UNIVERSITY OF SOUTHAMPTON

FACULTY OF LAW, ARTS & SOCIAL SCIENCES

School of Social Sciences

The Health and Educational Implications of Child Fostering in South Africa

by

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Thesis for the degree of Doctor of Philosophy

August 2004

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

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Child fostering refers to children being sent away from their biological parents to live with others, usually kin, for some period of time (Isiugo-Abanihe, 1985; Bledsoe and Brandon, 1992). Motivations include desire for education, transfer of child labour and redistribution of fertility and childcare costs (Isiugo-Abanihe, 1985; Ainsworth, 1992). It is a common practice in many African countries (Ainsworth, 1992), emerging in response to HIV/AIDS (Isiugo-Abanihe, 1994). Most studies have focused on the *decision* to foster but fewer have addressed *implications* for the children involved (Lloyd and Desai, 1992). Furthermore, no previous studies have controlled for fostering not being a random event and that a sample of fostered children is 'selective' in some important ways which influence their health and educational outcomes.

South African Living Standards and Measurement Study (SALSMS) 1993 data were used to establish the levels, patterns and correlates of fostering and to examine the health and educational outcomes of the children involved, whilst recognising that fostering is endogenous to such outcomes. Logistic, linear, treatment effect and selection models were used to achieve these aims.

This research found that 12% of children were fostered, the majority to grandparents. The correlates of fostering varied by the child's age, and composition of the receiving household was particularly important. Fostered children were less likely to report being ill but foster status was not significantly associated with the other health outcomes investigated. It was not necessary to control for the endogeneity of fostering when investigating health but it was important when examining education. Ignoring such endogeneity *underestimated* education outcomes, but when controlled for, fostered children were *more* likely to be enrolled in education and complete primary education than non-fostered children. This research therefore suggests that fostered children fare no worse with regards to health but that fostering is *beneficial* to education.

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ACKNOWLEDGEMENTS

I would like to sincerely thank the following people in completing this PhD thesis, without whom, it would not have been possible:

- Nyovani Madise and Monique Hennink for supervising this research project and their support and advice throughout.
- Paula Griffiths for suggesting the possibility of undertaking a PhD.
- Wendy Sigle-Rushton for suggesting the interesting topic and for supervising me for a year and her continued support since leaving Southampton.

- The Economic and Social Research Council (ESRC) for their financial support as well as the World Bank for the use of the SALSMS data and Diane Steele at the World Bank for her assistance.

- The academic, administrative and IT staff of the Social Statistics Division (especially Sandy).
- John Micklewright for his advice and experience with the two-stage modelling and comments on my chapter.
- Riccardo Borgoni for his advice with the equations.
- Dave Holmes for his technical expertise with SPSS and STATA as well as his constant support.
- Claire Beasley and James Raymer for help with referencing and Endnote.
- Participants of conferences and seminars for their useful comments and feedback.
- My PhD colleagues, particularly Angela for her technical and STATA advice, Ntsiki and Kabwe for their contextual information on South Africa, Tiz and Bazle. Also, to Cheese, Faiza, Gail and Sarah B for their support.
- My external examiner, Sarah Castle, and my internal examiner, Jane Falkingham, for their very useful comments on my thesis.

- My family and friends for their continued support and encouragement, especially Wil.

LIST OF ABBREVIATIONS USED

ACDIS	Africa Centre Demographic Information System
AIDS	Acquired Immune Deficiency Syndrome
BCG	Bacillus of Calmette and Guérin
BTT	Birth-to-Twenty
DHS	Demographic and Health Survey
DPT	Diphtheria, Pertussis and Tetanus
DSS	Demographic Surveillance Survey
ESD	Enumerator Subdistricts
ESRC	Economic and Social Research Council
FGDs	Focus Group Discussions
GDP	Gross Domestic Product
HAZ	Height-for-Age z-score
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
IDI	In-Depth Interviews
IMR	Infant Mortality Rate
IFPRI	International Food Policy Research Institute
IPPF	International Planned Parenthood Federation
KIDS	Kwazulu Natal Income Dynamics Study
LSMS	Living Standards and Measurement Study
MCA	Multiple Classification Analysis
MDG	Millennium Development Goal
ORC	Opinion Research Corporation Company
RC	Reference Category
SALDRU	South Africa Labour Development Research Unit
SALSMS	South Africa Living Standards and Measurement Study
SAVACG	South African Vitamin A Consultative Group
SD	Standard Deviation
SES	Socio-Economic Status
TB	Tuberculosis

TFR	Total Fertility Rate (births per woman)
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNPD	United Nations Population Division
UNICEF	United Nations International Children's Emergency Fund
US	United States
WAZ	Weight-for-Age z-score
WHO	World Health Organisation
WHZ	Weight-for-Height z-score
WFS	World Fertility Survey

CHAPTER ONE

Introduction and objectives

"A child is not for one person" **(Mende proverb (Bledsoe, 1988 p180)).**

1.0 Introduction

Although non-maternal care is a daily reality in some African societies (Borgerhoff Mulder, 1985; Castle, 1995), child fostering refers to the process by which children are sent away from their natal home to live with other people, usually kin, for some period of time (Isiugo-Abanihe, 1985; Bledsoe and Brandon, 1992). Motivations for child fostering include the desire for education, the transfer of child labour, and the redistribution of fertility and childcare costs (Isiugo-Abanihe, 1985; Ainsworth, 1992). Parents may foster children from rural to urban areas so that they might be provided with an education. Alternatively, a family might *request* a foster child from relatives if they have few children, or few children of the desired sex. Finally, mothers who work outside of the home, or have migrated to the city, may send children to other, frequently rural, relatives who may be in a better position to provide care (Ainsworth, 1992). Grandmothers, in particular, frequently take in foster children (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe, 1990a, 1990b; Bledsoe and Brandon, 1992).

Whilst fostering occurs cross-culturally (Goody, 1975, 1982; Gordon, 1987; Geronimus, 2003), child fostering is an extremely common practice in many African countries and often affects the living arrangements of very young children. In some societies of Africa, more than half of children are fostered (Goody, 1982). Interestingly, within many African countries, fostering is a traditional custom (Ainsworth, 1992), but the scale of the practice has increased more recently in response to the spread of Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) (Isiugo-Abanihe, 1994). Indeed, fostering in South Africa is both a traditional practice because of labour migration, marital instability and illegitimacy (Department of Health et al., 1998), and one that is increasing in scale because of economic development (Ainsworth, 1992) and the spread of HIV/AIDS (Isiugo-Abanihe, 1994).

Having provided an overview of child fostering, this chapter discusses the motivations and importance of studying fostering and its implications in section 1.1, with its links to health and education. The objectives of the thesis are then stated in section 1.2 before more detail on the profile of the study population is given in section 1.3 in order to provide a context to the research. Finally, the structure of the thesis is outlined in section 1.4.

1.1 Motivations and importance of study

Previous research has identified and outlined the various social, demographic and economic implications that make fostering worthy of further study (Isiugo-Abanihe, 1985). One important *demographic* implication is that fostering may overestimate child mortality if it is assumed that children not living in the natal household have died, as well as misleading conclusions being drawn about *which* household characteristics are associated with child mortality, that is, biological or foster household characteristics. Not only does fostering have the potential to influence mortality or the *estimates* of mortality, child fostering is a form of migration as well as a mechanism that facilitates the process. It involves mass migration of children without their parents (Ainsworth, 1992) which is a unique type of movement worthy of study. With regards to fertility, fostering provides parents with the ability to redistribute childcare costs throughout the entire extended family, and therefore may lessen the burden of high fertility. In a society where both fertility and sterility levels are high, fostering also allows child *labour* to be redistributed throughout the lineage; from high to low fertility members, and from younger to older members of the lineage. Actual fertility and desired family size are high throughout sub-Saharan Africa and child fostering is a temporary, reversible way of modifying household size and composition *post*-natally (Bledsoe, 1990a; Ainsworth, 1992). Fostering therefore measures the *"demand for children"* and is likely to influence fertility decisions and preferences (Ainsworth, 1992 p1). As a consequence, fostering may result in a reduced demand for family planning and has important policy implications (Isiugo-Abanihe, 1985). In addition, fostering can influence the proximate determinants of fertility as marriage tends to occur at younger ages for fostered girls and the fostering practice can reduce the length of breastfeeding (Isiugo-Abanihe, 1986; Bledsoe and Isiugo-Abanihe, 1989). Therefore, fostering is demographically important as it can have an impact on all three components of population change.

Although social scientists have recently begun to address the demographic and social impact of child fostering in Africa, most studies have focused only on the household *decision* of whether to foster children into or out of the household. Fewer studies have addressed the *impact* that fostering has on the children involved (Lloyd and Desai, 1992). Of these fostering studies, most have methodological limitations, or are out-dated, theoretical, unidisciplinary, or small-scale studies lacking generalisability. The findings from previous literature and their associated limitations are discussed in the next chapter.

There is some evidence that the practice of child fostering influences patterns of childcare, education, health and indeed child survival (Isiugo-Abanihe, 1985). Identifying fostered and non-fostered children in Sierra Leone, Bledsoe and Brandon (1992) found that compared to children who resided with their mothers, fostered children experienced higher levels of morbidity and mortality. In the Ivory Coast, Ainsworth (1992) found that fostered children performed more housework and attended school less often than non-fostered children. In contrast, fostered children in Ghana were, on average, *more* likely to attend school than their non-fostered counterparts (Isiugo-Abanihe, 1985). Again, these findings are discussed in more detail in Chapter 2. Understanding how fostering influences a child's health and well-being is extremely pertinent in countries where there is no social welfare system to support children in poor circumstances.

The United Nations (UN) and World Bank note the importance of such in their Convention on the Rights of the Child and Millennium Development Goals (MDGs), respectively. The UN Convention on the Rights of the Child states that all children have *"the right to survival"* and they stipulate health care and educational standards in order to achieve this (UNICEF, 2004a p1) but the fostering of children may compromise some of these rights. Furthermore, the MDGs of universal primary education by 2015 and reducing child mortality by two-thirds between 1990-2015 emphasise the importance placed on child health and education (World Bank, 2004a, 2004b). However despite these goals, 115 million children of school age remained out of school in 2000 and 1 in 11 children died before age 5 years in developing countries illustrating that much is still to be achieved with regards to child health and education. This thesis contributes to the knowledge of the health and education of fostered children; a subset of young people often ignored.

1.2 Objectives of study

Because of the high proportion of fostering, West African societies have provided case studies for the majority of the research on child fostering. However, Southern Africa has been less studied and South Africa provides a unique and interesting case study in sub-Saharan Africa, particularly with its complex history of apartheid. Therefore, the 1993 SALSMS data are used to:

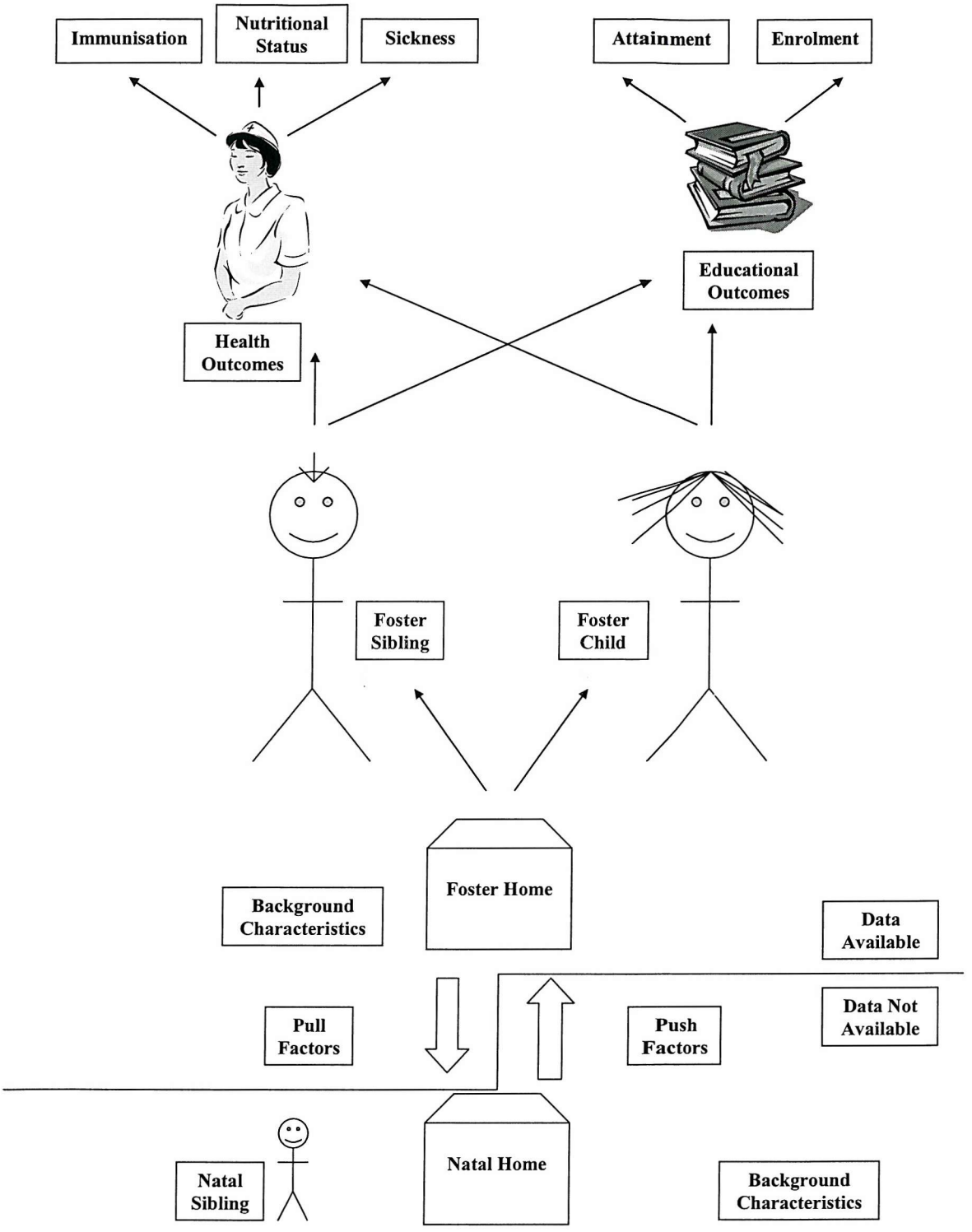
1. Establish the levels, patterns and correlates of fostering.
2. Examine the ways in which fostering affects the health outcomes of both fostered and non-fostered children.
3. Examine the ways in which fostering affects the educational outcomes of both fostered and non-fostered children.
4. Investigate the potential endogeneity of the fostering process on child outcomes.

Specifically, this thesis will attempt to answer the following research questions:

1. Does being *fostered* improve or impair the health and educational outcomes of the *fostered* child?
2. Does the act of *bringing in* a foster child improve or impair the health and educational outcomes of *other* children living in the household?

Figure 1.1 attempts to show some of these objectives visually. The SALSMS data are used to find out what proportion of children are fostered and the characteristics of such foster children and households in which they reside. The health and educational outcomes will be investigated and compared by foster status; for foster children, children living in households with foster children, that is, foster siblings, and children living in households without foster children, that is, those with no foster siblings. Furthermore, the analysis of the child outcomes will take account of the fact that fostering is not random, something not controlled for in previous studies. The 1993 SALSMS was the first survey based on the entire population of South Africa (SALDRU, 1994) and there has only been one round to date meaning that it is the most recent Living Standards and Measurement Study (LSMS) available for South Africa. The data and methodology used are discussed in Chapter 3.

Figure 1.1 Conceptual framework for the study of child fostering



1.3 The South African case study

As previously mentioned, fostering is a traditional practice in South Africa because of labour migration and one that is motivated by crisis reasons such as marital instability or illegitimacy when young women are forced to send their children to their own mothers, that is, the child's grandmother (Department of Health et al., 1998). Furthermore, the adult HIV prevalence rate has increased from less than 1% to about 20% in the last 12 years in South Africa (UNAIDS, 2004). This has led to an increase in fostering because parents become too ill to look after their children and because of the associated increase in the number of orphans, with 10% of children orphaned in 2001, 43% due to AIDS (UNICEF, 2003). Madhavan (2004) discusses that *"fostering has always been and continues to be a crucial part of black family life"* (p1443) and that apartheid put pressure on the extended family before HIV/AIDS so crisis fostering is not new in South Africa. The subsequent sections provide further background information for South Africa in order to contextualise the research.

1.3.1 The population of South Africa

South Africa is relatively developed compared to the rest of sub-Saharan Africa (Department of Health et al., 1998). In fact in 1993, the year of the data used in this study, South Africa was ranked as 85th with its Human Development Index[1] (HDI) value of 0.673, above all the other African countries (UNDP, 1993). Even though South Africa's HDI value has decreased only slightly to 0.666, it has since slipped to 119th position in the most recent 2004 HDI ranking (UNDP, 2004a). However, it is still ahead of all the *sub-Saharan* African countries, illustrating that it is relatively developed compared to these countries. It is also worth noting that the HDI value and rankings may not be comparable over time because of changes in methodology and country coverage, respectively (UNDP, 2004b). Indeed, the drop in country ranking seen above probably reflects an expansion in the number of sovereign states following the break-up of the Former Soviet Union and events in the Balkans and Central and Eastern Europe.

As mentioned earlier, child fostering is demographically important with implications for fertility, mortality and migration. Table 1.1 presents South Africa's demographic statistics for 1993, to equate it with the date of the LSMS data used in this study.

[1] The HDI is a measure of development, combining life expectancy at birth; adult literacy rate; primary, secondary and tertiary gross enrolment ratio; and Gross Domestic Product (GDP) per capita (UNDP, 2004b)

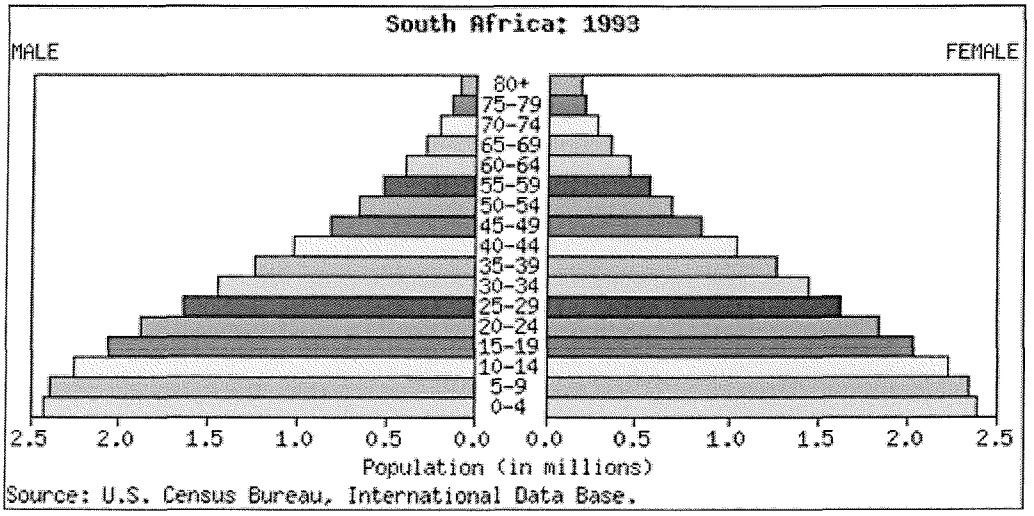
Table 1.1 Demographic statistics for South Africa, 1993

Characteristic	Value
Total mid-year population	39,270,643
Births per thousand population	25.28
Deaths per thousand population	8.56
Net number of migrants per thousand population	-4.36
Rate of natural increase (%)	1.67
Growth rate (%)	1.24
Life expectancy (years)	62.94
Total fertility rate (births per woman)	3.12
Sex ratio (males per female)	1.02

(SOURCE: US Bureau of the Census, 2004)

South Africa has been experiencing a fertility decline (Department of Health et al., 1998). However, there are differentials in fertility by residence with rural areas having nearly twice the Total Fertility Rate (TFR) of women in urban areas meaning that rural areas have a 'younger' population. Figure 1.2 shows the age-sex structure of South Africa in 1993. Again, the 1993 population pyramid is shown as it is the year when the data used in this study were collected.

Figure 1.2 Population pyramid, South Africa, 1993



(SOURCE: US Census Bureau, 2004)

As stated previously, child fostering is conductive of high fertility and Figure 1.2 shows a young expanding population, characteristic of a high fertility population. However as previously mentioned, fertility is decreasing shown by only a slight increase in numbers in the 0-4 year old category as compared to the 5-9 year old category rather than the steady increase in numbers of the preceding age groups. There are slightly more boys than girls in the younger age groups but slightly more women than men in the older age groups

because of the typical differentials in sex ratio at birth and life expectancy, respectively. In fact, a large sex differential in life expectancy was apparent in 1993 with a life expectancy for males of 59 years and the life expectancy for females of 67 years (US Bureau of the Census, 2004). Although the direction of the sex differential is typical with women outliving men, the large sex differential of 8 years is likely to be because the male death rate is much higher than that for females (Department of Health Republic of South Africa et al., 1998). Higher smoking, alcohol and injury rates for men could be possible reasons for this differential. Indeed, when investigating the impact of AIDS on the levels and causes of adult mortality in rural South Africa, Hosegood et al. (2004b) found that a fifth of deaths to 15-44 year old men were a result of injuries, mostly due to road traffic accidents and violence. Furthermore, there are differentials by race as Yach (1994) reports a median age at death of 75 years for White women but 44 years for African men. More recently, mortality levels have risen because of the HIV/AIDS epidemic (Department of Health Republic of South Africa et al., 1998).

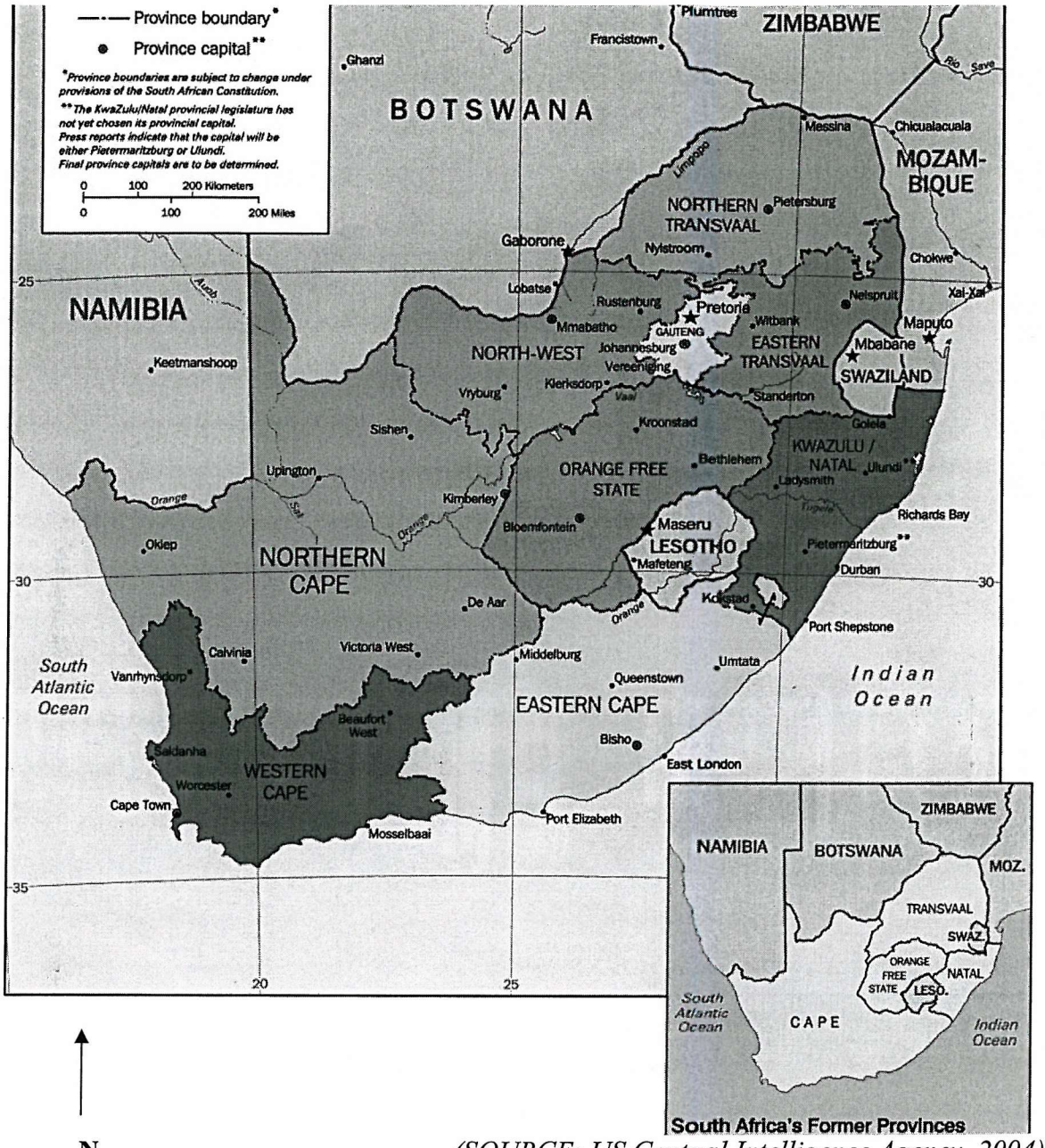
1.3.2 South Africa's history of apartheid

As fostering is primarily an African practice (Isiugo-Abanihe, 1985) and is often associated with economic motivations (Ainsworth, 1992), it is useful to note the history of apartheid and the associated racial segregation and inequalities in South Africa. Under the forty years of apartheid (1948-1994) there was residential segregation and inequality by race in South Africa with African households relegated to the 'homelands' with severe restrictions placed on migration (Constitutional Rights Foundation, 2000). In 1913, the Natives' Land Act meant that South Africa was separated into Black and White areas, and in 1948 the Afrikaner National party was voted into power by the White-only voters who imposed further restrictive laws benefiting people of White race (Department of Health et al., 1998). The 1950 Population Registration Act classified the population as 'White', 'African'/ 'Black', 'Coloured' (mixed race) or 'Indian'/ 'Asian' and the Group Areas Act stated the areas in which these groups could and could not live. Hereafter for consistency, race is classified as White, African, Coloured and Indian, the classifications used in the SALSMS 1993 data and that of the 1950 Population Registration Act.

Africans, which made up the majority of the population, were assigned to homelands, the minority of the land (Maharaj et al., 2000; Burgard, 2002). These homelands provided cheap labour and male labourers required documentation to be contracted to work outside these areas in mines, industry or White farms, creating new kinds of household such as female headed and grandmother households. This specially permitted migration to urban areas also created separate African 'townships' outside the cities (Constitutional Rights Foundation, 2000). In 1984, Indians and Coloureds were included in parliament but Africans remained excluded, even though their proportion of the population was increasing, because of their relatively higher fertility, whilst the proportion White was decreasing. The first democratic election took place in 1994 electing the African National Congress. This first democratically elected government had to tackle the inequalities that existed in the health and education systems (IPPF, 2000). This context has implications for the study of the health and educational outcomes of children involved in fostering and will be discussed subsequently. Figure 1.3 shows the provinces of South Africa.

The Eastern Cape, Orange Free State, Kwazulu Natal, Mpumalanga (Eastern Transvaal in Figure 1.3), Northern Province (Northern Transvaal in Figure 1.3) and North West Province include all the former homelands and so are still dominated by the African population (Donaldson, 2002). The highest proportion of Coloureds live in the Western Cape and Northern Cape and Indians tend to reside in Kwazulu Natal. The highest proportion of Whites reside in Gauteng and the Western Cape (Donaldson, 2002), the most developed provinces (Department of Health et al., 1998), and in the key urban centres of Johannesburg and Cape Town whereas Africans tend to reside in rural areas (Burgard, 2002). In fact, the Northern Province is the poorest in economic terms but Gauteng is considered the *"economic heartland"* (Donaldson, 2002 p36).

Figure 1.3 Map of South Africa



(SOURCE: US Central Intelligence Agency, 2004)

1.3.3 Child health in South Africa

The Infant Mortality Rate (IMR) was 49 per thousand live births in 1993, being 54 for boys and 44 for girls (US Bureau of the Census, 2004). As well as being higher among male infants, the IMR is higher in areas of worse socio-economic circumstances (Department of Health et al., 1998). For example, there are higher IMRs in the Eastern and Northern Capes as well as in Mpumalanga and Kwazulu Natal which are poorer provinces, and in rural areas as compared to urban areas. Furthermore, Yach (1994) reports that there are differentials by race with a ten-fold difference in IMR between Africans and Whites.

Although these mortality rates declined between 1986 and 1991, the rates are now showing an upward trend which has been linked to the increased mortality associated with HIV/AIDS (Department of Health et al., 1998). In fact the MDG of reducing child mortality by two-thirds between 1990-2015 (World Bank, 2004b) is far from being reached with both the IMR and under-5 mortality rate being higher in 2001 than in 1990 (UNDP, 2003).

Immunisation is one way of preventing child deaths. Coetzee et al. (1994) report that the measles cases and associated deaths are attributable to immunisation service inadequacies. However, they state that there has been a reduction in measles since 1990, attributing it to the 1990/1 Measles Immunisation Strategy and the *"cyclical nature"* of immunity (p145). However despite the nationwide measles immunisation campaign in 1990/1, Schoub and Martin (1993) report that there was a measles epidemic in 1992. Further immunisation campaigns aimed at eradicating polio and measles started in 1995 (Department of Health, 2000). The South African Demographic and Health Survey (DHS) found that 63% of children aged 12-23 months are *fully* immunised with Bacillus of Calmette and Guérin (BCG) which protects against Tuberculosis (TB), three doses of Diphtheria, Pertussis, and Tetanus (DPT) and polio, and measles, with less than 3% having received no vaccinations (Department of Health et al., 1998). However, there are differentials by residence with children from rural areas less likely to receive vaccinations. In addition, immunisation is highest in the Northern Cape and among children of educated mothers and among Coloureds. The Eastern Cape had the lowest immunisation against measles.

In the two weeks preceding the 1998 South African DHS, 13% of children under 5 years of age were reported to have had diarrhoea (Department of Health et al., 1998). The DHS report states that the higher prevalence of diarrhoea found among children aged 6-23 months was consistent with the age pattern of the disease seen in developing countries. Children of this age have increased exposure to illness following weaning, increased exposure to illness when they begin to be mobile and increased exposure to illness because of a not yet developed immune system.

Although exclusive breastfeeding is recommended for the first six months (WHO, 2004b), it is not very common in South Africa and supplementation begins early. Only 10% of infants are exclusively breastfed for the first three months and 1% for 4-6 months (Department of Health et al., 1998). Between 1987 and 1998, 9% of children under 5 years old were considered underweight in South Africa (UNICEF, 1999).

As a result of apartheid, there has been a *"fragmented approach"* to health care provision in South Africa with separated preventative and curative services (Dyer, 1993 p579). Furthermore, there have been inequalities racially, regionally and by private/public sector (Bachmann, 1994). Following the first democratic election, in 1994 a new Department of Health was created and the first African Minster for Health was appointed (Health Systems Trust, 1995). As a consequence, free health care was provided for pregnant women and all children under 6 years of age (Department of Health et al., 1998; IPPF, 2000).

1.3.4 Education in South Africa

During apartheid African children did not have to attend school, and if they did, attended schools of inferior quality (Constitutional Rights Foundation, 2000). The differential quality in schools was due to the fact that funding decisions for African schools were made centrally by White control and separate to that of White schools (Case and Deaton, 1998). For example, Thomas and Mabusela (1991) report pupil to teacher ratios in African schools three times that of White schools. Furthermore, the racial segregation during apartheid meant that children could not move to areas with better schools (Case and Deaton, 1998). These factors contributed to substantial differentials in schooling by race. Indians had the highest education, with similar attainment to Whites. As well as starting later, Africans and Coloureds also stopped going to school earlier, resulting in differentials in educational *attainment* by race. Also, although White households spent a lot more on school expenditure than African households, they spent *proportionately* less. The fact that although White households spent more *absolutely* on education they spent *proportionately* less brings in the issue of affordability and highlights the fact that educational fees may be a barrier to access amongst children living in poorer households. Nevertheless, even though fees for primary and secondary schooling were a necessity, school expenditure was considered a *"luxury good"* (p21).

Despite these inequalities, over the last few decades enrolment has increased (Yach, 1994) and almost all children in South Africa complete primary school (Maharaj et al., 2000), one of the MDGs. In sharp contrast, only about a third of 20-24 year olds complete secondary schooling (Maharaj et al., 2000). However overall, literacy is high with 82% of both men and women literate (IPPF, 2000) and net school enrolment was 94% between 1987-97 (Maharaj et al., 2000).

Even after the end of apartheid, schooling continued to be disrupted by violence and boycotts, as did racially based resource allocation (Maharaj et al., 2000). In fact, Maharaj et al. (2000) report that such violence prompted parents to send their children to rural schools which although were former homelands and not as well resourced, had the benefit of being undisturbed. In 1993, nearly two-thirds of children in the homeland areas were still going to schools that had varying admissions and pass rates and were of unequal quality. In 1993, education began at age 6-7 years but it was not compulsory for everyone, including Africans, until 1996. In this year attendance at school became compulsory for everyone from the school year that they reached age 7 years until they reached ninth grade or the end of the school year when they were 15 years of age (South African Schools Act, 1996).

1.3.5 Child Grants in South Africa

Under apartheid, a State Maintenance Grant was given to lone mothers excluding African women (Case et al., 2003). Although in time it included African women, it still excluded those living in rural areas. Therefore, in the process of reform, the new government began to phase out this State Maintenance Grant. As the 1996 Constitution of the Republic of South Africa stipulated that *"everyone has a right to have access to social security if they are unable to support themselves"*, grants were instead introduced for the *poor*, *"a cash transfer from the state to people who are unable to provide for themselves"* (Department of Social Development, 2004 p2). Although such grants were not around at the time of the data collection for the data used in this thesis, being introduced only later in April 1998 (Case et al., 2003), it is worth noting that today there are three means tested state grants available for children and their carers which may indeed have the effect of encouraging fostering:

1. Child Support Grant – *"payable to primary caregiver in respect of a child"* where the caregiver is *"any person who takes primary responsibility for the daily needs of the child and who may or may not be related to the child or children"* (Department of Social Development, 2004 p3). This grant was first introduced for children under the age of 7 years (Case et al., 2003) but was later extended to children below the age of 9 years, and then below age 11 years in 2004/5 and is to be below 14 years in 2005/6 (Department of Social Development, 2004).

2. Foster Care Grant – *"paid to foster parent/s in respect of a foster child who has been placed in their custody in terms of the Child Care Act"* (Department of Social Development, 2004 p2), that is, both parents have died or declared unfit to care.

3. Child Dependency Grant – *"payable to the parents, foster parents, guardians or custodians in respect of a child between the ages of 1 and 18 years in their care, who due to their mental and/or physical disability, need full-time care"* (Department of Social Development, 2004 p4).

Importantly, these grants are means tested, aiming to remove the previous urban bias, and are targeted at the 'primary caregiver' rather than the biological parent (Case et al., 2003). Case et al. (2003) assess the coverage of the Child Support Grant in the poor, rural, HIV-afflicted Hlabisa district in northern Kwazulu Natal, *"precisely the kind of area that the Child Support Grant is intended to reach"* (p1). The authors praise the *"commitment to implementation"* (p10) of the grant since a third of age entitled children were receiving the grant within five years of its implementation. They also found that the grant was targeting the poor as intended and being processed quickly. Noteworthy however, is that they found that children who were not residing with their mothers were less likely to receive the grant, attributing it to the possible lack of awareness of the grants being given to the 'primary caregiver' rather than the biological mother, as well as difficulty in obtaining the necessary documentation for application. This is of concern in a society with a significant proportion of child fostering and with the growing number of children orphaned by AIDS.

1.4 Summary and thesis outline

This first chapter has provided an overview of child fostering. In addition, it has stated why fostering is an important research topic and the objectives of this thesis. This chapter has also described the South African setting to be examined in order to contextualise the research. This context and history of apartheid is important to consider.

This thesis continues to investigate the levels, patterns and correlates of fostering in South Africa and the consequent health and educational outcomes for the children involved with a review of the previous literature on child fostering in Chapter 2. Chapter 3 describes the data source and statistical methodology used in this research. The results from these analyses are presented and discussed in the subsequent four chapters; Chapter 4 presents the levels, patterns and correlates of fostering in South Africa whilst Chapters 5 and 6 examine the health and educational implications of fostering, respectively. The analyses presented in Chapter 7 control for the potential endogeneity of fostering whilst investigating the health and educational outcomes to see if fostering is indeed endogenous to the child outcomes and if so, the effect of controlling for this. The final chapter discusses the principal findings and policy implications from the previous chapters, and the limitations, as well as areas for further research.

CHAPTER TWO

Patterns of child fostering in sub-Saharan Africa

2.0 Introduction

Child fosterage is a demographic phenomenon that is practiced throughout the world but is arguably most evident in sub-Saharan Africa, particularly West Africa (Isiugo-Abanihe, 1985). In these countries, it is a well-accepted means of child rearing and of delegating parental responsibilities. Although the practice *"developed in pre-colonial times"* (Goody, 1984 p269), over the past thirty years the child fostering literature has moved from investigating the norms and determinants underlying the practice to focus on the implications for the fostered child (Oppong, 1997). These studies have included both theoretical and empirical research, small-scale surveys and ethnographic studies as well as large-scale quantitative analyses. This chapter investigates the patterns of fostering in sub-Saharan Africa shown in the previous literature. Section 2.1 highlights the measurement and definitional issues complicating the study of child fostering before describing the levels of the practice. The motivations for fostering are examined in section 2.2 and the characteristics of the sending and receiving households, and foster children themselves, are discussed in sections 2.3, 2.4 and 2.5, respectively. Section 2.6 discusses the relationship that fostering has with fertility whilst section 2.7 recognises that fostering occurs cross-culturally. Section 2.8 reviews the health and educational implications for the children involved in the practice and section 2.9 discusses how the situation may have evolved with the advent of HIV/AIDS, before summarising with the issues that are left unaddressed by the previous studies in section 2.10.

2.1 Definitions, measurement and levels of fostering

Before reviewing the levels of fostering, it is useful to discuss how fostering is measured and defined in previous studies. Although some small-scale studies have attempted to directly focus on fostering, larger-scale data on fostering is usually obtained *indirectly* from fertility data (Isiugo-Abanihe, 1985). For instance, the author discusses that such large-scale surveys or censuses investigate the number of children residing with a woman, the number dead and the number absent in order to gauge the total number of live births.

However, the data on absent children is not often used and is sometimes not even coded when these children are potentially (but not always) fostered.

As well as difficulties in *measuring* fostering, there are *definitional* discrepancies in the literature for what constitutes fosterage. As a consequence, levels of fostering by each study are incomparable. For example, some authors suggest fostering has occurred when a child lives away from *both* biological parents (Lloyd and Gage-Brandon (1993) for example), whilst others suggest it requires living away from *only one* parent, particularly the mother (Bledsoe and Brandon (1992) for example). While the logic of this definition rests on the fact that mothers are the principal caretakers, many children who are living with their fathers only may be classified as fostered which may be too inclusive, especially in patrilineal societies. In addition, it is not clear whether *orphans* or *adopted* children should be classified as fostered (Ainsworth (1992) excludes orphans), and what *age* constitutes a child (Ainsworth (1992) considers 7-14 year olds excluding younger children fostered for weaning) or whether the *duration* of fostering spells should be considered (Nathan (2001) uses four months). However, some studies use more precise definitions. For instance, Nathan (2001) in her study of fostering in Tanzania differentiates between children who are maternally/paternally co-resident, maternal/paternal absentees, maternal/paternal orphans, motherless/fatherless and each combination thereof. Using local language definitions, Castle (1995) goes a step further and differentiates between formal and informal fostering in Mali. She identified six distinct types of child care arrangement within and between households: maternal care in the agnatic family; maternal care in the mother's natal family; inter-household fosters living with neither biological parent; intra-household fosters residing within the same household as their biological mother but being cared for by another woman; semi-permanent fosters constantly being moved between different households; and a forager who scrounged for food in other households (p683-684). Having considered all these definitions, this study defines a foster child as aged 0-15 years residing with neither their mother nor father, including orphans, irrespective of for how long.

Complicating the study of fostering further, it has been noted in the literature that non-fosters are not solely cared for by their biological mothers and may be *"not with her arm"* (Castle, 1995 p683) and are often cared for by their siblings or other caretakers whilst their mother works (Castle, 1995, 1996). Other authors also note that children are not cared for

by their mothers 100% of the time when they live with them, being supervised by the elderly, older children or co-wives (Bledsoe and Brandon, 1992; Shell-Duncan, 1994). Furthermore, foster children may continue to have contact with their biological parents whilst residing with others (Silk, 1987; Page, 1989). This therefore has important implications when interpreting findings from previous studies.

It is also useful to discuss the difference between adoption and fostering. Goody (1982) in her comprehensive discussion of parenthood, social reproduction, fostering and occupational roles in West Africa states that *"fosterage concerns the process of rearing, not the jural definition of status or relationships"* (p23). In contrast to adoption whereby a child assumes the lineage of the new guardians, Fiawoo (1978) discusses that when a child is fostered, he or she retains their own lineage. Therefore, the difference between adoption and fostering is that adoption is the surrendering of *full* rights and tends to be *permanent* whereas fostering is the surrendering of only *partial* rights, being more likely to be *temporary* (Isaac and Conrad, 1982; Ainsworth, 1992). Having said that, Castle (1995) found that formally fostered children in Mali remained fostered until marriage and that the responsibilities of bridewealth and dowry were agreed between the biological and foster family prior to any fostering arrangement. . Furthermore, Castle (1992) found that formally fostered children should indeed inherit from their caretakers but that in reality it rarely happened for foster boys. However, pre-inheritance was common, often in the form of jewellery for girls. In the context of South Africa, Harber (1999) discusses that adoption is primarily a White practice and that informal fostering to the extended family *"meet the needs"* of African households (p9). Bledsoe and Brandon (1992) discuss *adoption*, but note that this 'formal' transfer of children rarely occurs in sub-Saharan Africa. In fact, fostering and adoption that occur in the West is much more formalised and very different to that in sub-Saharan Africa. Indeed, fostering in sub-Saharan Africa may not even be considered so, making enumeration of fostered children in surveys difficult, particularly where fictive kinship classifications predominate. For example, nephews and nieces are most commonly fostered but some argue that this is not fostering and may not be regarded as so in the culture-specific context where your sister's child is 'your' child (Gil and Ghansah, 1968; Caldwell and Caldwell, 1987).

In fact, the maternal-child dyad used in 'typical' Western models of care may not be the norm in many African communities where sibling and surrogate caretaking are prevalent from an early age because children belong to the kin. Within this context, non-maternal care is a daily reality even for children living with their mothers (within-household fostering as identified by Castle (1995) discussed above) and shifting children is not at all an anomaly. Indeed, Castle (1995) confirms that *"large amounts of care by surrogate caretakers in addition to the mother therefore constitutes the 'normal' caretaking environment"* in rural Mali (p690), noting the importance of recognising the *"fluidity and flexibility of household boundaries"* (p685). Also, in her study of the Kipsigis of Kenya, Borgerhoff Mulder (1985) found that infants were always cared for by their mothers until four months of age, after which caretaking begins to be informally delegated to one or several older siblings. The sibling caretaker assumes more and more responsibility for the child as it gets older but by the time the child is three years of age, it is considered that the child no longer needs much in the way of care giving. These issues further complicate the study of fostering.

Findley and Diallo (1988) in their study of Mali found that 48% of their sample of children under 5 years of age and 43% of the sample aged 5-14 years were not related to the head of household or were other women's children besides the wife of the household head. This definition could overestimate fostering if the child lives with his/her parent(s) but someone else is identified as the household head. In fact, when the authors did indeed exclude children who had parents present in the household, only 4% of the cohort under age 20 years were classified as fostered, illustrating how the levels of fostering are considerably affected by the definition used. Similarly, the type of data used has an impact on the level of fostering. For example, the same authors show how *higher* levels of fostering exist when using more direct data on fostering rather than *indirect* data on foster status using relationship to the household head. In contrast to the levels given above, using the *direct* data which asked *explicitly* the details of any children fostered, 10% of children aged under 20 years of age were fostered in. This example illustrates how levels of fostering are substantially affected by the definition of fostering as well as the type of data used.

As a result of the different definitions of fostering used in each study, in order to gauge some kind of international comparison in the level of fostering comparing like with like, Table 2.1 shows children's living arrangements using data from selected DHS surveys

which use the same definition. The DHS surveys selected were those that were collected around 1993, the year of the data used in this research, and the data for South Africa, the study population. It must be noted that DHS data are not representative of *children*, discussed subsequently.

Despite Burkina Faso having a massive amount of labour migration to the Ivory Coast, Table 2.1 shows that Burkina Faso had the highest proportion living with both parents and South Africa had the lowest proportion. South Africa probably has the lowest proportion of children living with both parents because of the large amount of male labour migration which is probably also the reason behind the proportion of missing information. In each case, there were higher proportions of children living with their mother only than with their father only, again probably a result of male labour migration and excess male mortality. Furthermore, there were higher proportions of paternal orphans than maternal orphans. However, there were relatively low levels of double orphans but this is likely to have increased in recent years because of HIV/AIDS. If we consider as fostered those children who are not living with either biological parent, including orphans (the DHS definition), the highest proportions were in Namibia which had 29% of children living away from both parents and South Africa which had 25%, with the lowest proportion in Kenya. However, still a significant proportion of children were fostered in Kenya (9%).

There are contrasting opinions as to whether the practice of child fostering is increasing or decreasing. The general consensus from the previous literature is that the practice will decrease because of increasing modernisation and decreasing fertility, but that it will increase because of HIV/AIDS (Isiugo-Abanihe, 1994). The devastating impact of HIV/AIDS is yet to be fully realised. Previously these orphans were absorbed into the extended family but with the sheer numbers involved this may not be possible in the future. In addition, such large numbers of orphans being cared for by the extended family may be detrimental both to the children themselves and to the families who must share scarce resources. The evolution of fostering since HIV/AIDS is discussed in more detail in section 2.9. So why are children fostered? The next section addresses the motivations for the practice.

Table 2.1 Percent distribution of de jure children under age 15 years by survival status and residence of parents in selected sub-Saharan African countries

	Living with *both* parents	Living with *mother* only		Living with *father* only		Not living with *either* parent				
Country		**Father alive**	**Father dead**	**Mother alive**	**Mother dead**	**Both alive**	**Father only alive**	**Mother only alive**	**Both dead**	**Missing**	**Total**
Burkina Faso (1992/3)	78.4	3.7	3.2	2.7	1.6	7.2	0.6	1.3	1.0	0.4	100.0
Ghana (1993)	49.9	25.8	3.0	4.7	1.0	11.6	0.7	1.2	1.0	1.1	100.0
Ivory Coast (1994)	57.4	16.6	2.5	6.6	1.0	12.3	0.6	1.5	0.4	1.0	100.0
Kenya (1993)	58.1	22.8	4.4	1.3	1.0	7.8	0.4	0.8	0.3	3.1	100.0
Malawi (1992)	61.8	17.5	3.5	1.2	1.4	9.9	1.7	1.1	1.1	0.8	100.0
Namibia (1992)	35.9	25.9	2.8	3.7	0.3	24.6	1.3	2.3	0.4	2.9	100.0
Niger (1992)	75.2	5.4	2.0	2.6	1.6	9.6	1.1	1.7	0.4	0.6	100.0
Senegal (1992/3)	63.8	16.6	3.2	1.9	0.9	9.6	0.8	0.9	0.4	1.9	100.0
South Africa (1998)	32.8	29.5	5.0	2.5	0.4	20.6	1.0	2.7	0.8	4.8	100.0
Tanzania (1992)	62.9	12.9	3.4	4.4	1.0	9.9	0.9	1.2	0.4	3.0	100.0
Zambia (1992)	65.5	12.0	3.4	3.5	0.9	10.5	1.3	1.7	0.6	0.8	100.0
Zimbabwe (1994)	48.2	24.1	4.4	3.0	0.7	13.6	1.2	2.1	0.7	2.1	100.0

(SOURCE: ORC Macro, 2004)

2.2 Child fostering motivations

The causes and motivations underlying fostering can be viewed as push and pull factors for the sending and receiving households, respectively, although there is overlap in the motivations involved for these two types of household. This section gives a brief discussion of some of the differential motives for fostering in versus fostering out.

2.2.1 Motivations for sending households – push factors

Various types of fostering have been identified in the literature on this topic (Fiawoo, 1978; Goody, 1982, 1984; Isiugo-Abanihe, 1985). These can be listed as:

1. Kinship fostering.
2. Crisis fostering.
3. Alliance and apprentice fostering.
4. Domestic or service fostering.
5. Educational fostering for formal or Koranic schooling.
6. Fostering for weaning.

These groups are by no means mutually exclusive and fostering in and out can occur simultaneously. For instance, a girl could hypothetically be fostered to members of her kin to carry out domestic tasks in order that she is provided with an education, whilst another child of a different age is fostered into her natal household, meaning that children can essentially be exchanged. Having said that, Akresh (2003) found that only a small proportion of households (3%) sent and received children simultaneously in Burkina Faso. The following sections discuss each of these six types of fostering in turn.

2.2.1.1 Kinship fostering

Kinship fostering occurs within the extended family as a support mechanism (Isiugo-Abanihe, 1985). It is a consequence of the *"need to reallocate resources within the extended family"* as well to strengthen family ties (Isiugo-Abanihe, 1985 p56). All the previous studies have identified that virtually all fostering is to members of the kin. Furthermore, fostering to grandparents is particularly apparent (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe, 1990a, 1990b; Bledsoe and Brandon, 1992), and is discussed in greater depth later in the chapter.

Schildkrout's (1973) ethnographic study of fostering in urban Ghana found that children were transferred *"between biological kin, fictive kin, and non-kin of the same and of different ethnic groups"* (p48). Although the study found that child transactions occurred between both members of kin and non-kin, transactions were most likely between those who were 'close', that is, members of the same ethnic sub-group or area and the obligatory reciprocal arrangement lasted longer among kin than with non-kin. However, this ethnographic study investigated fostering transactions that occurred in one house over a two year period and can therefore not be generalisable to the rest of Ghana and the *frequency* or the political/economic *context* were not considered.

Fostering improves the socialisation and family ties within the kin structure for both the child and the parents involved (Desai, 1992; Lloyd and Desai, 1992). In an anthropological study of adoption and fostering, Silk (1987) argues that adoption and fostering are consistent with kin selection theory as the practice is contained within the kin since the process is largely *"unreciprocated altruism"* which would not occur with non-kin if they do not receive anything in return (p41). In addition, it discusses that fosters are unlikely to be treated as well as natural children because they are not as *"closely related"* to their foster parents as biological children (p42). However this study is theoretical and fostering is not necessarily unreciprocated since foster households may actually benefit through consolidating ties and gaining child labour etc, discussed subsequently in section 2.2.2.

2.2.1.2 Crisis fostering

Crisis fostering, as the name suggests, occurs when the household is in trouble, such as after divorce, separation, death, illegitimacy or infertility (Isiugo-Abanihe, 1985; Ainsworth, 1992; Bledsoe and Brandon, 1992; Lloyd and Desai, 1992). In Mali, over a quarter of children fostered in and 15% of children fostered out were for crisis reasons such as remarriage, divorce or death of their parents (Findley and Diallo, 1988). Page (1989) found that the most influential factor affecting the prevalence of child circulation was marital dissolution. Fostering is also used to remove any stigma attached to illegitimacy by removing the child from the household (Isiugo-Abanihe, 1985). There is a *"utility of fostering out children during difficult times"* in that crises normally mean a lack of resources and children may need to be fostered to reduce costs (Bledsoe, 1990a p87). This view is supported by Akresh (2003) in his comprehensive study of fostering decisions

in Burkina Faso. He found that households fostered out children as a *"risk-coping mechanism in response to exogenous income shocks"* (p24), using unexpected crop loss to measure this among his subsistence farming study population.

2.2.1.3 Alliance and apprentice fostering

Alliance and apprentice fostering have motivations of increasing or establishing alliances with respected families and increasing social advancements (Goody, 1984; Isiugo-Abanihe, 1985). Goody (1984) states that apprentice fostering is child labour in exchange for food, shelter and learning a trade. However, the study does not rely on any empirical evidence being merely a discussion of fostering, its history and in whose interests it is in. Also the foster child could be sent to a trainer or sponsor to learn a trade by a stricter upbringing (Isiugo-Abanihe, 1985). Goody (1984) states that alliance fostering is the only type of fostering reported in East Africa. Relationships can be established with adults of higher socio-economic status (SES) which leads to increased social prestige and mobility, making them a potential source of support for the parents and the child has better opportunities in employment and marriage (Bledsoe, 1990a). Isiugo-Abanihe (1985) states that the main motivation behind this type of fostering is *"social mobility"* (p57). Akresh (2003) also found in his Burkina Faso study that households with a better social network, defined as having parents or adult children or business people to foster to, were more likely to foster out, providing evidence for alliance fostering.

2.2.1.4 Domestic or service fostering

Domestic fostering helps to redistribute child labour (Isiugo-Abanihe, 1985). Girls especially, are sent to learn domestic tasks and sent to help young mothers, or to provide emotional support and companionship to the elderly or childless. Fosters perform domestic tasks and look after children in return for their upkeep or training. Some parents send out their children as domestic servants to relatives in the hope that they send remittances back home (Lloyd and Gage-Brandon, 1994). Indeed, although there may be some kin relationship, many young girls may be classified as domestic servants living in households without biological parents present. In addition to fostering to manage risks and for those with better social networks, Akresh (2003) also found that households fostered out to comply with labour demands. However, he found that these factors only influenced fostering out rather than fostering in. Using recent fieldwork data, matching both sending and receiving households, as well as Focus Group Discussions (FGDs) and In-Depth

Interviews (IDIs), he tested his theoretical framework using binary logit and household fixed effect logit models, testing for unobserved heterogeneity. However, he only considered children aged 5-15 years, therefore excluding young children whose household motivations are likely to be very different and also restricts the analysis to kinship fostering.

2.2.1.5 Educational fostering for formal or Koranic schooling

Isiugo-Abanihe (1986) found that in Western Nigeria, over half of children were fostered for educational reasons and is associated with the 'formal' education of fosters as a *"means of social mobility"* (p77). This illustrates the overlap with other fostering types such as alliance fostering. However, comparing educational fostering to non-kin members with kinship fostering, educational fostering occurs at older ages (Schildkrout, 1973). As well as reducing education costs by sending children away for schooling, parents gain from the practice by themselves receiving economic returns from their children as well as social advancement (Gomes, 1984; Isiugo-Abanihe, 1985; Bledsoe, 1990a; Lloyd and Blanc, 1996). The extended family allow more children to be educated than just the biological family could educate, as they provide additional support and a larger resource pool (Lloyd and Blanc, 1996). However in some contexts, the education of boys is supported more than the education of girls (Lloyd and Gage-Brandon, 1994). In contrast, Akresh (2003) did not find much evidence of educational motivations for fostering with only 9% of households citing schooling as the reason for fostering

2.2.1.6 Fostering for weaning

Finally, there is also a lot of evidence of fostering for weaning purposes (Isiugo-Abanihe, 1985; Bledsoe, 1990a; Bledsoe and Brandon, 1992; Schröder, 1995). The evidence suggests that fostering is occurring at younger and younger ages, where infants are sent to 'grannies' for weaning until they reach the 'age of sense' (about age 6 years) when they return or are fostered elsewhere for schooling (Bledsoe, 1990a). Children are sent away for weaning because short birth intervals mean competition for the mother's time. In addition, there is fear that breast milk can be contaminated with semen from the reintroduction of sexual intercourse (Bledsoe and Brandon, 1992).

