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April 2025

How have the returns to education evolved in post-apartheid South Africa?

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Education contributes to improving living standards, primarily through the labour market. Using more than 20 years of harmonized microdata, this article shows how the size and nature of the returns to education have evolved in post-apartheid South Africa. Despite a substantial increase in educational attainment, the returns to education have increased. By benefitting lower-wage workers more, this has reduced wage inequality which, nevertheless, remains extremely high.

Introduction

Education has many individual and social benefits. These include the promotion of rights, social capital, technological innovation, and social cohesion. But, in particular, education enables individuals to improve their living standards, primarily by improving their prospects in the labour market. The relationship between education and labour market outcomes – specifically earnings – is one of the oldest, most extensively studied topics in social science. Since the development of human capital theory in the 1960s, thousands of estimates of the ‘private return to education’ have been published for almost every country in the world, showing that the more education a worker has, the higher their earnings tend to be. The global average return of approximately 10 percent means that just one additional year of education is associated with a 10 percent increase in earnings.¹

This average return does not, of course, apply to everyone. Considerable differences exist both within and across countries. Notably, recent evidence suggests that several previously stylized facts have changed over time. For instance, from the 1960s until the beginning of the 21st century, the earnings-education relationship in most countries was concave, reflecting higher returns for lower levels of education.² More recent studies indicate a departure from this dynamic, revealing a now convex relationship with tertiary education yielding the highest return. This was plausibly due to both supply- and demand-side factors,

¹ Estimates of returns are based on the relationship between earnings and education at a given point in time.

² This is consistent with the idea of diminishing returns to education, where earnings increase with education but at a decreasing rate.*

such as increased coverage of lower levels of schooling and technological change favouring higher skills, operating separately or in combination.

This article considers these dynamics in the context of post-apartheid South Africa (see Köhler, 2024). Drawing on over two decades of harmonized household survey microdata, including the longest uninterrupted series of reliable, previously unavailable earnings data, I show how both the size and nature of the returns to education have evolved. The data allows us to do this with greater precision than was previously possible.

Data

I use two individual-level datasets covering most of the post-apartheid period: Statistics South Africa's (StatsSA) Labour Force Survey (LFS) from 2001 – 2007 and Quarterly Labour Force Survey (QLFS) from 2008 – 2023. Both are nationally representative, cross-sectional surveys of about 30 000 households. Collating these datasets, I arrive at a sample of about 4 million working-age (15 – 64 years) individuals over the 23-year period. Survey data from earlier years are avoided due to various sampling issues.

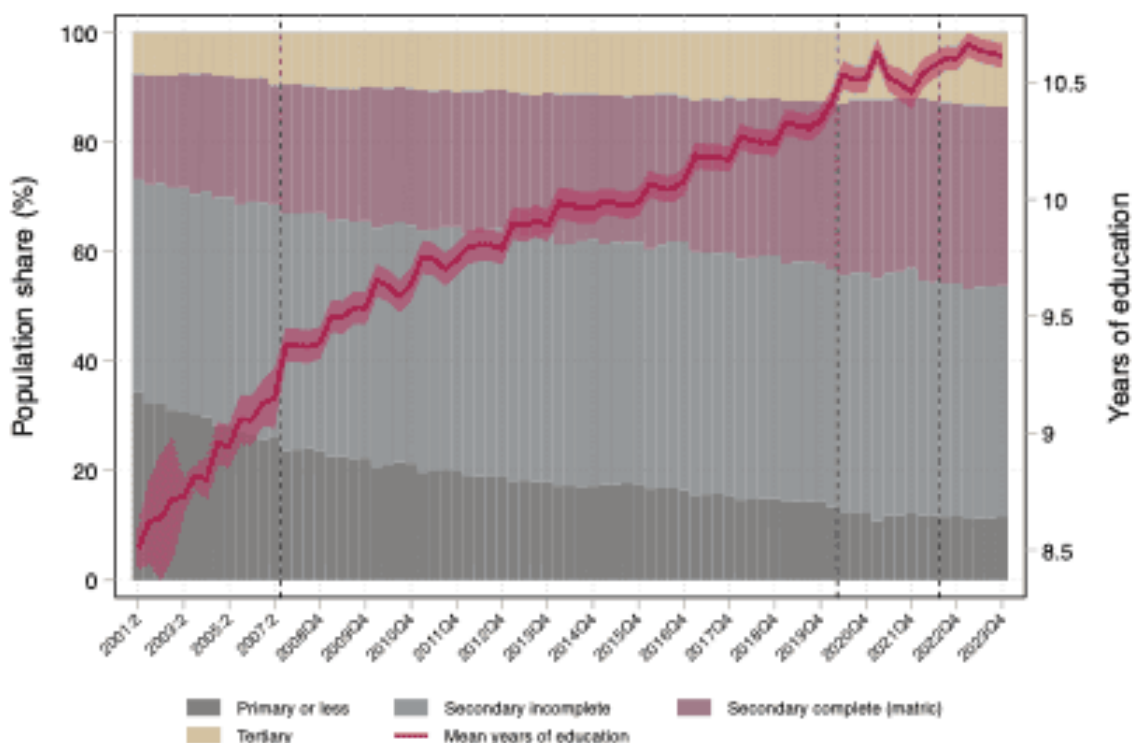
Both datasets include data on earnings for the employed. The LFS earnings data used is publicly available, while the QLFS earnings data is not but was privately provided by StatsSA. While earnings data from the QLFS is publicly available, this public data includes poor-quality earnings imputations for workers who did not report them, which, unfortunately, cannot be distinguished from the reported data. Imputations in the QLFS have been shown to produce implausible and volatile estimates; however, reliable ones can be obtained when the underlying unimputed data are used and adjusted for outliers and non-response. I make use of this data, which represents the longest uninterrupted series of arguably reliable wage data during the post-apartheid period.³

