The impact of health on the employment and earnings of young South Africans

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Abstract

This paper estimates the impact of health on employment and earnings among individuals aged 15-39 years in South Africa. Though one of the richest countries in Africa, South Africa is plagued by substantial disease burden especially from communicable diseases, injuries, maternal and child mortality, and non-communicable diseases. The country also has very high unemployment rates, with the unemployment rate among those aged 15-24 years exceeding 50% in 2014 (according to the International Labour Organization definition). The National Income Dynamics Study, a nationally representative panel survey of South African individuals and households, is used for the analysis. Using the second and third data waves (collected in 2010 and 2012 respectively) and controlling for genetic unobserved heterogeneity using sibling fixed effects, I find robust negative and statistically significant impact of adverse health status on employment and wages. These findings indicate that ill health is an added hindrance to young South Africans' employment and earnings, and is therefore likely to worsen poverty. Health policy can be a tool for improving the employment and earnings of young South Africans.

Keywords: Health; Employment; Wages; Youth; South Africa
JEL: I15; J21; J31; O12

1 INTRODUCTION

Active labour market participation and high productivity result in economic growth, and health is an arguably important determinant of these labour market outcomes. Better health likely results in increased productivity, thus increasing labour market earnings and the opportunity cost of non-participation in market activities (Cai & Kalb, 2006). Moreover, ill health can affect the manner in

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which economic agents value time away from work, thereby changing the relative utility between income and non-market time (Chirikos, 1993). For instance, poor health can result in the sick placing more value on non-market time relative to the healthy (due to say, such time being used in seeking health care). Additionally, poor health may indirectly affect labour market participation and earnings through reduced investment in human capital accumulation (Jack & Lewis, 2009). These channels suggest a negative impact of poor health on labour market participation and earnings. Conversely, low earnings due to poor health may induce an income effect, leading to a higher supply of labour/increased employment probability. This effect may be reinforced by the cost implications of ill health especially in the absence of universal health coverage, suggesting a negative relationship between better health and employment (Cai & Kalb, 2006).

Unobserved heterogeneity, such as ability (partly comprising a genetic component), may independently affect employment probability and wages. Failure to account for such unobserved heterogeneity may bias the coefficient of health in a(n) employment/wage regression.

This study estimates the impact of health on employment and wages among South Africans aged 15-39 years, and as such makes a number of contributions to the existing empirical literature. First, it estimates the impact of a composite health measure on both employment and wages in South Africa. Prior studies that estimated the employment effect of health in South Africa either used a single health indicator, i.e. HIV/AIDS (Levinsohn et al., 2013); or an indirect measure of HIV/AIDS-related health such as distance to an antiretroviral (ARV) clinic and the proportion of the population receiving ARV treatment in one's neighbourhood (McLaren, 2010). Though understanding the impact of a specific health condition on labour market outcomes is useful, it does not provide an assessment of the labour market effect of overall disease burden. Indeed, recent evidence from the South African Strategic Plan for the Prevention and Control of Non-communicable Diseases 2013-2017 indicates substantial morbidity from conditions other than HIV/AIDS, like non-communicable diseases (NCDs), maternal conditions and injuries. Thus, a composite health measure may provide a good approximation of the overall impact of illness on the labour market. Self-assessed health (SAH) has been shown to be a good composite proxy for health status (Jylhä, 2009). Furthermore, the use of SAH allows this study to differentiate between different levels of illness severity, unlike the above studies.

Second, most studies that analysed the impact of health on (un)employment in South Africa understandably restricted their analysis to Africans[1] given their use of HIV/AIDS-related health measures and the very high prevalence of the pandemic among Africans (Levinsohn et al., 2013; McLaren, 2010). This study focuses on all racial groups in South Africa. Third, this study accounts for unobserved heterogeneity using sibling fixed effects (FE). Levinsohn et al (2013) could not explicitly account for such due to data constraints.

[1]South Africa consists of four major racial groups: Africans (mainly indigenous blacks), coloureds (mainly of mixed ancestry), Indians and whites.