The literature suggests that there has been a shift in motivations over time with a move away from being a traditional practice to members of the kin, to strangers for educational reasons being the more dominant motivation (Goody, 1975; Isiugo-Abanihe, 1985). Goody (1975) speculated that this trend over time from kinship to non-kin fostering was because kin members were less able to meet the increased parental desires for their children through education or apprenticeships and that a higher proportion of girls were sent to members of non-kin than boys. However, crisis situations could now become the dominant type of fostering as a consequence of HIV/AIDS (Isiugo-Abanihe, 1994).

2.2.2 Motivations for receiving households – pull factors

Although there is some overlap with the motivations for sending households, there are also reasons why households foster in children which involve issues of both altruism and obligation. Furthermore, Ainsworth (1992) outlines four economic determinants for fostering in; the need for child labour, child investment, child care and future income.

People who foster in may have a demand for labour or a need for financial support or they may want a child if they have few or no children of the desired sex. There can be reciprocal arrangements in that in return for food and housing, the foster child has to provide domestic help for the receiving household (Fiawoo, 1978). As mentioned previously, fostering to grandmothers is particularly common. Grandmothers can benefit from the fostering transaction by being provided with emotional support and companionship in addition to labour from the child. Bledsoe and Isiugo-Abanihe (1989) suggest that grannies need foster children: *"like infertile women, an old woman is seen as lonely and piteous: she has no children by her, and needs a child as a walking stick"* (p452). Furthermore, they can expect support from the child's parents and future support from the child themselves (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe, 1990a). Ainsworth (1992) reports that grandmothers sometimes even *compete* for the care of their infant grandchildren so that they can obtain resources from the child's parents. Bledsoe (1988) discusses some Mende proverbs that illustrate the many claims on children. There is the idea that *"a child is not for one person"* (p180) meaning that many people rely on a child in terms of labour as well as future reciprocity. Another Mende proverb is *"children are like a young bamboo tree: you don't know which of the shoots will be cut away, and which will remain"* (p180) suggesting that only one child of several will be successful with the many people who have helped them in some way having demands on the child.

Whether in fact these foster parents do *actually* receive a return in the long-term is another matter (Ainsworth, 1992). In fact, it has been suggested that the child's future *"sense of obligation"* decreases over time (Bledsoe and Isiugo-Abanihe, 1989 p467). Fosterage is not a relationship where future support is obligatory but rather future support is assumed (Bledsoe, 1990a). The fact that children remain part of the natal household is perhaps important here as it limits how much children can give back to the foster parents.

Silk (1987) in her anthropological review of adoption and fostering, discusses that altruism plays a large role as the foster household is expected to nurture, feed, clothe and educate the children of others. With respect to crisis fostering, in particular, altruism may play a role along with friendship and patronage (Bledsoe, 1990a). In contrast, it can also be considered as an *obligation* for the receiving household (National Research Council, 1993). Bledsoe (1990a) certainly reports issues of obligation, discussing that *not* fostering may be viewed as negatively as childlessness for the Mende of Sierra Leone.

Another possible reason for fostering in may indeed be childlessness, which is often socially unacceptable. Many authors mention infertility as a reason to foster in (Schildkrout, 1973; Bledsoe and Brandon, 1992; Lloyd and Desai, 1992; Renne, 1993; Isiugo-Abanihe, 1994). However, Findley and Diallo (1988) found little evidence of fostering from high to low fertility households in Mali with a low proportion being fostered because of childlessness and no correlation between household size and fostering. The authors discuss that although there was evidence of fostering from high to low fertility households at the *aggregate* level, other social and economic contextual issues were involved as households do not *intentionally* decide to *"balance family sizes"* but that the process reflects the *"changing social and economic realities"* (p55).

2.3 Characteristics of sending households

Although the motivations for sending households have been discussed in the preceding section, previous studies have identified that sending households and biological mothers have particular characteristics. Isiugo-Abanihe (1985) explores fostering in the West African countries of Liberia, Sierra Leone and Nigeria, focusing on Ghana. Census data were used to regress an index of child fostering to see if fewer, or more than average, children were fostered out. With respect to the characteristics of the household fostering

out, he found that women's age, maternal education and being in a marital union were *negatively* associated with fostering out whereas the number of surviving children, number of persons per room, urban residence and work participation were *positively* associated with fostering out. In addition, in his later paper he found a negative relationship between age at first marriage and fostering (Isiugo-Abanihe, 1986). However, Isiugo-Abanihe's work used indirect census data incorporating a complex procedure to identify foster children involving many assumptions. Also, he only matched with the mother and so may identify as fostered those children living with their father but not their mother. Furthermore, he could not distinguish between fostered and adopted children if both parents had died.

In contrast to Isiugo-Abanihe's findings, using the 1993 Ghanaian DHS, Klomegah (2000) found a *positive* association between fostering and education with women in higher than secondary education fostering out their children to other people and those who fostered out had lower fertility, being contrary to the high fertility hypothesis discussed subsequently. He found that women in professional or skilled occupations and those who were unemployed were more likely to foster out than women in agricultural, manual and unskilled jobs. However, only a small proportion of fostering out (2%) was found and DHS data are not representative of children. Also, the methods used were not very robust, relying on contingency and Multiple Classification Analysis (MCA) tables and so cannot really conclude any cause and effect between fostering and fertility. Furthermore, the study only looks at married women which meant the exclusion of crisis fostering in times of divorce or pre-marital births which are also prime reasons for fostering out. Perhaps it would have been more insightful to investigate fostering *in* rather than *out*, for which a much higher proportion of fostering was reported in the final DHS report; 15% overall and 27% among children aged 13 years (Ghana Statistical Service, 1994).

Bledsoe (1990a) in her study of the Mende of Sierra Leone found that women who fostered their children out were more likely to be less educated, younger at their first pregnancy, working outside the home, polygynously married and Christian. Moreover, they had higher fertility on average and were more likely to have fostered in children themselves. In contrast, Schröder (1995) used DHS data from Liberia, Ghana, the Ondo State of Nigeria, Kenya, Zimbabwe and Botswana, as well as ethnographic literature from Kenya, Ghana and Liberia and found that educational attainment of the mother had *little* impact on

mother-child co-residence. However, supporting Bledsoe and Isiugo-Abanihe (1989), in Kenya she found that with increasing levels of education, children were less likely to be living away from their mother. Nevertheless, the definition of education was only classified as 'none' and 'some' and is therefore rather ambiguous. She also found that in Botswana, Zimbabwe and Kenya, women who worked for cash were more likely to be separated from their children.

Schröder (1995) also found that union factors were influential to fosterage, supporting the crisis theory. She found that divorced, widowed and separated women as well as those not yet married were more likely to have children fostered out. This was also the case for women married more than once who may not want to bring children from previous unions into new unions (Isiugo-Abanihe, 1985). Only in the Ondo State of Nigeria and Kenya did Schröder (1995) find that spousal non co-residence increased the risk of mother-child separation. Schröder also makes the assumption that non co-residence of mother and child is equivalent to fostering which is sometimes not the case, especially in patrilineal societies. The first round of the DHS from the 1980s was used and the six selected countries may not represent the regions of sub-Saharan Africa as intended. As a consequence, it may not be wise to generalise since sub-Saharan Africa is very heterogeneous. The DHS only infers fostering and does not capture fostering within the extended family, girls already married, living with their father, at boarding school, children of woman over 49 years of age and orphans. In addition, the ethnographic literature is small-scale with different focuses and incomparable to the DHS data, being from the 1960s and 1970s. Thus, the methodology did not truly complement each other.

Nathan (2001) found that *"remarriages among women is the most significant social determinant of fostering out children"* (pi). Younger, illiterate, polygamous, recent migrant women and urban dwellers with few resources with no residential partner were also the most likely to foster out according to Lloyd and Desai (1992). They also found that female headed households were less likely to foster out. The latter study investigates living arrangements in sub-Saharan Africa and Asia, with the use of 19 first round DHS surveys. However, the study failed to match with male data, therefore overestimating fosterage. The DHS data does not specifically address fostering and does not have questions on access to resources or income. As noted above, the sample excludes children whose mothers had died as well as mothers under 15 years and over 49 years, meaning that

the sample is *"not fully representative of all children in the population"* (p198). The extent of sample selectivity depend if the children of the excluded women are systematically different to those in the sample.

In their study of fostering in Cameroon, Eloundou-Enyegue and Stokes (2002) found that children of poor households and unmarried women were more likely to be fostered out but these characteristics were only influential in urban areas. Using discrete time logistic regression on panel data over twenty years as well as FGDs, they found a reduction in fostering out during Cameroon's economic crisis, attributing it to a decline in opportunities in urban areas rather than decreased demand. There was also a difference in timing between rural and urban areas. However, other factors could have been involved as receiving households were not investigated and the analysis was subject to recall errors. Furthermore, it only considers older children going to school, excluding orphans and uses a mother-based sample. Nevertheless, the study does suggest that there are economic associations with fostering.

2.4 Characteristics of receiving households

Although Madhavan (2004) states that the *"choice of the foster parent also depends on the reasons for fostering"* in her literature review of fostering in the era of AIDS in South Africa (p1445), previous studies have also identified particular characteristics that are associated with fostering *in* a child. As discussed previously, all studies find that most foster parents are kin members. For example, Isaac and Conrad (1982) found that 83.2% of Mende children were fostered to members of the kin, particularly maternal kin and to those of parental age in contrast to 'granny fostering'. However, the pattern of kinship members by age of the child differed. Over half of younger fosters aged 1-4 years were sent to members of maternal kin (mother's sister or parent) but only a third of 5-9 year olds and a fifth of 10-14 year olds went to these types of kin. This was attributed to the Mende's birthing behaviour whereby women go to their mother's household to give birth and leave their child behind after about a year. Furthermore, fostering to the birthplace decreased with age but fostering to the maternal brother was increasingly common with the age of the child. Although this study was the first to look at differences by residence and occupation with a large sample, it is not generalisable since it investigates a single ethnic group.

Shell-Duncan (1994) found that 98% of children were fostered to members of the kin among the Turkana of North West Kenya. However, she found that nearly 60% of foster mothers were the maternal grandmothers. She may also have overestimated fostering since the definition only considered mothers. Similar to this, Urassa et al. (1997) in their study of orphanhood and fostering in rural Tanzania found both orphans and fosters were cared for by the extended family, particularly maternal grandmothers. These 'grannies' were not of lower SES as found in previous studies (Bledsoe and Isiugo-Abanihe, 1989) but were households with a higher dependency ratio because of being female headed (Urassa et al., 1997). However, this study underestimated orphanhood and overestimated fosterage because of misclassifications during the baseline census. There was also under-reporting of these groups because of their relatively higher mobility. Furthermore, this was a small-scale regional study and so lacks generalisability.

Goody (1975) in her study comparing the delegation of parental roles in West Africa with those in the West Indies, found that in Northern Ghana, a large proportion of fostering (39-59%) was to people of the parent's generation. Furthermore, she found that girls were more likely than boys to be fostered to someone in their grandparent's generation. Isiugo-Abanihe (1985) indicates that most children in Ghana under 10 years of age, in fact 40%, were sent to their grandmothers, a smaller proportion to aunties and uncles and even fewer to other relatives. Fosterage to urban areas was more likely to be to more distant relatives or acquaintances and girls were often sent to non-relatives for child labour. In contrast in Mali, Findley and Diallo (1988) found that the majority of foster parents were uncles and aunts, on the wife's side of the family, and similar to other studies, many foster parents were grandparents. However, this study did not control for factors independently using a multivariate analysis. Similarly, Akresh (2003) found that 62% of children were fostered to immediate family members and in fact restricted his analysis to this group so that respondents could answer questions about them and reduce endogeneity between the household's decisions to foster and households in its network. Parents made up 32% of these immediate family members whereas brothers and sisters were less likely to take-in foster children.

Bledsoe (1990a) found that women in Sierra Leone who fostered in were older, had some education, did not work outside the home, were married, monogamous, migrant and had more children fostered out. However, many of these variables lack formal definition. For

example, it was not stated what was meant by 'less education', 'younger age', 'being older' and 'having some education'. Isiugo-Abanihe (1983)[2] found that well-educated women (attained secondary school education or higher) and women in high status occupations (white collar) were most likely to foster in (cited by Isiugo-Abanihe, 1986). In contrast to these findings, Sudre et al. (1990) in their study of fostering in Swaziland found that foster mothers were older and less literate than the biological mothers. Lloyd and Gage-Brandon (1993) found that in Ghana, female headed households and households headed by older heads were more likely to foster in a child, with most being grandparents to the child. In her study of Tanzania, Nathan (2001) found that the age of women was *"the most important qualifier"* for being a foster mother, with foster mothers being significantly older (pi). However, she also found that marital status was influential with being in a first marriage increasing the chance of being a foster mother.

Akresh (2003) also found that the network member who fostered in a child had particular characteristics. First, those in a 'good' occupation were more likely to receive a child, defined as 'business people' or 'bureaucrats', whereas those who were unemployed or retired or homemakers were less likely. Second, those in a long-term or stable marriage were more likely to receive a child, where long-term was defined as three years and unstable as recently married or widowed/divorced or never married. Third, the parent, or child of the sending household, was more likely to take-in a child. The education of the network member or whether their own children were enrolled in school did not matter but receiving households were more likely to be composed of children of a different age and sex than the sending household. Of particular interest was that the receiving decisions did not mirror the sending decisions, that is, the receiving households were not different to non-fostering households by the three measures investigated.

Among the Mende of Sierra Leone, most of the fostering of older children aged 5-14 years was to urban traditional non-farmers (carpenters, tailors, cloth-dryers, Koranic teachers, blacksmiths, masons, fishermen, sawyers, weavers, hunters and bakers), modern skilled and white collar households (Isaac and Conrad, 1982). Occupation and urban-rural residence were found important factors for determining kin-recipients for older fosters aged 5-14 years but not important for younger fosters aged 1-4 years which was

[2] This thesis from the United States (US) was not possible to obtain so the secondary source by the same author is referred to.

determined entirely by kinship. Serra (2000) in her theoretical economic analysis of fostering in sub-Saharan Africa discussed that children, particularly girls, are sent to households of better SES. However, her study was purely theoretical with no empirical evidence taking a unidisciplinary economic perspective. Nevertheless other studies, including more empirical studies, have also suggested that children are sent to households of better SES (Silk, 1987; Bledsoe, 1990b; Bledsoe and Brandon, 1992; Eloundou-Enyegue and Stokes, 2002; Akresh, 2003).

Related to this, Castle (1995) found that fostering was heavily influenced by age hierarchies, family obligations and women's status. She found that child movement was *"rigorously controlled by the female social hierarchy"* in rural Mali (p679). Indeed, she identified that children moved in only one direction from lower status mothers to higher status foster mothers who were older and therefore at another point in the life course. The lower status mother could not refuse the request for her child by a senior woman, and nor was she in a position to request a foster child herself. The author therefore concluded that fostering served to *"visibly reinforce socio-political power differentials between these women"* (p679).

2.5 Characteristics of fostered children

This section discusses that fostered children also share particular characteristics and are therefore a 'select' group.

2.5.1 Sex of foster children

Although it has been argued that girls are more likely to be fostered to perform domestic chores (Isiugo-Abanihe, 1985) and that boys are more likely to be fostered for educational reasons (Ainsworth, 1992), it seems that these two factors balance out, meaning that roughly equal proportions of boys and girls are fostered (Page, 1989; Shell-Duncan, 1994; Schröder, 1995; Urassa et al., 1997). In contrast, some authors have found more girls than boys are fostered (Fiawoo, 1978; Isiugo-Abanihe, 1985, 1986; Findley and Diallo, 1988; Pennington, 1991). This sex differential in foster children has been attributed to the stronger emotional bond with boys meaning that parents do not want to foster them out and that girls are more useful for housework and consequently more likely to be fostered in (Isiugo-Abanihe, 1985). In his later paper, Isiugo-Abanihe (1986) also found an

association between sex and residence in Ghana with the ratio of girls to boys even higher in urban areas. Furthermore, Isaac and Conrad (1982) found among the Mende in Sierra Leone that the sex ratio of fostered in and fostered out children differed by age, with twice as many girls aged 1-4 years fostered out but virtually the same sex ratios in the 5-9 and 10-14 year age categories.

2.5.2 Age of foster children

Although there is evidence of children being fostered as infants, being claimed at birth or fostered for weaning (Isiugo-Abanihe, 1985; Silk, 1987; Findley and Diallo, 1988; Bledsoe, 1990a; Pennington, 1991), most of the previous studies have shown that fostering *increases* with age. This pattern is speculated to be because there are less emotional bonds to older children for the biological parents (Fiawoo, 1978) and that older children are sent away for schooling and training (Isiugo-Abanihe, 1985). It could also be because young children are a drain on the parent's time and resources but older children can contribute and overcome such costs for the foster household (Serra, 1997). In addition, Isaac and Conrad (1982) comment that among the Mende of the Upper Bambara Chiefdom in Sierra Leone, infants are rarely separated from their mothers, except if their mother dies. Similar to this, the Gonja of Ghana do not foster children until age 6 or 7 years, the 'age of sense' (Goody, 1975, 1982). Bledsoe discusses that young children are sent away until they reach this 'age of sense' when they return or are sent elsewhere for education (Bledsoe, 1990a; Bledsoe and Brandon, 1992). This educational motive is supported by Eloundou-Enyegue and Stokes (2002) who found that children of secondary school age were six times as likely to be fostered out compared to those of early primary school age and children of late teens more likely than children of preteens. This finding was attributed to having no access to secondary schools in rural Cameroon. Of interest was that they found school performance more influential than demographic determinants of fostering such as sex and parity, with those of top and bottom performance being more likely to be fostered.

Serra (2000) in her theoretical economic analysis of fostering in sub-Saharan Africa discusses that the main split in age occurs at around ages 6-7 years as young children constitute one type of fostering and older children over this age constitute another. Castle (1996) also found that there were different reasons for fostering children of different ages among the Malian Fulani. She found that social reasons and pressure on the biological

household were dominant motivations for fostering young children but the tasks that older children can perform being the motivation behind fostering older children.

The typical upper ages of fostering are not really known since most previous studies have not addressed fostering above about age 15-16 years. Children of this age range and above could be absent from their biological parents for reasons other than fostering, heading their own household, or girls getting married and moving households, for example. Akresh's (2003) justification for using an upper bound of 15 years in Burkina Faso was that older children are considered adults and are old enough to marry and set-up households. In fact, some studies have restricted their analyses to children of younger ages. For example Bledsoe and Brandon (1992) investigated children aged 1-12 years, believing this to be the *"normal fosterage range"* (p292).

2.5.3 Residence of foster children

Previous literature suggests that children tend to be fostered from rural to urban areas (Ainsworth, 1992; Eloundou-Enyegue and Stokes, 2002) but there is evidence that this pattern varies by the age of the child (Isaac and Conrad, 1982). This pattern by residence is likely to be because there are often improved prospects for schooling and training in urban centres (Lloyd and Desai, 1992; Eloundou-Enyegue and Stokes, 2002). In contrast, Isiugo-Abanihe (1985; 1986) found that urban areas in Ghana were more likely to foster out and rural areas more likely to foster in suggesting that it was related to urban poverty.

Other studies have found no real evidence of differences by residence. For example, Schröder (1995) found no real difference by urban or rural residence in West Africa. However, in the Ondo State of Nigeria, children were more likely to be fostered out from rural areas than urban areas. In contrast, the reverse trend was found in Kenya, Zimbabwe and Botswana. Interestingly in Ghana, young children were more likely to be fostered to rural areas and older children to urban areas, which is consistent with the hypothesis of fostering young children to rural 'grannies' and older children to urban areas for educational or training purposes (Bledsoe, 1990a; Bledsoe and Brandon, 1992).

As Akresh (2003) uniquely managed to locate both sending and receiving households, he was able to establish the distance between the households in Burkina Faso. He found that 60% of sending and receiving households were within 25 miles of each other, a quarter

were 50 miles away in the capital, 9% were in the Ivory Coast and 6% were spread over the other provinces. Silk (1987) also discusses the distance that children are fostered and that children can be fostered over varying distances from within the same village to very long distances. However, Findley and Diallo (1988) in their study of Mali found that most children moved short distances with the majority of foster children coming from the same region or district. This is supported by Isiugo-Abanihe (1985) who found that most fosterage took place over short distances with 93% of rural fosters remaining in rural areas and 74% of urban fosters remaining in urban areas.

2.5.4 Ethnicity of foster children

Many studies have found that the level of fostering is considerably affected by ethnicity (Isiugo-Abanihe, 1985; Frank, 1987; Eloundou-Enyegue and Stokes, 2002). Page (1989) in her analysis of co-residence of mothers and their children in sub-Saharan Africa found that matrilineal societies had a slightly elevated proportion of children not residing with their mother. However, the World Fertility Survey (WFS) data for Cameroon, Ghana, the Ivory Coast, Kenya, Lesotho, the Sudan and Nigeria may report on the 'social' parent of the child rather than the 'biological' parent as well as problems of who is the 'usual' resident of the household and sensitivity to the household definition used. Also, Page (1989) may overestimate fostering as she only investigated non-maternal residence and did not consider paternal residence but noted that contact may still exist between the mother and the child, even if they are not residing together. Schröder (1995) found ethnicity to be a strong influencing factor of child fostering and supports Page's WFS findings that residential factors do not account for the differences observed between ethnic groups but rather that the non co-residential differences are due to *"social and cultural differences that distinguish ethnic groups"* (Schröder, 1995 p6). Like Schröder (1995), Isiugo-Abanihe (1985) argues that fostering is *"culturally determined"* and that there is *"cultural heterogeneity among ethnic groups"* as well as a matrilineal link (p62).

2.5.5 Duration of fostering

Few studies have investigated the duration of fostering since little data are available on this. However of those that *have* investigated duration, the length of fostering seems to vary considerably. In Ghana, the duration of fostering can be anything from 1 year to 15 years but half of children spent no more than 6 years away from their biological parents (Fiawoo, 1978). Also in Ghana, Goody (1982) reports that the length of fostering very

much depends on the age at which the child was fostered. This is because children will either build emotional bonds with their biological mother or foster mother. For example, those fostered at young ages may be fostered for longer durations than those fostered at later ages because they build-up a relationship with their foster mother. In contrast, those fostered at later ages will have more of an attachment to their biological mother meaning that the duration of fostering may not be so long. However, Goody (1982) reports varied lengths of fostering duration by ethnic group but that short-term fostering was not very common, reporting that *"until she or he was grown up"* was the determining length of time (p158). Similarly, Castle (1995) found that formally fostered children in Mali remained fostered until marriage. Akresh (2003) found that the average duration of fostering in Burkina Faso was two years and nine months.

2.6 The interrelationship between fostering and fertility

There is much evidence to suggest that fostering is a mechanism to support high fertility. In fact, Bledsoe (1990a) emphasises that fostering is a *"post-natal method of managing family size and composition"* (p81). This means that there are potential implications of reduced demand for family planning. As well as these important policy implications, fostering as a post-natal re-distributor of fertility challenges the notion that women do not have a numeric idea of what family size they want. Although the concept of desired family size is complex, sometimes based on the number of births and sometimes on the number of surviving children, the idea of fostering as a post-natal control on fertility provides support for the idea that *"nonnumerical responses to questions about desired family size show only that women do not think like demographers, not that women do not think about the size or the configuration of their offspring sets at all"* and that people do actually *"actively shape their families"* (Oppenheim Mason, 1997 p448). Indeed, child fostering allows high fertility to continue by reducing the costs of raising children to high fertility couples (Isiugo-Abanihe, 1985) so that economic ideas of the relative costs and benefits of children are redundant (Caldwell and Caldwell, 1987). For example, Bledsoe (1990a) quotes a Mende man: *"One does not necessarily bear the burden of raising one's children. They are sent out so parents don't face the problem of educating them or providing for them or suffer any problem emanating from their large family size"* (p87). Parents who face resource constraints from high fertility are more likely to foster out (Desai, 1992). In fact, Desai (1992) found in Ghana, Mali and Senegal that women who have more children tend

to have a higher number of children fostered out. In contrast, although Eloundou-Enyegue and Stokes (2002) suggested that fosterage *"sustains population growth by subsidizing high fertility among rural and poor families"* (p280), they surprisingly found that children from large households were less likely to be fostered out in Cameroon. A more intuitive suggestion is that if there is excess child labour within a particular household, then children may be fostered out (Ainsworth, 1992). Fostering also allows working women to send their children away for childcare. This is especially the case for young children and often involves grandmothers in rural areas looking after the children. This process has the added advantage that children can be raised more cheaply in rural areas while their mothers continue to work.

Isiugo-Abanihe (1986; 1994) investigated the interrelationships between fostering and high fertility in West Africa. Drawing on secondary data principally from the Ghanaian 1971 supplementary enquiry of the 1970 census and the 1973 Changing African Family Study in West Nigeria, a two-stage ordinary least squares regression was used to model the observed number of children away and the number of surviving children. The results showed a *"positive mutual association"* between fertility and fostering out in both Ghana and Nigeria (Isiugo-Abanihe, 1986 p97). However, there are issues of reverse causality. What is unclear is whether women foster out because they have a large number of children or whether they have a large number of children because they can foster out. As mentioned previously, through the proximate determinants, fostering is conductive of high fertility as foster girls tend to marry earlier and the practice reduces the length of breastfeeding. Isiugo-Abanihe (1986) also notes that cultural traditions and customs such as fostering should still be accounted for when investigating fertility as well as the conventional influences such as age and education. However, these analyses were limited to younger women aged 15-34 years who were more likely to have children fostered in order to minimise bias. It was also only possible to *indirectly* measure fostering with the census data sources through the number of children women have not living with them. Furthermore, Ainsworth (1992) found no such evidence of fostering as a mechanism to support high fertility with more economic determinants for fostering *in* than fostering out.

2.7 Fostering cross-culturally

Although fostering is an extremely common practice in sub-Saharan Africa, it is important to recognise that fostering occurs cross-culturally. Furthermore, it is important to note that this pattern of childrearing persists in both Africa and the diaspora. Goody (1975) compares fostering in West Africa with that in the West Indies in the form of Table 2.2.

Table 2.2 Summary of characteristics of fostering in West Africa and the West Indies

West Africa	West Indies
Strong element of purposive fostering by kin	Emphasis on crisis fostering by kin, purposive fostering by non-kin
Most foster parents are in parents' generation (i.e. collateral kin)	Most foster parents are in grandparental generation (i.e. lineal kin)
Male foster parents are common	Male foster parents are rare
Model of fostering stresses the claims of foster parent	Model of fostering stresses the needs of parent and child
Fostering kin are not necessarily primary kin of parents	Fostering kin tend to be primary kin of parents
Fostering links siblings' children (lateral linkage)	Fostering links generations (lineal linkage merging mother and her siblings with their children)
Fostering does not change birth status identity; status reciprocities unaltered	Fostering may change birth status identity informally; no status reciprocities operate

(SOURCE: Goody, 1975 p155)

Although Goody (1975) found many differences between fostering in West Africa and the West Indies as shown in Table 2.2, Gordon (1987) in her study of fostering in Antigua found that the reasons for fostering *"are not necessarily unique to the West Indian context"* (p437). For example, she found that children were fostered to close kin, older kin and to households of better SES, with equal numbers of boys and girls being fostered. Therefore, the patterns found by Gordon (1987) in the West Indies were very similar to those found in sub-Saharan Africa, as discussed above.

Goody (1982), in her comprehensive study of parenthood, social reproduction, fostering and occupational roles, focuses on West Africa, particularly Ghana, but also considers West Africans and West Indians in London. She found that Ghanaians and Nigerians were fostered to English foster parents, even Nigerian groups who traditionally did not foster. In contrast, she found that West Indian parents did not foster children to English foster parents. She therefore concluded that fostering was *"a very general paradigm of West African culture"* (p4) and that the fostering of West Africans by English foster parents illustrated *"an extreme case of seeking to utilize the delegation of educational and nurturant aspects of the parent role in the interests of social mobility and the attainment of*

advantageous, high status, adult roles" (p5). When discussing teenage childbearing in the US, Geronimus (2003) discusses that African American parents also make use of the extended family for childbearing: *"parents who value providing consistent emotional and material support for their children may develop, invest in, and rely on extended family or kin to insure their children have caring adults who are willing and able to supplement or even substitute for parental support"* (p885). Therefore, fostering occurs cross-culturally and persists in both Africa and the diaspora.

2.8 Implications of fostering

As discussed in Chapter 1, the demographic implications of child fostering include changes in migration, fertility and child survival. In addition, there are economic implications for the households involved through child labour and future income. Child fostering also has important social implications because the practice increases social networks and often, the social standing of the families involved. However, more important than these demographic, economic and social implications, there are child welfare implications. Few authors have explored this issue, as the majority of the literature has concentrated on the levels and determinants of fostering rather than the consequences. Even fewer authors have looked at the effects on the *other* children involved in the practice, that is, children left behind in the *natal* households and other children in the *foster* households. The following sections discuss the health and educational implications for these three groups of children.

2.8.1 Health implications of fostering

This section discusses the potential health implications of the fostering practice, specifically child mortality and morbidity, access to health care and nutritional status. West Africa has a high proportion of child fostering as well as high child mortality suggesting a very weak but potential link between fostering and child survival worthy of investigation (Isiugo-Abanihe, 1985). Bledsoe and Brandon (1992) found that women who had ever fostered out a child in sub-Saharan Africa experienced higher child mortality. However, this does not imply causation as a woman's child loss may encourage her to foster out surviving children to safeguard them against any suspected sources. The authors suggest that discrimination is only likely to occur if the foster parents already have several of their own children, especially if the foster child comes from a poor socio-economic background with no resources.

In contrast, Pennington (1991) found *no* association between fostering and mortality among the Herero, cattle and goat pastoralists, of North West Botswana, a more similar context to South Africa. However, the author raised the issue that non-fostered children who had died were censored as they may have been fostered if they indeed survived. Furthermore, since only surviving adults could be asked if they had ever been fostered, and if they had ever fostered out their own children, mortality could cause bias in identified foster status. Despite the small number of orphans, Urassa et al. (1997) in their study of orphanhood and fostering in rural Tanzania found that mortality rates were virtually the same for orphans, fosters and other children. It could be suggested that child fostering from rural to urban areas could be a mechanism used to *increase* the chances of child survival because of the large urban-rural differentials in child mortality (Brockerhoff, 1994). However, the author suggests that children of migrant women had higher mortality contradicting this hypothesis.

Bledsoe and Brandon (1992) examine the different kinds of fosterage and their possible morbidity and mortality consequences in sub-Saharan Africa. They used the qualitative techniques of open-ended interviews, participant observation, daily records of household observations as well as surveys and census data. They reviewed the nutrition studies of 1978 in Cameroon, Sierra Leone in the same year, Liberia in 1976 and the 1974 Liberia census. Using admission records from Serabu hospital 1979-85 of children aged 0-12 years, they examined the relative risk of hospitalisation, malnutrition and death among fostered and non-fostered children by sex and age. Therefore they had both quantitative and qualitative data on the social, economic and cultural factors that affect morbidity and mortality in Southern and Eastern Sierra Leone. Examining these data, they found that foster children were more at risk of mortality than other children in the household in which they were staying, that is, their foster siblings. In addition, they report that, in general, children from the host household do not suffer any daily discrimination from periodic economic shortages but that foster children are the first to be discriminated against in times of hardship. However, the authors argue that the *"circumstances of a child's fosterage"* determine whether the child is better off with their guardian than with their mother (p298). They also note that foster children may not be subject to increased mortality rates *because* they are fostered, that is, it may not be a *causal* link.

Although overall the authors find fostering to be detrimental, there are a number of flaws to their analyses, which they indeed discuss. First, they identify the problem of finding a big enough sample of foster children to analyse, particularly in the hospital studies they examined. As well as the small number of fosters, it is unlikely that the sample of hospital patients is representative of foster children as a whole and so the results may not be generalisable. For instance, this group are likely to be the worst cases if they have been admitted to hospital. The authors also note that larger nutrition surveys often do not collect information on fostered children since mothers are more likely to be able to answer questions about their children. In addition, such surveys often ask the head of the household, who are usually men who know little detail of the children's circumstances or questions about other family members. Similar issues exist for children living with their mothers since they are often cared for by other people such as grandmothers, siblings or indeed fostered children. Furthermore, few studies identify the caretakers of foster children and so the socio-economic characteristics of guardians are difficult to gauge. Moreover, some surveys ask the biological mothers about the conditions of the host household which they may not be aware of.

When investigating the implications of fostering, the authors note that the duration of fosterage needs to be accounted for since children who have been fostered for longer periods of time are more likely to be influenced by fostering than those fostered for a shorter period of time. Furthermore, the longer the child lives, the greater their chance of being fostered, that is, there is a censoring issue. In addition, it is deceptive to investigate the child's residence status at death as they are often sent home, which can lead to biased results. Furthermore, fostering is also a very informal practice and specific details such as dates are difficult to recall, meaning that regular, panel data would be more reliable. Finally, the authors also raise the issue that the characteristics of both the biological and host household do not necessarily reflect a child's mortality and morbidity risks as *"social barriers"* also exist as well as unequal resource distributions within households (Bledsoe and Brandon, 1992 p287), which are other important factors to consider in this study.

Nathan (2001) in her analysis of the welfare implications of fostering and orphanhood in Tanzania, found that non-*maternal* residence negatively affected child welfare, although no real significant association was found with *father's* residence/survival. This suggests that the presence of the *mother* is particularly important, probably because mothers usually bear

most of the caretaking responsibilities. She finds that children residing with their mothers had the highest reported sickness but this may be attributed to either poorer health or better reporting by mothers. She also found that the lowest reporting of sickness was among maternal orphans, possibly because of poorer reporting, and that reported illness was influenced by maternal residence and survival status, independent of age and paternal residence and survival status. Like Sudre et al. (1990) and Castle (1995; 1996) however, she also notes the possibility that children who are left in care may be *"comparatively healthier"* (Nathan, 2001 p156).

The author used a combination of data sources, including FGDs, IDIs and a longitudinal Demographic Surveillance Survey (DSS). The DSS was inadequate alone as it was not possible to tell if absent parents were alive or dead, which was vital for a study of both orphanhood and fosterhood. To overcome this issue, the author conducted an additional cross-sectional survey and linked the two surveys together. However, there still remained co-residence definitional issues as the survey used a four month threshold to define residence. This allows the investigation of shorter fostering spells as most migration definitions stipulate 1 year so her definition is somewhat more flexible. However, this short duration makes it harder to tell if the child outcomes are a result of the sending or receiving household. She also found that anthropometric measures were unfeasible during the fieldwork due to time constraints.

Nathan's (2001) study investigated the low HIV prevalence areas of the Kilombero Valley of Tanzania. Therefore it was a very localised and small-scale study that cannot be generalised to the country as a whole or to other areas, or more importantly, contemporarily to areas of high HIV prevalence. Although she investigated both the characteristics of foster children and their welfare implications, she also did not account for selection into fostering and did not compare the effects of fostering with those of the siblings involved. The study combined quantitative and qualitative approaches but neither the fathers nor children were identified for FGDs, which left their point of view uncovered. Nathan also notes other limitations of her study. For instance, the relatively higher mobility of foster children made it difficult to investigate their mortality experience. In addition, she only found a small number of links between the natal and foster households and so could not investigate what might have happened in the absence of fostering.

Serra (2000) in her theoretical economic analysis of child fostering in sub-Saharan Africa raised some important issues with regards to investigating the welfare implications of fostering. She discusses that a *"detailed empirical analysis"* with control groups or counterfactuals and the need to control for child and adult characteristics as well as *"attributing the cause of lower child welfare to fostering practices may simply mean taking the symptoms for the cause"* (p26). Without a controlled experiment, it is difficult to observe the counterfactual, that is, how well a foster child would have fared if not fostered but of course this is impossible to implement with human populations. The best estimate we have for this is comparing foster children's outcomes with those of their biological siblings left behind in the natal household as Nathan (2001) attempted. However, it must be noted that this is likely to be biased too. If non-fostered children fare better when a child is fostered (they may have more resources for example), there is likely to be an increase in their well-being as a consequence therefore narrowing the gap, if there is one.

With regards to access to health care, using population based data from the 1983 Swaziland National Nutrition Status Survey, Sudre et al. (1990) found that fostered children were less likely to be fully immunised but that attendance at maternal and child health clinics were similar between fostered and non-fostered children. The authors also found that nutritional status was also not significantly different for fosters and non-fosters, therefore not providing support for the hypothesis that fostering and poor health are linked. Although this study also addresses part-time fosters as those whose mothers were household members but away for more than half of the time, the definition of fostering did not include fathers. In addition, even though linear regression was used to investigate the anthropometric measures of nutritional status, only descriptive analyses were used to investigate immunisation status and attendance at maternal and child health clinics. Furthermore, although it notes the possibility that fosters may be a 'select' group being relatively healthier, it does not investigate or control for this.

Shell-Duncan (1994) when investigating several measures of nutritional status among the nomadic Turkana tribe in North West Kenya found no significant difference in Weight-for-Height (WHZ), arm circumference and tricep skin fold for fostered and non-fostered children. With regards to morbidity, the author found no significant difference in immunocompetence, attack of gastroentitis and respiratory infection with foster status. Although the results from the 1990-91 field study were consistent with the ethnographic

information collected, there were limitations. There were issues of bias with regards to the relatively smaller sample sizes in older cohorts because fostering was not mentioned during the interview as it is viewed as a common, informal and unimportant practice. Also censorship existed because young children who were not fostered at the time of the survey could have been in the future and there was under-enumeration of children because of recall error. Furthermore like many studies, the fostering definition did not include fathers.

In other studies investigating nutrition, Castle (1995; 1996) using the anthropometric z-score weight-for-age (WAZ) found that fostering had little influence on children's nutritional status in rural Mali. However, she found a difference in nutritional status by the *reason* that the child was fostered, as did Bledsoe and Brandon (1992). Children who were *requested* by the foster mother had better nutritional status than those who were fostered under *forced* circumstances. This could be due to conditions prior to being fostered. In her later paper, Castle (1996) suggested that there was an important *intergenerational* element of fostering. First, children who were fostered as children were more likely to foster their own children, potentially seeing the fostering process as *"an accepted and expected method of child-rearing"* (p199). Second, the author found that the nutritional outcomes also persisted intergenerationally with fostered children having children earlier and children of *mothers* who were fostered under forced circumstances having worse nutritional status. She noted that these mothers may not be familiar with the most favourable care and feeding practices and that *"children often imitate the behavior of their parents or principal caretakers when they themselves become adults"* (p202). Therefore, the cycle perpetuates with potential cohort effects and important policy implications.

However as previously mentioned, the author notes that even when a child is not fostered, they are not cared for by their mothers all of the time. This could therefore jeopardise the comparison between fostered and non-fostered children as it could also do in the other studies. In addition like others, the author notes that fostered children could actually be a 'select' group being healthier *per se* or that they could get returned home to their biological parents if they become seriously ill. Again, these are issues that also apply to the other studies of fostering and child health. However, Castle only uses one measure of nutritional status. Although her justification for using WAZ was that *"it reflects the effects of recent illness episodes as well as nutritional insults"*(Castle, 1995 p690), McMurray (1996) states

that the measure does not differentiate between short-term and long-term malnutrition and is better to use for children under 12 months of age rather than children aged under 5 years as in this study. Therefore WAZ may not have been the best choice of measure, when solely relying on one measure of nutritional status. Finally, Castle uses the cultural context to define fostering and refers to non-maternal care, therefore not considering the father.

Weaning is often associated with nutritional problems and those children sent to guardians for weaning were reported to be at double the risk by Bledsoe and Brandon (1992). The nutritional studies for Swaziland, Cameroon, Liberia and Sierra Leone reported worse nutritional status for children without mothers. In the context of South Africa, Case et al. (1999) in their study of resource allocation among step-households found that significantly more was spent by the household on food, especially healthy food, when the biological mother was the household head or the spouse of the head of the household indicating that the *"genetic tie to the child, and not any anticipated future economic tie, appears to be the tie that binds"* (pii).

Among the Mende of Sierra Leone, Bledsoe (1990b) reports that foster children eat less nutritious food and are punished by starvation but that malnutrition and death is higher for younger fosters because older foster children become more *"competent at stealing or foraging"* for food suggesting that younger fosters are more at risk (p73). However, this study does not provide any empirical evidence for these suggestions.

Using ethnographic data from 1981-2 and 1985 combined with quantitative data from Serabu hospital admissions in the Southern Bumpe Mende Chiefdom in rural Sierra Leone, Bledsoe et al. (1988) found that fostered children, especially girls, were underreported in hospital records and that young foster children were especially susceptible to malnutrition. In contrast, older foster children did not seem to be more at risk than children living with their mothers providing further evidence that younger children are most at risk. In addition, the study found differential allocation in food and medical care, especially for children who were sent to rural elderly caretakers. The 'grannies' often delayed medical treatment because they tended to be less economically well-off and were less likely to want to use modern medical facilities, being reliant on traditional remedies, quoting from a clinic attendant: *"Grannies don't usually bring in children very much: only when the child is an orphan. Or if the child is with her and is sick and she has already tried too many*

methods and these don't work. Grannies usually wait till the last minute before they come. They go to their herbalists and fortune tellers to look into the fortune of the child before they come" (p630). Young children were found to be especially at risk of malnutrition after being weaned as they are unable to look after themselves being dependent on the caregiver. The authors also note the psychological effect of fostering on health with a quote from a Mende nurse: *"The child is used to the mother, then suddenly it is sent to the granny [a real or fictive grandmother], whom it may not know well. Therefore, children get sick often when they are first sent to grannies. Also, the change in diet brings upsets to the child, no matter what it was eating before"* (p628). However, this study is based mainly on anecdotal evidence. Like other studies, the authors point out that sick children could well be returned to their biological parents which would be an explanation for the lower hospital admissions for foster children. In addition, the medical problems seen in the hospital may not be representative of the general population as they are likely to be more severe and serious if treated in hospital.

As well as the motivations for fostering being different for younger and older children (Castle, 1996; Serra, 2000), it appears that the implications for older children are very different to that of younger children cared for by 'grannies'. Older children are less susceptible to nutritional problems (Bledsoe and Brandon, 1992). Data taken from the Serabu hospital study of the Bumpe Chiefdom in Southern Sierra Leone showed that young fosters aged 1-5 years in Southern Sierra Leone were 16-23% as likely to receive hospital treatment whereas older children were 24-36% as likely. This suggests that older fosters were treated better. Fosters aged 1-5 years were admitted into hospital with malnutrition three times as frequently as non-fosters. Of fosters of this age, 19% had malnutrition, whereas only 6% of children living were with their mothers were malnourished. However, children aged 6-12 years showed no difference in malnutrition, reflecting reduced vulnerability and again providing support for the hypothesis that younger foster children are more vulnerable. In addition, older children are often sent to higher status families and to more affluent urban areas. This may lead to better nutritional status than if they were not fostered.

Additional sex differentials are shown in malnutrition. Foster girls aged 1-5 years were 49% more likely to be hospitalised compared to foster boys, and they were more likely to be malnourished (Bledsoe and Brandon, 1992). Time and money was not committed to

foster children in the form of health care compared to those living with a parent. Foster children may be considered lower in society and in times of economic hardship, they may be discriminated against first. They may also suffer lack of money towards medical care, and their guardians may wait until their health deteriorates significantly before treatment is sought. In addition, it is thought that fostered children complain about being ill in order to get out of household chores, and as a consequence, receive less medical care than children living with their mothers (Bledsoe et al., 1988).

Fostering by 'grannies' has received a lot of attention in the literature. There is evidence that some 'grannies' strictly abide to cultural food taboos, meaning that the child does not always receive the most nutritious food (Bledsoe and Brandon, 1992). In addition, health care may only be sought as the last option. This may be because 'grannies' are economically and geographically disadvantaged as they live in rural areas, away from health care facilities and other basic amenities and sanitation. In contrast to this discriminatory view, 'grannies' are reputed to spoil foster children. Although in theory grandmothers should have a wealth of experience in caring, being more knowledgeable about foods and diseases, there is evidence that they can actually be quite permissive with the children and over feed and pamper them (Bledsoe and Isiugo-Abanihe, 1989).

One particularly unique study looking at fostered *children's* perceptions of their health care and illness management in Ekiti Yorubu households in South West Nigeria found delayed treatment for foster children and that foster parents were less sensitive to the illness of a foster child (Oni, 1995). However, no difference between the distribution of illness was found by foster status, although there were differences found by reported body pain and skin-related illnesses which was attributed to heavier house work and the poorer personal hygiene of fosters. However, these results were based on self-reported illness and were subject to recall bias. It is also not known how much of this can be inferred to be because of fostering or if the child was more susceptible to illness in their natal home, that is, the extent to which they *retain* their morbidity and mortality risk from their *natal* household or they *assume* the mortality risk of the *host* household. Furthermore, the author discusses causality issues when a foster child is mistreated. For example, the foster child could be badly behaved and therefore the reasoning behind the differential treatment, that is, the foster parents may not be to blame. In contrast, the *biological* parents of the child may have attributed to the foster child's attitude and so they may also be involved.

Although it is not investigated in this study because of data availability, the psychological effect of fostering on the children involved must not be forgotten. Indeed, there is a great literature on caring and attachment and the consequences of multiple caretakers from an early age. Bowlby (1969) recognised that a child's first relationship with another person is the *"foundation stone of his personality"* therefore having longer-term implications, and that within the first year of life, a tie develops between the child and the mother-figure who meets the needs of the child (p221). He defined attachment behaviour as behaviour *"seeking and maintaining proximity to another individual"* (p241). Strong attachment behaviour is thought to be shown until about age 3 years but Bowlby (1969) notes that attachment behaviour lasts *"from the cradle to the grave"* (p256). He thought that the main attachment figure did not have to be the biological mother, and that there could be more than one, but recognised that both of these factors depended on household composition.

In his later work, Bowlby (1973) noted that with the mother absent, a child would suffer anxiety and distress in a strange place or with a strange person. However, the key factor was the mother's absence rather than the strange place or person *per se*. Furthermore, Bowlby (1969) noted that the *"threat of loss creates anxiety, and actual loss sorrow; both, moreover, are likely to arouse anger"* (p257). These theories of attachment have obvious implications for the study of fostering since early attachment shapes the child's later attitude and behaviour (Hetherington and Parke, 1993). Therefore, experiencing separation from the biological parents, even temporary separation, may affect a child's future development.

However does attachment theory hold in the African context where non-maternal care is the norm and where several individuals share the care of children (Whiting, 1963)? In her study of the Ganda of Uganda, Ainsworth (1963) witnessed attachment behaviour such as differential smiling, crying and vocalisation, looking at and following the mother, crying when the mother leaves the room, scrambling, burying the face, exploring from a secure base, clinging and greeting the mother (p76-80). However, she also found that infants accepted multiple caretakers. Among the rural African Gusii, LeVine (1994) found that interaction with the mother was phased out during the first year minimising distress from weaning or a new sibling: *"they are sometimes upset, but we observed no breakdown in the ability of children to adjust to new circumstances or move on to new relationships,*

possibly because mothers had begun lowering expectations for interaction during the first year" (p260). Therefore, theories of attachment are key as to why fostered children may seem less traumatised by the absence of maternal care.

In her review of the psychological implications of fostering, Castle (1996) concludes that regardless of the reasons for fostering, foster children were likely to suffer some kind of separation anxiety during the first few months that could have longer term implications. However she noted that those fostered under forced circumstances would be the worst off with intergenerational implications: *"malnutrition and subsequent impaired cognitive and physical development which can affect their child-bearing and child-rearing abilities in later life"* (p200). In contrast, when looking at the factors affecting infant care in the Kipsigis of Kenya, Borgerhoff Mulder (1985) found that absence of the mother did not compromise the quality of care, nor did it increase distress, therefore questioning the *"generality of Bowlby's thesis"* (p240). Similarly, Castle (1996) *"questions the applicability of Bowlby's model"* (p199) in African settings were non-maternal care is the norm. Indeed, the Children of Six Cultures study assumes that *"different patterns of child rearing will lead to differences in the personality of children and thus to differences in adult personality"* (Whiting, 1963 p5).

2.8.2 Educational implications of fostering

In addition to the health implications outlined above, there are likely to be educational implications of fostering, particularly for older children. Although fewer studies have investigated the educational outcomes of foster children, a couple have focused on the South African context. However in Ghana, Isiugo-Abanihe (1985) found a small differential in education by foster status, with slightly more fostered children enrolled in school than non-fostered children, supporting the explanation that children may be fostered in order to be provided with an education. However, the difference was not large and enrolment does not imply attendance or indeed attainment and drop-out rates may be higher for fosters. Isiugo-Abanihe (1985) also reported that foster girls were less likely to be in school than foster boys but there was consistency with the national average in Ghana. However, the author suggested that females experienced a higher drop-out rate because of labour demands in the home. Urban fosters attended school less than urban non-fosters. In contrast, more fosters were enrolled than non-fosters in rural areas, indicating that residence differentials exist in school enrolment by foster status. However, the author

notes that foster children may not have had the same education prospects as non-fosters where they came from.

In contrast to this beneficial educational view of fostering, Ainsworth (1992) reports that foster children in the Ivory Coast had considerably reduced school enrolment than both their *foster* siblings residing in the *host* household and their *biological* siblings left behind in their *natal* household. She found that foster *siblings* were more likely to be enrolled in school than fosters, especially girls and for children in urban areas. She also found that daughters from the host household received approximately the same financial help as foster girls. In contrast, far more was spent on sons within the host household than on foster boys. Because it is possible to match back to the natal household with the Ivory Coast LSMS, Ainsworth (1992) also found that *biological* siblings who remained at home had higher enrolment than the children who were fostered out. This was especially the case for girls and for children fostered from rural areas with virtually the same enrolment for brothers and children fostered from urban areas. As discussed earlier, without the possibility of a controlled experiment, this is the best estimate we have for what would have occurred in the absence of fostering.

Despite these findings, the author did not dismiss the existence of educational fostering as the findings referred to children aged 7-14 years (of primary school age) and that most communities had primary schools meaning no need to foster. In fact, a higher percentage of fosters were enrolled in secondary school compared to their biological siblings left at home, suggesting that educational fostering occurs for secondary schooling. Furthermore, Ainsworth (1992) also reported that foster children, not only girls, were more likely to do housework and farm work than biological children in the same household. However, foster girls did have the highest housework participation rates. Nevertheless, the author did warn that participation rates varied greatly by location and the residence from which the foster child came.

Although Ainsworth's (1992) study found significant economic determinants of fostering, it ignored the demographic and sociological explanations which are also involved in the fostering process. The author only considered children aged 7-14 years old, missing younger children fostered for different reasons such as weaning. She defined fosters as non-orphans living away from both parents, therefore not considering orphans who may be

another sub-group at risk. Also, she defined household membership as someone who had lived in the household for more than three months which is more flexible than the usual definitions but would exclude children who were fostered for very short periods of time. However, these children would be unlikely to be enrolled in school. There were also definitional discrepancies between a household fostering in and a household fostering out, as a non-resident child had to have *both* parents in a household, which meant a possible underestimate of children fostered out as a child can be sent away from one parent to live with someone else who is not the *other* parent. Ainsworth's complex economic models meant that a child could not be fostered from a womanless household, which is indeed not the case. In addition, many assumptions were made. For example, resident children in the host household and foster children were assumed to be replacements for each other, that is, that extra child labour could be acquired through fostering in children and that children spend all their time doing household work. Akresh (2003) whilst making the same assumption in his theoretical framework realised that the empirical evidence actually required a *"richer model of household decision making that incorporates altruism and treats foster children differently than biological children"* (p4). He found no significant difference in enrolment by foster status. Although a unique and useful feature of Ainsworth's (1992) study was the ability to match back to the natal household, meaning comparisons between fosters and foster siblings as well as the biological siblings left behind in the natal household, endogeneity of the fostering process when investigating such educational outcomes was not investigated.

Urassa et al. (1997) in their study of orphanhood and fostering in rural Tanzania found lower school enrolment and higher drop-out rates among orphans and fosters compared to children residing with both parents. In another study investigating polygyny and fostering among the Mende of Sierra Leone, Bledsoe (1988) found that women rely on their children, and so because of the jealously among co-wives, try to educate their children for future investment. In fact, the author found that *mothers* encouraged schooling more than *fathers* and that such women arranged advantageous fostering transactions for their children. In addition, women may invest in foster children more than in their *own* biological children in order to improve their prospects of future support. However, this was a small-scale study that only considered children under the age of 18 years living away from their mother therefore overestimating fostering with no linkage to the father. Furthermore, children at the upper end of the age category could be away from their

mother for reasons other than fostering. They could be heading their own household, for example.

With regards to education, Nathan (2001) found that parental residence/survival was not significantly associated with school enrolment in Tanzania, although orphans were less likely to be enrolled. However, school drop-out was negatively associated with residence/survival of the mother. Children living with their mothers were the least likely to drop-out of school in contrast to maternal orphans who were the *most* likely to drop out. More applicable to this research in the context of South Africa, Maharaj et al. (2000) found a slightly lower proportion of enrolment in school among fostered children compared to non-fostered children, for both Africans and Coloureds. Sixty-four percent of fostered children had completed primary school by age 13 years compared to 67% of non-fostered children, illustrating that foster children did slightly worse with respect to their progression through school. The differential was larger for Coloureds with 73% of fostered children completing primary school by age 13 years but 82% for non-fosters. However, education attainment was approximately the same by foster status. This analysis combined the 1993 SALSMS with the 1997 School Register of Needs. However, it may not have been appropriate to combine these two data sets since the conditions in South Africa would have changed considerably in the intervening period, especially with the end of apartheid allowing people to move nearer to their chosen school rather than segregation by race as experienced previously. The multivariate analysis also excluded children of Indian race and investigated fostering out which, as well as being under-enumerated as the authors suggested, was based on many assumptions as discussed in the next chapter. Although the authors commented on fosters being 'selected' into households that could better provide them with an education, they did not indeed investigate or control for this.

Again in the context of South Africa, using the same data as Maharaj et al. (2000) (but without the School Register of Needs), Zimmerman (2003) found contrasting results in that fosters were no less likely to attend school that others. In fact, he suggested that fosters move from households that have difficulty educating them to ones that are *"more apt to do so"* (p557). He found that fostering reduces the risk of not attending school by up to 22% and that boys benefit more from the fostering process than girls. However, attendance information is not available in the data set so the author must be assuming that children who are enrolled in school also attend. In addition, he considered *only* African children

aged 7-17 years and so those at the top end of the age range may not be fostered but heading their own household. Furthermore, the community questionnaire was used, which has been noted for its unreliability (Case and Deaton, 1998), as well as information on the occupation of the household head which also had a lot of missing data. Although a two-stage modelling approach was used, discussed in detail in the next chapter, for whether the household's own children went to school in the fostering-in equation, the study did not control for the fact that the *fostering* process is not random. Furthermore, the two-stage methodology involved using predicted probabilities and therefore did not control for the correlation of *unobservables* between equations discussed in more detail in the subsequent chapter.

