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► **To cite this version:**

| Julien Albertini, Anthony Terriau. Wealth and health in South Africa. 2019. halshs-02073800

**HAL Id: halshs-02073800**

**<https://shs.hal.science/halshs-02073800v1>**

Preprint submitted on 20 Mar 2019

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WP 1911 – March 2019

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### Keywords:

Wealth, Health, Inheritance, South Africa

### JEL codes:

C26, D31, I14, I15

# Wealth and health in South Africa

Julien Albertini\*      Anthony Terriau†

March 13, 2019

## Abstract

In this paper, we investigate the impact of wealth on health in South Africa using the National Income Dynamics Study (NIDS). We estimate a two-stage probit model with inheritance as an instrumental variable for wealth. We find no significant effect of wealth on health at the individual level, consistent with most of the results found for developed countries. Alternative specifications to the health outcomes (self-reported health versus reported diseases) as well as the introduction of gifts as an additional instrumental variable delivers similar results. In addition, we decompose wealth into liquid and illiquid wealth. Despite the health effect being higher for liquid than for non-liquid wealth, none of these measures involve substantial or significant effects on health.

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\*Univ Lyon, Université Lumière Lyon 2, GATE UMR 5824, F-69130 Ecully, France.  
Julien.Albertini@univ-lyon2.fr

†Univ Lyon, Université Lumière Lyon 2, GATE UMR 5824, F-69130 Ecully, France.  
anthony.terriau@univ-lyon2.fr

# 1 Introduction

Understanding the relationship between wealth and health at the individual level has led to a considerable amount of research. While the study of the "health-wealth gradient" is well illustrated for the developed countries and especially the US, very few studies focus on emerging countries. One major reason is that detailed statistics on health and wealth are relatively scarce, discontinued or unrepresentative, therefore making serious investigations difficult to realize. However, emerging countries provide a very interesting environment to evaluate this relation as wealth inequalities are often dramatically large and the access to health unaffordable for many individuals. This strong heterogeneity motivates the reassessment of the relation in the context of an emerging country.

In this paper, we investigate the impact of wealth on health in South Africa, a country that scores terribly in several dimension of economic inequalities. The apartheid system, which ended in 1994, trapped a large part of the population into poverty. Twenty-five years later, wealth inequalities remain stubbornly high. South Africa is also characterized by relatively high rates of mortality and morbidity, short life expectancy, and deep health inequalities (Coovadia et al., 2009). The strong heterogeneity in both dimensions provides an appealing context for such an investigation. We use a rich data set (National Income Dynamics Study (NIDS)) that documents several characteristics on the health and the wealth at the individual level and perform numerous estimations. The general message that emerges from the estimations is that wealth does not have any significant impact on health. This result is robust to alternative specifications to the health outcomes (self-reported health versus reported diseases), to the distinction between liquid and illiquid wealth and to the introduction of gifts as an additional instrumental variable.

Many studies have highlighted a positive association between health and wealth. The literature is dominated by two major views that reflect the channel of causality. On one side, illness raises out-of-pocket medical expenses and causes individuals to work less which reduces their income and impedes wealth accumulation. On the reverse side of the causality, wealthiest individuals are more likely to consume all kind of goods, including health-related ones. Poorest individuals can not afford health cares, therefore increasing their likelihood to have a deteriorated health status compared to rich individuals. In turn, one might expect that richer individuals are healthier than poor ones.

In this paper, we focus on the impact of wealth on health. The conventional estimation strategy consists in quasi-experimental designs exploiting exogenous wealth shocks for dealing with endogeneity issues. Exogenous variations in economic resources include unanticipated changes in stock market wealth (Smith, 2004; Schwandt, 2018), lottery winnings (Lindahl, 2005; Gardner and Oswald,

2007; Van Kippersluis and Galama, 2014; Apouey and Clark, 2015; Cesarini et al., 2016) and inheritances (Meer et al., 2003; Michaud and Van Soest, 2008; Kim and Ruhm, 2012; Carman, 2013; Van Kippersluis and Galama, 2014).