Unlike McLaren (2010), I do not exclude very young labour market participants from the analysis. Given that employment and earnings may differ between older respondents and their younger counterparts, especially in South Africa where the unemployment rate among 15-24 year olds is approximately double that of the general labour force (World Bank, 2015), it is important to include these younger workers in the analysis in order to get a more complete picture of the relationship. Unlike Levinsohn et al., I disaggregated the analysis between these younger adults and their older counterparts so as to ascertain if there are systematic differences between them. Finally, this study also analyses the impact of health on wages, evidence that is lacking in the South African literature.

I show that being in fair/poor health reduces employment probability by 29 percentage points relative to being in excellent health. Moreover, though the effect of being in fair/poor health (relative to excellent health) exceeds that of having at least twelve years of schooling, further analysis shows that this is driven by 15-25 year olds. Furthermore, the male employment premium seems to exist for individuals aged more than 25 years. Finally, being in fair/poor health exerts a negative impact on real monthly wages compared to being in excellent health.

The rest of the paper is organized as follows. I provide a brief background and subsequently review relevant empirical literature. Next, I discuss the data, main variables and models, present the results, discuss the findings, note the study's limitations and conclude.

1.1 *Brief background*

Though one of the richest countries in Africa and one of few African countries categorized as upper middle income by the World Bank, South Africa has a high disease burden. According to South Africa's Strategic Plan for the Prevention and Control of Non-communicable Diseases 2013-17, the country suffers from a quadruple burden of disease from HIV/AIDS and tuberculosis; maternal and child mortality; injuries; and NCDs. NCDs have been identified as a major source of the country's high disease burden, contributing about 40% of disability-adjusted life years in 2012 according to the World Health Organization[2]. In particular, physical inactivity among the youth is a major public health concern (Reddy et al., 2010). Thus, though the country has a significant HIV/AIDS crisis, other health problems significantly contribute to the disease burden.

South Africa also has very high unemployment rates, and youth unemployment is acute. While the strict unemployment rate (i.e. excluding unemployed non-job seekers) just before 1994 was approximately 13%, it increased to about 16% in 1995 and 26.7% in 2005 (Banerjee et al., 2008). It was 24% in 2008 (Ranchhod, 2009), and currently remains in that neighbourhood[3]. Youth unemployment is even more acute. The strict unemployment rate among those aged

[2] http://apps.who.int/gho/data/node.main.DALYCTRY?lang=en

[3] The decline in the unemployment rate from the mid-2000s has been attributed to the increase in the number of the discouraged unemployed.

15-24 years was 52.6% in 2014 (World Bank, 2015). Understanding whether health adversely affects the employment and earnings of young South Africans is important especially given high unemployment rates among this group and the fact that the high levels of inequality in South Africa are associated with high unemployment and wage differentials (Leibbrandt, Finn & Woolard, 2012)[4].

1.2 *Empirical literature review*

Though there is paucity of empirical evidence on the impact of health/nutrients on employment and earnings/productivity in South Africa, a number of studies exist in developing countries in general and Africa in particular. For instance, earlier work in Indonesia found that iron supplementation of iron-deficient men increased output by about 20% (Basta, Karyadi & Scrimshaw, 1979).

A number of studies have investigated the impact of HIV on the labour market in Africa. Fox et al (2004) found that Kenyan tea plantation workers who later died of AIDS had a 15% income reduction relative to other workers. Also, treating HIV+ patients with ARV was associated with increased productivity and labour force participation in Kenya (Thirumurthy, Zivin & Goldstein, 2008). Habyarimana et al (2005) uncovered a five-fold increase in absenteeism for HIV+ mine workers who developed AIDS in Botswana.

