# Analyzing and Decomposing South African Income Inequality by Income Source, Race, and Poverty Level for 2008 and 2014

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## Abstract

In South Africa's apartheid regime a white minority controlled the black African majority from 1948 until 1994, creating income and wealth inequalities between the different races that linger today. This paper uses data from the 2008 and 2014 National Income Dynamics Survey (NIDS) to understand income inequalities within and between racial categories, to examine how different income sources contribute to overall income inequality, and to study how the interaction between race and poverty shapes the inequality between African households when decomposing into subgroups above and below the poverty line. For this study, I use Gini coefficients to measure inequality. My findings demonstrate that Africans have continually earned less than their white counterparts, with an increase in inequality in all racial groups except for Africans. The Gini coefficient for government income in both years is relatively low, suggesting that it serves as redistributive income. Finally, for African households, wage income is a big contributor to the overall inequality, while government income can be seen more clearly as a redistributive source of income. This has implications for future government policies designed to address inequality.

## Keywords

South Africa, inequality, income inequality, 2008, 2014, gini coefficient, lorenz curve

## Cover Page Footnote

**1. Introduction:**

South Africa's apartheid regime separated society with a racial caste system in which a white minority controlled the Black African[1] majority from 1948 until 1994. At its core, apartheid was an economic system designed to empower whites while preventing Africans from achieving above a certain income level and professional status. Apartheid ended in 1994 after a series of negotiations between the ruling National Party and the African National Congress (ANC) facilitated the first democratic elections. To dismantle apartheid's legacy, the ANC pursued an economic strategy of Growth, Employment, and Redistribution (GEAR), which operated on a macroeconomic scale to increase the government's capacity for future social expenditure and take aim at the rampant wealth and income inequalities (Bhorat and Kanbur, 2006). Despite governmental welfare measures and redistribution efforts meant to reduce the legacy of apartheid, overall income inequality in South Africa rose between 1993 and 2008 (Leibbrandt et al. 2010).

This paper uses data from the 2008 and 2014 National Income Dynamics Survey (NIDS) to understand income inequalities within and between racial categories, to examine how different income sources contribute to overall income inequality, and to study how the interaction between race and poverty shapes income inequality. Gini coefficients serve as the measures of income inequality, making this paper easily comparable with the existing literature on South African income inequality.

This paper's goals correspond to the results section's three components. The first component examines the mean incomes and Lorenz curves by race for 2008 and 2014. This provides an overview of inter-race inequalities by partially replicating the study done by Janina Hundenborn, Murray Leibbrandt, and Ingrid Woodard (2016) based on another study by Murray Leibbrandt, Arden Finn, and Ingrid Woolard (2012) that analyzed inequality levels in different income sources for the years 1993 and 2008. I use similar methods of Hundenborn et al. (2016) to extend the analysis of Leibbrandt et al. (2012) for the same population to a 2014 data set, creating mean income variables and Gini coefficients by race. Lorenz curves subsequently represent the Gini coefficient graphically for each race in the years 2008 and 2014. The results section's second component decomposes Gini coefficients by income source for the overall population in each year. This again serves as an extension of work by Hunderborn et al. (2016) and Liebbrandt et al. (2012), the inclusion of rent and agriculture contributing to their existing literature in this thorough examination of sources of income inequality. The final component examines the Gini coefficients for the African populations above and below the poverty line in 2008 and 2014. This third component is similar to Murray Leibbrandt, Arden Finn, and Ingrid Woolard's (2000) decomposition of rural African subgroups above and below the poverty line for 1993, and is especially useful for a targeted perspective that discerns the largest inequalities: those between households above and below the poverty level.

My analysis shows an increase in mean incomes from 2008 to 2014 for all racial categories. These results are consistent with and without the addition of imputed rent and agricultural earnings[2]. White mean earnings significantly exceeded that of all other races while Africans earned the least in both years: reflecting the legacy of apartheid. The highest rate of growth in racial mean incomes between 2008 and 2014 was for African households, suggesting that government redistribution and affirmative action programs achieved at least some degree of

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[1] The Black majority in South Africa will be referred to as "African" to be consistent with similar literature.

[2] These variables were initially excluded so as to replicate and extend the work of Leibbrandt et al. (2012) After the successful replication, I use a total income variable including imputed rent and agriculture.

success. My analysis also reveals that inequality within the African racial category remained consistent over time, while intra-race inequality increased amongst non-Africans between 2008 and 2014. Notably, the White[3] population experienced the largest increase in inequality from 2008 to 2014.

In the second component of the results section, the decomposition of Gini coefficients by income source, wages were consistently the highest contributor to overall income and maintained a high Gini coefficient in both 2008 and 2014. This suggests that wage income significantly contributed to the high Gini coefficient for overall income. In contrast, government income only accounted for a small share of overall income and had a low Gini coefficient, indicating that the government transferred small amounts of money to many households at a relatively equal rate in redistributive efforts.

The final component of the results section includes the decomposition of African households into samples of those households below and above the poverty line. This reveals that wage income inequality was a high contributor to within-race inequality during 2008 and 2014, especially for the African subgroup above the poverty line. Additionally, government income served as a redistributive income source during both years and within both subgroups, as evidenced by the negative elasticity between government income and the overall income.

This paper contributes to existing literature such as Hundenborn et al. (2016) who use data from the 2008 and 2014 waves of the NIDS and find that differences in labor income explained a large portion of overall inequality in the South African population. The data from Hundenborn et al. (2016) suggest that despite government efforts to decrease inequality, it remains largely constant between the two years. Unlike the paper by Hundenborn et al. (2016) and similar to Leibbrandt et al. (2012), my paper examines racially disaggregated patterns in inequality. I study inequality through the lens of race to attempt to understand the complex legacy of inequality left by apartheid that is reflected differently within and between the different racial categories. My paper also explores a decomposition of the African population in particular, as Africans suffered systemic discrimination under apartheid (Lowenberg, 1989) and thus have much to overcome in the modern legacy of apartheid (Kingdon and Knight, 2004).

In Section 2, I will discuss a brief background of the economic inequality behind apartheid, followed by an exploration of data and methodology in Section 3. Section 4 is dedicated to analyzing the data, beginning in Section 4.1 with a broad income and inequality comparison for 2008 and 2014. Section 4.2 decomposes inequality by income source for 2008 and 2014, followed by Section 4.3, which decomposes Gini coefficients for African households above and below the poverty line in 2008 and 2014. Section 5 concludes the paper with a discussion of the overall findings and potential future avenues of study.

## 2. Background

By the time apartheid officially began in 1948, labor laws and land restrictions that prevented Black Africans from advancing had been in place for years. The economic boom from World War II had faded, and with many injured white Europeans returning home to South Africa, the government took increasing measures to economically protect the white minority at the expense of the Africans (Lowenberg, 1989).

