



# Estimating Economic returns to Education in South Africa

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## ABSTRACT

One of the most powerful drivers of economic mobility and improved earnings is education. However, the returns to education vary across age, gender, and race. This paper examined the economic returns to schooling in South Africa using data from the General Household Survey (GHS) 2022 with a total sample of 10883. The findings of the study revealed a positive relationship between education and income, suggesting that individuals with a higher education earn more than those with lower or no education. Surprisingly, the findings also showed that individuals with a master's degree earn more than those with a PhD degree. This may indicate differences in earnings by sector, as most PhD holders are in academia, which does not pay as much as other sectors. The study also confirms the persistent disparities between the previously disadvantaged racial groups and women, who earn less than their male counterparts, even with the same level of education. Furthermore, age and experience positively correlate with earnings. The findings of the study highlight the urgent need for policymakers to address systematic labour market inequality and promote equitable access to quality education for all in South Africa.

**Keywords:** Education, Earnings, General Household Survey, South Africa

## INTRODUCTION

Education is often considered a primary catalyst of a country's well-being, being a pillar of economic growth and development.<sup>1</sup> It is defined as the act of providing productive skills to individuals, which, when employed, gives a return that is greater than the cost and time used in acquiring the skill.<sup>2</sup> Its importance, originating from the early Egyptian Kingdom in 2061 BC to the origins of philosophy in the days of Socrates and Plato in Athens, 470 BC, has been recognised throughout the years through reduced inequality and increased standard of living of citizens.<sup>3</sup> As Adam Smith indicated, education is

<sup>1</sup> Vivian Thuso Molaodi, "Assessing the Effect of Education Levels on Economic Growth in South Africa," *International Journal of Research in Business and Social Science* (2147- 4478) 11, no. 10 (December 31, 2022): 366–74, <https://doi.org/10.20525/ijrbs.v11i10.2155>.

<sup>2</sup> Adam Smith, *The Wealth of Nations* [1776], vol. 11937 (na, 1937); Martin McCracken et al., "Human Capital Theory: Assessing the Evidence for the Value and Importance of People to Organisational Success," *Chartered Institute of Personnel and Development: Belfast, Northern Ireland* 42, no. 1 (2017): 130–41.

<sup>3</sup> James Bowen, "A History of Western Education Volume 3. The Modern West Europe and the New World" (New York: St. Martin's Press, 1981).

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an investment in human capital that should produce a return from the knowledge inculcated and the dexterity ensured.<sup>4</sup> However, one of the pressing issues in development economics and related disciplines is the disparities in the returns to education amongst individuals and groups in the labour market. It is highlighted that the earnings differential is a major problem globally, and much emphasis on these patterns within different regions of the world should be explored.<sup>5</sup>

South Africa is known for its historical disparities, rising poverty, unemployment, and inequality.<sup>6</sup> For instance, a Gini coefficient of 0.63 was recorded in 2022, while the official unemployment rate was recorded at 32.9% in the first quarter of 2023.<sup>7</sup> As such, these challenges highlight the important role education plays in sustainable economic growth, development, and social transformation.<sup>8</sup> Figure 1 presents a summary of average earnings by education level, offering a visual overview of the relationship between education and income.

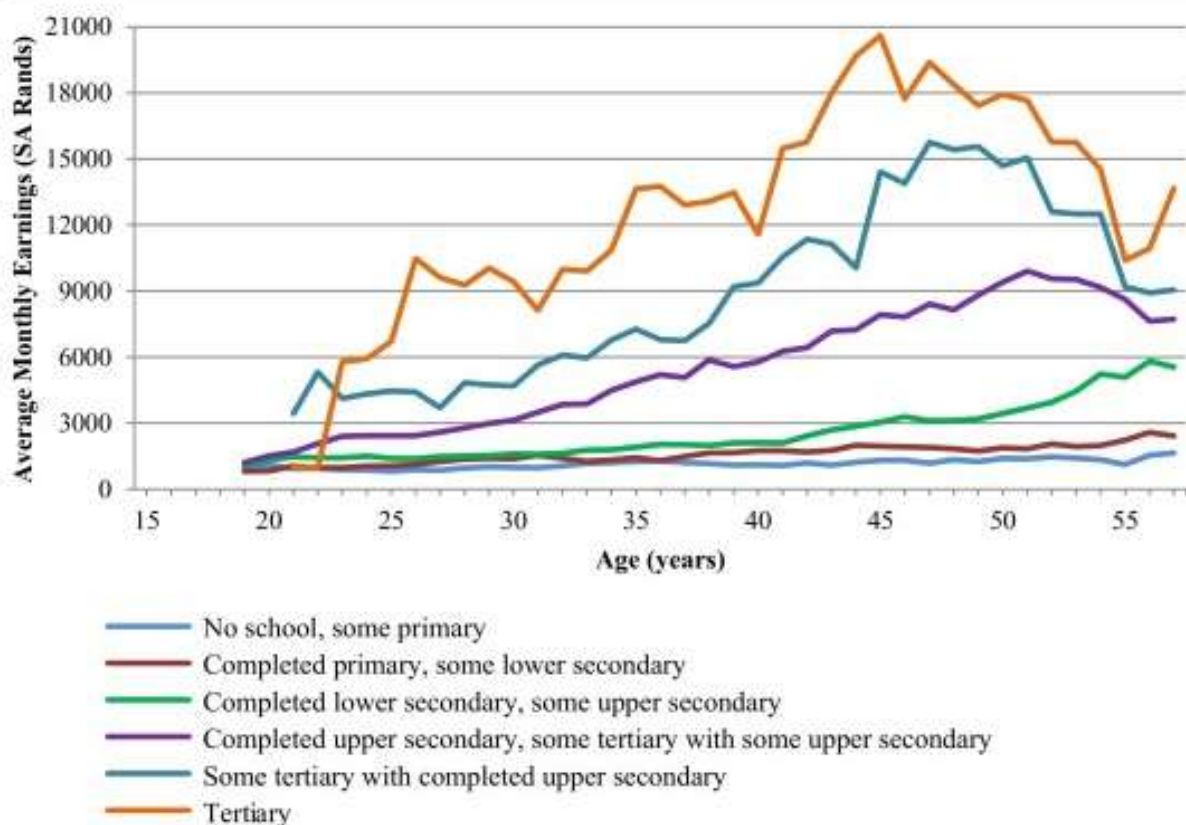


Figure 1: Average earnings and education levels  
 Source: Taylor Salisbury, "Education and Inequality in South Africa"<sup>9</sup>