Other developing country studies have investigated the effect of a wide variety of health indicators on wages. For instance, a review of health-wage studies in Latin America found that most studies generally reported positive and statistically significant effects of health on wages (Savedoff & Schultz, 2000). The main identification strategy used by these studies involved instrumenting health with community-level price proxies like access to potable water, distance to health facilities and the quality of household infrastructure (Ribero & Nuñez, 2001; Murrugarra & Valdivia, 1999; Cortez, 1999; Parker & Knaul, 1999). A similar identification strategy was used by Strauss (1986), who instrumented calorie intake with community-level nutrient prices. The study found that calorie intake increased agricultural productivity in Sierra Leone. Similar studies in Ghana and Brazil also found a positive impact of health (measured by height) on labour market earnings (Schultz, 2002). However, given that the above-mentioned instruments depend on possibly endogenous residency decisions (ability may jointly determine both wages/productivity and residency), using residency-related variables as instruments in a wage regression raises questions about the validity of the instruments.

The studies, which are closest in spirit to this paper, that have analyzed the impact of health on (un)employment in South Africa are Levinsohn et al (2013) and McLaren (2010) Levinsohn et al (2013) found that being HIV+ was associated with a 6-7 percentage point increase in the probability of unemployment in the African population. The effect was a 10-11 percentage point increase for Africans with less than 12 years of education. They used models based on

[4]South Africa has one of the highest levels of inequality globally, with a Gini coefficient which increased from 0.66 in 1993 to 0.70 in 2008 .(Leibbrandt, Finn & Woolard, 2012).

estimating propensity scores, and could therefore not control for unobserved heterogeneity. McLaren.(2010) estimated the impact of distance to an ARV clinic, and the proportion of one's neighbourhood treated with ARVs, on employment. The study found that among African men, living 3-15 miles from an ARV treatment centre increased employment probability by 3.3 percentage points relative to living 15-75 miles away. However, living 0-3 miles did not significantly affect employment. A 1 percentage point increase in the fraction of one's neighbourhood population receiving ARV increased one's employment probability by 0.4 percentage points on the average. Another study using a computable general equilibrium model found no effect of being HIV-positive on unemployment in South Africa (Arndt & Lewis, 2001).

From the foregoing, available evidence in South Africa only evaluated the impact of HIV/AIDS and ARV availability on employment. This study takes a broader view of illness/disability in line with the current reality of substantial non-HIV/AIDS morbidity. In addition, it evaluates the impact of health on earnings.

2 METHODS

2.1 *Data*

Data came from the National Income Dynamics Study (NIDS). NIDS is a nationally representative panel survey of South African households and individuals. It is conducted biennially and its currently available three waves were conducted in 2008, 2010 and 2012. Households were sampled via a stratified, two-stage cluster design. In the first stage, 400 primary sampling units (PSUs) were selected from Statistics South Africa's 2003 master sample comprising 3000 PSUs. These 400 PSUs were sampled within 53 district council strata in a manner where the chosen PSUs were proportional to the allocation of PSUs in the master sample. Thereafter, households were randomly selected within each selected PSU and individuals in selected households were interviewed. In wave 1, 7296 households comprising 28226 resident panel household members were sampled. Of these, 26776 individuals were successfully interviewed. In wave 2 (wave 3), 22058 (23262) respondents were successfully interviewed. About 80% of respondents interviewed in wave 1 were re-interviewed in wave 3. A detailed description of the survey is available at www.nids.uct.ac.za All the variables included in this analysis were current (i.e. wave 3) variables except for lagged (i.e. wave 2) SAH.

2.2 *Main Variables*

The employment variable is a dummy variable which equals one if the respondent was employed (i.e. engaged in a productive activity, often for money) over the past four weeks, and zero if she was unemployed. In analysis not reported here (but available on request), I show that the inclusion of the discouraged

unemployed (i.e. non-job seekers) did not significantly affect the results. The variable, *realwage*, denotes real monthly labour market earnings (i.e. monthly wage deflated by the monthly consumer price index corresponding to the interview month, with August 2012 as the base month). The original SAH measure in the dataset is a five-category health measure, ranging from 1 (i.e. excellent health) to 5 (i.e. poor health). It was obtained from the question, "How would you describe your health at present? Would you say it is excellent, very good, good, fair or poor?". For this analysis, I collapsed the fair and poor health categories in the employment regressions given the very small number of the latter (see Table 1) but the conclusions were similar with the five-category specification (results available on request). The excellent health category is the base category.Though some authors express scepticism regarding the validity of SAH due to its apparently subjective nature (Kreider, 1999), SAH has been found to reflect the rational thought processes of respondents, even capturing bodily sensations that are difficult to be detected in clinical tests (Jylhä, 2009).