While informative, all these studies have been conducted in developed countries, mainly in the US (Health and Retirement Study, National Health Interview Survey, Panel Study of Income Dynamics), in the UK (British Household Panel Survey), and in Scandinavia (Swedish Level of Living Surveys). Notable exceptions include the work of Case (2004) in the Western Cape province in South Africa, and Fichera and Savage (2015) in the Kagera region in Tanzania. The former exploits a reform of the state old age pension while the latter uses meteorological data as an instrument for income. Both studies find a positive effect of income on health. However, two major concerns can be raised. First, these two papers focus on specific regions, which considerably limits the external validity of the results. It is all the more important in the case of South Africa as racial differences are not equally distributed among the regions. Moreover, the Western Cape is the most endowed province in terms of health services<sup>1</sup> and the population belongs to the richest side on the income and socioeconomic status spectrum. Second, these two studies focus on income and not on wealth. As highlighted by Feinstein (1993), Smith and Kington (1997), McDonough et al. (1997), and Smith (1999), wealth seems to be a better measure of economic resources. Indeed, in South Africa, the relative per capita income of blacks (as a % of per capita income of whites) increases from 6.8% in 1970, six years after the Nelson Mandela's imprisonment, to 15.9% in 2000, six years after the end of apartheid (Leibbrandt et al., 2010). On the contrary, wealth inequalities have been lingering at a ratio close to 10:1 over the same period. Furthermore, in the event of a serious injury or illness out-of-pocket medical expenses may exceed the income of the household. The household then have to dig into one's own pocket to pay for medical cares. This self-insurance mechanism depends on how liquid the wealth is and whether liquid wealth is used to improve the household's health. This is we aim at investigating. All in all, the wealth heterogeneity tells far richest stories about dynamic of inequalities than does the income heterogeneity.

Our empirical strategy is close to that of Meer et al. (2003). We estimate a two-stage probit model with inheritance as an instrumental variable for wealth. Our estimates suggest that the wealth shock associated with inheritances does not significantly impact health. Robustness checks, performed through alternative health outcomes or by adding instruments or control variables confirm our findings. Furthermore, we investigate whether the liquidity of wealth matters for the

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<sup>1</sup>Public sector doctors per 100 000 uninsured population, public budget per head of South Africa, coverage by medical schemes, etc. See Coovadia et al. (2009), Figure 5: Indicators for health and development in South Africa's provinces, 2008.

robustness of our results. We show that non-liquid wealth has an effect close to zero on health. The impact of liquid wealth is higher but not substantial and not statistically significant.

The paper proceeds as follows. Section 2 describes the data. Section 3 presents the empirical strategy to estimate the effect of wealth on health. Section 4 provides a general discussion of our findings. Section 5 concludes and highlights avenues for future research.

## 2 Data

The National Income Dynamics Study (NIDS) is the first national panel study to document both the dynamics of wealth and health in South Africa. The survey started in 2008 and continues to be repeated with the same household members every two years. To our knowledge, the longitudinal dimension of the survey has not yet been exploited to investigate the effect of wealth on health. We use the waves 2 and 4 of the survey (2010 and 2014), referred to as  $t$  and  $t+1$  respectively, which include information on household wealth, inheritances, and health.

To measure the wealth, we use the sum of the household net worth (assets minus debts) of financial instruments, real estate, businesses, vehicles, livestock, and superannuation (in millions of rands). The average household wealth amounts to 340 000 rands while the median wealth is only 48 000 rands. The change in wealth, denoted by  $\Delta\text{Wealth}$ , corresponds to the difference between household wealth in  $t+1$  and  $t$  in millions of rands. Following Meer et al. (2003), we drop extreme outliers in wealth change, namely the bottom 1% and top 1% of  $\Delta\text{Wealth}$ .

We use self-reported health as the outcome variable to measure an individual's health. Self-reported health refers to the question "How would you describe your health at present?" and is measured on an ordinal Likert Scale with five answer categories: **1** ("Excellent"), **2** ("Very good"), **3** ("Good"), **4** ("Fair"), and **5** ("Poor"). This variable is often used in the literature to proxy health status (Frijters et al., 2005; Jones and Schurer, 2011). Although it is a subjective measure of health, numerous studies have demonstrated that self-reported health is a good predictor for objective health outcomes, including morbidity and mortality (Okun et al., 1984; Connelly et al., 1989; Idler and Angel, 1990; McCallum et al., 1994; Grant et al., 1995; Idler and Kasl, 1995; Lundberg and Manderbacka, 1996; Idler and Benyamini, 1997; Burström and Fredlund, 2001; Franks et al., 2003). In our sample, 32.14% of individuals rate their health as "Excellent", 29.36% as "Very good", 26.36% as "Good", 8.86% as "Fair", and 3.28% as "Poor". To measure an individual's health status, we introduce a dichotomous variable PH that equals 1 if an individual reports that his or her health is "Fair" or "Poor", and 0 otherwise<sup>2</sup>.

