

## **Assessing socioeconomic inequality in ageing in sub-Saharan Africa: an empirical assessment of South Africa**

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### **Abstract**

The population younger than five years is now exceeded by those older than 65 globally, with women making up a larger share. Because ageing was traditionally about people older than 60 or 65, Africa, with a predominantly younger population under 50 years, was previously not a focus of ageing research. However, shifting the focus away from people older than 65, a concept without concrete meaning in many African settings, this paper considers ageing a continuous process. It assesses socioeconomic inequalities in ageing and gaps in gender-related socioeconomic disparities in ageing in Africa using South Africa as a case study. Data come from four rounds of nationally representative general household surveys spanning 2003 to 2018. Using the concentration index to assess socioeconomic inequalities in ageing, a significantly large proportion of younger populations comes from poorer households, while the reverse is the case for older adults. There is a gendered pattern in socioeconomic inequality in ageing. While there are no significant differences in socioeconomic inequalities in ageing between boys and girls aged 0-9 years, socioeconomic disparities become apparent and significantly “favour” males in much older groups, say 60 years and above. The paper highlights the importance of multisectoral action and a gendered approach in addressing the significant socioeconomic inequalities in ageing. While further research is needed to understand key drivers of inequalities, mainstreaming ageing into multisectoral policies, especially prioritising

younger women, is necessary to build up resources to reduce socioeconomic disparities in ageing at older ages in South Africa.

**Keywords**

Ageing; socioeconomic inequalities in ageing; Sub-Saharan Africa; South Africa; gender inequalities

**JEL codes:** D63; J14; J18

**Highlights**

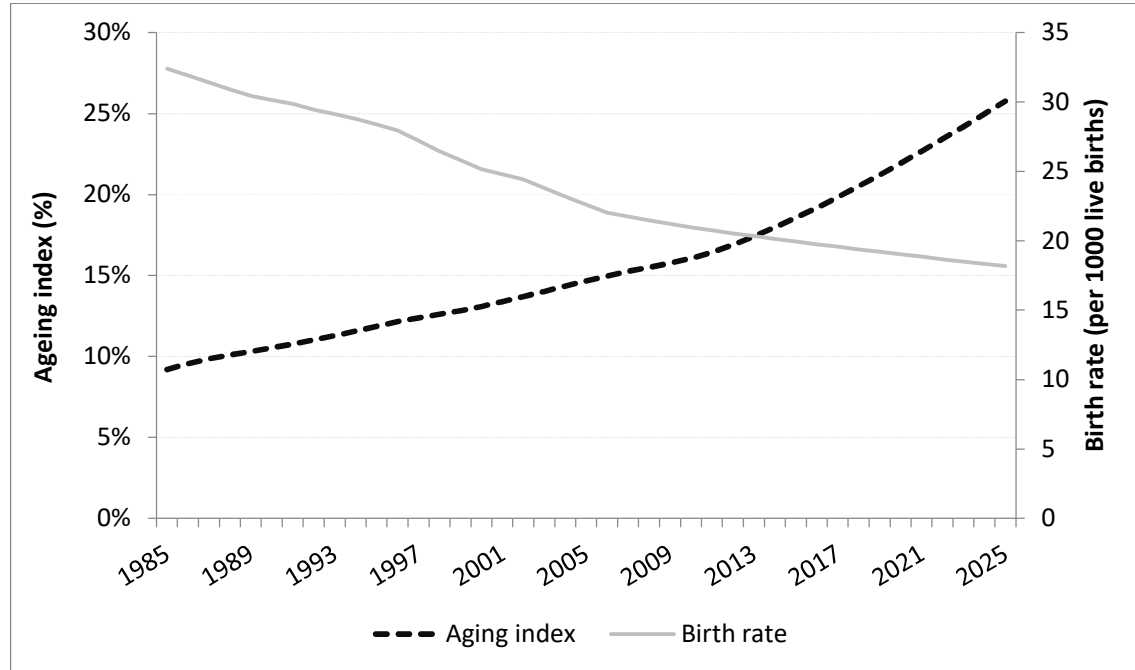
- Younger populations come from poorer households than older adults
- Socioeconomic inequality (SEI) in ageing is absent at younger ages for boys and girls
- SEIs in ageing become apparent and significantly “favour” older males
- Multisectoral action and a gendered approach are needed to address SEIs in ageing
- Policies needed to target women are necessary to reduce SEIs in ageing

## Introduction

Today, more people are 65 years or older than those younger than five, with more than a quarter living in low- and middle-income countries. The proportion of older people in many countries, including Africa, is projected to increase significantly by 2050 (United Nations, 2019). The older populations are important as their numbers increase and need a special focus (Ataguba *et al.*, 2021), as highlighted in the United Nations Decade of Healthy Ageing (United Nations, 2020). The Vienna International Plan of Action on Ageing developed at the first United Nations World Assembly on Ageing in Vienna in 1982 (Butler, 2002, United Nations, 1982) significantly focused on guaranteeing economic and social security to *older persons* to achieve national development (United Nations, 1982). Although the impact of the Plan of Action on Ageing has not been as substantial as expected, it raised awareness of the global population ageing issue and is a focal document for ageing policy globally (Butler, 2002). Consistently, the need for research and exchange of information features in many discussions addressing ageing (Aboderin and Ferreira, 2008, Butler, 2002, United Nations, 1982, World Health Organization, 2007). A major theme running through most international, regional, and national policies and calls for action on ageing is adopting multisectoral approaches to tackling the challenges associated with ageing, including health. However, research on ageing, including the economic aspects and the provision of social protection for older people in Africa, remains scanty (Aboderin and Ferreira, 2008, Maharaj, 2013).