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[3] When capitalized, "White" refers to the racial category used in the National Income Dynamics Survey and in apartheid-era legislation. This is used for the sake of consistency with other studies, that have continued the use of apartheid-era racial designations.

Africans were sent to homelands[4] and resettlement camps.[5] The government seized Africans' land, turning it over to white-owned farms. Homelands faced extreme overcrowding, and the poor farmland prevented agricultural subsistence, exacerbating economic inequality and hindering any efforts at economic independence (Nattrass and Seekings, 2005). After being forced onto homelands, Africans found their South African citizenship revoked, and became unable to qualify for government aid.[6]

Pass laws made it illegal for Africans to even be in a White neighborhood without a pass to prove they worked nearby, further restricting Africans. Education above the level necessary for unskilled (low-paying) work was outlawed for Africans, and they were prevented from joining labor unions, a staple of the South African labor force. These factors combined to create an effective limit on the amount African workers could earn, as they could not acquire the education or union memberships necessary to perform skilled labor (Mariotti, 2012). The most common sector for Africans to work in became mining, which relied heavily on a migrant labor system to deter illegal unions and keep wages low (Wilson, 2001).

As a result of all the measures taken to ensure white economic supremacy, shortly after the end of apartheid in 1994 an estimated 54.4% of all African households were in poverty compared to 41.4 % of all households in the overall population[7] (Leibbrandt et al., 2000). The new government run by the ANC established a hefty social welfare program and integrated schools, workforces, and labor unions in hopes of reducing racial inequalities and untangling the economic ramifications of apartheid (Bhorat, 2006).

## 3. Data and Methodology

This paper analyzes and decomposes Gini coefficients for different sources of income and different populations/subgroups in South Africa, looking specifically to understand inequalities within racial groups and how these inequalities have changed between 2008 and 2014.

To measure inequality I used Gini coefficients, as they are the most common metric of inequality, allowing for comparisons between this paper's findings and those in the rest of the literature. Gini coefficients for income are calculated using a Lorenz curve which plots the cumulative percentage of income on the y-axis against the cumulative percentage of the population on the x-axis. A 45-degree line represents a completely equal distribution of income. To construct the Lorenz curves used to analyze the Gini coefficients for this paper, I used the Stata extension glcurve (Jenkins, Stephen P., and Philippe Van Kerm, 2004). The Gini coefficient is equal to the following formula:

$$G = \frac{A}{A+B} \tag{1}$$

where A is the area between the Lorenz curve and the 45-degree line and B is the area between the Lorenz curve and the axis (Haughton, J. and S. R. Khandker, 2010). The closer a Gini

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[4] Homelands, also known as Bantustans, were regions with poor natural resources the South African government of apartheid forced Africans to relocate to. Africans separated by tribal identity, and after relocating were no longer able to claim South African citizenship. Though the homelands were on paper independent from the South African government, in reality they relied heavily on the government for jobs, resources and money.

[5] Resettlement camps were established on the edge of homelands as South Africa continued to relocate Africans and ran out of space.

[6] Some governmental policies went so far as to claim that offering pensions or other aid to Africans would be a violation of cultural tradition (Nattrass et al., 2005).

[7] In these calculations, African households composed 71% of all households.

coefficient is to zero, the more equal the distribution of income is; however, the closer it is to one, the more unequal the distribution is. It is widely used as a measure of income inequality because, as Haughton et al. (2010) explain, it satisfies the necessities of mean independence (multiplying incomes does not change the measurement), population size independence (measurement is independent of population size, all else equal), symmetry (two people switching incomes would not change the measurement), and Pigou-Dalton Transfer sensitivity (shifting income from rich to poor reduces the measurement). This paper derives Gini coefficients for each race and income category using the extension of *ineqdecgini* in Stata (Jenkins, Stephen P., 2019).

The coefficients calculated using *ineqdecgini* were then used to compare levels of inter-race and intra-race inequality (defining each race as it was categorized in the NIDS questionnaire using the following categories: African[8], Coloured[9], Asian/Indian, and White). These racial categories were established during apartheid, and have continued in use through the modern-day. Gini coefficients have been used to compare levels of inequality between and within racial groups, most notably for this paper and Leibbrandt et al. (2012).

Decomposing Gini coefficients by race or income source allows for clearer inspection of the sources of inequalities and whether economic divides are worsening between or within like racial groups or economic categories. In this study, I follow the methodology of Leibbrandt et al. (2000) who used a derivation by Stark, Taylor, and Yitzhaki (1986) to decompose the Gini Coefficient using the *sgini* Stata command (Van Kerm, 2020):

$$G = \sum_{k=1}^{K} S_k G_k R_k \tag{2}$$

Where $S_k$ is defined as the share of income source $k$ of total income; $G_k$ specifically measures the inequality of how income source $k$ is distributed, and finally $R_k$ reflects the correlation between the Gini coefficient of the income source with the Gini coefficient of the total income (a positive correlation would mean that as the Gini coefficient within the income source rises, so does the Gini coefficient for the overall income).

Elasticity, or the responsiveness of the Gini coefficient to a 1% increase in a particular income source $k$, can be derived from a decomposition using the components seen in Gini coefficient measurements. As expressed in a derivation by Schmit, Boisvert, and Tauer (2001), the equation for elasticity reads:

$$Elasticity = \left(\frac{S_k G_k R_k}{G_k}\right) - S_k \tag{3}$$

For all measurements this paper uses derived data from the nationally representative panel NIDS. This panel started in 2008 and follows a similar methodology to that of the Panel Study of Income Dynamics in the United States. Households surveyed in 2008 were followed across time. To date, five waves have been conducted (2008, 2010, 2012, 2014, and 2017). My analysis uses the 2008 and 2014 rounds of survey data collection. Each individual selected for the survey answered both an individual questionnaire and a household questionnaire. These were matched with household ID numbers to sort the information and match households together for aggregate income variables.

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[8] In racial categories established by apartheid and used in NIDS, "African" was used to describe all Black people.

[9] Unlike in the U.S., where "Coloured" is a racial slur, in South Africa "Coloured" is used as a racial category. The term was established during apartheid to include a range of people, most generally those who did not fall into the category of "White," "African" or "Indian/Asian." This group includes those descended from the Khoisan tribe, those with mixed heritage (typically White and African as a result of the colonization that occurred), and those related to Cape Malay community.

NIDS sorted income information into seven income categories: labor market income, government grants, investment income, subsistence agriculture income, imputed rent for owner-occupied housing, remittances, and other government income (Brophy et al., NIDS User Manual). The most important income source is labor market income, which consists of wages, first/second jobs, self-employment, bonuses, and other smaller variables. Government income was split into two variables: the first labeled "government income" includes grants and pensions, while the second, "other income," is strictly work-related government income (unemployment insurance and worker's compensation). Investment income accounts for interest, rent, and private pensions/annuities, while imputed rent accounts for the imputed income gained from owner-occupied housing (Brophy et al., NIDS User Manual). Finally, the remittance category acknowledges the historical importance of money received from family/friends as a form of income during apartheid as a means of subsistence in resettlement camps and homelands (Nattrass et al., 2005) and its persistence as an income source even in the years after apartheid. Subsistence agriculture (survival and income off of farming) has become possible with the end of apartheid, as Africans have once again been able to own land. A final collective "total household income" serves as the aggregate of these individual parts without the imputed rent.