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<sup>2</sup>We have performed estimates using different thresholds to distinguish healthy and unhealthy

**Table 1:** Description of health outcomes, wealth variables and instruments

| Variables               | Variables description  |
|-------------------------|--|
| <b>Health outcomes</b>  |  |
| PH                      | Poor health (based on self-reported health). Dummy that equals 1 if an individual reports that his or her health is "Fair" or "Poor", and 0 otherwise.   |
| PH2                     | Poor health (based on reported diseases). Dummy that equals 1 if an individual reports a major illness (cancer, heart problems, stroke, tuberculosis, diabetes, high blood pressure or asthma), and 0 otherwise. |
| <b>Wealth variables</b> |  |
| Wealth                  | Sum of the household net worth (assets minus debts) of financial instruments, real estate, businesses, vehicles, livestock, and superannuations (in millions of rands)   |
| $\Delta$ Wealth         | Difference between household wealth in $t + 1$ and $t$ (in millions of rands).   |
| Liquid wealth           | Sum of the household net worth (assets minus debts) of financial instruments (in millions of rands).   |
| Non-liquid wealth       | Sum of the household net worth (assets minus debts) of real estate, businesses, vehicles, livestock, and superannuations (in millions of rands).   |
| <b>Instruments</b>      |  |
| Inheritances            | Dummy that equals 1 if a member of the household has received an inheritance between $t$ and $t + 1$ .   |
| Gifts                   | Dummy that equals 1 if a member of the household has received a large gift between $t$ and $t + 1$ .   |

**Table 2:** Descriptive statistics

| Variables                                | Mean  | S.D.  | Min.  | Max.   |
|--|-------|-------|-------|--------|
| PH                                       | 0.12  | 0.32  | 0     | 1      |
| PH2                                      | 0.24  | 0.43  | 0     | 1      |
| Inheritance received in the last 4 years | 0.03  | 0.17  | 0     | 1      |
| Large gift received in the last 4 years  | 0.05  | 0.22  | 0     | 1      |
| Wealth                                   | 0.34  | 5.53  | -9.65 | 502.03 |
| Liquid wealth                            | 0.06  | 0.48  | -7.13 | 35.52  |
| Non-liquid wealth                        | 0.28  | 5.49  | -9.75 | 500.87 |
| Age                                      | 38.86 | 16.61 | 18    | 108    |
| Age squared                              | 1786  | 1521  | 324   | 11664  |
| Male                                     | 0.41  | 0.49  | 0     | 1      |
| African                                  | 0.83  | 0.38  | 0     | 1      |
| Coloured                                 | 0.14  | 0.35  | 0     | 1      |
| White                                    | 0.02  | 0.15  | 0     | 1      |
| Education                                | 8.75  | 3.75  | 0     | 12     |
| Children                                 | 2.11  | 2.09  | 0     | 19     |
| Couple                                   | 0.30  | 0.46  | 0     | 1      |
| Smoke                                    | 0.21  | 0.40  | 0     | 1      |
| Underweight                              | 0.06  | 0.24  | 0     | 1      |
| Overweight                               | 0.23  | 0.42  | 0     | 1      |
| Obesity                                  | 0.30  | 0.46  | 0     | 1      |
| Observations                             | 8,243 |       |       |        |



### 3 Empirical strategy

We estimate a two-stage probit model with inheritances as instrumental variable for wealth. Formally, the model is:

$$PH_i = \beta_1 \Delta Wealth_i + \beta_2 x_{1i} + u_i \quad (1)$$

$$\Delta Wealth_i = \Pi_1 x_{1i} + \Pi_2 x_{2i} + v_i \quad (2)$$

where  $PH$  is the dependent variable,  $\Delta Wealth$  the endogenous variable,  $x_{1i}$  the vector of exogenous variables and  $x_{2i}$  the instrument. As we treat  $\Delta Wealth$  as an endogenous variable, we must have one additional variable correlated with  $\Delta Wealth$  but not with  $u$ , conditionally on the other covariates. This variable must affect  $PH$  only through its effect on  $\Delta Wealth$  (that is, this variable should not affect health directly). Inheritance meets these conditions (See [Meer et al. \(2003\)](#) for a discussion on the use of inheritance as an instrumental variable).