In Africa, for instance, the African Union Policy Framework and Plan of Action on Ageing (2003) (HelpAge International, 2003) is a critical development that calls for countries on the continent to adopt national policies and strategies for addressing ageing (Aboderin and Ferreira, 2008). By 2015, only seven countries in Africa had adopted national policies on ageing, with only three of these countries (Kenya, Tanzania and South Africa) committing budgets (Scobie *et al.*, 2015). The limited research and policy action on ageing in Africa is in part attributed to the notion that ageing is about *older people*, even though there is no consensus on what it means to be “old” in Africa, where being significantly older is whenever severe functional limitations set in (Hunter and May, 2013, Maharaj, 2013). It could also be because Africa traditionally has a preponderance of younger people (Aboderin and Ferreira, 2008, Economic Commission for Africa, 2016, Maharaj, 2013).

Figure 1: Birth rate and ageing in South Africa, 1985 - 2025



Source: Actuarial Society of South Africa (2011)

Note: Ageing index = (the number of those aged 65 years or above ÷ the number of those aged below 15 years) × 100.

Now, the rate of increase in population ageing is higher in many low- and middle-income countries, including Africa, than in high-income countries, highlighting the need for research on ageing in the region (Maharaj, 2013). Although the ageing process is heterogeneous across Africa, North and Southern Africa record the most rapidly ageing populations (Maharaj, 2013). In South Africa, it is estimated that the proportion of people aged at least 60 years will increase from 7.7% in 2015 to 10.5% in 2030 (Scobie *et al.*, 2015) and 15.3% in 2050 (Hunter and May, 2013). The ageing index in Figure 1 indicates that the ratio of those aged at least 65 years to those below 15 years in South Africa has increased steadily over the past three decades, and by 2025, the ageing index will be 25%. The upward trend in the ageing index also reinforces the importance of ageing research in South Africa (Aboderin and Beard, 2015). This change in age structure in South Africa is faster than that experienced in higher-income countries, making it imperative for low- and middle-income countries to adapt quickly (Maharaj, 2013). Considering the pattern in Figure 1, a significant proportion of the population in South Africa will be older than 65 in the next few decades, but it is unclear how disparities in socioeconomic status change as people grow older in the country. Understanding this is necessary to prepare for the significant demographic change resulting in more people living beyond 65 years if their welfare is to be enhanced through policy. Therefore, research is needed into the patterns and inequalities in ageing (Aboderin and Ferreira, 2008) to provide evidence to improve the ageing

process in low- and middle-income countries, including South Africa. On this, the Second World Assembly on Ageing in Madrid in 2002 highlighted the need for special attention to understanding health disparities and inequalities of longevity within and between countries (Butler, 2002). Assessing socioeconomic inequality in ageing is critical for overall policy addressing the many dimensions of inequalities within countries. For policy within countries and in line with the sustainable development goals (SDGs) of reducing inequality and achieving gender equality (United Nations Development Programme, 2015), it is essential to understand which socioeconomic groups and genders are left behind in the ageing process for prioritisation, especially for social protection, income support and poverty alleviation programmes. Thus, this paper assesses socioeconomic inequalities in ageing for the first time using data from South Africa, a country in sub-Saharan Africa. It also assesses gaps in gender-related socioeconomic inequalities in ageing in South Africa. This paper is expected to provide empirical evidence and contribute to policy for reducing disparities in socioeconomic status in South Africa, where substantial inequalities in income, health and access to social services exist (Ataguba, 2021). It also recognises the importance of using a gendered approach to improve the population's well-being as people age.

## **Literature review**

### **Theoretical review**

While no specific theories focus directly on disparities in socioeconomic groupings as individuals grow older, most theoretical explanations relate mainly to socioeconomic inequalities in general quality of life and health, such as health status and health outcomes. However, they can be adapted to understand how inequalities in socioeconomic status change over an individual's life course. For instance, the life-course perspective (Braveman and Barclay, 2009) emphasises the role of context, including social context, over time in shaping an individual's outcomes. This is closely related to the cumulative advantage/disadvantage hypothesis that highlights how the interaction of complex forces over time systematically leads to divergence between individuals in characteristics such as money, wealth, health, general well-being or socioeconomic status (Dannefer, 2003). Here, an individual's life experiences manifest in disparities between them and others as they grow older; for example, when social disadvantage accumulates over time, inequality in many outcomes increases in older age (Zhang *et al.*, 2019). Broadly, multiple social determinants of ageing (Commission on Social Determinants of Health, 2008) affect different outcomes and disparities between individuals as

they age. Wealth accumulation theory (Jakobsen *et al.*, 2020) also helps explain disparities in socioeconomic inequalities in ageing. While wealth could be inherited or bequeathed, this theory highlights that the wealth accumulated by individuals over their life course determines how much they will have when they grow older, with those able to accumulate more having better outcomes, including health outcomes, than their counterparts (Barrett, 2003). The cumulative inequality theory (Ferraro and Shippee, 2009) presents an alternative that blends many other theories and is considered a middle-range theory incorporating macro- and micro-sociological contents (Ferraro and Shippee, 2009). According to the cumulative inequality theory, inequality accumulates over an individual's life course and "social systems generate inequality, which is manifested over the life course via demographic and developmental processes," with an individual's trajectory shaped mainly by risk accumulation, available resources, perceived trajectories, and human agency (Ferraro and Shippee, 2009, p.334). The cumulative inequality theory, which is relevant for this paper, provides an important consideration for understanding how many factors shape disparities between individuals as they age.