<sup>4</sup> Smith, *The Wealth of Nations* [1776].  
<sup>5</sup> Branco Milanovic, *Global Inequality: A New Approach for the Age of Globalization*, Harvard University Press, vol. 92 (Belknap Press, 2016), <https://doi.org/10.1111/1468-2346.12723>.  
<sup>6</sup> Andrew Kerr, "Measuring Earnings Inequality in South Africa Using Household Survey and Administrative Tax Microdata" (WIDER Working Paper, 2021).  
<sup>7</sup> Carolina Diaz-Bonilla et al., "Global Poverty Monitoring Technical Note - October 2022 Update to the Multidimensional Poverty Measure" (Washington DC, 2022).  
<sup>8</sup> Daniel F Runde, Romina Bandura, and Madeleine McLean, *Investing in Quality Education for Economic Development, Peace, and Stability* (JSTOR, 2023).  
<sup>9</sup> Taylor Salisbury, "Education and Inequality in South Africa: Returns to Schooling in the Post-Apartheid Era," *International Journal of Educational Development* 46 (January 2016): 43–52, <https://doi.org/10.1016/j.ijedudev.2015.07.004>.

The education system of South Africa is linked to the complex historical, economic, and social landscape. As such, the legacy of apartheid has left an indelible mark on the country's educational institutions, causing enormous gaps in accessing quality education and resources.<sup>10</sup> Although progress has been made in reducing income inequality and increasing investments in education, factors such as poor schools in underprivileged communities, unequal distribution of resources, and elevated dropout rates remain a concern.<sup>11</sup> These structural inadequacies lead to unequal economic benefits, with some demographic groups benefiting more from their education than others.

Considering the diverse mixture of South Africa's cultures, histories, and economic structures, earnings and educational differentials are heavily influenced by various factors, including race, age, gender, marital status, geographical location, the level of education of parents, ethnicity, historical and structural factors, including colonial legacies and social structure, amongst other factors.<sup>12</sup> In South Africa, race has a diverse impact on earnings, social inclusion, employment opportunities, and historical disadvantages, highlighting specific policy intervention needs.<sup>13</sup> Similarly, gender discrepancies also exist, as women experience additional challenges while having higher levels of education than men.<sup>14</sup> Specifically, women are 53.1% less likely than men to be employed. Married women have the lowest employment rates, whilst men who are married or cohabiting are more likely to have a job.<sup>15</sup>

These disparities are further exacerbated by geographic location, as rural communities are usually at a disadvantage compared to their urban counterparts due to limited access to quality schools, resources, and economic opportunities. This follows the fact that qualified educators are less willing to teach in rural areas than in urban areas.<sup>16</sup> Furthermore, research has shown that racial minorities living in poor areas face many challenges, contributing to education and income disparities.<sup>17</sup>

Returns to education are commonly quantified using the Mincerian function, which analyses the relationship between the years of schooling and earnings.<sup>18</sup> Although numerous studies used the Mincerian approach to analyse income and education in South Africa,<sup>19</sup> a gap still exists in

<sup>10</sup> M L. Ocampo, *A Brief History of Educational Inequality from Apartheid to Present. Global Perspectives on Human Language: The South African Context.* (Leland Stanford Junior University, 2004); S. Badat and Y Sayed, "Post-1994 South African Education: The Challenge of Social Justice," *He Annals of the American Academy of Political and Social Science* 652 (2014): 127–48.

<sup>11</sup> M.S. Mokgwathi, M.A. Graham, and J.J.R. De Villiers, "School Infrastructure Challenges in South Africa: Experiences of High School Principals and Teachers," *South African Journal of Education* 43, no. 4 (2023): 1–13; Development Bank of Southern Africa (DBSA), "The Effects of Poor Infrastructure in Education, Transport and Communities," 2025; N. Lombo and M Subban, "Physical Infrastructure Challenges in Rural Schools," *Administratio Publica* 32, no. 1 (2024): 69–101.

<sup>12</sup> Daniela Casale and Dorrit Posel, "Gender Inequality and the COVID-19 Crisis: Evidence from a Large National Survey during South Africa's Lockdown," *Research in Social Stratification and Mobility* 71 (February 2021): 100569, <https://doi.org/10.1016/j.rssm.2020.100569>; Jacqueline Mosomi, "Distributional Changes in the Gender Wage Gap in the Post-Apartheid South African Labour Market," March 2019 (Pretoria, 2019); C. Moyo, S. Mishi, and R Newadi, "Human Capital Development, Poverty and Income Inequality in the Eastern Cape Province," *Development Studies Research* 9, no. 1 (2022): 36–47; M Gardiner, "Education in Rural Areas. Centre for Education Policy Development (CEPD)," *Centre for Education Policy Development (CEPD) Issues* (2008); D.N. Gujarati, *Basic Econometrics*, 4th ED ( Newyork: The McGraw-Hill companies, 2004); Kerr, "Measuring Earnings Inequality in South Africa Using Household Survey and Administrative Tax Microdata."

<sup>13</sup> O. Mtapuri and P. Tinarwo, "From Apartheid to Democracy.," *Southern African Journal of Demography* 21, no. 01 (2021): 104–33; Moyo, Mishi, and Newadi, "Human Capital Development, Poverty and Income Inequality in the Eastern Cape Province."