Gini coefficients unless otherwise noted are computed using total income measures with imputed rent and agriculture, calculated per capita and deflated to 2012 nominal rand, the South African currency, to allow for comparison. Weights as outlined in Wittenberg (2009) were applied unless otherwise stated to match the demographics of NIDS to that of South Africa (as calculated in the census). Because many of these weights have been and continue to be updated with further waves and census information, the data in my study is a snapshot reflective of the currently available weights.

To only analyze respondents for the 2014 wave of NIDS, 162 of the 11,895 households in the derived household data were dropped from the dataset. Those 162 respondents did not provide income data in the individual survey thus making household calculations impossible--leaving this paper with data for 11,732 households. To find percentages of households receiving a source of income, dummy variables were created, with missing data values indicating that the responder did not receive the form of income. This was done because before answering how much the respondent earned from an income, they would first be asked a one-shot question as to whether they even received income from that source. If the respondent answered no, they would continue to the next segment of the questionnaire with a missing value imputed. After making the dummy variables and a set of per capita variables (to reflect average household per capita income for those who earned the income source), missing values were set to zero, to indicate that the respondents earned R[10] 0 from the income source.

In my final set of analyses, I restrict the analysis to the African population and then consider the decomposition of income sources contributing to total inequality among households above and below the poverty line, respectively. This uses the upper poverty line described in Statistics South Africa's National Poverty Lines 2018 paper (Statistics South Africa, 2018). To make the decomposition comparable between 2008 and 2014, the poverty line outlined by Statistics South Africa was multiplied by the NIDS deflator to index it to a 2012 value to maintain consistency with the other data from the study set to 2012 real rand. This meant that the poverty line for 2008 in 2012 rand ended up being roughly R 1,119.9, while for 2014 the line in 2012 rand was R 1067.4. While the poverty line used to determine which respondents were

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[10] Note that a capital "R" followed by a value is used to denote rand, similarly to how a dollar sign ($) precedes values in the United States' currency. R 0 thus means zero rand.

experiencing poverty did indeed change between the years, the shift was to accurately reflect the differences in the subgroup of households living in poverty.

**4. Results**
**4.1: Broad income comparison of 2008 and 2014**

   In Table 1 column 1, I set out to replicate the findings in Leibbrandt et al. (2012), reported in 2008 rand. The data do not exactly match those found in Leibbrandt et al. (2012), these numbers being off by roughly R +2 for the African income average, +17 for the Coloured average, -45 for the Asian/Indian average, -157 for the White average, and +3 for the overall average. The data's similarity to the data of Leibbrandt et al. (2012) suggests that the small discrepancy is most likely a product of changes to the dataset over time such as shifting weights (which have been updated since this paper was published to reflect accurate census data) or other minor updates (including respondents who specified in a later survey their race after not answering in 2008, or who were recategorized).

   Columns 2 and 3 exclude rent and agriculture but are adjusted for inflation to allow for comparison between the two years. These columns serve as an extension of the work structured by Leibbrandt et al. (2012) who compared 1993 values with 2008, providing benchmark values for future studies.

   Central to Table 1 is the growth experienced by all races between Column 4 (2008) and Column 5 (2014) indicating that all races have experienced increased mean income even when adjusting for inflation. Africans experienced the largest growth in the time period (roughly a 28.2% increase). This is especially interesting given the global financial crisis in 2008, during which the South African national economy was thrust into a recession (Rena, Ravinder, and Malindi Msoni, 2014). The high percentage of growth for African per capita income between 2008 and 2014 could be either the result of government programs aimed at reducing inequality especially along racial lines succeeding[11], or the result of more time having passed since the end of the apartheid regime for African entrance into the upper economic levels of the workforce from which they had previously been barred. Notably, the growth of Asian/Indian real per capita income was smallest, nearly stagnating while all other races experienced a larger increase in per capita income. This could be the result of starting from a wealthier vantage point at the end of apartheid and thus benefitting less from the government policy attempts to reduce inequality.

**Table 1: Income per capita mean for 2008 and 2014 excluding rent and agriculture and including rent and agriculture**

|  | Mean income excluding imputed rent and agricultural income | Mean of total income (including imputed rent and agricultural income) |
| --- | --- | --- |

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[11] Such programs include land reforms and redistribution, increased allocation of funds to schools, and increased recipients of and budget for prominent social grants such as the Child Support Grant (Bhorat, Haroon, and Cassim, 2014) that serves as a source of income for many South Africans each month.

|              | (1) | (2) | (3) | (4) | (5) |
|--------------|-----------:|-----------:|-----------:|-----------:|-----------:|
|              | 2008* | 2008 | 2014 | 2008 | 2014 |
| African      | 818.32 | 1340.80 | 1891.76 | 1545.94 | 2152.63 |
| Coloured     | 1398.11 | 2264.21 | 2680.39 | 2732.07 | 3112.08 |
| Asian/Indian | 4243.63 | 6916.60 | 7085.10 | 8180.85 | 8195.54 |
| White        | 6118.59 | 9814.60 | 12130.04 | 11725.08 | 14219.93 |
| Overall      | 1459.85 | 2368.63 | 2936.59 | 2785.99 | 3384.81 |

Per household per capita measure, deflator used to adjust to 2012 rand
Source: NIDS Wave 1 and own calculations
*unadjusted data; no deflator used in this column of calculations

The data from Columns 4 and 5 of Table 1, including the 2008 and 2014 mean of total per capita income, can be used to generate Lorenz curves and by extension Gini coefficients for the different races. Figures 1 and 2 reflect the inequalities of total per capita income distribution by race in 2008 and 2014 respectively. In Figure 1, the 2008 Lorenz curve, two lines stand out: the line for African households which is the most unequal by far with a relatively small middle class and significant uptick for the final quintile, and the line representing the White racial group which is the most equal of the curves represented (as can be seen by its proximity to a 45-degree line). Comparatively, the Gini coefficient for Africans for total per capita income is 0.60, while the Gini coefficient for Whites is 0.47[12]. This suggests that while Whites have a higher average per capita income (Table 1), that income is also more evenly distributed. Africans having a lower per capita income and such an unequal spread on the Lorenz curve suggests that relatively few Africans are high-income earners. Combined with the data of mean per capita income from Table 1, this suggests that the majority of African households in 2008 are low-income earners, while a few higher earners are causing the higher average income.