We use a large set of control variables. We first incorporate the initial values of health and wealth in order to analyze the sensitivity of the change in wealth to the initial level of each of these two variables. We then include variables on age, gender, education, marital status, and the number of children. Considering the particular background in South Africa, we also add racial variables. Several studies highlight the role played by wealth on life habits. For example, if tobacco is a normal good, a rise in wealth can lead to an increase in smoking, with harmful effects on both, health and wealth accumulation. We include a dummy variable *Smoke* that equals 1 if an individual has ever smoked, and 0 otherwise. Lastly, we use the body mass index (BMI) which is calculated by dividing the weight (in kilograms) by the height (in squared meters). The BMI categories are defined as follows: Underweight ( $BMI < 18.5$ ), Normal ( $18.5 \leq BMI < 25$ ), Overweight ( $25 \leq BMI < 30$ ), and Obesity ( $BMI \geq 30$ ). In South Africa, 30% of the population is obese, making it one of the most affected countries in Sub-Saharan Africa. This is a major public health concern because obese people are more likely to suffer from diabetes, hypertension, heart disease, stroke, and certain types of cancer. Therefore, it is likely that a change in wealth may be associated with a shift towards a diet with more sodium, fat or cholesterol, thereby leading to adverse consequences on health.

We first estimate ordinary least squares regressions of change in wealth on inheritance to assess the predictive power of our instrument in the first stage (See [Table 3](#)). Model (1) includes age variables and initial health while Model (2) incorporates initial wealth, which allows to evaluate the sensitivity of the OLS regressions to the initial level of health and wealth. Lastly, Model (3) includes additional sociodemographic variables and information on life habits. For each model, the estimates indicate that inheritances are strongly correlated with changes in wealth.

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individuals, with similar conclusions.

Consequently, our instrument exhibits strong predictive power in the first stage.

**Table 3:** OLS regressions of change in wealth on inheritance

| VARIABLES      | Model (1)              | Model (2)              | Model (3)              |
|----------------|------------------------|------------------------|------------------------|
| Inheritance    | 0.1030***<br>(0.0216)  | 0.1182***<br>(0.0209)  | 0.0979***<br>(0.0203)  |
| Initial wealth |                        | -0.2973***<br>(0.0134) | -0.4034***<br>(0.0141) |
| Initial health | -0.0442***<br>(0.0117) | -0.0566***<br>(0.0114) | -0.0280**<br>(0.0111)  |
| Age            | 0.0076***<br>(0.0013)  | 0.0086***<br>(0.0013)  | 0.0066***<br>(0.0013)  |
| Age squared    | -0.0001***<br>(0.0000) | -0.0001***<br>(0.0000) | -0.0000***<br>(0.0000) |
| Male           |                        |                        | 0.0314***<br>(0.0082)  |
| African        |                        |                        | 0.0451<br>(0.0357)     |
| Coloured       |                        |                        | 0.0357<br>(0.0365)     |
| White          |                        |                        | 0.4169***<br>(0.0447)  |
| Education      |                        |                        | 0.0165***<br>(0.0011)  |
| Children       |                        |                        | 0.0001<br>(0.0016)     |
| Couple         |                        |                        | 0.0455***<br>(0.0077)  |
| Smoke          |                        |                        | -0.0279***<br>(0.0098) |
| Underweight    |                        |                        | 0.0100<br>(0.0161)     |
| Overweight     |                        |                        | 0.0231**<br>(0.0090)   |
| Obesity        |                        |                        | 0.0570***<br>(0.0090)  |
| Observations   | 8,243                  | 8,243                  | 8,243                  |
| R-squared      | 0.0094                 | 0.0656                 | 0.1282                 |

S.E. in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Wealth variables are expressed in millions of rands.

