Does Abolishing User Fees Lead to Improved Health Status? Evidence From Post-Apartheid South Africa

Online Appendix

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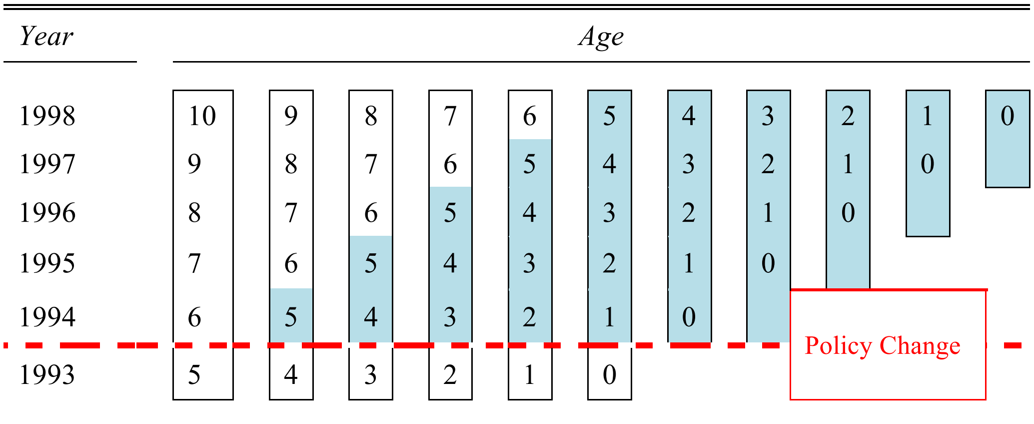
Appendix I: Degree of Exposure to Free Healthcare by Cohort

APPENDIX FIGURE 1.1: BIRTH YEAR AND LEVEL OF EXPOSURE TO FREE HEALTHCARE AS OF 1998



Notes: Each number refers to ages in the respective year, for every age in 1998. Shaded cells indicate years affected by the policy, and the dashed line indicates the timing of the policy change. The year before birth is included to account for pre-natal care.

Appendix II: Effect on Utilization

The main analysis shows that health status among children improved in the communities that initially had a clinic, suggesting that abolishing user fees resulted in greater utilization of health services among pregnant women and children under 6 years old.

While it would be ideal to conduct a difference-in-differences analysis on utilization just before and after the policy reform, the necessary data are unfortunately not available. Hence, we present three pieces of evidence that lend support to the assertion that free healthcare policy resulted in greater utilization of health services.

First, our argument is built upon findings from various other studies that removing user fees substantially improved delivery of pre-natal care to women not previously reached and increased the number of patients under 6 years (McCoy 1996; Department of Health 1998; Schneider and Gilson 1999; Wilkinson et al. 2001; Cooper et al. 2004; Morestin and Ridde 2009). Among them, Wilkinson et al. (2001) investigate the impact of the policy on changes in utilization patterns in the Hlabisa health district, located in northern KwaZulu-Natal Province, from 1992 through 1998. Their findings illustrate a sharp discontinuous increase in the number of new registrations and total attendances for care of children under 6 years old around the timing of the policy reform.

Second, *National Household Survey of Health Inequality in South Africa*, which sampled 4,000 nationally representative households in 1994 before the policy was implemented, identified cost of health care as the major barrier to undergo care for Africans (CASE 1995). The follow-up survey in 1998, on the other hand, indicates that 91 percent of black Africans were aware of the policy of free health care for children under 6 years old, and 86 percent of black Africans who sought health care in the public sector received primary care services for free.[1]

Third, as the best based on the existing KIDS data, we test whether the number of clinic visits correlates with the number of clinics in the community in 1998 for children under 6 years old. The survey asks whether the person has consulted a medical provider to treat illness if he or she was sick in the past 14 days. This variable comes with two obvious shortcomings. First, the sample size will be dramatically small. We observe only 87 children under 6 years old who had experienced a sickness. Second, because most communities already had at least one clinic by the time the survey was conducted in 1998, the distinction between high and low treatment regions in "the past 14 days" is subtle (and thus, the main analysis provides the lower bound impact). Since this disables us from applying the difference-in-differences

[1] Note that these numbers represent the entire sample. The survey results do not disentangle the outcomes by age of respondents.

strategy, we simply test a relationship between the number of clinics and the likelihood that a health center or clinic was visited, conditional on the number of other types of health facilities. Table 2.1 shows that the number of clinics is positively and significantly correlated with the likelihood that a person would visit a clinic for medical treatment, indicating that one additional clinic in the community increases the probability of a person visiting the clinic for medical treatment by 0.324. (The mean value of the dependent variable is 43 percent, whereas 24 percent visited private doctors, 18 percent visited hospitals, and 8 percent did not consult with anyone.) Though not conclusive, this suggests that utilization of clinics is associated with the availability of clinics.