<sup>14</sup> C. E. Ross and J Mirowsky, "Gender and the Health Benefits of Education," *The Sociological Quarterly* 51, no. 1 (2010): 1–19, <https://doi.org/https://doi.org/10.1111/j.1533-8525.2009.01164>; A.G. Dosunmu and M. Dichaba, "Women and Higher Education: Access, Equity and Opportunities for Woman in the Workplace," *South African Journal of Higher Education* 38 (2024): 21–45.

<sup>15</sup> Caro C Janse van Rensburg, Carike Claassen, and Alicia Fourie, "The Relationship between Marital Status and Employment in South Africa," *Journal of Economic and Financial Sciences* 12, no. 1 (2019): 1–9.

<sup>16</sup> Thomas F Luschei and Loris P Fagioli, "A Vanishing Rural School Advantage? Changing Urban/Rural Student Achievement Differences in Latin America and the Caribbean," *Comparative Education Review* 60, no. 4 (2016): 703–45; Raoul Van Maarseveen, "The Urban–Rural Education Gap: Do Cities Indeed Make Us Smarter?," *Journal of Economic Geography* 21, no. 5 (2021): 683–714; Richard Mark Wood, "A Review of Education Differences in Urban and Rural Areas," *International Research Journal of Educational Research* 14, no. 2 (2023): 1–3; Daniel Borbely et al., "Rurality, Socio-economic Disadvantage and Educational Mobility: A Scottish Case Study," *British Educational Research Journal* 50, no. 1 (2024): 162–82.

<sup>17</sup> Seyi Olalekan Olawuyi, Abbyssinia Mushunje, and Gabriel Eyinade, "Micro-Analysis of Earnings and Its Determinants in Eastern Cape Province of South Africa," *Journal of Infrastructure Policy and Development* 8, no. 6 (June 18, 2024): 2996, <https://doi.org/10.24294/jipd.v8i6.2996>.

<sup>18</sup> J. Mincer, " 'Schooling, Experience, and Earnings.' " (National Bureau of Economic Research (NBER), 1974).

<sup>19</sup> George Psacharopoulos and Harry Anthony Patrinos, "Returns to Investment in Education: A Decennial Review of the Global Literature," *Education Economics* 26, no. 5 (2018): 445–58; Steven Dunga and Lerato Mothibi, "Education And Earnings in South Africa: An Application of the Mincerian Function," in *Proceedings of the 45th International Academic Conference, London* (International Institute of Social and Economic Sciences, 2019), <https://doi.org/10.20472/IAC.2019.045.010>.

understanding the relationship between demographic characteristics such as race, gender, and geographic location on earnings and education outcomes.<sup>20</sup> Many studies fail to consider the aforementioned dimensions; therefore, this study aims to provide a comprehensive analysis of how demographic factors and education affect earnings in South Africa. The study benefits from more recent, comprehensive data collected from thousands of households in 2022. This study contributes to the broader discussion on the role of education in socioeconomic growth and provides useful insights for policymakers, educators, and scholars. This study aims to establish the groundwork for more equitable and effective policy approaches by bridging gaps in understanding the demographic differences in educational returns. This is because addressing these discrepancies is not only a social justice issue, but also a strategic need to realise South Africa's full economic potential and guarantee a more inclusive future for all its citizens.

## LITERATURE REVIEW

Gary Becker and Theodore Schultz developed the human capital theory, which stems from the principle that when an investment is made in humans to improve productivity, this could improve employment opportunities and future earnings.<sup>21</sup> Generally, skills and experience acquired from school and the workplace contribute to an employee's value and future earnings. The human capital theory posits that higher education is critical in advancing the production capacity of educated people.<sup>22</sup> As such, education directly and indirectly influences the economic development of a nation, whilst also having a positive correlation with the income of the educated individual.<sup>23</sup> Education is seen as a long-term investment, with long-term benefits like employment security, better economic position, and income benefits.<sup>24</sup> Thus, human capital refers to a person's intrinsic productive capabilities. These capabilities or abilities can be improved or increased through investment in education, on-the-job training, and health.<sup>25</sup> Smith also wrote of the importance of investing in human beings and identified skills and abilities as a fundamental source of progress and wealth creation.

The three main assumptions of the human capital theory, as asserted by Riddell, include the assumption of education as an investment.<sup>26</sup> This suggests that although individuals will incur costs, they will gain benefits in the future. This highlights the significance of the nature of the investment since the benefits to human capital can only be obtained in the future as income or earnings. The second assumption is based on the link between productivity and earnings, in which the literature highlights a correlation between higher education and productivity, leading to increased future earnings.<sup>27</sup> The last assumption is that of rational decision-making. This implies the cost of human capital is the opportunity cost of income forgone as an individual will not be employed due to the time dedicated to schooling instead of employment.

Investment in human capital has different types of returns. The first is the private returns that accrue directly to the individual. The private returns can also be monetary and non-monetary.<sup>28</sup>

<sup>20</sup> María Arrazola and José De Hevia, "Gender Differentials in Returns to Education in Spain," *Education Economics* 14, no. 4 (2006): 469–86; Mduzuzi Biyase and Talent Zwane, "Does Education Pay in South Africa? Estimating Returns to Education Using Two Stage Least Squares Approach," *The International Business & Economics Research Journal (Online)* 14, no. 6 (2015): 807; Psacharopoulos and Patrinos, "Returns to Investment in Education: A Decennial Review of the Global Literature"; Dunga and Mothibi, "Education And Earnings in South Africa: An Application of the Mincerian Function."

<sup>21</sup> Gary S Becker, "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy* 70, no. 5, Part 2 (1962): 9–49; Theodore W Schultz, "Investment in Human Capital," *The American Economic Review* 51, no. 1 (1961): 1–17; T.V. Nkohlhla, "*The Impact of Education on Economics Growth in South Africa: Econometric Analysis.*" (University of Stellenbosch, 2014).

<sup>22</sup> Ntsapokazi Deppa, "The Impact of Education on Economic Growth in South Africa" (University of KwaZulu-Natal, 2018).

<sup>23</sup> Nkohlhla, "*The Impact of Education on Economics Growth in South Africa: Econometric Analysis.*" .