**Table 4:** Two-stage probit estimates of health status (marginal effects)

| VARIABLES       | Model (1)              | Model (2)              | Model (3)              |
|-----------------|------------------------|------------------------|------------------------|
| $\Delta$ Wealth | -0.0169<br>(0.1545)    | -0.0245<br>(0.1399)    | -0.0040<br>(0.1629)    |
| Initial wealth  |                        | -0.0384<br>(0.0431)    | -0.0043<br>(0.0671)    |
| Initial health  | 0.0693***<br>(0.0124)  | 0.0674***<br>(0.0129)  | 0.0585***<br>(0.0109)  |
| Age             | 0.0109***<br>(0.0016)  | 0.0111***<br>(0.0017)  | 0.0104***<br>(0.0016)  |
| Age squared     | -0.0001***<br>(0.0000) | -0.0001***<br>(0.0000) | -0.0001***<br>(0.0000) |
| Male            |                        |                        | -0.0374***<br>(0.0106) |
| African         |                        |                        | 0.0376<br>(0.0398)     |
| Coloured        |                        |                        | 0.0185<br>(0.0404)     |
| White           |                        |                        | 0.0184<br>(0.0838)     |
| Education       |                        |                        | -0.0052*<br>(0.0030)   |
| Children        |                        |                        | -0.0013<br>(0.0018)    |
| Couple          |                        |                        | 0.0020<br>(0.0106)     |
| Smoke           |                        |                        | 0.0228**<br>(0.0114)   |
| Underweight     |                        |                        | 0.0513***<br>(0.0156)  |
| Overweight      |                        |                        | -0.0251**<br>(0.0106)  |
| Obesity         |                        |                        | -0.0251*<br>(0.0136)   |
| Observations    | 8,243                  | 8,243                  | 8,243                  |

S.E. in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Coefficients are marginal probability effects of the respective variables.

We then estimate a two-stage probit model. The first stage consists in regressing our endogenous variable ( $\Delta\text{Wealth}$ ) on our instrument (Inheritance) and the other exogenous variables. In the second stage, we estimate a probit equation for the probability of being in poor health, including the predicted values and residuals from the first stage, as well as the other exogenous variables. The estimates are reported in table 4.

Our instrumental variables estimation suggests that there are no significant causal effects of inheritances on health. Our preferred specification (Model (3)) shows that for an increase in wealth by 1 000 000 rands between  $t$  and  $t + 1$  (namely, over a 4-years period), the probability of being in poor health decreases by only 0.4 percentage point, other things being equal. Note that such an increase in wealth corresponds to a shift from the 5th percentile of wealth in  $t$  to the 95th percentile in  $t + 1$ . Therefore, we can consider that the impact of wealth on health is negligible. The next section provides a general discussion on our findings.

## 4 Robustness

### 4.1 Alternative health outcome

Health is a complex and multidimensional concept which can be measured in several ways. We propose to assess the sensitivity of our results by using an alternative health outcome. Instead of using self-reported health, which is a global but subjective measure of health, we use an indicator based on reported diseases. We create a dummy PH2 that equals 1 if an individual reports a major illness (cancer, heart problems, stroke, tuberculosis, diabetes, high blood pressure or asthma), and 0 otherwise<sup>3</sup>. This alternative measure is more objective, since it is based on a medical diagnosis, but less global, since it only concerns specific diseases. We estimate again the version of the model with all covariates and obtain comparable results to the previous ones (Appendix B).

### 4.2 Additional instrument

A standard concern about instrumental variables estimation is the validity of the instrument. As argued by Meer et al. (2003), Michaud and Van Soest (2008), Kim and Ruhm (2012), Carman (2013), and Van Kippersluis and Galama (2014) inheritance is a suitable instrument for the change in wealth because it provides an exogenous and random wealth shock. First, inheritances provide additional economic resources that can be used to increase health care spending. Second,

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<sup>3</sup>Disease prevalence is provided in Appendix A. Note that conclusions are similar if we use one of these diseases as an health outcome.

the amount and the timing of bequests are uncertain, so that inheritances can be considered as unanticipated. However, as underlined by [Carman \(2013\)](#), inheritance may be correlated with health if the emotional burden of the death of a family member leads to negative effects on health. We tackle this potential issue by using gifts as an additional instrumental variable. We create a variable "Gift" that equals 1 if a member of the household has received a large gift between  $t$  and  $t + 1$ , and 0 otherwise. We then augment the first-stage regression with this variable. The results obtained with this additional instrument are appreciably the same ([Appendix C](#)).