APPENDIX TABLE 2.1– ASSOCIATION BETWEEN THE NUMBER OF CLINICS AND UTILIZATION

Variables	
Clinic	0.324**
	(0.161)
Public hospital	-0.233**
	(0.114)
Dispensaries	0.287
	(0.211)
Maternity home	0.097
	(0.185)
Observation	87
R^2	0.08

Notes: The sample includes children under 6 years old in KIDS98.

Appendix III: General Trends in Health Status between 1993 and 1998

The main analysis in this paper focuses on the distinction between the high- and low-treatment regions, in addition to the difference in time between 1993 (pre-reform period) and 1998 (post-reform period). In this section, we illustrate general trends in health status by cohort over time between 1993 and 1998.

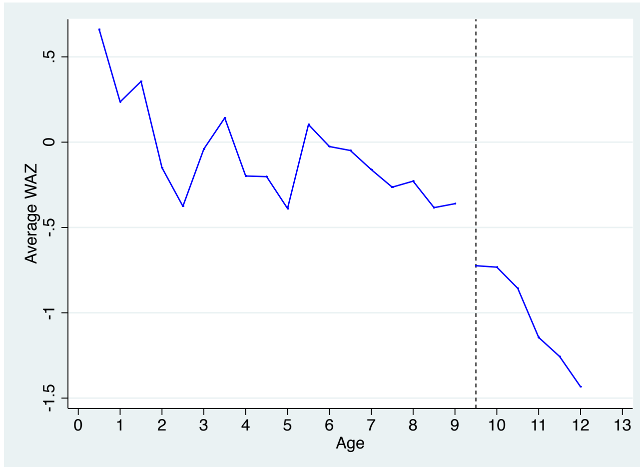
Appendix Figure 3.1 illustrates average WAZ in KIDS98 by age. A dashed line separates cohorts that were and were not affected by the free healthcare services. The figure is analogous to Figure 1 Panel B in the main text without the distinction between the high- and low-treatment regions. It shows that health status is higher for younger cohorts, while there is a sharp increase in WAZ among cohorts that were at least partially exposed to the free healthcare.

To present regression-adjusted estimates, we run the following regressions;

$$W_{ihkt} = \gamma_0 + \gamma_{1k} \sum_k \lambda_k \times Post_t + X'_h\gamma_2 + (X'_c \times Post_t) + Post_t + \eta_c + \psi_k + \varepsilon_{ihkt}$$

where $\lambda_k = 1$ for each cohort k born in the same year, Post = 1 if it is a post-reform observation (observations in 1998), η_c is community fixed effects, and ψ_k is cohort fixed effects. The parameters of interests, γ_{1k}, represent cohort-by-cohort health improvements from 1993 to 1998. The sample is restricted to cohorts observed both in KIDS93 and KIDS98 (those who were aged 0 to 6 in 1993).

Appendix Table 3.1 presents the results. The omitted group is the cohort aged 11 years old in 1998, and thus itself and all its interactions are omitted. Each entry in the table corresponds to the parameter of the interaction term above. Note that the cohorts aged 10 and above in 1998 were not eligible to free healthcare. The results suggest that most affected cohorts improved health status significantly more, relative to the non-affected reference cohort. It is odd that cohorts aged 5 in 1998, equivalent to newborns in 1993, do not show a positive increase in WAZ over time; this may be simply due to a difficulty in comparing newborns to 5 year-old children using WAZ.



APPENDIX FIGURE 3.1: AVERAGE WAZ IN KIDS98

APPENDIX TABLE 3.1–GENERAL TRENDS IN HEALTH, BY COHORT

	Dependent variable			
	Weight-for-age z-score			
Age in 1998	(1)	(2)	(3)	(4)
5	-0.461	-0.340	-0.405	-0.410
	(0.415)	(0.429)	(0.424)	(0.427)
6	0.826**	0.811**	0.731*	0.730*
	(0.402)	(0.391)	(0.393)	(0.396)
7	0.374	0.385	0.360	0.358
	(0.336)	(0.326)	(0.336)	(0.338)
8	0.679**	0.745**	0.685**	0.680**
	(0.291)	(0.301)	(0.290)	(0.292)
9	0.068	0.102	0.073	0.075
	(0.314)	(0.314)	(0.314)	(0.317)
10	0.143	0.161	0.080	0.074
	(0.326)	(0.329)	(0.313)	(0.316)
Observations	1781	1781	1776	1776
R^2	0.07	0.14	0.15	0.15
Community FE	No	Yes	Yes	Yes
HH characteristics	No	No	Yes	Yes
Community characteristics	No	No	No	Yes

Notes: The sample includes all cohorts that are observed both in KIDS93 and KIDS98, which are those aged 0-6 in KIDS93 and those aged 5-11 in KIDS98. Cohorts are defined by the year of birth. All specifications include cohort fixed effects and the dummy for post-reform observations (KIDS98). Standard errors are clustered at the community level. The omitted group is the cohort aged 11 years old in 1998.