<sup>24</sup> A O Ayeni and O S Olanunkanmi, "Relationship between Student Learning Factors and Their Learning Outcome in Senior Secondary School Economics in Osun State Public Secondary Schools, Nigeria," *Journal of Emerging Trends in Educational Research and Policy Studies* 6, no. 2 (2015): 159–68.

<sup>25</sup> Eric R Eide and Mark H Showalter, "Human Capital," *DJ Brewer and P. McEwan (Section Eds), International Encyclopedia of Education, Economics of Education Section*, 2010.

<sup>26</sup> William Craig Riddell, *The Impact of Education on Economic and Social Outcomes: An Overview of Recent Advances in Economics* (Canadian Policy Research Networks, 2006).

<sup>27</sup> Riddell, *The Impact of Education on Economic and Social Outcomes: An Overview of Recent Advances in Economics.*

<sup>28</sup> Harry Patrinos, "Estimating the Return to Schooling Using the Mincer Equation," *IZA World of Labor*, 2016, <https://doi.org/10.15185/izawol.278>.

Monetary returns are in terms of increased earnings over a lifetime, and non-monetary returns may include social status, personal freedom, and rational choices.<sup>29</sup> In females, it also included low fertility among other issues.<sup>30</sup> The actual rate of return to education can only be calculated by starting with the cost involved. This is not always straightforward, as it may include unquantifiable costs and opportunity costs. Eide and Showalter present a model proposed by Psacharopoulos where costs and returns are modelled over a person's lifetime time see Figure 2.<sup>31</sup>

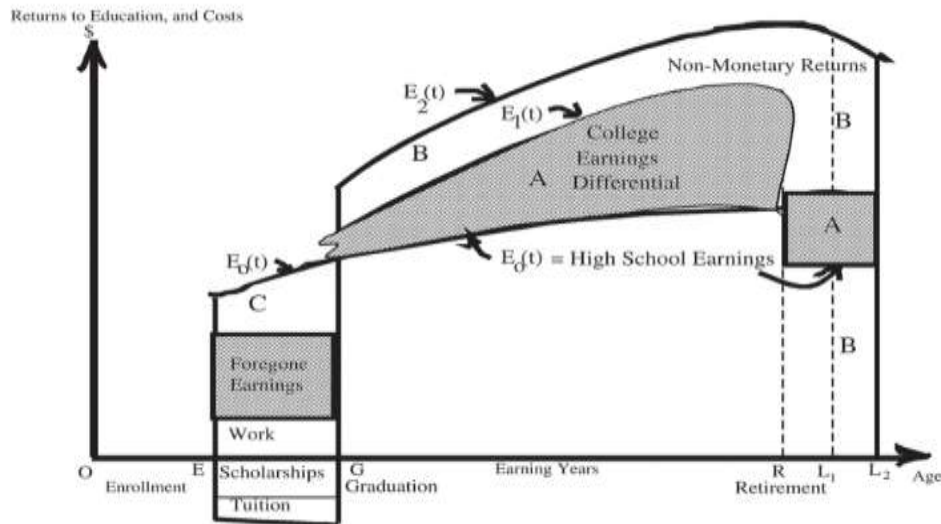


Figure 2: Effects of human capital investment on lifetime earnings

The argument in Figure 2 is that there are costs associated with investment in higher education; however, the returns that follow far outweigh its costs. In measuring this return, several approaches have been proposed.<sup>32</sup> According to Eide and Showalter, a full discounting method of the rate of return to a university degree can be presented as follows:<sup>33</sup>

$$\sum_{t=1}^n \frac{C_t}{(1+r)^t} - \sum_{t=n+1}^m \frac{B_t}{(1+r)^t} = 1$$

Where  $C_t$  Represent opportunity costs of a university degree in year  $t$ ;  $B_t$  Represent benefits of a university degree in year  $t$ ;  $n$  represents the length of education ;  $(m-n)$  represents years in the workforce; and  $r$  represents the rate of return. Stark presents a slightly different approach where  $A$  and  $B$  represent the earnings stream with and without the investment, respectively, as follows.<sup>34</sup>

<sup>29</sup> Simona Potelienė and Zita Tamašauskienė, "The Rate of Return to Investment in Education: A Case Study of Lithuania," *Wroclaw Review of Law, Administration & Economics* 4, no. 2 (December 1, 2014): 41–55, <https://doi.org/10.1515/wrlae-2015-0014>.

<sup>30</sup> Evan D. Peet, Günther Fink, and Wafaie Fawzi, "Returns to Education in Developing Countries: Evidence from the Living Standards and Measurement Study Surveys," *Economics of Education Review* 49 (December 2015): 69–90, <https://doi.org/10.1016/j.econedurev.2015.08.002>.

<sup>31</sup> E.R. Eide and M.H. Showalter, "Human Capital," in *International Encyclopedia of Education* (Elsevier, 2010), 282–87, <https://doi.org/10.1016/B978-0-08-044894-7.01213-6>; George Psacharopoulos, "Returns to Education: An Updated International Comparison," *Comparative Education* 17, no. 3 (1981): 321–41.

<sup>32</sup> Alan Stark, *Which Fields Pay, Which Fields Don't?: An Examination of the Returns to University Education in Canada by Detailed Field of Study* (Canada Department of Finance, 2007); David Card, "Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems," *Econometrica* 69, no. 5 (2001): 1127–60.

<sup>33</sup> Eide and Showalter, "Human Capital," 2010.

<sup>34</sup> Stark, *Which Fields Pay, Which Fields Don't?: An Examination of the Returns to University Education in Canada by Detailed Field of Study*.

$$0 = \sum_{i=1}^N \frac{(A_i - B_i - C_i)}{(1 + r)^i}$$

Where C represents the private costs associated with investment in education, N represents the number of years between the starting point of an investment and retirement.