### **Empirical review**

Globally, there is a dearth of empirical studies examining disparities in socioeconomic status as individuals age. However, a significant body of research documents growth in wealth accumulation as people grow older, even if this relationship is not linear (Cagetti, 2003, Di Matteo, 1998). Also, several papers document health disparities in ageing, with life expectancy and health outcomes significantly higher among wealthier people than their counterparts (Marengoni and Calderon-Larrañaga, 2020, Marmot and Nazroo, 2001, Perlman, 2008). Many of these disparities are explained by the social determinants of health, which relate to the conditions people are born into, live in, grow and work in. The dearth of empirical studies in Africa is not surprising, as less than 0.5% of the population is 80 or older, with about 90% younger than 50 (Economic Commission for Africa, 2016). Importantly, this picture is changing as the number of people older than 60 has increased in Africa over the past two decades (Scobie *et al.*, 2015), prompting more ageing-related research. What is essential in this paper is recognising, at least in Africa, that ageing is a lifelong process continuing throughout life (World Health Organization, 2007). It should be about a continuum along the age dimension rather than focusing on "older people" alone, which has no concrete meaning in many African settings. An initial attempt at this in South Africa was the focus on the "near-olds" aged between 50 and 59 years and transiting into much older adults (Hunter and May, 2013). Hunter

and May (2013) make the case to not only focus on those aged 60 years and above because any shock (e.g., in health and general welfare) experienced by the near-old population, for instance, could create significant challenges in later years, which aligns with the cumulative advantage/disadvantage theory.

Africa made significant progress in the past, and there are opportunities to improve the welfare of its population. The average life expectancy at birth in sub-Saharan Africa increased significantly from about 40 years in 1960 to about 61 years in 2015 (World Bank, 2020). However, there are substantial disparities in life expectancies between countries in sub-Saharan Africa and globally. In 2016, a girl born in Sierra Leone was expected to live, on average, about 33 years less than a girl born in Japan. The significant disparities in life expectancy by the World Health Organization (WHO) regions occur along the fault lines of national income and development levels, with African countries recording the lowest life expectancies at birth compared to the other WHO regions (Perlman, 2008, World Health Organization, 2019a). Although the pattern is changing, generally, population ageing is typical in Asia and Europe, with Africa and other low-and middle-income countries having a small fraction of the population of older people (i.e., people aged at least 60 years) (Aboderin and Ferreira, 2008, Maharaj, 2013, Pillay and Maharaj, 2013).

While other studies examine socioeconomic inequalities in health, functionality or general well-being associated with ageing, this paper provides an interesting insight into the widening or narrowing of socioeconomic status inequalities as people age. This is the first study to document this pattern using a life-course lens with populations arranged by age groups. It draws on the cumulative inequality theory to show how inequalities could cumulate over an individual's life span from birth to old age, shaped by the wider environment, including the socioeconomic landscape.

## **Methods**

### **Data**

This paper uses data from four rounds (2003, 2008, 2013 and 2018) of the cross-sectional nationally representative South Africa General Household Survey (GHS) conducted by Statistics South Africa (StatSA) using a stratified two-stage design. The first stage involved selecting primary sampling units (PSUs) with probability proportional to size (PPS). Dwelling units are

sampled within PSUs using systematic sampling in the second stage. The 2018 GHS was based on the 2013 Master Sample that contained over 3300 PSUs, using the 2011 National Population Census (NPC) information. The 2013 and 2008 GHS used the Master Sample based on the 2001 NPC, while the 1996 NPC Master Sample guided the 2003 GHS. The 2003, 2008, 2013, and 2018 GHS sample sizes are 99345, 94744, 93749, and 71137 individuals, respectively.

### **Key variables of interest**

This paper views ageing as a continuum and not just about those aged at least 60 or 65 years, for instance. It uses eight age groups for each GHS dataset to assess socioeconomic inequality. These age groups (0-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70+ years) allow for observing the patterns and trends in socioeconomic inequality in the ageing process in South Africa between 2003 and 2018. Specifically, dummy variables were created for each age group (e.g., the category 0-9 is coded “1” if the individual is aged between zero and nine years, and zero otherwise, etc.). The age group dummy variables are denoted as follows,  $D_{0-9}, D_{10-19}, \dots, D_{70+}$ . These are the major variables for capturing ageing, the paper’s main focal area.

Living standard measures are critical for assessing socioeconomic inequalities. Economists use different measures to assess living standards. Per capita or per adult equivalent household income may be preferred in many high-income countries, and expenditure or consumption is commonly used in many low- and middle-income countries (O'Donnell *et al.*, 2008, Sahn and Stifel, 2003, Younger *et al.*, 1999). Expenditure or consumption is used instead of income because many low- and middle-income countries often lack well-organised labour markets and have significant informal employment (Auriol and Warlters, 2005). There are also considerable difficulties in measuring income accurately with the “seasonal variability in such earnings, and the large shares of income... from self-employment both in and outside of agriculture” (Sahn and Stifel, 2003 p.464). Individuals sometimes do not reveal actual income to avoid taxation (Lancaster *et al.*, 1999). Economic theory favours consumption to measure long-term welfare compared to current income (Blundell and Preston, 1995) because income may fluctuate with economic fortunes, activities and events compared to consumption that may be smoothed. For empirical analysis, however, the choice of a measure of living standard or welfare depends on the information in the dataset.

The South Africa GHS datasets only contain categorical data on household expenditure as an individual or household income is unavailable. However, GHS datasets contain other useful

information for constructing household wealth. The popular asset-based welfare indices (Filmer and Pritchett, 2001, Vyas and Kumaranayake, 2006) are used in this paper to build a “continuous” measure of wealth, assuming that all household members share the same welfare level. The Principal Components Analysis (PCA) (Hotelling, 1933, 1936) was used to generate the wealth index with nine variables available in the rounds of the GHS datasets used in this paper (household expenditure categories, the type of dwelling, roof material, wall material, main source of drinking water, source of energy for lighting, ownership of a fixed phone line, cell phone and television). These variables were carefully selected through an extensive refinement process outlined in Vyas and Kumaranayake (2006).

