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Does Money Protect Health Status? Evidence from South African Pensions

Anne Case

7.1 Introduction

A strong, positive association between income and health status has been documented between countries, within countries at points in time, and within countries over time with economic development. The channels by which better health leads to higher income, and those by which higher income protects health status, are of interest to both researchers and policy makers. However, quantifying the impact of income on health and documenting the mechanisms through which income leads to better health are difficult, given the simultaneous determination of health and income.

In this paper, we quantify the impact of a large, exogenous increase in income—that associated with the South African state old age pension—on health status. We find, in households that pool income, that the pension protects the health of all household members, working in part to protect the nutritional status of household members, in part to improve living conditions, and in part to reduce the stress under which the adult household members negotiate day-to-day life.

We begin in section 7.2 with a discussion of an integrated family survey run in 1999, one that captured information on individuals' health, mental health, social connectedness, and economic status. In section 7.3 we document the relationship between income and health status and then turn to the pension as an instrument, allowing us to identify the causal impact of

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income on health status. In section 7.4 we document some of the pathways through which higher incomes lead to better health.

7.2 The Langeberg Survey

In 1999, the South African Labour and Development Research Unit (SALDRU) at the University of Cape Town ran a survey on a racially stratified random sample of 300 households (1,300 individuals) in the Langeberg Health District, which is comprised of three magisterial districts (county-sized administrative units) in the Western Cape in South Africa[1] (see Case and Wilson 2001 for additional details on the survey).

The survey instrument used was one that had been developed over a four-year period and was the joint product of researchers at the University of Cape Town (Monica Ferreira, Human Sciences Research Council/University of Cape Town (HSRC/UCT) Centre for Gerontology; Karen Charlton, nutrition and dietetics unit; and Francis Wilson, economics and SALDRU); the University of the Western Cape (Pieter le Roux, economics); the University of the Witwatersrand (Merton Dagut and Martin Wittenberg, faculty of commerce); Rhodes University (Valerie Moller); the Medical Research Council (Krisela Steyn and Debbie Bradshaw); Princeton University (Anne Case and Angus Deaton, economics and Woodrow Wilson School); Harvard University (Robert Jensen, Kennedy School of Government; David Bloom and Larry Rosenberg, School of Public Health; and Lakshmi Reddy Bloom); Massachusetts Institute of Technology (MIT; Courtney Coile, economics); and Steven Low (University of Cape Town), John Gear (Health Systems Trust), Najma Shaikh and Ingrid le Roux (Western Cape Provincial Department of Health), together with other persons in the medical community of South Africa. This team of gerontologists, economists, public health experts, and physicians grappled with the survey design, both structure and content, through many rounds of piloting, until there was consensus that the questionnaire worked well in the field. Funding for the pilot surveys was provided by the National Institute of Aging, through a grant to David Bloom and the National Bureau of Economic Research; by the John D. and Catherine T. MacArthur Foundation, through a grant to Princeton University; and through the HSRC/UCT Centre for Gerontology at the University of Cape Town. Funding for

1. The survey was carried out under the auspices of SALDRU, the Southern African Labour and Development Research Unit of the School of Economics at the University of Cape Town, under the direction of Francis Wilson. The survey manager was Jaqui Goldin, who organized the interviews, which were conducted by students of the School of Social Work at the University of Cape Town and community workers who had been specially trained in the process. Sampling and listing was done by Matthew Welch and Faldie Esau, with generous advice from Jim Lepkowski of the Institute for Social Research at the University of Michigan.

the Langeberg survey was provided by the Mellon Foundation, through a grant to the University of Cape Town.

A key component of the survey design was that every adult identified as a household member would be interviewed separately. In South Africa, as elsewhere, household members often have private information to which other members do not have access. A household member's earnings, for example, or whether she has a bank account, is often information that she would protect from others in the household. In addition, conflict between household members can lead to very different accounts of life in the household. In one pilot household, the head of household reported that no one in the household drank "too much." His adult children, interviewed separately, spoke of the fear they lived with because their father was regularly drunk and abusive. In another pilot household, the female household head refused to recognize the presence of her son's child as a member of her household, although this grandchild was living in her house with her son. Relying only on the account of one "knowledgeable household member," as do most household surveys, the child's presence (or the head's drinking problem) would have been entirely overlooked. Moreover, mental and physical health status relate to individuals, not to households, and should be asked at the individual level.

The survey had four modules. The first was a household module, which collected information from the person in the household identified as "most knowledgeable about how income is spent by this household" on household composition, income, and expenditures. We added experimental questions on whether and how often adults and, separately, children in the household had to skip meals because there was not enough money for food. We also added experimental questions on how the household would classify its financial situation (on a five point scale from "very comfortable" to "extremely poor") and, when the household respondent gave an answer that was not at least "comfortable," the question was asked how much money in total the household would need per month to be comfortable.

The survey also had a module for younger adults (aged eighteen to fifty-four), in which questions were asked on work histories, earnings, health status, mental health status, and social connectedness. A module for older adults (aged fifty-five or greater) asked additional questions on activities of daily living and about South Africa's unique old age pension. Weight and height were recorded for all adults. The fourth module in the survey collected information on vaccines from children's health cards, interviewed an adult about whether and for how long the child was breast fed, and weighed and measured all children aged twelve and under.

Summary statistics for the survey are provided in table 7.1, where we present means by race for health status, individual incomes, and household and individual characteristics that are important in what follows.

All adults aged eighteen and above were asked to rate their health, in an-

Table 7.1 **The Langeberg Survey: Variable Means and Standard Errors (adults, aged eighteen and above)**

	Blacks	Coloreds	Whites
Self-reported health status[a]	2.80	2.34	2.22
	(.091)	(.060)	(.124)
Respondent's total income	489	921	2,968
	(82.8)	(145)	(538)
Respondent's age	37.1	38.8	49.6
	(1.41)	(.756)	(2.29)
Respondent's completed education	6.95	6.52	11.7
	(.276)	(1.07)	(.465)
Indicator: Respondent is a pensioner	.100	.076	.220
	(.044)	(.015)	(.057)
Indicator: Respondent lives with a pensioner	.232	.213	.326
	(.074)	(.059)	(.083)
Indicator: Respondent lives with someone aged 55 or above	.361	.337	.512
	(.080)	(.061)	(.088)
Indicator: Respondent lives in a household that does not pool income	.186	.244	.104
	(.075)	(.052)	(.039)
No. of observations	229	316	136

Notes: Sample means are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). Standard errors are presented in parentheses.