### 4.3 Are inheritances anticipated?

Inheritances might have little effects on health if they are fully anticipated. Although we have ever presented some arguments suggesting that bequests are difficult to predict, one may argue that inheritances could be anticipated. To address this issue, we add a variable "Anticipated wealth shock" that equals 1 if an individual expects that his or her household will be richer in  $t + 1$ , and 0 otherwise<sup>4</sup>. We then include it in the first-stage regression. We still find small and insignificant effects of wealth on health ([Appendix D](#)).

### 4.4 Liquid vs non-liquid wealth

Lastly, we test whether the definition of wealth matters for the robustness of our results. According to the conventional wisdom liquid wealth could be a better predictor of health than total wealth. In the event of a health shock, liquid wealth can immediately be used to cover medical expenses whereas it takes time to convert non-liquid wealth into health expenditures. To test this hypothesis, we distinguish liquid wealth, composed of cash, life insurance, unit trusts, stocks, shares and other financial instruments, and non-liquid wealth, composed of net worth of real estate, businesses, vehicles, livestock, and superannuation ([Appendix E](#)). We estimate again our model on liquid wealth and non-liquid wealth as a measure of wealth. We show that liquid wealth has a much more important effect on health than non-liquid wealth but, in both cases, the impact is small and not statistically significant ([Appendix F](#)).

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<sup>4</sup>Individuals are asked whether they expect that their household will be richer in five years. Contrary to the PSID for the US economy, this measure includes various sources of wealth increase and not only inheritance. Despite being an imperfect measure, this variable can still be used as a proxy for expected inheritance.

Our robustness checks confirm that there is no causal link from wealth to health. This suggests that heirs do not use the increase in wealth induced by inheritances to purchase goods and services that improve health. Consequently, the results previously found in the US (Meer et al., 2003; Michaud and Van Soest, 2008; Kim and Ruhm, 2012; Carman, 2013; Van Kippersluis and Galama, 2014) appear to be also valid in the context of a developing country such as South Africa.

## 5 Conclusion

Numerous studies highlight a positive association between wealth and health. The "health-wealth gradient" boils down to three different approaches: causal effects from health to wealth, causal effects from wealth to health, and unobserved common factors influencing health and wealth together. To date, no consensus has emerged about what is the most relevant channel of causality. While the vast majority of this literature focus on developed countries, little is said in the case of emerging countries. In order to improve our understanding on this relation, we evaluate the impact of wealth on health in South Africa using the National Income Dynamics Study (NIDS). South Africa provides an interesting environment to assess this channel since wealth inequalities are dramatic. For instance, the top decile of households own more than 70% of total wealth.

We estimate the wealth effects on health using two-stage probit model. To tackle the endogeneity issue, we perform instrumental variables estimation with inheritance as an instrument for change in wealth. Our results suggest that wealth shocks resulting from inheritances have negligible impacts on health. We investigated the sensitivity of our results in various dimensions. We consider an alternative health outcome *i.e.* the gifts ; we add an instrumental variable and analyze the potential impact of expectations on future wealth. In all cases, the effects of wealth on health are small and insignificant. Lastly, we show that the health effect is higher for liquid than for non-liquid wealth but not substantial and not significant in both cases. We conclude that among the three possible channels of causality in the health-wealth gradient, the one that belongs to the impact of wealth on health might not exist in the particular context of South Africa, at least in the short-run.

As mentioned in the literature, the absence of a causal link does not rule out the possibility that wealth has an impact of health. The major weakness of this estimation is that it actually evaluates relatively short-term effects since the sample is based on a four years period (two waves). In addition, the estimation does not take into account the health insurance context of South Africa. Public and private health insurance coexist but only 6.75% of individuals have a private health insurance (10% if we only consider employed workers). Investigating the

nature of the health insurance as well as the quality of health cares may surely be good candidates for further investigation of this channel of the health-wealth gradient.