A substantial increase in educational attainment

South Africa has experienced a substantial increase in educational attainment during the post-apartheid period. As shown in Figure 1, the average working-age individual had 8.5 years of education in 2001, which grew by 25 percent to 10.6 years by 2023. This increase is explained by the growth in the share of the working-age population with either completed secondary ("matric") or tertiary education alongside a reduction in the share with primary education or less. By 2023, nearly half (46 percent) of the working-age population [had completed secondary schooling](#), growing from just over one quarter (27 percent) in 2001. As a consequence, educational attainment inequality has reduced by 40 percent. These patterns likely reflect both a sustained rise in the demand for higher levels of education together with the expansion in access to secondary and tertiary education.

³ A more detailed discussion of the data and adjustments are available in Köhler (2024).

Figure 1: Distribution of educational attainment among the working-age population, 2001 – 2023



Source: Köhler (2024).

The return to education has risen, particularly for tertiary education

Despite the large rise in educational attainment, the average return to education has risen.⁴ Based on estimates adjusted for participation in work⁵, the average return has grown by 1.1 percentage points (or 8 percent), from 13.6 percent in 2001 to 14.7 percent in 2023, a statistically significant difference. In other words, in 2023 just one additional year of education was associated with nearly 15 percent higher real hourly wages on average. The returns for all racial groups grew, but by varying degrees. This suggests that the increase in demand for higher-educated workers has outpaced the increase in supply – consistent with international trends. These returns are high by international standards, surpassing the global average of 10 percent as well as the averages of all African countries and of other countries at a similar level of development.