[a]1 = Excellent; 2 = Good; 3 = Average; 4 = Poor; 5 = Very Poor.

swer to the following questions: "How would you describe your health at present? Would you say it is excellent, good, average, poor or very poor?" Answers are scored from 1 to 5, with "excellent" equal to 1 and "very poor" equal to 5. Self-reported health has been shown to be a strong predictor of mortality, even when one controls for current health status and behaviors. Poor self-ratings of health are also a significant predictor of change in functioning among the elderly (see Idler and Kasl 1995 for findings on changes in functioning and for extensive references on the studies of self-reported health and mortality). In the Langeberg survey, we find blacks report themselves to be in significantly worse health (2.80) than coloreds (2.34) and whites (2.22), with mean self-reported health for blacks closer to "average" than to "good." The median response among blacks was "average," whereas that among coloreds and whites was "good."

Table 7.1 also makes clear that blacks have significantly lower incomes than do colored and white respondents in the Langeberg survey. On average, black incomes are one-half of colored incomes, and colored incomes are one-third of white incomes. Whites are significantly older than blacks or coloreds in the Langeberg survey—in part due to the fact that this area of the Western Cape is a popular retirement area for whites. Whites also have markedly higher levels of education; whites, on average, have com-

pleted twelve years of schooling, whereas blacks and coloreds, on average, have completed fewer than seven. Roughly 10 percent of our adult black and colored sample are pensioners, and more than 20 percent of the black and colored adults in our sample live with a pensioner.

7.3 The Impact of Income on Health Status

A strong association between income and health status can be seen in table 7.2, which examines the relationship between self-reported health status and income, while controlling for age, sex, and education. Self-reported health status is an ordinal measure, and regressions that treat the difference between "excellent" and "good" (say) as equal to that between "poor" and "very poor" are unlikely to be appropriate. For that reason, we quantify the relationship between income and health status using ordered probits. For blacks and coloreds, a doubling of income is associated with an improvement in self-reported health of roughly 0.2 points. For whites, a doubling of income is associated with an improvement in health status of 0.3 points.

For all races, older adults report worse health, on average. However, results in table 7.2 show that the health status of whites erodes more slowly with age (.023 points per year of age) than does that of blacks (.035), bearing in mind that higher numbers are associated with worse health. For blacks, a doubling of income is associated with the same improvement in

Table 7.2 **Income and Health Status**

	South Africa			United States	
	Blacks	Coloreds	Whites	Blacks	Whites
Log(own income)	–.229	–.222	–.325	–.176	–.209
	(.071)	(.068)	(.130)	(.004)	(.002)
Age	.035	.032	.023	.019	.017
	(.005)	(.004)	(.012)	(.0002)	(.0001)
Education	–.049	.014	–.155	–.052	–.077
	(.024)	(.015)	(.064)	(.001)	(.001)
Female	.136	.006	–.019	.153	.079
	(.216)	(.166)	(.247)	(.008)	(.003)
No. of observations	122	243	86	83,427	544,256

Sources: The Langeberg Survey 1999 (columns [1]–[3]; http://web.uct.ac.za/depts/saldru/lang.htm) and the U.S. NHIS 1986–1995 (columns [4]–[5]; http://ww.cdc.gov/nchs/nhis.htm).

Notes: Standard errors are presented in parentheses. Dependent variable = self-reported health status (1 = Excellent, 5 = Very Poor). South African ordered probits are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). Income for the NHIS is total household income. Both the U.S. and South African samples restricted to adults aged eighteen and older.

health status we would expect to see if we could roll back the respondent's age by six years: Both are associated with an improvement in health of just over 0.2 points. Education is associated with better health, particularly for whites. We find a much smaller effect for blacks and no effect for colored respondents. This may be due to the fact that blacks and coloreds would have been forced to attend schools that were inferior to white schools in virtually every dimension (see Case and Deaton 1999).

For comparison, the last two columns in table 7.2 present ordered probits for blacks and whites in the United States, using data from the National Health Interview Survey (NHIS) from 1986 to 1995. The association between income and health status in the United States is very similar to that observed in the Langeberg survey for blacks and coloreds, with a doubling of income being associated with roughly a 0.2 point improvement in health status. The self-reported health status of Americans erodes more slowly with age than that of South Africans. As was true in the South African data, we find health status in the United States eroding more quickly with age for blacks than for whites. Education in the United States appears to be protective of health status and, again as was true in the South African data, education appears to be more protective for whites than for blacks. Women in the United States report worse health on average, controlling for age, education, and log of household income. The "female" coefficient is very similar for the black samples of the Langeberg (.136) and the NHIS (.153), although in the Langeberg its standard error is large.

That there is a strong association between income and health status does not by itself demonstrate that income has a causal effect on health. Threads run from income to health, and from health to income, with third factors potentially influencing them both (Smith 1999; Fuchs 1982). We must have a sharp knife with which to cut the knot between health and income. The South African old age pension is just that sort of instrument.

The state old age pension was originally intended as a safety net for the small numbers of whites who reached retirement age without an adequate employment-based pension. The pension was first extended to the colored and Indian population in an attempt to make the three-chamber parliament politically palatable (van der Berg 1994), and payments were gradually equalized across all racial groups during the disintegration of the apartheid regime in the early 1990s. Complete parity in payment between races was reached, and the system was fully in place at the end of 1993.