Appendix IV: Effect of Free Healthcare on Health Status by Alternative Measures

In this section, we examine the effect of free healthcare using the same strategies adopted in the main analysis, but with alternative measures of health status. After describing three conventional ways to measure health status in the literature, we present empirical results using the alternative measures of health status. We also discuss similarities and disparities across different measures.

In the literature of examining nutritional status among children, three conventional anthropometric indices have been widely used: weight-for-age z-score (WAZ), weight-for-age z-score (WHZ), and height-for-age z-score (HAZ). While weight and height are also used for adults to measure health status, these z-score measures have the additional advantages of taking account of differences across age (usually age in month) and gender. Both WAZ and WHZ are known to reflect short-term fluctuations in nutritional status, as recovered nutrition is quickly captured by these indices even after periods of malnutrition (Ashworth 1969; Duflo 2003) or diarrhea (Schmidt et al. 2010). On the other hand, HAZ reflects a long-term history of nutritional accumulation, and a low level of HAZ is associated with stunting.

Throughout our paper, we use WAZ to focus on short-term effects of free healthcare on nutritional status among black African children. We use WAZ instead of WHZ because our baseline sample shows substantially lower levels of WAZ than that of well-nourished U.S. children, while WHZ is already positive even among the baseline sample (Table 1). While the difference between WAZ and WHZ appears to be odd, this is consistent with samples used in other studies (see, for example, Steenkamp, von der Marwitz, and Giovanelli 2004). In an effort to confirm impacts on short-term nutrition, we use WHZ and repeat the main analysis. Table 4.1 below presents the results on newborns, analogous to Table 3 and Table 4 in the main text. Point estimates tend to be smaller in magnitude compared with those in Table 3 and Table 4, reflecting the fact that the baseline sample already had normal WHZ. Panel A of Figure 4.1 illustrates that most of the impact comes from improvements in WHZ at the lower tail, and there was a substantial increase around the medium WHZ in 1998. Importantly, the pattern of the findings is essentially the same: the removal of user fees had positive results, and the magnitudes of these effects are larger for boys than for girls. Table 4.2 presents results on children already born at the time of policy reform, which is analogous to Table 5 in the main text. Likewise, we find smaller in magnitude yet statistically significant estimates, while some estimates are significant even for girls. Therefore, these results still highlight greater effects on boys than girls, while girls may not have been entirely excluded from the free healthcare.

Table 4.3, Table 4.4, and Panel B of Figure 4.1 below, on the other hand, present no similar pattern when HAZ is used as the dependent variable. Such disparity in findings between WAZ/WHZ and HAZ is not surprising. Although we cannot reject the possibility that free healthcare only had short-term effects, it is in general known that stunted children take much longer to catch up in growth (Ashworth and Millward 1986; Gorstein et al. 1994; Gross, Schultink, and Sastroamidjojo 1996). For example, Bobonis, Miguel, and Puri-Sharma (2006) find evidence that iron supplementation and deworming drugs affect only WAZ among preschool children but not HAZ. Walsh, Dannhauser, and Joubert (2002) also find significant improvements only in WAZ and not in HAZ two years after they implemented a community-based nutrition education program in the Free State and Northern Cape Provinces.

To test naively whether the free healthcare had any long-term effect on HAZ, we use observations in KIDS2004, the third, and last, wave of KIDS that revisited the same individuals in 2004. The survey includes weight and height information for children aged 7 to 11. Note that all these children were at least partially affected by the policy change in 1994. Figures 4.2 depicts height (Panel A) and weight (Panel B) across years of birth by treatment status. If increased access to healthcare led to substantial long-term improvements in health status, those who were born in 1992 to 1994 would show the greatest disparities in height between the high and low treatment regions, because they were in critical periods for long-term health conditions (i.e., the first three years after birth) in 1994, when the treatment intensity was relatively distinct between the two regions. Children who were born in relatively recent years, say in 1997, may not show differences because differences in the treatment intensity determined by the availability of clinics waned as clinic constructions were promoted in the low-treatment region. The figure shows that children in the high-treatment region attained slightly greater height for older children, although the difference is not statistically significant. However, the difference is more distinct compared with the differences in weight for the same children; children in the low-treatment region have completely caught up with those in the high-treatment region in terms of short-term nutritional status.

