.403	-0.188	-0.447	-0.212
	(0.483)	(0.480)	(0.531)	(0.484)	(0.529)
Female head	0.165	0.240	0.323	0.286	0.391
	(0.288)	(0.289)	(0.346)	(0.299)	(0.340)
PCE (log)		0.455***	0.521***	0.380**	0.455**
		(0.166)	(0.182)	(0.170)	(0.185)
Urban dummy		-0.470	-0.416	-0.622*	-0.566
		(0.336)	(0.353)	(0.357)	(0.368)
Maximum education		-0.0269	-0.0102	-0.0229	-0.0125
		(0.0574)	(0.0702)	(0.0555)	(0.0660)
Children 0-5			0.243**		0.228**
			(0.103)		(0.115)
Children 6-15			0.139		0.129
			(0.0859)		(0.0880)
Women 16-59			-0.163		-0.145
			(0.154)		(0.154)
Men 16-64			-0.263		-0.266
			(0.168)		(0.166)
Female pensioners, 60+			-0.319		0.0302
			(0.285)		(0.625)
Male pensioners, 65+			0.513		0.743
			(0.517)		(0.573)
Child related grant				-0.716**	-0.727**
				(0.291)	(0.296)
Remittances				0.156	0.0677
				(0.292)	(0.306)
Old age pension				-0.188	-0.506
				(0.348)	(0.771)
Constant	-2.413***	-4.612***	-5.303***	-3.717***	-4.413***
	(0.260)	(0.956)	(0.980)	(1.028)	(1.079)
Observations	1,587	1,587	1,587	1,587	1,587
p	0.0970	0.0111	0.000122	0.0116	0.000414

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008)

APPENDIX 9: HEADSHIP TEST, MODERATE UNDERWEIGHT

Moderate underweight	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	-0.0248	0.0604	0.238	0.0326	0.225
	(0.302)	(0.299)	(0.316)	(0.300)	(0.318)
Only female(s) employed	-0.431	-0.332	-0.412	-0.343	-0.439
	(0.274)	(0.275)	(0.297)	(0.281)	(0.302)
Both male(s) and female(s) employed	-0.344	-0.190	-0.0230	-0.214	-0.0414
	(0.423)	(0.424)	(0.466)	(0.440)	(0.474)
Female head	-0.0223	-0.0115	0.111	0.0465	0.203
	(0.253)	(0.247)	(0.277)	(0.253)	(0.282)
PCE (log)		0.0603	0.146	-0.00034	0.111
		(0.148)	(0.161)	(0.153)	(0.163)
Urban dummy		-0.0640	0.0374	-0.153	-0.0681
		(0.280)	(0.293)	(0.294)	(0.302)
Maximum education		-0.0906***	-0.108***	-0.0832**	-0.107***
		(0.0342)	(0.0402)	(0.0348)	(0.0412)
Children 0-5			-0.0169		-0.0176
			(0.102)		(0.0998)
Children 6-15			0.147**		0.150**
			(0.0727)		(0.0731)
Women 16-59			0.0272		0.0500
			(0.103)		(0.104)
Men 16-64			-0.132		-0.138
			(0.121)		(0.124)
Female pensioners, 60+			-0.221		0.0479
			(0.263)		(0.313)
Male pensioners, 65+			0.698*		0.926**
			(0.398)		(0.408)
Child related grant				-0.511**	-0.515**
				(0.218)	(0.216)
Remittances				-0.198	-0.302
				(0.278)	(0.291)
Old age pension				-0.0726	-0.465
				(0.282)	(0.311)
Constant	-1.819***	-1.279*	-1.860**	-0.609	-1.291
	(0.236)	(0.736)	(0.866)	(0.818)	(0.883)
Observations	1,607	1,607	1,607	1,607	1,607
p	0.491	0.135	0.0191	0.0342	0.00136

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008)

APPENDIX 10: HEADSHIP TEST, SEVERE UNDERWEIGHT

Severe underweight	(1)	(2)	(3)	(4)	(5)
Only male(s) employed	0.336	0.388	0.608	0.368	0.612
	(0.404)	(0.398)	(0.426)	(0.403)	(0.429)
Only female(s) employed	-0.664*	-0.600	-0.586	-0.625	-0.613
	(0.393)	(0.407)	(0.425)	(0.410)	(0.430)
Both male(s) and female(s) employed	-0.379	-0.278	-0.0921	-0.307	-0.103
	(0.802)	(0.801)	(0.799)	(0.847)	(0.814)
Female head	0.430	0.418	0.660	0.464	0.714
	(0.393)	(0.398)	(0.457)	(0.414)	(0.467)
PCE (log)		-0.0472	-0.00960	-0.0784	-0.0174
		(0.217)	(0.227)	(0.224)	(0.233)
Urban dummy		0.142	0.267	0.0815	0.200
		(0.373)	(0.397)	(0.384)	(0.400)
Maximum education		-0.0584	-0.0724	-0.0556	-0.0745
		(0.0505)	(0.0575)	(0.0517)	(0.0587)
Children 0-5			-0.276		-0.288
			(0.188)		(0.191)
Children 6-15			0.213**		0.212**
			(0.0996)		(0.0994)
Women 16-59			-0.00906		0.0113
			(0.152)		(0.153)
Men 16-64			-0.0777		-0.0830
			(0.160)		(0.164)
Female pensioners, 60+			-0.371		0.0535
			(0.300)		(0.359)
Male pensioners, 65+			1.055*		1.307**
			(0.625)		(0.625)
Child related grant				-0.267	-0.248
				(0.342)	(0.326)
Remittances				-0.0184	-0.0857
				(0.415)	(0.423)
Old age pension				-0.210	-0.687*
				(0.444)	(0.350)
Constant	-3.019***	-2.245*	-2.362*	-1.856	-2.095
	(0.349)	(1.243)	(1.404)	(1.428)	(1.476)
Observations	1,607	1,607	1,607	1,607	1,607
P	0.215	0.246	0.0705	0.523	0.0398

Weighted data. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations, NIDS (SALDRU, 2008)