One unique study in Ghana that asked foster children whether they liked being fostered found that half of girls wanted to live with their biological parents, 35% would continue living in their foster household but the rest were undecided (Fiawoo, 1978). Despite this finding, the majority of girls (80%) said that their *"foster parents had been very kind"* but still 62% of girls missed their biological parents (p283). Boys on the other hand seemed to prefer their foster household with only a third missing their natural parents and virtually all of them thinking that their foster parents had been kind. This evidence seems to suggest that the foster children themselves do not see the practice as being detrimental. However, this is not surprising given that the maternal-child dyad is not the norm in most of Africa. Bledsoe (1990b) in her study of social mobility and hardship of foster children in Sierra Leone discusses that the treatment that fostered children are subjected to depends very much on the *relationship* between the senders and receivers. Other authors suggest that the *circumstances* of fostering is an important determinant (Bledsoe and Brandon, 1992; Castle, 1995, 1996) illustrating that the context of fostering must be taken into account.

2.9 The evolution of fostering since HIV/AIDS

Although the data used in this thesis do not capture the influence of HIV/AIDS since they are from 1993, it is important to recognise how the HIV/AIDS epidemic has changed the context of fostering. Even though there is a wealth of literature, this section summarises how family structures have changed and cope with the growing number of orphans, that is, crisis fostering, as discussed previously. Zaba et al. (2004) state that the tradition of child fostering in sub-Saharan Africa means that the growing number of children orphaned by

AIDS are being cared for by grandparents. However, UNICEF (2003) report that *"many extended family networks have simply been overwhelmed"* (p4).

As well as an increased number of orphans, HIV/AIDS has increased movement and changes in family structure which directly impact fostering. For example, in rural South Africa, Hosegood and Ford (2003) found increased outmigration, household mobility and dissolution as well as smaller household size. However, they found only a very small number of child headed households, attributing it to the multiple number of adults in each extended family household, and the fact that children do not have the financial support from the state to live without an adult. Similarly, Urassa et al. (2001) found no child headed households in rural Tanzania as well as increased adult and child mortality, reduced household size and high mobility and household dissolution. Furthermore, Hosegood et al. (2004a) established that the risk of household dissolution was four times higher when there had been a death and that the risk increased with multiple deaths. However, the *cause* of death was not an influential factor but poorer households were more likely to dissolve.

As well as having implications for child care, the dissolution of households has implications for data collection if households no longer exist and as HIV/AIDS tended to be clustered within households (Zaba et al., 2004). Furthermore, Gregson et al. (1999) note that enumeration could be made even more difficult by changes in fostering because of increased morbidity and mortality therefore *"weakening observed associations between HIV and orphan prevalence in localized communities"* (pS253). The increased child mortality and decreased fertility associated with the HIV/AIDS epidemic (Zaba et al., 2004) could also have implications for the supply of children to be fostered. Indeed, Nakiyingi et al. (2003) found in rural Uganda that, whilst controlling for child's HIV status, maternal mortality as well as HIV status were influential factors of child survival. Infant mortality was higher for children whose mothers were HIV positive but child mortality was also higher for children whose mothers had died.

As well as influencing the levels of fostering and data collection, HIV/AIDS has also had an impact on child outcomes. At the aggregate level, there may be decreased demand for schooling because of the increased number of child deaths as well as children dropping out of school to care for their ill parents or in order to save expenses or provide labour (UNPD, 2003). Furthermore, at the aggregate level, the education and health care sectors are losing

personnel and become *"stretched"* with few resources (Zaba et al., 2004 pS1) which may also have impacts on children's health and educational outcomes. At the household level, incomes and expenditure are likely to be greatly reduced which lead to poverty and debt and which may have implications for child welfare as well as the motivations for fostering discussed above (Zaba et al., 2004). Children may be subject to stigma but Crampin et al. (2003) found that surviving children were not discriminated against if their parents were ill or had died of HIV/AIDS. Despite this, the psychological impact of the HIV/AIDS epidemic must not be ignored and Zaba et al. (2004) note the difficulty in measuring the psychosocial and emotional implications. Gregson et al. (1999) importantly recognise that the stigma linked with HIV may create differentials in mortality between children orphaned by AIDS and non-orphans. Indeed, Case et al. (2004) found that orphans have worse educational outcomes than non-orphans. Similarly, UNICEF (2003) report that orphans are *"more likely to suffer damage to their cognitive and emotional development, less likely to go to school, more likely to be subjected to the worst forms of child labour"* (p4). Therefore, it is important to be aware that the levels, patterns, determinants and implications of fostering are all likely to be very much influenced by the HIV/AIDS epidemic and have important implications for the findings of this thesis.

2.10 Summary

This chapter has summarised the previous literature on fostering in sub-Saharan Africa, focusing on its levels, patterns, determinants and implications. It has been shown that a substantial proportion of children are fostered in sub-Saharan Africa and that there are many motivations for both the sending and receiving households, some of which overlap. Foster children, and their sending and receiving households, exhibit particular characteristics suggesting that fostered children are a 'select' group that should perhaps be controlled for when investigating their welfare implications. The studies that have investigated welfare implications seem to be contradictory but tend to suggest that fostering may be detrimental to young fosters. However, it must be noted of the appropriateness of comparing South Africa to other African countries, and that not all previous research is equally applicable since the South African context is very different, having a history of apartheid, a significant proportion of the population being White and having had an independent government for longer (Burgard, 2002). This chapter has also shown that much of the literature suffers from limitations, methodological shortcomings

and definitional ambiguity. As a consequence, this study aims to add to the body of research by examining the levels, patterns and welfare implications of fostering whilst attempting to overcome some of these issues and fill in the gaps of knowledge thus far.

Much of the previous literature discussed in this chapter is more than a decade old. Furthermore, it is inconclusive and contradictory in need of further investigation. Therefore, this study will use more recent data to investigate the more contemporary fostering process. Furthermore, South Africa is used as a case study as many of the previous studies have concentrated on West Africa rather than Southern Africa. In addition, this research is a large-scale quantitative analysis in contrast to some of the previous smaller-scale studies. Few studies have investigated the determinants of fostering *as well as* the implications of fostering as will this research. Most have addressed health implications rather than educational implications and even fewer have addressed *both*. Most of the previous literature has simply compared such child outcomes for fostered and non-fostered populations, ignoring the other sub-groups that are influenced by fostering. Although it is not possible to match back to the natal household with the data to investigate the outcomes for the biological siblings left behind, the best estimate we have for what would have happened in the absence of fostering, this thesis will compare the child outcomes for non-fostered children, fostered children and children residing in households with foster children, that is, foster siblings. Even though some of the studies recognised that fostered children may be a 'selected' group, none of them controlled for this when investigating the welfare implications. This research will control for the potential endogeneity of fostering by using two-stage methodology incorporating both the correlates of fostering and the child outcomes, and the possible correlation of unobservables between equations. Although it is obviously not possible to overcome all of the limitations of previous studies, the methodology proposed to overcome some of these issues is described in the next chapter.

CHAPTER THREE

Data and methods

3.0 Introduction

Chapter 2 discussed some of the previous studies on child fostering and their associated limitations. This research uses quantitative methods and attempts to overcome some of the shortcomings of previous research. Specifically, the two-stage modelling described later in this chapter to control for the fact that fostering is potentially endogenous to child outcomes is something that has not been controlled for in previous studies. This chapter discusses the data source used in section 3.1, and its associated limitations. The data preparation and quality is described in section 3.2 as well as the variables used and their construction. The methods of data analysis are described in section 3.3 including the quantitative methodology used to examine the levels, patterns and correlates of fostering; the health and educational implications for the children involved in fostering; and the two-stage modelling used to control for and investigate the non-random nature of the fostering process.

3.1 Data sources

In the absence of direct data explicitly investigating fostering, LSMS data are used in this thesis as they provide information on fostered children and their circumstances better than any other commonly used secondary data source. For example, it is possible to identify fostered children using the census from the number of children women have not living with them and relationship to the household head but this involves a complex elimination procedure and many assumptions (Isiugo-Abanihe, 1985, 1986). Furthermore, the census does not include health and educational information for the children. Although the DHS *does* include such information, as yet[3] it is not representative of *children* since it collects information on the children of eligible *women,* excluding maternal orphans and children born to women under the age of 15 and over the age of 49 years (Lloyd and Desai, 1992) and importantly teenage mothers could be more likely to foster out. In contrast, the LSMS collects information on *all* household members (Grosh and Grewwe, 1995). The LSMS

[3] When available, the latest South African DHS should be representative of children.

also has a number of advantages over the DHS data, specifically because of its additional and more comprehensive income and expenditure variables.

Although other more contemporary data are available such as Birth-to-Twenty (BTT), the Africa Centre's Demographic Information System (ACDIS) and the Kwazulu Natal Income Dynamics Survey (KIDS), they are not *nationally* representative. For instance, KIDS usefully re-surveyed the same LSMS sample from the Kwazulu Natal province in 1998, providing panel data (IFPRI, 2005). However, only the Kwazulu Natal province was sampled for the second time period as well as only African and Indian households. BTT is a rich longitudinal study which follows a cohort of children who were born in Johannesburg-Soweto in 1990 (University of Witwatersrand, 2005). Although representative of children living in this metropolitan area over time, the data are not *nationally* representative. Similarly unrepresentative of South Africa as a *whole*, the ACDIS is another rich longitudinal data set from the poor, rural, HIV-afflicted Umkhanyakude District in Kwazulu Natal (Africa Centre, 2005).

Fostered children can be identified in the nationally representative LSMS from the relationship to the household head and whether the mother and father are present in the household (World Bank, 1993). If they are, then they can be identified with the person code, but if not, they are classified as absent or dead. Some of the LSMS data, such as that for Ghana and the Ivory Coast, as well as determining current fostered status, retrospectively determine maternal co-residence at age 10 years for older children as well as matching fostered children to their maternal and paternal information so it is possible to investigate fostering out as well as fostering in (Ainsworth, 1992). However, the cross-sectional nature of the LSMS data means that that it is not possible to investigate any possible cause and effect of being fostered, or indeed the duration of being fostered, except potentially in the Ghanaian and Ivory Coast surveys that retrospectively determine maternal co-residence.

Since the World Bank established the LSMS in 1980, there has been a shift in focus from being primarily research based to assessing the consequences of policies on living standards (Grosh and Grewwe, 1995). This shift in emphasis has also meant a shift away from standard surveys to ones that are more country specific. The principal objective of LSMS surveys is to: "*collect household data that can be used to assess household welfare,*

to understand household behaviour, and to evaluate the effect of various government policies on the living conditions of the population" (p2).

The data collection involves three main types of questionnaire: the household questionnaire, the community questionnaire, price questionnaire, and sometimes the special facility questionnaire is used (Grosh and Grewwe, 1995). The household questionnaire collects information on the people who live in the household (household roster at the individual level) and the modules collect a wide range of information, including information on consumption, expenditure, income and household characteristics (World Bank, 1993). Each component of the household questionnaire collects data at the most appropriate level but all the information can be merged, along with that from the other questionnaires, to create data at the individual level. However, although the information is not as detailed as would be collected on a survey with a narrower focus, it allows the investigation of *"different aspects of living standards"* (SALDRU, 1994 p3). In order to minimise the household questionnaire, the community questionnaire asks community leaders, government officials, headmasters/teachers and health care workers about aspects of the community, such as school and health care facilities, that relate to all the households in the same area (Grosh and Grewwe, 1995). However, this information is only asked in rural areas since such communities are less easy to distinguish in urban areas. Market sellers respond to the price questionnaire which collects information on local prices where they vary by region of the country. Finally, the special facility questionnaire asks about school and health facilities to supplement the corresponding modules in the household questionnaire.

The questionnaires are very comprehensive with automatic skip questions and questions are asked verbatim from the questionnaire minimising errors by the interviewers (Grosh and Grewwe, 1995). Because the fieldwork is carried out in two rounds, any inconsistencies can be verified during the second round. In addition, the relatively small sample size and the small group of fieldworkers help minimise non-sampling errors, although it is noted that a larger sample size could potentially reduce sampling error. Once the data have been directly entered into a computer, avoiding the additional transcription process, they undergo cleaning and verifications for consistency, especially the anthropometric module which has an additional set of checks comparing the survey data on the individual's age, height and weight measurements with World Health Organisation

(WHO) reference tables. Because of the attempts to minimise errors, the resultant data quality tends to be high with low proportions of missing data. In addition, non-response of entire households is low and only a result of failure to locate the address or vacant dwellings. Internal consistency and accuracy are also high since each household member is asked each questionnaire module themselves rather than proxy responses for adults.

3.1.1 The South African Living Standards and Measurement Study

The SALSMS was conducted in 1993 and was the first survey based on the *entire* population of South Africa, *including* the former homelands (SALDRU, 1994). Previously, *"demographic data were fragmented and incomplete"* with apartheid meaning inadequate data on Africans (Department of Health et al., 1998 p3). The survey was carried out as a result of data scarcity and the need for poverty analysis with funding from the governments of Denmark, Norway and the Netherlands through the World Bank (SALDRU, 1994; Grosh and Grewwe, 1995). Furthermore, the need for poverty analysis was for the run up to the first democratic elections at the end of April 1994 when information on living standards was needed to inform policy making to achieve the goals of the Government of National Unity's Reconstruction and Development Programme (SALDRU, 1994). There has only been one round to date which means that although it is over ten years old, it is the most recent LSMS available for South Africa. The full comprehensive household questionnaire was used as well as the price and community questionnaires but the special facility questionnaire was not administered (Grosh and Grewwe, 1995).

A two-stage self-weighting sample design was used with the first stage being Census Enumerator Subdistricts (ESDs) and households being the second stage providing a representative sample (SALDRU, 1994). Where the ESD populations were relatively large, such as the African township of Soweto, aerial photographs were used to draw up equivalents, and villages or village groups were used in other areas, such as the former homelands. These first stage units were systematically selected with probability proportional to size selected from a sampling frame. In order to ensure racial and geographical representation of South Africa's population, the first area stage units were listed by statistical region, within that, by urban rural residence, and within that, in order of percentage African. Next, households or 'stands' were listed in each selected ESD which were again selected systematically.

This sampling design therefore relies somewhat on estimates based on the 1991 census and projections from it to get estimates for 1993, assuming no migration across provinces, and the consequent limitations are realised. For example, assumptions about population growth from 1991 had to be made and it was actually overestimated. However, this was reported to have *"little effect on the findings of the survey"* (SALDRU, 1994 p5). In addition, although migrant labour hostels were included, there were exclusions from the sample such as people in hospital, old age homes, hotels and hostels or educational institutions as well as the homeless. Therefore, those in boarding schools and fostering/adoption/orphanage institutions are excluded from this analysis. However, such institutions are an *"oddity"* (Madhavan, 2004 p1451) and are not of concern to this study which focuses on informal fostering. It is possible that children in such institutions are mentioned in the household roster by family members but such individuals do not have full information and so are not investigated, as discussed subsequently.

The sample did not in fact turn out to be self-weighting (SALDRU, 1994). This was because violence prevented interviewing in two clusters as well as failure to complete interviewing in one cluster and *"systematic under-representation of Whites"* (p6). As well as for sampling issues, the latter was thought to be because Whites were more likely to refuse to respond or be absent. Furthermore, in October 2001 two clusters were removed from the data set being considered *"highly unreliable"* (World Bank, 2001 p1). Because race is such a strong determinant of standards of living in South Africa, weights were applied by race and residence in the former homelands (SALDRU, 1994). However, because of past restrictions on residence during apartheid, if more or less clusters of particular races were selected, then generalisations should not be made. As mentioned in Chapter 1, South Africa is culturally heterogeneous and a lot has changed since the end of apartheid. The HIV/AIDS epidemic, in particular, has resulted in a large number of orphans.

The household questionnaire collected information from 9,000 households (SALDRU, 1994). The LSMS uses a household definition rather than identifying families. In order to avoid duplication of people residing in more than one place, the SALSMS uses *two* definitions of the household for the two sections of the questionnaire. For the household *roster* which collects the basic information, data was collected at the individual level for everyone who met the following criteria:

i) "live under this 'roof' or within the same compound/homestead/stand at least 15 days out of the past year, and

ii) when they are together they share food from a common source (i.e. they cook and eat together); and

iii) contribute to or share in, a common resource pool (i.e. they contribute to the household through wages and salaries or other cash and in-kind income or they may be benefiting from this income but not contributing to it, e.g. children, and other non-economically active people in the household. Visitors were excluded from this definition" (SALDRU, 1994 p4).

The appropriate parts of the rest of the household questionnaire were administered to those who had *"lived under this roof for more than 15 days out of the last 30 days"* (SALDRU, 1994 p4). Therefore, full information was only available for those who had lived in the household for 15 days in the past month as opposed to *basic* information on all individuals who had lived in the household for 15 days in the last year as in the household *roster*.

The household questionnaire collected basic information in the household roster as well as housing characteristics, education, health, employment and personal activities, migration, agricultural activities, non-agricultural household enterprises, expenditures on non-food items, expenditures on food and consumption on food produced by the household, fertility, other income, savings and borrowing and anthropometric information (Grosh and Grewwe, 1995). The household head or main respondent answered the questions on housing and household composition whereas the best informed household member answered the questions on the household's income and expenditure. Some educational testing was conducted and the anthropometric information was only collected for children currently 5 years old or younger. As the *parents* of children were asked about the health of children, the responses are not self-reported and are perceived by the parents. In the case of foster children who did not have their parents present in the household, it is assumed that someone else in the receiving household responded. Another limitation of the data is the weakness of the anthropometric data which is noted in the data documentation (SALDRU, 1994). However, Coetzee and Ferrinho (1994) discuss that weight data tends to be prone to change, particularly in younger children, being dependent on whether measured prior to or after meals. In contrast to the anthropometric information, schooling data are available for those aged 6-24 years (Grosh and Grewwe, 1995).

The community questionnaire collected information for each cluster on demographic information of the community, as well as economy and infrastructure, education, health, agriculture, recreational facilities (World Bank, 1993). As mentioned previously, these types of questions addressing community issues were answered by respected members of the community. Although information collected in this questionnaire would influence child health and educational outcomes, this information was judged to be heavily biased and so was not used in this study. In addition, much of the community information was incomplete with many clusters missing information and other analysts of the data have speculated that the community questionnaire was not treated as seriously as the main household questionnaire (Case and Deaton, 1998) and so better not to use as simply excluding community information for some clusters would result in selection bias. The price questionnaire collected data on how prices varied by region and source (SALDRU, 1994). Price information on a range of goods was therefore collected from both a formal and informal source within each cluster.

3.2 Data preparation and data quality

The data preparation of the 1993 SALSMS involved merging the individual level household roster containing all the basic information on the household members with a number of other files of interest containing information on housing, education, remittances, employment, health, anthropometry, demographics, income and expenditure, 35 files in total. In order to perform this lengthy task, each case had to have a unique identifier which, because of incomplete data cleaning, did not always exist and made it a difficult process.

Those whose age was missing were excluded; 498 cases out of the total sample of 43,687. A children's file was then created by selecting those 15 years and under from the household roster. Although a common cut-off used to define a child is a person under 18 years of age (UNICEF, 2004c), for the models estimated here 15 was chosen as the cut-off because the UN consider 15 years to be the minimum age of the economically active population (WHO, 2004a). However, it is important to note that children make an economic contribution way before age 15 years, perhaps at age 7-8 years, so there is a need to question the appropriateness of the UN definition. In addition, in this cultural context, children age 16 years and older are old enough be living away from their parents, not

through fostering, that is, heading a household, or married. This definition also includes infants under age 1 year as there is evidence that fostering often occurs at a very young age for weaning (Isiugo-Abanihe, 1985; Bledsoe, 1990a; Bledsoe and Brandon, 1992; Schröder, 1995). As mentioned in the previous chapter, other studies have missed this sub-group by only considering older children, for example aged 7-14 years (Ainsworth, 1992).

In order to select children 15 years and under, *current* age had to be computed from age at *next* birthday, the only age information collected by the survey aimed at minimising the underreporting of infants (Maharaj et al., 2000). The survey was carried out towards the end of 1993 so this computation should reflect *actual* age, although this cannot be verified as birthdates were not collected[4]. Age will refer to the computed *current* age of the child hereafter. As maternal and paternal information was only available for children who were living with both their parents, the child file was then merged with basic demographic information on the household head and the spouse of the household head which was available for each child. This created a file with 16,704 children.

This file was then cleaned and coded. Inconsistent cases such as child heads, wives/husbands/partners, fathers/mothers, grandparents, mothers/fathers-in-law, sons/daughters-in-laws and great grandparents were excluded from the file because it was likely that they were mis-coded as they were not really plausible classifications for relationship to the household head for children aged 0-15 years. Although some of the combinations may have been possible for the older children, they were thought to bias the results since these would not be representative children. Indeed, although child headed households may have increased since the collection of these data as an implication of the HIV/AIDS epidemic, Urassa et al. (2001) found no child headed households in their study of the impact of HIV/AIDS in rural Tanzania, and similarly, Hosegood and Ford (2003) found very few child heads in the rural district of Umkhanyakude in northern Kwazulu Natal, despite having very high AIDS mortality. Household helps (and relatives of) and lodgers were also excluded from the sample as there was only basic household roster information for these individuals rather than full information from all the modules of the questionnaire. However, the implications of excluding this group are noted since they

[4] Date of birth was collected in the anthropometric component of the questionnaire and so was only available for children ≤5 years old.

could indeed be fostered children. Therefore, a further 57 cases were excluded for these reasons.

As discussed in Chapter 2, there are many contrasting definitions of what constitutes a foster child. Foster children were identified in this study by coding children who had neither their mother nor their father present in the household. Although this is still an indirect way of measuring fostering, it is more direct than that possible using census or DHS data. In addition, it is thought that if respondents were asked explicitly about any foster children that they may have living with them, that they may not class such children as being fostered in the South African cultural context (Gil and Ghansah, 1968; Caldwell and Caldwell, 1987). This definition therefore included maternal and paternal orphans, if the other parent was not present, as well as double orphans. The limitation of combining these groups is realised but there were only a small number of orphans, and double orphans did not differ systematically from fostered children, as discussed in the next chapter. There were 49 cases excluded if this parental residence information was missing. In addition, 22 'foster' children were nonetheless classified as being the son or daughter of the household head and so were excluded from the sample. It is noted that this definition of fosterhood may capture children who are living with their step mother whilst their father is away working in the mines. Duration of residence could not be incorporated into the definition of fosterage because this information was not available in the data for fostering *in*. It should also be noted that as these data are not longitudinal it is not possible to identify any cause and effect of fostering; this measure of current foster status may not indeed reflect long term living arrangements. Ginther and Pollak (2000) report that *current* measures of family structure may be a *"weak indicator for childhood circumstances and events"* and could lead to *"unreliable estimates"* (Ginther and Pollak, 2000 p11). It is noted that only *current* foster status can be determined and that children may be fostered when they are older (censored) (Pennington, 1991). Also, children that have died may have been fostered had they survived and previously fostered children may have returned home. In order to examine parental residence in more detail, several combinations of maternal and paternal absence/co-residence/orphanhood were created.

As discussed earlier, the appropriate parts of the questionnaire, that is, anthropometric information for those 5 years and younger, and education information for those aged 6 years and over, were only answered for those who had lived under the household roof for

more than 15 days out of the preceding 30. Therefore, there was only basic household roster information for those who did not live under the household roof for more than 15 days out of the last month and so these children were excluded from the sample (395 cases in total) because their health and educational outcomes could not be investigated. However, it is noted that some of these children may have been fostered out and foster children may have just arrived in the household. In addition, 7 more cases were excluded where the sex of the child was missing. It is noted that all these exclusions could bias the findings if they are systematically different. However, the final child sample contained 16,174 children aged 0-15 years.

The SALSMS does not match fostered children to their maternal and paternal information as in the Ghanaian and Ivory Coast data in order to investigate fostering *out* as well as *in*. However, because the SALSMS does include data on the number of months spent away from the household in the previous twelve months and the reason for absence, it should in theory be possible to investigate children who may be *potentially* fostered out but obviously in not so much detail as is possible in the other data sets. However in reality, this is a very difficult task that involves many assumptions as one has to decide on what duration away from the household constitutes fostering. Also, although children may be fostered out in order to be provided with an education, being away at boarding school for example is not thought to constitute fostering and so the reason for absence also hampers the investigation. Furthermore, if the children are absent, then their parents could potentially be with them and so would not be defined as fostered. Because there is no matching, duplication is also possible if a child is away from the household but is sampled in another household. Finally, there is only basic household roster information for those who are away for more than 15 days out of the past 30 days, and so it is not possible to investigate their health and educational outcomes fully. Therefore, there seem to be too many assumptions involved to investigate fostering *out* with the SALSMS data and so this analysis concentrates solely on being fostered in. This is supported by Zimmerman (2003) who also thought it advisable to investigate fostering in only. Another limitation is that reasons for a foster child residing in a household are not stated and so the true motivations cannot fully be investigated without a complementary qualitative approach. However, a combination of both quantitative and qualitative approaches was not used here as it was thought that such qualitative data collection would not complement findings from 1993

with the situation in South Africa now being very different in respect to political changes and the HIV/AIDS epidemic.

The variables of interest, based on theory developed from previous studies discussed in Chapter 2, and those available and reliable to use in the data, were then coded. Such variable codings can be seen in Tables 3.1a-b.

Table 3.1a Description of outcome variables

Variable	Coding
Fostered	Not fostered in; fostered in.
Illness	Not ill in 2 weeks preceding survey; ill in last 2 weeks preceding survey. (For those aged 0-5 years).
Immunisation status	Not had a vaccination against measles; had a vaccination against measles. (For those aged 1-5 years).
HAZ	Continuous z-score, values outside ± 5 coded as system missing and so excluded from analyses. Categorised for bivariate analysis - normal (≥-1SD), mild (≥-2 SD and < -1SD), moderate (≥-3 SD and < -2SD) and severe (< -3 SD) and whether stunted (< -2 SD) or not (≥-2SD). (For those aged 0-5 years).
WAZ	Continuous z-score, values outside ± 5 coded as system missing and so excluded from analyses. Categorised for bivariate analysis - normal (≥-1SD), mild (≥-2 SD and < -1SD), moderate (≥-3 SD and < -2SD) and severe (< -3 SD) and whether underweight (< -2 SD) or not (≥-2SD). (For those aged 0-5 years).
WHZ	Continuous z-score, values outside ±5 coded as system missing and so excluded from analyses. Categorised for bivariate analysis - normal (≥-1SD), mild (≥-2 SD and < -1SD), moderate (≥-3 SD and < -2SD) and severe (< -3 SD) and whether wasted (< -2 SD) or not (≥-2SD). (For those aged 0-5 years).
Enrolled in education	Not enrolled in any form of formal education; enrolled in some form of formal education. (For those aged 6-15 years).
Competed primary education	Not completed primary education; completed primary education if completed standard 5 or above. (For those aged 13-15 years).

SD = Standard Deviation

Table 3.1b Description of explanatory variables

Variable	Coding
Child background characteristics	
Sex	Male; female.
Current age	Current age in years – continuous (categorised for preliminary analyses).
Current age squared	Current age*current age.
Foster status	Foster child; foster sibling; no foster siblings.
Currently being breastfed	No; Yes (Interacted with age and age squared). (For those aged 0-5 years).
Number of times fed each day	≤3 times a day; > 3 times a day; not known. (For those 0-5 years).
Measles vaccination status	Not received a vaccination against measles; received a vaccination against measles; < 1 year of age so too young to receive vaccination; not known. (For those 0-5 years).
WHZ	Continuous z-score, values outside ±5 coded as system missing and so excluded from analyses. Categorised for bivariate analysis - normal (≥-1SD), mild (≥-2 SD and < -1SD), moderate (≥-3 SD and < -2SD) and severe (< -3 SD). (For those 0-5 years).
Been ill in the preceding two weeks	No; yes.
Receiving household composition characteristics	
Race	African; Coloured; Indian; White.
Head's sex	Male; female.
Head's age	≤49 years; ≥50 years.
Head's education	Not completed primary education; completed primary education.
Number of non-fostered children	0-2 children; 3-5 children; ≥6 children.
Number of children	1-3 children; 4-6 children; ≥7 children.
Receiving household SES indicators	
Type of dwelling	'Shack'; Other.
Water supply	Not piped; piped.
Equivalised monthly expenditure	≤25th percentile; > 25th percentile – ≤50th percentile; > 50th – ≤75th percentile; > 75th percentile.
Equivalised food expenditure	≤25th percentile; > 25th percentile – ≤50th percentile; > 50th – ≤75th percentile; > 75th percentile.
Equivalised health expenditure	≤25th percentile; > 25th percentile – ≤50th percentile; > 50th – ≤75th percentile; > 75th percentile.
Equivalised school expenditure	≤25th percentile; > 25th percentile – ≤50th percentile; > 50th – ≤75th percentile; > 75th percentile.
Receive bursary	In the past year the household did *not* receive any help with education in the form of bursaries, scholarships or donations; in the past year the household received help with education in the form of bursaries, scholarships or donations.
Receive remittances	Household does not receive remittances; household receives remittances.
Receiving household area characteristics	
Province	Western/Northern Cape; Eastern Cape; Kwazulu Natal; Orange Free Sate; Mpumalanga; Northern Province; North West; Gauteng.
Residence	Rural; urban; metropolitan.

SD = Standard Deviation

For all variables, the missing responses, including those where reasons were given for the non-response (that is, data not available in questionnaire; field not applicable; respondent refused to answer; respondent did not know answer to question) were grouped together. When this was less than 5%, these values were excluded from the analysis by coding the values as system missing. The potential bias is realised here in that these individuals could be systematically different from those who responded to the questions but imputation for non-response was beyond the scope of this thesis. However, if there were larger proportions missing, then a separate 'not known' category was created. If there was more than 40% missing, the variable was not included. Such excluded variables included the head of household's occupation (64% missing), age started solids (72% missing), and the child's occupation where there were also too few numbers in each category. Although there may well be associations between these variables and the outcome variables investigated, this cannot be verified with data of this quality.

The coding of the variables was intuitive and involved the collapsing of categories into fewer meaningful ones with reasonable numbers. These categorisations were informed by preliminary analyses. For example, head's age was categorised into under 50 years and 50 years and over as household heads with fostered children had a higher mean age of over 50 years, whereas household heads without fostered children had a lower mean age – preliminary analyses showed that this was an appropriate cut-off to use. Head's education was collapsed into two categories of whether they had completed primary education or not. Type of dwelling was also collapsed into 'shack' or not, grouping houses, traditional dwellings, maisonettes, flats, hostels, outbuildings, combination of buildings and other dwellings together, as again, preliminary analyses showed this to be the most appropriate categorisation. The exact definition of what constitutes a 'shack' was not provided in the data documentation but it is thought that such dwellings could reflect lower SES and increased exposure to disease (Department of Health et al., 1998).

With respect to the province codings, the newest codes were used and the names changed to reflect the new names in South Africa. The Northern and Western Capes were combined as there were only small numbers in the Northern Cape and both had high proportions of Coloureds, although it is realised that the Western Cape is one of the wealthiest provinces and the Northern Cape one of the most deprived. The residence information provided in the data was used but again there was no documentation referring

to what constituted urban, rural and metropolitan areas. However, it is thought that metropolitan areas might encompass large cities such as Johannesburg and Cape Town and township areas around the major cities. Race was available at the household level and the four classifications in the data were used and are hereafter referred to reflecting classifications during apartheid, although it must be noted of the relatively smaller number of Indians compared to the other racial groupings.

Some variables were not directly available in the data but could be computed from other information. For example, it was not possible to use past fertility or child mortality information as this was not available for foster children whose mothers were not resident in the same household and there were substantial numbers of missing cases. Therefore, several household composition variables were computed, including the number of non-fostered children and the number of children (regardless of foster status) in the household. These were treated as categorical because the number of children is not strictly continuous. The two variables were coded slightly differently because the analysis uses a file of children, only households with children were selected and so it was not possible to have *zero* children in the household. In contrast, it was possible to have zero *non*-fosters. Also, the number of boys, girls, young children (0-5 years) and older children (6-15 years) were computed but it was decided to use the number of children total (and non-fostered) in the analyses so that the numbers did not get too small.

Using the same type of aggregation, a foster status variable was computed to determine children living in households where foster children reside, that is, foster siblings in order to compare the outcomes of such children with those who do not have foster siblings, and foster children themselves. Another group of children potentially influenced by the fostering process are those left behind in the natal household when a child is fostered out. Unfortunately, it was not possible to investigate this group because too many assumptions were involved with identifying children who were fostered and, as discussed previously, it was not possible to match back to natal households with the data.

Ainsworth (1992) demonstrates that the decision to foster depends to some extent on household economic factors. It was also not possible to create a SES index from household durables to measure long-term wealth as is commonly used because there were high proportions of missing for these variables. However, it was decided to make use of

the LSMS's unique feature of including income and expenditure variables (current wealth), with which a SES index would likely be highly correlated. The constructed variables available in the data were made use of since computing such income and expenditure variables from scratch was beyond the scope of this thesis. As there were several of these constructed income and expenditure variables, those chosen for the analyses were driven by theory and when more than one was used, those which were not strongly correlated.

Expenditure variables were preferred over income variables. Falkingham and Namazie (2002) discuss the differences between income and expenditure measures of household welfare when investigating measures that identify 'the poor'. They discuss the various advantages and disadvantages of the different measures, specifically that *income* does not include the savings or borrowing facilities that a household may have but that *expenditure* may not differentiate between people with and without choices using the example of people *choosing* not to eat meat and those who cannot *afford* to eat meat. Economists prefer the measure of expenditure as it does not fluctuate as much as income which is particularly a problem in developing countries when income varies substantially by agricultural season. In addition, income can often be severely under-reported because people fear that the survey information will be used for other purposes.

However, the expenditure measures are not without their limitations. In fact, Bollen et al. (2001) when comparing different SES proxies using the Ghanaian and Peruvian LSMS found that expenditures did not perform as well in fertility models as did the value of durables. They concluded that an index of the ownership of durables was best. This was because such data were easier to collect and did not rely on estimates of value or regional fluctuations in price. Expenditures tend to fluctuate and they very much depend on the length of the recall period (Falkingham and Namazie, 2002).

Total monthly expenditure was used when investigating the correlates of fostering; food and health expenditure were used when investigating the health outcomes and total school expenditure when investigating the education outcomes. Although health expenditure is likely to be jointly determined by illness and school expenditure by enrolment, correlation between these variables was not high and these relationships were thought important to investigate. Furthermore, Case and Deaton (1998) found that school expenditure was a *"luxury good"* in South Africa (p21), and health expenditure is also expected to be so.

These continuous expenditure variables, available in the data, were coded into equivalence scales by computing household size to the power of 0.75 to account for *medium* economies of scale and then dividing the expenditure by this to get the per capita expenditure, taking economies of scale into account. Unfortunately, this method ignores household composition because of the added complication of foster children, that is, the differing needs by age of household members (Falkingham and Namazie, 2002). These continuous expenditure variables, accounting for economies of scale, were positively skewed as one would expect and so rather than transforming the variable by logging it so that the assumptions of normality were not violated, they were categorised into quartiles to provide a *relative* measure of wealth compared to other households. This quartile ranking was done at the child level. It is noted that this use of categorisation means that some of the information is 'lost' and that the results are reliant on the choice of cut-offs but these quartile measures were preferred to compare households' *relative* expenditures.

Some hypotheses that were developed in the literature review were unable to be tested because of data unavailability. For example, marital status and information on marriage and lineage systems were not collected in the LSMS survey and so could not be included in the analysis which is a big limitation of the data. In addition, some variables were not included because of issues of collinearity. For example, the head's spouse's information was investigated, such as their age and education, but were dropped because of being correlated with the head of household's information. Ethnicity was dropped in favour of race as race was thought more important in the South African context. The number of rooms and number of people per room were originally included but were dropped in favour of the type of dwelling and the number of children. Spousal presence was dropped as it was correlated with the sex of headship.

Another aspect of data quality is completeness of the *outcome* variables and the reporting of the children's age. Table 3.2 shows the completeness of the outcome variables used in the analyses after coding and cleaning. It shows that only the information collected in the anthropometric module of the household questionnaire had a significant proportion of missing data and the weakness of such anthropometric data was mentioned in the data documentation (SALDRU, 1994). The anthropometric measures of nutritional status had approximately a quarter of the information missing. Furthermore, 40% of the information

on whether the child had been vaccinated against measles was missing, which has obvious limitations if these children are systematically different in any way.

Table 3.2 Percent missing for the outcome variables

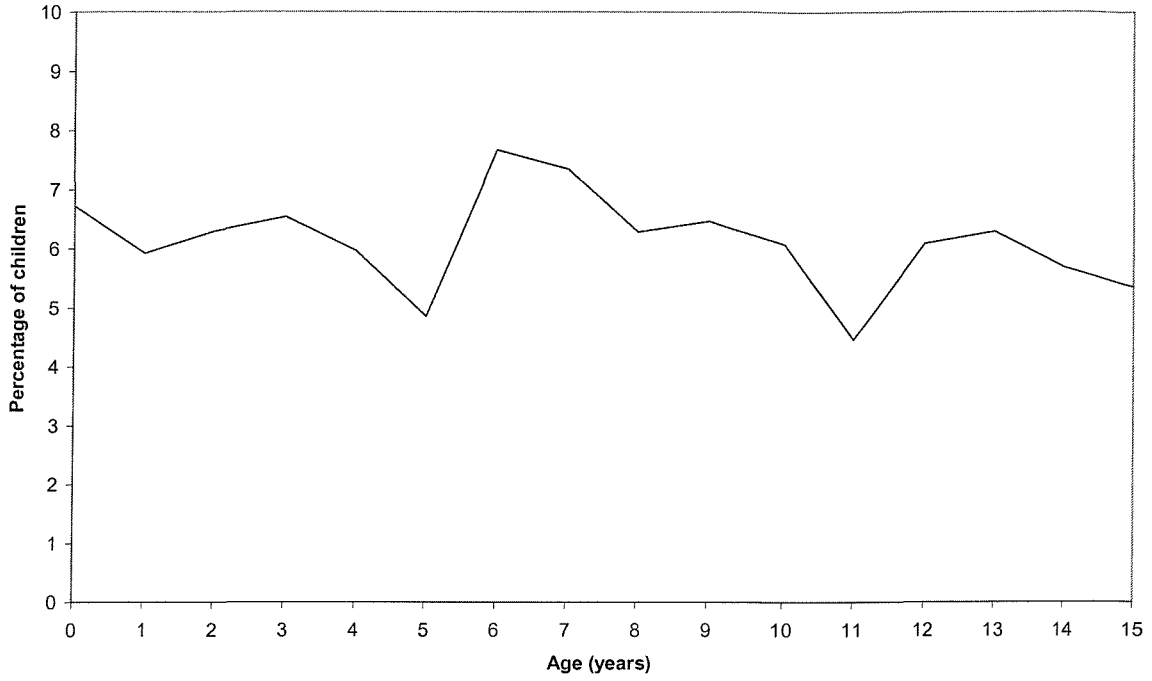
Outcome variable	Observations	Percent missing
Fostered in (for 0-15 year olds)	16174	0.0
Ill in last two weeks (for 0-5 year olds)	5870	0.0
Vaccinated against measles (for 1-5 year olds)	4783	40.7
HAZ (for 0-5 year olds)	5870	25.0
WAZ (for 0-5 year olds)	5870	22.7
WHZ (for 0-5 year olds)	5870	23.9
Enrolled in education (for 6-15 year olds)	102304	1.0
Primary education completion (for 13-15 year olds)	2802	0.1

Note: Percent missing calculated after data cleaning and coding as discussed so some missing cases already removed.

As mentioned previously, age at next birthday was collected by the survey in order to minimise underreporting of infants (Maharaj et al., 2000). Although accuracy of reporting cannot be verified for all children[5], Figure 3.1 indicates heaping at age 6 years. This is likely to be because children of this age were not included in the lengthy anthropometric data collection so age may have been mis-reported as a year older in order to shorten the interview (Case and Deaton, 1998). This inflation of age could cause issues when investigating education for children currently aged 6 years as they could actually be age 5 years and so not old enough to be enrolled in school. Therefore the data could indicate lower enrolment than it indeed should. In addition, some of the responses are potentially subject to recall error. Specifically, reported illness during the preceding two weeks relies on recall. However, this recall duration is considered short enough to minimise this but information on income and expenditures over the month preceding the survey could be subject to more recall error.

[5] Date of birth was collected in the anthropometric component of the questionnaire and so was only available for children ≤5 years old.

Figure 3.1 Line graph showing the percentage of children by their current age, South Africa, 1993



3.3 Methods of data analysis

The following section describes the methods of data analysis. First, the methods used for examining the correlates of fostering are discussed, followed by those used for investigating the health and educational outcomes of the children, and finally, the methods used to control for the endogeneity of the fostering process when investigating such child outcomes.

Before these methods are discussed, it should be noted that weights were not applied to these data. Although the data were aimed to be self-weighting, they are not. However, as also discussed previously, there still remain issues of geographical and racial representation because of the clusters selected and removed from the data because of the racial segregation that still existed in 1993. Therefore, instead of applying weights, province, residence and race were controlled for. The limitation of using unweighted data is noted but unweighted data were more appropriate for the complex models discussed later in this chapter. However, the results can only be generalisable to the sample taken. In fact, this is all that is possible as the results cannot be generalised to the context of South Africa today, as previously mentioned, as the situation is very different compared to 1993

especially with regards to the HIV/AIDS epidemic which is why no qualitative methods were used as they would not complement the data.

3.3.1 Levels, patterns and correlates of fostering

The first objective of this thesis was to establish the levels, patterns and correlates of child fostering in South Africa. The data were coded for the fostering analyses as shown in Table 3.1 a-b.

3.3.1.1 Preliminary analysis

First, frequencies were run of fostering, residence status and household composition for all children aged 0-15 years to gauge the levels of fostering in the sample. Next cross-tabulations of fostering in were run by child background characteristics, household composition, household SES indicators and area characteristics. This was to gain an insight into the patterns of fostering by these characteristics to see which variables appeared most related to fostering. For this bivariate analysis, age was constructed as a categorical variable. Pearson's chi-squared tests were used to identify any significant associations and adjusted residuals were produced to show *where* any such associations existed. Finally, correlations were run to check for collinearity before the modelling.

3.3.1.2 Multivariate analysis - logistic regression

The correlates of fostering were modelled using logistic regressions, where the binary dependent variable was set equal to one if the child was fostered in and zero otherwise. Although in different African contexts, fostering motivations have been documented to vary by age as discussed in Chapter 2 with children being sent to 'grannies' for weaning until the 'age of sense' (about age 6 years) and then at older ages for education (Bledsoe, 1990a; Bledsoe and Brandon, 1992). These differing fostering motivations by age were the justification for running two models; one for children aged 0-5 years and one for children aged 6-15 years. Serra (2000) in her theoretical economic analysis of child fostering in sub-Saharan Africa stated that the divide in age between the two distinctive types of fostering occurs at about age 6-7 years. As well as the link to the 'age of sense' in the literature, the reasoning behind this exact cut-off was for consistency with the later analyses investigating the child outcomes because the anthropometric information was only available for children up to the age of 5 years, and schooling information was only

available for those aged 6 years and above. There were 5,870 children 0-5 years and 10,304 children 6-15 years.

Variables were firstly added in 'blocks'. First were child background characteristics, then household composition variables, household SES indicators and area characteristics sequentially to see the effect of adding in such variables. The sequence of entering variables is described in Table 3.3.

The same variables were entered in both models (0-5 year olds and 6-15 year olds). Age squared was included as the bivariate analysis indicated that a curvilinear relationship existed between age and fostering.

Table 3.3 Explanatory variables in the models for the correlates of fostering

Model A	Model B	Model C	Model D
Child background characteristics	**Child background characteristics**	**Child background characteristics**	**Child background characteristics**
Sex	Sex	Sex	Sex
Current age	Current age	Current age	Current age
Current age squared	Current age squared	Current age squared	Current age squared
	Receiving household composition characteristics	**Receiving household composition characteristics**	**Receiving household composition characteristics**
	Race	Race	Race
	Head's sex	Head's sex	Head's sex
	Head's age	Head's age	Head's age
	Head's education	Head's education	Head's education
	No. of non-fostered children	No. of non-fostered children	No. of non-fostered children
		Receiving household SES indicators	**Receiving household SES indicators**
		Type of dwelling	Type of dwelling
		Equivalised monthly expenditure	Equivalised monthly expenditure
		Receive remittances	Receive remittances
			Receiving household area characteristics
			Province
			Residence
			Age*residence

An interaction was included between age and residence as it was thought that these two variables would be correlated as in the preliminary analysis, with younger children being fostered into rural households and older children being fostered into urban households to have better access to education and employment (Isaac and Conrad, 1982). An interaction between sex and age of the child was also considered because the same study suggested

that the sex ratio of fostered children differed by age but cross-tabulations showed no significant association between the two. Similar to this, as previous literature suggested that more girls were fostered from urban areas (Isiugo-Abanihe, 1986), an interaction was also considered between sex and residence but cross-tabulations showed no significant association. Only interactions that were theory-based were tested. The reference category for the categorical explanatory variables was the one with the most intuitive meaning or the highest number of cases. After this 'block' approach, the parsimonious model was selected by first selecting the stepwise model and then by using more stringent modelling criteria by only including variables contributing at least 1% to the pseudo R squared. This meant that two final parsimonious models were produced for the correlates of fostering, one for each age group.

The limitations of these modelling approaches are noted. First, there are limitations to using a stepwise procedure as a starting point. The problems associated with stepwise regression are discussed by Raftery (1995) and Scribney (1998). One of the main arguments against the stepwise procedure is that the model is fitted by the software *without* using theory rather than by the data analyst *guided* by theory (Scribney, 1998). However, the variables selected for the model were based on theory and those available and reliable to use in the data and the stepwise procedure was used merely as a starting point. Other arguments against stepwise include that the R squared values are upwardly biased, as are the coefficients, confidence intervals are too narrow, p-values *"do not have proper meaning"* and problems if collinearity exists (p1). However, the R squared, coefficients, p-values and confidence intervals were not interpreted as the stepwise model was not the final parsimonious model, only a starting point. Collinearity between variables was also assessed before the model building process began and variables dropped if they were highly correlated with another with a tolerance of less than 0.05 for the parsimonious model. It could also be argued that potentially influential variables are excluded from the final parsimonious model by only including variables that contributed 1% to the pseudo R squared. However, the aim was to find an interpretable and meaningful model with variables that explained most of the variance in the data which is why this stringent criterion was used.

3.3.2 Health implications of fostering

The second objective was to examine the ways in which fostering affects the health outcomes of both fostered and non-fostered children. The health information collected in the household questionnaire (rather than the unreliable community questionnaire) were whether any household member had been sick in the previous two weeks, the nature of the illness; how many days they had been sick and not being able to do what they normally do; who if anyone had been consulted; how long it takes to get there; how long they had to wait for treatment; how much they were charged in total; the cost of the medicine; the reason if no-one was consulted (World Bank, 1993). The anthropometry component of the questionnaire collected data on gender of the child; date of birth; source of birth date; whether the child had a hospital or clinic card; number of measles, DPT, Polio and TB vaccinations; whether they were being breastfed; how many times the child was fed each day; their weight and height and the reason if not measured. Five measures of health status were used as outcome variables – illness as a measure of morbidity, immunisation status as a proxy for access to health care and height-for-age (HAZ), weight-for-age (WAZ) and weight-for-height (WHZ) as measures of nutritional status. Who was consulted when the child was ill and the reason for non-consultation was also investigated. It is important to note that it was not possible to investigate psychological and emotional outcomes since there were no data on this, but which may well have been important outcomes to investigate with regards to parental separation. Child mortality was also not examined as it was not possible to investigate foster status for those who had died, that is, they are censored. Health outcomes were only investigated for children aged 0-5 years because, except for illness, the data collection for these outcomes was restricted to children aged 5 years and under, as discussed above, using a cut-off consistent with the earlier fostering analysis. In addition, the previous literature suggests that young fosters are particularly at risk (Bledsoe et al., 1988; Bledsoe, 1990b; Bledsoe and Brandon, 1992). Information was available on sickness or injury in the preceding two weeks to the survey for *all* respondents, regardless of age. However, when using this as a health outcome, only those aged 0-5 years were considered for consistency with the other health outcomes. This included people who had some sort of permanent injury, disability or ailment (World Bank, 1993). Although the data contained more detailed information about the nature of the illness, it must be noted that the binary outcome used was *reported* illness and so was *perceived*, not necessarily reflecting *actual* illness or the *severity* or *period* of the illness (McMurray, 1996). In addition, as noted previously, this information was reported by

parents for children and there are issues with whether the reporting could be biased against non-biological children. However, it is an important outcome variable to investigate since Nathan (2001) found that residential status was associated with reported illness in Tanzania, as discussed in Chapter 2.

Another health outcome was immunisation status, a proxy for access to health care. Immunisation was chosen because as Gage et al. (1997) suggest, it *"requires action by the family"* (p295) and Sudre et al. (1990) found that fostered children in Swaziland were less likely to be fully immunised, as discussed in Chapter 2. Having received a vaccination against *measles* was used as a proxy for having received all the recommended immunisations as this is usually one of the last immunisations that children receive (O'Brien et al., 1998). The World Bank discuss that immunisation is vital in reducing child mortality and measles, in particular, is the leading vaccine-preventable cause of death (World Bank, 2004b). In the South African context, *"measles continues to be a major cause of morbidity and mortality"* (Naidoo and Meyers, 1994 p125). However, it is noted that the child may not have had the other vaccinations, or indeed the full course of vaccinations. In addition, since the WHO recommend vaccination against measles at age 9-12 months in developing countries (UNICEF, 2004b), vaccination status was only investigated for children aged 1-5 years.

The other outcome variables were continuous anthropometric measures of nutritional status, being HAZ, WAZ and WHZ. Nutritional status was investigated because malnutrition is involved in 60% of childhood deaths as it weakens the child making them more vulnerable to other infections (World Bank, 2004b). Furthermore, there are longer-term implications of malnutrition such as impaired development and quality of life (Coetzee and Ferrinho, 1994; Yach, 1994). Again, it is important to further investigate the findings from previous studies. For example, in several studies Bledsoe found that young foster children were especially susceptible to malnutrition (Bledsoe et al., 1988; Bledsoe, 1990b; Bledsoe and Brandon, 1992).

HAZ, WAZ and WHZ are standardised z-scores of nutritional status, compared to the Center for Disease Prevention and Control reference, and quantify different aspects of nutritional status (Steele, 2002). The references used are *"well nourished populations of American children"* (McMurray, 1996 p159) and so the inappropriateness of such

references are realised in the context of South Africa. Low HAZ, or *length* for age in the case of children under 2 years of age, is an indicator of *long-term* past malnutrition whereas low WAZ indicates *current* malnutrition but the latter indicator does not distinguish between short-term and long-term malnutrition and is better to use for under 1 year olds. Low WHZ also indicates *present* malnutrition but is more robust than WAZ being independent of age, allowing for stunting. The relative strengths and weaknesses of each measure are the reason for making use of all three indicators rather than only one. As the data are cross-sectional there can be *"no indication of growth trends"* (McMurray, 1996 p152). However, the author notes that it is possible to investigate socio-economic, demographic and environmental associations with nutritional status using cross-sectional data, as is the aim of this study.

3.3.2.1 Preliminary analysis

Frequencies of the health outcomes were first investigated. For the preliminary analysis only, as well as age, the continuous anthropometric variables were categorised into normal ($\geq$-1 standard deviation (SD) from the reference median), mild ($\geq$-2 SD and < -1SD), moderate ($\geq$-3 SD and < -2SD) and severe (< -3 SD) and into dichotomous outcomes stunted/underweight/wasted (< -2 SD) or not ($\geq$-2SD) for the initial analysis. However, it is realised that this initial analysis is limited by these choice of cut-offs (McMurray, 1996) which is why mean HAZ, WAZ and WHZ was also investigated. The distributions of the continuous anthropometric measures, HAZ, WAZ and WHZ were verified to be normal using histograms and the mean of these measures were graphed by age to see if there were any changes by age, noting that they were the mean for many children rather than trends over time for a single child.

Next, cross-tabulations by the potential explanatory variables were investigated, including chi-squared tests of significance and adjusted residuals to identify where such significant associations arose. In the case of illness, it was also thought interesting to tabulate of those who were ill, with whom they consulted, and if no-one was consulted, indeed the reason for this. This was carried out by foster status to investigate whether foster children were taken for medical consultation less, as speculated in previous literature (Bledsoe and Brandon, 1992; Oni, 1995). Who was consulted was coded into no-one/family/friend; health person/facility (including private doctor; health centre/clinic; hospital; primary health worker; private nurse); traditional healer and other (including

shop/supermarket/pharmacy/other). Reasons for not consulting anyone were coded into did not want to/need to; financial reasons (including too expensive; insufficient money for transport) and other (including did not know where to go; knew where to go but not how to get there; hours not convenient; other). Finally, correlations were run to see if any variables were correlated with each other to avoid issues of collinearity in the multivariate analyses.

3.3.2.2 Multivariate analysis - logistic and linear regression

The correlates of illness and vaccination were modelled using logistic regressions, where the binary dependent variable was set equal to one if the child was ill/vaccinated and zero otherwise. The explanatory variables used were based on theory and those that were available and reliable to use, as seen in Tables 3.4 and 3.5. Importantly, foster status was included as an explanatory variable to see if there were any differences in the health outcomes of children in households without foster children, foster children themselves and children in households with foster children, and it should be noted that there could be some bias for households that foster in several children. Although there is a hierarchical structure to the data, that is, children within households, within clusters, this was not controlled for since a multi-level approach was beyond the scope of this thesis which instead aimed to investigate the potential endogeneity issue, discussed in section 3.3.4.

In addition, for the model for illness, interactions were considered between breastfeeding and age and age squared to account for the association with age. However, it must be noted that this is whether the child is *currently* being breastfed and does not infer *exclusive* breastfeeding, or any relation to the *duration* or *initiation* of breastfeeding. Although mostly only non-fostered children were likely to be breastfed, there were a few fostered children reported as being breastfed as well as no problems of collinearity in the data and so breastfeeding was thought an important variable to include in the model for illness because of the protective effect of the antibodies in breast milk (Burgard, 2002).

Also, for the model for illness, vaccination status was included as an explanatory variable, a category for those under age 1 year was included for those who would be too young to have received the measles vaccination and a 'not known' category as approximately 40% were missing this information.

The relationship between nutritional status and morbidity can work both ways. Thus, a measure of nutritional status was included as this was thought to influence morbidity because malnourished children could have increased susceptibility to infection (Madise and Mpoma, 1997). The anthropometric measure WHZ was chosen as the measure of nutritional status as McMurray (1996) considers it the *"best indicator of present malnutrition"*, being independent of age (p155). However, WHZ may not reflect overall growth problems that may have started before fostering.