In summary, our findings remain the same as the main analysis when using WHZ to measure health status: free healthcare had substantial short-term impacts on nutritional status, and the magnitudes of the effect are greater for boys than for girls. The long-term effects may require further investigation.

APPENDIX TABLE 4.1–EFFECT OF FREE HEALTHCARE ON NEWBORNS

	Dependent Variable: Weight-for-height z-score				
Variables	(1)	(2)	(3)	(4)	(5)
Panel A: All					
High*Post	0.222	0.333	0.288	0.405	0.360
	(0.244)	(0.265)	(0.258)	(0.299)	(0.288)
Observations	1032	1032	1032	1032	1032
R^2	0.01	0.09	0.10	0.10	0.10
Panel B: Boys					
High*Post	0.193	0.438	0.378	0.625	0.566
	(0.297)	(0.351)	(0.344)	(0.414)	(0.400)
Observations	528	528	528	528	528
R^2	0.04	0.18	0.19	0.18	0.19
Panel C: Girls					
High*Post	0.256	0.286	0.291	0.340	0.350
	(0.308)	(0.399)	(0.398)	(0.440)	(0.447)
Observations	504	504	504	504	504
R^2	0.01	0.16	0.18	0.16	0.18
Household characteristics	No	No	Yes	No	Yes
Community characteristics	No	No	No	Yes	Yes
Cohort FE	No	Yes	Yes	Yes	Yes
Community FE	No	Yes	Yes	Yes	Yes

Notes: The table is analogous to Table 3 and Table 4 in the main analysis. Column (1) includes dummies for the high-treatment region and for the post-reform period. Robust standard errors are reported in the parentheses.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

APPENDIX TABLE 4.2–EFFECT OF FREE HEALTHCARE ON ALREADY BORN CHILDREN

	Dependent Variable				
	Weight-for-height z-score				
Variables	(1)	(2)	(3)	(4)	(5)
Panel A: All					
High*Post	0.447*	0.542**	0.504**	0.565*	0.521*
	(0.230)	(0.239)	(0.235)	(0.290)	(0.287)
Observations	1150	1150	1147	1150	1147
R^2	0.01	0.12	0.13	0.12	0.13
Panel B: Boys					
High*Post	0.314	0.634*	0.588*	0.913**	0.860**
	(0.282)	(0.322)	(0.318)	(0.383)	(0.373)
Observations	588	588	587	588	587
R^2	0.03	0.22	0.23	0.23	0.23
Panel C: Girls					
High*Post	0.573*	0.618*	0.581*	0.481	0.436
	(0.301)	(0.326)	(0.335)	(0.390)	(0.401)
Observations	562	562	560	562	560
R^2	0.01	0.14	0.16	0.15	0.16
Household characteristics	No	No	Yes	No	Yes
Community characteristics	No	No	No	Yes	Yes
Cohort*Period FE	No	Yes	Yes	Yes	Yes
Community FE	No	Yes	Yes	Yes	Yes

Notes: The table is analogous to Table 5 in the main analysis. Column (1) includes dummies for the high-treatment region and for the post-reform period. Robust standard errors are reported in the parentheses.

***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

APPENDIX TABLE 4.3– EFFECT OF FREE HEALTHCARE ON NEWBORNS

		Dependent Variable			
	Height-for-age z-score				
Variables	(1)	(2)	(3)	(4)	(5)
Panel A: All					
High*Post	-0.210	-0.334	-0.368	-0.362	-0.389
	(0.294)	(0.305)	(0.305)	(0.344)	(0.348)
Observations	1041	1041	1041	1041	1041
R^2	0.01	0.13	0.14	0.13	0.14
Panel B: Boys					
High*Post	-0.129	-0.243	-0.280	-0.227	-0.257
	(0.343)	(0.402)	(0.407)	(0.473)	(0.481)
Observations	538	538	538	538	538
R^2	0.01	0.17	0.18	0.17	0.18
Panel C: Girls					
High*Post	-0.293	-0.497	-0.535	-0.529	-0.572
	(0.386)	(0.390)	(0.384)	(0.449)	(0.447)
Observations	503	503	503	503	503
R^2	0.02	0.20	0.21	0.20	0.22
Household characteristics	No	No	Yes	No	Yes
Community characteristics	No	No	No	Yes	Yes
Cohort FE	No	Yes	Yes	Yes	Yes
Community FE	No	Yes	Yes	Yes	Yes