### Analytical approach

Economists and epidemiologists use different methods to assess health inequalities (Wagstaff *et al.*, 1991, Wolfson and Rowe, 2001). As summarised in Wagstaff *et al.* (1991), these methods include the range, Lorenz curve and Gini index, pseudo-Lorenz curves, the index of dissimilarities, the slope and relative indices of inequality, and the concentration index. However, the concentration index (*CI*) is the primary analytical technique used in this paper to assess socioeconomic inequalities in ageing because of its consistency with ranking individuals by socioeconomic groups, sensitivity to changes in the distribution of individuals across socioeconomic groups and consistency with the experience of the variable of interest by socioeconomic distribution (Kakwani *et al.*, 1997, Wagstaff *et al.*, 1991). While the standard *CI* summarising socioeconomic inequalities can be computed in many ways (Duclos and Araar, 2006), in this paper it was computed for each age group variable ( $D_{0-9}, D_{10-1}, \dots, D_{70+}$ ) in each round of the GHS datasets through the convenient regression approach (Kakwani *et al.*, 1997) given below:

$$2\sigma_r^2 \left( \frac{D_i}{\mu_D} \right) = \alpha + \beta r_i + \varepsilon_i \quad (1)$$

where  $D_i$  is individual  $i$ 's value for each age group dummy variable,  $D_{0-9}, D_{10-1}, \dots, D_{70+}$  with  $\mu_D$  as the corresponding mean value. The variance of the fractional rank of the wealth index ( $r$ ) is given as  $\sigma_r^2$ . The concentration index is  $\beta$ , the ordinary least squares coefficient on  $r$  in Equation (1), and was implemented in Stata™ (StataCorp, 2021) using the *-conindex-* module (O'Donnell *et al.*, 2016). Note that the GHS data were treated as cross-sectional and not pooled. Also, the concentration index computed using the convenient regression approach is equivalent to that using the approach outlined in Duclos and Araar (2006).

Theoretically, the values of the concentration index range from  $-1.0$ , a situation where the value of the variable of interest ( $D_{0-9}, D_{10-19}, \dots, D_{70+}$ ) is one for only the poorest individual and zero for others, to  $+1.0$  (i.e., when the value of the variable is one for only the wealthiest individual), with zero corresponding to the absence of inequality (Wagstaff *et al.*, 1991). For example, if the concentration index of  $D_{0-9}$  is equal to  $+1$ , it means that the only individual aged between zero and nine years is the wealthiest individual. Generally, a negative concentration index ( $CI < 0$ ), often called a pro-poor distribution, means that the age group dummies ( $D_{0-9}, D_{10-19}, \dots, D_{70+}$ ) take on the value of one more often among poorer populations than wealthier populations. In contrast, a positive index ( $CI > 0$ ) or a pro-rich distribution means the variables take on the value of one more among wealthier than poorer populations (Ataguba *et al.*, 2018). The normalisation of the concentration index is proposed when the variables are dichotomous, as used here, because  $CI$  values are not bounded between the theoretical range of  $-1$  and  $+1$  (Erreygers, 2009, Wagstaff, 2005). However, as shown recently, the normalised concentration index may sometimes be counterintuitive for policy (Ataguba, 2022). Therefore, the standard concentration indices have been reported in this paper, and no further normalisation was done.

### **Gendered socioeconomic inequalities in ageing**

Although the male/female sex ratio at birth is generally greater than 100, this decreases below 100 beyond age 60 as the mortality rate becomes higher among men than women, even in Africa (Pillay and Maharaj, 2013, World Health Organization, 2007, 2019b). Globally, for instance, there are about 123 women for every 100 men aged at least 60 years (World Health Organization, 2007). Women, who comprise a larger share of older adults, face exclusion related to many things, including sexism and ageism in research and knowledge development (World Health Organization, 2007). In addition to this decline in the sex ratio, particularly after age 60, this paper hypothesises that socioeconomic inequalities in ageing exist between the male and female populations, which may become more pronounced beyond 60 years. For policy to address gender gaps resulting from inequalities in ageing, a central part of the SDG agenda, socioeconomic inequalities in ageing need to be disaggregated by sex to understand differences between men and women, especially past age 60.

Recognising the gendered differences in ageing experience (Barslund *et al.*, 2019, Foster and Walker, 2013), the socioeconomic inequality in ageing is computed for each age group separately for male and female subpopulations using the standard concentration index in Equation (1). If  $j$  represents the age groups, such that  $j = 0 - 9, 10 - 19, \dots, 70 +$ , then the

differences in socioeconomic inequalities in ageing between male and female sub-populations at a specific age group ( $\Delta CI_{D_j}$ ) are given as:

$$\Delta CI_{D_j} = CI_{D_j}^{\text{Male}} - CI_{D_j}^{\text{Female}} \quad \forall j \quad (2)$$

where  $CI_{D_j}$  is the standard concentration index of the dummy variable  $D_j$ , and the equivalents for the female and male subpopulations are given as  $CI_{D_j}^{\text{Female}}$  and  $CI_{D_j}^{\text{Male}}$ , respectively. From Equation (2), we define a pro-female socioeconomic inequality to occur at any age group ( $j$ ) when  $\Delta CI_{D_j} < 0$  at  $j$ . Pro-male socioeconomic inequality corresponds to  $\Delta CI_{D_j} > 0$ , while a gender-neutral socioeconomic inequality occurs when  $\Delta CI_{D_j} = 0$  at  $j$ . Standard errors for  $\Delta CI_{D_j}$ ,  $CI_{D_j}^{\text{Female}}$  and  $CI_{D_j}^{\text{Male}}$  were computed in Stata™ using the bootstrap methods (Efron and Tibshirani, 1986) with 500 replications each.