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## A Disease prevalence

Disease prevalence

| Disease             | Prevalence (as %) |
|---------------------|-------------------|
| Cancer              | 0.007082          |
| Heart               | 0.018556          |
| Stroke              | 0.008516          |
| Tuberculosis        | 0.039591          |
| Diabetes            | 0.032659          |
| High Blood Pressure | 0.114889          |
| Asthma              | 0.025398          |

## B Alternative health outcome

Two-stage probit model with an alternative health outcome

| VARIABLES       | 1st stage              | 2nd stage              |
|-----------------|------------------------|------------------------|
| Inheritance     | 0.0977***<br>(0.0203)  |                        |
| $\Delta$ Wealth |                        | -0.0139<br>(0.2439)    |
| Initial wealth  | -0.4033***<br>(0.0141) | -0.0104<br>(0.1003)    |
| Initial health  | -0.0216**<br>(0.0087)  | 0.0863***<br>(0.0111)  |
| Age             | 0.0067***<br>(0.0013)  | 0.0177***<br>(0.0031)  |
| Age squared     | -0.0000***<br>(0.0000) | -0.0001***<br>(0.0000) |
| Male            | 0.0313***<br>(0.0082)  | -0.0380***<br>(0.0127) |
| African         | 0.0456<br>(0.0357)     | 0.0485<br>(0.0531)     |
| Coloured        | 0.0382<br>(0.0365)     | 0.0288<br>(0.0534)     |
| White           | 0.4206***<br>(0.0447)  | 0.1139<br>(0.1269)     |
| Education       | 0.0167***<br>(0.0011)  | -0.0022<br>(0.0042)    |
| Children        | 0.0001<br>(0.0016)     | -0.0042*<br>(0.0023)   |
| Couple          | 0.0451***<br>(0.0077)  | -0.0084<br>(0.0147)    |
| Smoke           | -0.0282***<br>(0.0098) | 0.0183<br>(0.0147)     |
| Underweight     | 0.0086<br>(0.0161)     | 0.0681***<br>(0.0225)  |
| Overweight      | 0.0235***<br>(0.0090)  | 0.0027<br>(0.0139)     |
| Obesity         | 0.0581***<br>(0.0090)  | -0.0035<br>(0.0187)    |
| Observations    | 8,243                  | 8,243                  |

S.E. in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## C Additional instrument

Two-stage probit model with an additional instrument

| VARIABLES       | 1st stage              | 2nd stage              |
|-----------------|------------------------|------------------------|
| Inheritance     | 0.0868***<br>(0.0204)  |                        |
| Gift            | 0.0686***<br>(0.0154)  | (0.0030)               |
| $\Delta$ Wealth |                        | -0.0040<br>(0.1488)    |
| Initial wealth  | -0.4061***<br>(0.0141) | -0.0046<br>(0.0616)    |
| Initial health  | -0.0273**<br>(0.0111)  | 0.0587***<br>(0.0104)  |
| Age             | 0.0066***<br>(0.0013)  | 0.0104***<br>(0.0016)  |
| Age squared     | -0.0000***<br>(0.0000) | -0.0001***<br>(0.0000) |
| Male            | 0.0315***<br>(0.0082)  | -0.0374***<br>(0.0101) |
| African         | 0.0436<br>(0.0356)     | 0.0379<br>(0.0397)     |
| Coloured        | 0.0358<br>(0.0365)     | 0.0188<br>(0.0403)     |
| White           | 0.4160***<br>(0.0446)  | 0.0197<br>(0.0788)     |
| Education       | 0.0162***<br>(0.0011)  | -0.0052*<br>(0.0027)   |
| Children        | 0.0000<br>(0.0016)     | -0.0013<br>(0.0018)    |
| Couple          | 0.0446***<br>(0.0077)  | 0.0017<br>(0.0101)     |
| Smoke           | -0.0278***<br>(0.0097) | 0.0229**<br>(0.0112)   |
| Underweight     | 0.0087<br>(0.0161)     | 0.0513***<br>(0.0156)  |
| Overweight      | 0.0230**<br>(0.0090)   | -0.0251**<br>(0.0103)  |
| Obesity         | 0.0569***<br>(0.0090)  | -0.0252**<br>(0.0128)  |
| Observations    | 8,243                  | 8,243                  |

S.E. in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## D Anticipated wealth shock