An important aspect of labour economics has remained the relationship between education and earnings.<sup>35</sup> This relationship is not straightforward, since some researchers find no causality between education and earnings, whilst others do, and some have shed light on external aspects that influence education and earnings.<sup>36</sup> For instance, Psacharopoulos and Patrinos investigated returns to investment in education. Their findings suggested that a person's earnings will, on average, increase by between 8% and 10% for every year of schooling.<sup>37</sup> Furthermore, numerous scholars such as Dunga, Mothibi, and Nasiphi investigated returns to education in South Africa and found a correlation between higher levels of education and higher wages.<sup>38</sup> Additionally, Dunga and Mothibi identified access to quality education as a constraint in the labour market,<sup>39</sup> while Nasiphi showed that the returns to education are higher for individuals with a tertiary qualification, and emphasised that the benefits of education vary due to race and gender, highlighting a level of inequality.<sup>40</sup>

Turning towards demographic factors and their contribution to education and earnings, the concept of earning disparity is often used when discussing variations between groups or even between individuals, for which these disparities are a result of numerous factors.<sup>41</sup> For instance, the gender wage gap has remained a key issue, as empirical evidence shows that women are more likely to earn less than their male counterparts, even if they have the same level of education. Numerous studies have investigated education and earnings and found that additional years of schooling significantly boost earnings. For instance, in the U.S., Doyle and Skinner estimated a 9.7% income increase per year of post-secondary education, with stronger effects for women and negligible impact for men.<sup>42</sup> While Mamun et al. reported an 18% return per year in Bangladesh, with women recining 20% and men only 13%.<sup>43</sup> These gender differences were attributed to labour market segmentation, which limits male returns in some contexts and exposes women to wage disparities and job insecurity.<sup>44</sup>

Another key issue affecting education and earnings is geographical variation. Literature contends that educational attainment or even one's decisions to further education are influenced by the proximity to higher education institutions.<sup>45</sup> Depken et al. investigated the returns to education in South Africa in 2010 and 2012. The study found that the returns to education for people living in urban areas were higher

<sup>35</sup> C.R. Tambornini, C. Kim, and A Sakamoto, "Education and Lifetime Earnings in the United States," *Demography* 52, no. 4 (2015): 1383–1407.

<sup>36</sup> Peet, Fink, and Fawzi, "Returns to Education in Developing Countries: Evidence from the Living Standards and Measurement Study Surveys"; William R. Doyle and Benjamin T. Skinner, "Estimating the Education-Earnings Equation Using Geographic Variation," *Economics of Education Review* 53 (August 2016): 254–67, <https://doi.org/10.1016/j.econedurev.2016.03.010>; Bente Castro Campos, Yanjun Ren, and Martin Petrick, "The Impact of Education on Income Inequality between Ethnic Minorities and Han in China," *China Economic Review* 41 (December 2016): 253–67, <https://doi.org/10.1016/j.chieco.2016.10.007>; Sefa Awaworyi Churchill and Vinod Mishra, "Returns to Education in China: A Meta-Analysis," *Applied Economics* 50, no. 54 (2018): 5903–19; Ravi Somani, "The Returns to Higher Education and Public Employment," *World Development* 144 (2021): 105471.

<sup>37</sup> Psacharopoulos and Patrinos, "Returns to Investment in Education: A Decennial Review of the Global Literature."

<sup>38</sup> Dunga and Mothibi, "Education And Earnings in South Africa: An Application of the Mincerian Function"; M Nasiphi, "Returns to Education in South Africa" (Johannesburg, 2022).

<sup>39</sup> Dunga and Mothibi, "Education And Earnings in South Africa: An Application of the Mincerian Function."

<sup>40</sup> Nasiphi, "Returns to Education in South Africa."

<sup>41</sup> Olawuyi, Mushunje, and Eyinade, "Micro-Analysis of Earnings and Its Determinants in Eastern Cape Province of South Africa."

<sup>42</sup> Doyle and Skinner, "Estimating the Education-Earnings Equation Using Geographic Variation."

<sup>43</sup> Shamsul Arifeen Khan Mamun et al., "The Private Returns to Education in Rural Bangladesh," *International Journal of Educational Development* 84 (2021): 102424.

<sup>44</sup> T J Friderichs, G Keeton, and M Rogan, "Decomposing the Impact of Human Capital on Household Income Inequality in South Africa: Is Education a Useful Measure?," *Development Southern Africa* 40, no. 5 (2023): 997–1013.

<sup>45</sup> Jean Mangan et al., "Fair Access, Achievement and Geography: Explaining the Association between Social Class and Students' Choice of University," *Studies in Higher Education* 35, no. 3 (2010): 335–50; Robin Benz, "Geographical Constraints and Upper Secondary Track Choice: Does Distance to Schools Prevent Students from Entering School-Based Programmes?," *Review of Regional Research*, 2025, 1–26.

than those of people living in rural areas.<sup>46</sup> In their study, Echazarra and Radinger revealed that socioeconomic backgrounds drive rural-urban gaps, thus diverting expectations towards the completion of higher education.<sup>47</sup> Furthermore, the study asserts that individuals from rural areas are less likely to complete their higher educational learning as compared to individuals who do not come from rural communities, despite having the same characteristics. Lastly, Burgess et al. assert that poor households are most likely to reside in areas with limited access to amenities, such as access to quality schools.<sup>48</sup>

Discrimination in the labour market is also an important factor affecting education and earnings. As per the literature, this is referred to as unequal treatment of people due to factors such as gender, race, age, and ethnicity.<sup>49</sup> For instance, Salisbury estimated the social and private returns to education in South Africa post-1990 and found that Whites gained a 23% return per additional year of schooling, compared to 19% for Coloureds and 16% for Blacks. While returns improved for the previously disadvantaged groups, Whites continued to benefit disproportionately.<sup>50</sup> Similarly, Carnevale et al. showed that although a college degree enhances lifetime earnings, racial disparities persist in the U.S., with Hispanic and African American graduates earning less than their White and Asian peers.<sup>51</sup> Gradín further underscored the persistence of racial wage gaps in South Africa.<sup>52</sup>

Another factor influencing education and earnings is a person's socioeconomic status and family background. Literature contends that children from higher socioeconomic statuses tend to complete their higher education, indicating increased future earnings.<sup>53</sup> Furthermore, Wen investigated the causal effect of parental marital status on a child's earnings. The findings showed that people who grow up with married parents are most likely to earn 11.7% more than those who did not grow up with married parents, including the divorced or separated. Additionally, the study revealed a larger and significant earnings gap for individuals with highly educated parents and married individuals.<sup>54</sup>

The empirical evidence unequivocally shows a direct link between education and earnings; however, mixed findings are found in terms of which demographic factors affect education and earnings. Therefore, given South Africa's unique socioeconomic landscape, characterized by significant disparities in educational access through its demographic structure and the persistent income inequality, this study provides compelling evidence in examining the relationship between education and earnings, considering the demographic landscape in South Africa. It is through this study that an understanding of these dynamics could inform policy interventions aimed at promoting growth and developing policies aimed at addressing inequality in the country. As such, the section below discusses the methodological approach followed by this study.