## Results

Most of the South African population is predominantly female (51%). Also, most people (>60%) live in urban areas (Table 1). As shown in Table 1, the country's average household size declined marginally from about 3.8 to 3.5 members per household between 2003 and 2018. The proportion of the population aged less than 40 also declined between 2003 and 2018. Still, more than 70% of the population is aged less than 40 years. The population aged at least 60 ranged between 7% and 8%, while about 5% of the entire population received an old-age pension from the government. Voluntary private health insurance (called medical scheme) in South Africa covered less than one-sixth of the population in 2018, a drop from about 18.4% in 2013. The self-identified black race makes up a substantial share of the population. This share increased marginally from 78.3% in 2003 to 81.0% in 2018, while the share of the self-identified white race group declined over the same period from 10.2% to 7.8%. Overall, education attainment improved marginally, with the proportion of individuals with no formal education reducing from 22.7% to 18%, while for tertiary education, there was an increase from 2.7% to 8.2% between 2003 and 2018 (Table 1).

Table 1: Descriptive statistics

	2003	2008	2013	2018
Household size (average)	3.778	3.764	3.684	3.543
<b>Age category</b>				
0-9 years	20.6%	20.4%	19.6%	20.3%

10-19 years	22.6%	20.6%	19.3%	17.2%
20-29 years	18.0%	19.8%	18.5%	18.2%
30-39 years	14.1%	14.1%	15.7%	17.2%
40-49 years	10.7%	10.5%	11.2%	11.1%
50-59 years	6.9%	7.4%	7.9%	7.8%
60-69 years	4.1%	4.2%	4.8%	5.0%
70+ years	3.0%	3.0%	3.0%	3.2%
<b>Race category</b>				
African/Black	78.3%	79.0%	79.8%	81.0%
Coloured	9.1%	9.0%	9.0%	8.7%
Indian/Asian	2.5%	2.5%	2.5%	2.5%
White	10.2%	9.4%	8.7%	7.8%
<b>Highest education level</b>				
No formal education	22.7%	21.4%	18.4%	18.0%
Primary level	30.5%	27.3%	24.7%	22.8%
Secondary level	44.1%	48.8%	53.0%	51.0%
Tertiary level	2.7%	2.4%	3.9%	8.2%
<b>Marital status</b>				
Married	27.8%	27.4%	27.4%	27.8%
Single	65.4%	66.6%	66.3%	66.2%
Divorced, widowed, or separated	6.9%	6.0%	6.4%	5.9%
Female	51.8%	51.5%	51.3%	51.1%
Urban location	56.0%	61.1%	63.2%	64.8%
Old-age pension recipient	5.2%	4.9%	5.3%	5.6%
Private health insurance	15.4%	16.3%	18.4%	16.5%

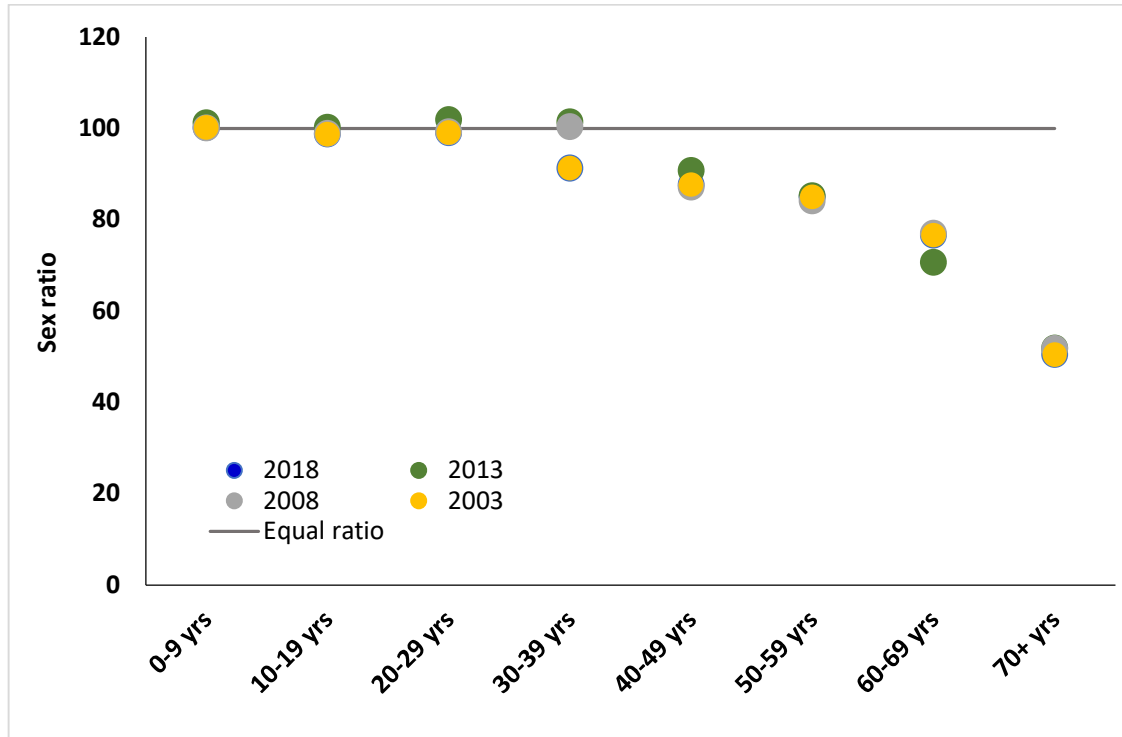
*Note:* Although the original sample sizes are 99345, 94744, 93749, and 71137 individuals for 2003, 2008, 2013 and 2018, respectively, the final sample sizes here may vary per variable due to missing values for some variables. These statistics have been weighted to reflect national figures.

*Source:* Computed using GHS data.

The age-specific sex ratios in Figure 2 show that while there is parity in the proportion of females and males from birth to age 29 in South Africa, the proportion of females begins to exceed that of males from age 30 and continues until 70+ years. This pattern remained similar between 2003 and 2018, with the male-to-female ratio dropping to 1:2 by 70 years and above, meaning there are twice as many females as males for those aged at least 70 years. Although there is significant gender parity from birth until age 30 in South Africa, there is a negative relationship between wealth and those aged 0-30 years and a positive association for those

aged at least 30 years (Figure 3). This means that younger populations are generally in poorer households than older populations.