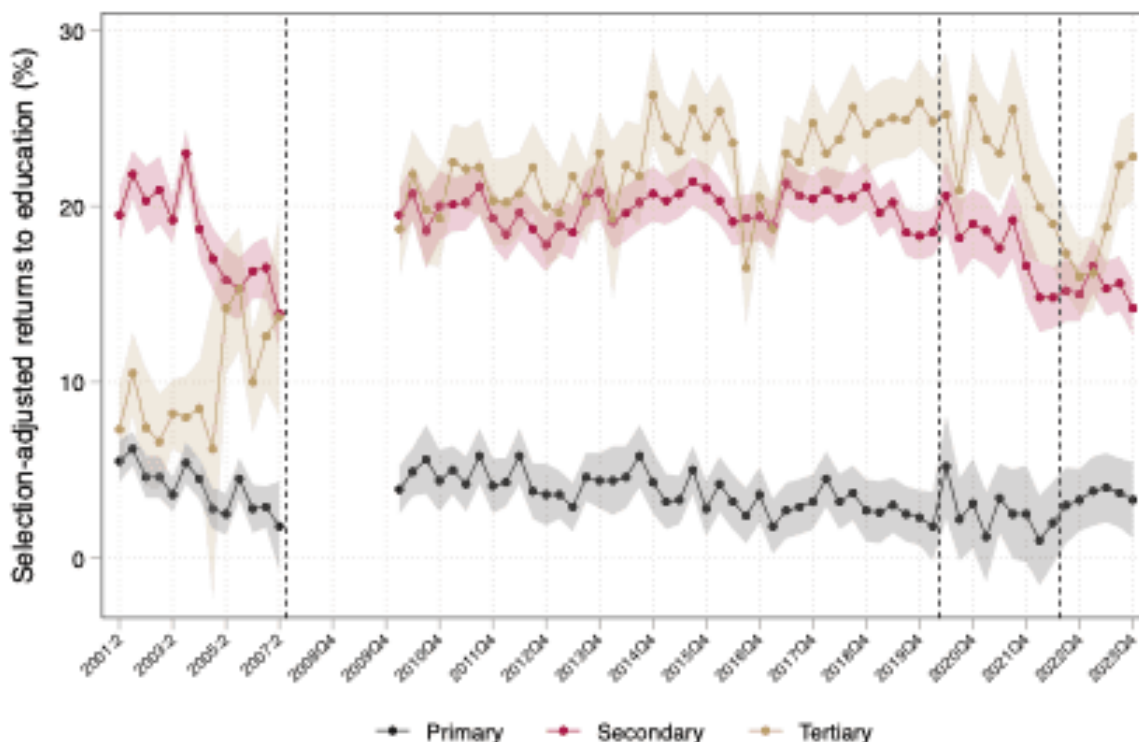
Notably, South Africa's returns structure has shifted to favour tertiary education, which is consistent with broader international trends. As shown in Figure 2, the returns to tertiary education have tripled in size from 7.3 percent in 2001 to 23 percent in 2023. Concurrently,

⁴ To estimate the average return to education in a given year, I estimate a conventional Mincerian earnings function. The estimates approximate the private rate of return earned on the opportunity cost of an individual's time out of the labour market to attend school for an additional year. Importantly, these estimates are not necessarily causal due to several sources of bias, but their magnitudes are often very similar to those from quasi-experimental designs.

⁵ Because earnings data is only available for the employed, estimates based on earnings data alone are not representative of the entire population. The results reported here are mainly 'selection-adjusted' estimates which account for both labour force participation and employment using a variation of the Heckman two-step procedure. A more detailed discussion of the data and adjustments is provided in Köhler (2024).

the returns of lower levels of education have shrunk, from 5.5 to 3.3 percent for primary and 19.5 to 14.2 percent for secondary, perhaps in part because of rising unemployment of those with lower education levels.

Figure 2: Trends in the return to education, by level of education, 2001 – 2023



Source: Köhler (2024).

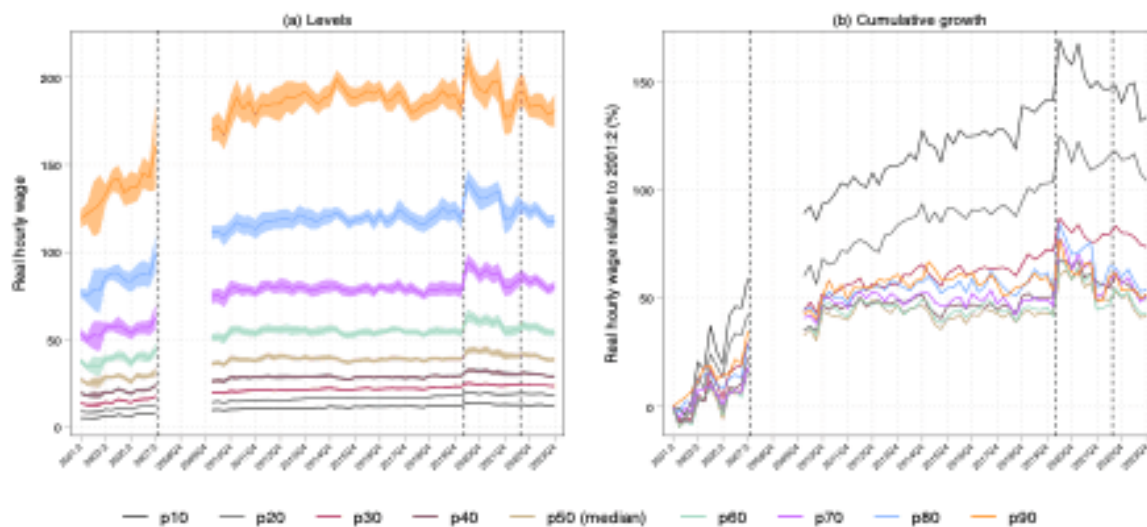
Stronger returns at the bottom of the wage distribution have placed downward pressure on wage inequality