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[12] For context, according to the World Bank, Brazil had a Gini coefficient of 53.9 in 2018, the United States had a Gini coefficient of 41.4 in 2016, and Sweden had a Gini coefficient of 28.8 in 2017.

**Figure 1: Lorenz Curve for Total Household Income Per Capita by Race, 2008**
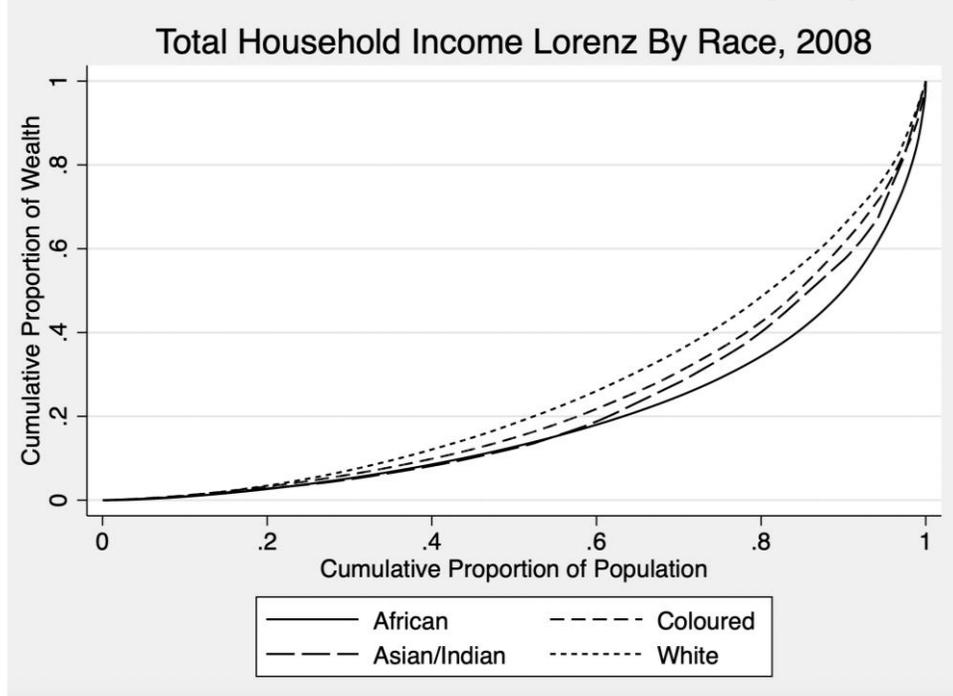


Source: NIDS Wave 1 and own calculations

Most striking about Figure 2 is the increase in inequality among all races. Whites faced the largest of the increases, growing from a Gini coefficient of 0.47 to 0.63. This stands out as notable, especially due to the 2008 recession, and could be a factor of Whites continuing to earn significant amounts of money at higher levels, even as working-class Whites with less education dealt with pay cuts.[13] Inequality among the Asian/Indian population also increased from 0.56 to 0.59, a small shift that suggests the community may have benefitted from starting from a higher vantage point within the economy before the 2008 financial crisis. For the Coloured population as well, inequality rose from 0.53 to 0.58; the smaller increase in inequality either the result of fewer Coloured people represented in upper earning tiers or the result of successful affirmative action and government subsidy programs. Indeed, African inequality stayed relatively consistent in the time period, changing from 0.605 to 0.601. This result could be considered a success of the programs in preventing rising inequality amidst the turmoil of 2008, but also a failure of the programs as they did not do much to reduce inequality. Overall, the shift towards inequality for all races except for Africans seems to indicate that government policies to reduce inequality have been largely ineffective at achieving substantial reductions in income inequality, though the policies could have helped mitigate some of the economic impacts of the 2008 crash on the African community.

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[13] NIDS also notably faced a low White response rate when conducting the survey, meaning that the small sample size could be a factor behind the drastic shift in the Gini coefficient if a certain demographic of the White population were less likely to participate.

**Figure 2: Lorenz Curve for Total Household Income Per Capita by Race, 2014**
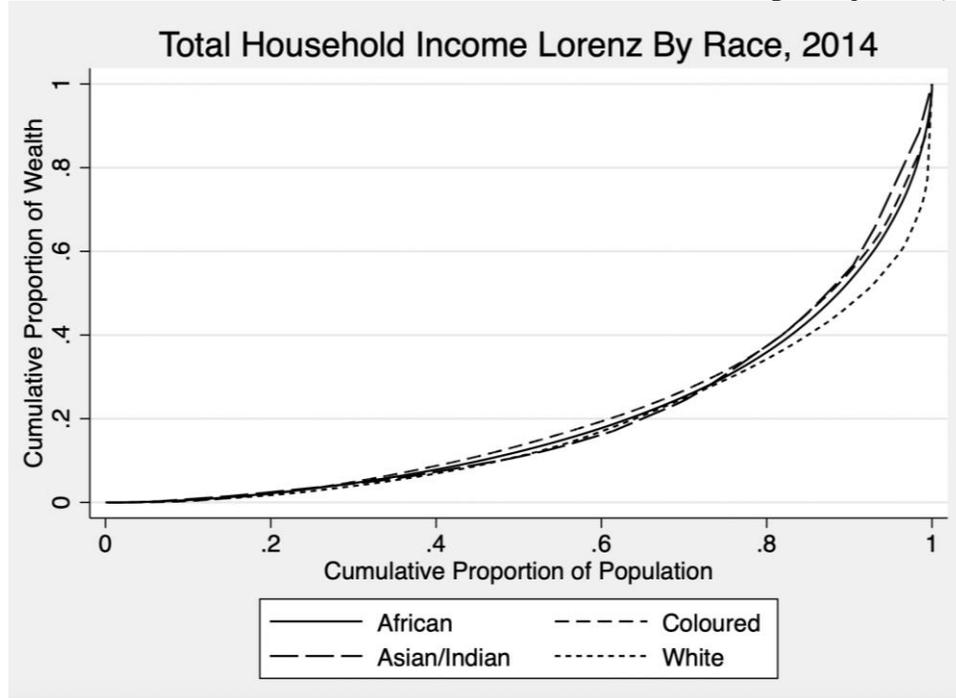


Source: NIDS Wave 4 and own calculations

### 4.2: Decomposing income inequality by income source for 2008 and 2014

Table 2 presents a decomposition by income sources for 2008 using the income categories created by the household NIDS variables and adjusted to 2012 real per capita rand.

Government income stands out as having the lowest Gini coefficient both for households receiving the income and for the overall population. The data show that the many people who relied on government income gain little from it, thus the reason behind the lower Gini coefficient.