All analyses in this study were restricted to observations where there were at least two siblings aged 15-39 years in a household with non-missing employment status (for the employment regressions) or wage information (for the wage regressions) in wave 3. Care should be taken regarding the wage analysis as the sample is only 357 observations (see Table 1); thus, the reliability of the sibling FE wage regression estimates may not be guaranteed.

2.3 *Model*

It is common to use instrumental variables to identify the impact of an arguably endogenous variable when such instruments are available. However, there is no convincing health instrument in the dataset[5]. Given that unobserved heterogeneity is a major source of health endogeneity in this context (as noted in the introduction), this study mitigates the problem by controlling for sibling FE. However, I am unable to account for health measurement error if it exists, due to data constraints. Significant measurement error in SAH may affect the consistency of my estimates. There is however, some suggestion in the literature that measurement-related biases likely to plague SAH may cancel out (Bound, 1991).

I assume that an individual enters a given period with existing health stock and makes her labour market decision conditional on other relevant characteristics. Therefore, following Fletcher .(2013), I specify the following models of employment and wage determination:

$$\text{employment}_{i,t} = \alpha_0 + \sum_{j=2}^{4} \alpha_j SAH_{j,it-1} + X_{i,t}\gamma + \theta_s + u_{i,t} \qquad (1)$$

[5]I tried instrumenting current health with its lag in a sibling FE model. The instrument was very weak and thus the result was not reported.

$$\text{in}(\text{realwage}_{i,t}) = \beta_0 + \sum_{j=2}^{4} \beta_j SAH_{j,it-1} + X_{i,t}\delta + \upsilon_s^0 + v_{i,t} \quad (2)$$

where SAH_j is the jth self-assessed health category, with the "1" category omitted (where 1 denotes excellent health, and 4, fair/poor health); $X_{i,t}$ is a vector of covariates (e.g. education, gender and age); θ_s and υ_s^0 are sibling FE while u and v are idiosyncratic error terms; α, β, γ and δ are parameters; t denotes the current period, while t-1 denotes a one-period time lag (representing two years). The use of sibling FE helps account for fixed unobserved genetic determinants of the outcomes. However, the model is unable to account for time-varying unobserved heterogeneity if present. For robustness, smoking (likely correlated with unobserved heterogeneity and labour market outcomes especially among the youth; see e.g. Heckman et al (2006)) is included in both the employment and wage models, while union status is included in the wage model. I later test the FE assumption using a robust Hausman test. Given the very chronic state of unemployment among very young youth in South Africa, the employment model is further disaggregated by age group to see if the impact of health differs between very young youth and their older counterparts.

3 RESULTS

From Table 1, 51.5% of the sample were employed. Average real monthly earning was R2948 (i.e. \$359)[6]. In the employment (wage) sample, 49% (57.4%) self-identified as being in excellent health while only 1% (0%) reported being in poor health. 39.3% (49%) had at least a *matric*[7]. The average age of the respondents was 26.7 (27.9) years. Asians and Whites constituted a small proportion of the sample. When they were excluded from the analysis, the results remained virtually unchanged (results available on request).

Table A1 (see Appendix) reports (naïve) OLS results for the relationship between lagged SAH and employment. Being in very good and fair/poor health were associated with statistically significant lower employment probabilities than being in excellent health. There was no statistically significant association between being in good health and being in excellent health across different model specifications. Table A2 in the Appendix indicates non-trivial associations between SAH and real wage, though these were not statistically significant.