Before examining how returns vary across the wage distribution, it is important to show how wages have varied over time. As shown in Figure 3, our estimates, in contrast to studies that have relied on the problematic, publicly available QLFS wage data, suggest that real (pre-tax) wages have grown across the entire distribution. Growth occurred mainly before 2010 and subsequently slowed, which aligns with the overall performance of the economy. Notably, growth has been strongest at the bottom, where real incomes have more than doubled over the period. Growth was more modest at the top, and lowest - but still positive - in the middle. As a consequence, this analysis suggests that wage inequality has decreased – the magnitude of which depends on the measure⁶ – but nevertheless remains high⁷.

⁶ For instance, the variance of the logarithm of real hourly wages shrunk by 25 percent, from 1.49 in 2001 to 1.11 in 2023.

⁷ This is consistent with Kerr's (2024) recent analysis of other household survey and tax administrative data. See Kerr, A. (2024). Earnings and Earnings Inequality in South Africa: Evidence from Household Survey and Administrative Tax Microdata from 1993 to 2020. Review of Income and Wealth.

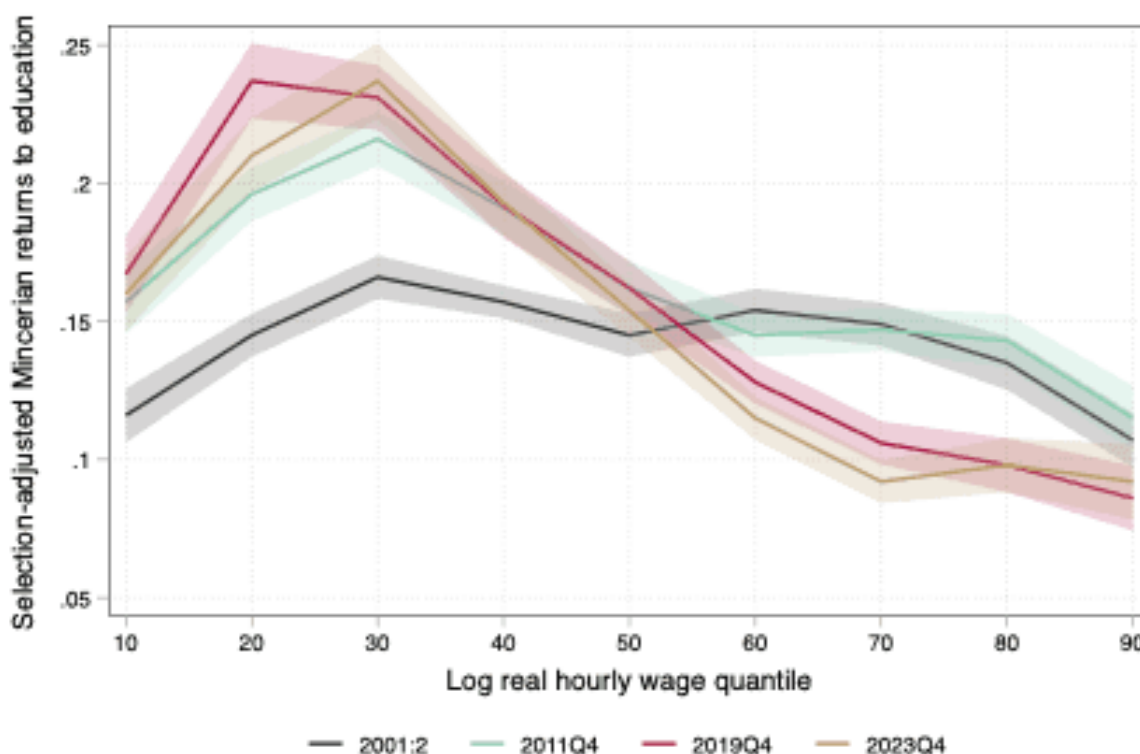
Figure 3: Real hourly wages across the wage distribution, 2001 – 2023



Source: Köhler (2024).