In contrast to government income, wage income had a Gini coefficient of 0.69 for those earning wage income.[14] While the average household income for those receiving was R 2674.63, this number is most likely the result of only a few high-earning wage earners with the rest of the population relegated to whatever minimums (if any) are established by their labor union. A total of 68.42% of households received some income from wages, and wage income was unequally distributed across households regardless of whether they received the income or not. This suggests that the problem is less with households having access to wage-earning opportunities, but rather an unequal distribution within the opportunities that exist.

Agricultural income exhibited the highest Gini coefficient in both categories of Gini coefficients, indicating that agriculture was a highly unequal form of income. Even so, it is a relatively small percent share in total income despite the nearly one-fifth of households that received it. Though some relied on agriculture for income, what they made was both relatively little and highly unequal in distribution. The inequality is understandable given the history of apartheid, in which land was forcibly removed from Africans and given to white farmers to

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[14] The Gini coefficients presented here are similar in magnitude to those of Hundenborn et al. (2016). Any differences can likely be accounted for by weight updates and potential differences in the construction of aggregate income variables.

aggregate in large farms. With modern efforts to redistribute land, under a willing-buyer willing-seller model, land redistribution efforts have been slow and ultimately limited in scope. Even efforts to return stolen land are difficult, as the majority of successful land settlements involve urban land with monetary compensation, not the return of the land (Hall, 2004).

**Table 2: Decomposition of Gini coefficients by income source, 2008**

| Income Source: | % of HHs receiving income: | Mean HH income from source for those receiving: | Mean HH income from source for all HHs: | % share in total income: | Gini coefficient for income source for HHs receiving: | Gini coefficient income source for all HHs: |
|---|---|---|---|---|---|---|
| Wages | 71.27% | 2674.63 | 1906.29 | 68.42% | 0.69 | 0.78 |
| Government | 59.98% | 286.11 | 171.60 | 6.16% | 0.45 | 0.67 |
| Remittances | 15.20% | 654.87 | 99.55 | 3.57% | 0.80 | 0.97 |
| Imputed Rent | 85.63% | 484.48 | 414.88 | 14.89% | 0.73 | 0.78 |
| Investment | 7.17% | 2475.69 | 177.62 | 6.38% | 0.70 | 0.98 |
| Agriculture | 17.91% | 13.91 | 2.49 | 0.09% | 0.91 | 0.99 |
| Other | 2.37% | 573.30 | 13.56 | 0.49% | 0.74 | 0.99 |
| Total |  |  | 2785.99 | 100.00% | 0.68 | 0.69 |

Per household per capita measure, with weights, and deflator used to adjust to 2012 rand
Source: NIDS Wave 1 and own calculations

Table 3 in 2014 finds that many of the income source inequality patterns observed in 2008 persist. While the Gini coefficient for households receiving wage income decreased from 0.69 in 2008 to 0.66 in 2014, the mean household income for those receiving wage income increased R 555.79 over the same time period. This is demonstrative of wage-based reforms such as minimum wages being implemented alongside an increase in wages for high-earning individuals. Important industries such as mining, domestic work, and agriculture experienced increases in the minimum wage between 2008 and 2014.

Government income remained a key driver of alleviating income inequality in 2014. The proportion of households receiving government income fell minimally and the average amount received increased relative to 2008. The associated Gini coefficient for households receiving and for overall households declined slightly as well. All told, this demonstrates that the redistributive effect of government income to subsidize households in need continued through the time period. Indeed, as seen in my data, payouts for one of the biggest sources of government income--the Child Support Grant--had increasing payouts over the years between 2008 and 2014 (Webb and Vally, 2020).

Thirdly, investment income nearly doubled the mean income for households receiving. In addition, the Gini coefficient for households receiving investment income increased from 0.70 in 2008 to 0.89 in 2014. One explanation is that despite the issues facing South Africa's economy

after the global stock market crash of 2008, investment opportunities have become increasingly lucrative for the few wealthy patrons able to invest heavily, while for smaller investors payouts have decreased.

The paper by Hundenborn et al. (2016) using NIDS data found similar marginal decreases in the Gini coefficients for wage and government income, while also noting the increase of investment usage over time. Hundenborn then applied the analysis of inequality for a comparison between 1993, 2008, and 2014 without looking at racially disaggregated patterns, while in the next component of my research I further decompose my study of inequality into subsections of the African population.

Finally, to have the most accurate information, for Table 3, two totals were included for income. The first of these totals is the total reported income from the questionnaire. For those who didn't respond, the data was cleaned to set their answer to zero, as this most often meant they skipped that series of questions and thus did not qualify to answer. Some, however, may have skipped this question out of a disinterest in answering rather than a lack of receiving the income. Using other sections of either the individual or household surveys, many of these answers could be later imputed. The "Total 2" row includes values that are taken from using the aggregate of imputed income, rather than just the response values. Because the 2014 wave of NIDS happened relatively recently, imputations have not been made across all income sources, meaning that in the "Total 1" category, 252 respondents ended up with zero income, as there were no imputations made to correct the data. For this paper, moving forward only "Total 1" will be used for calculations, as this is the total that allows for the reported variables of income sources to be used. Note that "Total 1" *does* include imputed rent, however, the rest of the variables are merely reported and not imputed, as the imputations have not been derived yet. Unlike the 2014 wave, Wave 1 from 2008 has been released long enough that these imputations were made, however, given time the breakdown of income sources with imputations will also be released.

Between the two total variables, Total 2 has a lower Gini, which suggests that many of the imputations were made to adjust for an underreporting most severe among low-income households, as Total 2 is more equal than Total 1. Even so, the change is minor enough that for this paper, Total 1 will be used as the aggregate total variable moving forward.

**Table 3: Decomposition of Gini by income source, 2014**

| Income Source: | % of HHs receiving income: | Mean HH income from source for those receiving: | Mean HH income from source for all HHs: | % share in total income: | Gini for income source for HHs receiving: | Gini for income source for all HHs: |
|---|---|---|---|---|---|---|
| Wages | 68.05% | 3230.42 | 2198.15 | 64.94% | 0.66 | 0.77 |
| Government | 58.38% | 340.23 | 198.62 | 5.87% | 0.40 | 0.65 |
| Remittances | 23.47% | 446.50 | 104.81 | 3.10% | 0.59 | 0.90 |
| Imputed Rent | 86.10% | 512.61 | 441.37 | 13.04% | 0.73 | 0.77 |
| Investment | 7.33% | 5872.13 | 430.52 | 12.72% | 0.89 | 0.99 |
| Agriculture | 7.17% | 95.55 | 6.85 | 0.20% | 0.88 | 0.99 |
| Other | 9.16% | 489.89 | 4.49 | 0.13% | 0.60 | 1.00 |
| Total | | | 3384.81 | 100.00% | 0.66 | 0.68 |
| Total 2 [with imputations] | | | 4017.17 | | | 0.66 |

Per household per capita measure, with weights, and deflator used to adjust to 2012 rand
Source: NIDS Wave 4 and own calculations

## 4.3: Decomposing income inequality for African households above and below the poverty line in 2008 and 2014

Table 4 presents the decomposition analysis for African households above and below the poverty line. Among households above the poverty line wage income exhibited both high elasticity and high correlation with total income, suggesting that not only does wage income increase overall inequality but it also is a large driver of total income inequality. A larger share of the total income comes from wages among households above the poverty line compared to those below the poverty line. In the subgroup above the poverty line, the Gini coefficients for the wage income overall and those receiving the wage income are relatively similar, suggesting that most inequality from the wages doesn't arise from non-earners but rather the drastic differences in income.