The pension appears to be a modest amount of money when measured using a yardstick of white incomes but looks like quite a large amount of money when measured against black incomes: At the time of the Langeberg survey, the pension was 520 rands per month, an amount equal to the median colored income and 2.5 times the median black income in the Langeberg survey. On paper, the pension is means-tested. In practice, women aged sixty or above and men aged sixty-five or above generally re-

ceive the full amount of the pension if they do not have a private pension. The take-up rate for the state pension is roughly 80 percent for blacks and coloreds. For whites, who are generally covered by private pensions, the take-up rate is less than 10 percent (Case and Deaton 1998).

7.3.1 Identification

We identify the impact of money on health status by comparing the self-reported health status of black and colored adults who live with pensioners and those that do not. For children, we use height for age as a measure of long-term nutritional status and compare heights of children living in households with and without a pensioner. For most of the analysis, we will focus on black and colored households and will identify pensioners based on age eligibility in order to avoid issues of take-up.

If all black and colored elderly receive the pension, we cannot identify the impact of the pension separately from the impact of having an elderly person in the household. Perhaps grannies have more time to care for small children, leading to healthier children among those who live with a granny. Alternatively, if older adults require a good deal of care and attention, then their presence may prove to be a burden on other adults in the household.

We propose two strategies to disentangle the impact of the pension income from the impact of the pensioner. First, the Langeberg survey asked a "knowledgeable" household member whether people in the household pool their incomes. If incomes are pooled, then the pension income should protect the health status of all household members. However, if incomes aren't pooled, then we should find no effect of pension receipt on the health of other household members. Table 7.1 shows that roughly 20 to 25 percent of black and colored adults in the Langeberg survey are living in households that do not pool income. (The strongest predictor of nonpooling is the presence in the household of a young adult—male or female—who is currently working for money. In pilot surveys, we found that these young men and women are often not willing to put their money into a common household pool.) We will use the difference in the impact of pension income in households that pool and those that do not as one strategy to identify the effect of money on health status.

The second strategy is to control for the number of older household members (aged fifty-five and above) in our analysis. If as adults get older they become more helpful (harmful) to the health of other members, then we should be able to quantify that effect by adding a control for the number of members aged fifty-five and above. This second strategy, then, quantifies the difference made by the presence of older members who are receiving the pension (aged sixty and above for women, sixty-five and above for men) and those who are not (aged fifty-five to pension age). Table 7.1 shows that roughly one-third of the black and colored adults in the Langeberg survey were living with someone aged fifty-five or above.

In what follows, we do not present results controlling for household or individual income because these are likely to be determined jointly with the health status of household members. Each pensioner brings 520 rands per month into the household, and the tables that follow can be read as the estimated effect of this extra income on respondents' health status.

7.3.2 The Effect of Income on Health Status

We estimate the effect of pension income on health status by running ordered probits of self-reported health status on the number of pensioners in the household and on an indicator that the respondent is a pensioner, controlling for age, sex, race, and race interacted with sex, for black and colored adults in the Langeberg survey. Results for these probits are presented in table 7.3.

We present results separately for respondents from households where incomes are pooled (columns [1] and [2]), not pooled (columns [3] and [4]), and for all respondents regardless of pooling status (columns [5] and [6]).

Table 7.3 shows that in households that pool income the pension protects the health status of all adults. All else being equal, adding an additional pensioner to the household improves the health status of all adults by 0.5 points. In households that pool income, pensioners receive no additional health protection above that which all adults receive: The coefficient on the indicator that the respondent is a pensioner is positive (suggesting worse health), but never significantly different from zero. In contrast, in households that do not pool income, having pensioners in the household is

Table 7.3 **Pensioners, Income Pooling, and Health Status: Colored and Black Respondents Only**

	Household Pools Income		Household Does Not Pool Income		All Households	
No. of pensioners	–.503	–.586	.148	.182	–.291	–.357
	(.259)	(.383)	(.278)	(.264)	(.154)	(.269)
Indicator: Respondent is a pensioner	.262	.314	–1.03	–1.03	–.195	–.161
	(.612)	(.682)	(.450)	(.448)	(.480)	(.523)
No. of members aged 55 or above	—	.089	—	–.033	—	.070
		(.179)		(.149)		(.163)
Indicator: Household does not pool income	—	—	—	—	–.019	–.009
					(.087)	(.075)
No. of observations	422	422	95	95	517	517

Notes: Standard errors are presented in parentheses. Ordered probits are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). All probits include indicators for age, sex, race, and age interacted with race. Results are robust to estimation separately by race, and to the inclusion of the respondent's years of completed education. Dashes indicate that this variable was not included in the ordered probit.

not protective of health status, unless the respondent is the pensioner. In nonpooling households, pensioners report health status that is one full point better (1.03) than other household members, on average, controlling for age, race, and sex. That pension income has a larger effect on pensioners' health in nonpooling households is consistent with a model in which money protects health status. In nonpooling households, the pensioner may retain a greater share of the pension income for his or her personal use, which then would have a larger effect on personal health.

The number of members aged fifty-five or above is not a significant determinant of health status in either pooling or nonpooling households. The coefficient on this measure of the number of older members is small and insignificant in all specifications. The presence of an older member has no significant effect on health status, unless that older person brings resources in the form of a pension.

When we group together respondents from households that pool and those that do not, we find that the presence of pensioners is still protective of health status, although the coefficient has been attenuated by grouping together respondents who are protected by pension income (those from pooling households) and those who are not (those from nonpooling households).

Overall, we take the results in table 7.3 as evidence that pension income protects health status of all adult household members in pooling households and the health status of the pensioners (and pensioners only) in nonpooling households.