Table 2 depicts the impact of health on employment and real wages controlling for genetic unobserved heterogeneity.

Table 2 indicates that being in fair/poor health resulted in a statistically significant 29 percentage point decline in employment probability relative to excellent health. Being in very good and good health respectively resulted in 6 and 9 percentage point decline in employment probability relative to excellent health. These were however not statistically significant at conventional levels.

[6] USD1=R8.21 in 2012 (http://data.worldbank.org/indicator/PA.NUS.FCRF).

[7] '*Matric*' is a term which equates to twelve years of formal education in South Africa.

Reporting fair health[8] resulted in a 61% decline in real monthly wages relative to being in excellent health. Both the very good and good health categories resulted in a 12% decline, though they were not statistically significant as in the case of employment.

4 DISCUSSION

The above results indicate that health has a non-trivial effect on employment and wages among young South Africans. Though this study design and health measure differ from other South African studies (as is evident from the literature review), the results conform to these previous studies in terms of coefficient sign. The difference in coefficient magnitude between my estimates and Levinsohn et al (2013) (where the latter found a 6-7 percentage point impact of HIV on unemployment probability) may stem from a number of reasons. First, my estimates relate to the impact of SAH, a composite health measure, while Levinsohn et al. estimated the impact of HIV/AIDS on unemployment. Differences in effect size between a single health indicator and a composite measure have been noted in the literature (Currie & Madrian, 1999). It may also result from my ability to distinguish between mild and severe ill health, something Levinsohn et al. could not do due to the nature of their health measure. Similarly, the difference between my estimates and McLaren .(2010)[9] may stem from the fact that distance to an ARV clinic and the proportion of one's neighbourhood population treated with ARV (McLaren's health indicators) do not necessarily translate into better health even for HIV-positive patients. For instance, stigma (a significant problem in South Africa; see e.g. Maughan-Brown .(2010)) may hamper ARV utilization even for those living close to an ARV clinic[10]. In addition, McLaren's health variables are mainly indicative of HIV/AIDS-related health, and do not necessarily represent overall health status.

The effect of fair/poor health (relative to excellent health) exceeds that of having at least twelve years of schooling (relative to less) for both employment probability and wages in this study. While fair/poor health resulted in a 29 percentage point decline in employment probability, having at least twelve years of schooling only resulted in a 14 percentage point increase. For wages, it was 61.4% and 31.9% respectively. I also tested the assumed FE assumption for both the employment and wage regressions using the robust Hausman tests (Wooldridge, 2002). The random effects model was rejected in both cases (Sargan-Hansen p values were 0.00 and 0.01 for the employment and wage equations respectively).

[8] There was no respondent in the poor health category in the wage sample.

[9] Recall that McLaren found that living 3-15 miles from an ARV treatment centre increased employment probability by 3.3 percentage points relative to living 15-75 miles. Also, a 1 percentage point increase in the fraction of one's neighbourhood population receiving ARV increased one's employment probability by 0.4 percentage points.

[10] Though our samples are not identical, it is doubtful that these differences are entirely due to compositional differences.

To test the robustness of the estimates, I included union status (possibly an independent predictor of wages, which may not be correlated with health) and smoking, which may co-occur with illness (Fletcher, 2013) (see Table 3; the first column is the employment regression while the last two columns are wage regressions). Table 3 indicates that the results were robust to the inclusion of these variables.

Given the very high youth unemployment rate in South Africa, it is plausible that the labour market outcomes of very young adults differ from those of their older colleagues. Disaggregating the analysis by age group may help us understand whether the impact of health on employment differs across these groups. If for instance, very young adults are more likely to be employed in manual occupations for which say, physical fitness is especially important, the penalty for very poor (physical) health may be substantially higher than among their older counterparts.

Table 4 depicts FE models disaggregated by age group[11]. "Young youth" and "old youth" respectively refer to individuals aged 15-25 years and 26-39 years. The cutoff of 25 was informed by data considerations so as to have sufficient observations in both groups to permit reliable analysis.