The government income share below the poverty line is nearly ten times that above, which reflects the redistributive nature of government income. The negative elasticity held by government income both above and below the poverty line emphasizes its position as a redistributive source, as increases in government income would cause a decrease in the overall Gini coefficient. The impact of changes in governmental income would be powerful especially below the poverty line, where the negative elasticity is approximately twice that of the negative elasticity above the poverty line. The government income above the poverty line also has a negative correlation with total income while below the poverty line the correlation is positive, thus reflecting how government income decreases the total Gini coefficient in the above category while increasing it in the lower. This makes sense, as those above the poverty line would become less economically stratified with government income, whereas since those below the poverty line are competing for resources from the same fund, an increase in funding would only increase inequality in one of the most important forms of income.

Imputed rent in both categories holds a positive correlation with the total income, suggesting that it is (especially for the subgroup above the poverty line) a fairly strong indicator of inequality while (as can be seen in the negative elasticity present in both groups) still slightly decreasing overall inequality. The Gini coefficient for those receiving imputed rent above the poverty line is much higher than the Gini coefficient in the same category for those below, suggesting increased inequality for imputed rent above the poverty line (perhaps due to a greater diversity of housing for those above the poverty line).

**Table 4: Decomposition of income sources for African households above and below poverty line, 2008**

| | Income Source | Share of source in total income | Gini coefficient of source for HHs receiving | Gini coefficient for income source | Elasticity between source and total Gini | Gini correlations between source and total income |
|---|---|---|---|---|---|---|
| Above Poverty Line | | | | | | |
| | Wages | 79.09% | 0.5439 | 0.5514 | 0.0916 | 0.9190 |
| | Government | 3.84% | 0.8034 | 0.8067 | -0.0632 | -0.3602 |
| | Remittances | 3.08% | 0.9555 | 0.9562 | -0.0048 | 0.3950 |
| | Imputed Rent | 11.34% | 0.6093 | 0.6837 | -0.0218 | 0.5294 |
| | Investment | 1.35% | 0.5959 | 0.9726 | -0.0025 | 0.3766 |
| | Agriculture | 0.10% | 0.9233 | 0.9911 | -0.0018 | -0.3085 |
| | Other | 1.20% | 0.7535 | 0.9873 | 0.0024 | 0.5456 |
| | Total | 100.00% | | 0.4480 | 0.0000 | 1.0000 |
| At and Below Poverty Line | | | | | | |
| | Wages | 36.82% | 0.4012 | 0.6717 | 0.1984 | 0.6995 |
| | Government | 36.56% | 0.3797 | 0.5167 | -0.1333 | 0.3754 |
| | Remittances | 5.71% | 0.4994 | 0.9138 | -0.0002 | 0.3328 |
| | Imputed Rent | 18.87% | 0.4434 | 0.4836 | -0.0723 | 0.3896 |
| | Investment | 1.01% | 0.4764 | 0.9845 | 0.0120 | 0.6801 |
| | Agriculture | 0.51% | 0.8986 | 0.9726 | -0.0035 | 0.0999 |
| | Other | 0.52% | 0.3965 | 0.9901 | -0.0010 | 0.2469 |
| | Total | 100.00% | | 0.3031 | 0.0000 | 1.0000 |

Per household per capita measure, with weights, and deflator used to adjust to 2012 rand
Source: NIDS Wave 1 and own calculations

In 2014, perhaps the most significant developments revealed by the data were the relative consistency of the wage Gini coefficients for those both above and below the poverty line, even as government income grew less unequal (especially for the subgroup above the poverty line). The minimal change seen in the Gini coefficients for wage data in both sets of African subgroups parallels the trend in the overall population described by Tables 3 and 4, where both wage Gini coefficients remained largely unaffected despite slight shifts in those receiving and the amount they received. The slight growth of government income as a share of total income for the

population of 3.8% to 5.2% indicates growing redistributive efforts to combat wage-driven inequalities. Even so, government efforts to reduce inequality would ideally be targeted at wages.

Despite reforms to minimum wage, the Gini coefficient of wages and the overall Gini coefficient for Africans above the poverty line remain high and are similar values. Between 2008 and 2014, many of South Africa's industries increased the minimum wage, including the mining sector (2014), the domestic work sector (annually 2008-2014), and the agricultural work sector (annually 2009-2014). Raising minimum wages could have indeed been a factor in the decrease in Gini coefficient for Africans receiving wage income above the poverty line, as those who earned wage income now earned with the new minimum in place[15]. In contrast, between 2008 and 2014 the inequality among all households below the poverty line for the wage Gini increased, which could be a result of the minimum wage forcing workers out of the workforce as a result of the increase in price per worker.

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[15] This assumes that those above the poverty line are impacted by the minimum wages. South Africa's economy has shifted towards skilled labor in industries such as manufacturing and technology, which is more likely to be composed of those with connections to jobs, education, and land (Banerjee, A, Galiani, S, Levinsohn, J, McLaren, Z & Woolard, I, 2008).

**Table 5: Decomposition of income sources for African households above and below the poverty line, 2014**

| | Income Source | Share of source in total income | Gini coefficient of source for HHs receiving | Gini coefficient for income source | Elasticity between source and total Gini coefficient | Gini coefficient correlations between source and total income |
|---|---|---|---|---|---|---|
| Above Poverty Line | | | | | | |
| | Wages | 75.03% | 0.5241 | 0.5821 | 0.1234 | 0.9231 |
| | Government | 5.21% | 0.4498 | 0.6994 | -0.0814 | -0.3701 |
| | Remittances | 4.57% | 0.5662 | 0.8867 | -0.0302 | 0.1768 |
| | Imputed Rent | 10.70% | 0.6223 | 0.6834 | -0.0266 | 0.5071 |
| | Investment | 4.08% | 0.7184 | 0.9720 | 0.0174 | 0.6778 |
| | Agriculture | 0.19% | 0.8387 | 0.9891 | -0.0012 | 0.1757 |
| | Other | 0.23% | 0.5961 | 0.9935 | -0.0015 | 0.1674 |
| | Total | 100.01% | | 0.4614 | 0.0000 | 1.0000 |
| At and Below Poverty Line | | | | | | |
| | Wages | 28.10% | 0.3744 | 0.7242 | 0.1598 | 0.6797 |
| | Government | 39.93% | 0.3182 | 0.5111 | -0.0682 | 0.5091 |
| | Remittances | 9.91% | 0.4340 | 0.8539 | 0.0215 | 0.4471 |
| | Imputed Rent | 20.22% | 0.4835 | 0.5099 | 0.0017 | 0.2454 |
| | Investment | 0.98% | 0.3028 | 0.9863 | 0.0047 | 0.4720 |
| | Agriculture | 0.71% | 0.7366 | 0.9725 | 0.0021 | 0.4165 |
| | Other | 0.15% | 0.3109 | 0.9980 | -0.1215 | 0.6742 |
| | Total | 100.00% | | 0.3138 | 0.0000 | 1.0000 |