We turn to the impact of pension income on health outcomes for black and colored children in table 7.4, where we present results of regressions of height for age, controlling for the number of pensioners in the household. We restrict our sample to children born after January 1, 1994, the date at which the pension was fully operational. We find, with or without controls

Table 7.4 **Pensioners and Children's Height: Colored and Black Children Born after January 1, 1994**

	Black Children		Colored Children	
No. of pensioners	5.10	8.09	6.03	5.74
	(2.62)	(3.87)	(1.51)	(1.62)
No. of members aged 55 or above	—	–3.11	—	.574
		(3.55)		(.907)
No. of observations	37	37	44	44

Notes: Standard errors are presented in parentheses. Ordinary least squares regressions are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). All regressions contain an indicator for female children. Dependent variable = children's height in centimeters.

for the number of members aged fifty-five and above, that a pensioner is associated with roughly a five centimeter increase in a child's height for age, controlling for sex, household size, the number of members aged zero to seventeen, and a complete set of quarter-since-birth indicator variables to capture the effect of age on height. This effect is roughly equal to one half-year's growth for black and colored children aged zero to six in the Langeberg data and is roughly 1 standard deviation increase in height for age (this estimate is, then, slightly higher than that estimated by Duflo, 2000, who found that grandmothers' pensions increased heights for age for granddaughters by 0.7 standard deviations, using data from a period before the pension was entirely operational).

The evidence in section 7.3 shows that cash, in the form here of the South African old age pension, improves the health status of all adults in households where income is pooled and the heights of children living with pensioners. We turn in section 7.4 to discuss ways by which rands might lead to better health outcomes.

7.4 Mechanisms Leading to Better Health

The mechanisms through which money may be used to foster better health may be many. We begin with a look at the answers to open-ended questions asked of pensioners: "What did you start doing differently when you received your pension?" and "In what ways did your life become better when your pension started, if any?" We present the answers to these questions (for the pensioners who provided answers) in table 7.5. Some respondents note that the pension is smaller than the amount of money they had been earning, but many report the pension to be a greater amount. Food figures prominently in the pensioners' responses. One respondent replies, for example, that he now "looked after the children and made sure that there was always something to eat." In addition, many respondents report that they upgraded their housing, putting in a kitchen unit, or a phone, or a paraffin stove. Finally, some pensioners report they have fewer worries.

We can quantify some of these mechanisms by examining the impact of the pension on nutrition, on sanitation, on psychosocial stress, and on the health consequences of limitations in activities of daily living.

7.4.1 Activities of Daily Living

One mechanism through which the old age pension appears to improve health is through protecting the health status of the older household members who report limitations in their activities of daily living (ADLs). The Langeberg survey asked all household members aged fifty-five and older about their level of difficulty in carrying out the following activities by themselves:

Table 7.5 **Respondent Reports on Life after Pension Receipt: Black and Colored Pensioners**

PANEL A
"What did you start doing differently when you received your pension?"

Race	Sex	Open-Ended Response
		In Households that Do Not Pool Income
Black	F	Yes things became different because the money that I earned was smaller than the pension.
Colored	F	Still the same.
Black	F	Bought furniture and renovated the house.
Black	F	I had to start budgeting. I never budgeted before.
Black	F	Relieved poverty a bit.
Black	M	No
Black	F	Opened a bank account.
Colored	M	The household were more easier when she got the pension.
Colored	M	His lifestyle changed—better living conditions.
Colored	F	Nothing.
		In Households that Pool Income
Colored	M	They bought less food now because of the expense of some things.
Colored	M	The hours of work was reduced and he could pay his burial money up to date.
Colored	F	All necessities—such as bed linen and enough food for the household.
Colored	M	A telephone put in.
Colored	M	Were able to pay off his burial.
Colored	F	Nothing changed as the money became more, the price of groceries increased.
Black	M	He gave it to his wife.
Black	F	She started to suffer; bought less food because she got less money.
Black	M	Financially it went worse because the pension is less than what he earned.
Black	M	Doing odd jobs on own time.
Black	M	Pay debts, pay municipality.
Black	F	Lifestyle improved.
Black	F	I buy kitchen unit.
Black	F	Could afford a better life, like buying more food for children.
Black	M	Cannot recall.
Black	M	Looked after the children and made sure that there was always something to eat.
Colored	F	Bought personal things.
Colored	M	Life gets better and could save money.
Colored	F	Nothing changed. Her salary wasn't much less than her pension.
Colored	F	The household were more easier when she got the pension.
Black	M	In the household things goes much better. I could bought a parafin stove.
Colored	M	Worked a less than before.
Colored	M	Expenses needed to decrease with a strict budget.
Colored	F	Sick—asthma.
Colored	F	TO BUY MORE BEDDING.
Colored	F	Nothing—too many expenses.

(*continued*)

Table 7.5 (continued)

PANEL B

"In what ways did your life become better when your pension started, if any?"

Race	Sex	Open-Ended Response
		In Households that Do Not Pool Income
Black	F	It become better because pension money was more that make my life to be better.
Colored	F	None wise my life became better.
Black	F	It is better. I'm more independent.
Black	F	It was better cause they could buy food though not yet enough.
Black	M	Still the same.
Black	F	I could open my own bank account and my life has improved.
Colored	M	She could buy more food.
Colored	M	Residentiality improved and conditions in house seems to be stable.
Colored	F	Went worse.
		In Households that Pool Income
Colored	M	Did not become better at all.
Colored	M	He has always food to eat now.
Colored	F	Lifestyle improved now.
Colored	M	Yes converted.
Colored	M	Is able to buy himself some things.
Colored	F	Can now buy more groceries and other specialities.
Black	M	It didn't get better because while he was working he earned more money.
Black	F	When she stopped working she draw UIF money.
Black	M	Life did not get better.
Black	M	None.
Black	F	Could buy more food.
Black	F	My life become better than before because the pension money is more.
Black	F	Could maintain children better than before.
Black	M	Nothing changed.
Black	M	None.
Colored	F	Could buy better food for the house hold.
Colored	M	I could buy any thing I need and to give money for household.
Colored	F	It did not improve much.
Colored	F	She could buy more food.
Black	M	With the income.
Colored	M	Don't have to work anymore.
Colored	M	There were less worries, and they didn't need to work anymore and could rest.
Colored	F	No money.
Colored	F	NONE.
Colored	F	Not better.

dressing
bathing
eating
toiletting
taking a bus, taxi, or train
doing light work in or around the house
managing money (if they had to)
climbing a flight of stairs
lifting or carrying a heavy object
walking 200–300 meters

If an older respondent reported difficulty with an activity (answering "difficult, but can do with no help," "can do but only with help," or "can't do"), then the respondent was given a value of "1" for having a limitation in that activity. The number of limitations was then summed over all activities. For black and colored respondents, the number of limitations in ADLs are plotted in figure 7.1, where we find a great deal of variation in limitations within this population.