Table 3.4 Explanatory variables in the model for the correlates of illness

Model A	Model B	Model C	Model D
Child background characteristics	**Child background characteristics**	**Child background characteristics**	**Child background characteristics**
Sex	Sex	Sex	Sex
Current age	Current age	Current age	Current age
Current age squared	Current age squared	Current age squared	Current age squared
Foster status	Foster status	Foster status	Foster status
Currently being breastfed	Currently being breastfed	Currently being breastfed	Currently being breastfed
Number of times fed each day	Number of times fed each day	Number of times fed each day	Number of times fed each day
Measles vaccination status	Measles vaccination status	Measles vaccination status	Measles vaccination status
WHZ	WHZ	WHZ	WHZ
Currently being breastfed*current age	Currently being breastfed*current age	Currently being breastfed*current age	Currently being breastfed*current age
Currently being breastfed*current age squared	Currently being breastfed*current age squared	Currently being breastfed*current age squared	Currently being breastfed*current age squared
	Receiving household composition characteristics	**Receiving household composition characteristics**	**Receiving household composition characteristics**
	Race	Race	Race
	Head's sex	Head's sex	Head's sex
	Head's age	Head's age	Head's age
	Head's education	Head's education	Head's education
	Number of children	Number of children	Number of children
		Receiving household SES indicators	**Receiving household SES indicators**
		Type of dwelling	Type of dwelling
		Water supply	Water supply
		Equivalised food expenditure	Equivalised food expenditure
		Equivalised health expenditure	Equivalised health expenditure
			Receiving household area characteristics
			Province
			Residence

Table 3.5 Explanatory variables in the model for the correlates of immunisation

Model A	Model B	Model C	Model D
Child background characteristics	**Child background characteristics**	**Child background characteristics**	**Child background characteristics**
Sex	Sex	Sex	Sex
Current age	Current age	Current age	Current age
Current age squared	Current age squared	Current age squared	Current age squared
Foster status	Foster status	Foster status	Foster status
Been ill in preceding two weeks	Been ill in preceding two weeks	Been ill in preceding two weeks	Been ill in preceding two weeks
	Receiving household composition characteristics	**Receiving household composition characteristics**	**Receiving household composition characteristics**
	Race	Race	Race
	Head's sex	Head's sex	Head's sex
	Head's age	Head's age	Head's age
	Head's education	Head's education	Head's education
	Number of children	Number of children	Number of children
		Receiving household SES indicators	**Receiving household SES indicators**
		Type of dwelling	Type of dwelling
		Equivalised health expenditure	Equivalised health expenditure
			Receiving household area characteristics
			Province
			Residence

As with the analysis for the correlates of fostering, and noting the same limitations, variables were firstly added in 'blocks' to see the effect of adding in such variables. First, child background characteristics were included, and then household composition variables. Next, household SES indicators were included, and finally, area characteristics were added into the model. The reference category for the categorical explanatory variables was the one with the most intuitive meaning or the highest number of cases. Then the parsimonious model was selected by first selecting the stepwise model and then by using more stringent modelling criteria by only including variables which explained most of the variance contributing at least 1% to the pseudo R squared. The tolerance was checked for issues of collinearity as discussed earlier.

For the continuous anthropometric z-score measures of nutritional status, linear regression was used. Linear regression was preferred to using the binary or multiple categories in binary logistic or multinomial logistic regression as McMurray (1996) states that it is better *"to treat anthropometric indicators as continuous variables, and to focus on patterns of covariation rather than on the odds of being in one discrete category rather than another"* (p161). The variables used in the modelling are in Table 3.6.

Table 3.6 Explanatory variables in the models for the correlates of nutritional status

Model A	Model B	Model C	Model D
Child background characteristics	**Child background characteristics**	**Child background characteristics**	**Child background characteristics**
Sex	Sex	Sex	Sex
Current age	Current age	Current age	Current age
Current age squared	Current age squared	Current age squared	Current age squared
Foster status	Foster status	Foster status	Foster status
Currently being breastfed	Currently being breastfed	Currently being breastfed	Currently being breastfed
Number of times fed each day	Number of times fed each day	Number of times fed each day	Number of times fed each day
Measles vaccination status	Measles vaccination status	Measles vaccination status	Measles vaccination status
Been ill in the preceding two weeks	Been ill in the preceding two weeks	Been ill in the preceding two weeks	Been ill in the preceding two weeks
Currently being breastfed*current age	Currently being breastfed*current age	Currently being breastfed*current age	Currently being breastfed*current age
Currently being breastfed*current age squared	Currently being breastfed*current age squared	Currently being breastfed*current age squared	Currently being breastfed*current age squared
	Receiving household composition characteristics	**Receiving household composition characteristics**	**Receiving household composition characteristics**
	Race	Race	Race
	Head's sex	Head's sex	Head's sex
	Head's age	Head's age	Head's age
	Head's education	Head's education	Head's education
	Number of children	Number of children	Number of children
		Receiving household SES indicators	**Receiving household SES indicators**
		Type of dwelling	Type of dwelling
		Water supply	Water supply
		Equivalised food expenditure	Equivalised food expenditure
		Equivalised health expenditure	Equivalised health expenditure
			Receiving household area characteristics
			Province
			Residence

As discussed by McMurray (1996), age was included in the model to see the influence on nutritional status as age increases, and age-squared to account for the curvilinear pattern found in the bivariate analysis, rather than the *"absolute variation in height and weight as age increases"* (p161). Breastfeeding and age and age squared interaction terms were included, similar to the model for illness. Again, breastfeeding was considered important to nutritional status because of its nutritious value (Burgard, 2002), even though only a small number of fostered children were reported as breastfed. Illness was included as an explanatory variable in the nutritional status models as it was thought to reduce nutritional status perhaps by loss of nutrients (Madise and Mpoma, 1997). Again, the modelling

involved first adding the variables into the model in 'blocks' and then selecting the stepwise model, before finally selecting a model based on more stringent criteria, that is, where each variable contributed at least 1% to the adjusted R squared and where each variable had a tolerance of over 0.05.

3.3.3 Educational implications of fostering

The third objective of this study was to examine the educational implications for fostered and non-fostered children. The education information collected in the household survey (rather than the unreliable community questionnaire) was the highest educational qualification; enrolment and if not why not; the last year of enrolment; how long it takes to go to school; how much it costs to travel to and from school; what form of transport used; educational spending; bursaries, scholarships and school meals (World Bank, 1993). The education outcomes chosen as dependent variables were enrolment in education and having completed primary education and the reasons for non-enrolment were also investigated. These indicators were chosen for a kind of proxy for access to school and some kind of measure of attainment/achievement. These are important outcomes to investigate as attainment by foster status has not been considered that much by previous literature and evidence for enrolment by foster status is contrasting. For example, some studies have found that fosters were no less likely or more likely to be enrolled (Isiugo-Abanihe, 1985; Zimmerman, 2003) whereas others have found that foster children were less likely to be enrolled (Ainsworth, 1992; Urassa et al., 1997; Maharaj et al., 2000).

It must be noted however, that education enrolment does not imply attendance and that attainment is cumulative and age-censored which is difficult to investigate with cross-sectional data such as this. Therefore, completion of primary education (Standard Five) was investigated only for those of the age range when they should have done so. Discrete time hazard modelling was not used to account for the cumulative age effect on educational attainment as it was not thought to add anything additional to the analysis. Although most children in South Africa complete primary education and less complete secondary (Maharaj et al., 2000), this study did not investigate secondary education as the child would then be considered too old to be fostered. As education information was available for respondents aged 6-24 years, enrolment in education was investigated for children aged 6-15 years but completion of primary education was investigated for children aged 13-15, that is, children who should have completed primary education.

3.3.3.1 Preliminary analysis

First frequencies were run of the outcome variables followed by cross-tabulations of the variables of interest based on theory developed from previous studies, and the outcome variables. Chi-squared statistics identified significant associations and adjusted residuals where such associations lay. Correlations were run to check for any multi-collinearity issues. It was also thought interesting to investigate the *reasons* for non-enrolment by foster status. Reasons for non-enrolment were coded into financial and opportunity costs (school expenses being too high; needed to get work; required to work at home or on the farm); illness/disabled/became pregnant; no school locally; could not cope with school work and 'other' (completed education[6]; school boycott; social unrest violence, other).

3.3.3.2 Multivariate analysis - logistic regression

Each of the education outcomes was modelled using a logistic regression, where the binary dependent variable was set equal to one if the child was enrolled/had completed primary education and zero otherwise. The explanatory variables were those available and reliable and based on theory, as seen in Table 3.7. Similar to the other models, first the explanatory variables were entered in 'blocks' followed by selection of the stepwise model and finally a more stringent criteria with each variable contributing at least 1% to the pseudo R squared with a tolerance of above 0.05.

[6] Only one person was reported as having completed their education and so would not have been enrolled.

Table 3.7 Explanatory variables in the models for the correlates of enrolment and primary completion

Model A	Model B	Model C	Model D
Child background characteristics	**Child background characteristics**	**Child background characteristics**	**Child background characteristics**
Sex	Sex	Sex	Sex
Current age	Current age	Current age	Current age
Current age squared	Current age squared	Current age squared	Current age squared
Foster status	Foster status	Foster status	Foster status
Been ill in preceding two weeks	Been ill in preceding two weeks	Been ill in preceding two weeks	Been ill in preceding two weeks
	Receiving household composition characteristics	**Receiving household composition characteristics**	**Receiving household composition characteristics**
	Race	Race	Race
	Head's sex	Head's sex	Head's sex
	Head's age	Head's age	Head's age
	Head's education	Head's education	Head's education
	Number of children	Number of children	Number of children
		Receiving household SES indicators	**Receiving household SES indicators**
		Type of dwelling	Type of dwelling
		Equivalised school expenditure	Equivalised school expenditure
		Receive bursary	Receive bursary
			Receiving household area characteristics
			Province
			Residence

3.3.4 Controlling for the endogeneity of fostering

As discussed in Chapter 1, understanding how fostering influences a child's health and well-being is of central importance, especially in countries where there is no child support system in place. However, it is necessary to recognise that simply comparing fostered and non-fostered populations of children ignores the fact that fostering is not a randomised treatment. As previous research looking at the determinants of fostering has demonstrated fairly conclusively, as will this thesis, a sample of fostered children is 'selective' in some potentially important ways (more able children may be selected for educational fostering and sick children may be less likely to be fostered out for example), and the use of non-fostered children in order to establish a counterfactual is perhaps problematic.

This thesis aims to examine the ways in which fostering affects the health and educational outcomes of both fostered and non-fostered children. After investigating the correlates of fostering, health and education, particular care will be taken to correct for selection in the measurement of fostering effects. Treatment effect methodologies developed by Manski

(1989) and Heckman et al. (1998) permit an unbiased measure of the effect of fostering (the 'treatment') on child outcomes (the 'treatment effect').

3.3.4.1 The conceptual problem

Sample selection is not an uncommon problem as not everything occurs randomly meaning that it is a *"fundamental aspect of many social processes"* (Winship and Mare, 1992 p327). However, it is indeed a problem as simply ignoring it leads to bias. So, how do we deal with it? As it is unethical to permit experiments that randomly assign children to be fostered or not, it is necessary to use observational studies that collect data on this behavioural choice from 'real life' and eliminate selectivity bias by modelling the processes together, that is, fostering and the child outcomes (Panis and Lillard, 1994).

The two-stage modelling approach is more typical in the econometrics literature (for a more detailed description of the econometric models see Maddala (1983) and Greene (2000)). One of the most common examples of sample selection involves earnings which can *only* be observed when someone is working. However, an example which is more consistent with that in this study is described by Heckman (1979) whereby wages of non-migrants do not provide good estimates for the wages of migrants had they not migrated since migration is not a randomised treatment. In this example, wages could be observed for both migrants and non-migrants, similar to this study where health and educational outcome data are available for both fostered and non-fostered children.

Although many of the studies on the welfare implications of child fostering suggest that the practice means that foster children fare worse compared to non-fostered children, the economists Ginther and Pollak (2000) in their study of the effect of family structure on education outcomes in the US, point out that it is possible for some *"unobserved variable or process"* to influence both family structure and education outcomes, meaning that a selection effect makes it difficult to disentangle any potential relationships that actually exist (p8). In fact, they found that the association between family structure and child outcomes *"reflect selection rather than causation"* (p1).

Although in the US context looking at the effects of living with a stepparent, some studies have attempted to investigate the issue of selection bias by using sibling comparisons (Case et al., 2000; Evenhouse and Reilly, 2000; Ginther and Pollak, 2000). These studies

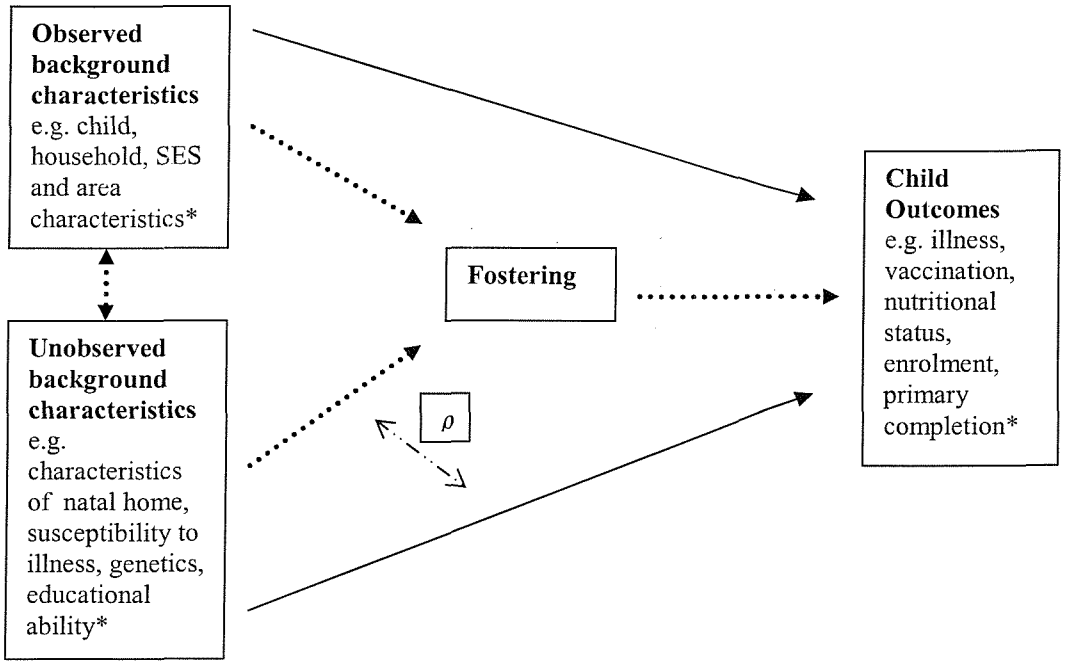
attempt to control for unobserved family characteristics by comparing children in the same households. However, even when using this sibling comparison approach, it is noted that there could still be unobserved characteristics that influence the children's well-being as well as being correlated with living with a stepparent (Evenhouse and Reilly, 2000).

Such two-stage methodology has been used in the demographic context which also faces such selection issues. Similar to Steele and Curtis' (2003) conceptual problem whereby contraceptive method choice is an important factor influencing contraceptive discontinuation whilst being endogenous, fostering is likely to be endogenous to the child's health and educational outcomes, since there are likely to be unobserved factors that influence *both* fostering and the child health and educational outcomes such as susceptibility to illness, genetics, educational ability and indeed the biological household characteristics of the fostered child. Steele and Curtis (2003) used a multi-level multi-process approach to model the two processes together, whilst accounting for possible correlation in the unobserved individual characteristics across such processes.

There is one study on fostering to date which incorporates this two-stage methodology. Of interest, it also used the same data as that used in this study (Zimmerman, 2003). However, it did not control for *fostering* being potentially endogenous to education outcomes but rather attempted to control for enrolling children in school being potentially endogenous to fostering. The reasoning was that parents may be more likely to foster out their child to a certain household if it will educate their child. He therefore created a binary variable from a probit regression for whether a household was more likely than average to enrol all its children in school, defined as more than a 95% predicted probability of doing so. He then incorporated this binary variable as an explanatory variable in the fostering-in equation, assuming that factors that influence enrolment are only influencing fostering *through* enrolment. He found that foster children were no less likely to attend school and may move to schools that can better provide them with an education. However, this analysis did not control for any *unobservables* involved, and potential correlation between them. Therefore, no such methodology has been used in the study of fostering and child outcomes to control for the fact that *fostering* is not a randomised treatment and potential correlation between unobserved factors that influence both fostering and child outcomes.

Figure 3.2 presents the conceptual problem visually. It shows that the health and educational outcomes can be influenced by both *observed* and *unobserved* factors. In addition, these factors can influence the outcomes through the mediatory condition of being fostered. Recognising the endogeneity issue means that it is possible to differentiate between the *direct* effects of fostering and *indirect* effects that exist because of selection (Panis and Lillard, 1994; Lillard et al., 1995). If a selection effect exists, there will be correlation between the unobserved factors that influence both fostering and the child outcomes as indicated by ρ in the diagram. Therefore, it may not be advisable to model child outcomes by simply ignoring these pathways and the possible correlation between unobservables as it is likely to result in bias.

Figure 3.2 Pathways of the fostering process



Note: *Community and cultural factors are also important but are not available in the data/cannot be used.

(SOURCE: Adapted from Steele, 2001)

3.3.4.2 The identification issue

In order to satisfactorily model the two processes, that is, fostering and the child outcomes, it is necessary that at least one instrumental variable is used, that is, a variable that is predictive of the endogenous fostering variable but not of the child outcome variables (Evenhouse and Reilly, 2000; Steele and Curtis, 2003). Evenhouse and Reilly (2000) point out that it is difficult to find such variables that are ideal instruments. Although it is

technically possible to estimate the two processes without identifiers, it is not advisable since the model would only be identified by the non-linearity of the error distribution.

Such instrumental variables are chosen in the analyses of the correlates of fostering and the health and educational outcomes (Chapters 4 – 6), with the choice of variables from the data being theory driven and *a priori*. As discussed earlier, a stringent modelling criterion was used by which only the most influential variables that explained most of the variance were selected in the final parsimonious models. The actual instrumental variables used are discussed in Chapter 7. However, it is realised that the results of this analysis rely on these chosen variables acting as 'good' instruments. Winship and Mare (1992) discuss the limitations of models used for sample selection bias and state that estimates *"often differ substantially from the experimental estimates and tend to fluctuate depending on which variables are included in the selection equation"* (p342) and that there is a need for *"strong substantive rationale for the regressors included in the equation"* (p343).

3.3.4.3 The impact of the selection process

As discussed in Chapter 2, previous research has suggested that child outcomes vary by foster status. Also, as discussed earlier, foster children are potentially 'selected' and this could lead to bias in estimating such child outcomes which has not been considered in previous fostering studies, which simply ignore the potential endogeneity issue when examining child outcomes. As well as being able to investigate the strength of any selection effect by quantifying the correlation between the error terms of the two equations (Panis and Lillard, 1994), there can be positive or negative selection effects. In fact, when investigating whether stepchildren are subject to differential treatment to biological children or if selection accounts for the poorer outcomes of stepchildren, Evenhouse and Reilly (2000) found evidence of both positive and negative selection effects depending on which child welfare measure was used. Controlling for endogeneity corrects the bias which may change the size, sign and significance of the coefficients (Lillard et al., 1995). Although studies by Panis and Lillard (1994) and Steele and Curtis (2003) found that ignoring endogeneity led to an underestimate of child survival and contraceptive discontinuation, respectively, the *direction* of the selection effect is unclear and difficult to hypothesise (Steele and Curtis, 2003). For example, with regards to education, foster children could be more likely to attend school and do well in school if they are fostered to a household for the specific purpose of being provided with an education, that is, to a

household that has better access to schooling or to a household that can better afford to educate them (Isiugo-Abanihe, 1985; Zimmerman, 2003). In contrast, they could be less likely to attend school, having to perform more household chores (Ainsworth, 1992). It should however be noted that there may also be a gap between the perceived and actual reasons of fostering. The objective of the latter part of this thesis (Chapter 7) is to investigate whether fostering is in fact endogenous to child outcomes in South Africa, and if this is indeed the case, to investigate the effect of controlling for such endogeneity as well as identify a less biased effect of being fostered.

3.3.4.4 Two-stage model fitting

As previously mentioned, the dependent variables (illness, vaccination status, measures of nutritional status, education enrolment and primary completion) are observed for *all* the observations in the data, that is, for *both* fostered and non-fostered children. As a consequence the issue is not *sample* selection bias but *endogeneity* (Millimet, 2001). Treatment effect models were used to estimate the effect of the endogenous fostering treatment on the continuous anthropometric z-scores, *"conditional on two sets of independent variables"* (STATA Corporation, 2003a p274). Y_j is the fully observed continuous variable (HAZ, WAZ or WHZ) conditional on the exogenous independent variables $\mathbf{X}_j$ (vector of the most influential explanatory variables for the anthropometric outcomes as found in Chapter 5) and $\mathbf{W}_j$ (vector of the most influential explanatory variables for fostering of 0-5 year olds as found in Chapter 4) in the regression function (STATA Corporation, 2003a p275-6):

$$Y_j = \beta' \mathbf{X}_j + \delta F_j + \epsilon_j$$

$$F^*_j = \gamma' \mathbf{W}_j + u_j$$

$$F_j = \begin{cases} 1, \text{ if } F^*_j > 0, \text{ that is, if the child is fostered} \\ 0, \text{ if } F^*_j \leq 0, \text{ that is, if the child is not fostered} \end{cases}$$

where
$$\epsilon_j \sim N(0,\sigma)$$
$$u_j \sim N(0,1)$$
$$\text{corr}(\epsilon_j, u_j) = \rho$$

F_j is the endogenous variable for whether the child is fostered or not. The binary outcome to be fostered or not, F_j, is modelled as the outcomes of an unobserved latent variable for the propensity of being fostered, F^*_j, which is assumed to be a linear function of the exogenous covariates $\mathbf{W}_j$ and a random component of u_j (STATA Corporation, 2003a p275-6). Both equations were modelled for the full sample of children aged 0-5 years. Maximum likelihood was used for efficient estimation (Dolton and Makepeace, 1986).

The likelihood ratio test of independence between the equations tests the null hypothesis that the error terms of the two equations are uncorrelated (STATA Corporation, 2003a), that is, whether the error term of the fostering model is uncorrelated with the error term in the child outcome equations. There is no evidence of endogeneity if there is no significant correlation between the unobservables, ρ (Panis and Lillard, 1994). If no such correlation exists, then it is sufficient to rely on the results from the ordinary least squares estimation to investigate child outcomes, with foster status included as an explanatory variable. If a correlation *does* exist, suggesting that fostering is endogenous to the child outcome, the strength of the selection effect can be obtained from the correlation coefficient ρ, and the coefficients will be less biased than those obtained from a one-stage model ignoring endogeneity.

However, there was no equivalent of this treatment effect model approach for binary outcomes and so it could only be used when the outcome variable was continuous, for example with the anthropometric measures of nutritional status HAZ, WAZ and WHZ. A suitable model for the binary outcomes variables, that is, ill or not ill, vaccinated or not, enrolled in education or not and completed primary education or not, is the extension of the Heckman selection model for binary outcomes, Heckprob (Van de Ven and Van Pragg, 1981). However, as this approach only models the sub-sample of *fostered* children for the second stage of the estimation procedure, the model can be run again for the sub-sample of *non-fostered* children by reversing the binary fostering outcome to whether they were *not* fostered or not.

Y^*_j is a latent variable for the propensity of the binary child outcome, being ill for example, and $\mathbf{X}_j$ is the vector for the key explanatory variables for that child outcome as found in Chapters 5 and 6. Y^*_j is only observed if $F_j > 0$, that is, if the child is fostered. F^*_j is a latent variable for the propensity of being fostered. $\mathbf{W}_j$ is the vector of the most

influential explanatory variables for whether the child is fostered or not for the appropriate age range of children as found in Chapter 4. Again, maximum likelihood estimation was used for estimating the following model:

$$Y^*_j = \beta' \mathbf{X}_j + \epsilon_j$$

$$F^*_j = \gamma' \mathbf{W}_j + u_j$$

$$F_j = \begin{cases} 1, \text{ if } F^*_j > 0, \text{ that is, fostered} \\ 0, \text{ if } F^*_j \leq 0, \text{ that is, not fostered} \end{cases}$$

$$Y_j = \begin{cases} 1 \text{ if } Y^*_j > 0, \text{ that is, ill} \\ 0, \text{ if } Y^*_j \leq 0, \text{ that is, not ill} \end{cases}$$

where $\epsilon_j \sim N(0,1)$

$u_j \sim N(0,1)$

$\text{corr}(\epsilon_j, u_j) = \rho$

The likelihood ratio test tells us if the outcome is significantly different to the outcome when it is modelled *"by fitting the probit and selection models separately"* (STATA Corporation, 2003b p80). When $\rho \neq 0$, the impact of controlling for this selection effect and the 'effect' of being fostered was investigated by comparing the marginal predicted probabilities from the two-stage selection model with those obtained from a one-stage probit model with fostering incorporated as a binary explanatory variable, that is, the mean predicted probability produced by each modelling approach for fosters and non-fosters. For this comparison, probit models were used for the one-stage models rather than logit models, as previously, for ease of comparison because probit models are preferred to logit models in this case as they are *"more easily generalised to a multiequation problem"* (Winship and Mare, 1983 p103). Predicted probabilities for non-fosters from the selection model were obtained by running the model for the sub-sample of non-fostered children.

To gauge the sensitivity of the results, the equation specifications were modified with some other plausible specifications. For example, some variables that were found significant in the model building process, with both the outcomes and the selection model, but that were

not selected for the final parsimonious models were incorporated into the models in turn to see if there was any change in the significance of the correlation coefficient.

3.4 Summary

This chapter has summarised the data source and methods being employed in this research to establish the levels, patterns and correlates of fostering and the health and educational implications for the children involved. Specifically, this chapter has shown how the endogeneity of the fostering process can be investigated and controlled for when investigating such child outcomes which has not been done in previous studies. However, although the data are out-dated and cannot be generalisable to South Africa today, the *methodology* can be generalisable to other demographic processes that occur non-randomly. The findings are now presented and discussed in the subsequent four analysis chapters.

CHAPTER FOUR

Levels, patterns and correlates of fostering

4.0 Introduction

This chapter investigates the first objective of this thesis, that is, the levels, patterns and correlates of fostering in South Africa. It further investigates the findings from previous studies outlined in Chapter 2 by discussing the existence of kinship fostering by examining the foster children's relationship to the head of household. The background characteristics of the children are examined to investigate fostering by sex, and whether there are differences in fostering by age as identified in previous studies. Characteristics of the foster household, including household SES, are also discussed to investigate the type of households that foster in children and the possible economic motivations. The data also allows the investigation of fostering due to the high fertility hypothesis, which stipulates fostering in to low fertility households. Area characteristics are also examined to investigate whether younger children are fostered to rural areas and older children to urban areas for better access to education and training.

Section 4.1 presents the percentage distribution of residence status. Whether a child is fostered in or not is then investigated in section 4.2 which presents the bivariate results of factors associated with fostering. Section 4.3 presents the characteristics of fostered children that were found by employing logistic regression models, modelling the odds of being fostered into a household versus not. The correlates of fostering were modelled separately for two age groups of children; 0-5 years and 6-15 years, as discussed in the previous chapter. Variables were added into the models in a sequential way by first adding the child background characteristics, then household characteristics, household SES indicators and finally area characteristics. The parsimonious models were then selected and the findings discussed in section 4.4, along with their policy implications. A summary is provided in section 4.5.

4.1 Levels and patterns of residence status

Table 4.1 shows the residence status for the sample of children aged 0-15 years old in the 1993 SALSMS.

Table 4.1 Percentage distribution of children aged 0-15 years by residence status, South Africa, 1993

Residence status	Percent	Observations
Non-fosters		
Both parents present in household	54.41	8800
Father present but mother absent	2.15	347
Father present but mother dead	0.54	87
Father absent but mother present	25.76	4167
Father dead but mother present	5.33	862
Fosters		
Both parents absent	9.60	1552
Father absent and mother dead	0.87	141
Father dead and mother absent	0.85	138
Both parents dead	0.49	80
Total	100.00	16174

Unweighted data

Table 4.1 shows that only just over half of children aged 0-15 years old lived with both parents present in the same household. A third of children had one of their parents absent from the household (children with *one* parent either absent or dead), and 31% were paternal absentees (*mother* present but father absent or dead) and nearly 3% were maternal absentees (*father* present but mother absent or dead). Nearly 12% had both their parents absent from the household (father *and* mother absent or dead), most of whom were absent rather than dead, and were therefore classified as foster children. Over 90% of children had both their parents alive who were either present or absent, nearly 2% were maternal orphans with their mother dead and nearly 7% were paternal orphans with their father dead, and there were 0.5% double orphans with both their parents dead. Double orphans were classified as foster children due to the small proportion and as they exhibit similar characteristics, discussed subsequently.

Figure 4.1 shows the proportion of foster children, children living in households with foster children, that is, foster siblings, and children living in households without any foster children.

Figure 4.1 Pie chart showing the percentage distribution of foster status for children aged 0-15 years, South Africa, 1993

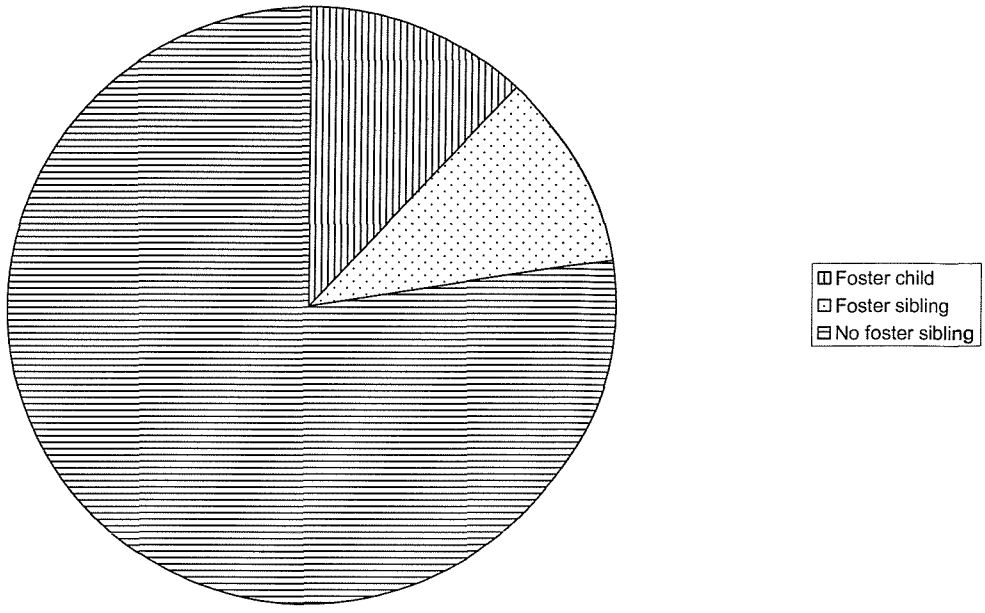
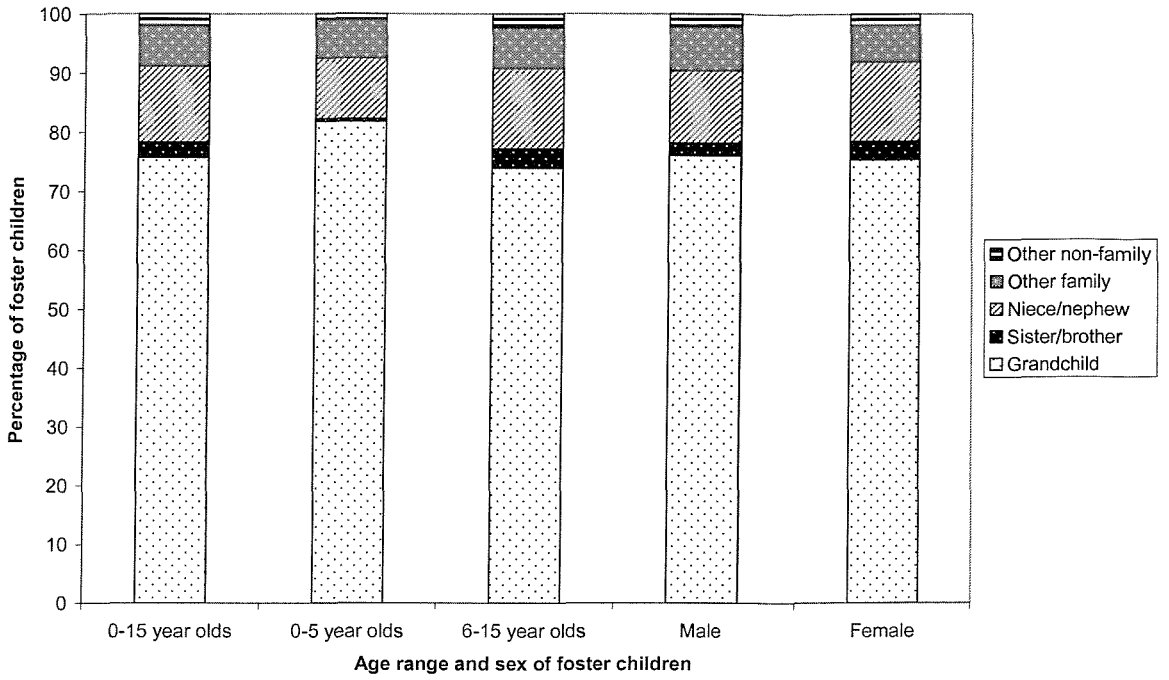


Figure 4.1 shows that a significant proportion of children are influenced by the fostering practice by either being fostered (12%) or being a foster sibling (11%). Furthermore, some of the 78% of children living in households without foster children could be potentially influenced by the fostering practice, with siblings fostered out. The results shown in Chapters 5 and 6 will compare the health and educational outcomes of these three groups of children.

In order to investigate kinship fostering, Figure 4.2 shows how the relationship to the household head alters by the age and sex of the foster child. It clearly presents the fact that the vast majority of foster children reside with their grandparents. Other large proportions reside with their uncles and aunts and other family members, leaving smaller proportions living with their siblings and other non-family. A higher proportion of younger children and a lower proportion of older children are the grandchildren of the household head. Therefore, there seems to be a move away from residing with grandparents to other family and non-family members with age but the vast majority of foster children in both age groups were in fact related to the head of the household. Although the differences are not so marked by sex, *slightly* more boys than girls were the grandchildren, other family and other non-family of the household head. In contrast, a higher proportion of girls were the siblings or niece of the head of household.

Figure 4.2 Stacked bar chart showing the percentage distribution of relationship to the household head for foster children, by age and sex, South Africa, 1993



4.2 Factors associated with fostering in – bivariate analysis

The mean age of the fostered children was 9 years and the proportion of children fostered increased with age as can be seen in Figure 4.3. It also shows a stronger increase from ages 0-6 years, after which the increase becomes more gradual. There appears to be heaping at age 6 years which could reflect an increase in fostering for those of school age. However, it could also reflect the fieldworkers trying to shorten the interview as children of age 6 years were not measured for anthropometric information (Case and Deaton, 1998).

Figure 4.3 Line graph showing the percentage of foster children by current age, South Africa, 1993

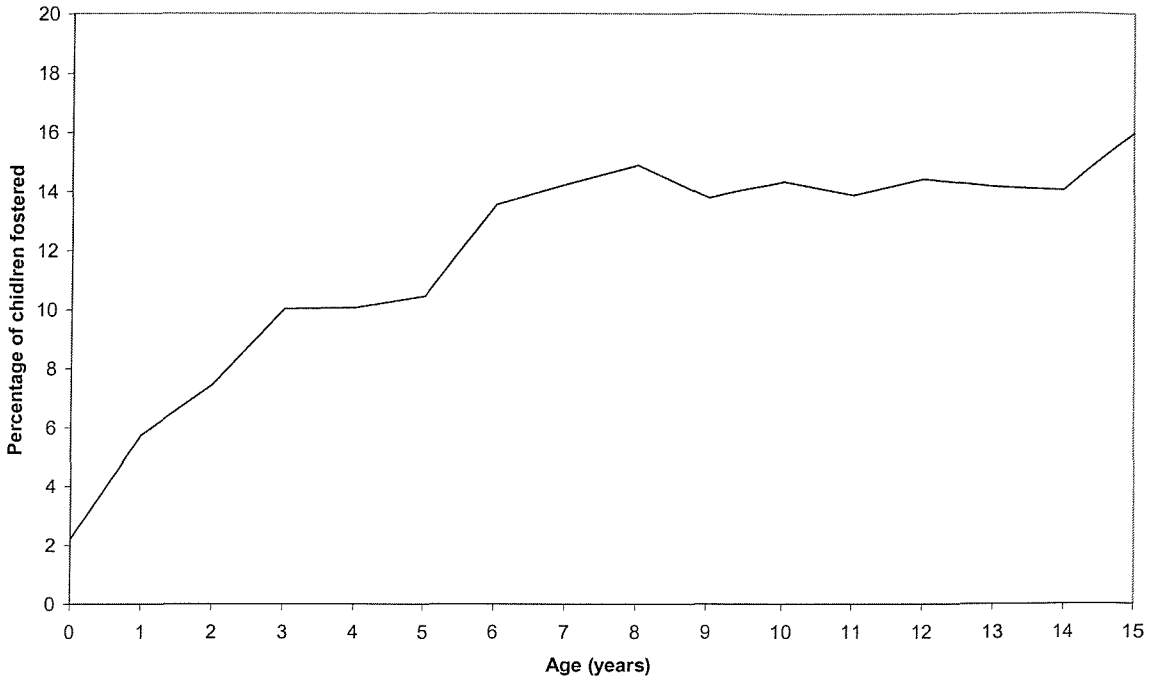


Table 4.2 presents the bivariate results of factors associated with a child being fostered in. It presents a cross-tabulation of child background characteristics, household composition characteristics, household SES indicators and area characteristics by the proportion of children fostered in. In addition, it presents the number of children and chi-squared level of significance measuring the strength of the association between the background variables and whether the child is fostered.

A cross-tabulation was also produced to assess whether double orphans were systematically different from foster children, that is, whether they should indeed be classified as foster children. Although the results are not shown here, there were virtually the same patterns as presented in Table 4.2. Only children residing in African households were orphaned and there were slight differences by province and residence. Overall, double orphans exhibited similar characteristics as fostered children and so their classification as fostered children should not bias the subsequent findings.

Table 4.2 Percentage of children aged 0-15 years fostered by background characteristics, South Africa, 1993

		Percent fostered	Observations	Chi-squared significance level
Child background characteristics				
Sex	Male	12.01	8168	
	Female	11.62	8006	
Current age	0-3 years	6.33	4121	***
	4-7 years	12.35	4177	
	8-11 years	14.21	4089	
	12-15 years	14.60	3787	
Receiving household composition characteristics				
Race	African	13.11	13466	***
	Coloured	9.63	1236	
	Indian	4.58	371	
	White	0.91	1101	
Head's sex	Male	8.49	11416	***
	Female	19.76	4711	
Head's age	≤49 years	4.74	8778	***
	≥50 years	20.70	6865	
Head's education	Not completed primary education	14.84	8988	***
	Completed primary education	8.03	6912	
Number of non-fostered children	0-2	24.56	6017	***
	3-5	4.51	7798	
	≥6	3.43	2359	
Receiving household SES indicators				
Type of dwelling	Shack	10.48	1450	*
	Other	11.97	14682	
Equivalised monthly expenditure	≤25th percentile	14.14	4037	***
	> 25th percentile – ≤50th percentile	12.71	4045	
	> 50th percentile – ≤75th percentile	13.83	4043	
	> 75th percentile	6.59	4036	
Receive remittances	No	10.37	10401	***
	Yes	14.41	5773	
Receiving household area characteristics				
Province	Western/Northern Cape	10.02	1258	***
	Eastern Cape	18.69	3018	
	Kwazulu Natal	11.25	3759	
	Orange Free State	19.18	1069	
	Mpumalanga	8.52	1432	
	Northern Province	7.39	2450	
	North West	10.63	1242	
	Gauteng	8.12	1946	
Residence	Rural	12.64	10097	***
	Urban	12.66	3002	
	Metropolitan	8.29	3075	

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4.2 shows that there were very similar proportions of boys and girls fostered and the chi-squared significance level indicates no significant association between the child's sex and whether they were fostered in or not. As mentioned in the previous chapter, cross-tabulations between age and sex were tested but were also insignificant. In contrast, the chi-squared statistic indicates a highly significant association at the 1% level with all other factors, except the type of dwelling which was only significant at the 10% level.

With regards to the household compositional characteristics, Table 4.2 shows that households of African race had the highest proportion of children fostered in, followed by households of Coloured race and Indian race, with households of White race having the lowest proportion, in particular. There were higher proportions of children fostered into female headed households and households where the head was aged 50 years or over. There was also a higher proportion of foster children residing in households where the head had not completed primary education and lower proportions where the head had completed primary education. In addition, a negative relationship existed between the proportion of children fostered into a household and the number of non-fostered children in the household.

The household's SES also seemed to influence whether a child was fostered in or not. There was a slightly lower proportion of children fostered into 'shacks' compared to other types of dwelling. A nearly negative relationship existed between monthly expenditure and fostering, with the proportion of children fostered into a household decreasing with increasing expenditure. In addition as you might expect, a higher proportion of children were fostered into households that receive some kind of remittances from someone in another household.

Area characteristics of the household also seemed to influence fostering. The highest proportion of fostered children were residing in the Eastern Cape and Orange Free State and the lowest proportion in the Northern Province, Mpumalanga and Gauteng. The other provinces seem to have approximately similar proportions of foster children. Another significant association with geographical variation is that there were roughly the same proportion of fostered children in urban and rural areas but a lower proportion in metropolitan areas. A cross-tabulation showed that there was a significant association between age and residence with the adjusted standardised residuals indicating less younger

fosters in urban areas than expected and more older fosters in metropolitan areas than expected. However, no such significant association existed between sex and residence. This potential interaction as well as the child background characteristics, household composition characteristics, household SES indicators and areas characteristics were then investigated further in the multivariate analyses.

4.3 Factors associated with fostering in – logistic regression results

The correlates of fostering were modelled separately for two age groups of children; 0-5 years and 6-15 years. These age groups were modelled separately because previous literature suggests that the determinants of fostering vary by the age of the child and because in subsequent chapters the health outcomes are available for only the younger group of children and the educational outcomes for the older children. This was discussed in more detail in the preceding chapter. The variables were firstly added into the model in 'blocks'. Model A included only the background characteristics of the child. Model B incorporated household composition characteristics. Model C additionally adjusted for SES indicators of the household, and finally, Model D also controlled for area characteristics of the household. The justification for the variables chosen was based on theory from previous literature discussed in Chapter 2, and the variables available in the data set, as discussed in Chapter 3.

4.3.1 Factors associated with fostering in 0-5 year old children

Table 4.3 shows the odds ratios for being fostered versus not being fostered for 0-5 year olds for the four models, by 'block'. The pseudo R squared and the number of observations are also provided. Consistent with the bivariate analysis, the first model which included only the child background characteristics, found the sex of the child to be insignificant but age of the child to be significant. The odds of being fostered increased significantly by the age of the child. A curvilinear relationship also existed as age squared was also highly significant. These patterns remained in the subsequent models when household composition and SES indicators and area characteristics were added.

Table 4.3 Odds ratios for being fostered for 0-5 year olds, South Africa, 1993

Parameter		Model A	Model B	Model C	Model D
Child background characteristics					
Sex	Male (RC)	1.00	1.00	1.00	1.00
	Female	0.95	0.95	0.95	0.98
Current age		2.12***	2.08***	2.04***	2.17***
Current age squared		0.91***	0.92***	0.92***	0.92***
Receiving household composition characteristics					
Race	African (RC)		1.00	1.00	1.00
	Coloured		0.71	0.81	0.86
	Indian		0.28**	0.40	0.44
Head's sex	Male (RC)		1.00	1.00	1.00
	Female		1.44***	1.35***	1.38***
Head's age	≤49 years (RC)		1.00	1.00	1.00
	≥50 years		4.00***	3.92***	3.82***
Head's education	Not completed primary education (RC)		1.00	1.00	1.00
	Completed primary education		0.77**	0.87	0.80
Number of non-fostered children	0-2 (RC)		1.00	1.00	1.00
	3-5		0.15***	0.14***	0.14***
	≥6		0.11***	0.10***	0.11***
Receiving household SES indicators					
Type of dwelling	Shack (RC)			1.00	1.00
	Other			1.10	1.11
Equivalised monthly expenditure	≤25th percentile (RC)			1.00	1.00
	> 25th percentile - ≤50th percentile			0.71**	0.85
	> 50th percentile - ≤75th percentile			0.99	1.31
	> 75th percentile			0.54***	0.76
Receive remittances	No (RC)			1.00	1.00
	Yes			1.54***	1.55***
Receiving household area characteristics					
Province	Western/Northern Cape				1.03
	Eastern Cape				1.89***
	Kwazulu Natal (RC)				1.00
	Orange Free State				1.40
	Mpumalanga				0.87
	Northern Province				0.56**
	North West				0.77
	Gauteng				1.18
Residence	Rural (RC)				
	Urban				0.84
	Metropolitan				1.37
Residence*age interaction	Rural *age (RC)				1.00
	Urban*age				1.05
	Metropolitan*age				0.83*
Observations					5239
Pseudo R squared		0.03	0.20	0.21	0.23

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category;
Model A adjusts for child characteristics; Model B additionally adjusts for household composition characteristics; Model C additionally adjusts for household SES indicators; Model D additionally adjusts for area characteristics; Note: Children in White households excluded as perfectly predicted failure

Indian race was significant in the second model incorporating household composition characteristics, reducing the odds of a child being fostered into an Indian household compared to an African household. However, this became insignificant in Model C when household SES indicators were additionally controlled for, suggesting that these socio-economic factors accounted for this pattern. Children in female headed households and households headed by someone aged 50 years or over had significantly increased odds of being fostered in compared to children in households headed by men and heads 49 years or younger, respectively. These patterns remained in the subsequent models when household SES indicators and area characteristics were controlled for. Children in households where the head had completed primary education had significantly reduced odds of being fostered compared to children in households headed by heads who had not completed primary education. This was no longer significant in the subsequent models, suggesting that the household SES indicators accounted for this pattern. However, a pattern that existed in the subsequent models was that children had significantly reduced odds of being fostered into households as the number of non-fostered children in the household increased, that is, a negative relationship.

In Model C, when household SES indicators were additionally adjusted for, children in households with a monthly expenditure of between the 25th and 50th percentile and over the 75th percentile had significantly reduced odds of being fostered compared to children residing in households with monthly expenditures of less than or equal to the 25th percentile. However, this pattern did not exist in Model D when the area characteristics were controlled for suggesting that the area characteristics accounted for this pattern. In contrast, children in households that received remittances from someone else in another household had significantly increased odds of being fostered compared to those children residing in households that did not receive such remittances. This pattern existed in Model D when the area characteristics were incorporated.

When area characteristics of the household were controlled for in Model D, children residing in households in the Eastern Cape had significantly *increased* odds of being fostered compared to children residing in Kwazulu Natal. In contrast, children residing in the Northern Province had significantly *reduced* odds of being fostered compared to children in Kwazulu Natal. The residence-age interaction was significant at the 10% level in this fourth model. The pseudo R squared increased substantially when the household

compositional characteristics were added in Model B indicating their particular importance, which is further supported by the significance of most of these variables.

Table 4.4 presents the odds ratios for the final parsimonious model for 0-5 year olds. Only the variables that explained most of the variance were selected for the parsimonious model, that is, those that contributed at least 1% to the pseudo R squared, as discussed in the data and methods chapter.

Table 4.4 Odds ratios for being fostered for 0-5 year old children, South Africa, 1993 – parsimonious model

Parameter		Odds ratio
Child background characteristics		
Current age		1.35***
Receiving household composition characteristics		
Head's sex	Male (RC)	1.00
	Female	1.41***
Head's age	≤49 years (RC)	1.00
	≥50 years	4.58***
Number of non-fostered children	0-2 (RC)	1.00
	3-5	0.15***
	≥6	0.11***
Receiving household SES indicators		
Equivalised monthly expenditure	≤25th percentile (RC)	1.00
	> 25th percentile - ≤50th percentile	0.81
	> 50th percentile - ≤75th percentile	1.17
	> 75th percentile	0.45***
Receiving household area characteristics		
Province	Western/Northern Cape	0.81
	Eastern Cape	1.73***
	Kwazulu Natal (RC)	1.00
	Orange Free State	1.38
	Mpumalanga	0.87
	Northern Province	0.58**
	North West	0.74
	Gauteng	0.85
Observations		5679
Pseudo R squared		0.22

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

Table 4.4 shows that child background characteristics, household composition characteristics, household SES indicators and area characteristics were all of influence to fostering, but household composition characteristics were, in particular. With regards to child background characteristics, only age was found of paramount importance. The age squared term did not explain enough of the variance in the data to be selected in the parsimonious model. An increase in the child's age of one year increased the odds of a child being fostered by 35%. Moving to the household compositional characteristics,

children residing in female headed households were 41% more likely to be fostered than children residing in male headed households. Similar to this, children residing in households whose head was 50 years old or over were four-and-a-half times more likely to be fostered than children in households whose head was younger than 50 years. A negative relationship existed with the number of non-fostered children residing in the household. The odds of being fostered in decreased as the number of non-fostered children in the household increased. For example, children in households with 3-5 non-fostered children were 85% less likely to be fostered and children in households with six or more non-fostered children were 89% less likely to be fostered compared to children in households with only 0-2 non-fostered children. The household's SES was also important. Children living in households with a monthly expenditure of over the 75th percentile were 55% less likely to be fostered compared to children living in households with a monthly expenditure of less than or equal to the 25th percentile. Finally with regards to area characteristics, the province of residence was important. Children living in the Eastern Cape were 73% more likely and children living in the Northern Province were 42% less likely to be fostered compared to children living in Kwazulu Natal.

4.3.2 Factors associated with fostering in 6-15 year old children

The same methodology was used for the older age group of children aged 6-15 years. Similar to the 0-5 year old model, the variables were first added by 'block' with child background characteristics being added first, followed by household composition characteristics and household SES indicators and finally area characteristics. Table 4.5 shows the odds ratios for being fostered versus not being fostered for 6-15 year olds.

Model A controlled for the child background characteristics, being the sex and age of the child and an age squared term. None of these variables were significant and this remained the case in the subsequent models when household composition, household SES indicators and area characteristics were controlled for. Household composition characteristics were additionally adjusted for in Model B. The race of the household was highly significant. Children residing in households of Coloured, Indian and White race were significantly less likely to be fostered compared to children residing in African households. This pattern remained in the subsequent models, except that Coloured race lost its significance in Model C when household SES indicators were controlled for but became significant again in Model D when the area characteristics were controlled for.

Table 4.5 Odds ratios for being fostered for 6-15 year olds, South Africa, 1993

Parameter		Model A	Model B	Model C	Model D
Child background characteristics					
Sex	Male (RC)	1.00	1.00	1.00	1.00
	Female	0.96	1.02	1.01	1.02
Current age		0.97	1.04	1.05	1.08
Current age squared		1.00	1.00	1.00	1.00
Receiving household composition characteristics					
Race	African (RC)		1.00	1.00	1.00
	Coloured		0.72**	0.87	0.58***
	Indian		0.35***	0.49**	0.47**
	White		0.04***	0.06***	0.06***
Head's sex	Male (RC)		1.00	1.00	1.00
	Female		1.59***	1.54***	1.56***
Head's age	≤49 years (RC)		1.00	1.00	1.00
	≥50 years		4.42***	4.22***	4.16***
Head's education	Not completed primary education (RC)		1.00	1.00	1.00
	Completed primary education		0.88*	1.05	1.04
Number of non-fostered children	0-2 (RC)		1.00	1.00	1.00
	3-5		0.12***	0.11***	0.11***
	≥6		0.05***	0.05***	0.05***
Receiving household SES indicators					
Type of dwelling	Shack (RC)			1.00	1.00
	Other			1.32**	1.48***
Equivalised monthly expenditure	≤25th percentile (RC)			1.00	1.00
	> 25th percentile - ≤50th percentile			0.77***	0.83**
	> 50th percentile - ≤75th percentile			0.70***	0.78**
	> 75th percentile			0.47***	0.55***
Receive remittances	No (RC)			1.00	1.00
	Yes			1.34***	1.34***
Receiving household area characteristics					
Province	Western/Northern Cape				1.64**
	Eastern Cape				1.10
	Kwazulu Natal (RC)				1.00
	Orange Free State				1.30*
	Mpumalanga				0.58***
	Northern Province				0.55***
	North West				0.68**
	Gauteng				1.09
Residence	Rural (RC)				1.00
	Urban				1.84*
	Metropolitan				0.75
Residence*age	Rural*age(RC)				1.00
	Urban*age				0.94**
	Metropolitan*age				1.00
Observations					9803
Pseudo R squared		0.00	0.27	0.28	0.29

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category;
Model A adjusts for child characteristics; Model B additionally adjusts for household composition characteristics; Model C additionally adjusts for household SES indicators; Model D additionally adjusts for area characteristics

Similar to the 0-5 year old model, children residing in female headed households and households headed by older heads aged 50 years or over had significantly increased odds of being fostered compared to children residing in male headed households and households headed by younger heads aged under 50 years, respectively. These patterns remained in subsequent models. Children residing in households where the head had completed primary education had significantly reduced odds of being fostered compared to children residing in households with heads who had not completed primary education. However, this term lost its significance in the subsequent models when household SES indicators and area characteristics were added suggesting that the SES indicators accounted for the pattern. Similar to the 0-5 year old model, a significant negative relationship existed between the number of non-fostered children in the household and whether a child was fostered. This pattern remained in the subsequent models when SES indicators and area characteristics were controlled for.

Model C incorporated a 'block' of variables as indicators of the household's SES. Children residing in dwellings other than 'shacks' had significantly increased odds of being fostered compared to children living in 'shacks' and this pattern remained in Model D when area characteristics were controlled for. Children living in households whose monthly expenditure was above the 25th percentile had significantly reduced odds of being fostered compared to children in households whose monthly expenditure was less than or equal to the 25th percentile. These patterns remained when area characteristics were added. Children living in households that received remittances from someone outside the household had significantly increased odds of being fostered compared to those living in households that did not receive such remittances and the pattern remained.

Area characteristics were added in Model D. Children residing in the Western or Northern Capes and the Orange Free State had significantly increased odds of being fostered compared to children residing in Kwazulu Natal. In contrast, children residing in Mpumalanga, the Northern Province and the North West Province had significantly reduced odds of being fostered compared to children in Kwazulu Natal. In addition, children living in urban residences had increased odds of being fostered compared to children in rural areas and the interaction between residence and age was also significant. Again, the pseudo R squared increased substantially when the household compositional factors were introduced. Table 4.6 shows the final parsimonious model for the odds of

being fostered versus not being fostered for 6-15 year olds, being selected by the methods described earlier and in the previous chapter.

Table 4.6 Odds ratios for being fostered for 6-15 year old children, South Africa, 1993 – parsimonious model

Parameter		Odds ratio
Receiving household composition characteristics		
Race	African (RC)	1.00
	Coloured	0.68***
	Indian	0.34***
	White	0.04***
Head's sex	Male (RC)	1.00
	Female	1.61***
Head's age	≤49 years (RC)	1.00
	≥50 years	4.58***
Number of non-fostered children	0-2 (RC)	1.00
	3-5	0.12***
	≥6	0.05***
Observations		9960
Pseudo R squared		0.27

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

Table 4.6 indicates that only household composition characteristics were really paramount in determining fostering for older children aged 6-15 years. The race of the household was found to be highly significantly associated with whether a child was fostered or not. Children in households of Coloured race were 32% less likely to be fostered compared to children in African households. Similarly, children in Indian households were 66% less likely to be fostered compared to children in African households and children in households of White race were even less likely to be fostered, being 96% less likely to be fostered compared to children in African households. Therefore, children in African households had the highest odds of being fostered.