This strong growth in wages, particularly at the bottom of the wage distribution, and consequent reduction in wage inequality, may at least partially be explained by education. To explore this further, it is helpful to examine the returns to education across the earnings distribution. How much higher on average are the earnings of those at, say, the 20th percentile, than of a cohort with the same work experience but one year less of education? As shown in Figure 4, in 2001 this return was positive at about 15 percent across most of the distribution. Over time, it has become strongest towards the bottom and weakest towards the top. The average return among the lowest-earning 40 percent of workers grew by 37 percent, while that among the higher-earning 40 percent shrunk by 26 percent.

Figure 4: Estimates of the return to education across the wage distribution, 2001 – 2023



Source: Köhler (2024).

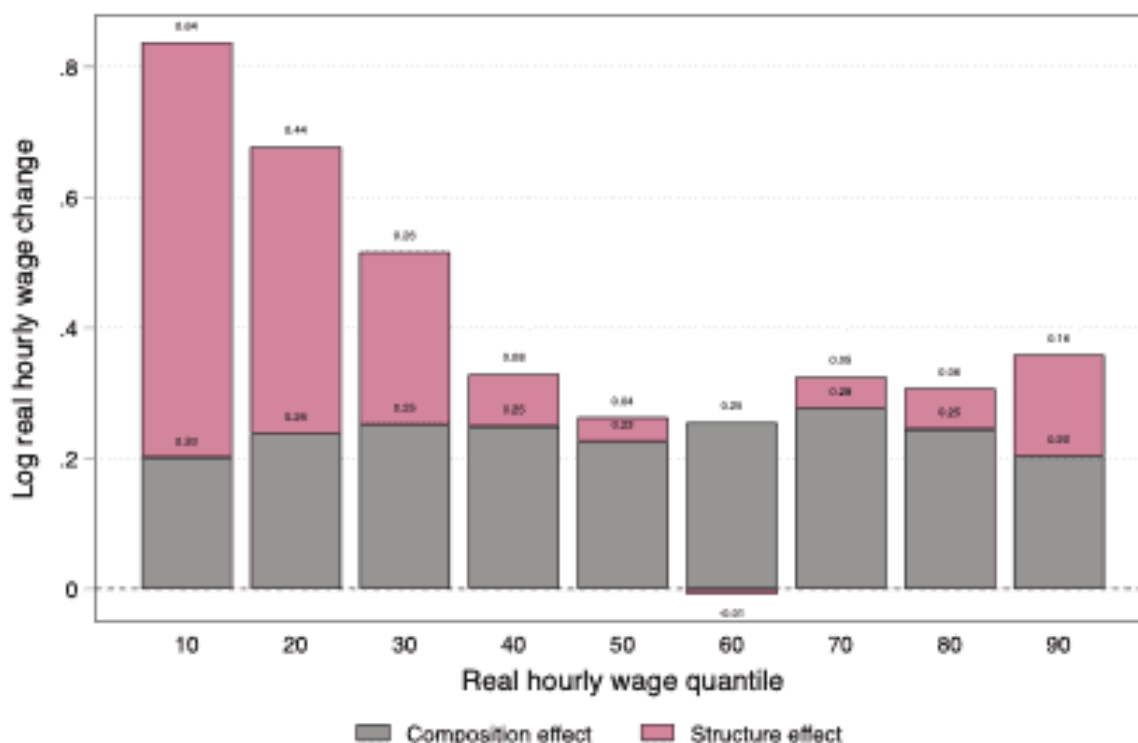
Both higher attainment and higher returns have driven wages upwards

How much of the aforementioned wage growth, both on average and across the distribution, is due to growth in educational attainment versus growth in the returns to education? Using decompositional techniques described in Köhler (2024), I show that, on average, over half (58 percent) of the growth in real wages is explained by growth in attainment. Although this component is dominant, the remaining share (42 percent) attributable to increases in the returns to education is substantial. The analysis suggests that the importance of the latter has more than doubled over time, explaining just 20 percent of wage growth from 2001–2011 but 42 percent from 2001–2023. This is in part because the returns to education are higher at higher levels of education attainment, as shown in figure 2 above.