Per household per capita measure, with weights, and deflator used to adjust to 2012 rand
Source: NIDS Wave 4 and own calculations

Additionally, the Gini coefficient for government income for African households receiving government income nearly halved, going from 0.8034 in 2008 to 0.4498 in 2014, while the overall government income Gini coefficient for the subgroup above the poverty line

decreased from 0.8067 to 0.6994[16]. This corresponds to an increase in government grants in the wake of the 2008 recession (Bhorat et al., 2014).

The largest of the South African government grants is the Child Support Grant (CSG) (Ibid.), with 71% of children receiving such grants, the income going to their households to fund care and education. The CSG was expanded in 2010 to include support for children until age 18 instead of the previous cutoff of 15 in 2008, giving payouts to roughly 2.5 million more children in 2012 than it did in 2008, alongside a R50 increase in payment size (Department of Social Development, South African Social Security Agency, and United Nations Children's Fund, 2012). The raising of the age to allow for greater coverage meant that roughly 1 million more children received the grant in 2010 than in 2009 (Department for Social Development et al., 2012). Calculations by Christopher Webb and Natasha Vally (2020) suggest that the child support grant has on average increased 5.5% each year 2010-2019, with some years slightly above or below this mean. This confirms data presented in this paper: that indeed government support has been increasing, and it has been serving as a redistributive form of income for many below the poverty line.

Despite the increase in funding, however, a study by Leibbrandt, Woolard, Finn, and Argent (2010) found that many families in need remain ineligible for grants due to the increased documentation required to receive CSGs in particular that began in 2008. Hundenborn et al. (2016) corroborated data from this paper in a 2016 working paper similarly high levels of continuing inequality between 2008 and 2014, again citing Leibbrandt et al. (2010) and the patchy dispersion of grants as a potential reason for the persistent inequality despite increases in government spending.

Ultimately, the shifts in the decomposition of African households both above and below the poverty level suggest that while increased efforts have been made to reduce inequality via governmental income, the initiatives have been insufficient as a result of not reaching enough of the individuals below the poverty line who need the income most.

## 5. Conclusion

Noting trends in the series of data presented in this paper is key to understanding the dynamics and evolution of income inequality in South Africa in 2008 and 2014. The first section demonstrated that all races saw an increase in mean per capita income. Of the races, Africans experienced the largest percent growth in mean income, while mean incomes for Asians/Indians nearly stagnated. This could be indicative of the success of affirmative action policies or redistribution efforts. Alternatively, the stagnation of Gini coefficients for African households suggests that the growth experienced in mean income might instead be the result of the labor unions' increased wage income in the absence of a matching increase in government redistribution efforts. Between 2008 and 2014, African households experienced a marginal decrease in income inequality. Consequently, Africans were the most unequal race in 2008,

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[16] Interestingly, in the study by Hundenborn et al. (2016), the Gini coefficient remained relatively constant for government income of the overall population, going from 0.776 in 2008 to 0.758 in 2014. Though this contradicts the numbers I calculated (0.67 in 2008 and 0.65 in 2014), it still remains notable, as both sets of numbers exhibit relatively little change. One explanation for the discrepancies is the definition of what grants were included in government income. Regardless, the stagnation is important to note when compared to the fluctuations of the Gini coefficient for Africans below the poverty line. Hundenborn et al. (2016) also found similar trends of negative elasticity between government income and the total Gini coefficient, emphasizing the nature of government income as redistributive. Again, however, the findings of Hunderborn et al. are for the overall population not for any racial subgroups or a breakdown of those above/below the poverty line.

while whites were the most unequal race in 2014. While government efforts at redistribution may have succeeded in staving off a greater increase in inequality during the 2008 recession, they haven't made progress in overall income inequality seen among African households.

Notably, the White mean income remained much higher than that of the other races, pointing to drastic inequalities between races that have remained despite the end of apartheid. The most significant of the Gini coefficient increases was also for White households, perhaps as a result of the 2008 recession.

The income decomposition revealed low government Gini coefficients in both 2008 and 2014, suggesting that government income has become a redistributive measure. This stands in contrast to the high wage Gini coefficient for both years. Because wage income is a large share in overall income, wages most likely increased the overall Gini coefficient for the population. The stark contrast between the government and wage measures reveals the tension at the heart of South African inequality: efforts to redistribute income in the smaller allotments that the government is able, contrasted with the few high wage earners driving inequality.

Finally, decomposing for African households above and below the poverty line revealed a divide in wage income, with a higher share and more inequality found in the section above the poverty line. The Gini coefficient for wage income had a relatively high correlation in both years to the total Gini coefficient, suggesting again that the relationship between wage income and overall inequality has persisted over time for African households both above and below the poverty line, perhaps due to the presence of labor unions or a failure of government reform. Additionally, government income served in both years as a higher share of income for those below the poverty line than for those above it, and the negative elasticity between government income and the overall Gini coefficient further emphasized the redistributive effect of South Africa's welfare program.

Gini coefficients were an effective way to measure inequality for this study as they capture the broader picture of inequality while allowing for further decomposition. The subsequent decomposition allows for a better understanding of what subgroups experience the most inequalities and what income sources are driving such inequities. The continual theme reflected throughout the data suggests that government income has been an important method of redistributing income and preventing a further rise in inequalities, while the wage inequalities remained relatively consistent over time, most likely due to the influence of labor unions.

The findings of this paper complement and extend those found in past papers of Hudnenborn et al. (2016) and Leibbrandt et al. (2000) by replicating data showing the inequality of wage income and extending analyses for subgroups of Africans above and below the poverty line. My paper allows for a more detailed and complex look at inequality due to the breakdown of racial category (an important acknowledgment given the history of apartheid) and the decomposition for African households, which serves as useful for future policies designed to target African households and help alleviate the unequal burden of apartheid's legacy. Additionally, this paper differs from the study by Hunderborn et al. (2016) based uponLeibbrandt et al. (2012) as my paper also offers insight into agricultural income and imputed rent.