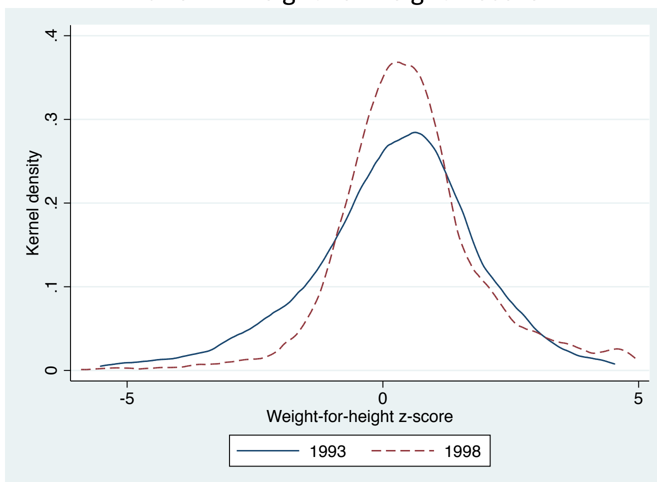
Notes: The table is analogous to Table 3 and Table 4 in the main analysis. Column (1) includes dummies for the high-treatment region and for the post-reform period. Robust standard errors are reported in the parentheses.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

APPENDIX TABLE 4.4: EFFECT OF FREE HEALTHCARE ON ALREADY BORN CHILDREN

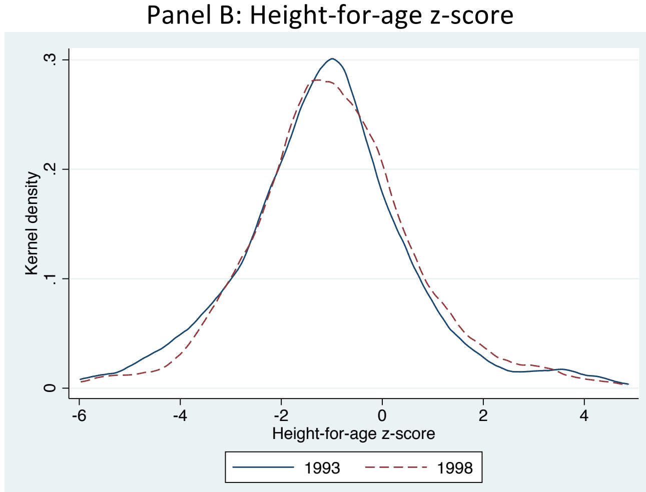
	Dependent Variable				
	Height-for-age z-score				
Variables	(1)	(2)	(3)	(4)	(5)
Panel A: All					
High*Post	0.071	0.002	-0.026	0.030	-0.006
	(0.243)	(0.248)	(0.238)	(0.284)	(0.275)
Observations	1184	1184	1184	1184	1184
R^2	0.00	0.11	0.12	0.12	0.12
Panel B: Boys					
High*Post	0.025	0.070	0.056	0.115	0.092
	(0.307)	(0.317)	(0.309)	(0.367)	(0.360)
Observations	610	610	609	610	609
R^2	0.00	0.17	0.18	0.17	0.18
Panel C: Girls					
High*Post	0.121	-0.036	-0.076	-0.035	-0.084
	(0.322)	(0.326)	(0.323)	(0.360)	(0.358)
Observations	574	574	572	574	572
R^2	0.00	0.14	0.15	0.14	0.15
Household characteristics	No	No	Yes	No	Yes
Community characteristics	No	No	No	Yes	Yes
Cohort*Period FE	No	Yes	Yes	Yes	Yes
Community FE	No	Yes	Yes	Yes	Yes

Notes: The table is analogous to Table 5 in the main analysis. Column (1) includes dummies for the high-treatment region and for the post-reform period. Robust standard errors are reported in the parentheses.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