That limitations in ADLs are significantly correlated with health status can be seen in table 7.6, where we report estimates from ordered probits of self-reported health status as a function of the number of limitations in ADLs—by sex of respondent, an indicator that the respondent is a pensioner, the number of ADLs interacted with the respondent being a pensioner, and the number of ADLs interacted with the household size—for black and colored respondents aged fifty-five and older. All probits in table 7.6 also control for the respondent's sex, race, age, race interacted with age,

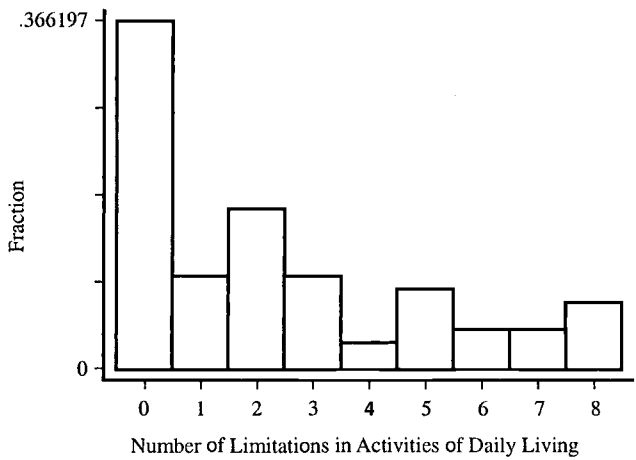

Fig. 7.1 Limitations in activities of daily living (ADLs)

Table 7.6 Activities of Daily Living (ADLs) and Self-Reported Health Status

No. of ADL limitations					
Male respondent	.152	.376	.481	.381	.535
	(.087)	(.159)	(.198)	(.156)	(.190)
Female respondent	.235	.576	.791	.585	.896
	(.129)	(.189)	(.274)	(.186)	(.239)
Indicator: Respondent				.251	.890
is a pensioner				(.388)	(.385)
No. of ADL limitations			–.249		–.335
× pensioner			(.120)		(.112)
No. of ADL limitations		–.044	–.048	–.044	–.050
× household size		(.026)	(.028)	(.025)	(.027)

Notes: The ADL questions were asked only in the older adult module (aged fifty-five and above), and sample is restricted to black and colored respondents aged fifty-five and above. Number of observations = 70. Standard errors are presented in parentheses. Ordinary least squares regressions are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). All regressions include indicators for sex, race, age, race interacted with age, and controls for the number of household members and the number of members aged zero to seventeen. Dependent variable = self-reported health status (1 = Excellent, 5 = Very Poor); ordered probits.

and include the number of household members and the number of members aged zero to seventeen.

We find that limitations in ADLs are associated with significantly worse health status. Limitations for women are associated with larger erosions in health status than are those for men (although the difference between women and men is not statistically significant). Pensioners with limitations in ADLs report better health status than do older adults with limitations who do not receive the pension. In addition, older adults in larger households report better health status with limitations in ADLs than do other older adults. It appears that both the pension income and residence in a large household is protective for members with limitations.

These results are consistent with a model in which money (in the form of a pension) brings help (purchased or volunteered) when respondents cannot dress or bathe by themselves. In addition, in a large household, it is possible that additional household members may be at hand to help when an older adult is unable to dress or bathe himself or herself.

7.4.2 Sanitation

A second way in which money may influence health is through better sanitation. The pension may be used to upgrade household facilities, and some of the improvements made may have health consequences. In table 7.7, we present evidence from probit estimation that the presence of a pensioner in the household is positively and significantly correlated with a flush toilet in the dwelling and negatively correlated with an indicator that

Table 7.7 Sources of Water

	Source of Household's Water is Off-Site		Indicator: Flush Toilet in Dwelling	
Someone in household is eligible for a state pension	–.001		.187	
	(.039)		(.118)	
No. of years of pension receipt (based on pensioner's age)		–.008		.031
		(.007)		(.014)
Urban	–.066	–.064	.111	.111
	(.087)	(.087)	(.950)	(.193)

Source: The Langeberg survey 1999.

Notes: Standard errors are presented in parentheses. Sample restricted to black and colored households. All probits include household size, and an indicator that the household is colored. Probits are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). Numbers reported in the table are the change in the probability of the household having this type of sanitation, given a change in the right side variable. Number of observations = 220.

the household's source of water is off-site. Roughly 40 percent of the black and colored households in our sample have a flush toilet; 10 percent do not have water on-site. Obtaining water on-site, or a flush toilet, may take time to accomplish. We allow for this possibility in table 7.7 by regressing these water-related variables on the number of years the pensioner should have been receiving his or her pension (based on age) interacted with an indicator that a pensioner is present. We find that the presence of a flush toilet is significantly more likely the greater the number of years of pension receipt in the household.

7.4.3 Nutrition

Results in table 7.8 suggest that the pension is also useful in protecting the nutritional status of adults within the household. A knowledgeable household member was asked in each household whether in the past year an adult in the household had skipped a meal or had the size of a meal reduced because of lack of funds. Probit results in table 7.8 show that, in households where pensions are pooled, the pension significantly reduces the probability that an adult has skipped a meal. In households that pool income, the presence of a pensioner reduces the probability that an adult has skipped a meal by roughly 25 percent (with or without controls for the number of members aged fifty-five and above.) These results are consistent with the answers given to open-ended questions (reported in table 7.5), where many pensioners reported that life had changed upon pension receipt because the pensioner could now purchase enough food.