## METHODOLOGY

This section of the paper documents the approach taken in the analysis of the data, explains the model specification, and the data to be utilised in the analysis. The main objective of the paper was to assess the different premiums or returns to education associated with different levels of educational qualifications in South Africa. Thus, concerning the analysis of human capital, it is hypothesised that the more one invests in education, the higher the expected return to follow. The paper focuses on the

<sup>46</sup> Craig Depken, Chanda Chiseni, and Ernest Ita, "Returns to Education in South Africa: Evidence from the National Income Dynamics Study," *Zagreb International Review of Economics & Business* 22, no. 1 (2019): 1–12.

<sup>47</sup> Alfonso Echazarra and Thomas Radinger, "Learning in Rural Schools: Insights from PISA, TALIS and the Literature," *OECD Education Working Papers*, no. 196 (2019): 0\_1-77.

<sup>48</sup> Simon Burgess, Ellen Greaves, and Anna Vignoles, "School Choice in England: Evidence from National Administrative Data," *Oxford Review of Education* 45, no. 5 (2019): 690–710.

<sup>49</sup> Olawuyi, Mushunje, and Eyinade, "Micro-Analysis of Earnings and Its Determinants in Eastern Cape Province of South Africa."

<sup>50</sup> Taylor Salisbury, "Education and Inequality in South Africa: Returns to Schooling in the Post-Apartheid Era," *International Journal of Educational Development* 46 (2016): 43–52.

<sup>51</sup> Anthony P Carnevale, Stephen J Rose, and Ban Cheah, "The College Payoff: Education, Occupations, Lifetime Earnings. Executive Summary.," *Georgetown University Center on Education and the Workforce*, 2011.

<sup>52</sup> Carlos Gradín, "Occupational Gender Segregation in Post-Apartheid South Africa," *Feminist Economics* 27, no. 3 (July 3, 2021): 102–33, <https://doi.org/10.1080/13545701.2021.1906439>.

<sup>53</sup> Robert Haveman and Barbara Wolfe, "The Determinants of Children's Attainments: A Review of Methods and Findings," *Journal of Economic Literature* 33, no. 4 (1995): 1829–78.

<sup>54</sup> Bob Wen, "The Power of Marriage: The Causal Effect of Parental Marital Status on Child's Earnings," *Proceedings of the Northeast Business & Economics Association*, 2020, 166–73.

private returns to education, specifically monetary returns. It is acknowledged that there are social returns to education and also nonpecuniary returns, which we do not consider in this paper. The null hypothesis was that there is no statistically significant difference in the earnings received by people with different qualifications, ranging from no schooling to doctoral level. The other secondary objectives pertained to race (population group), gender, and age. The paper uses data collected by Statistics South Africa in 2022. The ontology and epistemological standpoint of the analysis is grounded in the understanding that education is an investment that is expected to yield a positive return, as postulated in the human capital literature.<sup>55</sup> Adam Smith was the first to document this understanding of education as an investment, which implied an expected return greater than the cost associated. Thus, the paper proceeds to estimate a regression to show the relationship between education and earnings.

## Data

The data was cleaned to remove those aged below 18 years. The data was collected for heads of households, hence, household and head of household characteristics were included in the data. In the analysis, only those with a labour salary reported were included; those with no labour salary reported were not included in the analysis. The paper is intended to analyse the returns to education and document the different premiums for each education level. Based on the GHS 22, a total of 10883 heads of households were included.

Table 1 shows the number of participants from each of the 9 provinces. Gauteng had the largest number with a 28.54% representation. This aligns with the population distribution of the country. The other provinces were also a representation of the population, as reported in the latest census figures.

**Table 1: Tabulation of provincial representation**

Province	Freq.	Percent	Cum.
Western Cape	1186	10.90	10.90
Eastern Cape	1118	10.27	21.17
Northern Cape	479	4.40	25.57
Free State	667	6.13	31.70
KwaZulu-Natal	1717	15.78	47.48
North-West	640	5.88	53.36
Gauteng	3106	28.54	81.90
Mpumalanga	879	8.08	89.98
Limpopo	1091	10.02	100.00
Total	10883	100.00	

Source: Statistics South Africa, 2022

Table 2 provides the household population group by race, with the African/Black population having a higher representation of 82.27%. The other population groups are also represented proportionately to their population sizes in the country.

**Table 2: Tabulation of head population group**

Population group of the household head	Freq.	Percent	Cum.
African/Black	8953	82.27	82.27
Coloured	971	8.92	91.19
Indian/Asian	245	2.25	93.44
White	714	6.56	100.00
Total	10883	100.00	

Source: Stats SA, 2022.

<sup>55</sup> George Psacharopoulos, "Returns to Education: A Brief History and an Assessment," *Education Economics* 32, no. 5 (September 2, 2024): 561–65, <https://doi.org/10.1080/09645292.2024.2370119>.

Furthermore, Table 3 shows the gender of the households, with males having the greatest representation of 65.38%. The number of households headed by females is representative enough at 34.62% to capture the sentiments of their gender.