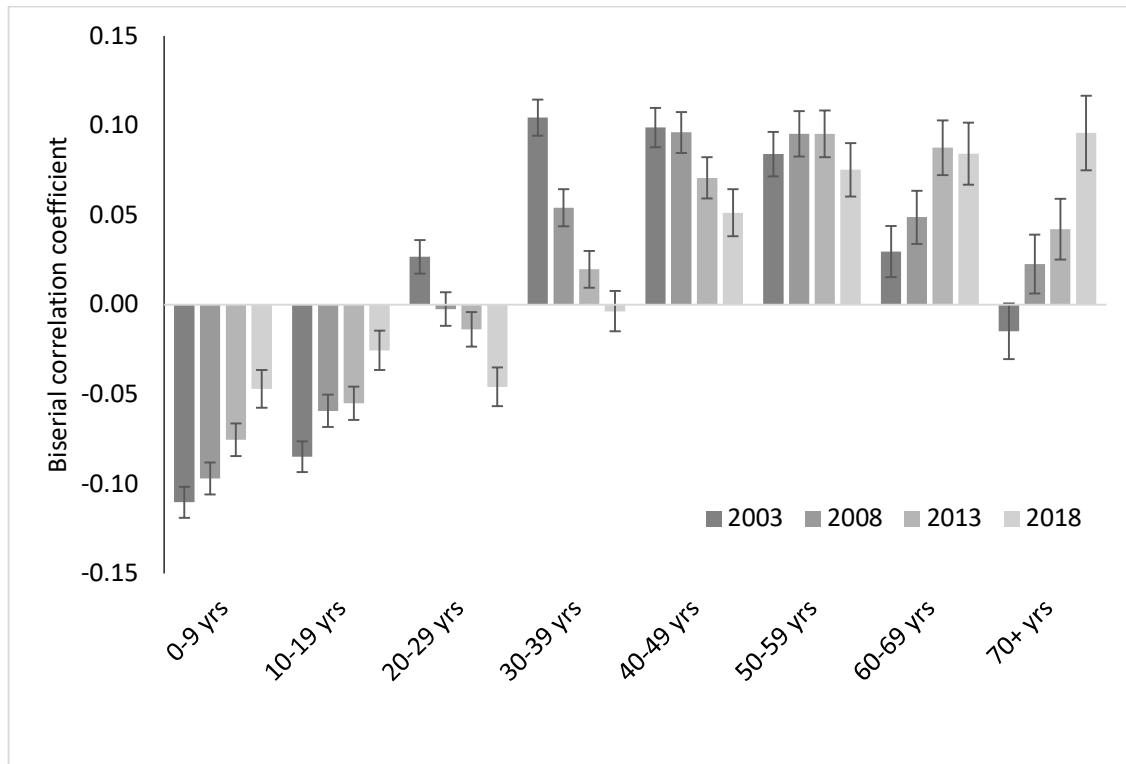
Figure 2: Age-specific sex ratio, South Africa, 2003-2018



Note: sex ratio =  $\frac{\text{Male population}}{\text{Female population}} * 100$

Source: Computed using GHS data.

Figure 3: Biserial correlation between the age groups and household wealth, South Africa, 2003-2018



Note: Error bars represent the 95% confidence intervals

Source: Computed using GHS data.

Socioeconomic inequality results in Figure 4 highlight an interesting pattern where the concentration indices are significantly negative for younger age groups but positive for older age groups. This means that socioeconomic inequalities in ageing are pro-poor for younger populations but pro-rich for older populations. Apart from 2003 (panel a), where the concentration index for the 70 + age group is positive but not statistically significant, the index is positive and significant for the other years. Generally, the concentration index switches from negative to positive from the 30 – 39 age group upwards. Overall, for all the years considered in the analysis presented in Figure 4, socioeconomic disparities in ageing favour wealthier groups at older ages but not younger ages, as the younger population groups are disproportionately poorer.

<<Figure 4 here>>

The gendered analysis presented in Figure 5 sheds further light on the nature of socioeconomic disparities in ageing in South Africa. While socioeconomic inequalities in ageing are pro-poor for younger population groups (populations aged between zero and 30 years) and pro-rich for

older population groups (people aged at least 30 years), there are gender disparities in the pattern of socioeconomic inequalities for all age groups.

<<Figure 5 here>>

Socioeconomic inequality in ageing is similar for boys and girls aged 0-9 years for all the years considered in this analysis (Figure 5). While boys and girls start with similar socioeconomic inequality, this diverges as they grow older. Interestingly, socioeconomic disparities in ageing among females may become higher than for males, which switches at older age groups, usually from 50 years and above. Although the sex ratios indicate a higher proportion of females to males for those aged at least 40 years (Figure 2), the male population living beyond this age group tend to be wealthier than their female counterparts, as shown in Figure 5.

<<Figure 6 here>>

An analysis of the differences between the concentration index of ageing for males and females is shown in Figure 6. Here, there is a statistically significant pro-male inequality in ageing in older age groups, especially among those aged at least 60. Pro-female inequalities in younger age groups tend to be statistically insignificant except for a few. In 2003, for instance,  $\Delta CI_{D_{70+}} = 0.105$  and it remained similar and statistically significant throughout, increasing to 0.161 in 2018. As noted previously, the difference was almost zero for the 0 – 9 age group ( $\Delta CI_{D_{0-9}} \sim 0.0$ ) between 2003 and 2018. So, socioeconomic inequality in ageing is both pro-rich and pro-male for older population groups even though more women live longer than men.