That skipping meals is associated with poorer health can be seen in table 7.9, where we regress health status on an indicator that meals were skipped,

Table 7.8 **Meals Missed for Lack of Money and the Old Age Pension**

	Household Pools Income		Household Does Not Pool Income		All Households	
No. of pensioners in household	–.256 (.107)	–.210 (.150)	–.161 (.203)	–.047 (.209)	–.242 (.069)	–.186 (.123)
No. of members aged 55 or above		–.051 (.090)		–.124 (.080)		–.063 (.080)
Indicator: Household does not pool income					–.029 (.080)	–.037 (.084)
No. of observations	186	186	34	34	220	220

Notes: Dependent variable = 1 if the "knowledgeable" household member reported that in the past twelve months an adult in the household skipped a meal or had the size of a meal reduced because there was not enough money for food. Numbers reported in the table are the change in the probability that a member has missed a meal, given a change in the right side variable. Also included in each probit are household size and an indicator for the household's race. The sample contains one observation per household. Sample restricted to black and colored households.

together with information on the number of pensioners in the household. In a pooling household, when an adult is reported to have skipped a meal, health status of respondents is 0.20 points worse. In nonpooling households, the coefficient on missing a meal is also large (.23), but is not significantly different from zero, given the large standard error the coefficient attracts. Adding the information on meal skipping reduces the pensioner coefficient in pooling households by roughly 5 percent. With enough information on how pension income is spent, we may be able to parse out the effect of having a pensioner in the household on household health into its component parts.

7.4.4 Psychological Risk Factors

Pension receipt may also reduce the level of psychosocial stress faced by household members. Adler et al. (1994) and Marmot (1999), among others, have argued that the lack of adequate resources may reduce people's ability to cope with stressful life events and may put people at risk for depression, hostility, and psychosocial stress.

We explore this channel using data collected in the Langeberg survey on depression, a close correlate of stress (Sapolsky 1994). Each adult respondent was asked how often in the past week they

felt that they could not stop feeling miserable
felt depressed
felt sad
cried a lot
did not feel like eating
felt that everything was an effort

Table 7.9 Hunger and Health Status

	Pooled			Not Pooled			All		
Indicator: An adult in the household skipped meals	—	.199 (.078)	.197 (.078)	—	.226 (.236)	.220 (.231)	—	.200 (.088)	.197 (.085)
No. of pensioners in household	–.606 (.409)	–.586 (.399)	–.477 (.282)	.189 (.171)	.232 (.150)	.375 (.303)	–.387 (.283)	–.357 (.277)	–.253 (.164)
Indicator: Respondent is a pensioner	.319 (.684)	.332 (.680)	.266 (.605)	–.864 (.526)	–.916 (.524)	–.958 (.511)	–.151 (.526)	–.159 (.522)	–.211 (.473)
No. of members aged 55 or above	.123 (.202)	.125 (.191)	—	.145 (.238)	.157 (.249)	—	.113 (.186)	.118 (.178)	—
Household size	–.026 (.058)	–.020 (.061)	–.004 (.059)	–.112 (.123)	–.124 (.128)	–.110 (.111)	–.030 (.061)	–.028 (.065)	–.014 (.057)
Household does not pool income	—	—	—	—	—	—	.020 (.083)	.014 (.085)	–.009 (.104)
No. of observations	413	413	413	95	95	95	508	508	508

Source: The Langeberg survey 1999.

Notes: Standard errors are presented in parentheses. Sample restricted to black and colored households. All regressions are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). Included in all regressions are indicators that the respondent is colored, female, respondent's age, and age interacted with colored, and the number of members aged zero to seventeen. Dashes indicate that this variable was not included in this ordered probit.

Table 7.10 The Depression Index and the Old Age Pension

Indicator: Household contains at least on pensioner	–.529	
	(.266)	
Indicator: Household contains one pensioner		–.518
		(.238)
Indicator: Household contains two or more pensioners		–.942
		(.517)
Indicator: Respondent is a pensioner	–.316	–.188
	(.302)	(.356)
No. of members aged 55 or above	.072	.113
	(.177)	(.204)
Indicator: Household does not pool income	.100	.079
	(.294)	(.313)

Notes: Standard errors are presented in parentheses. Ordinary least squares regressions are weighted using weights based on the 1996 South African census, taking into account the stratification of the sample (by race), and the clustering of observations (by enumerator area). Sample restricted to black and colored respondents aged eighteen and above. Number of observations = 528. All regressions include indicators for sex, race, age, race interacted with age, and controls for the number of household members and the number of members aged zero to seventeen. Dependent variable = Depression Index (with values from 0 to 8). Blank cells indicate that this variable was not included.

experienced restless sleep
felt they could not get going

We use a respondent's answers to these questions to create a depression index. Specifically, for each, if the respondent reported that he or she felt this way "most of the time" we coded their answer as a "1," and our depression index is the simple sum of these responses. Table 7.10 shows that the depression index is significantly lower the greater the number of pensioners in the household. The presence of members aged fifty-five and above has no significant effect on the index, suggesting that it is not the presence of older members, but the money they bring with them, that reduces stress for all adults within the household.

7.5 Conclusions

Income, in the form of an old age pension, has been shown here to improve the health status of all household members in households that pool income. This improvement provides a benchmark against which governments and international organizations interested in improving health status can evaluate other health-related interventions. In those cases in which the lack of capacity, organizational ability, or political will makes improvement in health systems difficult to deliver, the delivery of cash may be a better option if the goal is improvement in health.

References

Adler, Nancy E., Thomas Boyce, Margaret A. Chesney, Sheldon Cohen, Susan Folkman, Robert L. Kahn, and S. Leonard Syme. 1994. Socioeconomic status and health, the challenge of the gradient. *American Psychologist* 49 (1): 15–24.

Case, Anne, and Angus Deaton. 1998. Large cash transfers to the elderly in South Africa. *Economic Journal* 108:1330–61.

———. 1999. School inputs and educational outcomes in South Africa. *Quarterly Journal of Economics* 458:1047–84.