While other studies have also focused on non-monetary measures of inequality, this study focuses on income as it is similar between years and does not shift with developing technology. Even so, it is important to recognize the contribution of other non-monetary measures of deprivation. While no direct effects of particular policies or efforts were studied, the decompositions within this paper remain helpful to consider for future studies and policies that

target inequality, especially the inequality rampant along racial lines and present between Africans above and below the poverty line.

**References:**

1. Argent, Jonathan. 2009. 'Household Income: Report on NIDS Wave 1' NIDS Technical Paper No.3.
2. Banerjee, A, Galiani, S, Levinsohn, J, McLaren, Z & Woolard, I, 2008. 'Why has unemployment risen in the New South Africa? Economics of Transition' 16, 715–740.
3. Bhorat, Haroon, and Aalia Cassim. 2014. 'South Africa's Welfare Success Story II: Poverty-Reducing Social Grants.' *Brookings*, January 27.
4. Bhorat, H & Ravi Kanbur, SM (Eds), 2006. Poverty and Policy in Post-Apartheid South
5. Africa. HSRC (Human Sciences Research Council) Press, Cape Town.
6. Brophy, T., Branson, N., Daniels, R.C., Leibbrandt, M., Mlatsheni, C., & Woolard, I., 2018. *National Income Dynamics Study panel user manual*. Release 2018. Version 1. Cape Town: Southern Africa Labour and Development Research Unit.
7. Center for Global Development. 2015. 'South Africa's Child Support Grant.'
8. DSD (Department of Social Development), SASSA (South African Social Security Agency), and United Nations Children's Fund (UNICEF). 2012. "The South African Child Support Grant Impact Assessment."
9. Granlund, Stefan, & Tessa Hochfeld (2020) "'That Child Support Grant Gives Me Powers' – Exploring Social and Relational Aspects of Cash Transfers in South Africa in Times of Livelihood Change," The Journal of Development Studies, 56:6, 1230-1244, DOI: 10.1080/00220388.2019.1650170
10. Hagen-Zanker, Jessica, and Jenny Morgan, with Charles Meth. 2011. 'South Africa's cash social security grants: Progress in increasing coverage.' Overseas Development Institute.
11. Hall, Ruth. 2004, 'Land Restitution in South Africa: Rights, Development, and the Restrained State.' Canadian Journal of African Studies / Revue Canadienne des Études Africaines, 38:3, 654-671.
12. Haughton, J. and S. R. Khandker. 2010. *Handbook on poverty and inequality*. Work Bank publications. Chapter 6.
13. Hundenborn, J., Leibbrandt, M., Woolard, I. (2016). 'Drivers of Inequality in South Africa.' A Southern Africa Labour and Development Research Unit Working Paper Number 194/NIDS Discussion Paper 2016/16. Cape Town: SALDRU, University of Cape Town.
14. Jenkins, Stephen P., and Philippe Van Kerm. 2004. "GLCURVE: Stata module to derive generalised Lorenz curve ordinates," Statistical Software Components S366302, Boston College Department of Economics, revised 24 Jun 2008.
15. Jenkins, Stephen P., 2019. "INEQDECGINI: Stata module to estimate Gini coefficient with optional decomposition by subgroups," Statistical Software Components S458679, Boston College Department of Economics, revised 22 Sep 2019.
16. Jenkins, Stephen P., 1999. "INEQDECO: Stata module to calculate inequality indices with decomposition by subgroup," Statistical Software Components S366002, Boston College Department of Economics, revised 22 Jan 2015.
17. Kingdon, G. G., and J. Knight (2004): Unemployment in South Africa, 1995-2003: Causes, Problems, and Policies,.Journal of African Economies, 16(5), 813 - 848.
18. Leibbrandt, Murray, Arden Finn & Ingrid Woolard (2012) 'Describing and decomposing post-apartheid income inequality in South Africa,' Development Southern Africa. 29, 19-34.

19. Leibbrandt, M., Woolard, I., Finn, A., and Argent, J. 'Trends in south african income distribution and poverty since the fall of apartheid.' OECD Social, Employment and Migration Working Papers, 101 (2010).

20. Leibbrandt, Murray, Christopher Woolard and Ingrid Woolard (2000) 'The Contribution of Income Components to Income Inequality in the Rural Former Homelands of South Africa: a Decomposable Gini Analysis,' Journal of African Economies, 9, 79–99.

21. Lowenberg, Anton D, 1989. "An Economic Theory of Apartheid." *Economic Inquiry* 27, no. 1: 57–74.

22. Mariotti, M, 2012. Labour markets during apartheid in South Africa. Economic History Review 65, 1100–1122.

23. Nattrass, N. and J. Seekings. 2005. Class, Race and Inequality in South Africa, Chapter 5, The rise of unemployment under Apartheid, pp. 49 – 90.

24. Rena, Ravinder and Malindi Msoni. 2014. 'Global Financial Crises and its Impact on the South African Economy: A Further Update,' Journal of Economics, 5:1, 17-25.

25. Schmit, T. M., R. N. Boisvert, and L. W. Tauer. 2001. 'Measuring the Financial Risks of New York Dairy Producers,' *Journal of Dairy Science, 84, 411–420.*

26. Southern Africa Labour and Development Research Unit. National Income Dynamics Study (NIDS) Wave 1, 2008 [dataset]. Version 7.0.0. Pretoria: SA Presidency [funding agency]. Cape Town: Southern Africa Labour and Development Research Unit [implementer], 2018. Cape Town: DataFirst [distributor], 2018. https://doi.org/10.25828/e7w9-m033

27. Southern Africa Labour and Development Research Unit. National Income Dynamics Study 2014-2015, Wave 4 [dataset]. Version 2.0.0. Pretoria: Department of Planning, Monitoring, and Evaluation [funding agency]. Cape Town: Southern Africa Labour and Development Research Unit [implementer], 2018. Cape Town: DataFirst [distributor], 2018. https://doi.org/10.25828/f4ws-8a78

28. Stark, O., J. Taylor and S. Yitzhaki. 1986. 'Remittances and Inequality', *Economic Journal*, 96, 722–40.

29. *Statistics South Africa.* 2018. "National Poverty Lines."

30. Van Kerm, Philippe, 2020. "SGINI: Stata module to compute Generalized Gini and Concentration coefficients, Gini correlations and fractional ranks," Statistical Software Components S458778, Boston College Department of Economics.

31. Webb, Christopher and Natasha Vally. 2020. 'South Africa has raised social grants: why this shouldn't be a stop-gap measure.' *The Conversation*, May 7.

32. Wilson, Francis (Winter 2001). "Minerals and Migrants: How the Mining Industry Has Shaped South Africa". *Daedalus*. MIT Press on behalf of American Academy of Arts & Sciences. 130 (1): 99–121. JSTOR 20027681.

33. Wittenberg, Martin. 2009. 'Weights: Report on NIDS Wave 1' NIDS Technical Paper No.2.

34. The World Bank**.** 2020. The World Bank Group.