## Discussion

Parity exists in the sex ratio for lower age groups in South Africa, but there are expectedly more females than males in older age groups. This is not different from what is obtained globally, as the average life expectancy of women exceeds that of men, especially at older ages (World Health Organization, 2019b). Because there is a negative correlation between being young and wealthy, something that aligns with the wealth accumulation theory (Jakobsen *et al.*, 2020), this paper finds significant socioeconomic inequalities in ageing persisting in South Africa since 2003—pro-poor inequalities for younger populations and pro-rich inequalities for older populations. The results mean a significantly large proportion of younger populations comes from poorer households. In comparison, a larger share of older populations comes from wealthier households, with a gendered socioeconomic inequality pattern. While there are

generally no differences in socioeconomic inequalities in ageing between boys and girls aged 0-9 years, socioeconomic disparities become apparent and significantly pro-male in much older groups, say 60 years and above. In South Africa, like in most parts of the world where more females live longer than males, socioeconomic inequality in ageing favours wealthier men more than more affluent women past the age of 60 because the positive concentration indices of ageing for the male population exceed the corresponding indices for the female population in older age groups. The limited opportunities for upward mobility for older people, suggesting that “inequality late in life should carry extra weight in policy agendas” (Barslund *et al.*, 2019, p.24), means that policy options to prioritise older populations are critical for achieving progress and caring for the older population groups. On this, Ataguba *et al.* (2021) call for a United Nations Convention on the rights of older people in the face of increased longevity. Thus, while this paper considers ageing as a continuous process, much of its discussions, especially on policy, focus on addressing the needs of older people. Implicitly, a practical implication of this paper is strongly recognising the need for appropriate policies to progressively act on current younger populations who will become future older people.

In South Africa, like in many similar countries, the major sources of income for older populations out of the formal labour force (i.e., people 65 years and above) include pensions and investment income with limited labour income (Makiwane and Kwizera, 2006). It is estimated that about 37% of men, compared to 16% of women older than 60, are in the labour force (Pillay and Maharaj, 2013), mainly to augment the old-age pension from the government (Hunter and May, 2013). Because the sex ratio beyond age 65 is significantly less than 100, the old-age pension in South Africa is expected to have a strong gender dimension as it targets more women than men (Burns *et al.*, 2005, Pillay and Maharaj, 2013). Among the predominantly African population, about 40% of males aged 65 years or older, compared to about 90% of the females, receive a pension in South Africa (Hunter and May, 2013). In 2019 alone, over 3.5 million people, predominantly women, received state-provided old-age pensions (South African Social Security Agency, 2019). In other regions in Africa, particularly in North Africa, older-age support systems significantly target more older men than older women, even with a sex ratio of less than 100 (Pillay and Maharaj, 2013). So, it is expected that women who live much longer than men should be relatively well-off in South Africa and receive significant government support via pension. Still, the results in this paper indicate a gendered pattern in socioeconomic inequalities in ageing with pro-male disparities, especially at older ages. Because investment income is significantly higher among men than women in South Africa (Orthofer, 2016), the pro-male inequality in ageing may signify that non-pension incomes

are the primary driver of income and the gendered inequalities in older populations found in this paper.

Active or healthy ageing improves older people's quality of life and welfare (Barslund *et al.*, 2019, Scott *et al.*, 2021) as a one-year increase in life expectancy through slowing down ageing, for instance, is worth US\$38 trillion (Scott *et al.*, 2021). However, even though more women than men live beyond age 65, women are worse off beyond this period in different aspects. Perhaps, explained by the cumulative advantage/disadvantage theory (Dannefer, 2003), women accumulate more social disadvantages than their male counterparts, leading to the widening inequalities supported by the cumulative inequality theory (Ferraro and Shippee, 2009). Older women are more likely poorer than older men (Hunter and May, 2013) and suffer from age-related discrimination that increases their vulnerability (Gresh and Maharaj, 2013). Older women in South Africa also report poorer health outcomes, including multimorbidities, than men. Women receiving old-age pensions in South Africa have an increased caregiving burden compared to men (Burns *et al.*, 2005), which may reduce their welfare levels compared to their male counterparts, leading to pro-male inequalities in ageing, especially for older populations. In many settings in Africa, older "men are more likely than women aged 60 and over to have greater companionship and support as a result of being married in their older age" (Pillay and Maharaj, 2013, p.35). This is similar in South Africa, where about 80% of older men, compared to 47% of women, are married or in a consensual relationship (Pillay and Maharaj, 2013). Although debatable, it may boost older men's welfare levels, leading to pro-male socioeconomic inequalities in ageing observed in this paper. These disparities are predicted to widen over time, reinforcing the increasing need for policies and action to ensure older people's well-being for a healthy ageing experience (World Health Organization, 2007), especially among women.

South Africa, one of the few countries in Africa with specific policies on ageing, has, among other things, a human rights protocol for older people, a national ageing policy and a social grant for senior citizens (i.e. a non-contributory old-age pension) (Burns *et al.*, 2005, Scobie *et al.*, 2015). However, the country is still challenged by the lack of a defined strategy, weak coordination among government agencies and non-governmental agencies, lack of skilled staff, and insufficient budget (Scobie *et al.*, 2015) even though it is recognised that addressing the needs of older people through targeted activities can potentially reduce the challenges with ageing in the country. Socioeconomic disparities in population ageing have remained the same over the past decade and a half, calling for renewed and increased efforts to address the plights

of older people in the country, especially women who have lived longer than 60 years. This also means that if we can construct age group-specific cohorts and follow them over time, the pattern observed for each cross-section, as shown in this paper, mimics the likely results. So, the gendered socioeconomic inequalities in ageing call for mainstreaming ageing into policies across different sectors relating to gender in South Africa (HelpAge International, 2003). Because this paper contends that ageing is continuous and not just about those aged at least 65 years, multisectoral policies addressing disparities between women and men at all ages will cumulatively yield significant dividends at older ages. While there are many conceivable approaches, support through economic empowerment and a gendered prioritisation of old-age pension, where women receive a higher old-age pension amount, could be a significant move, mainly because most women aged 60 years and over are no longer in the labour force and carry a relatively heavier family burden than their male counterparts. Also, because men are more likely to participate in the labour force than women in South Africa (Nwosu and Woolard, 2017), targeting women during the years of active participation in the labour force or through education, skills building and training could substantially reduce the gendered socioeconomic disparities in ageing at older ages. Multisectoral policies to address the socioeconomic inequalities in ageing, including between men and women, should also be guided by the need to ensure healthy or active ageing (Barlund *et al.*, 2019) because of the fundamental importance of the quality of life across the life course, including for older people.