It's clear, however, that the average case above doesn't apply uniformly across the wage distribution. As shown in Figure 5, while growth in attainment (the "composition effect") is the dominant force across most of the distribution, growth in the returns to education (the "structure effect") dominate at the bottom – explaining up to 71 percent of real wage growth among the bottom 20 percent of workers⁸. Recall that, as per Figures 3 and 4, this group experienced the most significant growth in both wages and returns over time.

⁸ By race, the increase in educational attainment remains the dominant force across most of the distribution for all groups apart from White individuals, which is likely explained by the latter's already relatively high education levels.

Figure 5: Decomposition of real hourly wage growth across the wage distribution, 2001 - 2023



Source: Köhler (2024).

A welcome reduction of inter-racial wage inequality, but a growing importance of unequal returns

It is encouraging that the role of race in determining wages has declined in post-apartheid South Africa. In 2001, differences in race explained 27 percent of wage inequality, falling to 18 percent by the end of 2023⁹. Inter-race wage inequality has fallen, accounting for 32% of total wage inequality in 2001 decreasing to 20% by 2023¹⁰. Despite this progress, racial wage gaps remain large. For instance, in 2001, the average Black African worker's hourly wage was just 25 percent of that of the average White worker. Over 20 years later by 2023, this gap had narrowed to 29 percent, primarily due to a more significant growth in the former's wage (89 compared to 59 percent).

At least some portion of these wage differences can be explained by differences in education levels, while another portion can be explained by differential returns to education – how the labour market values an additional year of education across different racial groups, often seen as a potential sign of discrimination. Using a similar decomposition technique as above, I find that, in 2001, education attainment differences explained most (67 - 73 percent) of the average gap between a given group's wage compared with white workers, but by 2023, this had fallen to 32 - 55 percent. This likely reflects the convergence

⁹ Calculated using a variance decomposition of the logarithm of real hourly wages.

¹⁰ Calculated using a decomposition of the Theil index. This decrease in inter-race income inequality is now well-established in the academic literature, alongside a concurrent increase in intra-race income inequality. I estimate that the intra-race component has increased from 68 percent in 2001 to 80 percent in 2023.

of educational attainment levels across racial groups. Additionally, however, it implies that inter-race wage inequality is increasingly explained by differential returns to education. While this may be suggestive of increasing discrimination, it at least partially reflects differences in the quality of education.

Conclusions and policy implications

South Africa has experienced a noteworthy increase in educational attainment and reduction in educational attainment inequality in the post-apartheid period. Despite this, the average return to education has increased, implying that the increase in demand for higher-educated workers outpaced the increase in supply. In particular, the returns structure has greatly shifted in favour of tertiary education. Encouragingly, these rates of return have become significantly stronger for lower-wage workers and consequently, together with higher educational attainment, this has driven their real wages upwards. This has placed downward pressure on wage inequality which has reduced but, nevertheless, remains extremely high.

Overall, these findings highlight the dual roles of rising educational attainment and an increasingly convex returns structure in shaping wage dynamics and inequality in post-apartheid South Africa. While significant progress has been made, the now much stronger returns to tertiary education suggest that further enhancing upward mobility and reducing inequality requires a policy focus on interventions that expand access to quality tertiary education. Among others, these may include expanded financial aid, preparatory programmes, and greater capacity in higher education institutions. A prerequisite, of course, includes improving the quality of primary and secondary schooling. At the same time, given that many South Africans remain unable to access further education, investment in targeted social protection and active labour-market programmes, such as cash transfers, enterprise development initiatives, and public employment programmes, remain essential both to provide income relief and to foster longer-term economic participation. In the absence of such interventions, South Africa risks deepening its already extreme unemployment and inequality levels.

Notes

This article is based on the following working paper: Köhler, T. (2024). A Paradox of Progress: Rising Education and Unequal Labour Market Returns in Post-Apartheid South Africa. Research on Socio-Economic Policy (RESEP) Working Paper. Department of Economics, Stellenbosch University, Stellenbosch. Available here: https://resep.sun.ac.za/wp-content/uploads/2025/06/kohler_2024_paradox_of_progress_241212_v2.pdf.

The author gratefully acknowledges funding from Allan and Gill Gray Philanthropies as part of the Covid-Generation project managed by Stellenbosch University's Research on Socio-Economic Policy (RESEP) unit. The findings and conclusions contained within are those of the author and does not necessarily reflect positions or policies of Allan & Gill Gray Philanthropies.

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