**Table 3: Tabulation of head gender**

Gender of household head	Freq.	Percent	Cum.
Male	7115	65.38	65.38
Female	3768	34.62	100.00
Total	10883	100.00	

Source: Stats SA, 2022

**Table 4: Tabulation of education category**

Education categorised	Freq.	Percent	Cum.
No education	534	4.91	4.91
Primary	1352	12.42	17.33
Secondary	6887	63.28	80.61
NTC(NQF1-3)	84	0.77	81.38
N4 NTC (NQF 5)	177	1.63	83.01
Certificate without grade 12	43	0.40	83.41
Higher certificate with grade 12	155	1.42	84.83
Diploma	654	6.01	90.84
Higher diploma	124	1.14	91.98
Bachelor’s degree	561	5.15	97.13
Honors degree	197	1.81	98.94
Master’s degree	85	0.78	99.72
Doctoral/PhD	30	0.28	100.00
Total	10883	100.00	

Source: Stats SA, 2022

Table 4 displays the various categories of education, with secondary education representing the majority with 63.28%. The sample shows that fewer people have a university qualification, and even fewer with a postgraduate qualification. This should entail a higher cost or opportunity cost of a higher qualification, which must necessitate a higher premium as a return.

**Model specification**

An ordinary least squares regression was estimated in the initial model to check if the assumptions made under OLS were satisfied. Besides having a strong, significant F test in the overall model, the model suffered from heteroscedasticity. Thus, more robust residuals were needed to satisfy the homoscedasticity assumption.

The calculation of robust standard errors is given as follows.

$$Se(\hat{\beta}) = \sqrt{\frac{\sum_{i=1}^n e_j^2 i e^2 i}{RSS^2} * \frac{N}{N - K - 1} \dots} \quad (1)$$

Thus, it is done by estimating a robust model, which then deals with the heteroscedasticity and provides results that are no longer plagued by varying standard errors.

The estimated equation is specified as follows.

$$Y_i = \beta_0 + \sum_{i=1}^n \beta_i X_i + \sum_{j=1}^m \theta_j D_j + \varepsilon_i \dots \quad (2)$$

Where Y is earnings represented by labour salary in the regression

- $\beta_0$  is the intercept term, which is a constant.
- $\beta_1$  to  $\beta_n$  are coefficients associated with the independent variables included in the model are continuous and hence can capture a unit change
- $X_i$  to  $X_n$  are the independent variables that are continuous in nature, such as age
- $\theta_j$  to  $\theta_m$  are the coefficients associated with the categorical variables, also known as dummy variables, entered in the model
- $D_j$  to  $D_m$  are all the dummy variables entered in the regression model.
- And  $\varepsilon_i$  is the robust error term arrived from equation 1
- An expanded version of equation 2 would therefore be expressed as follows

$$\begin{aligned} \text{Labor Salary} = & \beta_0 + \beta_1 \text{Age}_i + \theta_1 \text{gender}_j + \theta_2 \text{Mixedrace}_j + \theta_3 \text{Indian/asian}_j + \theta_4 \text{White}_j \\ & + \theta_5 \text{Primary}_j + \theta_6 \text{Secondary}_j + \theta_7 \text{NTC(NQF1 - 3)}_j + \theta_8 \text{N4 NTC (NQF 5)}_j \\ & + \theta_9 \text{certificate}_j + \theta_{10} \text{Higher certificate}_j + \theta_{11} \text{Diploma}_j \\ & + \theta_{12} \text{Higher diploma}_j + \theta_{13} \text{Bachelors}_j + \theta_{14} \text{Honors}_j + \theta_{15} \text{masters}_j \\ & + \theta_{16} \text{Doctoral}_j + \varepsilon \dots \quad (3) \end{aligned}$$

**PRESENTATION OF FINDINGS AND DISCUSSION**

The results of the regression equation estimated in Stata 18 are reported in Table 5. These are results of the robust estimation that takes care of heteroscedasticity. The overall results of the model have a significant F-statistic with a p-value of < 0.000, indicating that the model is a good fit.

**Table 5: Linear Regression**

Labour Salary	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Female	-3775.052	335.994	-11.24	0	-4433.663	-3116.442	***
Population group	0	-	-	-	-	-	
Coloured	5903.074	609.597	9.68	0	4708.153	7097.996	***
Indian/Asian	17701.012	1811.731	9.77	0	14149.689	21252.336	***
White	24861.199	1532.017	16.23	0	21858.166	27864.233	***
Primary	-1600.81	506.004	-3.16	.002	-2592.671	-608.949	***
Secondary	2915.824	493.913	5.90	0	1947.664	3883.983	***
NTC(NQF1-3)	11073.936	4145.724	2.67	.008	2947.561	19200.31	***
N4 NTC (NQF 5)	10035.151	1428.617	7.02	0	7234.802	12835.5	***
Certificate witho~12	10529.827	2176.323	4.84	0	6263.836	14795.818	***
higher certificat~12	12744.673	1956.441	6.51	0	8909.692	16579.654	***
Diploma	15726.282	1100.455	14.29	0	13569.189	17883.375	***
Higher diploma	18927.530	2830.153	6.69	0	13379.914	24475.146	***
Bachelor's degree	23180.058	1397.115	16.59	0	20441.457	25918.659	***
Honors degree	28774.126	2499.295	11.51	0	23875.053	33673.199	***

master's degree	47820.311	4832.234	9.90	0	38348.251	57292.372	***
Doctoral/PhD	42803.918	5750.076	7.44	0	31532.721	54075.115	***
Head age	164.546	16.827	9.78	0	131.563	197.53	***
Constant	-740.204	942.551	-0.79	.432	-2587.776	1107.368	
Mean dependent var	13370.213			SD dependent var	21392.842		
R-squared	0.316			Number of obs	10883		
F-test	109.373			Prob > F	0.000		
Akaike crit. (AIC)	243809.455			Bayesian crit. (BIC)	243940.764		
*** $p < .01$ , ** $p < .05$ , * $p < .1$							

The main focus of the estimation is to show the link between different education levels and earnings. Labour salary was used to represent earnings differentials by education level. It is acknowledged that a measure that includes non-pecuniary returns would be more accurate. However, given the unavailability of data, there cannot be a better indication of returns to education than one's salary.<sup>56</sup>

Gender and population group were entered as control variables in the regression. The results in Table 5 show that gender and race are significant in explaining the variation in earnings. Gender entered as 1 for females has a negative coefficient, indicating that females, on average, earn R3775.05 less than their male counterparts. This is not surprising, as the literature is full of evidence of income disparities between males and females.<sup>57</sup> Thus, aside from the education level determining the earnings differentials, gender is still important in explaining the differences. Thus, a male PhD holder would, on average, earn R42,803.82 more than a male with no education, but R39,027.87 more than a female with no education.