Characteristics of the head of the household were also found important. Children residing in female headed households were 61% more likely to be fostered compared to children in male headed households. Similar to the 0-5 year old model, children in households headed by someone aged 50 years or over were four-and-a-half times more likely to be fostered than children in households headed by someone under age 50 years. In addition, there was a negative relationship between the odds of being fostered and the number of non-fostered children in the household. Children in households with 3-5 non-fostered children were 88% less likely and children in households with six or more non-fostered children were

95% less likely to be fostered compared to children in households with 0-2 non-fostered children. These results will now be discussed in relation to findings from previous studies.

4.4 Discussion and policy implications

The levels and patterns of residence and the influence of child, household composition, SES and area characteristics will now be drawn together for 0-5 year old and 6-15 year old children as well as the associated policy implications. Although the varying context of South Africa is realised, comparisons are made with other studies on fostering in Africa in the absence of South African research or research in a similar context.

4.4.1 Levels and patterns of residence status

The analyses in this chapter have found that only about half of children live with both their parents, with paternal absence more common than maternal absence, as one would expect with the dominance of male labour migration in the context of South Africa (Department of Health et al., 1998). In addition, there was a higher proportion of paternal orphans as one would expect because of women's relatively longer life expectancy (US Bureau of the Census, 2004) and the age differential between partners. However, a low proportion of double orphans was found which is probably because the data were collected in 1993. The proportion is likely to be a lot higher now as a consequence of HIV/AIDS. In fact, the proportion of orphans was twenty times higher by 2001 at 10%, nearly half due to AIDS (UNICEF, 2003). Although no information is available for the reason why the child was residing without their mother or father present, this finding does suggest a low proportion of children fostered for crisis reasons such as the death of both parents. However, it is noted that there could be other crisis motivations but these are impossible to uncover with the data.

Approximately 12% of children were fostered, which although is less than that found in West Africa, is likely to have risen even more in light of HIV/AIDS. As noted in Chapter 2, it is not appropriate to compare the proportion of children fostered with those found in other studies because of the definitional incomparability. A further 11% of children were identified as foster siblings and so were likely to be influenced by children being fostered into their household. Also, some of the other children not living with any foster children are likely to be influenced by fostering as some are likely to be siblings left behind in the

natal household. As mentioned earlier, the outcomes for these three groups of children are investigated in the subsequent chapters.

The majority of fosters were found to be related to the head of the household into which they were fostered, illustrating the high prevalence of kinship fostering as acknowledged in previous literature. In addition, a large proportion of foster children were the grandchildren of the household head, which is also well documented in the literature in other African countries as 'granny fostering' (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe, 1990a, 1990b; Bledsoe and Brandon, 1992). In the South African context, grandmother households also exist as a result of apartheid and the consequent labour migration of parents (Burgard, 2002). Perhaps such 'grannies' should be targeted by policies aimed at children rather than only their mothers. However, this poses challenges for policy makers as these 'grannies' could be less receptive as they tend to be older, poorer, less educated and live in rural areas (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe and Brandon, 1992). The implications for children being cared for by such a disadvantaged sub-group should also be considered. However, it should be noted that just because children are fostered into a household headed by a grandparent, it does not mean that these children are fostered to them, that is, they could be fostered to *other* people in the household.

Furthermore, the percentage distribution of the relationship to the household head altered with the age of the child, with a higher proportion of younger fosters living with grandparents and a higher proportion of older children living with other members of the family and non-family. This was expected as it has been documented in the literature that children live with 'grannies' until the 'age of sense' when they are then sent to relatives or non-kin members who are in a better position to provide education or training (Goody, 1975; Isiugo-Abanihe, 1985). In addition, Isaac and Conrad (1982) in their study of the Mende in Sierra Leone found that young fosters went to maternal kin primarily because of birthing behaviours but that this co-residence decreased with the age of the child. Perhaps young children may be most at risk as a higher proportion are living with these perhaps disadvantaged 'grannies' (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe and Brandon, 1992) and should therefore be monitored and targeted. The implications for foster children are discussed in the subsequent chapters.

Although the differences by sex of the child were not as marked, more girls were fostered to siblings and uncles/aunts, possibly to provide childcare for their children, and more boys were sent to non-kin, probably to be provided with an education. However, a counterintuitive finding was that there was also a slightly higher proportion of *boys* fostered to their grandparents. In fact, Goody (1975) found in Ghana that *girls* were more likely to live with someone in the generation of their grandparents as well as members of non-kin, this pattern was also not reflected in this analysis. As the findings differ from the literature found in other parts of Africa, some greater reflection of the South African study setting is needed here. Perhaps as a result of apartheid and labour migration, boys got left behind with 'grannies' whilst girls were sent to provide domestic chores for their aunts/uncles or look after their cousins whilst their parents were working. However, the differences by sex were not large.

The analysis controlled for child background characteristics, household composition and SES indicators and area characteristics for the two age groups of children. These 'blocks' of variables were all found important for the 0-5 year olds but only the household composition characteristics for the 6-15 year olds were selected in the parsimonious model. Each of these groups of factors is now discussed in turn.

4.4.2 The influence of child background characteristics

The preliminary findings were supported by the logistic regression results as the sex of the child was not included in the parsimonious models, and although fostering was modelled separately for the two age groups, the model for 0-5 year olds suggested that the age of the child was additionally important to whether they were fostered, being selected in the parsimonious model with a positive relationship shown. These findings have also been duplicated in previous studies. Shell-Duncan (1994) found no association between fostering and the sex of the child among the Turkana of North West Kenya, and nor did Urassa et al. (1997) in their study of rural Tanzania. Also, Schröder (1995) found no differences by sex in any of the sub-Saharan African countries she investigated, except for Ghana.

The increase in fostering by age would be expected for several reasons. It is unlikely that very young infants would be fostered out as there are stronger emotional ties with these children (Fiawoo, 1978). Isaac and Conrad (1982) report that young infants are not

separated from their mothers unless by death in Sierra Leone, and Goody (1975) reports that among the Gonja of Ghana, children are not fostered until much later at the 'age of sense', age 6-7 years. Akresh (2003) also found a small proportion of fostering among those under 5 years but a sharp increase at age 6 years. Although the author did not find any evidence of educational fostering, a further potential explanation for the increase in fostering by age is that children of an older age are fostered for schooling (Goody, 1975; Fiawoo, 1978; Goody, 1982, 1984; Isiugo-Abanihe, 1985; Bledsoe and Isiugo-Abanihe, 1989; Maharaj et al., 2000; Zimmerman, 2003). For example, Eloundou-Enyegue and Stokes (2002) found that children of secondary school age were more likely to be fostered than children of primary school age because of lack of access to secondary schools in rural Cameroon. However, the reasons for fostering could not be investigated here.

Moving to the host household's perspective; young children place more of a time and financial drain as they have to be supported but do not make an economic contribution until they are older (Serra, 1997). Although Isaac and Conrad (1982) reported that there were twice as many girls fostered at young ages before the sex ratio balanced out, no significant association between age and sex of the fosters was found here. Perhaps in the context of South African with the strong apartheid history of labour migration, children of both sexes are fostered out at each age. Child background characteristics were not found very important in the model for 6-15 year olds, with no such variables being significant.

4.4.3 The influence of household composition characteristics

With respect to the household composition factors, the fostering practice was found most common amongst the African race in the preliminary analysis. The model for 6-15 year olds also found the race of the household to be highly significant and was included in the parsimonious model. Children residing in households of African race were most likely to be fostered and children in White households were least likely to be fostered. This was expected as fostering is an African tradition where non-maternal care is a daily reality and the maternal-child dyad is not the norm (Borgerhoff Mulder, 1985; Castle, 1995), being stated as a *"feature of black family life"* (Madhavan, 2004 p1443). Furthermore, in the context of South Africa with the strong racial inequalities as a consequence of apartheid, such African households are likely to be poorer, forced to work and foster their children. Differences by ethnicity have also been found in previous literature in other African contexts (Isiugo-Abanihe, 1985; Frank, 1987; Page, 1989; Schröder, 1995; Eloundou-

Enyegue and Stokes, 2002) but race was preferred in the case of South Africa and is related to ethnicity, as discussed in the preceding chapter. Race was not found very important for 0-5 year olds which may be a result of the differential motives for fostering by age, with education motives dominating at the older ages. There may have been access issues for schools by race immediately before the end of the apartheid government. For example, older African children may be fostered to attend school of a better quality which was restricted because of apartheid (Case and Deaton, 1998). Furthermore, they may be fostered to more peaceful schools as a result of boycotts and violence (Maharaj et al., 2000). However, it is not possible to draw any conclusions about fostering motivations with the data available.

The sex and the age of the household head were important in the preliminary analyses and in both models with children living in households headed by females and with older heads being more likely to be fostered. This sex differential has also been found in previous literature (Lloyd and Gage-Brandon, 1993). This may be an indication of women having more of the child-rearing role and an influence over the fostering decision-making. Also, as a consequence of male labour migration, female headed households may need more labour in the absence of a male. Indeed, Maharaj et al. (2000) suggest that in the context of South Africa female headed households exist in the former homelands because of male labour migration but that such households are reliant on remittances being sent back from the absent males. As a consequence, female headed households may need other help in the form of foster children. However, the finding also supports the 'granny fostering' hypothesis (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe, 1990a, 1990b; Bledsoe and Brandon, 1992) as such 'grannies' are likely to have a higher dependency ratio being female headed (Urassa et al., 1997).

The difference by age has also been observed previously (Lloyd and Gage-Brandon, 1993; Nathan, 2001). This is further evidence for 'granny fostering' found elsewhere in Africa (Bledsoe and Isiugo-Abanihe, 1989; Bledsoe, 1990a, 1990b; Bledsoe and Brandon, 1992). 'Granny' households have also been reported in South Africa as a result of labour migration of parents (Burgard, 2002) and have important policy implications. As grandmothers appear to play a strong role in child care then they should be targeted by interventions aimed at children. Aubel et al. (2003) also write of the need to involve grandmothers in mother and child health projects in Senegal because of the prominent role

they play in the family. However as previously mentioned, it must be noted that just because the foster child is in their grandparent's household, it does not mean that they are fostered to 'granny'. Households whose head's had completed primary education had a lower proportion of fostered children in the preliminary analysis possibly reflecting grandparent fostering with such foster parents having lower education attainment but no such associations were significant after controlling for indicators of SES in the multivariate analyses.

The preliminary analysis, along with both models found a significant negative relationship between fostering and the number of non-fostered children residing in the household. This was as expected and is further evidence for the high fertility hypothesis which is well documented in the literature suggesting that fostering allows the redistribution of children from high to low fertility members (Isiugo-Abanihe, 1985, 1986; Caldwell and Caldwell, 1987; Bledsoe, 1990a; Bledsoe and Brandon, 1992; Desai, 1992; Lloyd and Desai, 1992; National Research Council, 1993; Renne, 1993; Isiugo-Abanihe, 1994). As there appears to be a link between fostering and fertility and possibly *"demand for children"* (Ainsworth, 1992 p1), fosterage may have an impact on fertility decisions and family planning demand (Isiugo-Abanihe, 1985). Therefore, studies of contraceptive use and family planning need to consider the influence of fostering in contexts where fostering is common. However as the data do not allow matching back to the natal household, it is not possible to conclude whether children are fostered out from higher fertility households into lower fertility households.

Therefore, household composition characteristics were found to be perhaps the most influential of the 'blocks' added in the multivariate analyses, increasing the proportion of variation explained substantially and with most variables being selected in the parsimonious models. In fact, only household composition characteristics were selected in the model for 6-15 year olds. The household's SES indicators were also important in the model for 0-5 year olds and are discussed in the next section.

4.4.4 The influence of household SES indicators

The preliminary analyses showed that the SES indicators were all significantly associated with fostering, if only at the 10% level in the case of dwelling type. There was a lower proportion of fosters living in 'shacks' compared to other types of dwelling. This may be

because these households are poorer and less able to accommodate a foster child in their dwelling. There was also a negative relationship seen between equivalised monthly expenditure and the proportion of children fostered. In contrast to dwelling type, this could indicate that fostering is more common among poor households. These two contrasting findings could illustrate separate issues, that is, the ability to *accommodate* a foster child and *maintenance* issues. However, the preliminary bivariate analysis did not *control* for all the *other factors*. Finally, the preliminary analysis showed that foster children were more likely to live in households that were receiving remittances. These remittances could be from the child's parents and a household may be more likely to foster in if they are receiving some kind of remittances, either income or value-in-kind, in return for supporting the child (Ainsworth, 1992). However, who the remittances were received from was not a focus of this study. These associations with the economic factors suggest the importance of economic motivations as described previously in the literature by Ainsworth (1992) who found more economic motivations on this fostering-*in* side of the fostering transaction.

However although the household indicators of SES were significant in the preliminary analysis, only monthly expenditure was selected in the parsimonious model and only in the younger model for 0-5 year olds. One reason why monthly expenditure was selected in the younger model may be that foster households may need to spend more on feeding younger children than older children, net of child care costs, as older children may overcome their maintenance costs and be better able to support themselves and make an economic contribution by either being employed or contributing to the household (Serra, 1997). Children living in households with a monthly expenditure of over the 75th percentile were 55% less likely to be fostered compared to children living in households with monthly expenditures less than or equal to the 25th percentile. Controlling for other factors, this confirms the finding from the preliminary analyses that wealthier households are less likely to foster in a child so may be fostering is a tradition amongst the poor. This is contradictory of previous studies that suggest fostering to households of better SES in other African contexts (Silk, 1987; Bledsoe, 1990b; Bledsoe and Brandon, 1992; Serra, 2000; Eloundou-Enyegue and Stokes, 2002; Akresh, 2003). However, data were not available on the SES circumstances of the household of origin to investigate this. Nevertheless, the finding could be explained by the lower SES of 'granny' caretakers which has been documented in previous literature (Bledsoe and Isiugo-Abanihe, 1989;

Bledsoe and Brandon, 1992) and the lower SES of Africans for whom fostering is common.

4.4.5 The influence of area characteristics

The preliminary analysis found strong provincial differences in fostering by region and that metropolitan households had lower proportions of fosters. The lower proportion of fostered children in metropolitan areas could be because more young children are sent to rural areas to 'grannies' and older children to urban areas for education and training (Bledsoe, 1990a; Bledsoe and Brandon, 1992). In the context of South Africa, it could be because Whites tend to reside in the large cities (Burgard, 2002) such as Johannesburg and Cape Town whereas fostering tends to be amongst Africans. Alternatively, the pattern could reflect that perhaps households living in townships cannot physically accommodate foster children. Although there was a significant association between age and residence, no such association was found between sex and residence. This is contrary to what Isiugo-Abanihe (1985) found in Ghana with more girls being fostered *out* of urban areas but perhaps sex differentials by residence do not exist in the South African context where children of both sexes are equally likely to be fostered by residence because of strong labour migration.. Although province was significant in both models, it was only selected in the parsimonious model for 0-5 year olds, and in neither parsimonious model was residence selected, contradicting the preliminary analyses. The model for 0-5 year olds found the odds of a child being fostered lowest in the Northern Province, the poorest province (Donaldson, 2002), and highest in the Eastern Cape. Fostering tends to be highest in the former homeland provinces of the Eastern Cape, Orange Free State and Kwazulu Natal which are dominated by the African population which could explain this finding with fostering being an African tradition.

4.5 Summary

This chapter has established the levels, patterns and correlates of fostering in South Africa. In summary, these analyses have found a significant proportion of fostering and that fostering is associated with a number of factors that vary by the age of the child. For example, household composition characteristics were found particularly important, especially for older children. Evidence for the theories of kinship and 'granny fostering' has been found as well as the high fertility hypothesis and an economic influence. The

factors discussed are suggested to be *associated* with fostering in and are not inferred to be *causal* in any way, being merely suggested to be possible correlates that suggest that fostering is not a random process. Indeed this is the reason why the variables are described as *correlates* of fostering as opposed to *determinants*. This thesis now goes on to investigate child outcomes, before finally controlling for these possible correlates of fostering when further investigating the health and educational outcomes for the children involved.

CHAPTER FIVE

Health implications of fostering

5.0 Introduction

This chapter examines the health outcomes of the children involved in fostering, where the Western family model does not apply, being the second objective of this thesis. It compares the outcomes for foster children, children residing in households which have fostered in a child, that is, foster siblings, and children living in households without any foster children, that is, non-fostered children without any foster siblings. However, all three of these groups of children could be potentially influenced by fostering, if only indirectly. Obviously, the health of the fostered children themselves could be influenced. Children residing with these foster children could also be influenced, with *possibly* more children in the household to feed and provide health care for. Finally, children could be fostered out of a household and so their biological siblings left behind in the natal household could benefit from less sibling competition for resources. However unfortunately, it is not possible to identify the latter group with these data.

The health outcomes investigated are whether the child was ill in the two weeks before the survey, whether they had received a vaccination against measles as a proxy for access to health care, and three anthropometric measures of nutritional status. The chapter further investigates the findings of previous studies, which although contradictory, infer that being fostered could be detrimental to the child's health, particularly young children, as discussed in Chapter 2. As a result, and because most of the data are available for 0-5 year olds, only younger children of this age are considered.

Section 5.1 presents factors associated with being ill before going on to examine whether conditional on illness, someone was consulted when the child was ill, who that person was, or the reason if no one was consulted. Sections 5.2 and 5.3 investigate factors associated with immunisation and nutritional status, respectively. The findings and policy implications are discussed in section 5.4 in relation to the previous literature and section 5.5 finally summarises.

5.1 Factors associated with illness

This section examines the prevalence of illness by investigating whether the child was ill in the preceding two weeks to the survey. The survey asks if any member of the household had been ill in the past two weeks, including people with some form of permanent injury, disability or ailment (World Bank, 1993). This information was collected for all household members and is therefore available for all children aged 0-15 years. However, as discussed in Chapter 3, illness was only investigated for children up to the age of 5 years for consistency with the other health indicators. However, it must be noted that this illness was self-reported and was likely to be reported by a parent in the case of children, and someone else in the case of foster children. In addition, although the nature of illness was given, this was only likely to be a *perception* of illness and the *severity* of the condition was not diagnosed. Therefore, the data are subject to self-reporting bias as well as interviewer bias if there was a difference in the level of probing etc. However, about 8.5% of children aged 0-5 years were reported to have been ill in the two weeks prior to the survey.

5.1.1 Factors associated with illness – bivariate analysis

Table 5.1 presents the percentage distribution of illness by child background characteristics, with the number of children and the chi-squared significance level. It shows that all the factors had significant associations with whether the child was sick except the child's sex, current nutritional status (measured by WHZ) and dwelling type.

The reporting of illness decreased with the age of the child. A counter-intuitive finding was that children who were not currently being breastfed had a lower reporting of illness compared to those who were currently breastfeeding. However, younger children were more likely to have been breastfeeding and it seems that younger children had a higher reporting of illness which may account for this and will be controlled for in the multivariate analyses. The number of times the child was fed each day was also significantly associated with whether the child was reported sick. Another counter-intuitive finding was that children who were fed three times or less had a lower reporting of illness and children whose information on this was not known had the highest. Again, this group of children are likely to be older and so age will be controlled for in the multivariate analyses.

Table 5.1 Percentage of children aged 0-5 years who were ill in the preceding two weeks by background characteristics, South Africa, 1993

		Percent ill	Observations	Chi-squared significance level
Child background characteristics				
Sex	Male	8.19	2992	
	Female	8.83	2878	
Current age	0-1 years	11.50	2044	***
	2-3 years	7.22	2077	
	4-5 years	6.52	1749	
Currently being breastfed	No	7.75	4271	***
	Yes	10.89	1267	
Number of times fed each day	≤3	7.57	3000	**
	> 3	9.20	2412	
	Not known	10.92	458	
Measles vaccination status	No	7.11	225	***
	Yes	8.15	2613	
	< 1 year old	13.06	142	
	Not known	6.58	1945	
WHZ	Normal	8.39	3409	
	Mild	8.04	634	
	Moderate	4.94	263	
	Severe	8.54	164	
Receiving household composition characteristics				
Race	African	7.72	4946	***
	Coloured	8.39	429	
	Indian	21.49	121	
	White	14.71	374	
Head's sex	Male	9.29	4218	***
	Female	6.49	1633	
Head's age	≤49 years	10.67	3279	***
	≥50 years	5.57	2404	
Head's education	Not completed primary education	6.58	3284	***
	Completed primary education	11.01	2488	
Number of children	1-3	10.47	2922	***
	4-6	7.59	2239	
	≥7	3.24	709	
Receiving household SES indicators				
Type of dwelling	Shack	9.34	589	
	Other	8.42	5273	
Water supply	Not piped	7.35	2245	**
	Piped	9.22	3623	
Equivalised food expenditure	≤25th percentile	5.22	1493	***
	> 25th percentile – ≤50th percentile	7.99	1489	
	> 50th percentile – ≤75th percentile	7.98	1517	
	> 75th percentile	13.24	1367	
Equivalised health expenditure	≤25th percentile	4.36	1948	***
	> 25th percentile – ≤50th percentile	7.76	928	
	> 50th percentile – ≤75th percentile	8.48	1522	
	> 75th percentile	14.47	1472	

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.1 continued...

		Percent ill	Observations	Chi-squared significance level
Receiving household area characteristics				
Province	Western/Northern Cape	8.24	461	***
	Eastern Cape	7.51	1092	
	Kwazulu Natal	9.75	1282	
	Orange Free State	6.01	366	
	Mpumalanga	12.15	535	
	Northern Province	6.37	911	
	North West	5.49	455	
	Gauteng	10.94	768	
Residence	Rural	7.37	3650	***
	Urban	9.81	1070	
	Metropolitan	10.87	1150	

* significant at 10%; ** significant at 5%; *** significant at 1%

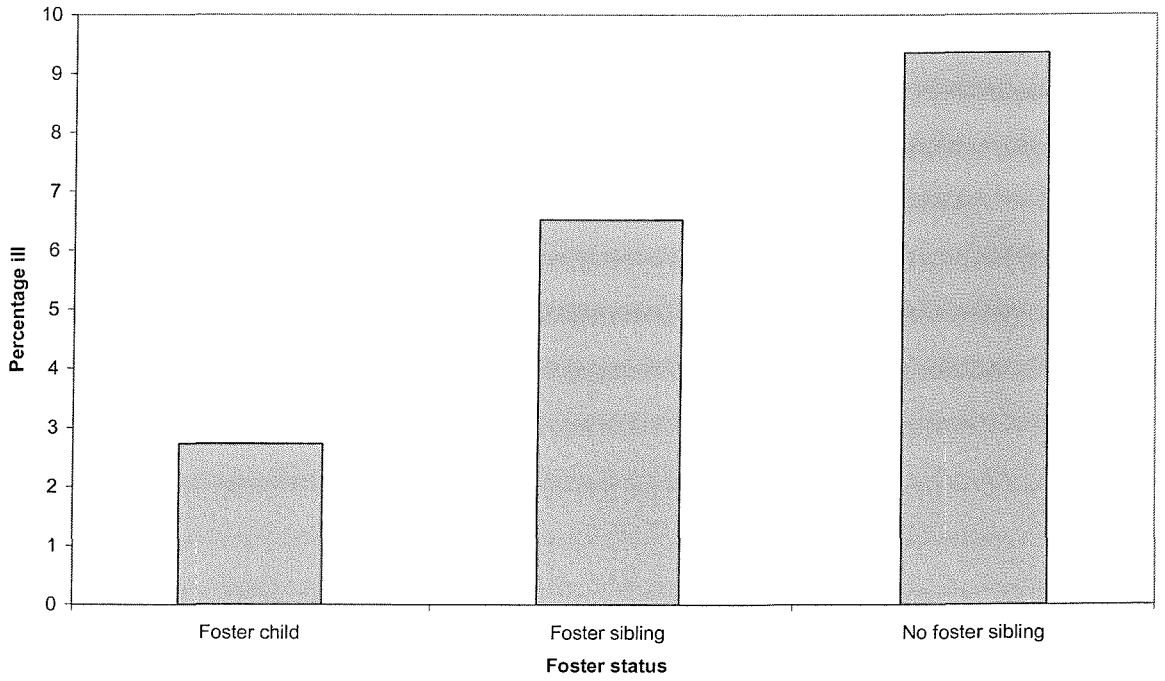
Vaccination status, a proxy for access to healthcare, was also highly significantly associated with whether the child was ill. Children who had not been vaccinated against measles had the lowest proportion reported and those who were under a year old, that is, not yet old enough to receive such a vaccination, had the highest reporting of illness, perhaps also related to age which will be controlled for in the multivariate analyses.

As well as child background characteristics being associated with whether a child was ill, all the household composition characteristics were highly significantly associated. Children in African households had the lowest reported illness and children in Indian households the highest reported ill. Children living in male headed households had higher reported illness than children living in female headed households. Also, children in households headed by someone under age 50 years had higher reported illness than children in households headed by someone aged 50 years or more. However children residing in households headed by someone who had completed primary education had higher reported illness than children in households whose head had not completed primary education. Also, the number of children in the household was significantly associated with the reporting of illness at the 1% level. In fact, a negative relationship existed between the number of children in the household and the reporting of illness.

Indicators of the household's SES were also associated with the illness reporting. There was a higher reporting of illness among children residing in households with a piped water supply compared to children living in households without a piped water supply. Also there were positive relationships between food and health expenditure of the household and the reporting of illness. Finally, residential characteristics of the household were also significantly associated with whether a child was reported ill. Children from the North West province had the lowest reported illness, and children in Mpumalanga had the highest. Urban-rural residence was also highly associated with illness reporting. Children in rural areas had the lowest reported illness and children living in metropolitan areas had the highest.

Of particular interest is that foster status was highly significantly associated at the 1% level with whether the child was ill. This can be seen visually in Figure 5.1. Foster children had the lowest reporting of sickness, with 2.7% reported ill in the last two weeks, 6.5% of children with foster siblings were reported ill and 9.4% of children with no foster children in the household were reported ill. The following section further investigates these associations by employing logistic regression models, enabling the associations to be investigated independently whilst controlling for the other factors.

Figure 5.1 Bar chart showing the proportion of children aged 0-5 years reported ill in the preceding two weeks by foster status, South Africa, 1993



5.1.2 Factors associated with illness – logistic regression results

The following section presents the results from the logistic regression models, modelling the odds of being ill versus not being ill. The variables were added into the models in a sequential manner in 'blocks' as in the previous chapter. The first model controlled for child background characteristics; the second model additionally adjusted for household composition characteristics; the third model adjusted for household SES indicators; and the fourth model adjusted for area characteristics. The variables included in each 'block' were shown in Table 3.4 in Chapter 3. The reasons for controlling for such variables were based on theory developed from previous literature and the variables available in the data. This was discussed in more detail in Chapter 3. Only the results for the parsimonious model are presented here and include only variables that contributed at least 1% to the pseudo R squared. The methods of model selection were also described in more detail in Chapter 3.

Table 5.2 shows the parsimonious model of the odds of a child being ill versus not being ill. Area characteristics were not selected in the parsimonious model for the correlates of reported illness indicating that they did not explain much of the variance in the data.

Table 5.2 Odds ratios for being ill in the preceding two weeks for children aged 0-5 years, South Africa, 1993 – parsimonious model

Parameter		Odds ratio
Child background characteristics		
Current age		0.84***
Foster status	Foster child	0.44***
	Foster sibling	0.84
	No foster siblings (RC)	1.00
Receiving household composition characteristics		
Head's age	≤49 years (RC)	1.00
	≥50 years	0.57***
Receiving household SES indicators		
Equivalised health expenditure	≤25th percentile (RC)	1.00
	> 25th percentile - ≤50th percentile	1.89***
	> 50th percentile - ≤75th percentile	2.10***
	> 75th percentile	3.43***
Observations		5683
Pseudo R squared		0.06

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

The odds of being ill decreased with the age of the child. An increase in age of one year decreased the odds of illness by 16%. Of particular interest to this thesis was the association with foster status, which was included in the parsimonious model, indicating its importance explaining the variance in the data. Foster children were 56% less likely to

have been reported ill and children with foster siblings were 16% less likely to have been reported ill compared to children with no foster children in their household. Children living in households with a head 50 years or older were 43% less likely to have been reported ill compared to children in households headed by someone under the age of 50 years. Finally, health expenditure was also included in the parsimonious model, showing a positive relationship with illness. The next section further investigates the morbidity of children by foster status and by who was consulted if a child was ill, and the reason, if indeed no one was consulted.

5.1.3 Types of consultation and reasons for not consulting

Figure 5.2 shows the percentage distribution of who was consulted if the child was ill by foster status. Although the association was not significant for 0-5 year olds, Figure 5.2 indicates that in fact foster siblings had the lowest proportion consulting no-one or family/friend and the highest proportion consulting a health professional or facility. Fosters were the 'next best' with most seeing a health person/facility and a much lower proportion seeing no one or family/friend, but a higher proportion than foster siblings. Children in households without foster children seem to be worse off with the highest proportion consulting no-one or a friend/family member and the lowest proportion attending a health facility or seeing a health person and were the only group to consult a traditional healer or someone else. However, most children who were ill consulted a health person or facility.

Figure 5.2 Stacked bar chart showing the percentage distribution of who was consulted when children aged 0-5 years were ill by foster status, South Africa, 1993

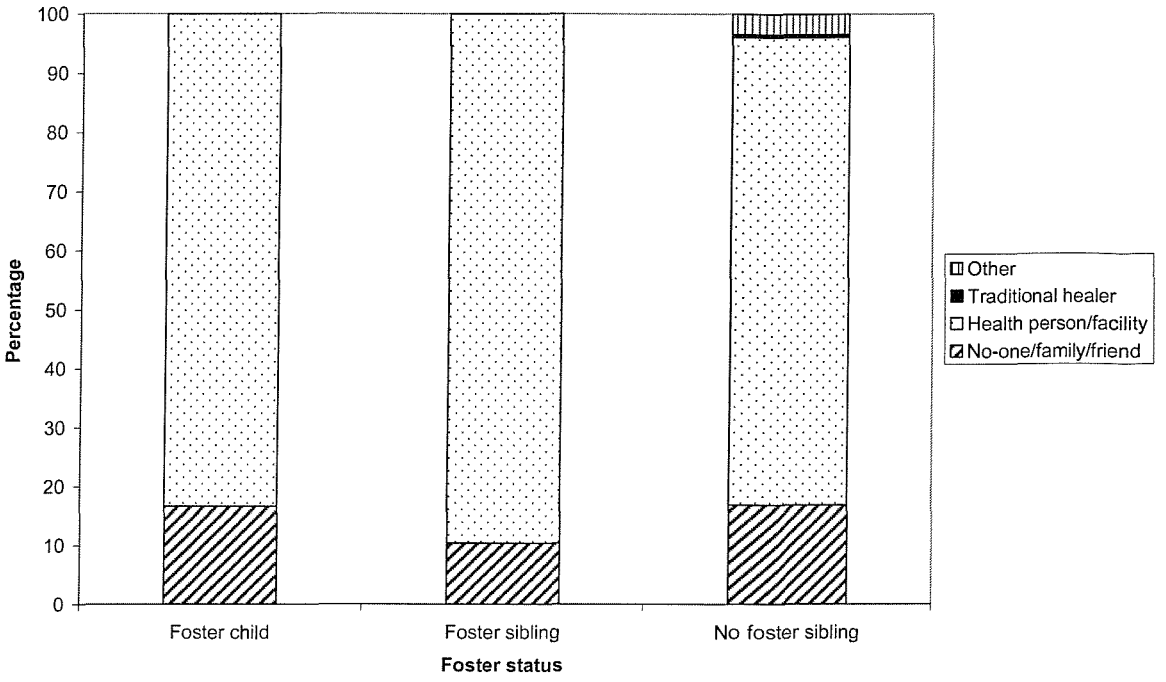
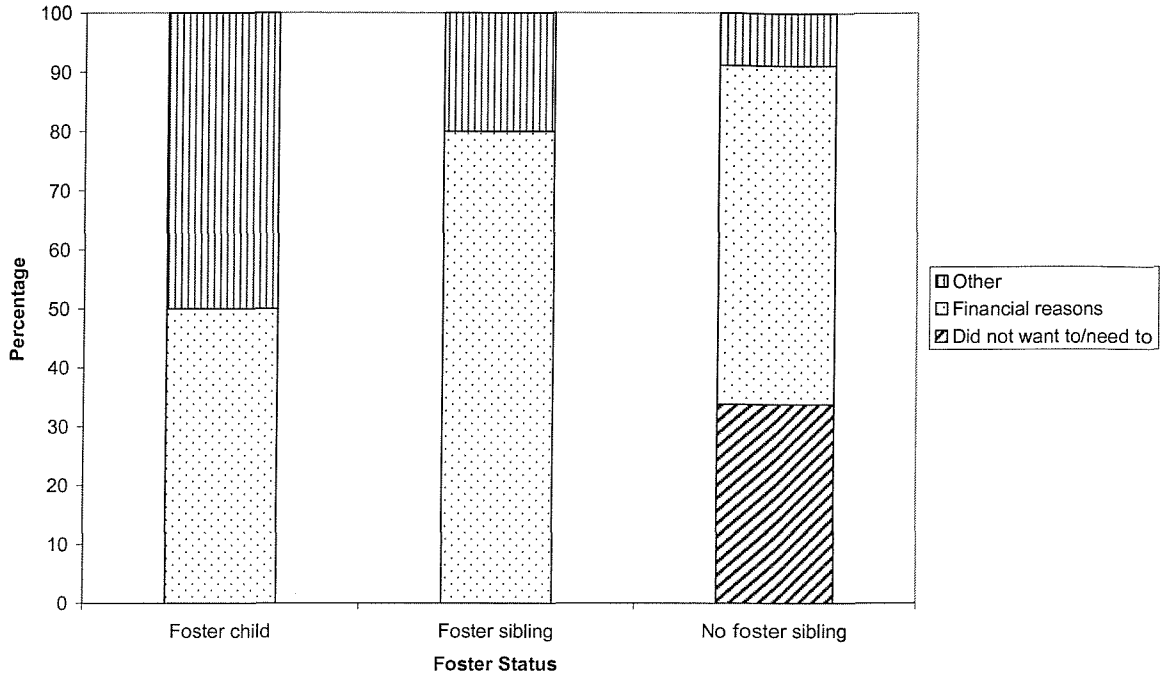


Figure 5.3 shows the reasons given if *no-one* was consulted by foster status, although the relationship is not statistically significant for 0-5 year olds, possibly because it is based on small numbers (n=75) as most children received some sort of consultation, be it only with a friend/family member. It shows that for all categories, financial reasons were the primary motive for not consulting anyone. However this reason was not as prominent amongst foster children who had the highest proportion not consulting anyone for 'other' reasons which included not knowing where to go or how to get there, inconvenient hours and other unspecified reasons. Children in households without foster children had the highest proportion of not wanting or needing to consult anyone. Foster siblings had the highest proportion not consulting someone because of financial reasons.

Figure 5.3 Stacked bar chart showing the percentage distribution of reasons for non-consultation for ill children aged 0-5 years by foster status, South Africa, 1993



5.2 Factors associated with immunisation status

This section investigates the practice of receiving immunisations reflecting access to health care. Specifically it investigates whether children received a vaccination against measles. This is used as a proxy for receiving a course of vaccinations as measles is usually one of the last immunisations to be received by a child (O'Brien et al., 1998). However, it is recognised that the measure may not indicate that children had indeed received the full course of immunisations recommended. Of children aged 1-5 years, 92% had received a measles vaccination. Children aged 1-5 years were considered, as children should have received the vaccination by 12 months of age as WHO recommends the vaccination at 9-12 months old in developing countries (UNICEF, 2004b). This was discussed in more detail in Chapter 3. This section describes the background factors associated with being vaccinated against measles and then models the odds of being vaccinated using logistic regression.

5.2.1 Factors associated with immunisation – bivariate analysis

Table 5.3 shows the background characteristics associated with receiving a measles vaccination along with the number of children and chi-squared significance level.

Table 5.3 Percentage of children aged 1-5 years who were vaccinated against measles by background characteristics, South Africa, 1993

		Percent vaccinated	Observations	Chi-squared significance level
Child background characteristics				
Sex	Male	91.96	1418	
	Female	92.18	1420	
Age	0-2 years	91.74	1296	
	3-5 years	92.35	1542	
Been ill in preceding two weeks	No	91.99	2609	
	Yes	93.01	229	
Receiving household composition characteristics				
Race	African	90.95	2209	***
	Coloured	97.00	300	
	Indian	97.06	102	
	White	94.27	227	
Head's sex	Male	92.30	2091	
	Female	91.33	738	
Head's age	≤49 years	92.76	1644	
	≥50 years	91.11	1114	
Head's education	Not completed primary education	90.68	1492	***
	Completed primary education	93.57	1307	
Number of children	1-3	93.42	1535	***
	4-6	91.05	1039	
	≥7	88.26	264	
Receiving household SES indicators				
Type of dwelling	Shack	87.94	282	***
	Other	92.52	2554	
Equivalised health expenditure	≤25th percentile	91.39	941	
	> 25th percentile – ≤50th percentile	91.90	420	
	> 50th percentile – ≤75th percentile	91.95	708	
	> 75th percentile	93.11	769	
Receiving household area characteristics				
Province	Western/Northern Cape	96.32	299	***
	Eastern Cape	88.09	403	
	Kwazulu Natal	92.03	590	
	Orange Free State	89.70	165	
	Mpumalanga	92.96	270	
	Northern Province	92.27	453	
	North West	89.23	195	
	Gauteng	94.17	463	
Residence	Rural	89.84	1595	***
	Urban	95.02	522	
	Metropolitan	94.87	721	

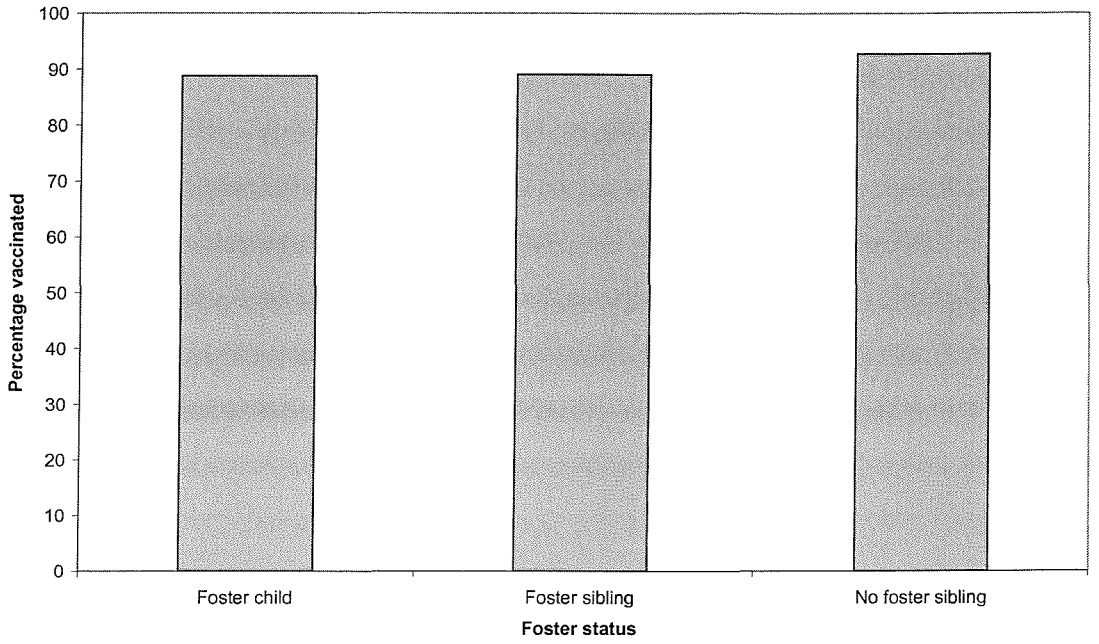
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.3 shows that none of the child background characteristics were significantly associated with vaccination status. In contrast, household composition characteristics *were* associated with vaccination status. Children living in African households were the least likely to be vaccinated and children in Indian households were the most. The sex and age of the household head were not significantly associated with whether the child was vaccinated. However, the education of the household head *was* highly significantly associated with vaccination status. A higher proportion of children were vaccinated against measles who lived in households whose head had completed primary education compared to children in households whose head had not completed primary education. Also, the number of children in the household was negatively and significantly associated with vaccination status at the 1% level.

Indicators of the household's SES were also significant. There was a lower proportion of children vaccinated who lived in 'shacks' compared to children who lived in other types of dwelling. However surprisingly, health expenditure was not significantly associated with vaccination status. In contrast, area characteristics were highly significantly associated with whether children were vaccinated or not. There were provincial differences with children in the Western/Northern Capes being the highest proportion vaccinated against measles and children in the Eastern Cape being the lowest proportion of children being vaccinated. In addition to provincial differentials, there were also differences by urban-rural residence. Rural areas had the lowest proportion of children vaccinated and urban areas the highest.

Of particular interest to this study is the association with foster status. Figure 5.4 shows the proportion of children vaccinated against measles by foster status, an association that was significant at the 5% level. Although the vast majority in all groups are vaccinated, Figure 5.4 shows that the highest proportion of measles vaccination was among children who lived in households without any foster siblings. The next section goes on to further investigate these factors independently in logistic regression models.

Figure 5.4 Bar chart showing the proportion of children aged 1-5 years who were vaccinated against measles by foster status, South Africa, 1993



5.2.2 Factors associated with immunisation – logistic regression results

This section models the odds of a child receiving a measles vaccination versus not receiving one for 1-5 year olds. Again child background characteristics, household composition characteristics, indicators of the household's SES and area characteristics were controlled for. The variables included in these 'blocks' were shown in Table 3.5 in Chapter 3 and were based on theory developed by previous studies and variables available in the data. Only the results of the parsimonious model are presented and discussed here. The model selection criteria were discussed in more detail in Chapter 3.

Table 5.4 presents the final parsimonious model. Interestingly, the parsimonious model only included area characteristics. Also, although province was included in the final parsimonious models, none of the regions differ significantly from the reference category. Of interest however, was the highly significant association of residence. Children living in households in urban and metropolitan areas were over twice as likely to be vaccinated against measles as children residing in rural areas.

Table 5.4 Odds ratios for being vaccinated against measles for children aged 1-5 years, South Africa, 1993 – parsimonious model

Parameter		Odds ratio
Receiving household area characteristics		
Province	Western/Northern Cape	1.37
	Eastern Cape	0.71
	Kwazulu Natal (RC)	1.00
	Orange Free State	0.63
	Mpumalanga	1.28
	Northern Province	1.26
	North West	0.89
	Gauteng	0.80
Residence	Rural (RC)	1.00
	Urban	2.25***
	Metropolitan	2.25***
Observations		2838
Pseudo R squared		0.02

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

5.3 Factors associated with nutritional status

Using the anthropometric z-scores available in the data, this section investigates nutritional status. Low HAZ is an indicator of *"long-term past malnutrition"* whereas low WAZ indicates *"current or acute malnutrition"* but it is not possible to differentiate between long and short-term malnutrition with WAZ (McMurray, 1996 p150). Therefore, although WAZ is still a good overall measure, low WHZ is a better measure of *current* malnutrition as it is *independent of age*, especially for cross-sectional data. Children with z-scores exceeding –5 or +5 standard deviations below/above the reference median were excluded from the analysis as they were thought to be unreliable. These issues were discussed in more detail in Chapter 3.

5.3.1 Levels of nutritional status

Cut-offs were used to summarise the data for some of the preliminary analyses. Above –1 standard deviation from the reference median denoted 'normal' nutritional status, between –1 and –2 indicated 'mild' malnutrition, between –2 and –3 standard deviations 'moderate' malnutrition and below –3 standard deviations indicated 'severe' malnutrition. Figure 5.5 shows the percentage distribution of the severity of the nutritional status indicators for children aged 0-5 years for whom the data were available.

Figure 5.5 Stacked bar chart showing the percentage distribution of the severity of HAZ, WAZ and WHZ for children aged 0-5 years, South Africa, 1993

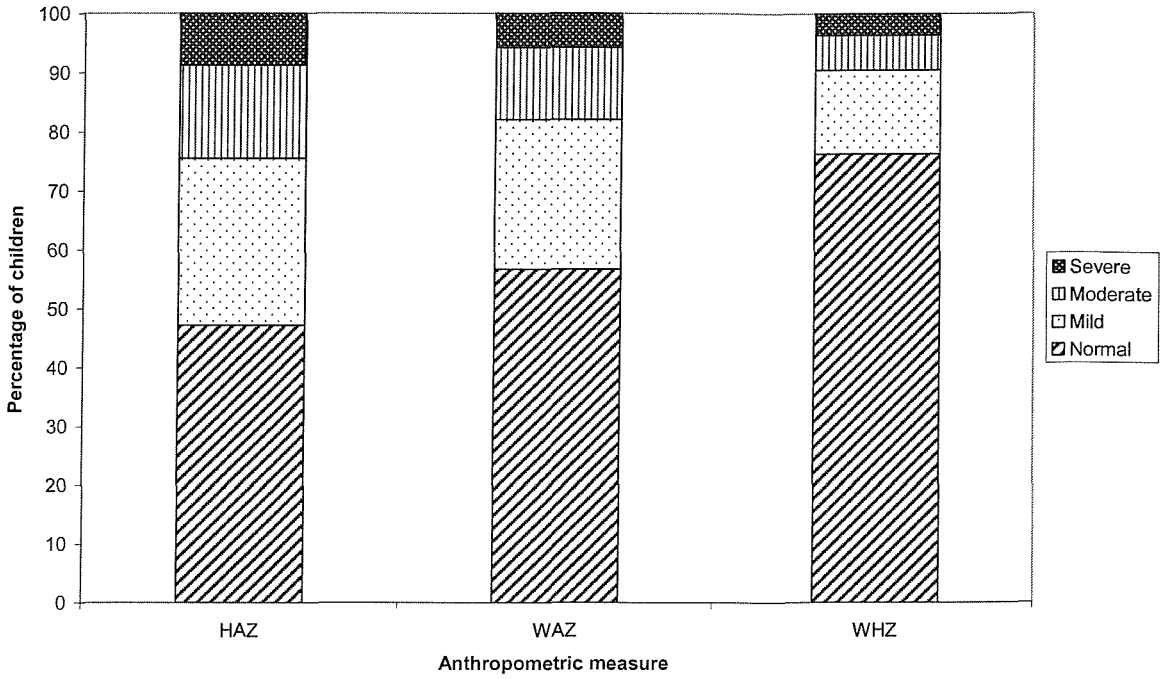
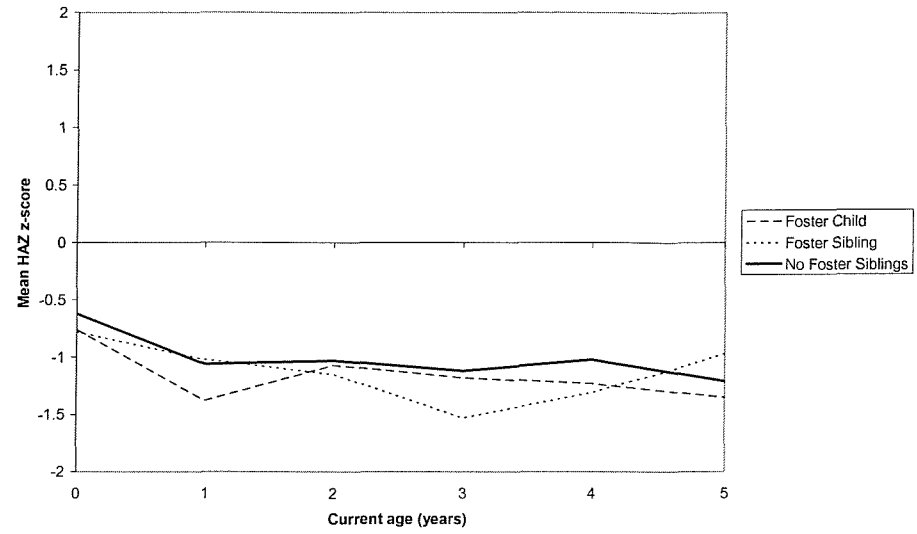
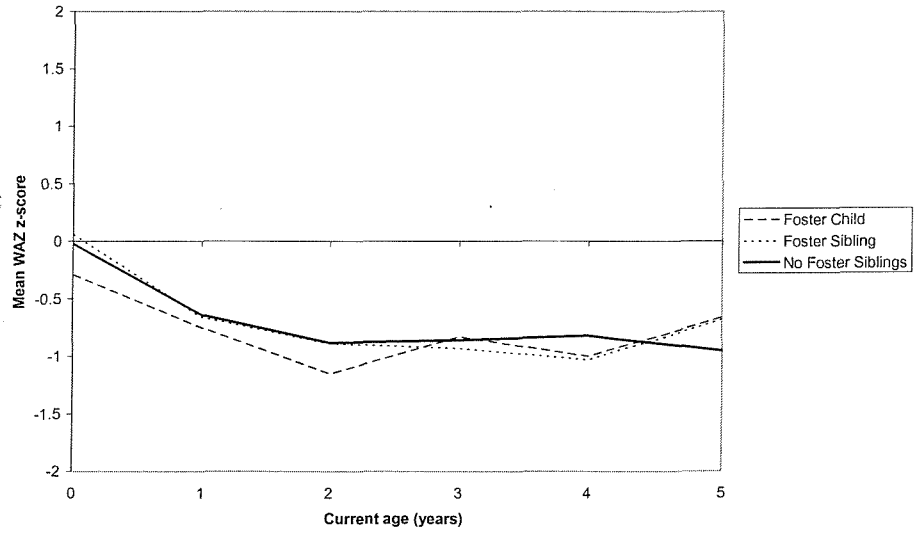


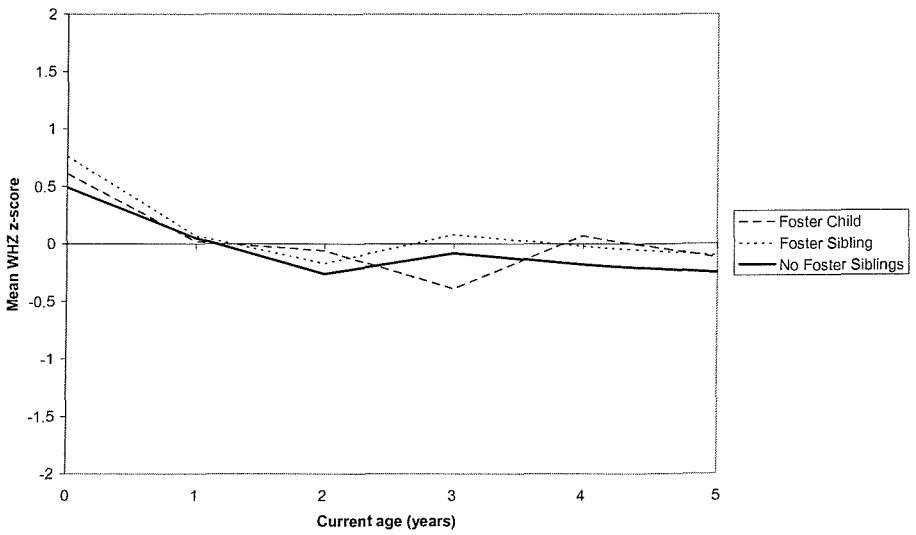
Figure 5.5 indicates that only just under half of children had 'normal' HAZ and that over half had 'normal' WAZ but three-quarters had 'normal' WHZ. In fact, a quarter of children were classified as 'stunted' (moderate or severe HAZ). However, 18% were classified as 'underweight' (moderate or severe WAZ), and a tenth were classified as 'wasted' (moderate or severe WHZ).

Figure 5.6 shows line graphs of *mean* HAZ, WAZ and WHZ by age and foster status. It must be noted that they do not show growth patterns but nutritional status by the age of the child as the children are different at each age as the data are cross-sectional rather than longitudinal (McMurray, 1996). Furthermore, the graphs are not likely to show earlier periods of food shortage as such decreases in nutrition become less visible with time as children have the chance to 'catch-up' their growth.

Figure 5.6 Line graphs showing mean HAZ, WAZ and WHZ by current age of the child and foster status, South Africa, 1993







With regards to HAZ, Figure 5.6 shows that children with no foster siblings seem to have the highest mean HAZ for the majority of the age range, except for children aged 1 and 5 years. Foster children had the lowest mean HAZ during infancy and children with foster siblings aged 2-4 years. However, it must be noted that there were only relatively small numbers of foster children at the younger ages (15 foster children at age 0 year and 43 at age 1 year with HAZ information) because fostering increased with age. Looking at the pattern by age, mean HAZ for foster children decreases during infancy and then increases for those aged 2 years before decreasing again for children aged 2-5 years. In contrast mean HAZ for foster siblings decreases by the age of the child until age 3 years, after which it subsequently increases. For children without foster siblings, mean HAZ decreases during infancy and then remains fairly constant by the age of the child. This is the typical pattern reported in developing countries (Burgard, 2002).

The second graph in Figure 5.6 shows that mean WAZ is lowest for foster children aged 0-2 years whereas mean WAZ is similar for foster siblings and children without foster siblings for children of this age. Foster siblings had the lowest and children without foster siblings the highest mean WAZ for children aged 3-4 years. For children aged 5 years, children without foster siblings had the lowest mean WAZ whereas foster children and foster siblings had approximately the same mean WAZ. Looking at the pattern by age, the mean WAZ for foster children decreased sharply between ages 0-2 years, after which it fluctuated. In fact, this general pattern was also observed for foster siblings and children without any foster siblings but it did not fluctuate as much as for foster children.

The final graph in Figure 5.6 shows that mean WHZ decreased during infancy for all children of all foster statuses from a mean WHZ above zero. After age one year, mean WHZ fluctuated around zero for all foster statuses, especially for foster children. Indeed foster children had the lowest mean WHZ among children aged 3 years but the highest among children aged 4 years. The following section further investigates characteristics of stunted, underweight and wasted children by investigating what child background characteristics were associated with such severe malnutrition.

5.3.2 Factors associated with nutritional status – bivariate analysis

Table 5.5 shows the percentage distribution of stunting, underweight and wasting by child background characteristics for children aged 0-5 years. Cut-offs were used for meaningful interpretation and to summarise the data, although the limitations of using cut-offs are recognised. Children below –2 standard deviations from the reference median were considered stunted (low HAZ), underweight (low WAZ) or wasted (low WHZ).