Panel A: Weight-for-height z-score

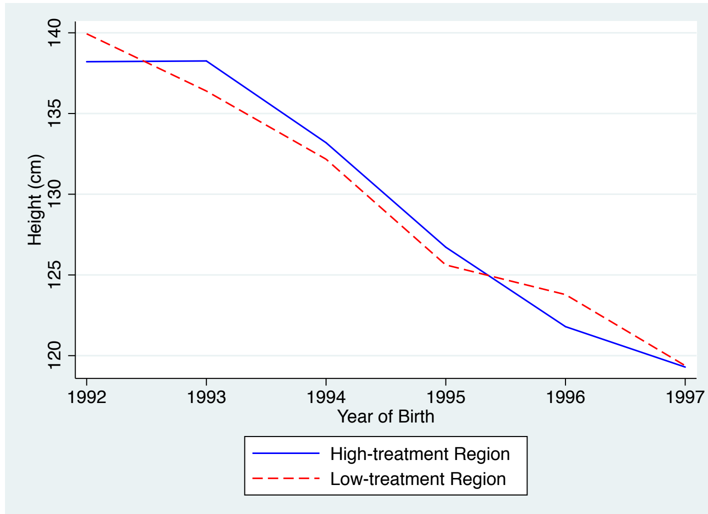


Panel B: Height-for-age z-score

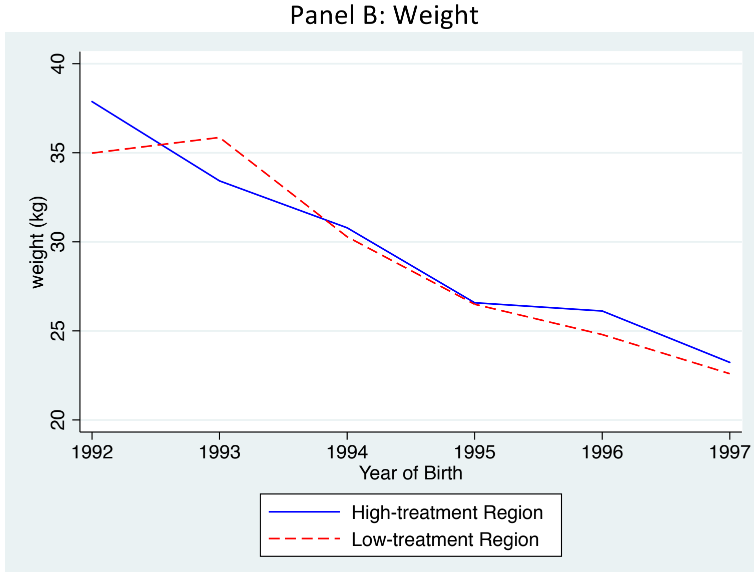


APPENDIX FIGURE 4.1: DISTRIBUTION OF WHZ AND HAZ

Panel A: Height



Panel B: Weight



APPENDIX FIGURE 4.2: AVERAGE HEIGHT AND WEIGHT IN KIDS2004

Appendix V: Further Investigation of the Mechanism

In this section, we further investigate the mechanisms leading to our main results in three ways. First, we test the possibility that changes in the sample composition through either migration or attrition might confound the main results. Second, we examine related social policies targeting child health improvements in South Africa and show that they do not bias the estimates. Lastly, we highlight a main component of free healthcare services provided at clinics.

Changes in the sample composition may drive the results through two channels: migration and/or attrition. Migration, however, is less likely to be prevalent in our sample. As noted, under apartheid, millions of black Africans were forced into "homelands." They had little freedom to choose where to live and their mobility was severely restricted, making it difficult to migrate to areas with better health infrastructure. However, the demise of apartheid freed black Africans from these constraints, which could have led to a change in the composition of the sample population in the high- and low-treatment regions. To avoid this geographical self-selection bias after 1994, we identify households according to the communities in which they resided in 1993, instead of according to their current communities. Both are highly correlated, as approximately 96 percent of the households in KIDS98 still lived in the same community as in 1993, yet the former is predetermined and not endogenous to selection into the high-treatment region. Nonetheless, we repeat the main analysis using only the samples who did not migrate by 1998, shown in Table 5.1. The main results are essentially unchanged, suggesting that migration itself cannot explain the main results.

Attrition does not appear to bias the main results, either. The original sample contains 1,389 households (215 are Indian and 1,174 are Africans), of which 1,178 households (85 percent) were followed up on in 1998. The attrition rate is lower than other related studies and thus of limited concern (Carter and Maluccio 2003). To test whether attrition is associated with the treatment status, we first merge observations between KIDS93 and KIDS98 at the individual level. The dependent variable is a binary variable equal to one if an individual reports WAZ in KIDS93 but does not report WAZ in KIDS98 (i.e., missing in KIDS98), regressed on the treatment status. The coefficient is -0.011 with the standard error of 0.033. Thus, since attrition is not systematically correlated with the treatment status, it does not confound the main results.

A bigger concern would be related to social policies targeting child health during the same period. South African society has gone through dramatic changes since 1994. Under the leadership of President Nelson Mandela, the main objective of the government policies was integrating and consolidating social systems and eradicating racial disparities that had been segregated by the apartheid regime. In the health sector, the primary component of the new government health policy package was the removal of user fees from primary care for pregnant mothers and children under 6 years of age at public health facilities. Black Africans until then had severely limited access to healthcare services, with almost 74% of them identifying the cost of healthcare as the major barrier to receiving treatment. It is not surprising that abolishing user fees relaxed this budget constraint and resulted in substantial improvements in access to healthcare.