Case, Anne, and Francis Wilson. 2001. Health and wellbeing in South Africa: Evidence from the Langeberg Survey. Princeton University. Mimeograph.

Duflo, Esther. 2000. Grandmothers and granddaughters: Old age pension and intra-household allocation in South Africa. NBER Working Paper no. 8061. Cambridge, Mass.: National Bureau of Economic Research, December.

Fuchs, Victor R. 1982. Time Preference and Health: An Exploratory Study. In *Economic aspects of health*, ed. Victor R. Fuchs, 93–120. Chicago: University of Chicago Press.

Idler, Ellen L., and Stanislav V. Kasl. 1995. Self-Ratings of health: Do they also predict change in functional ability? *Journal of Gerontology: Social Sciences* 508 (6): S344–53.

Marmot, Michael. 1999. Epidemiology of socioeconomic status and health: Are determinants within countries the same as between countries? In *Socioeconomic status and health in industrial nations,* ed. Nancy E. Adler, Michael Marmot, Bruce S. McEwen, and Judith Stewart, 16–29. New York: The New York Academy of Sciences.

Sapolsky, Robert M. 1994. *Why zebras don't get ulcers, A guide to stress, stress-related diseases and coping.* New York: W. H. Freeman.

Smith, James P. 1999. Healthy bodies and thick wallets: The dual relationship between health and economic status. *Journal of Economic Perspectives* 13 (2): 145–66.

van der Berg, Servaas. 1994. *Issues in South African social security.* Washington, D.C.: World Bank.

Comment Robert T. Jensen

There has been a surge of interest in the relationship between socioeconomic status (SES) and health. Much of this evidence has drawn on data from wealthy, industrialized nations. The present paper makes an important contribution because it both presents evidence from a low-income country and uses a unique strategy to isolate the effect of income on health. The latter point is particularly important since most studies that find a cross-sectional correlation between health and SES are unable to rule out

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the possibility that causality runs in the opposite direction (from health to SES) or that there are unobservable "third factors" affecting both health and SES. Direction of causality is clear in this paper because it examines the impact of a large, exogenous income source, namely the South African old age pension system.

The author finds that pension income has a large effect on health, especially improving measures of self-reported health status. Further, pensions improve the health of not only the elderly recipients, but also of other household members living with pensioners. However, the others only benefit in households which "pool," or share, income. This result provides a significant sophistication and refinement beyond what is typically seen in studies of the SES–health relationship. If income is not pooled perfectly within households, the correct measure of SES for an individual is not total household income (per capita), but only the amount of income actually available to that person. Recent empirical evidence, especially from developing countries, has confirmed that distribution within households is not always equal and that household decision making cannot be treated as though it arises from a single household utility function with pooled income.

The results isolating the effects of income on health can serve as a useful benchmark for evaluating health interventions. In low-income countries, the effectiveness of health interventions (such as construction of health clinics or the provision of medicines) is often limited. A number of factors often inhibit success of these interventions, including difficulties in distribution, delivery, and maintenance, as well as funding for ongoing costs, such as medicines and medical personnel. Quite simply, it is often too difficult to maintain a well-functioning system of health clinics adequately supplied with medicines and trained personnel, especially when much of the population is dispersed in low-density rural areas, and funding is poor. In this context, finding that increases in income improve health suggests that perhaps the best (or most cost-effective) health intervention may be direct cash grants. Therefore, the results of this report carry great significance. In an effort to refine and strengthen these results, I offer the following comments:

Can Income be a Mixed Blessing?

The reduced-form relationship between health and SES tells an interesting story but to some extent may not tell the whole story. Income surely has some effect on health but examining the reduced-form relationship ignores critical and important individual factors and dynamics. In particular, while income may bring improved health through the purchase of adequate nutrition, medical care, and services, it may bring adverse consequences as well. For example, obesity is a problem in South Africa, especially among women (the *mean* value of the body mass index among older women is 32,

which qualifies as obese). This is a significant public health concern because obesity is a risk factor for conditions such as hypertension, heart disease, and diabetes. If more income leads to more food intake or a diet that is higher in sodium, fat, or cholesterol (for example, increases in income may be associated with increases in meat consumption; see Jensen in this volume), then we might expect income to ultimately have adverse consequences on health. The measurable effects on health (and mortality) may not show up for many years but are something that should be monitored.

It is also possible that increases in income could be associated with increases in smoking and drinking because there is some evidence (from developed countries) that alcohol and tobacco are normal goods. These behavioral factors could also ultimately lead to worse health. For the South African case in particular, there might be a difference between men and women in terms of what effect the increased pension income has on alcohol and tobacco consumption.

The interesting aspects of focusing on both the positive and negative effects on health would be to offer insight into the design of strategies that capture the positive benefits of improvements in income but avoid the negative consequences, for example, subsidizing certain foods or lowering fees for health clinics (though these strategies are often problematic in themselves).

What are the Direct Channels through which Income Affects Health?

Ultimately, the paper and ink that make up currency have no direct health-promoting or curative properties. The value of such an in-depth, integrated household survey like the one used in this paper is that it provides information on a variety of topics that might assist in trying to uncover the specific channels through which income affects health (again, in both positive and negative directions). For policy purposes, it is these direct channels that may be of most interest. The paper investigates a few specific channels: assistance in daily living, meals missed, and depression/psychosocial stress. However, there are numerous other channels through which income might affect health:

- Living environment (moving to a safer or cleaner living environment);
- Sanitation/water (greater access to sanitation or clean water);
- Medical services (more likely to get a checkup, to see a doctor if ill, to pay for a higher-quality private doctor; more able to afford medicines if necessary);
- Labor supply: Increases in nonlabor income could lead to reductions in working hours, which would reduce physical strain on the body (although a more sedentary lifestyle could adversely affect health);
- Diet and nutrition (intake of foods with higher nutritional content,

that is, moving away from low-cost staples [like grains] that are filling and provide calories, and toward foods with higher levels of other nutrients): However, again, some of these foods could also have higher levels of fat, sodium, or cholesterol.