Table 5.5 Percentage of children aged 0-5 years who were stunted, underweight and wasted by background characteristics, South Africa, 1993

		Percent stunted	Percent underweight	Percent wasted	Observations
Child background characteristics					
Sex	Male	26.66***	18.79	10.07	2254
	Female	22.29	17.17	9.01	2149
Current age	0-1 years	23.30	14.10***	8.06*	1452
	2-3 years	25.48	21.03	10.37	1621
	4-5 years	24.72	18.51	10.15	1327
Currently being breastfed	No	25.04*	18.70***	10.04**	3475
	Yes	22.26	14.95	7.68	898
Number of times fed each day	≤3	24.24	19.19***	10.58***	2442
	> 3	25.09	15.76	7.93	1861
	Not known	21.00	30.39	15.31	98
Measles vaccination status	No	34.95***	25.00***	14.52***	186
	Yes	22.27	18.38	10.33	2295
	< 1 year old	17.43	10.04	6.29	684
	Not known	31.26	20.70	9.16	1222
Been ill in preceding two weeks	No	24.73	18.18	9.74	4036
	Yes	22.34	15.78	7.42	364
Receiving household composition characteristics					
Race	African	26.75***	19.76***	10.32***	3667
	Coloured	21.07	14.66	5.87	341
	Indian	8.41	7.21	7.62	9
	White	6.51	3.34	4.78	19
Head's sex	Male	23.67**	17.63	9.54	3177
	Female	26.73	18.79	9.62	1216
Head's age	≤49 years	21.98***	16.01***	9.19	2461
	≥50 years	27.80	19.85	9.49	1795
Head's education	Not completed primary education	29.04***	21.37***	10.87***	2459
	Completed primary education	18.39	13.53	7.80	1871
Number of children	1-3	20.13***	15.94***	9.57	2166
	4-6	27.86	19.33	9.93	1716
	≥7	31.86	22.03	8.24	521

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.5 continued...

		Percent stunted	Percent underweight	Percent wasted	Observations
Receiving household SES indicators					
Type of dwelling	Shack	30.16***	25.71***	15.91***	440
	Other	23.93	17.14	8.87	3957
Water supply	Not piped	30.15***	19.72**	8.76	1688
	Piped	21.05	16.90	10.07	2713
Equivalised food expenditure	$\leq 25^{th}$ percentile	33.93***	22.68***	9.69*	1117
	$> 25^{th}$ percentile – $\leq 50^{th}$ percentile	26.77	19.23	8.50	1143
	$> 50^{th}$ percentile – $\leq 75^{th}$ percentile	20.89	15.93	11.36	1101
	$> 75^{th}$ percentile	15.80	13.81	8.70	1038
Equivalised health expenditure	$\leq 25^{th}$ percentile	29.42***	20.98***	9.47*	1458
	$> 25^{th}$ percentile – $\leq 50^{th}$ percentile	28.23	20.99	10.69	712
	$> 50^{th}$ percentile – $\leq 75^{th}$ percentile	23.71	17.96	10.73	1139
	$> 75^{th}$ percentile	16.45	12.08	7.69	1094
Receiving household area characteristics					
Province	Western/Northern Cape	21.80***	14.01***	7.45***	344
	Eastern Cape	32.28	10.90	3.26	824
	Kwazulu Natal	23.54	17.05	9.15	960
	Orange Free State	24.90	21.05	13.58	261
	Mpumalanga	18.77	15.11	6.43	389
	Northern Province	27.81	27.11	14.30	748
	North West	24.73	30.94	16.43	275
	Gauteng	16.45	14.92	11.52	599
Residence	Rural	28.03***	16.61***	9.33	2726
	Urban	19.31	17.06	10.33	782
	Metropolitan	18.44	13.77	9.55	890

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.5 shows that child's sex only had a significant association with stunting, with boys having a higher risk than girls. However, age of the child was significantly associated with the other two measures of malnutrition, being the proportion of children underweight and wasted. There was an inverted U-shape distribution of the proportion underweight and wasted with age categorised, but higher proportions of children underweight than wasted.

Whether the child was currently being breastfed was significantly associated with all three measures of malnutrition, if only at the 10% level for the proportion stunted. There were higher proportions of malnutrition for children who were not currently being breastfed for all three measures of nutritional status. Another association with feeding practices was the number of times the child was fed each day. There was a lower proportion of children who were underweight and wasted who were fed more than three times each day compared to

children who were fed less than this and the highest proportions underweight and wasted among children who it was not known how many times they were fed each day. There was no such significant relationship with stunting.

Vaccination status was highly significantly associated with all three measures of malnutrition. Children who were not vaccinated against measles had higher proportions of stunting, underweight and wasting. Those who were less than 1 year old and so would not have yet been vaccinated had the lowest proportion of children malnourished for all three indicators of nutritional status. Also, there was a large proportion of children malnourished for whom vaccination status was unavailable. However, illness in the preceding two weeks before the survey was not significantly associated with any of the indicators of malnourishment.

Household composition characteristics were also associated with malnutrition. Children in African households had the highest proportion of children stunted, underweight and wasted, whereas children in White households had the lowest proportion of all three indicators. The head's sex was significantly associated with stunting with a higher proportion of stunting among children living in female headed households compared to male headed households. Although this pattern existed for the other two indicators, the associations were not statistically significant. The age of the head of household was also significantly associated with the proportion of children stunted and underweight with a significantly higher proportion of children malnourished who were living in households headed by older heads aged 50 years or older compared to children living in households headed by younger heads under the age of 50 years. Head's education was significantly associated with all three indicators of malnutrition at the 1% level. Children living in households with heads who had not completed primary education had higher proportions of malnourishment than children in households headed by someone who had completed primary schooling. There was also a fertility influence with the number of children in the household being significant and a positive relationship between the number of children in the household and the proportion of children stunted and underweight.

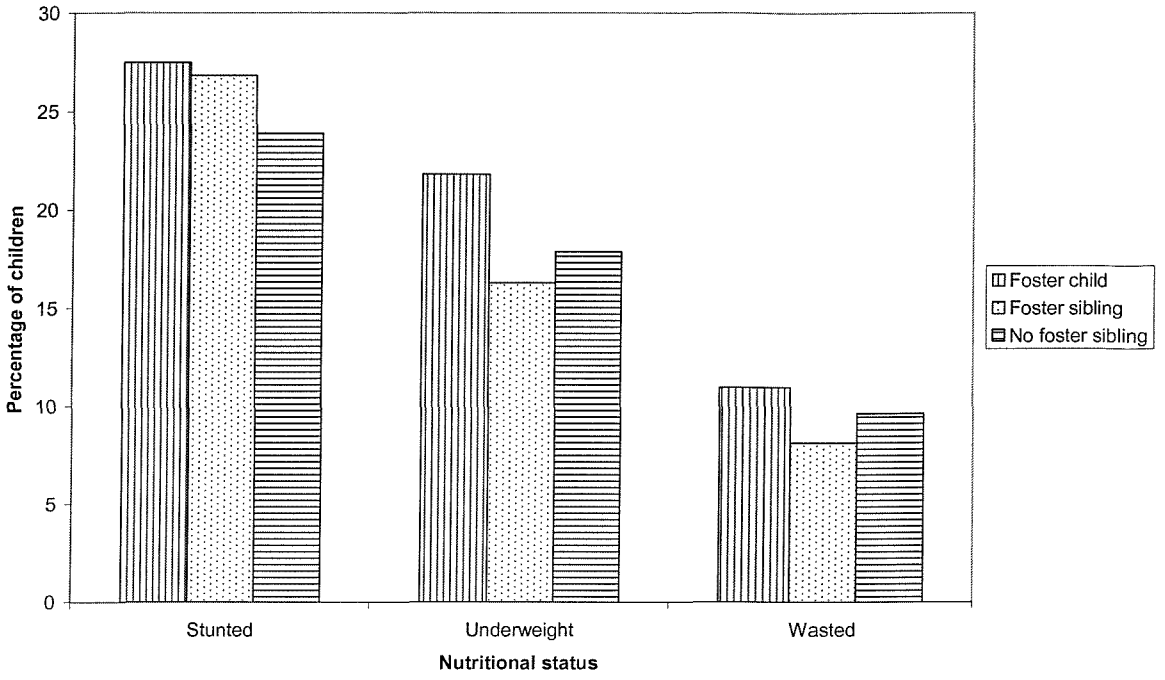
Indicators of household SES were also significantly associated with malnutrition. Dwelling type was significantly associated with all three measures of malnourishment. In all three cases there were higher proportions of children malnourished who were residing

in 'shacks' compared to other types of dwelling. In addition, there were significantly higher proportions of children stunted and underweight who resided in households that did not have piped water compared to children in households which did have a piped water supply, although there was no such significant association with wasting. There were virtually negative associations between the household's food expenditure and the proportion of children malnourished in all three cases, although the association was only significant at the 10% level for the proportion wasted. Similar to this, a negative relationship existed between the proportion of children malnourished and the household's health expenditure, except in the case of wasting where again the relationship was not completely negative.

There were also significant regional differences for all three indicators of malnutrition. The Eastern Cape had the highest proportion of children stunted and Gauteng had the lowest proportion. In contrast, the North West province had the highest proportion of children underweight and wasted and the Eastern Cape the lowest. As well as differences by region, urban-rural residence was also significantly associated with the proportion of children stunted and underweight, with rural areas having the highest proportion of children stunted and metropolitan areas the lowest. In contrast, although metropolitan areas had the lowest proportion of children underweight, urban areas had the highest. However, urban-rural residence was not significantly associated with wasting.

Importantly, the child's foster status only appeared to be significantly associated with the proportion of children underweight. Figure 5.7 shows malnutrition by foster status visually. It clearly shows that there was a higher proportion of children stunted and that the lowest proportion of children were wasted. However, it also shows differentials in malnutrition by foster status which is of interest to this study. The lowest proportion of stunted children was among those with no foster sibling. The rates of stunting among foster children and siblings were similar. With regards to underweight and wasting, foster siblings had the lowest proportion. Although from the graph it appears that foster children were more malnourished regardless of indicator used, the chi-squared p-value indicates that only the association was significant with the proportion underweight. Although the above analysis may be sensitive to the cut-offs used (McMurray, 1996), mean HAZ, WAZ and WHZ by the variables showed very similar patterns as presented and discussed here.

Figure 5.7 Bar chart showing the proportion of children aged 0-5 years who were stunted, underweight and wasted by foster status, South Africa, 1993



5.3.3 Factors associated with nutritional status – linear regression results

The *continuous* anthropometric measures were modelled using *linear* regression as results using logistic regression or multinominal logistic regression with such cut-offs would be sensitive to the cut-offs used and linear regression is considered the most suitable method with cross-sectional data (McMurray, 1996). This was discussed in Chapter 3. The child background characteristics, household composition characteristics, household SES indicators and area characteristics were added into the model in a sequential fashion by 'block', as previously. The variables used were shown in Table 3.6 in Chapter 3 and were theory driven and those available in the data.

Table 5.6 presents the coefficients for the parsimonious models for HAZ, WAZ and WHZ which were selected using the criteria discussed in Chapter 3 whereby the variables selected contributed at least 1% to the adjusted R squared. Table 5.6 shows a low adjusted R squared for all three models of nutritional status, suggesting that most of the variance in the data is left unexplained. However, McMurray (1996) states that this is normal because the z-scores are standardised by age and as age accounts for most of the variation, the adjusted R squared only measures the variation not explained by age. The table also shows a clear negative relationship between the child's age and their WAZ and WHZ, decreasing with age, but no such significant relationship existed with HAZ, with age not being

included in the final parsimonious model. An increase in age by one year reduced the child's WAZ by 0.06 standard deviations and WHZ by 0.04 standard deviations. The number of times the child was fed each day was only included in the parsimonious model for WHZ. Children for whom this information was unknown had a WHZ of 0.39 standard deviations lower than children who were fed three times or less each day.

Table 5.6 Coefficients for HAZ, WAZ and WHZ for children aged 0-5 years, South Africa, 1993

Parameter		HAZ	WAZ	WHZ
Child background characteristics				
Current age			-0.06***	-0.04**
Number of times fed each day	≤3 (RC)			0.00
	> 3			0.07
	Not known			-0.39**
Measles vaccination status	No	-0.32***	-0.19*	-0.14
	Yes (RC)	0.00	0.00	0.00
	< 1 year old	0.44***	0.64***	0.56***
	Not known	-0.07	-0.05	0.11**
Receiving household composition characteristics				
Race	African (RC)	0.00	0.00	
	Coloured	0.08	0.11	
	Indian	0.56***	0.03	
	White	0.91***	1.00***	
Receiving household SES indicators				
Equivalised food expenditure	≤25th percentile (RC)	0.00		
	> 25th percentile – ≤50th percentile	0.25***		
	> 50th percentile – ≤75th percentile	0.47***		
	> 75th percentile	0.63***		
Receiving household area characteristics				
Province	Western/Northern Cape		-0.22*	-0.17*
	Eastern Cape		0.07	0.27***
	Kwazulu Natal (RC)		0.00	0.00
	Orange Free State		-0.39***	-0.47***
	Mpumalanga		-0.18**	-0.21**
	Northern Province		-0.56***	-0.55***
	North West		-0.68***	-0.85***
	Gauteng		-0.22***	-0.32***
Constant		-1.48***	-0.50***	0.15*
Observations		4399	4538	4470
Adjusted R squared		0.08	0.09	0.07

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

Measles vaccination status was highly significant and selected in all three models of nutritional status. Children who were not vaccinated against measles had a HAZ 0.32 standard deviations lower than children who had been vaccinated against measles. Also,

children who were less than a year old and too young to have received the vaccination had a HAZ of 0.44 standard deviations higher than children who had been vaccinated. Similar patterns existed with WAZ and WHZ. Children who had not had a measles vaccination had a WAZ of 0.19 standard deviations lower than children who had been immunised against measles. Children who were less than a year old had WAZ of 0.64 standard deviations higher and WHZ 0.56 standard deviations higher than children who had been vaccinated. Also, children for whom this information was not available had a WHZ of 0.11 standard deviations higher than children who had been vaccinated against measles.

With respect to household composition characteristics, only race was included in the parsimonious models, and only in those for HAZ and WAZ. Children living in Indian households had a HAZ 0.56 standard deviations higher than children living in African households. Also, children in White households had a HAZ of 0.91 standard deviations higher than children in African households, meaning that children in African households had the lowest HAZ. Similar to this, children in White households had a WAZ of one standard deviation higher than children in African households, with again, children in African households having the lowest WAZ.

The only household SES indicator to be included in any of the parsimonious models was food expenditure and it was only selected in the parsimonious model for HAZ. A strong positive association was found between food expenditure and nutritional status measured by HAZ. Children in households with food expenditures of above the lower quartile but below or equal to the median had a HAZ of 0.25 standard deviations higher than children in households with a food expenditure of below or equal to the lower quartile. Children in households with a food expenditure of between the median and the upper quartile had a HAZ 0.47 standard deviations higher than children in households with a food expenditure of below or equal to the lower quartile. Finally, children in households whose food expenditure was above the upper quartile had a HAZ of 0.63 standard deviations higher than children in households with a food expenditure of below or equal to the lower quartile.

The province of residence was selected in the parsimonious models for WAZ and WHZ, showing some strong provincial differentials in nutritional status. Children residing in the Western/Northern Cape, Orange Free State, Mpumalanga, Northern Province, North West

province and Gauteng all had significantly reduced WAZ compared to children residing in Kwazulu Natal. The same pattern was observed for WHZ except that children in the Eastern Cape had significantly higher WHZ than children in Kwazulu Natal whereas WAZ for children in this province did not differ significantly from the reference. Therefore, children in Kwazulu Natal had the highest WAZ and children in the Eastern Cape had the highest WHZ whereas children in the North West province had both the lowest WAZ and WHZ. The following section goes on to discuss the findings of these analyses and to discuss the influence of foster status on health outcomes in relation to the previous literature.

5.4 Discussion and policy implications

This section discusses the findings and policy implications of the health analyses by discussing the factors associated with reported illness, immunisation and nutritional status. Findings are compared to other African studies on the health implications of fostering in the absence of South African studies. However, the importance of context is noted and that not all studies are equally applicable.

5.4.1 Factors associated with illness

The analysis of whether the child was ill in the two weeks preceding the survey found that 8.5% of 0-5 year olds were reported ill. However, the findings must be treated with caution since this refers to *reported* illness and relies on the perception of illness, and indeed of someone reporting it as well as recall bias. The severity of the illness was not diagnosed by a medical practitioner and so was not investigated.

Both the preliminary and multivariate analyses showed that the child's sex was not associated with reported illness. However both analyses showed that reported illness decreased with the age of the child, that is, a negative relationship existed. This perhaps indicates that children become less susceptible to illness with age as they build-up immunity to childhood diseases with younger children being more vulnerable to sickness (Bledsoe et al., 1988). This finding could also be related to reporting. For instance, it could be more likely for women to report illness of babies and very young children who are likely to be under closer observation with a stronger emotional bond to young children

(Fiawoo, 1978). However, this finding suggests that young children may be most at risk and should perhaps be monitored and targeted by health intervention schemes.

Of particular interest was the highly significant association between reported illness and foster status found in both the bivariate and multivariate analysis. Foster children had the lowest reported illness, followed by children with foster siblings and children in households without any foster children had the highest reported illness. Although, previous literature has suggested that fostering, or the *circumstances* of fostering, may be detrimental to the child's health (Bledsoe et al., 1988; Bledsoe and Brandon, 1992; Renne, 1993; Castle, 1995; Oni, 1995; Nathan, 2001), there could be several reasons accounting for this association. First, it may only be healthier children who are fostered as it is unlikely that sick children would be sent away (Sudre et al., 1990; Castle, 1995, 1996; Nathan, 2001). Second, foster children may be healthier as a *consequence* of being fostered, that is, they fare better in the foster home by having better access to food, nutrition and health care. Third, if a foster child became ill, it is likely that they may return to their parental home, which could also account for the association (Bledsoe et al., 1988; Castle, 1995, 1996). In addition, it is thought that fosters report being ill to get out of household chores and so their reporting of illness may not have been relayed to the interviewers (Bledsoe et al., 1988; Bledsoe, 1990b). Finally, another reporting issue is that illness may be better reported for biological children (Oni, 1995; Nathan, 2001). Although not significantly different from the reference, foster siblings also had lower reported illness than non-fostered children so they may also be subject to poorer reporting, evidence for Ginther and Pollak's (2000) 'disruption hypothesis'. In the US context investigating the influence of blended families, the authors proposed that the presence of step-children affected the other children in the family. Therefore perhaps in the context of fostering, children in the receiving household are influenced by the presence of a fostered child and may be an 'at risk' group even though they are not fostered *themselves* (Evenhouse and Reilly, 2000). However, this idea of 'disruption' may not be so applicable in the African context where there are lots of movements in and out of the household unit. Alternatively, foster siblings may be healthier than non-fostered children *per se.* Also, households with 'sick' children may also not want to foster in. Therefore, there are many ways in which the *association* can be interpreted and the data available do not allow us to identify more or less accurate interpretations. Also, as the data are cross-sectional, only the child's current foster status was used and therefore it may not reflect residential circumstances over the

entire childhood, that is, it may not be a good indicator for longer-term foster status (Ginther and Pollak, 2000). However, an implication of these findings is that perhaps reporting of illness needs to be improved in foster households for both foster children and their foster siblings.

Although information about consultation was based on small numbers and the associations were not significant, the analysis suggested that foster siblings received the best health care with the highest proportion seeing a health person or facility and the lowest proportion seeing no-one or family/friend. Children without foster siblings seemed to be worst off with the highest proportion consulting no-one or family/friend and the lowest seeing a health person/facility. Foster children also had a large proportion seeing no-one/family/friend. Perhaps if a foster child was seen as ill, then their biological parent would be consulted accounting for this large proportion. However, these findings suggest that foster households may have better access to health care than non-foster households. In addition, although financial reasons were the major reason for non-consultation, foster children had the highest proportion who were not consulted for 'other' reasons, possibly because the child was not their own child so perhaps the foster household did not feel responsible for dealing with a health issue. However, overall as these findings were not statistically significant, there does not seem to be any real difference in health care consultation or the reasons for non-consultation by foster status.

Similar to this study, in Swaziland Sudre et al. (1990) found that there was no real difference in attendance at maternal and child health clinics by foster status. Hill et al. (2003) discuss the importance of decision making with regards to health seeking behaviour in reducing child mortality. The authors state the importance in the recognition of *when* a child is unwell, knowing when the illness needs to be treated and seeking well-timed and suitable care, illustrating that it is not simply the *reporting* of illness that is important. There are therefore important policy implications for increasing awareness of such.
The preliminary analysis found higher proportions of children reported ill amongst those who were currently being breastfed, which was a counter-intuitive finding. However as noted previously, these children are likely to be younger and more susceptible to childhood diseases. Indeed, after controlling for age in the multivariate analysis, there was no such significant relationship. Similar to this, another counter-intuitive finding from the preliminary bivariate analysis was that the lowest proportion of reported illness was among

children who were fed three times or less a day. Again, this counter-intuitive finding is likely to be an age-related finding as these children are likely to be older and not so susceptible to childhood diseases and no such pattern was found in the multivariate analysis after controlling for age, although those children for whom this information was unavailable had significantly increased odds of reported illness. However, the number of times fed each day was not selected in the parsimonious model and so it was not one of the factors that explained most of the variance in the data. Another age related counter-intuitive issue in the bivariate analysis was that children who had not been vaccinated against measles had the lowest reported illness and children under age one year had the highest reported illness. Again, once controlling for other factors, no such significant association was apparent.

Household composition was also found important to reported illness, especially in the bivariate analysis. The highest proportion of reported illness was among children in Indian households and the lowest among children in African households. This could be because it is quite common for Indian women to stay at home rather than work and so could suggest that Indian women are in a better position to care for the child and are more likely to notice if a child is sick. However, race of the child's household was no longer significant after controlling for the household's SES and so was not selected in the parsimonious model. The bivariate results also showed higher proportions of illness among children in households headed by men and younger heads. Sex of the head of household was not significant in the multivariate analysis but the age of the head remained highly significant and was selected in the parsimonious model. Children in households headed by older heads aged 50 years or older had significantly reduced odds of being ill compared to children in households headed by someone under the age of 50 years. This could be explained by the large proportion of 'granny fostering' and it has been suggested in the literature that these 'grannies' fail to recognise illness of the child and so it may not be that the child is less likely to get ill but that it is less likely to be *reported* (Bledsoe et al., 1988). In fact these authors suggest that children in the care of 'grannies' may be *more* susceptible to illness with lower nutrition because of food taboos and contaminated water supplies and poor health care access. This has policy implications with the need to target 'grannies' to improve their awareness of child illness and their receptiveness and accessibility to modern health care facilities so that they can be used rather than reliance on traditional methods. The preliminary analysis also found that children in households headed by educated heads

had higher reported illness as one would expect because of better reporting of illness with higher levels of education. However, after controlling for the household's SES, there was no such significant association. The bivariate analysis also found a negative relationship with the number of children in the household and reported illness. It was thought that a positive association would be found because overcrowding is more likely to be home to diseased environments and lead to increased infection. However, this finding could be accounted for the fact that as there are more children, illness becomes more difficult to notice. Although the association remained highly significant in the modelling, it was not selected in the parsimonious model and so not one of the variables that explained most of the variance in the data.

Indicators of SES were also significantly associated with reported illness. The bivariate results suggested a higher proportion of illness among children who lived in households with a piped water supply. This seemed an unexpected result as it was thought that these children would be healthier with a safer source of water. One potential explanation could be that these households are of higher SES and so recognise and report illness better as Diamond et al. (2000) note that *"the reporting of ill health is almost always affected by socioeconomic status, such that highly educated groups are likely to articulate their own health status more effectively and more frequently than others"* (p14). Another potential explanation for this positive association between reported morbidity and SES, as seen typically in developing countries in contrast to more developed countries where the reverse is found, could be that the poor 'postpone' reporting themselves as sick as to do so would involve seeking health care, which they cannot afford. Indeed, Falkingham (2004) when finding a similar positive association between self-reported morbidity and SES in Tajikistan describes the relationship between perception of illness and health-seeking behaviour as *"complex"* (p251). She suggests that the poor perhaps more narrowly define illness, or defer the acknowledgement of illness until it is severe, as they do not have the resources to access medical care (p251-2). However, when controlling for other factors in the multivariate analysis, there was no such significant relationship. A positive relationship was found between both food and health expenditure and reported illness. However, when controlling for other factors, food expenditure was no longer significantly associated with the reporting of morbidity. As expected, health expenditure remained positively associated with the reporting of illness and was selected in the parsimonious model. Households with higher health expenditures had a higher reporting of illness. This

was likely to be because a household is more likely to have higher health expenditure if people are ill, in order to cure the illness. However, there are issues of reverse causality as there is no information about the order of events and so the health expenditure could have been *preventative* before the event, rather than *curative* after the event, although it is suspected that this is unlikely in the South African context.

Finally, the preliminary bivariate analysis also found associations with place of residence. The preliminary analysis found that children in the North West province had the lowest reported illness and children in Mpumalanga the highest. Mpumalanga is one of the former homelands dominated by the African population (Donaldson, 2002) and so is likely to be poorer and home to more unhealthy conditions. In addition, the preliminary analysis also found that children in rural areas had the lowest reported illness and children residing in metropolitan areas the highest. Although no definition is provided in the data documentation, it is likely that metropolitan areas would be the large metropolitan areas such as Johannesburg and Cape Town and would encompass township slum areas that surround the major cities that are likely to house more unhealthy living conditions. However, province and urban-rural residence were not selected in the final parsimonious model as there were only significant associations at the 10% level when controlling for other factors in the multivariate analysis.

5.4.2 Factors associated with immunisation status

The analysis found that the vast majority of children had in fact been vaccinated against measles, with 92% of children aged 1-5 years having received a measles vaccination. This may be a result of the measles vaccination campaign in 1990/1 (Du Plessis and Carstens, 1993; Schoub and Martin, 1993; Coetzee et al., 1994; Metcalf et al., 1994; Dyer et al., 1996). However, it must be noted that these children may not have received the full course of recommended immunisations. Indeed the DHS, conducted in 1998, suggests that only 63% of children aged 12-23 months were fully immunised with BCG, three doses of DPT and polio, and measles vaccines (Department of Health et al., 1998) and several studies discuss the 'missed opportunities' for immunisation in South Africa and the need to make sure children have received their full course of immunisations at every possible opportunity (Dyer, 1993; Harrison et al., 1993; Metcalf et al., 1994). Both the preliminary and multivariate analyses found that the sex and age of the child were not associated with

whether the child received a measles vaccination. This suggests that both girls and boys may have equal access to health care in the South African context.

Importantly for this study, the preliminary analysis found that foster status was significantly associated with whether a child had been vaccinated against measles. Foster children had the lowest proportion vaccinated and children without foster siblings were the highest indicating poor access to health care for foster households on the whole as compared to children in natal households, contrasting the insignificant pattern for illness consultation. However, since only a small number of infants were fostered, this may say more about the sending than the receiving household. It could also be because immunisation cards were not transferred with the child to the foster family so they do not know. In Swaziland, Sudre et al. (1990) also found that foster children were less likely to be fully immunised. Gage et al. (1997) found that household structure was an important factor determining immunisation status in Nigeria, but found no such association in Niger. Although it may be not equally applicable in the African context, the finding that foster siblings also had lower immunisation than children in non-foster households, could reflect the 'disruption hypothesis' proposed by Ginther and Pollak (2000) in the sense that the pressures of fostering in a child influence the outcomes of *all* the children in the household. Therefore, foster siblings may be an 'at risk' group, even though residing with their parent(s) and another group to be targeted by policy (Evenhouse and Reilly, 2000). As a consequence, perhaps foster households in general should be targeted by immunisation campaigns. However, foster status was not found significant in the multivariate analysis after area characteristics were controlled for suggesting that the area characteristics indeed accounted for the differences previously found. Therefore foster children and their foster siblings do not appear to fare any better or worse with regards to immunisation in this analysis.

The bivariate analyses found that race was associated with immunisation status. The lowest proportion of children vaccinated against measles was among children in African households and the highest among children in Indian households. Similar to the findings for illness, this pattern could be a result of Indian women being at home rather than working and making sure that the child gets immunised. However when controlling for other factors, only children in Coloured households had significantly increased odds of being immunised compared to children in African households, but this association was no

longer significant when area characteristics were included. This perhaps indicates that there was still racial segregation in 1993 immediately before the end of the apartheid government with regional factors accounting for the previous differences by race.

Preliminary findings also indicated that children in households headed by educated heads were more likely to be immunised as one would expect but after controlling for other factors this was no longer significant. Similar to this, the preliminary findings indicated a negative relationship between immunisation status and the number of children in the household. Again, after area characteristics were controlled for, this association was no longer significant. Also, both the preliminary and multivariate analysis found that children living in households *other* than 'shacks' were more likely to be immunised than children residing in 'shacks', perhaps reflecting that children living in better-off households are more likely to be vaccinated. However, type of dwelling was not included in the parsimonious model. Health expenditure was not significantly associated with immunisation status in any of the analyses which is likely to be because immunisation was free (Metcalf et al., 1994). Therefore, this study has found that immunisation status is not determined by child background characteristics, household composition or SES, but is instead a matter of access with province and residence explaining most of the variance in the data.

Area characteristics were found to be important correlates of immunisation illustrating that inequalities still existed immediately before the end of the apartheid government. The preliminary analysis found that children in the Western and Northern Capes, provinces with high proportions of Coloureds, had the highest proportion of children vaccinated against measles. Children residing in the Eastern Cape, a former homeland and so dominated by Africans, had the lowest. These patterns could reflect differential medical provision by region with better access and facilities in the Western and Northern Capes than in the poorer former homeland of the Eastern Cape. Indeed, the Western Cape seems to have one of the best health facilities as measured by the number of hospital beds per population (Chetty, 1995). Furthermore Port Elizabeth, in the Eastern Cape, experienced measles epidemics in 1982/3 and 1987 and is considered a *"high-risk area"* (Du Plessis and Carstens, 1993 p794). Although province was selected in the parsimonious model, no provinces differed significantly from the reference category.

It therefore seems that urban-rural residence is the most important correlate of immunisation. The preliminary analysis found that children in rural areas had the lowest proportion vaccinated against measles and urban the highest, again probably reflecting access to health care. However, the parsimonious model found that children residing in both urban and metropolitan areas were over twice as likely to be immunised against measles as children residing in rural areas. Although children in rural residences had the lowest odds of having a measles vaccination, they may not have been residing in rural residences when they should have been immunised. However, Dyer (1993) also reported higher coverage in urban areas than rural areas. An explanation for this pattern is provided by Van Rensburg and Fourie (1994) who state that *"health personnel and facilities concentrate in the urban and metropolitan areas, leaving rural areas, and the rural homelands in particular, in a relatively underprovided and underserviced position"* (p97).

This intuitive finding has important policy issues in that rural areas need to be targeted with immunisation programs. There is a need for outreach to rural areas with mobile clinics and a house-to-house approach (Wilkinson and Kendell, 1994; Dyer et al., 1996). Furthermore, authors have discussed the need to reduce 'missed opportunities' for immunisation and make sure children are fully immunised when visiting both preventative and curative health services, being especially the case for the highly mobile populations such as foster children (Harrison et al., 1993). The authors also discuss that there were fewer 'missed opportunities' among services that integrated both preventative and curative care suggesting there is a need to integrate these services. Other authors have recommended that immunisation is monitored on entry to school (Slabber, 1993; Coetzee et al., 1994; Naidoo and Meyers, 1994) and Dyer (1993) discusses that there is a need for a *"firm policy on immunisation"* (p579). In fact, another mass immunisation programme aimed at eradicating measles was started in 1995 (Department of Health, 2000) so it would be interesting to see if such provincial and residential differentials still exist. However, findings from the South African 1998 DHS suggest that residential differentials still exist illustrating that much still needs to be done (Department of Health et al., 1998).

5.4.3 Factors associated with nutritional status

The analysis of the three indicators of nutritional status, found that a quarter of children were stunted, 18% were underweight and nearly a tenth were wasted. This same pattern by measures of nutritional status has been observed by McMurray (1996) in Burundi, Uganda

and Zimbabwe. Indeed, the author states that wasting is not very common but most common among infants when they are weaned at about 1-2 years of age. In the South African context, other studies have also found a similar proportion of children stunted (Coutsoudis et al., 1994; SAVACG, 1996; Burgard, 2002). Furthermore, the high proportion of stunted children is of concern as there are long-term implications so children's growth must be monitored (Coetzee and Ferrinho, 1994).

The preliminary analysis investigating the proportion of children stunted, underweight and wasted, that is, the severe forms of malnutrition, found that the sex of the child was only significantly associated with stunting, where there were a higher proportion of boys stunted than girls. The multivariate analyses supported this finding that girls had significantly higher nutritional status than boys with all three measures illustrating that boys may be more vulnerable. This finding has been found previously in Malawi by Madise and Mpoma (1997) who suggested that boys were biologically more frail. Having said that, sex of the child was not selected in any of the parsimonious models indicating that it was not a key correlate of nutritional status.

Although the z-scores are age *standardised* (McMurray, 1996), the line graphs of HAZ, WAZ and WHZ by age of the child showed that the continuous anthropometric measures of nutritional status varied by age. Age was also significantly associated with the proportion underweight and wasted, with an inverted U-shape distribution shown in the bivariate analysis, giving justification for the inclusion of the age squared term in the multivariate analyses. Age remained significant in the multivariate analyses for these measures and was selected in the parsimonious models, although age squared was not selected. Therefore, a negative relationship was found between age and both WAZ and WHZ, rather than a curvilinear one. This finding suggests that nutritional status may deteriorate with age, perhaps because children are no longer breastfed and begin supplementary food, another finding found previously (Madise and Mpoma, 1997). Therefore, there is a need to target children being weaned as they may be an at risk group. It was surprising that age was not significantly associated with stunting as this should build-up over time, being a long-term measure of malnutrition. McMurray (1996) suggested that WHZ was independent of age for children aged 1-10 years. Although age was significant in the multivariate results, this could have been because WHZ decreases in the first year of life before becoming more constant. This was supported by the line graphs

in the preliminary analysis but low anthropometric measurements for infants could be a result of pre-maturity.

Interestingly, foster status was only significantly associated with the proportion of children underweight. Foster children were the highest proportion underweight and foster siblings and those without foster siblings had similar proportions. This suggests that foster children might fare worse in foster households than their foster siblings so may be discriminated against first (Bledsoe et al., 1988; Bledsoe and Brandon, 1992). Although the associations were insignificant, foster children also had the highest proportion of both stunting and wasting. Therefore, perhaps foster children should be targeted with nutritional interventions. However, as there is no information on the duration of the fostering spell, it cannot be inferred whether there is in fact a relationship with stunting which is a measure of long-term malnutrition. The reason for the insignificance of stunting and wasting by foster status could be because the presence of foster siblings are underestimating the effect of fostering (Evenhouse and Reilly, 2000).

There appeared to be differences by foster status when investigating the continuous outcomes by age using line graphs. Indeed, non-fostered children who did not live with a fostered child had the highest HAZ for the majority of ages with fosters and foster siblings having lower HAZ. Fosters had the lowest HAZ during infancy and the lowest mean WAZ during ages 0-2 years suggesting that young fosters are particularly at risk and in need of targeting (Bledsoe et al., 1988; Bledsoe and Brandon, 1992). However, it appears that foster siblings are also 'at risk' (Evenhouse and Reilly, 2000) with the lowest HAZ at ages 2-3 years and WAZ at ages 3-4 years. Foster siblings have previously been understudied but foster children and foster siblings could be in competition for resources, and although it may not be equally applicable in Africa, this provides further evidence for Ginther and Pollak's (2000) 'disruption hypothesis'. Contrary to this idea, Castle (1996) found that fostered children tended to be in less competition for resources than non-fostered because often they were the only child in the family. Non-fostered children living in households without foster children may be faring better having better access to food if their siblings had been fostered out, although this is not possible to investigate with the data available. However, when the continuous anthropometric measures were used in the multivariate analysis, and other factors controlled for, foster status was no longer associated with WAZ,

or any of the measures of nutritional status, indicating that foster children and foster siblings do not fare any better or worse.

A similar result was found by Castle (1995) who found very little influence on children's nutritional status, measured by WAZ, although she did suggest that the finding could have been accounted for by the fact that surrogate/sibling caretakers were so common even among those residing with their mother. In addition, Castle (1995; 1996) found that the *circumstances* of fostering were also important with foster children having better nutritional status if they were *requested* by the foster household rather than being fostered under *forced* circumstances. In her later study of the Fulani in rural Mali, Castle (1996) found that WAZ was "*more strongly associated with the reasons for the child's transfer rather than with fostering per se*" (p193). Unfortunately, this was not possible to investigate with the data used in this study. In Swaziland, Sudre et al. (1990) also found that nutritional status did not really vary by foster status. Similar to this, Shell-Duncan (1994) also found no significant difference in WHZ for foster children or other measures of nutritional status such as arm circumference and tricep skinfold among the nomadic Turkana pastoralists of North West Kenya, a finding supported by ethnographic evidence which found no apparent inequity in food allocation.

The preliminary analysis found a higher proportion of malnutrition by all three indicators for those children not currently breastfeeding. Although this illustrates the importance of breastfeeding in a low breastfeeding society where supplementation begins early (Department of Health et al., 1998), there are issues of perinatal HIV transmission for breastfeeding campaigns in such a country with a high HIV prevalence. Furthermore, fostering is also likely to inhibit the breastfeeding practice. However, there is an age issue and once this was controlled for by interacting it with age and age squared in the multivariate analysis, it was only significant for WAZ and WHZ, and was not included in the parsimonious model. Also relating to feeding practices, the bivariate analysis found lower proportions of children underweight and wasted who were fed more than three times each day as one would expect. This only remained significant in the model for WHZ and was selected in the final parsimonious model. Children for whom this information was not known had significantly reduced WHZ compared to those who were fed less than or equal to three times a day. This suggests that not monitoring feeding may be detrimental to nutritional status as the children may not be eating enough nutritious food that can perhaps

be ensured if feeding is observed. Unfortunately it is not possible to suggest that no observations of feeding practices led to malnutrition with the cross-sectional data used here.

Vaccination status was highly significantly associated with all three measures of nutritional status and was included in the parsimonious models for all three indicators. Children who were not immunised against measles had a lower HAZ and WAZ than children who were immunised illustrating an additional benefit of immunisation or a potential household characteristic of influence since immunisation *"requires action by the family"* (Gage et al., 1997 p295). Furthermore, children who are not immunised may have worse access to health care and face illness leading to nutritional inadequacies. This illustrates the additional importance of immunisation, further emphasising the importance of access to immunisation and health care. Also, children who were under a year old and too young to be immunised had higher HAZ, WAZ and WHZ than children who had been immunised. Children under a year old were still likely to be breastfeeding and receiving nutritious breast milk which could account for this. Previous illness was not associated with nutritional status but it must be noted that illness was perceived and reported. Also, McMurray (1996) notes that cross-sectional data are not likely to reflect a relationship between illness and nutritional status as illness affects growth and so any such differences are more likely to be found in longitudinal data.

The preliminary analysis found that children residing in African households had the greatest risk of malnutrition and children in White households the lowest by all three indicators of malnutrition. Race remained significant when the continuous outcomes were modelled and it was found that race was the only important household composition characteristic and was included in the parsimonious models for HAZ and WAZ. Children in Indian and White households had significantly higher HAZ than children in African households and children in White households had significantly higher WAZ than children in African households. These White and Indian households were likely to better-off and able to feed children nutritious food compared to African households. This illustrates that there are racial differences in nutrition, even after socio-economic and residential characteristics were controlled for, as also found by Burgard (2002) in South Africa. Racial inequalities still existed and need to be addressed

Although the preliminary analyses also found a higher proportion of stunting among female headed households and a higher proportion of children stunted and underweight in households headed by older heads, the sex and the age of the head of household were not included in any of the final parsimonious models. However, Bledsoe et al. (1988) suggest that less nutritious food is given to foster children who live with elderly 'grannies' among the Mende of Sierra Leone. In contrast, Castle (1996) found that *"active care is rarely given by the mother and is more frequently given by surrogate caretakers, such as the child's siblings or grandparents"* (p197). In addition, the preliminary analysis in this thesis found that children residing in households headed by people who had completed primary education had lower proportions of malnutrition for all three indicators than children in households headed by those who had not completed primary education. It is suggested that children in educated households are more likely to be fed nutritious food. Again, this variable was not found to explain enough variance in the data to be selected for the parsimonious models.

There was a higher proportion of malnutrition among children living in 'shacks' according to the preliminary analysis by all three indicators. These households are likely to be poorer with less healthy living conditions and likely to be less able to feed their children as well. Similar to this, the preliminary analysis also found a higher proportion of stunting and children underweight in households without a piped water supply. A negative association was also found between the household's food and health expenditure and the three measures of malnutrition. However, the only indicator of SES selected in the parsimonious models was food expenditure and it was only selected in the final parsimonious model for HAZ. A positive relationship existed between food expenditure and HAZ. This is as one would expect as it was assumed that children in households who spend relatively more on food are better fed, depending on intra-household allocation.

Strong provincial differences were seen in both the bivariate and multivariate analyses. However, province was only selected in the parsimonious models for WAZ and WHZ. Kwazulu Natal had the highest WAZ and the Eastern Cape had the highest WHZ. The North West province had the lowest WAZ and WHZ. These are counter-intuitive findings since Kwazulu Natal and the Eastern Cape are former homelands where lower nutritional status might be expected. Also contrary to expectations was that province was not significant in the multivariate analysis for HAZ after other factors were controlled for

because it has been found that stunting is a particular problem in some provinces and in rural areas (SAVACG, 1996). Although the bivariate results found significant associations between residence and the proportion of children stunted and underweight, residence was not significant after controlling for other factors.

5.5 Summary

This chapter investigated the health of children involved in fostering, the second objective of this thesis. Of importance, it found that foster children had the lowest odds of reported illness. However, there are issues of reporting and reverse causality meaning that it is difficult to disentangle any relationships that exist. There were no real significant associations between foster status and immunisation and nutritional status, illustrating that foster children and foster siblings do not seem to fare any better or worse with regards to these health indicators. Furthermore, it is not possible to draw firm conclusions about health status of individual children from cross-sectional data (McMurray, 1996). Moreover, these results ignore the fact that fostered children are different in some potentially important ways which could lead to biased estimates. This 'selection effect' will be controlled for in Chapter 7, the fourth objective of this thesis. The next chapter investigates the educational outcomes of foster children.

CHAPTER SIX

Educational implications of fostering

6.0 Introduction

This chapter examines the educational outcomes of children involved in fostering, objective three of this thesis. It compares the educational outcomes of foster children, foster siblings and children living in households without foster children. As mentioned in previous chapters, these three groups can all be potentially influenced by the practice of fostering. The educational outcomes examined include enrolment in education for 6-15 year olds and completion of primary education for 13-15 year olds. These age groups are considered as education information was available for those over 6 years and children should have completed primary education by age 13 years.

Although fostering for educational reasons has been well documented in the literature as discussed in Chapter 2, previous studies have found contrasting evidence of the influence of foster status on educational outcomes. This chapter further investigates these contradictory findings by investigating factors associated with enrolment in education and completion of primary education, including foster status. Section 6.1 investigates the factors associated with education enrolment. Then, the reasons for non-enrolment are examined by foster status. Completion of primary education was another outcome investigated, discussed in section 6.2. The findings of the children's education outcomes are discussed in section 6.3 in relation to the previous literature, along with their policy implications, and section 6.4 summarises.

6.1 Factors associated with education enrolment

This section examines whether a child is enrolled in education or not. It was found that 92% of children aged 6-15 years were enrolled in education. This section first investigates the background factors associated with enrolment and then controls for these factors in a logistic regression model, modelling the odds of being enrolled versus not being enrolled. If a child was not enrolled, the reasons for this were also investigated.

6.1.1 Factors associated with education enrolment – bivariate analysis

Table 6.1 shows the child background characteristics, household composition characteristics, household SES indicators and area characteristics associated with enrolment, with the chi-squared level of significance indicating the strength of the association. Interestingly, a slightly higher proportion of girls were enrolled in education compared to boys. There was an inverted U-shape distribution in the proportion enrolled by age. As one would expect, children who had been ill in the preceding two weeks before the survey had a lower proportion enrolled in education.

There were also differences in enrolment by the household composition characteristics. Children in African households had the lowest enrolment in education and children in Indian households had the highest enrolment. Children in households headed by younger household heads aged under 50 years had a higher proportion enrolled compared to children in households headed by older heads aged 50 years or over. There was also a higher proportion of children enrolled among households whose head had completed primary education compared to those whose head had not. In addition, there was a higher proportion of children enrolled in households with 1-3 children compared to children in households with more than 3 children.

Household SES indicators were also related to education enrolment. Households residing in 'shacks' had a lower proportion of children enrolled in education compared to children residing in other types of dwelling. Also, as one would expect, there was a significant positive association between the household's school expenditure and the proportion of children enrolled in education. Similar to this, as one would expect, households receiving a bursary in the last year, that is, receiving some help with education in the form of bursaries, scholarships or donations, had a higher proportion of children enrolled in education compared to households which did not receive any such bursary.

Regional and residential differentials in enrolment were also apparent. Children living in the North West province had the lowest enrolment and children living in Gauteng had the highest. In addition, children living in rural areas were the lowest proportion enrolled in education and children living in metropolitan areas were the highest.

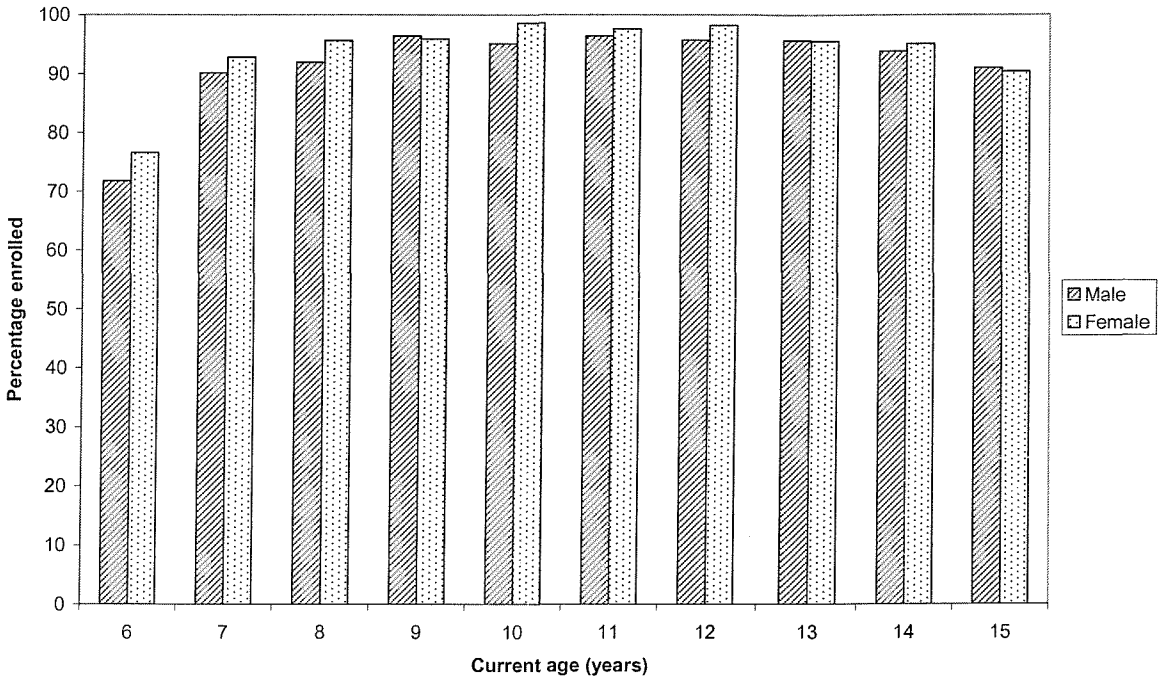
Table 6.1 Percentage of children aged 6-15 years enrolled in education by background characteristics, South Africa, 1993

		Percent enrolled	Observations	Chi-squared significance level
Child background characteristics				
Sex	Male	91.29	5121	***
	Female	93.37	5084	
Age	6-8 years	85.97	3385	***
	9-11 years	96.66	3056	
	12-15 years	94.53	3764	
Been ill in preceding two weeks	No	92.49	9790	***
	Yes	88.43	415	
Receiving household composition characteristics				
Race	African	91.58	8436	***
	Coloured	94.52	803	
	Indian	99.60	249	
	White	96.09	717	
Head's sex	Male	92.52	7124	
	Female	91.84	3053	
Head's age	≤49 years	93.21	5447	***
	≥50 years	91.73	4416	
Head's education	Not completed primary education	89.72	5651	***
	Completed primary education	95.52	4379	
Number of children	1-3	93.18	5121	***
	4-6	91.46	4053	
	≥7	91.46	1031	
Receiving household SES indicators				
Type of dwelling	Shack	89.44	852	***
	Other	92.58	8631	
Equivalised school expenditure	≤25th percentile	79.69	1881	***
	> 25th percentile – ≤50th percentile	92.29	2581	
	> 50th percentile – ≤75th percentile	95.55	2765	
	> 75th percentile	97.35	2978	
Receive bursary	No	93.15	9751	**
	Yes	97.75	178	
Receiving household area characteristics				
Province	Western/Northern Cape	94.44	792	***
	Eastern Cape	90.94	1899	
	Kwazulu Natal	91.18	2439	
	Orange Free State	93.13	699	
	Mpumalanga	93.49	891	
	Northern Province	94.85	1534	
	North West	84.42	783	
	Gauteng	96.15	1168	
Residence	Rural	90.52	6381	***
	Urban	94.62	1913	
	Metropolitan	96.08	1911	

* significant at 10%; ** significant at 5%; *** significant at 1%

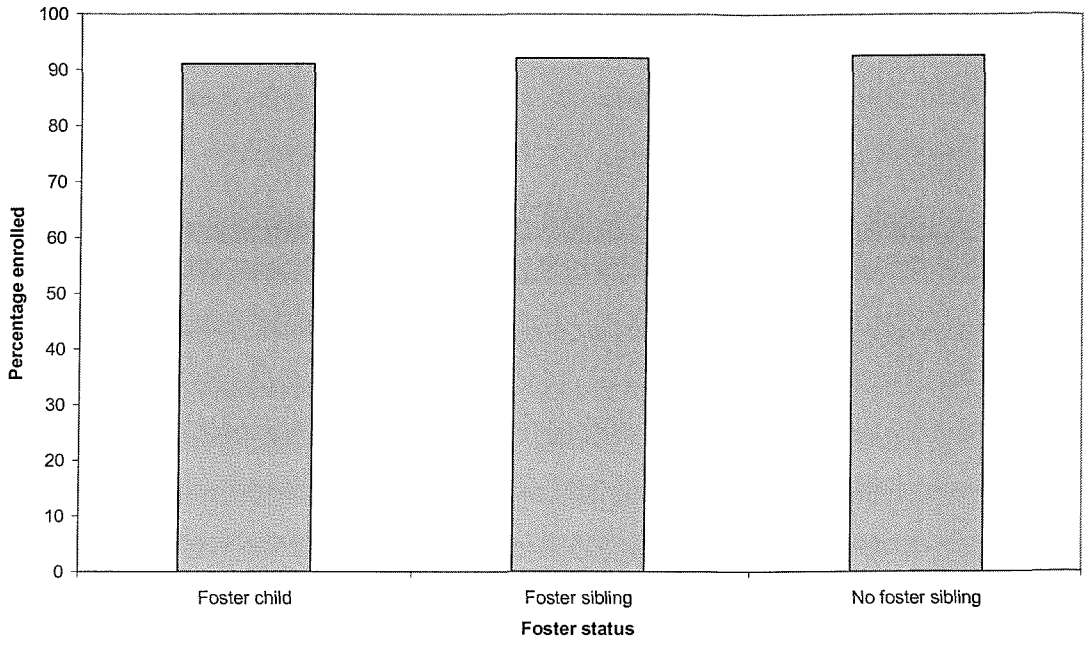
The enrolment pattern by age and sex is shown visually in Figure 6.1. Consistent with the patterns shown in Table 6.1, there appears to be an inverted U-shape distribution in enrolment by age and a higher proportion of girls enrolled than boys at almost every age, except at ages 9, 13 and 15 years.

Figure 6.1 Bar chart showing the proportion of children aged 6-15 years enrolled in education by age and sex, South Africa, 1993



Of interest to this study, Figure 6.2 illustrates that there was not much difference in education enrolment by foster status. Although the association between enrolment and foster status was insignificant, fosters were the lowest proportion enrolled followed by foster siblings and those without foster siblings were the highest proportion enrolled.

Figure 6.2 Bar chart showing the proportion of children aged 6-15 years enrolled in education by their foster status, South Africa, 1993



The next section further investigates these associations by employing logistic regression models, controlling for these child background characteristics, household composition characteristics, household SES indicators and area characteristics.

6.1.2 Factors associated with education enrolment – logistic regression results

In order to investigate factors associated with enrolment in education, logistic regression models were applied, modelling the odds of being enrolled versus not being enrolled. Variables were added into the model in a sequential way by 'block', by first controlling for child background characteristics, then adjusting for household composition characteristics, then indicators of household SES, and finally, area characteristics were adjusted for, as in Chapters 4 and 5. The variables included in these 'blocks' were presented in Table 3.7 in Chapter 3. The reasons these variables were controlled for was based on theory developed from previous literature and those variables available in the data, and were also discussed in Chapter 3. Only the results of the parsimonious model are presented here. Variables selected in the final parsimonious model contributed at least 1% to the pseudo R squared. The methods of model selection were also discussed in more detail in Chapter 3.

Table 6.2 presents the odds ratios for the parsimonious model for enrolment. It shows that an increase in age of one year increased the odds of being enrolled in education by nearly ten times. The age squared term is also highly significant at the 1% level, indicating that a curvilinear relationship exists. Moving to the household composition characteristics, children in Indian households had the highest odds of being enrolled, being thirteen times as likely to be enrolled compared to children in African households. A counter-intuitive finding was that children in White households were 37% less likely to be enrolled compared to children in African households. Children in households where the head of household had completed education were 70% more likely to be enrolled in education compared to children in households where the head had not completed primary education.