The results in the robust regression presented in Table 5 show that the a priori expectations of higher education being associated with higher earnings are confirmed.<sup>58</sup> The variables in the regression were entered with education categorized, ranked from no education, followed by primary, and going up to the highest level, which is Doctoral or PhD. The p-values for all the coefficients are less than 0.00, indicating that all the variables entered are significant in explaining the variation in earnings.

The base category for education was those with no education and those who did not indicate their education level. Thus, the results show that the base group is better than those with primary education. This is a distortion, as one would expect those with no education to be lower than those with primary education. As mentioned, this is a sign that some people with higher levels of education opted not to indicate their qualification; hence, this pushed the average score of the group. However, for those who indicated it is clear that those with higher levels earn more. Secondary education has a R2915.20 higher cost than those with no education. As one goes up the qualifications, the average earnings are increasing, with those with a PhD earning the highest at R42803.92, higher than those with no education, ceteris paribus.

An interesting observation is that, on average, those with a master's degree earn R47, 820.31 higher than those with no education, while those with a PhD earn R42, 802.92. This implies that having a PhD does not increase one's earning potential based on this data. The discrepancy could be explained by the fact that the data were not segregated by employment sector. If the data were to be broken down by sector, it would have shown an increase from master's to PhD, but when it is not segregated, the PhD

<sup>56</sup> A. Agyeman, "Estimating the Returns to Schooling: A Comparison of Fixed Effects and Selection Effects Models for Twins," *Ghana Journal of Science* 61, no. 1 (July 31, 2020): 15–30, <https://doi.org/10.4314/gjs.v61i1.2>; A. Ashenfelter and O. Krueger, "Estimates of the Economic Return to Schooling from a New Sample of Twins," *The American Economic Review* 84, no. 5 (1994): 1157–73.

<sup>57</sup> Fariyal F Fikree and Omrana Pasha, "Role of Gender in Health Disparity: The South Asian Context," *Bmj* 328, no. 7443 (2004): 823–26; Alexandre Gori Maia and Yao Lu, "Gender and Racial Differences in the Earnings Penalty of Working from Home before and during the COVID-19 Pandemic" (IDB Working Paper Series, 2024); StatsSA, "Publications Statistics by Place Statistics by Theme," Stats SA, 2022, <http://www.statssa.gov.za/?p=11361>; US Equal Employment Opportunity Commission, "Fact Sheet: Same Gap, Different Year The Gender Wage Gap: 2019 Earnings Differences by Gender, Race, and Ethnicity," *Nursing and Midwifery Board of Australia*. 440 (2019).

<sup>58</sup> Doyle and Skinner, "Estimating the Education-Earnings Equation Using Geographic Variation."

has a lower average because the majority of PhDs are in the academic sector, and their earnings are lower than executives in the industry who normally have a master's or an MBA. It is very unlikely that master's degree holders earn more than PhD holders if they are all in the same industry. Age has a positive and significant coefficient, which in the Mincerian function would be squared to capture experience. Thus, the results of a positive coefficient indicate that the more experienced individuals are also likely to earn higher than those who are just joining the workforce.

The differences in earnings for people with the same qualification within the same sector could be a result of employment policies that necessitate negotiations on entry. However, due to information asymmetry, which is linked to background privileges, people who are from disadvantaged backgrounds have weaker bargaining positions because they are desperate for a job; hence, they are willing to accept lower pay than those who are well-connected. Thus, transparency and equality, same pay for equal work, is the policy implication to deal with such disparities.

## RECOMMENDATIONS

The gender wage gaps evident in the country highlight the need for policymakers to address this through wage gap legislation. Additionally, policymakers direct more efforts towards previously disadvantaged groups' access to education, specifically secondary and tertiary education. There is an increasing need for collaboration between industry and higher education, due to the mismatch between postgraduate education and the labour market demand in South Africa. As such, there is a need for the implementation of targeted skills development policies and affirmative employment policies to deal with the educational and racial inequality in income in South Africa.

## LIMITATIONS AND FUTURE RESEARCH

Although the study provides valuable insight into the returns of education in South Africa, several limitations warrant consideration. The use of cross-sectional data limits the ability to track earnings trajectories or establish causality. Additionally, the unexpected earnings level for a master's degree holder over a PhD holder suggests meaningful grounds for further investigation into occupational sorting and sectoral dynamics. As such, future research could build on these insights by employing longitudinal data, exploring informal sector outcomes, and applying decomposition techniques to better understand the structural drivers of unequal returns to education.

## CONCLUSION

This paper examined education returns to schooling in South Africa, with a specific focus on the role of age, gender, and race. The findings of the study confirm the strong association between higher education attainment and increased earnings in South Africa. Moreover, the findings also showed that individuals with secondary education earn higher earnings than individuals with no formal education, and individuals with postgraduate education, specifically those with a master's and PhD degrees, have higher income levels. Interestingly, the findings also revealed that individuals with a master's degree earn more than those with a PhD degree, suggesting a labour market mismatch issue at the highest education level and an overqualification issue in South Africa. Additionally, this study highlights the crucial inequality that exists between males and females, in addition to racial inequalities in the South African labour market. Furthermore, the legacy of the apartheid era remains a significant determinant of income, which is still tied to race. However, the study also showed that one's work experience in the workplace, regardless of their age, could also be beneficial towards their earnings.

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