Given all these potential channels linking SES and health, and given how much detail the survey collects, it would be interesting to see more direct evidence. For example, it should be possible to track health effects through increases in food expenditure and changes in food consumption patterns, alcohol and tobacco use, working hours, and use of medical services.

Limiting Factors: Is Income Necessary, Sufficient, Both, or Neither?

Income is likely to have an effect on health through the various channels mentioned previously but there are likely to be factors that limit the extent to which income can help. For example, if medicine and medical care are important factors in the production of health, which they are likely to be, then large increases in income won't help much unless there are accessible health facilities nearby with well-trained personnel and an adequate supply of medicines. Income likewise will not clean the water one pulls from a stream or contaminated well (unless the person moves to a new area or buys a filter or some other mechanism for treating water). Income also will not drain a swamp or spray to clear an area of malaria-carrying mosquitoes or prevent other vector-borne illnesses, though they may allow one to purchase vaccines or medicines or prophylactics, such as mosquito netting or repellent. Given that some of the major illnesses and leading causes of death in low-income countries arise from greater environmental and health threats that a person may not be able to control on their own or that are not specifically related to income(for example, infectious diseases, parasites, and AIDS), understanding the limiting factors and the interaction of income with these other factors and with other health interventions may provide important insights for health policy.

The Use of Subjective Measures of Health Status

As a complex and multidimensional concept, defining "good health" is extremely challenging and measuring it even more difficult. Measures such as overall, self-reported health status (self-ranking on a scale of 1 to 5, from very bad to very good) have gained widespread popularity. These measures have been shown to have good predictive power for mortality (in developed countries), as individuals are likely able to recognize the state of their health, perhaps even in ways sophisticated tests cannot detect. However, there are a few possible problems with these measures; first, awareness of health conditions in low-income countries is much lower than in wealthy

nations. Individuals in wealthy nations may have a lot of information about their health status due to the much higher use (and quality) of medical services, which would allow them to provide meaningful answers to questions about overall perceived health status. Another problem is that individuals may norm their responses relative to a reference group; if I live among other people who are mostly very poor and my health is slightly better, I may say that my health is very good. Similarly, a rich person may norm their health relative to a reference group of other rich people. But differences in averages across the groups may make the comparisons in self-reported health status by income less appropriate. If the rich are, on average, healthier than the poor, a rich person's report of "bad" may actually reflect better true health status than a poor person's "good" due to these reference group effects.

Also, while such measures may be good predictors of mortality, it is possible that systematic errors arise precisely along the specific lines of SES, which would cause problems for studies of the SES–health relationship. The rich and poor are likely to have differential awareness or knowledge of health conditions, and thus there would arise differences in the extent to which self-reports are good measures of true health. Of course, to the extent this is true, it would most likely only strengthen the association between SES and health because the rich are more likely to be aware of health conditions or illnesses they have due to greater use of (higher quality) medical services. But if the goal is to get a valid estimate of the effects of income on health, especially for use as a benchmark against which to compare the impacts of other policies, any biases should be a cause of concern.

One potential specific problem with the use of self-assessed health in the present case is that the data show that the pension income is associated with reductions in a "depression index." Figure 7C.1 demonstrates the main con-

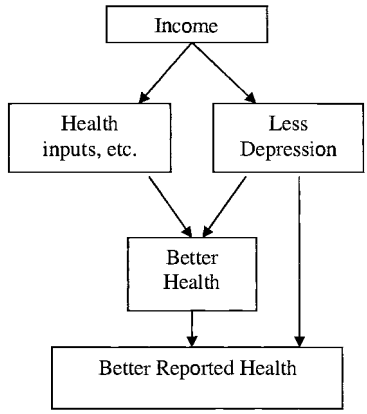

Fig. 7C.1 A potential problem with self-reported health status

cern. Income leads to improvements in health (for example, through greater inputs into health), but also leads to lower depression. Reduced depression, aside from possibly affecting health itself, may change reported health status, even in the absence of any true changes in health. People who are less depressed are likely to report everything more positively, and thus even without changes in health status there could be changes in *reported* health status. This would again affect the extent to which we can use income as a benchmark.

Overall, it is certainly possible that subjective, self-reported health measures are just as meaningful in developing as in developed nations and valid even for use in SES-health studies. However, there is a need for validation studies. Confirming their validity would provide a great value to researchers interested in health in developing countries because a single, easy question that captures meaningful information on such a hard-to-measure but important attribute as health could be used widely in a variety of surveys and studies.

Pooling

Some of the most intriguing results of the paper are the differences in the impacts of the pension on the health of nonpensioners, for pooling versus nonpooling households. The finding that the health of children and other adult members improves in pension households only when income is pooled provides powerful evidence that (1) income matters for health, (2) the distribution of income within households, sharing, and pooling matter for the well-being of individuals within households, and (3) even a simple question asking whether the household pools income captures a meaningful characteristic of household behavior. Empirical and theoretical research in development economics has taken quite seriously (perhaps because of the prevalence of extended households) the notion of resource sharing and decision making within households, moving beyond the simple notion that a household behaves as though there were a single utility function and budget constraint. This paper provides yet another example of the power and relevance of such analysis. It would seem that studies from wealthier nations should follow suit or at least test for the validity of the assumptions of the conventional model of household behavior.

There should also be more research on how better to infer resource sharing within households. Asking only whether income is pooled at all (0 or 1) may ignore some important "shades" of sharing between complete sharing and no sharing. There may be domains and areas of decision making in which households behave more like a single entity, and others where they act more like a collection of individual optimizers. A further issue is that individuals within households may be differentially aware of the extent to which income is pooled within the household. In the present paper, only

one "knowledgeable" person in the household is asked about pooling. As is emphasized in the paper with regard to the need to collect information on individual health and incomes, certain information within households is private. It is possible that there may not be perfect pooling, but only the person holding back some of their money is aware of it. In general, further probing and research on distribution and decision making within households is likely to yield important information about individual well-being and its distribution.