Two-stage probit model with anticipated wealth shock

| VARIABLES                | 1st stage              | 2nd stage              |
|--------------------------|------------------------|------------------------|
| Inheritance              | 0.0976***<br>(0.0203)  | 0.0358***<br>(0.0081)  |
| $\Delta$ Wealth          |                        | -0.0045<br>(0.1630)    |
| Initial wealth           | -0.4032***<br>(0.0141) | -0.0044<br>(0.0671)    |
| Initial health           | -0.0278**<br>(0.0111)  | 0.0585***<br>(0.0109)  |
| Anticipated wealth shock | 0.0175**<br>(0.0081)   | 0.0122<br>(0.0085)     |
| Age                      | 0.0066***<br>(0.0013)  | 0.0104***<br>(0.0016)  |
| Age squared              | -0.0000**<br>(0.0000)  | -0.0001***<br>(0.0000) |
| Male                     | 0.0314***<br>(0.0082)  | -0.0372***<br>(0.0106) |
| African                  | 0.0403<br>(0.0357)     | 0.0349<br>(0.0398)     |
| Coloured                 | 0.0317<br>(0.0366)     | 0.0165<br>(0.0404)     |
| White                    | 0.4136***<br>(0.0447)  | 0.0169<br>(0.0835)     |
| Education                | 0.0164***<br>(0.0011)  | -0.0053*<br>(0.0030)   |
| Children                 | 0.0001<br>(0.0016)     | -0.0013<br>(0.0018)    |
| Couple                   | 0.0451***<br>(0.0077)  | 0.0017<br>(0.0105)     |
| Smoke                    | -0.0276***<br>(0.0098) | 0.0230**<br>(0.0114)   |
| Underweight              | 0.0096<br>(0.0161)     | 0.0510***<br>(0.0156)  |
| Overweight               | 0.0225**<br>(0.0090)   | -0.0255**<br>(0.0106)  |
| Obesity                  | 0.0571***<br>(0.0090)  | -0.0250*<br>(0.0136)   |
| Observations             | 8,243                  | 8,243                  |

S.E. in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## E Decomposition of household wealth

### Decomposition of household wealth

| Wealth components  | Mean   | % Total wealth |
|--|--------|----------------|
| <b>Liquid wealth</b>   |        |                |
| Financial instruments (Cash, life insurance, unit trusts, stocks, shares...) | 0.0874 | 25.48          |
| <b>Non-liquid wealth</b>   |        |                |
| Real estate  | 0.1712 | 49.90          |
| Businesses   | 0.0105 | 3.05           |
| Vehicles   | 0.0083 | 2.41           |
| Livestock  | 0.0030 | 0.88           |
| Superannuations  | 0.0627 | 18.28          |
| Total  | 0.3431 | 100.00         |

## F Liquid vs non-liquid wealth

Two-stage probit model with an alternative health outcome

| VARIABLES       | 1st stage              | 2nd stage              |
|-----------------|------------------------|------------------------|
| Inheritance     | 0.0977***<br>(0.0203)  |                        |
| $\Delta$ Wealth |                        | -0.0139<br>(0.2439)    |
| Initial wealth  | -0.4033***<br>(0.0141) | -0.0104<br>(0.1003)    |
| Initial health  | -0.0216**<br>(0.0087)  | 0.0863***<br>(0.0111)  |
| Age             | 0.0067***<br>(0.0013)  | 0.0177***<br>(0.0031)  |
| Age squared     | -0.0000***<br>(0.0000) | -0.0001***<br>(0.0000) |
| Male            | 0.0313***<br>(0.0082)  | -0.0380***<br>(0.0127) |
| African         | 0.0456<br>(0.0357)     | 0.0485<br>(0.0531)     |
| Coloured        | 0.0382<br>(0.0365)     | 0.0288<br>(0.0534)     |
| White           | 0.4206***<br>(0.0447)  | 0.1139<br>(0.1269)     |
| Education       | 0.0167***<br>(0.0011)  | -0.0022<br>(0.0042)    |
| Children        | 0.0001<br>(0.0016)     | -0.0042*<br>(0.0023)   |
| Couple          | 0.0451***<br>(0.0077)  | -0.0084<br>(0.0147)    |
| Smoke           | -0.0282***<br>(0.0098) | 0.0183<br>(0.0147)     |
| Underweight     | 0.0086<br>(0.0161)     | 0.0681***<br>(0.0225)  |
| Overweight      | 0.0235***<br>(0.0090)  | 0.0027<br>(0.0139)     |
| Obesity         | 0.0581***<br>(0.0090)  | -0.0035<br>(0.0187)    |
| Observations    | 8,243                  | 8,243                  |

S.E. in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1