To the best of our knowledge, there is no other obvious health policy that confounds our treatment effects. Since our difference-in-differences strategy exploits the variations between communities with a clinic and those without one, confounding policies must be necessarily correlated with the existence of health facilities. This condition rules out policies like social pension programs. Further, since our findings show impacts only on children under 6 years old, confounding policies, if any, should also target the same age-group children, ruling out policies like school feeding programs.

However, one of the shortcomings with our analysis is that, since we proxy the improved access based on the physical existence of a health facility in the community in 1993, the treatment effect is attributed to a package of treatments provided through health facilities, making it infeasible to disentangle the effects of individual medical services patients received.

For example, the Integrated Nutritional Programme (INP) started in 1995, as part of the comprehensive primary healthcare framework, included maternal nutrition, breastfeeding assistance, nutrition education, child immunization, growth monitoring, nutritional promotion from infants through adolescents, and micronutrient supplementation. Thus, on one hand, some of the services included the INP are provided as part of free healthcare, i.e., maternal nutrition and breastfeeding assistance can be considered as part of free prenatal services to pregnant mothers. On the other hand, if nutritional promotion or supplementation to infants were the key determinants of child health growth, policy implications would be different from ours – the government should focus on nutritional programs instead of primary healthcare services. We provide three main reasons that lead us to believe that this was not the case, but rather that primary healthcare had the first-order effect on child health improvements.

First and foremost, various studies find little evidence that INP had measurable effects. Both national and regional studies have found that many of the INP interventions have failed to alleviate malnutrition and to improve health status among the target groups, mainly because of poor implementation due to inadequate human resources and lack of appropriate capacity (Witten et al. 2001; Labadarios et al. 2005; Swart, Sanders, and McLachlan 2008; Harris and Drimie 2012; Iversen et al. 2012). Rather, free healthcare was the major success in boosting health status. This is also reflected in the national household surveys, in which 63% percent of black Africans voted for free primary health care as the best governmental health policy, whereas only 22% viewed school feeding positively, 15% were in favor of the clinic-building program, 15% for the HIV/AIDS program, and 9% for the immunization (CASE 1999).

Second, the INP was provided not only through health facilities but was also promoted at the community level. If the INP brought about substantial improvements in health status, communities even without clinics should have received the benefits as well, and thus do not confound the treatment effect in our identification strategy. In addition, we explicitly control for whether there was an immunization campaign at the community level. Since immunization is part of the INP and can potentially proxy the intensity of INP coverage in the community (in the sense that communities where immunization was carried out as part of INP should have also received other components of the INP), we believe the impacts through the INP must be minimal.

Lastly, Wilkinson et al. (2001) found substantial increases in curative treatments for children under 6 years old when the free healthcare policy was implemented, but did not find an effect on preventive treatments.

In summary, all of the above evidence supports our contention that primary healthcare services, particularly curative treatments through primary care, were primarily responsible for improving nutritional status. This highlights the importance of establishing and expanding access to health services for children.

Appendix Table 5.1–Difference-in-differences matrix in means of health status by Period and Treatment Status, without migrants

Panel A: Effect on Newborns

	Weight-for-age z-score		
	High	Low	Diff.
Post-reform:	0.346	-0.055	0.401
Aged 0 to 3 in KIDS98	(0.157)	(0.076)	(0.174)
Observations	[204]	[282]	
Pre-reform:	-0.503	-0.397	-0.106
Aged 0 to 3 in KIDS93	(0.166)	(0.115)	(0.200)
Observations	[221]	[282]	
Difference	0.849	0.342	0.507
	(0.196)	(0.144)	(0.241)

Panel B: Effect on Already Born Children

	Weight-for-age z-score		
	High	Low	Diff.
Post-reform:	0.068	-0.348	0.416
Aged 5 to 8 in KIDS98	(0.127)	(0.070)	(0.145)
Observations	[277]	[331]	
Pre-reform:	-0.503	-0.397	-0.106
Aged 0 to 3 in KIDS93	(0.166)	(0.115)	(0.200)
Observations	[221]	[282]	
Difference	0.571	0.049	0.522
	(0.223)	(0.127)	(0.255)

Notes: The observations are restricted to the households who resided in the same community in 1998 as in 1993. Additional comments are the same as Table 2.

References

Ashworth, Ann. 1969. "Growth Rates in Children Recovering from Protein-Calorie Malnutrition." *British Journal of Nutrition*, 23: 835-845.

Ashworth, Ann, and D.J. Millward. 1986. "Catch-up Growth in Children." *Nutrition Reviews*, 44(5): 157-163.