Table 6.2 Odds ratios for being enrolled in education for children aged 6-15 years, South Africa, 1993 – parsimonious model

Parameter		Odds ratio
Child background characteristics		
Current age		9.80***
Current age squared		0.90***
Receiving household composition characteristics		
Race	African (RC)	1.00
	Coloured	1.02
	Indian	12.55**
	White	0.63*
Head's education	Not completed primary education (RC)	1.00
	Completed primary education	1.70***
Receiving household SES indicators		
Equivalised school expenditure	$\leq 25^{th}$ percentile (RC)	1.00
	$> 25^{th}$ percentile - $\leq 50^{th}$ percentile	3.90***
	$> 50^{th}$ percentile - $\leq 75^{th}$ percentile	7.22***
	$> 75^{th}$ percentile	10.43***
Receiving household area characteristics		
Province	Western/Northern Cape	2.08**
	Eastern Cape	2.00***
	Kwazulu Natal (RC)	1.00
	Orange Free State	3.34***
	Mpumalanga	1.83***
	Northern Province	3.15***
	North West	0.53***
	Gauteng	2.04***
Observations		10030
Pseudo R squared		0.22

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

As one would expect, school expenditure was selected in the final parsimonious model, showing a significant positive association with enrolment. Children in households whose school expenditure was above the lower quartile and less than or equal to the median were nearly four times more likely to be enrolled compared to children in households whose

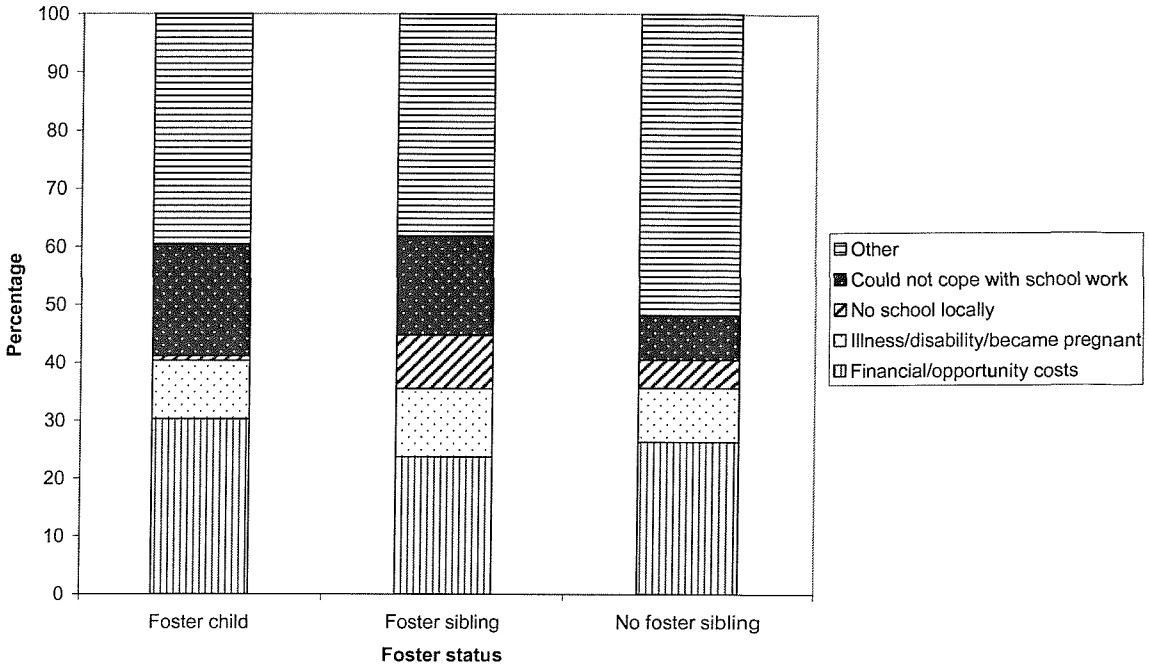
school expenditure was less than or equal to the lower quartile. Children in households whose school expenditure was above the median and less than or equal to the upper quartile were seven times more likely to be enrolled in education than children in households whose school expenditure was less than or equal to the lower quartile. Finally, children in households whose school expenditure was above the upper quartile were ten times more likely to be enrolled in education than children in households whose school expenditure was less than or equal to the lower quartile.

There were also strong provincial differences in enrolment. Children residing in households in the Western, Northern or Eastern Capes, Mpumalanga and Gauteng were about twice as likely to be enrolled in education compared to children residing in Kwazulu Natal. Children residing in the Orange Free State and the Northern Province were about three times as likely to be enrolled in education compared to children in Kwazulu Natal. In contrast, children residing in households in the North West Province were 47% less likely to be enrolled in education compared to children in the Kwazulu Natal reference. The next section goes on to investigate the *reasons* behind why children were not enrolled in education if they were indeed not enrolled.

6.1.3 Reasons for not being enrolled in education

Figure 6.3 shows the reasons for children not being enrolled in education by foster status, an association that was highly significant at the 1% level. It shows that 'other' reasons were the main reasons for non-enrolment. As well as reasons that are not known, this grouping also included school boycott, social unrest and violence. This cited reason was highest for those with no foster siblings and approximately the same for fosters and their foster siblings. However, financial reasons was another major reason for non-enrolment and the highest proportion who cited this as a reason were foster children and the lowest proportion with this reason was among children with foster siblings. Interestingly, no school locally was the lowest reason given for all three groups. However, the lowest proportion of foster children gave this reason followed by children without foster siblings and finally children with foster siblings.

Figure 6.3 Stacked bar chart showing the percentage distribution of reasons why children aged 6-15 years were not enrolled in education by foster status, South Africa, 1993



6.2 Factors associated with primary completion

As the study of education attainment is complicated by the fact that it is strongly determined by age, this section examines primary completion for children aged 13-15 years as by age 13 years children should have completed primary education. Although most people complete primary education in South Africa (Maharaj et al., 2000), only 55% of children aged 13-15 years had completed primary education in the SALSMS sample. Associations with background factors were investigated before controlling for them in a logistic model.

6.2.1 Factors associated with primary completion – bivariate analysis

Table 6.3 shows the percentage of children aged 13-15 years who had completed primary education by child background characteristics, household composition characteristics, household SES indicators and area characteristics. It shows that all the factors were significantly associated with completion of primary education, mostly at the 1% level, except illness in the preceding two weeks which was insignificant.

Table 6.3 Percentage of children aged 13-15 years who have completed primary education by background characteristics, South Africa, 1993

		Percent completed primary education	Observations	Chi-squared significance level
Child background characteristics				
Sex	Male	49.49	1366	***
	Female	61.03	1432	
Age	13	41.07	1013	***
	14	58.59	920	
	15	68.79	865	
Been ill in preceding two weeks	No	55.25	2697	
	Yes	59.41	101	
Receiving household composition characteristics				
Race	African	50.20	2297	***
	Coloured	69.12	217	
	Indian	91.14	79	
	White	85.37	205	
Head's sex	Male	56.83	1941	**
	Female	52.53	849	
Head's age	≤49 years	60.79	1502	***
	≥50 years	50.74	1210	
Head's education	Not completed primary education	43.92	1530	***
	Completed primary education	70.45	1215	
Number of children	1-3	60.07	1495	***
	4-6	51.54	1040	
	≥7	44.11	263	
Receiving household SES indicators				
Type of dwelling	Shack	44.93	227	***
	Other	56.23	2561	
Equivalised school expenditure	≤25th percentile	28.82	451	***
	> 25th percentile – ≤50th percentile	48.08	676	
	> 50th percentile – ≤75th percentile	56.08	756	
	> 75th percentile	73.33	915	
Receive bursary	No	55.13	2672	***
	Yes	77.61	67	
Receiving household area characteristics				
Province	Western/Northern Cape	63.94	208	***
	Eastern Cape	43.16	512	
	Kwazulu Natal	54.75	674	
	Orange Free State	41.21	199	
	Mpumalanga	55.29	255	
	Northern Province	61.75	400	
	North West	45.89	207	
	Gauteng	76.38	343	
Residence	Rural	47.59	1723	***
	Urban	59.41	505	
	Metropolitan	75.44	570	

* significant at 10%; ** significant at 5%; *** significant at 1%

Similar to education enrolment, there was a higher proportion of girls who had completed primary education compared to boys. As one would expect, there was a higher proportion who had completed primary education with the age of the child. Household characteristics were also significantly associated with whether the child had completed primary education or not. Children in households of African race had the lowest proportion who had completed primary education and children in Indian households had the highest proportion. Children residing in male headed households had a higher proportion of primary completion than children in female headed households. In addition, there was a higher proportion of primary completion for children in households with younger household heads (under age 50 years) than children in households with older heads (aged 50 years or over).

Also, there was a much higher proportion of children that had completed primary education in households that were headed by educated heads who had *themselves* completed primary education compared to those in households with heads who had not completed primary education. A negative association existed between the number of children in the household and the proportion of children who had completed primary schooling.

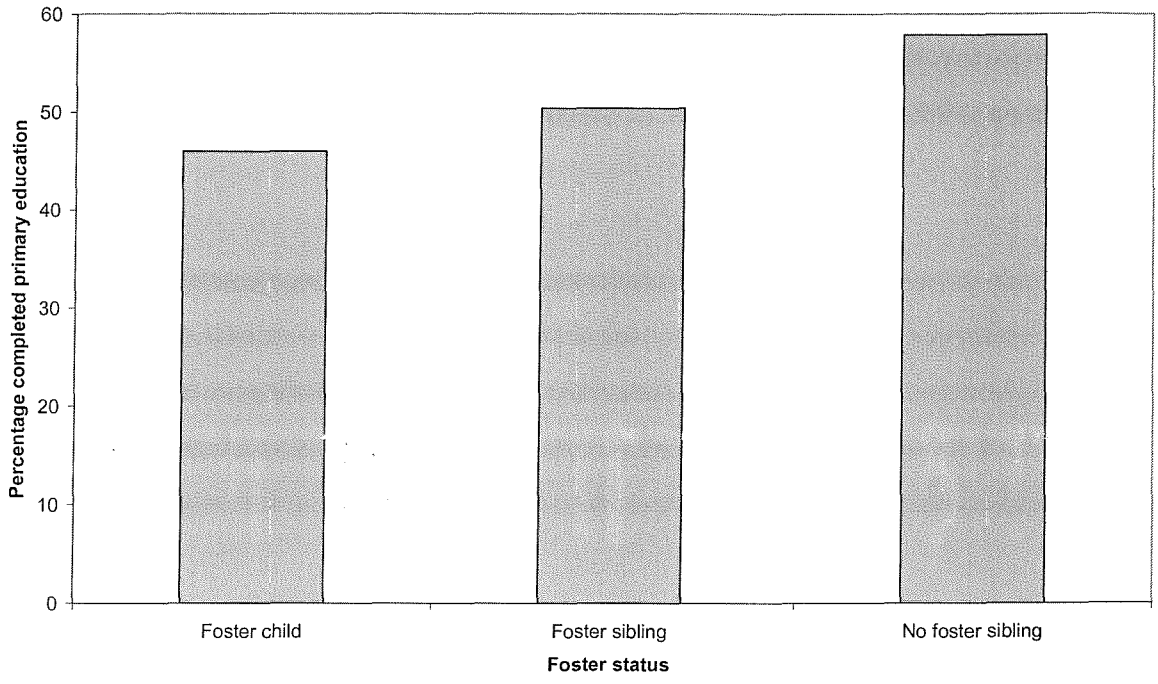
The SES of the household was also important. There was a lower proportion of children who had completed primary education residing in 'shacks' than in other types of dwelling. A positive association existed between household's school expenditure and the number of children who had completed primary education. In addition, households that received some kind of bursary, scholarship or donation had a higher proportion of children who had completed primary education than those who did not.

There were also strong provincial and residential differentials. The highest proportion of children who had completed primary education was among the Gauteng region and the lowest proportion among the Orange Free State. Also, the lowest proportion of children who had completed primary education was in the rural areas and the highest in the metropolitan areas.

Interestingly, foster status was significantly associated with primary completion at the 1% level. Figure 6.4 shows that the lowest proportion of children who had completed primary

education were indeed foster children. In fact less than half of foster children had completed primary education. The highest were children living in households which did not have any foster children, of which 58% had completed primary, and half of foster siblings had. These factors are now controlled for in the logistic regression analysis.

Figure 6.4 Bar chart showing the proportion of children aged 13-15 years who had completed primary education by foster status, South Africa, 1993



6.2.2 Factors associated with primary completion – logistic regression results

In order to investigate factors associated with primary completion, logistic regression models were applied, modelling the odds of primary completion versus not having completed primary education. Variables were added into the model in a sequential manner by 'block', by first controlling for child background characteristics, then adjusting for household composition characteristics, then indicators of household SES, and finally, area characteristics were adjusted for, as in Chapters 4 and 5. The variables included in these 'blocks' were the same as those modelled for enrolment and were based on theory developed from previous literature and variables available in the data as discussed in Chapter 3. Only the results of the parsimonious model are presented here. Again the final parsimonious model only includes variables that contributed at least 1% to the pseudo R squared but the methods of model selection were also discussed in more detail in Chapter 3. Table 6.4 presents the odds ratios for the parsimonious model for primary completion.

Table 6.4 Odds ratios for completing primary education for children aged 13-15 years, South Africa, 1993 – parsimonious model

Parameter		Odds ratio
Child background characteristics		
Current age		1.99***
Receiving household composition characteristics		
Race	African (RC)	1.00
	Coloured	2.24***
	Indian	6.70***
	White	2.78***
Head's education	Not completed primary education (RC)	1.00
	Completed primary education	2.11***
Receiving household SES indicators		
Equivalised school expenditure	$\leq 25^{th}$ percentile (RC)	1.00
	$> 25^{th}$ percentile - $\leq 50^{th}$ percentile	2.41***
	$> 50^{th}$ percentile - $\leq 75^{th}$ percentile	3.18***
	$> 75^{th}$ percentile	4.55***
Receiving household area characteristics		
Province	Western/Northern Cape	0.76
	Eastern Cape	0.91
	Kwazulu Natal (RC)	1.00
	Orange Free State	0.80
	Mpumalanga	1.35*
	Northern Province	1.82***
	North West	0.75
	Gauteng	1.63***
Observations		2745
Pseudo R squared		0.17

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

Table 6.4 shows that a unit increase in age increased the odds of primary completion by nearly 100%. Children in Coloured households were twice as likely to complete primary education as children in African households. Children in White households were nearly three times more likely to complete primary education than children in African households and children in Indian households were nearly seven times as likely to complete primary education as children in African households. Overall, children in African households had the lowest odds of completing primary education. The head of household's own education was an important factor in determining the child's education attainment. Children living in households whose head had completed primary education were twice as likely to complete primary education *themselves* compared to children living in households whose heads had not completed primary education.

School expenditure was also highly significantly associated with completing primary education, with a positive relationship shown. Children living in households with a school expenditure larger than the lower quartile but smaller than or equal to the median were 2.4

times as likely to complete primary education than children residing in households with school expenditures equal to or below the lower quartile. Children in households with a school expenditure of above the median and below or equal to the upper quartile were three times as likely to complete primary education than children residing in households with school expenditures equal to or below the lower quartile. Finally, children in households whose school expenditure was above the upper quartile were four-and-a-half times as likely to complete primary education than children residing in households with school expenditures equal to or below the lower quartile.

There were also provincial differences in primary completion. Children residing in Mpumalanga were 35% more likely to complete primary education than children residing in Kwazulu Natal. Children in Gauteng were 63% more likely and children in the Northern Province were 82% more likely to complete primary education than children in Kwazulu Natal. These findings along with the previous findings on education enrolment will be discussed in relation to the previous literature. Again, it is noted that not all previous African studies are equally applicable to South Africa, but there are a couple of studies that have investigated the education outcomes of fostered children in South Africa.

6.3 Discussion and policy implications

This section draws together the findings for the education outcomes investigated, being education enrolment for children aged 6-15 years and primary completion for children aged 13-15 years. The associated policy implications are also discussed.

6.3.1 Factors associated with education enrolment

The analysis has shown that 92% of children aged 6-15 years were enrolled in education. However, it must be noted that this does not infer attendance at school which was an incorrect assumption made by Zimmerman (2003) who investigated enrolment using the same data. South Africa is a relatively developed country (Department of Health et al., 1998) which could explain this high proportion of enrolment. The preliminary analysis indicated that girls were more likely to be enrolled than boys, which although is contradictory of sub-Saharan Africa, has also been found in Botswana in Southern Africa (World Bank, 2004c), another country similarly dominated by male labour migration to the mines in South Africa. Perhaps boys are therefore less motivated to go to school if they

are expected to migrate for work. However, although the sex of the child was significant in the logistic regression models, it was not included in the final parsimonious model indicating that it was not one of the variables that explained most of the variance in the data. Both the bivariate and multivariate analyses indicated a curvilinear relationship between enrolment and age. This is likely to be because enrolment increases with age until a certain point when children of older ages may start working and drop out of school. In the context of South Africa, it could also be driven by Africans and Coloureds starting school later and dropping out sooner (Case and Deaton, 1998). It must also be noted, as it was by the same authors, that the age heaping at age 6 years in order to shorten the interview by avoiding the anthropometric measurements as discussed in Chapter 3 could mean that some children reported as age 6 years are indeed not old enough to attend school and so would not be enrolled.

Of interest to this study was that fosters had the lowest proportion enrolled in education, followed by foster siblings and those without foster siblings were the highest proportion enrolled. Ainsworth (1992) and Urassa et al. (1997) (and Maharaj et al. (2000), in the context of South Africa) also found that fosters had lower enrolment and higher rates of drop-out which was linked to the time spent performing household tasks. This suggests that fostering may be detrimental to education. There is evidence of Ginther and Pollak's (2000) 'disruption hypothesis' as foster siblings also had lower enrolment than those without foster siblings so the act of bringing in a foster child could also be detrimental to the children already in the foster household. However, the association was not found significant in either the bivariate or multivariate analyses, and perhaps the idea of 'disruption' is not so appropriate in the African context. This therefore indicates that perhaps fostering for educational reasons as documented in the literature (Goody, 1975; Fiawoo, 1978; Goody, 1982, 1984; Isiugo-Abanihe, 1985; Bledsoe and Isiugo-Abanihe, 1989) may not be so prevalent in South Africa. The findings here are consistent though with Nathan (2001) who found no significant association between parental residence/survival and enrolment in Tanzania. Another reason for the insignificance of foster status could be that foster siblings in the households *underestimated* any effect (Evenhouse and Reilly, 2000). The insignificance of foster status does however suggest that foster children and foster siblings fare no better or worse with regards to education enrolment.

However interestingly, foster status *was* highly associated with the *reasons* the child was not enrolled in education, with one of the principal reasons being financial, especially for fosters, and not so important among children with foster siblings. Therefore, if children were fostered for educational reasons, then perhaps when times got hard, the foster children were the first to be forced to drop out of school rather than the biological children of the household, that is, they experience discrimination under harsh resource constraints (Evenhouse and Reilly, 2000). Also, although it is not possible to generalise since access to schooling was one of the least cited reasons for non-enrolment with small numbers, it was lowest among foster children indicating that perhaps they were fostered to have access to schooling. However, there was generally good access to schooling as one would expect in South Africa being a relatively more developed country of sub-Saharan Africa (Department of Health et al., 1998). The main reason for non-enrolment was cited to be 'other' reasons which included social unrest and violence. This was highest for those without foster siblings and approximately the same for children within foster households suggesting that perhaps children are fostered for this reason in the context of South Africa. Maharaj et al. (2000) suggest that boycotts still existed in 1993 and continue today which has forced parents to send their children to more peaceful schools.

Children of African race were the least likely to be enrolled in education and Indian race were the most likely in the preliminary analysis, but when controlling for other factors in the multivariate analysis, although children in Indian households remained most likely to be enrolled, children in White households were the least likely. This was an unexpected finding as it was thought children of White race may be of a higher SES and may be more likely to attend school. However, this could be explained by poverty being very different for Whites and Africans, so when holding everything else the same, White children are less likely to be enrolled. Case and Deaton (1998) also found that children in Indian households had the most education in their analysis of the same data. However, they also found that children in White households were not far behind. What is clear is that racial differences in schooling and schooling resources still existed at the time of the survey and still do today (Case and Deaton, 1998; Maharaj et al., 2000). Therefore, race remains very important in the context of South Africa being one of the factors explaining most of the variance in the data.

The preliminary bivariate analysis indicated that households headed by younger heads had higher enrolment. This could be because these households may not need as much domestic help or that they may encourage education more. However, these factors were not significant in the logistic regression models once other factors were controlled for. In contrast, the *education* of the household head was found very influential in both the bivariate and multivariate analyses, indicating that children in households headed by someone who had completed primary education were more likely to be enrolled in education themselves. This pattern has been found previously by Lloyd and Blanc (1996) in Kenya, Tanzania, Cameroon, Niger, Malawi, Namibia and Zambia. This was an expected finding in that if the head themselves was educated, they may value the importance of education and try to educate those children in their household. There seemed to be a vicious circle effect in that if the head of household was not educated then the children in the household were less likely to be enrolled in education and so will be uneducated, and when they become household heads, the cycle will continue. This has policy implications and means that educational interventions may have an intergenerational impact making them additionally effective.

The number of children in the household was found important in the preliminary analysis with the proportion of children enrolled decreasing with the number of children residing in the household. This was likely to be because of competition for resources or the need for childcare or help around the house, preventing children from being enrolled in school. This pattern also raises issues of quantity and quality with an increased number of children meaning a trade-off with quality in that it is more difficult to educate them all. However, although the number of children was significant in the multivariate analysis, it was not selected in the parsimonious model, not explaining most of the variance in the data.

The preliminary analysis, in particular, showed that enrolment was associated with the SES of the household, finding that lower proportions of children were enrolled if they were living in 'shacks', if the household had a relatively low school expenditure and if they did not receive some sort of bursary, scholarship or donation. This was likely to be because only households that were better-off could afford for the child to go to school, in both *actual* and *opportunity* costs. Case and Deaton (1998) found that in the context of South Africa even though White households spent much more on education, African households spent a much higher *proportion* of total expenditure on schooling than White households

and spend more on children in secondary school than in primary school. However, a lower proportion is spent on uniforms, school meals and transport among White households as compared to African households. Only the household's school expenditure was found significant in the multivariate analysis. A positive relationship was found, as expected, between the household's relative school expenditure and whether the child was enrolled in education. Households with higher school expenditure would be able to afford to keep children in school. However, there are issues of reverse causality here in that the school expenditure will be higher if children are enrolled in school but it is impossible to disentangle this inter-relationship with the data available.

Both the preliminary and the multivariate analyses found that there were strong regional differentials indicating perhaps differentials in access to schools by province. Also, children living in metropolitan areas were more likely to be enrolled in education and children in rural areas least likely. Again, this indicated issues of access, as well as children being needed for jobs or to work on the farm in rural areas, although this was not included in the parsimonious model and so was not as important as other factors. This was possibly because primary schools were likely to be accessible in both urban and rural areas as South Africa is relatively well developed compared to other sub-Saharan African countries (Department of Health et al., 1998). The situation may be different if considering secondary or tertiary institutions. Maharaj et al. (2000) in the South African context even report parents sending their children to schools in rural areas to avoid violence in urban areas. In contrast to urban-rural residence, province was selected in the parsimonious model. The bivariate analysis found that the highest proportion of children were enrolled in education in Gauteng, the *"economic heartland"*, and the lowest in the North West, a former homeland (Donaldson, 2002 p36). However, although the multivariate analysis still found the North West province to have the lowest odds of enrolment, after controlling for other factors, children in the Orange Free State, a former homeland, had the highest odds of enrolment. This latter finding was counter-intuitive but the provincial differentials could be a result of apartheid influences when African children were restricted to which school they could attend and when funding decisions were made by White control (Case and Deaton, 1998). This indicates that although South Africa is relatively developed compared to other countries in sub-Saharan Africa (Department of Health et al., 1998), there still may be access to schooling issues that need addressing by policy interventions.

6.3.2 Factors associated with primary completion

The preliminary analyses have shown that 55% of 13-15 year olds had completed primary education, which although is in 1993, is far from the MDG of universal primary education (World Bank, 2004a). Although the data are from 1993, this was a lower proportion than expected as most people in South Africa complete primary education (Maharaj et al., 2000). However, it could be that they take longer to complete which would not be shown in this analysis when only considering children up to age 15 years. Using the same data, Maharaj et al. (2000) found that children of different race achieve different rates of primary completion in South Africa, which is also supported by Case and Deaton (1998), with children of Indian and White race having better education outcomes than children of African and Coloured race suggesting that these latter racial groups need to be targeted in particular with education interventions. The speed of primary school completion has implications for progression into secondary schooling and potentially employment and future development and opportunities. Therefore there is a need to improve the quality and access to schooling by increasing resources.

Similar to enrolment, the bivariate analysis indicated that a higher proportion of girls completed primary education than boys, a finding that has been found previously in Botswana which also has high male labour migration (World Bank, 2004c). May be boys are not so motivated to do well and progress in school if they are likely to migrate to work in mining. However, although the sex of the child remained highly significant after controlling for other factors in the multivariate analysis, it was not included in the parsimonious model for primary completion as it was not one of the variables explaining most of the variance in the data. However, a positive relationship was found with age in both the bivariate and multivariate analyses as one would expect, allowing children to complete primary education if they had to repeat any years.

Of interest to this study was the influence of foster status on educational attainment. The preliminary analysis found that foster status was significant with the proportion of children who had completed primary education at the 1% level. The lowest proportion of children having completed primary education were foster children, followed by children residing with foster children, and finally, children not living with any foster children had the highest proportion of primary completion. This suggests that fostering may be detrimental to education. If children are indeed fostered for education reasons, it could be that they are

forced to drop out of school before they complete primary education. It could also be a rate of transition issue, that is, that they do not progress through school at the speed that they should. This was noted by Maharaj et al. (2000) who, although found little difference in attainment by foster status, found that foster children were *"slightly disadvantaged"* with regards to speed of transition, especially Coloured foster children (p13). These results contrast those from studies that suggest that foster children have enhanced educational outcomes (Isiugo-Abanihe, 1985; Bledsoe, 1988; Zimmerman, 2003).

Also, perhaps foster siblings are placed under increased competition for resources when a foster child is brought into the household and so they too face the fact that their education is compromised. Although it could be argued that 'disruption' is not such a problem in the African family model which accommodates all kinds of movement in and out of the household unit, this provides evidence for the 'disruption hypothesis' suggested by Ginther and Pollak (2000) whereby the pressure of a foster child in the household could not only affect the foster child but also all the children in the household. Therefore, foster siblings may also be an 'at risk' group, even though they live with their parent(s) (Evenhouse and Reilly, 2000) so perhaps foster households in general should be targeted with education interventions. However, although this was an interesting finding, the association was not significant when area characteristics were controlled for and so was not included in the final parsimonious model for primary completion, suggesting that fosters and foster siblings do not fare any better or worse with regards to completion of primary education. Although it is impossible to verify with the data, it could be that educational motivations are not apparent in the South African fostering context as documented in previous literature (Goody, 1975; Fiawoo, 1978; Goody, 1982, 1984; Isiugo-Abanihe, 1985; Bledsoe and Isiugo-Abanihe, 1989).

As one would expect in South Africa, race of the household was found to be significantly associated with whether the child completed primary education. This was found in both the bivariate and multivariate analyses. However, unlike the anomaly found in the enrolment analyses with children in White households having the lowest odds of enrolment, a more expected result was found with regards to primary completion. Children in African households had the lowest odds of completing primary education, followed by children in Coloured households, then children in White households, and finally, children in Indian households had the highest odds of completion. This result was

also mirrored in the preliminary analysis and was also found by Case and Deaton (1998). They suggested that Africans and Coloureds typically started school at a later age and dropped out at an earlier age compared to White and Indian children so this would have a direct effect on education attainment and primary completion. The authors also note that race disparities still exist in South Africa today, even after apartheid, and certainly at the time of the survey, especially with regards to resource constraints for African households and schools. Africans and Coloureds especially need to be targeted to reduce the inequalities in schooling and resources and increase the quality of schooling to ensure timely progression through school. In 1996, schooling was made compulsory for children of all racial groups (South African Schools Act, 1996) which was a step towards this. Even after the end of apartheid, Yach (1994) emphasises the need to monitor race statistics to make sure that there are improvements and to target interventions. Therefore, policy interventions very much need to consider the context of South Africa, particularly its apartheid history.

Both studies using the SALSMS by Case and Deaton (1998) and Maharaj et al. (2000) found strong influences of the family and households on education outcomes, which was also the case here illustrating the validity of the results. In the bivariate analysis there were higher proportions of children having completed primary education in households where the head of household was male and also if the head of household was younger than 50 years. Again, this could be because male headed households and younger headed households need less domestic help and the children can therefore be educated or that they value the importance of education more. However, these findings were not significant in the multivariate analyses after controlling for the other factors. Maharaj et al. (2000) attributed the insignificance of female headed households to absent males retaining decision making powers whilst away working. Another finding similar to enrolment was that children in households headed by educated heads who had completed primary education had higher odds of completing primary education themselves compared to children in households whose head had not completed primary education, even after controlling for other factors and was one of the key factors explaining most of the variance. Again, this has been found previously (Lloyd and Blanc, 1996; Case and Deaton, 1998) and these households are likely to be aware of the importance of education and illustrates that educational policy interventions also have additional implications for future generations because of the vicious circle effect.

The bivariate analysis for primary completion found a negative association between the number of children in the household and the proportion of children completing primary education, a finding suggesting that increased competition for schooling may lead to drop-out as there becomes increased need for employment and child care. This finding was no longer significant after controlling for household SES indicators and so was not included in the final parsimonious model.

The preliminary analysis also found that there was a lower proportion of children completing primary education who were living in 'shacks', likely to be because these were poorer households and so face constraints in that children are forced to drop-out of school in order to gain an income. However, although this finding was still significant in the logistic regression models, it was not selected in the parsimonious model as it was not one of the factors than explained most of the variance. In contrast, school expenditure was both significant in the bivariate analysis and remained important enough to keep in the parsimonious model for primary completion contributing at least 1% to the pseudo R squared. Similar to the enrolment results, a positive relationship existed between the household's relative school expenditure and whether the child completed primary education or not. Households that had higher education expenditure were more likely to be able to keep children in school to complete primary education but it may also be that their expenditure was higher for this reason, that is, issues of reverse causality exist. Another finding similar to the enrolment results was that the bivariate analysis for primary completion found that there were higher proportions of children completing primary education in households receiving some kind of bursary. Although this was an expected finding, it was not significant after controlling for the other factors.

The province the child resided in however, was significant in both the bivariate and multivariate analyses for primary completion. The preliminary analysis found the highest proportions of children completing primary education in Gauteng and the lowest in the Orange Free State. As mentioned previously, Gauteng is probably the most developed region, whereas the Orange Free State is one of the former homelands and so relatively less developed (Donaldson, 2002). However, after controlling for the other factors, the North West had the lowest odds of primary completion and the Northern Province had the highest odds. Although the North West province is one of the former homelands, the finding for the Northern Province was counterintuitive since it is probably the poorest and least

developed province (Donaldson, 2002). Although primary schools are likely to be accessible because South Africa is relatively developed compared to other sub-Saharan African countries, there are likely to be differentials in the *quality* of school as documented by Case and Deaton (1998) and Maharaj et al. (2000) which could account for this differential in primary completion. Such differential quality issues need to be addressed by policy interventions. Also, although residence was significantly associated with completion of primary education in the preliminary analysis, with the lowest proportion of completion in rural areas and the highest in metropolitan areas, residence was not selected in the parsimonious model. This is likely to be because even rural areas in South Africa have access to a primary school. It may have been different if other levels of educational attainment, such as secondary and tertiary, were considered, although this was not possible when investigating just children 15 years and younger. Older age groups were not considered as they were thought too old to be fostered.

6.4 Summary

This chapter examined the educational outcomes of the children involved in fostering, the third objective of this thesis. The analysis has shown that the correlates of enrolment and primary completion are similar and that many factors influence the two such as a positive relationship with the education of the household head and school expenditure. These findings have policy implications showing the importance of educating the population in the sense that there is an intergenerational impact and that expenditure is a potential barrier to enrolment and primary completion that needs overcoming by providing free education. In addition, there seem to be geographical issues with regards to access and quality of school which need to be addressed. For example, children residing in the North West province had the lowest odds of enrolment and primary completion so perhaps this province should be targeted in particular with education interventions. Although there was a highly significant association between foster status and the *reasons* for non-enrolment, foster status was not significantly associated with enrolment or primary completion after controlling for other factors. This suggests that foster children and foster siblings do not fare any better or worse with regards to their education. The next chapter will investigate this further by identifying whether the 'selective' nature of fostering needs to be controlled for and if it leads to any contrasting findings. This was the final objective of this research which has not been addressed previously.

CHAPTER SEVEN

Controlling for the endogeneity of fostering when investigating child outcomes

7.0 Introduction

As discussed in the methodology chapter, simply comparing fostered and non-fostered children ignores the fact that fostering is not randomly assigned. Rather, the findings from Chapter 4 demonstrate that different types of children are fostered into different types of household suggesting that foster children are indeed 'selected'. Chapters 5 and 6 investigated the factors influencing health and educational outcomes, some factors of which also influenced fostering. Because such *observable* factors seem to influence both fostering and child outcomes, perhaps *unobservables* do as well. As a consequence, it may not be advisable to simply compare child outcomes of fostered and non-fostered children without taking this selection effect into account.

This penultimate chapter therefore further examines the health and educational outcomes of fostered and non-fostered children investigated in the preceding chapters by *additionally* accounting for the correlates of fostering, whilst controlling for correlation between unobservables, to see whether these factors do indeed need to be controlled for when investigating the health and educational outcomes of children. The objectives of this chapter are three fold. First, to investigate whether fostering is endogenous to health and educational outcomes; second, if so, to investigate the *effect* of controlling for such endogeneity; and third, to investigate the consequent *effect* of being fostered. The key correlates of fostering as found in Chapter 4 were incorporated into the child outcome models found in Chapters 5 and 6 in a two-stage modelling process. The methodology was discussed in more detail in Chapter 3. Section 7.1 presents the two-stage modelling for the health outcomes and section 7.2 presents the two-stage modelling for the education outcomes. Section 7.3 discusses the results, comparing them to previous studies, before the final section summarises the findings.

7.1 Two-stage modelling of the health outcomes

The key correlates of fostering for children aged 0-5 years, as found in the parsimonious model in Chapter 4, were incorporated into a two-stage model with each of the health outcomes to see whether the error terms of the fostering equation and the health outcome equations were correlated, that is, unobservable factors. The correlates of fostering for 0-5 year olds were used since the health outcomes were also investigated for this age range. This was discussed in more detail in Chapter 3.

7.1.1 Two-stage modelling of illness

Table 7.1 shows the variables included in the selection model for illness, the total number of observations used in the model, and the estimate for ρ, measuring the correlation of unobservables, as well as the associated p-value for the likelihood ratio test of independence between equations.

Table 7.1 Variables included in the two-stage selection model for illness

	Process	
Variable	**Fostering**	**Illness**
Child background characteristics		
Current age	√	√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivlised monthly expenditure	√	
Equivalised health expenditure		√
Receiving household area characteristics		
Province	√	
Observations		5679
Correlation between unobservables, ρ		-0.44
P-value for the likelihood ratio test of independence between equations		0.16

Note: Since foster status was selected in the parsimonious model for illness, the three category variable was replaced with a binary explanatory variable in the one-stage model and removed from the two-stage model when investigating the selection effect of being fostered

Table 7.1 shows that identification was achieved through instrumental variables that were predictive of the endogenous fostering variable for 0-5 year olds but not the illness outcome, that is, the head's sex, number of non-fostered children in the household, the household's monthly expenditure and province of residence. These were variables that were found of key importance for fostering but not for illness in the previous analysis chapters, that is, explaining most of the variance in the data. With respect to the two-stage

selection model, the likelihood ratio test of independence between equations showed that the illness outcome was not significantly different from the illness outcome obtained by fitting the probit and selection models separately. Although the correlation between the error terms of the fostering and illness equation showed a moderate negative association indicating a moderate negative selection effect, it was not significant. As there was no significant correlation between the unobservables, there was no evidence of endogeneity. Therefore, the two-stage estimates are not presented here and the one-stage estimation strategy, as discussed in Chapter 5, is preferred.

The sensitivity of these results were investigated with other plausible equation specifications (see Tables A.1a-f in Appendix). For example, some of the variables that were found significant with illness in the model building process but that were not selected in the final parsimonious model were entered into the illness equation specification. Such variables included the number of times the child was fed each day, the number of children in the foster household and residence. Variables that were found significant in the model for fostering for 0-5 year olds during the model building process that were not selected in the final parsimonious model were also used to test the equation specifications. Such variables included age squared, whether the household received remittances and an interaction between residence and the age of the child. The results were fairly robust to these changes in equation specification, with the error terms between the equations remaining uncorrelated with no significant evidence of endogeneity.

7.1.2 Two-stage modelling of immunisation status

Table 7.2 shows the variables in the selection model for immunisation status, the total number of observations and the correlation coefficient for the error terms, ρ, with the associated p-value for the likelihood ratio test of independent equations. The instrumental variables used for identification shown in Table 7.2 were the child's age, the head's sex, the head's age, the number of non-fostered children in the household and the household's monthly expenditure, that is, variables that were found in the previous chapters to be the most predictive of fostering but not immunisation. Similar to illness, the likelihood ratio test of independence between equations showed that the vaccination outcome was not significantly different from the outcome obtained by fitting the probit and selection models separately. Again, a moderate negative association was shown between the error terms indicating a moderate negative selection effect but this was not significant. Because of this

insignificance, there was no evidence of endogeneity so the two-stage results are not presented here as the one-stage results discussed in Chapter 5 are the preferred estimates.

Table 7.2 Variables included in the two-stage selection model for immunisation status

	Process	
Variable	**Fostering**	**Immunisation**
Child background characteristics		
Current age	√	
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Residence		√
Observations		4411
Correlation between unobservables, ρ		-0.42
P-value for the likelihood ratio test of independence between equations		0.13

To check the sensitivity of the results, type of dwelling was incorporated into the selection model as it was found significant in the model building process for the vaccination outcome but was excluded from the final parsimonious model as it was not one of the variables explaining most of the variance. Similar to this, variables that were excluded from the parsimonious model for the correlates of fostering for 0-5 year olds but were found significant in the model building process, as stated earlier, were incorporated into the selection equation. The results were robust to these changes in specification with no significant correlation found between the error terms suggesting no evidence of endogeneity (see Tables A.2a-d in Appendix).

7.1.3 Two-stage modelling of nutritional status

Table 7.3 shows the variables included in the two-stage treatment effect model for the continuous outcome HAZ, along with the number of observations, correlation coefficient, ρ, and associated p-value for the likelihood ratio test for independence between equations.

Table 7.3 Variables included in the treatment effect model for HAZ

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receiving household area characteristics		
Province	√	
Observations		4252
Correlation between unobservables, ρ		0.04
P-value for the likelihood ratio test of independence between equations		0.60

The instrumental variables used for identification purposes were current age of the child, the head of household's sex and age, the number of non-fostered children in the household, monthly expenditure and province, those found in the previous chapters to be predictive of fostering for 0-5 year olds but not of HAZ. Table 7.3 shows that it was not possible to reject the null hypothesis that the two error terms of the fostering equation and HAZ equation were uncorrelated, suggesting that the one-stage results discussed in Chapter 5 hold. In fact, the correlation between the error terms was extremely weak indeed, being very close to zero, indicating very little evidence of endogeneity, and insignificant.

Sensitivity of the results was verified in the same way as previously, investigating other plausible models with variables that were found significant in the model building process but that were not included in the final parsimonious models. Such variables significant to HAZ were sex of the child, number of children in the household, type of dwelling and health expenditure. It was unexpected that age of the child was not found significant to HAZ in the model building process because HAZ is a long-term measure of malnutrition which should therefore build-up over time, so adding age to the HAZ model specification was also tested. The variables stated earlier that were found significant with 0-5 year old fostering but not included in the final parsimonious model were also incorporated. The results were found robust with the correlation coefficient remaining close to zero and statistically insignificant, implying no evidence of endogeneity (see Tables A.3a-h in Appendix).

Table 7.4 shows the variables included in the two-stage treatment effect model for WAZ, along with the number of observations, estimate for the correlation coefficient, ρ, and the associated p-value for the likelihood ratio test of independence between equations.

Table 7.4 Variables included in the treatment effect model for WAZ

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.12

Identification was achieved by the head of the household's sex and age, number of non-fostered children in the household and monthly expenditure. Table 7.4 also shows that the likelihood ratio test of independence between equations means that the null hypothesis of no correlation between the error terms of the two equations cannot be rejected. Indeed, the correlation between the error terms was again very weak but negative, suggesting little evidence of endogeneity that was insignificant. As there was no evidence of endogeneity, the one-stage estimates for WAZ hold, as discussed in Chapter 5.

Verification of the sensitivity to the equation specification was tested as previously with some other plausible equation specifications investigated. Some of the variables that were significant to WAZ but not included in the final parsimonious model that were included in the specification were sex of the child, whether the child was currently breastfeeding, whether the child had been ill in the preceding two weeks before the survey, interactions between breastfeeding and age and age squared, the head of household's sex, number of children in the household, type of dwelling, food and health expenditure. The same variables were also incorporated into the foster model that were stated earlier, that is, those significant in the model building for fostering of 0-5 year olds but not selected for the final parsimonious model. The results were robust with the correlation coefficient remaining

similar and insignificant implying no evidence of endogeneity (see Tables A.4a-n in Appendix).

Table 7.5 shows the variables used in the two-stage treatment effect model for WHZ, as well as the number of observations, correlation coefficient, ρ, and the p-value for the likelihood ratio test of independence between equations.

Table 7.5 Variables included in the treatment effect model for WHZ

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4311
Correlation between unobservables, ρ		-0.07
P-value for the likelihood ratio test of independence between equations		0.37

Instrumental variables that provided identification were the head of household's sex and age, the number of non-fostered children in the household and monthly expenditure, those found predictive of fostering but not of WHZ. From Table 7.5, one can see that the likelihood ratio test indicated that it was not possible to reject the null hypothesis that the two error terms were uncorrelated. The correlation between the error terms was very weak, being once again close to zero, although negative, suggesting virtually no evidence of endogeneity. As there was no evidence of such, the one-stage results presented and discussed in Chapter 5 are preferred.

Variables that were incorporated into the model for WHZ to check robustness were those that were significant in the model building process but not included in the final parsimonious model, that is, sex of the child, the interaction between breastfeeding and age of the child and age squared, race, the head of household's sex and education and the number of children in the household. Variables that were used to change the specification of the foster model were the same as those stated previously, that is, those found

significant in the foster model for 0-5 year olds in Chapter 4 but not included in the final parsimonious model. The results were robust with the correlation coefficient remaining negative and fairly close to zero with no evidence of endogeneity with any of these equation specifications (see Tables A.5a-j in Appendix). Therefore, there was no evidence of fostering being endogenous to any of the health outcomes. Potential endogeneity with the education outcomes is discussed in the next section.

7.2 Two-stage modelling of the education outcomes

The education enrolment and primary completion outcomes were modelled using their principal correlates as found in the parsimonious models in Chapter 6, together with the principal correlates of fostering for children aged 6-15 years, as found in the parsimonious model in Chapter 4, using two-stage selection models. The correlates for fostering for 6-15 year olds were used as it was applicable to the age range of children with education information.

7.2.1 Two-stage modelling of education enrolment

Table 7.6 shows the variables included in the two-stage selection model for enrolment in education, with the total number observations in the model, correlation coefficient, ρ, and the associated p-value for the likelihood ratio test of independence between equations.

Table 7.6 Variables included in the two-stage selection model for enrolment

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		9942
Correlation between unobservables, ρ		-0.32
P-value for the likelihood ratio test of independence between equations		0.00

Identification was achieved by the head of household's sex and age and the number of non-fostered children in the household, variables predictive of fostering for 6-15 year olds but not of enrolment. The p-value of the likelihood ratio test of independence between equations in Table 7.6 shows that there *was* evidence of a moderate negative correlation between the error terms of the two equations which was significant. Therefore, the unobservables that increase fostering are negatively correlated with the unobservables that increase enrolment. As a result, the one-stage results for enrolment discussed in Chapter 6 do *not* hold as they are likely to be biased since there was a moderate selection effect apparent.

Testing the sensitivity of these results involved including variables that were found significant in the model building of education enrolment but that were not included in the final parsimonious model. These included sex of the child, whether the child had been ill in the preceding two weeks before the survey, the number of children in the household and urban-rural residence. Changes to the foster selection equation were also made including those variables that were found significant when modelling the correlates of fostering for 6-15 year olds in Chapter 4 but that were not included in the final parsimonious model. Such variables included the type of dwelling, monthly expenditure, whether the household received any remittances, province, residence and an interaction between residence and age of the child. The results were robust with there still being a significant correlation between the error terms of the two equations, indicating that unobserved factors that influence both fostering and education enrolment were correlated and needed to be accounted for in the selection model (see Tables A.6a-j in Appendix).

The two-stage approach controlling for endogeneity was therefore justified and so the effects of doing so examined by looking at the difference in the marginal predicted probabilities for fosters and non-fosters produced by the two-stage approach compared to a one-stage approach. For the one-stage approach, the final parsimonious models for the correlates of the education outcomes selected in Chapter 6, but additionally incorporating fostering as a binary explanatory variable, were estimated using probit models. Probit models were used for the one-stage models as opposed to logit models as in the preceding chapters for ease of comparison with the two-stage models which make use of the probit function (Winship and Mare, 1983). In addition to comparing the two approaches to investigate the effect of controlling for *endogeneity*, the effect of *fostering* was investigated

by examining the marginal predicted probability of the outcomes for fostered and non-fostered children, taking such selection into account. The two-stage selection model had to be additionally run for the sub-sample of non-fostered children to obtain the marginal predicted probabilities for non-fosters. This was discussed in more detail in Chapter 3. These marginal predicted probabilities by foster status and model approach are shown in Figure 7.1.

Figure 7.1 Marginal predicted probability of being enrolled in education for fosters and non-fosters 6-15 years, from the one-stage probit and two-stage selection models, South Africa, 1993

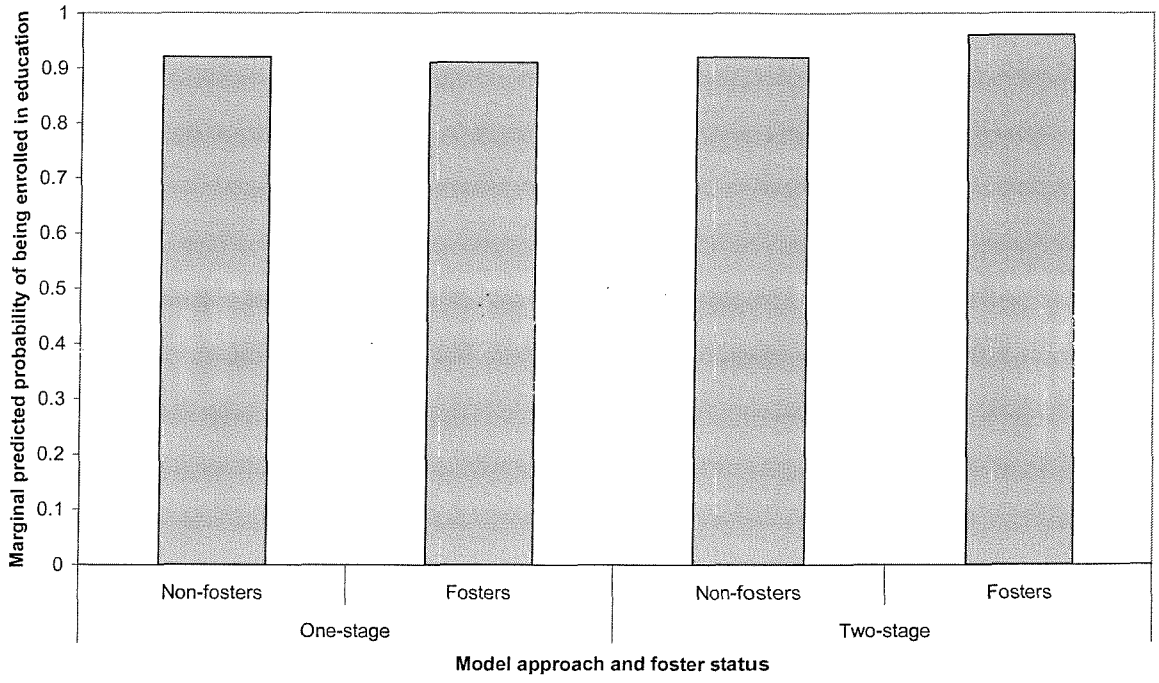


Figure 7.1 shows that the probability of being enrolled from the one-stage probit model was slightly higher (one percentage point) for non-fosters as compared to fosters. In contrast, when taking selection into account, the probability of enrolment for fosters was four percentage points higher than non-fosters. When comparing the two modelling approaches, the predicted probability of enrolment for non-fosters was the same. However, a difference was shown in the probability of enrolment for fosters when using the two modelling approaches. Foster children had a probability of enrolment five percentage points higher using the two-stage approach compared to the one-stage approach.

The mean of the predicted probabilities from each model was calculated by the explanatory variables and foster status. Table 7.7 and Figure 7.2 show these marginal predicted probabilities for fosters and non-fosters by each model approach by the explanatory variables.

Table 7.7 Marginal predicted probability of being enrolled in education for fosters and non-fosters 6-15 years, from the one-stage probit and two-stage selection models, South Africa, 1993

		1-stage model		2-stage model	
		Non-fosters	Fosters	Non-fosters	Fosters
Receiving household composition characteristics					
Race	African (RC)	0.92	0.90	0.92	0.95
	Coloured	0.95	0.92	0.94	0.98
	Indian	1.00***	0.99***	1.00***	1.00
	White	0.96	0.96	0.96	1.00
Head's Education	Not completed primary education (RC)	0.90	0.89	0.90	0.94
	Completed primary education	0.96***	0.94***	0.96***	0.98*
Receiving household SES indicators					
Equivalised school expenditure	≤25th percentile (RC)	0.80	0.79	0.80	0.90
	> 25th percentile – ≤50th percentile	0.92***	0.92***	0.93***	0.95***
	> 50th percentile – ≤75th percentile	0.95***	0.95***	0.96***	0.97***
	> 75th percentile	0.97***	0.97***	0.97***	0.99***
Receiving household area characteristics					
Province	Western/Northern Cape	0.94**	0.93**	0.94**	0.98
	Eastern Cape	0.91***	0.89***	0.91***	0.94
	Kwazulu Natal (RC)	0.91	0.89	0.92	0.96
	Orange Free State	0.93***	0.93***	0.92***	0.98***
	Mpumalanga	0.94***	0.91***	0.94***	0.96
	Northern Province	0.95***	0.96***	0.95***	0.96
	North West	0.85***	0.82***	0.85***	0.91**
	Gauteng	0.97***	0.95***	0.96***	0.99

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category
Note: Adjusted for age and age squared (see Figure 7.2). The one-stage model included foster status as an explanatory variable that was then excluded in the two-stage model. However, only selected results are presented - probabilities are presented for fosters and non-fosters for comparison purposes.

First, comparing the modelling procedures, Table 7.7 shows that using the one-stage and two-stage models produced very similar probabilities of enrolment for non-fosters by all the explanatory variables. However, the differences between the probabilities produced by the two models were much more marked for foster children. In particular, foster children

in households whose school expenditure was below or equal to the lower quartile had a predicted probability of enrolment of 0.79 from the one-stage probit model and a probability of 0.90 from the two-stage selection model, an 11 percentage point difference. In addition, foster children in Kwazulu Natal had a predicted probability of enrolment of 0.89 from the one-stage model and 0.96 from the two-stage model, and children in the North West Province had a probability of 0.82 from the one-stage model and 0.91 from the two-stage model. In fact, in every case except children in the Northern Province (where it was the same), the probability of enrolment was higher for fosters from the two-stage model than from the one-stage model, suggesting that the one-stage model *underestimates* the probability of enrolment for foster children.

Second, when investigating the impact of being *fostered*, that is, comparing the marginal predicted probabilities of enrolment for fosters and non-fosters using only the selection model, it seems that enrolment was higher for fostered children. In fact, it appears that by each category of each explanatory variable, fostered children had at least the same or a higher probability of enrolment. For example, non-fostered children residing in the North West province had a probability of enrolment of 0.85 compared to fostered children who had a probability of 0.91. Similar to this, non-fosters residing in the Orange Free State had a probability of enrolment of 0.92 compared to fosters who had a probability of enrolment of 0.98.

Finally, when looking at the probability of enrolment by the explanatory variables using the two-stage selection model, that is, the more reliable estimates than those given in Chapter 6 because endogeneity is controlled for, Table 7.7 shows that both fostered and non-fostered children in African households had the lowest probability of enrolment and children in Indian households the highest. Both fostered and non-fostered children in households headed by a head who had completed primary education had a higher probability of education enrolment than those in households headed by someone who had not completed primary education. A positive relationship between education enrolment and school expenditure was shown for both fosters and non-fosters. Children in the North West province had the lowest probability of enrolment and children in the Gauteng province had the highest.

Figure 7.2 shows these same marginal predicted probabilities of being enrolled in education by age for fosters and non-fosters, produced by both the one-stage probit model and the two-stage selection models.

Figure 7.2 Line graph of the marginal predicted probability of being enrolled in education by age for fosters and non-fosters, produced by the one-stage probit model and the two-stage selection models, South Africa, 1993

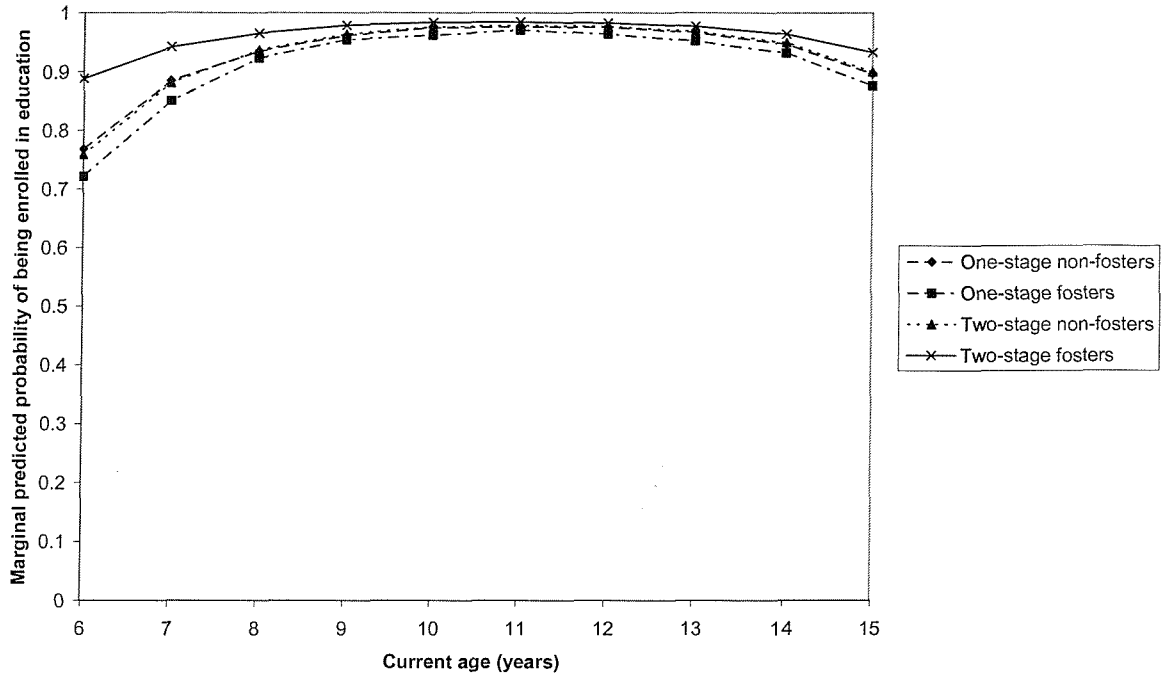


Figure 7.2 shows a curvilinear relationship between age and enrolment for both fosters and non-fosters and by both the one-stage and two-stage models, hence justification for the age squared term being included. Similar to patterns shown in Table 7.7, Figure 7.2 shows that the probability of enrolment was lowest for foster children using the one-stage probit model and foster children using the two-stage selection model had the highest probability of being enrolled. The differences were more marked at the early and later ages but not so much in the mid-age group. The one-stage and two-stage probabilities by age were similar for non-fosters.

7.2.2 Two-stage modelling of primary completion

Table 7.8 shows the variables used for the two-stage selection model for primary completion with the total number of observations, ρ estimate, and p-value for the likelihood ratio test of independence between equations.