Fair/poor health resulted in a statistically significant 29 percentage point decline in employment probability relative to excellent health in the young youth sample. It was 22 percentage points in the old youth sample, though the latter effect was not statistically significant. The impact of fair/poor health (relative to excellent health) dominated that of having at least a *matric* (relative to less education) only among the young youth. A plausible explanation for these age-based differences is that adolescents and very young adults may be more likely to seek (and be offered) employment in largely low-tier jobs where physical fitness may play a larger role than education in employment mainly due to their perceived inexperience. This explanation is more plausible if SAH mainly reflects physical health. Therefore, young youth possibly suffering from severe health conditions (hence reporting fair/poor health) may be more likely to suffer a huge employment penalty[12].

Table 4 also suggests that the employment premium in favour of males in South Africa hardly emerges till after 25 years. To my best knowledge, this is a novel finding given that though there is some evidence about a positive male employment premium in South Africa (Kingdon & Knight, 2007; Kingdon & Knight, 2004), I am unaware of any evidence regarding when this premium is likely to arise. This result remained robust to using 24 years as the cutoff (available on request).

4.1 *Limitations and future research*

Apart from the inability to control for time-varying unobserved heterogeneity, the small sibling wage sample is a limitation of this study. Thus, I could not

[11] I could not conduct a similar analysis for wages given the small sample size.

[12] Descriptive evidence from the data shows that the proportion of the young youth employed in elementary occupations was slightly higher than that of the old youth (40% vs 35%).

conduct as detailed an analysis as is the case with employment. Furthermore, controlling for genetic/family FE through both parents represents a cleaner form of identification compared to using only mothers as in this study given that some respondents may be half siblings. Data constraints with regard to linking biological fathers to their children made such an analysis infeasible. Also, incorporating the informal sector may further enrich the analysis given possible differences between the formal and informal sectors. Unfortunately, there was no variable in the dataset for such a distinction. But this may not be a significant shortcoming as the informal sector in South Africa is not very large, unlike many African countries (Kingdon & Knight, 2007). It will also be interesting to know what explain(s) both the non-existence of an employment gender gap among the young youth and its emergence among the older youth in South Africa. Lack of data (e.g. employer gender perceptions across age groups) did not permit further analysis in this regard. Finally, having found the impact of being in fair/poor health on employment and wages relative to being in excellent health, a logical follow-up will entail ascertaining what fair/poor health actually means in terms of illness severity and the amount of resources necessary to improve such a health status to excellent health on the average. Unfortunately, these are issues that cannot be addressed with the available data but form an agenda for future research.

5 CONCLUSION

To the extent that genetic unobserved heterogeneity is a significant cause of health endogeneity in an employment/earnings model, this study has made important findings in the absence of a convincing instrument. First, being in fair/poor health significantly reduces the probability of employment relative to being in excellent health. While being in very good and good health decrease employment probability (compared to excellent health), the differences are not statistically significant. The adverse employment effect of being in fair/poor health relative to being in excellent health exceeds that of having at least twelve years of schooling (compared to having less education). Further analysis indicates that the dominance of severe ill health over having at least 12 years of schooling is mainly driven by youth aged 15-25 years. In addition, the male employment premium only exists among those aged more than 25 years.

While being in worse health results in lower real wages relative to being in excellent health, only respondents in fair health earn significantly less than their excellent health counterparts statistically. Also, the wage penalty for being in fair health relative to excellent health exceeds the gain accruing to having at least twelve years of schooling (relative to having less education).

By focusing on a composite health measure, this study not only obtains estimates of the impact of overall health on employment and wages, but distinguishes between the impact of moderate and severe ill health among young South Africans. Improving the health of the youth, especially the severely ill, has the potential to boost employment and wages among young South Africans.

In addition to understanding how to use health policy to improve employment and wage outcomes, further research should focus on understanding the factors responsible for the emergence of a male employment premium in South Africa.

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