Bobonis, Gustavo J., Edward Miguel, and Charu Puri-Sharma. 2006. "Anemia and School Participation." *Journal of Human Resources*, 41(4): 692-721.

Carter, Michael R., and John A. Maluccio. 2003. "Social Capital and Coping with Economic Shocks: An Analysis of Stunting of South African Children." *World Development*, 31(7), 1147-1163.

Community Agency for Social Enquiry (CASE). 1995. *A National Household Survey of Health Inequalities in South Africa*. Washington, D.C.: The Henry J. Kaiser Family Foundation.

Community Agency for Social Enquiry (CASE). 1999. *The Second Kaiser Family Foundation Survey of Health Care in South Africa*. Washington, D.C.: The Henry J. Kaiser Family Foundation.

Cooper, Diane, Chelsea Morroni, Phyllis Orner, Jennifer Moodley, Jane Harries, Lee Cullingworth, and Margaret Hoffman. 2004. "Ten Years of Democracy in South Africa: Documenting Transformation in Reproductive Health Policy and Status." *Reproductive Health Matters*, 12(24). 70-85.

Department of Health. 1998. *Department of Health Achievements and Highlights of 1997*. Pretoria: Department of Health.

Duflo, Esther. 2003. "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa." *The World Bank Economic Review*, 17(1): 1-25.

Gorstein, J., K. Sullivan, R. Yip, M. de Onis, F. Trowbridge, P. Fajans, and G. Clugston. 1994. "Issues in the Assessment of Nutritional Status using Anthropometry." *Bulletin of the World Health Organization*, 72(2): 273-283.

Gross, R., W. Schultink, and S. Sastroamidjojo. 1996. "Stunting as an Indicator for Health and Wealth: An Indonesian Application." *Nutrition Research*, 16(11): 1829-1837.

Harris, Jody, and Scott Drimie. 2012. "Toward an Integrated Approach for Addressing Malnutrition in Zambia: A Literature Review and Institutional Analysis." IFPRI Discussion Paper 01200.

Iversen, P. O., D. Marais,, L. du Plessis, and M. Herselman. 2012. "Assessing Nutrition Intervention Programmes That Addressed malnutrition Among Young Children in South Africa Between 1994-2010." *African Journal of Food, Agriculture, Nutrition, and Development*, 12(2): 5928-5945.

Labadarios, D., N.P. Steyn, C. Mgijima, and N. Daldla. 2005. "Review of the South African nutrition policy 1994-2002 and targets for 2007: achievements and challenges." *Nutrition*, 21: 100-108.

McCoy, David. 1996. *Free Health Care for Pregnant Women and Children Under Six in South Africa: An Impact Assessment*. Durban: Health Systems Trust.

Morestin, Florence, and Valery Ridde. 2009. *The Abolition of User Fees for Health Services in Africa Lessons from the Literature*. Universite de Montreal.

Schneider, Helen, and Lucy Gilson. 1999. "The Impact of Free Maternal Health Care in South Africa." In *Safe motherhood Initiatives: Critical Issues*, edited by in Marge Bere and T.K. Sundari Ravindran, 93-101. Oxford: Blackwell Science.

Schmidt, Wolf-Peter, Sophie Boisson, Bemd Genser, Mauricio Barreto, Kathy Baisley, Suzanne Filteau, and Sandy Cairncross. 2010. "Weight-for-age z-score as a Proxy Maker for Diarrhea in Epidemiological Studies." *Journal of Epidemiology & Community Health*, 64: 1074-1079.

Steenkamp, Liana, Jill von der Marwitz, and Charlene Giovanelli. 2004. "Nutritional Status of HIV+ Pre-School Children in South Africa." Unpublished.

Swart, Rina, David Sanders, and Milla McLachlan, 2008, "Nutrition: A Primary Health Care Perspective," In *South African Health Review 2008* ed. By Barron, P. Health Systems Trust.

Walsh, CM, A. Dannhauser, and G. Joubert. 2002. "The Impact of a Nutritional Programme on the Anthropometric Nutritional Status of Low-Income Children in South Africa." *Public Health Nutrition*, 5: 3-9.

Wilkinson, David, Eleanor Gouws, Marlene Sach, and Salim S. Abdool Karim. 2001. "Effect of Removing User Fees on Attendance for Curative and Preventive Primary Health Care Services in Rural South Africa." *Bulletin of the World Health Organization*, 79(7): 665-671.

Witten, C., P. Jooste, D. Sanders, and M. Chopra. 2001. Micronutrient Programme in South Africa. Paper presented at Workshop on 'Successful Micronutrients Programs' held at IUNS, Vienna, August 2001. University of the Western Cape, Capetown, South Africa.