Table 7.8 Variables used in the two-stage selection model for primary completion, South Africa, 1993

Variable	Process	
	Fostering	Primary completion
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		2710
Correlation between unobservables, ρ		-0.47
p-value for the likelihood ratio test of independence between equations		0.00

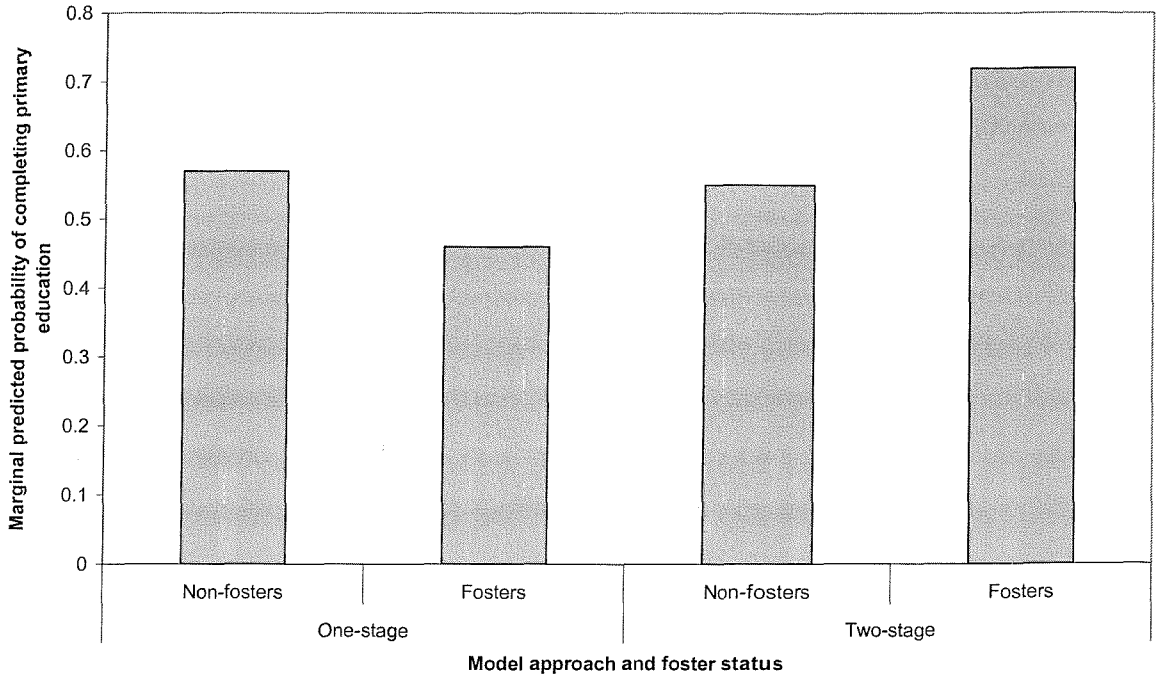
Identification was achieved by excluding the head of household's sex and age and the number of non-fostered children in the household from the primary completion equation. Table 7.8 shows that the likelihood ratio test indicated a correlation between the error terms of the fostering equation and the primary completion equation which was significant. In fact, this was the strongest correlation found, and therefore the strongest selection effect that was moderately negative. Therefore again, the one-stage results presented in Chapter 6 are likely to be biased.

Yet again, the results were found to be quite robust when the equation specifications were changed. Sex of the child, current age of the child squared, type of dwelling and residence were each incorporated into the primary completion model, because they were found to be significant in the original model building process (but they were not selected in the final parsimonious model for primary completion). The variables that were significant correlates for the fostering of 6-15 year olds but that were not selected in the final parsimonious model were each put into the fostering specification. Again, there was no real alteration in the correlation coefficient which remained significant (see Tables A.7a-j in Appendix).

As for education enrolment, the mean predicted probabilities for fosters and non-fosters were produced from the one-stage probit and two-stage selection model. Again, in order to do this, a one-stage probit model had to be run for primary completion with foster status as

a binary explanatory variable, and the selection model had to be additionally run for the sub-sample of *non*-fostered children. Figure 7.3 shows these marginal predicted probabilities by foster status and model approach.

Figure 7.3 Marginal predicted probability of completing primary education for fosters and non-fosters 13-15 years, from the one-stage probit and two-stage selection models, South Africa, 1993



Similar to the findings for enrolment, Figure 7.3 shows that with respect to the overall probability of primary completion, non-fosters had a higher probability of primary completion using the one-stage probit model but fosters had a higher probability when using the two-stage selection model. Similar to the models for enrolment, the probability of primary completion was similar for non-fostered children using both the one-stage and two-stage approaches. However, a huge differential of 26 percentage points existed between the overall probability of primary completion for foster children when using the two approaches. Therefore, although the same pattern was shown as the enrolment findings, the differences for completion were a lot more marked between the two approaches. Table 7.9 and Figure 7.4 show the marginal predicted probabilities for completion of primary education for fosters and non-fosters produced by the one-stage probit model and the two-stage selection models for comparison which are the means of

the predicted probabilities produced by each model by foster status and the explanatory variables.

Table 7.9 Marginal predicted probability of completing primary education for fosters and non-fosters 13-15 years, from the one-stage probit and two-stage selection models, South Africa, 1993

		1-stage model		2-stage model	
		Non-Fosters	Fosters	Non-Fosters	Fosters
Receiving household composition characteristics					
Race	African (RC)	0.51	0.45	0.50	0.68
	Coloured	0.70***	0.59***	0.68***	0.85
	Indian	0.92***	0.87***	0.90***	1.00
	White	0.87***	-	0.87***	0.83
Head's education	Not completed primary education (RC)	0.45	0.39	0.73	0.65
	Completed primary education	0.72***	0.61***	0.71***	0.80**
Receiving household SES indicators					
Equivalised school expenditure	≤25th percentile (RC)	0.30	0.24	0.28	0.49
	> 25th percentile – ≤50th percentile	0.49***	0.43***	0.48***	0.70***
	> 50th percentile – ≤75th percentile	0.58***	0.49***	0.56***	0.72**
	> 75th percentile	0.75***	0.67***	0.73***	0.83***
Receiving household area characteristics					
Province	Western/Northern Cape	0.67	0.52	0.63	0.82
	Eastern Cape	0.45	0.38	0.43	0.59
	Kwazulu Natal (RC)	0.56	0.49	0.55	0.43
	Orange Free State	0.41	0.39	0.43	0.45**
	Mpumalanga	0.57*	0.45*	0.53	0.82*
	Northern Province	0.62	0.57	0.62***	0.87***
	North West	0.47	0.36	0.47	0.46**
	Gauteng	0.77***	0.71***	0.76**	0.86

* significant at 10%; ** significant at 5%; *** significant at 1%; RC = reference category

Note: Adjusted for age (see Figure 7.4). The one-stage model included foster status as an explanatory variable that was then excluded in the two-stage model. However, only selected results are presented - probabilities are presented for fosters and non-fosters for comparison purposes.

First, with regards to the *model* comparison, Table 7.9 shows that apart from if the head had not completed primary education, the probability of primary completion for non-fosters was fairly similar using both the one-stage probit model and the two-stage selection model. However, the differences in probabilities for foster children across the two models were a lot more marked. Only foster children in Kwazulu Natal had a lower probability of primary completion estimated by the two-stage model as compared to the one-stage model. In particular, foster children in the Western/Northern Capes and the Northern Province had

a probability of primary completion 30 percentage points higher when estimated by the two-stage selection model compared to the one-stage probit model. Foster children in Mpumalanga had a predicted probability of primary completion of 0.45 from the one-stage model and 0.82 from the two-stage model, a 37 percentage point difference. Similar to enrolment, the one-stage probit model seemed to be *underestimating* primary completion for foster children, *severely* in this case.

Second, when investigating the effect of *fostering* by examining the probability of primary completion for fosters and non-fosters using the selection model, it appears that in most cases fostered children had a substantially higher probability of primary completion. For example, non-fostered children living in households with a school expenditure of above the lower quartile but below the median had a probability of primary completion of 0.48 compared to 0.70 for fosters, a difference of 22 percentage points. In addition, non-fostered children living in the Mpumalanga province had a probability of completing primary education of 0.53 compared to 0.82 for fostered children, a difference of 29 percentage points. In fact, only fosters in White households and households headed by uneducated heads, and children living in the Kwazulu Natal and the North West provinces had lower probabilities of primary completion than non-fosters.

Finally, when examining the more reliable estimates of primary completion for fosters and non-fosters using the selection model, children in African households had the lowest probability of completing primary education and children in Indian households the highest. For fosters, children in households headed by a head who had completed primary education had a higher probability of primary completion compared to those in households headed by someone who had not completed primary education. The reverse was true for non-fosters. A positive relationship was seen with school expenditure for both fosters and non-fosters. Fostered children in the Northern Province had the highest probability of primary completion and those in Kwazulu Natal the lowest. In contrast, non-fosters in Gauteng had the highest probability of completion and those in the Eastern Cape and Orange Free State the lowest.

Figure 7.4 shows these such marginal predicted probabilities of completing primary schooling by age for fosters and non-fosters using the one-stage probit model and the two-stage selection models.

Figure 7.4 Line graph of the predicted probability of completing primary education by age for fosters and non-fosters, produced by the one-stage probit model and the two-stage selection models, South Africa, 1993

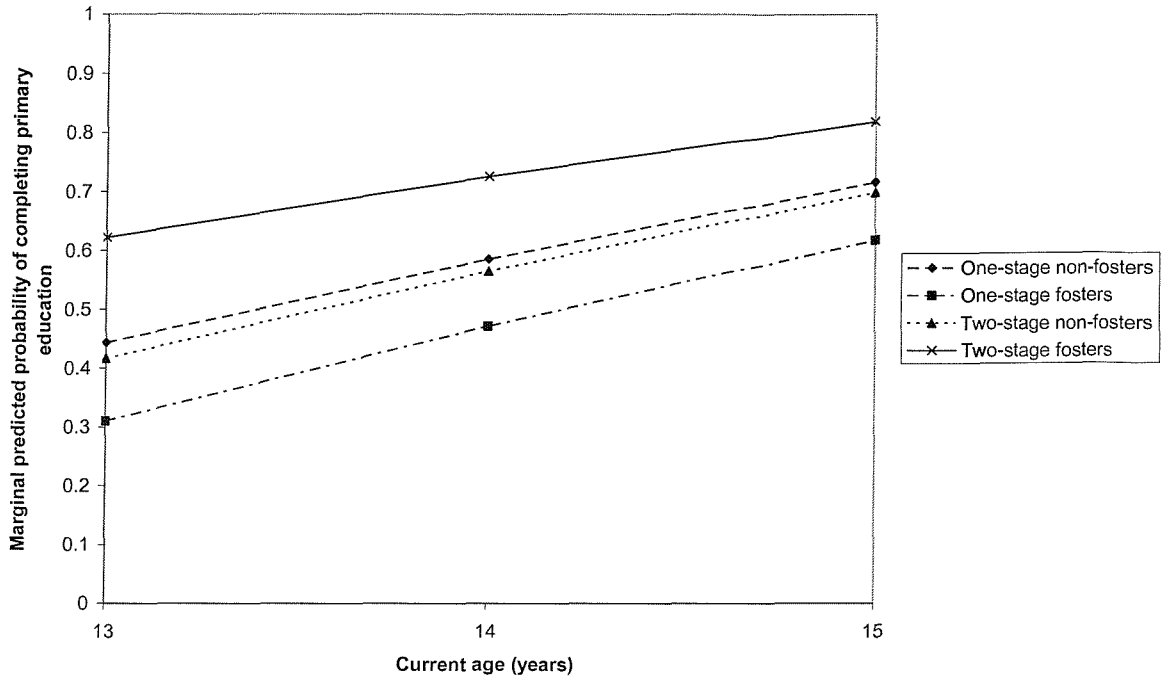


Figure 7.4 shows a strong positive linear association between age and completion of primary education for both fosters and non-fosters, and for both models. However like the patterns shown in Table 7.9, there were marked differences between the probabilities of completion for the four groups, especially for the foster children by the two types of model. At age 13 years, fosters had double the probability of primary completion by the two-stage model than fosters predicted by the one-stage model. Similar to enrolment, foster children, as estimated by the one-stage probit model, had the lowest probability of primary completion throughout the age range. However, foster children, as estimated by the two-stage selection model, had the highest. The probability for non-fosters was fairly similar by the two models.

7.3 Discussion

The likelihood ratio test showed that for all the health outcomes, the one-stage and two-stage models were *not* significantly different. Therefore, in this context and with these data, it is suggested that it is not necessary to take into account the correlates of fostering, and the unobservables involved, when investigating the health outcomes of fostered and non-fostered children. In short, there was no evidence of endogeniety with respect to the

health outcomes. Therefore, previous studies that have compared the health outcomes of fostered and non-fostered children in this way should be fairly robust. This was not completely unexpected as it is unlikely that children are fostered for health reasons. However, another explanation for the insignificance of the selection model for illness and immunisation status could be a reflection of the relatively smaller sample size of the *sub-sample* of fostered children on which the health outcomes were modelled.

In contrast, the likelihood ratio test for education enrolment and completion of primary education suggests that there *was* a significant difference when using the two-stage selection model since the error terms *were* in fact correlated, meaning that there *was* a 'selection effect'. Therefore, when investigating the education outcomes of fostered and non-fostered children, the correlates of fostering and correlation between unobservables need to be considered as a sample of fostered children is 'selective' and differs in some important ways. This is intuitive when children are fostered in order to be provided with an education as documented in previous literature (Goody, 1975; Fiawoo, 1978; Goody, 1982, 1984; Isiugo-Abanihe, 1985; Bledsoe and Isiugo-Abanihe, 1989; Maharaj et al., 2000; Zimmerman, 2003). Indeed, a possible reason for the finding of endogeneity with education outcomes but not with the health outcomes could be because fostering has shifted from being a traditional practice to kin members to being one that is practiced primarily for educational motives to non-kin (Goody, 1975; Isiugo-Abanihe, 1985). However, this is not possible to investigate since the reasons behind fostering are not known.

There was in fact a *negative* correlation between the unobservables influencing fostering and the education outcomes. The unobservables that increased fostering were negatively correlated with the unobservables that increased enrolment and primary completion. Unobservables such as educational ability and the background characteristics of the child's biological home could be involved and influencing both their education outcomes and propensity to be fostered. Therefore, the negative selection effect could be a result of the most educationally disadvantaged children being fostered.

It was possible to identify the potential impact of ignoring the selection effect when comparing the model approaches. When using the one-stage probit model, *non*-fosters had a higher probability of enrolment in education and primary completion. However, when

taking selection into account, *foster* children had a higher probability of being enrolled and completing primary education, being more pronounced for primary completion. This is again intuitive if children are fostered for educational reasons and perhaps children are being fostered to households that can better provide them with an education (Zimmerman, 2003). In fact, by each explanatory variable for enrolment, and by the majority for primary completion, foster children had a higher probability than non-fosters. Differences in enrolment were more pronounced in the earlier and later ages with not so many differentials in the mid ages when most were enrolled in education. At later ages, it is more likely for children to drop-out with increased pressures to work. In addition, at early ages, children could be kept at home to help with chores until it is felt necessary that they gain an education. These patterns could also be driven by Africans and Coloureds starting school later and finishing earlier (Case and Deaton, 1998).

Although the probabilities were very similar from the models for non-fosters, the one-stage probit model seemed to be underestimating both education enrolment and primary completion for foster children compared to the two-stage selection model. Although in a different context, Urassa et al. (1997) in their study of orphanhood, child fostering and the HIV/AIDS epidemic in rural Tanzania found that school enrolment was lower for foster children and orphans. These findings are similar to those found here when using the one-stage probit models. However, the authors did not control for the fact that these sub-groups are 'selected' and if they had controlled for this, then the reverse findings could have been visible as in this analysis.

Maharaj et al. (2000) used the same data to investigate children's schooling in South Africa but additionally linked it to the 1997 School Register of Needs. Incorporating a multi-level approach, these authors found that a slightly lower proportion of foster children were enrolled in school and that fosters, especially Coloureds, were slightly worse-off with regards to education transition and if they had completed primary education by age 13 years. Although they did note the 'selection' of foster children, they did not control for this and if they had done so may have found the reverse pattern as has this analysis. However, they found that education attainment was equal and suggested that children may have had access to resources for education through fostering who may not have had them in their natal households. If they had taken the 'selection' of foster children into account they may indeed have found evidence for this.

Although Zimmerman (2003) did take an econometric two-stage approach to investigate the educational outcomes of foster children, he incorporated a dummy variable for whether the household was *"more likely than average"* to enrol all its children in the second stage fostering-in regression equation (p567), which is the reverse to what was attempted here. Although he used the same SALSMS 1993 data, he only considered children of African race and used the unreliable school community information but found that foster children were no less likely to attend school than others. However, if he had taken the correlates of *fostering* into account and the correlation between unobservables then he may have indeed found that foster children were in fact *more* likely to be enrolled given their household circumstances than otherwise similar children who were not fostered.

Therefore, previous studies that have investigated the educational outcomes of fostered and non-fostered children simply by comparing them have overlooked the fact that fostered children are 'selectively' different from non-fostered children. In fact, it is likely that if such factors were taken into consideration then the educational outcomes are likely to be a lot better for foster children than originally suggested.

Although in a developed world context, several studies that have indeed attempted to investigate a possible selection effect to investigate the effect of family structure on child outcomes. Ginther and Pollak (2000) using sibling comparisons to investigate educational outcomes suggested that one of the reasons for the negative associations between being raised by a single parent or stepparent found *"reflect selection rather than causation"* (p1). Case et al. (2000) found that using sibling comparisons, children brought up by someone other than their biological mother achieved significantly less schooling than the biological children of the woman. Evenhouse and Reilly (2000), who also used sibling comparisons to account for unobserved factors to investigate the stepparent effect in the US context, found evidence of both selection *and* discriminatory treatment for step children. In fact, the authors who looked at numerous measures of child welfare found the direction of selection bias to vary and could increase or decrease the real stepparent effect therefore warning against the use of only one measure of child welfare which is why this study has more than one measure of such, seven in total. Therefore it appears that most studies that investigated a selection effect have indeed found evidence of one, suggesting that results from studies that did not control for the endogeneity of fostering should be viewed with caution.

Comparing the education outcomes for fostered and non-fostered children, the findings here suggest that being fostered is in fact beneficial to enrolment and primary completion with the probability of both being higher for fostered children compared to non-fostered children when using the selection model by each explanatory variable for enrolment and by the majority for primary completion. This has been suggested in some previous studies. For example, Bledsoe (1988) suggested that women *"invest more in"* fostered children than in their own children (p180). In addition, as mentioned previously, studies have suggested that children may move to households in order to be provided with an education (Goody, 1975; Fiawoo, 1978; Goody, 1982, 1984; Isiugo-Abanihe, 1985; Bledsoe and Isiugo-Abanihe, 1989; Maharaj et al., 2000; Zimmerman, 2003).

The education outcome results in this chapter are thought to be more reliable than those found in Chapter 6 when the potential endogeneity was not considered. For example, the anomaly of children in White households having the lowest education enrolment in Chapter 6 was contradicted by the findings in this chapter. The more reliable results in this chapter were in fact more expected with children in African households having the lowest enrolment, followed by children in Coloured households, then White households, with children in Indian households having the highest enrolment. This pattern has been found previously by Case and Deaton (1998). Although the more reliable results in this chapter, like those found in the previous chapter, also found that children residing in the North West province had the lowest enrolment, the province with the highest enrolment was found to be different. The more reliable results here found that children in Gauteng had the highest enrolment compared to children in the Orange Free State as found in the previous chapter. This new finding was more expected since Gauteng is considered the *"economic heartland"* of South Africa and that the Orange Free State is a former homeland (Donaldson, 2002 p36). The patterns by head's education and school expenditure and the curvilinear relationship with the age of the child found here were consistent with those found and discussed in Chapter 6.

With regards to primary completion, the same positive associations by age and school expenditure were found in both chapters. However, the patterns by race, head's education and province varied slightly when endogeneity was controlled for. The expected finding by race as found by Case and Deaton (1998) discussed above was found in Chapter 6 and for non-fosters using the two-stage results here. However, foster children residing in

Coloured households had a slightly higher probability of primary completion than Whites from the two-stage results in this chapter. Furthermore, the same pattern by head's education was shown in Chapter 6 and for foster children using the two-stage model but a different result was found using the two-stage model for non-fostered children. Children residing in households where the head had *themselves* completed primary education were more likely to complete primary education than those in households whose head had not completed primary education except for non-fostered children using the two-stage model where the reverse was found. Finally, although children residing in the Northern Province had the highest primary completion in Chapter 6 and in this chapter when controlling for endogeneity, a slightly different pattern was found with regards to which province had the *lowest* primary completion. Children residing in the North West province had the lowest primary completion in Chapter 6, but although completion remained low for this province in the two-stage models, non-fostered children in the Eastern and Orange Free State had the lowest probability of primary completion and foster children in Kwazulu Natal had the lowest. All these provinces are former homelands and so dominated by the African population (Donaldson, 2002) so these findings are not unexpected since these provinces are likely to have poorly resourced schools.

The two-stage results in this chapter seem to have been quite robust to changes in the equation specifications. In addition, even though the parsimonious models guided the choice of instrumental variables, the instrumental variables seem to identify the selection equations quite well, as seen in the sensitivity analysis (see Appendix). At least, the head of household's sex and the number of non-fostered children in the household were used in each equation specification as instrumental variables. In the previous chapters, these were found key predictive variables of fostering, explaining most of the variance in the data, but not of the other child outcomes investigated. In Chapter 4, children were found more likely to be fostered into households headed by women. Furthermore, children were fostered into households with fewer non-fostered children. The inclusion of these instrumental variables is therefore theory based, supporting the theories of 'granny fostering' and the high fertility hypothesis. These are therefore hypothesised to be the key factors of paramount importance to fostering.

7.4 Summary

This chapter has sought to investigate and control for the potential endogeneity of the fostering process when examining the child outcomes, the final objective of this thesis. Therefore, this chapter firstly investigated whether such endogeneity existed, and then the effect of controlling for such, and finally the consequent effect of being fostered on the child outcomes. In summary, not taking the correlates of fostering and the unobservables involved into account, that is, ignoring the possibility that fostered children are very different from non-fostered children, leads to some misleading conclusions when examining education outcomes. A negative selection effect was apparent with the unobservables that increase fostering being negatively correlated with the unobservables that increase enrolment and primary completion. Educationally disadvantaged children being fostered could be one such possible unobservable involved. However, for these data, it is not necessary to control for such selection when investigating the health outcomes used here in this context. Older children that are fostered fare better with respect to their education, having a higher probability of being enrolled in education and completing primary education compared to their (otherwise similar) non-fostered counterparts. Therefore, fostering appears to be beneficial to children with respect to their education. Although there seems to be no real difference for non-fosters, one-stage probit models seem to underestimate the education outcomes for foster children compared to two-stage selection models. These findings have methodological implications. The approach used here could be applied to other such endogenous demographic processes. Currently this methodology seems confined to the econometric and sociological disciplines when in fact demographic processes need to control for their non-randomness to ensure non-biased estimates. Such methodological and policy implications are discussed in the final chapter which draws together the findings of this thesis as well as the limitations.

CHAPTER EIGHT

Summary and conclusions

8.0 Introduction

The objectives of this thesis were to establish the levels, patterns and correlates of fostering and examine the ways in which fostering affects the health and educational outcomes of both fostered and non-fostered children, whilst recognising that fostering is not a randomised event. More specifically, it aimed to investigate whether being fostered, or the act of bringing in a foster child, improved or impaired the health and educational outcomes for fostered children and other children living in the household. This final chapter summarises the key findings and policy implications of this research in section 8.1 and the limitations of this study in section 8.2. The potential implications of this research are also discussed as well as areas for further research in the final section.

8.1 Key findings and policy implications

This thesis has five key findings. First, approximately 12% of children in South Africa were fostered, the majority of which were related to the household head, most being the grandchildren. This evidence of kinship and 'granny fostering' illustrates the importance of the extended family in the care of children in the South African context which has implications for policy. Overwhelmingly children are fostered into their grandparents household, however many health care messages target only biological parents of children, mothers in particular (Lloyd and Desai, 1992). Therefore, one of the key implications of this research is that public health and education messages need to broaden their target group to also include the carers of fostered children who may be grandmothers or older relatives. There is evidence that this is now being done in the form of the Child Support Grant and Foster Child Grant which are received by the 'primary caregiver' rather than a biological parent (Case et al., 2003). Unfortunately, these caregivers may be more difficult to reach since poorer, uneducated and older generations may be less receptive to modern health care messages, with less access to health facilities (in rural areas) and hold beliefs in traditional methods (Bledsoe et al., 1988; Bledsoe and Brandon, 1992; Castle, 1996). Indeed, there is evidence that these caregivers are not being reached as the Child Support

Grant is more likely to be received by mothers (Case et al., 2003). Furthermore, as there was a significant proportion of fostering, it is a pattern of childcare that should not be ignored because of its social, demographic and economic implications (Isiugo-Abanihe, 1985).

Second, household composition is a particularly important correlate of fostering, especially household size, with children being fostered into households with few children. This suggests that fertility influences fostering and so more broadly, that fosterage may have an impact on fertility decisions and family planning demand (Isiugo-Abanihe, 1985; Ainsworth, 1992). Therefore, studies of fertility, contraceptive use and family planning behaviour need to consider the influence of fostering in countries where this practice is common. However, there are aspects of reverse causality since fostering can lead to high fertility and the reverse can also hold, as discussed by Isiugo-Abanihe (1986; 1994), which further complicates the incorporation of the fostering context in such studies.

Third, a key methodological finding of this study is need to account for the endogeneity of fostering when investigating education outcomes for fostered children, but not for research on health outcomes. Ignoring the selective nature of fostering underestimated the education outcomes for fostered children, resulting in misleading findings. Therefore the results of previous studies which did not control for the non-randomness of fostering are likely to be biased and should be viewed with caution, at least in this context.

Fourth, foster children and foster siblings did not fare any worse than those who had not experienced fosterage with regards to the health outcomes measured in this study. In fact, fostered children were less likely to be reported as ill. This was suggested to be because of poor reporting and so reporting of illness needs to be improved for fostered children. However, foster status was not significantly associated with immunisation and nutritional status, after controlling for other factors. It is suggested that foster children and foster siblings fare no better or worse with regards to access to health care, such as immunisation, and nutrition and so the UN's Rights for the Child and the World Bank's MDGs should not be compromised due to the practice of fostering.

Finally, fostered children were more likely to be enrolled in education and complete primary education than their non-fostered counterparts. A negative selection effect was

apparent when investigating the education outcomes of fostered children, with the unobservables that increased fostering being negatively correlated with the unobservables that increased both enrolment and primary completion. Therefore, in the context of South Africa, it appears that the most educationally disadvantaged children may be fostered, perhaps to improve their education prospects (Zimmerman, 2003). This would broadly suggest that being fostered improves the education outcomes of fostered children, at least in this context, and so fostering should not compromise the educational goals of the UN's Rights of the Child or the World Bank's MDGs.

8.2 Limitations of this study

Even though this thesis attempted to overcome some of the shortcomings of previous studies, this research is not without its own limitations. Although these limitations have been noted throughout, both data and methodological limitations are summarised below.

8.2.1 Data limitations

With respect to the SALSMS 1993 data, the sampling design of the survey relied on census estimates and the sample had exclusions (SALDRU, 1994), such as fostering, adoption and orphanage institutions for example, although there are not likely to have been many of these in South Africa at that time (Harber, 1999; Madhavan, 2004). Also, because of the strong residential patterns by race in South Africa, if clusters were not selected, such as those that were found unreliable (World Bank, 2001), it could mean that the sample was not racially representative, a major problem in South Africa. Another problem was that full health and education information was only available for those who resided in the household for 15 days in the previous month. Full information was also not available for household helps etc so they could not be investigated when they could be potentially fostered. A further problem with the data was the unreliability of the community information that could not be incorporated into the analysis (Case and Deaton, 1998). This information, such as which clusters had immunisation campaigns and school facility information, would have been very useful to this study for contextual information but the data collection was compromised. There also appeared to be age heaping at current age 6 years which meant that these children may not be old enough to be enrolled in school which may be a flaw to the analysis of enrolment.

It was not possible to match the foster children back to their natal household as in the Ghanaian and Ivory Coast LSMS data. As a consequence it was not possible to investigate the implications for the children left behind in the natal home, an imperfect but closer estimate for what would have occurred in the absence of fostering. In addition, it was not possible to tell who the child was fostered to within the household, and who was looking after the child, only that they were residing in a household without their biological parents present. This is a big weakness of the data. Furthermore, the *reasons* for fostering out/in could not be investigated as well as emotional implications. Although this kind of motivational and psychological information could have been investigated using qualitative methodologies, the 1993 data are now rather out-dated being over ten years old so such qualitative data would not have complemented the survey data to provide contextual explanations behind the quantitative findings.

In addition, too many assumptions were involved to investigate fostering out so it was not possible to compare the symmetry between fostering in and out characteristics as previous studies have done (Ainsworth, 1992; Akresh, 2003). In the absence of a case-control study or longitudinal survey, with reliance on cross-sectional data, it is not possible to investigate any true cause and effect of fostering. Only current residence was examined as there was no information available on duration of residence in the household and so it cannot truly be inferred that any of the welfare outcomes are in fact due to fostering. As a consequence, only *associations* can be inferred rather than any *causal* inferences. There is also a censoring issue in that non-fostered children could be fostered in the future, or could have indeed been in the past (Pennington, 1991). Children's welfare outcomes could be a result of such fostering in the past rather than their current residence, or a combination of the two making it difficult to disentangle any relationships that potentially exist.

With regards to the child welfare outcomes investigated, using whether the children had received a measles vaccination incorrectly assumes that they had received all the necessary immunisations, or indeed, the full course. Similar to this, reported illness relies on reporting and recall which may be especially an issue for non-biological children. The reliability of the anthropometric data was also warned against (SALDRU, 1994) and so the results here could be plagued by measurement error. Also, enrolment in education does not imply attendance nor indeed regular attendance and so many assumptions are made.

8.2.2 Methodological limitations

In terms of the methodological limitations of this study, weights were not applied to the data because of issues of geographical and racial composition and because unweighted data were more appropriate for the complex models. Instead province, residence and race were controlled for. Also, some cases were excluded that had item non-response such as those missing crucial age and sex information instead of using imputation methods which were beyond the scope of this thesis. This could bias the results if the excluded cases were systematically different from the rest of the sample.

The collapsing and categorisation of variables also led to a loss of information but was necessary to obtain meaningful and interpretable findings. For example, orphans were classified as foster children since they exhibited similar characteristics and because there were so few but these could be another 'select' group worth investigating further. Breastfeeding was considered extremely important to health and so incorporated in the models for illness and nutritional status, but although collinearity was checked for, there were only a small number of fostered children reported as being breastfed and so this limitation is also realised. The sex and age of children in the receiving households were not investigated as the numbers got too small. Constructed expenditure variables were used as computation of such money metric measures was beyond the scope of this thesis. However although the constructed variables were transformed to account for the number of people in the household and the associated economies of scale, they did not account for the household composition because of the complexity involved when investigating fostering. Furthermore, the limitations of using equivalised health expenditure in the models for the health outcomes and school expenditure in the models for the education outcomes are noted since they are jointly determined and not suitable variables for indicators of household SES or affordability. Perhaps a more easily interpretable measure of SES should have been used such as monthly expenditure or a measure of affordability, where a better proxy might be the percentage of household expenditure rather than the absolute amount. Furthermore, it may not make sense to equivalise these health and education expenditures where it may make more sense to take account of the number of sick persons or number of school aged children. Finally with regards to SES, although whether a household received remittances was investigated, *who* they were received *from* was not examined as it was not a prime focus of this study.

The limitations of using the stepwise modelling criteria and the selection of only variables that contributed 1% to the R squared are noted. The aim in this thesis was to find the key correlates that explained most of the variance in the data with meaningful and interpretable models. Furthermore, although children were nested within households, within clusters, multi-level modelling was also beyond the scope of this thesis since the aim was to investigate and control for the endogeneity of fostering rather than the hierarchical nature of the data. However, the two-stage results that controlled for such endogeneity rely on the instrumental variables chosen acting as 'good' instruments, which they indeed seem to be judged from the sensitivity analysis (see Appendix). The head of household's sex and number of non-fostered children were chosen as instrumental variables in each case, being predictive of fostering but not the child outcome investigated. These are consistent with theories of 'granny fostering' and the high fertility hypothesis described in the literature.

Also, discrete time hazard modelling was not used to account for the cumulative age effect (censoring) on education attainment. Because of heaping at age 6 years, perhaps enrolment should have been re-estimated without children aged 6 years as Case and Deaton (1998) did, since such children may have been only 5 years of age and so not old enough to go to school. Although 6 year olds could have been removed from the analysis, it was thought that children were more likely to be fostered when they attain school age. For example, Akresh (2003) found an increase in fostering at age 6 years in Burkina Faso.

Probably the biggest limitation of this analysis is that the findings are not generalisable to children in South Africa but only to the 1993 SALSMS sample. This is because the South African context is very different today, especially in respect to the HIV/AIDS epidemic. It could be argued that the motivations behind fostering have now shifted away from educational motives to those of crisis because of the huge number of orphans. Therefore the levels, patterns and correlates of fostering are now likely to be very different. Furthermore, the welfare implications of orphans are likely to be a lot worse rather than the beneficial effect of fostering on education shown here. For example, UNICEF (2003) report that orphans cared for by the *"overwhelmed"* extended family face worse health and educational outcomes (p4). Case et al. (2004) also report that orphans have worse educational outcomes than non-orphans. Furthermore, as the HIV/AIDS epidemic proceeds to infect many in the general population, it could be argued that orphans may also be a less 'select' group. Therefore, the HIV/AIDS epidemic has huge implications for the

findings of this thesis as the levels, patterns, correlates and implications are all likely to be influenced. Harber (1999) and Madhavan (2004) discuss the future of the adoption and fostering practices in the South Africa context in response to HIV/AIDS.

Despite these many data and methodological limitations, this thesis adds to the knowledge of fostering and its welfare implications in South Africa immediately before the end of apartheid, and in so doing, has also contributed to statistical methodology. However, the findings from this thesis must be interpreted in the light of these limitations. In particular, these data may not be the most appropriate for the exploration of the topic of fostering. The *context* of the shifting of children, the characteristics of their carers, the whole *process* of decision-making regarding their movement together with the characteristics of their families of origin and foster carers cannot be examined with this data set and yet it is these factors that are likely to have an enormous impact on the child's well-being. Therefore, perhaps these analyses raise more questions than they answer. In spite of this, and although the *findings* may not be generalisable, the *methodology* is and there are associated aspects for further research, since there are still many gaps in knowledge.

8.3 Further research

As the SALSMS survey did not focus explicitly on fostering, the indirect nature of the data used in this thesis had some limitations. This highlights a number of data collection issues which need to be addressed in further research on fostering using these data. There needs to be direct questioning on fostering in large scale surveys such as the DHS and LSMS to enable further investigation of the phenomenon, specifically including the duration and reasons for fostering. Furthermore, there needs to be improved linkage in such surveys between sending and receiving households in order to investigate fostering in and fostering out. Moreover, longitudinal data collection on foster status and health and educational outcomes would allow more investigation of a potential cause and effect association. These issues are even more pressing in the wake of HIV/AIDS and likely increase in crisis fostering. In addition, there are important methodological implications. Many demographic processes do not occur randomly and so this needs to be taken into account when investigating them.

As the situation is very different in South Africa today, it would be interesting to compare the results from the 1993 LSMS with the next round of the survey when it is conducted, or indeed the re-survey of the Kwazulu Natal province in 1998 (KIDS). Similarly, the latest DHS could provide some useful contemporary data when it is available which should be representative of children, unlike its predecessor. Although beyond the scope of this thesis, a comparative analysis between the LSMS and DHS could be explored, confining the LSMS sample to reflect the DHS to shed valuable light on any potential biases. An in-depth analysis could also be carried out making use of the rich longitudinal BTT data from the Johannesburg-Soweto metropolitan area and comparing it to the poor, rural HIV-afflicted Umkhanyakude District in Kwazulu Natal with the ACDIS data.

If possible, it would be useful to link back to the natal households to investigate their characteristics and what might have happened to foster children in the absence of fostering by looking at the outcomes of children in the natal household. Furthermore, it would be fascinating to conduct qualitative research to compare with this to gain more of an insight into the motivations, influences and cultural norms underlying the phenomenon of fostering, especially since it is hypothesised that the motivations will have changed from being educational to crisis motives because of HIV/AIDS. It would also be intriguing to find out attitudes towards fostering, particularly from the children themselves, if it is considered as fostering in the African context, and if the foster children are treated as part of the family or as 'outsiders', and if the Foster Child Grant has had any impact since its introduction in 1998 (Case et al., 2003). It would also be useful to gauge some kind of understanding of the decision-making process, that is, who decides about whether, and which, children are fostered, and if sending households approach potential receiving households or vice versa, and the reasons behind the decision to foster in/out. As Madhavan (2004) discusses, it would be interesting to investigate the reasons behind fostering of children orphaned by AIDS, that is, if there are *altruistic* issues for non-kin as opposed to feelings of *obligation* on the part of kin members. It would also be important for policy to examine the child welfare measures of orphaned children as they are likely to fare worse being a more vulnerable sub-group (UNICEF, 2003; Case et al., 2004) and whether they are indeed a less 'select' group. In summary, bringing the analysis up-to-date and extending it by investigating other outcome variables would be a potentially interesting area for further research.

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APPENDIX

Sensitivity analysis for two-stage models

Table A.1a Variables included in the two-stage selection model for illness – sensitivity analysis

	Process	
Variable	**Fostering**	**Illness**
Child background characteristics		
Current age	√	√
Number of times fed each day		√*
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivlised monthly expenditure	√	
Equivalised health expenditure		√
Receiving household area characteristics		
Province	√	
Observations		5679
Correlation between unobservables, ρ		-0.45
P-value for the likelihood ratio test of independence between equations		0.18

Note: Since foster status was selected in the parsimonious model for illness, the three category variable was replaced with a binary explanatory variable in the one-stage model and removed from the two-stage model when investigating the selection effect of being fostered. *Number of times fed each day added to illness equation since significant in model building process.

Table A.1b Variables included in the two-stage selection model for illness – sensitivity analysis

	Process	
Variable	**Fostering**	**Illness**
Child background characteristics		
Current age	√	√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	√
Number of non-fostered children	√	
Number of children		√*
Receiving household SES indicators		
Equivlised monthly expenditure	√	
Equivalised health expenditure		√
Receiving household area characteristics		
Province	√	
Observations		5679
Correlation between unobservables, ρ		0.01
P-value for the likelihood ratio test of independence between equations		0.98

Note: Since foster status was selected in the parsimonious model for illness, the three category variable was replaced with a binary explanatory variable in the one-stage model and removed from the two-stage model when investigating the selection effect of being fostered. *Number of children added to illness equation since significant in model building process.

Table A.1c Variables included in the two-stage selection model for illness – sensitivity analysis

	Process	
Variable	**Fostering**	**Illness**
Child background characteristics		
Current age	√	√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivlised monthly expenditure	√	
Equivalised health expenditure		√
Receiving household area characteristics		
Province	√	
Residence		√*
Observations		5679
Correlation between unobservables, ρ		-0.45
P-value for the likelihood ratio test of independence between equations		0.16

Note: Since foster status was selected in the parsimonious model for illness, the three category variable was replaced with a binary explanatory variable in the one-stage model and removed from the two-stage model when investigating the selection effect of being fostered. *Residence added to illness equation since significant in model building process.

Table A.1d Variables included in the two-stage selection model for illness – sensitivity analysis

	Process	
Variable	**Fostering**	**Illness**
Child background characteristics		
Current age	√	√
Current age squared	√*	
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivlised monthly expenditure	√	
Equivalised health expenditure		√
Receiving household area characteristics		
Province	√	
Observations		5679
Correlation between unobservables, ρ		-0.42
P-value for the likelihood ratio test of independence between equations		0.18

Note: Since foster status was selected in the parsimonious model for illness, the three category variable was replaced with a binary explanatory variable in the one-stage model and removed from the two-stage model when investigating the selection effect of being fostered. *Age squared added to foster equation since significant in model building process.

Table A.1e Variables included in the two-stage selection model for illness – sensitivity analysis

	Process	
Variable	**Fostering**	**Illness**
Child background characteristics		
Current age	√	√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivlised monthly expenditure	√	
Equivalised health expenditure		√
Receive remittances	√*	
Receiving household area characteristics		
Province	√	
Observations		5679
Correlation between unobservables, ρ		-0.45
P-value for the likelihood ratio test of independence between equations		0.15

Note: Since foster status was selected in the parsimonious model for illness, the three category variable was replaced with a binary explanatory variable in the one-stage model and removed from the two-stage model when investigating the selection effect of being fostered. *Whether receive remittances added to foster equation since significant in model building process.

Table A.1f Variables included in the two-stage selection model for illness – sensitivity analysis

	Process	
Variable	**Fostering**	**Illness**
Child background characteristics		
Current age	√	√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivlised monthly expenditure	√	
Equivalised health expenditure		√
Receiving household area characteristics		
Province	√	
Residence	√*	
Residence*age	√*	
Observations		5679
Correlation between unobservables, ρ		-0.44
P-value for the likelihood ratio test of independence between equations		0.16

Note: Since foster status was selected in the parsimonious model for illness, the three category variable was replaced with a binary explanatory variable in the one-stage model and removed from the two-stage model when investigating the selection effect of being fostered. *Residence/age interaction added to foster equation since significant in model building process.

Table A.2a Variables included in the two-stage selection model for immunisation status – sensitivity analysis

	Process	
Variable	**Fostering**	**Immunisation**
Child background characteristics		
Current age	√	
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Type of dwelling		√*
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Residence		√
Observations		4411
Correlation between unobservables, ρ		-0.41
P-value for the likelihood ratio test of independence between equations		0.15

*Type of dwelling added to immunisation equation since significant in model building process.

Table A.2b Variables included in the two-stage selection model for immunisation status – sensitivity analysis

	Process	
Variable	**Fostering**	**Immunisation**
Child background characteristics		
Current age	√	
Current age squared	√*	
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Residence		√
Observations		4411
Correlation between unobservables, ρ		-0.42
P-value for the likelihood ratio test of independence between equations		0.13

*Age squared added to foster equation since significant in model building process.

Table A.2c Variables included in the two-stage selection model for immunisation status – sensitivity analysis

	Process	
Variable	**Fostering**	**Immunisation**
Child background characteristics		
Current age	√	
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receive remittances	√*	
Receiving household area characteristics		
Province	√	√
Residence		√
Observations		4411
Correlation between unobservables, ρ		-0.49
P-value for the likelihood ratio test of independence between equations		0.07

*Whether receive remittances added to foster equation since significant in model building process.

Table A.2d Variables included in the two-stage selection model for immunisation status – sensitivity analysis

	Process	
Variable	**Fostering**	**Immunisation**
Child background characteristics		
Current age	√	
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Residence	√*	√
Residence*age	√*	
Observations		4411
Correlation between unobservables, ρ		-0.46
P-value for the likelihood ratio test of independence between equations		0.10

*Residence/age interaction added to foster equation since significant in model building process.

Table A.3a Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	√*
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receiving household area characteristics		
Province	√	
Observations		4252
Correlation between unobservables, ρ		0.02
P-value for the likelihood ratio test of independence between equations		0.80

*Age added to HAZ equation as HAZ should build-up over time, being a long-term measure of nutritional status.

Table A.3b Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Sex		√*
Current age	√	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receiving household area characteristics		
Province	√	
Observations		4252
Correlation between unobservables, ρ		0.03
P-value for the likelihood ratio test of independence between equations		0.63

*Sex added to HAZ equation since significant in model building process.

Table A.3c Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Number of children		√*
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receiving household area characteristics		
Province	√	
Observations		4252
Correlation between unobservables, ρ		0.08
P-value for the likelihood ratio test of independence between equations		0.28

*Number of children added to HAZ equation since significant in model building process.

Table A.3d Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Type of dwelling		√*
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receiving household area characteristics		
Province	√	
Observations		4247
Correlation between unobservables, ρ		0.04
P-value for the likelihood ratio test of independence between equations		0.56

*Type of dwelling added to HAZ equation since significant in model building process.

Table A.3e Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Equivalised health expenditure		√*
Receiving household area characteristics		
Province	√	
Observations		4252
Correlation between unobservables, ρ		0.04
P-value for the likelihood ratio test of independence between equations		0.55

*Health expenditure added to HAZ equation since significant in model building process.

Table A.3f Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	
Current age squared	√*	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receiving household area characteristics		
Province	√	
Observations		4252
Correlation between unobservables, ρ		0.03
P-value for the likelihood ratio test of independence between equations		0.66

*Age squared added to foster equation since significant in model building process.

Table A.3g Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receive remittances	√*	
Receiving household area characteristics		
Province	√	
Observations		4252
Correlation between unobservables, ρ		0.03
P-value for the likelihood ratio test of independence between equations		0.72

*Whether receive remittances added to foster equation since significant in model building process.

Table A.3h Variables included in the treatment effect model for HAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**HAZ**
Child background characteristics		
Current age	√	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√
Receiving household area characteristics		
Province	√	
Residence	√*	
Residence*age	√*	
Observations		4252
Correlation between unobservables, ρ		0.04
P-value for the likelihood ratio test of independence between equations		0.58

*Residence/age interaction added to foster equation since significant in model building process.

Table A.4a Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Sex		√*
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.16
P-value for the likelihood ratio test of independence between equations		0.10

*Sex added to WAZ equation since significant in model building process.

Table A.4b Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Current age squared		√*
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.11

*Age squared added to WAZ equation since significant in model building process.

Table A.4c Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Currently being breastfed		√*
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4353
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.12

*Currently being breastfed added to WAZ equation since significant in model building process.

Table A.4d Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Been ill in the preceding two weeks		√*
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.12

*Been ill in the preceding two weeks added to WAZ equation since significant in model building process.

Table A.4e Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Currently being breastfed		√*
Measles vaccination status		√
Currently being breastfed*age		√*
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4353
Correlation between unobservables, ρ		-0.14
P-value for the likelihood ratio test of independence between equations		0.13

*Breastfeeding/age interaction added to WAZ equation since significant in model building process.

Table A.4f Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Current age squared		√*
Currently being breastfed		√*
Measles vaccination status		√
Currently being breastfed*age		√*
Currently being breastfed*age squared		√*
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4353
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.13

*Breastfeeding/age squared interaction added to WAZ equation since significant in model building process.

Table A.4g Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	√*
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.13
P-value for the likelihood ratio test of independence between equations		0.20

*Head's sex added to WAZ equation since significant in model building process.

Table A.4h Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Number of children		√*
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.02
P-value for the likelihood ratio test of independence between equations		0.86

*Number of children added to WAZ equation since significant in model building process.

Table A.4i Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Type of dwelling		√*
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4374
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.12

*Type of dwelling added to WAZ equation since significant in model building process.

Table A.4j Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised food expenditure		√*
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.17
P-value for the likelihood ratio test of independence between equations		0.06

*Food expenditure added to WAZ equation since significant in model building process.

Table A.4k Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Equivalised health expenditure		√*
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.14

*Health expenditure added to WAZ equation since significant in model building process.

Table A.4l Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Current age squared	√*	
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.15
P-value for the likelihood ratio test of independence between equations		0.12

*Age squared added to foster equation since significant in model building process.

Table A.4m Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receive remittances	√*	
Receiving household area characteristics		
Province	√	√
Observations		4379
Correlation between unobservables, ρ		-0.16
P-value for the likelihood ratio test of independence between equations		0.10

*Whether receive remittances added to foster equation since significant in model building process.

Table A.4n Variables included in the treatment effect model for WAZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WAZ**
Child background characteristics		
Current age	√	√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Residence	√*	
Residence*age	√*	
Observations		4379
Correlation between unobservables, ρ		-0.17
P-value for the likelihood ratio test of independence between equations		0.09

*Residence/age interaction added to foster equation since significant in model building process.

Table A.5a Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Sex		√*
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4311
Correlation between unobservables, ρ		-0.07
P-value for the likelihood ratio test of independence between equations		0.36

*Sex added to WHZ equation since significant in model building process.

Table A.5b Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Currently being breastfed		√*
Number of times fed each day		√
Measles vaccination status		√
Breastfeeding*age		√*
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4284
Correlation between unobservables, ρ		-0.06
P-value for the likelihood ratio test of independence between equations		0.39

*Breastfeeding/age interaction added to WHZ equation since significant in model building process.

Table A.5c Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Current age squared		√*
Currently being breastfed		√*
Number of times fed each day		√
Measles vaccination status		√
Breastfeeding*age		√*
Breastfeeding*age squared		√*
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4284
Correlation between unobservables, ρ		-0.07
P-value for the likelihood ratio test of independence between equations		0.37

*Breastfeeding/age squared interaction added to WHZ equation since significant in model building process.

Table A.5d Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Race		√*
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4311
Correlation between unobservables, ρ		-0.08
P-value for the likelihood ratio test of independence between equations		0.29

*Race added to WHZ equation since significant in model building process.

Table A.5e Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	√*
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4311
Correlation between unobservables, ρ		-0.04
P-value for the likelihood ratio test of independence between equations		0.58

*Head's sex added to WHZ equation since significant in model building process.

Table A.5f Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Head's education		√*
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4260
Correlation between unobservables, ρ		-0.11
P-value for the likelihood ratio test of independence between equations		0.16

*Head's education added to WHZ equation since significant in model building process.

Table A.5g Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Number of children		√*
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4311
Correlation between unobservables, ρ		-0.03
P-value for the likelihood ratio test of independence between equations		0.66

*Number of children added to WHZ equation since significant in model building process.

Table A.5h Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Current age squared	√*	
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Observations		4311
Correlation between unobservables, ρ		-0.07
P-value for the likelihood ratio test of independence between equations		0.36

*Age squared added to foster equation since significant in model building process.

Table A.5i Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receive remittances	√*	
Receiving household area characteristics		
Province	√	√
Observations		4311
Correlation between unobservables, ρ		-0.06
P-value for the likelihood ratio test of independence between equations		0.43

*Whether receive remittances added to foster equation since significant in model building process.

Table A.5j Variables included in the treatment effect model for WHZ – sensitivity analysis

	Process	
Variable	**Fostering**	**WHZ**
Child background characteristics		
Current age	√	√
Number of times fed each day		√
Measles vaccination status		√
Receiving household composition characteristics		
Head's sex	√	
Head's age	√	
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√	
Receiving household area characteristics		
Province	√	√
Residence	√*	
Residence*age	√*	
Observations		4311
Correlation between unobservables, ρ		-0.08
P-value for the likelihood ratio test of independence between equations		0.31

*Residence/age interaction added to foster equation since significant in model building process.

Table A.6a Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Sex		√*
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		9942
Correlation between unobservables, ρ		-0.32
P-value for the likelihood ratio test of independence between equations		0.00

*Sex added to enrolment equation since significant in model building process.

Table A.6b Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Been ill in preceding two weeks		√*
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		9942
Correlation between unobservables, ρ		-0.32
P-value for the likelihood ratio test of independence between equations		0.00

*Being ill in the preceding two weeks added to enrolment equation since significant in model building process.

Table A.6c Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Number of children		√*
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		9942
Correlation between unobservables, ρ		-0.30
P-value for the likelihood ratio test of independence between equations		0.01

*Number of children added to enrolment equation since significant in model building process.

Table A.6d Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Residence		√*
Observations		9942
Correlation between unobservables, ρ		-0.31
P-value for the likelihood ratio test of independence between equations		0.00

*Residence added to enrolment equation since significant in model building process.

Table A.6e Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Type of dwelling	√*	
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		9908
Correlation between unobservables, ρ		-0.32
P-value for the likelihood ratio test of independence between equations		0.00

*Type of dwelling added to fostering equation since significant in model building process.

Table A.6f Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√*	
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		9933
Correlation between unobservables, ρ		-0.30
P-value for the likelihood ratio test of independence between equations		0.01

*Monthly expenditure added to fostering equation since significant in model building process.

Table A.6g Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receive remittances	√*	
Receiving household area characteristics		
Province		√
Observations		9942
Correlation between unobservables, ρ		-0.34
P-value for the likelihood ratio test of independence between equations		0.00

*Whether receive remittances added to fostering equation since significant in model building process.

Table A.6h Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province	√*	√
Observations		9942
Correlation between unobservables, ρ		-0.32
P-value for the likelihood ratio test of independence between equations		0.00

*Province added to fostering equation since significant in model building process.

Table A.6i Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age		√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Residence	√*	
Observations		9942
Correlation between unobservables, ρ		-0.32
P-value for the likelihood ratio test of independence between equations		0.00

*Residence added to fostering equation since significant in model building process.

Table A.6j Variables included in the two-stage selection model for enrolment – sensitivity analysis

	Process	
Variable	**Fostering**	**Enrolment**
Child background characteristics		
Current age	√*	√
Current age squared		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Residence	√*	
Residence*age	√*	
Observations		9942
Correlation between unobservables, ρ		-0.32
P-value for the likelihood ratio test of independence between equations		0.00

*Residence/age interaction added to fostering equation since significant in model building process.

Table A.7a Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Sex		√*
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		2710
Correlation between unobservables, ρ		-0.45
p-value for the likelihood ratio test of independence between equations		0.00

*Sex added to primary completion equation since significant in model building process.

Table A.7b Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Current age squared		√*
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		2710
Correlation between unobservables, ρ		-0.47
p-value for the likelihood ratio test of independence between equations		0.00

*Age squared added to primary completion equation since significant in model building process.

Table A.7c Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Type of dwelling		√*
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		2710
Correlation between unobservables, ρ		-0.47
p-value for the likelihood ratio test of independence between equations		0.00

*Type of dwelling added to primary completion equation since significant in model building process.

Table A.7d Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Residence		√*
Observations		2710
Correlation between unobservables, ρ		-0.46
p-value for the likelihood ratio test of independence between equations		0.00

*Residence added to primary completion equation since significant in model building process.

Table A.7e Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Type of dwelling	√*	
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		2700
Correlation between unobservables, ρ		-0.47
p-value for the likelihood ratio test of independence between equations		0.00

*Type of dwelling added to foster equation since significant in model building process.

Table A.7f Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised monthly expenditure	√*	
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Observations		2708
Correlation between unobservables, ρ		-0.42
p-value for the likelihood ratio test of independence between equations		0.01

*Monthly expenditure added to foster equation since significant in model building process.

Table A.7g Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receive remittances	√*	
Receiving household area characteristics		
Province		√
Observations		2710
Correlation between unobservables, ρ		-0.49
p-value for the likelihood ratio test of independence between equations		0.00

*Whether receive remittances added to foster equation since significant in model building process.

Table A.7h Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province	√*	√
Observations		2710
Correlation between unobservables, ρ		-0.46
p-value for the likelihood ratio test of independence between equations		0.00

*Province added to foster equation since significant in model building process.

Table A.7i Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age		√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Residence	√*	
Observations		2710
Correlation between unobservables, ρ		-0.47
p-value for the likelihood ratio test of independence between equations		0.00

*Residence added to foster equation since significant in model building process.

Table A.7j Variables used in the two-stage selection model for primary completion, South Africa, 1993 – sensitivity analysis

	Process	
Variable	**Fostering**	**Primary completion**
Child background characteristics		
Current age	√*	√
Receiving household composition characteristics		
Race	√	√
Head's sex	√	
Head's age	√	
Head's education		√
Number of non-fostered children	√	
Receiving household SES indicators		
Equivalised school expenditure		√
Receiving household area characteristics		
Province		√
Residence	√*	
Residence*age	√*	
Observations		2710
Correlation between unobservables, ρ		-0.47
p-value for the likelihood ratio test of independence between equations		0.00

*Residence/age interaction added to foster equation since significant in model building process.