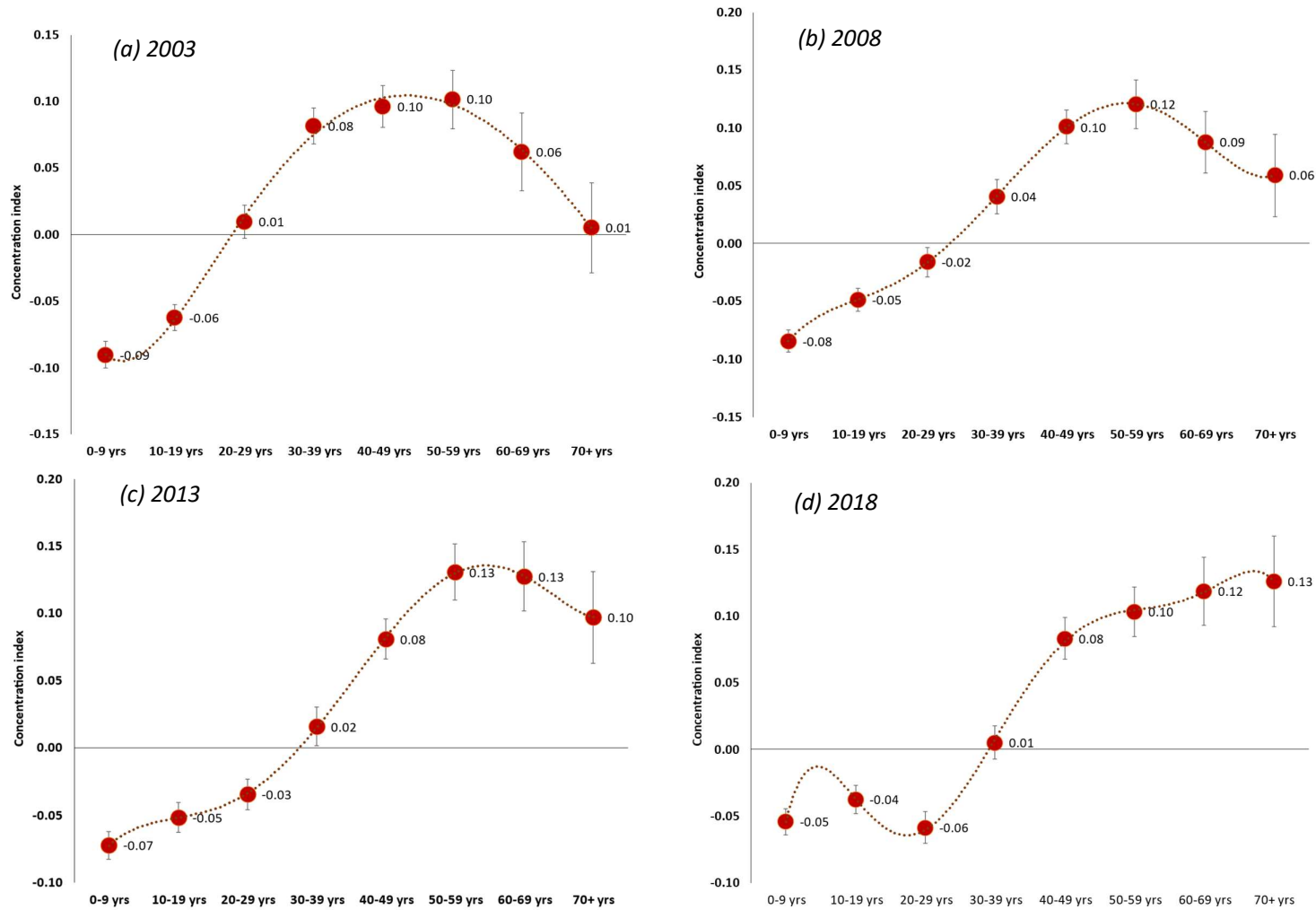
This paper is the first to assess socioeconomic inequalities in ageing. Its strength lies in the approach proposed to assess socioeconomic inequality in ageing, including the gendered analysis. This novel approach provides an avenue for future research to investigate the relationships between socioeconomic disparities in ageing (or healthy ageing) and other related phenomena like health and access to other social services. Using nationally representative surveys for multiple years allowed for assessing changing patterns and trends. Interestingly, socioeconomic inequality in ageing patterns in South Africa remained similar over the past decades. Although the paper could not construct different population cohorts to be followed over time because of the limited cross-sectional data, the similarities in the socioeconomic inequality in the ageing pattern for all the survey years used in this paper approximate the dynamism and evolution of socioeconomic disparities in ageing over the life course. While this may not change the conclusions in this paper, with many more rounds of the GHS data over several decades, it will be possible to construct and follow up pseudo-cohorts. The paper has a few limitations. It used age groups with a ten-year time interval, which may be considered a wide interval. While some papers may consider a five-year time interval (see, for example,

Barlund *et al.*, 2019) in assessing ageing, the ten-year interval used in this paper was adopted to avoid having a small number of people in specific age categories, which may reduce the estimation power. Relatedly, the analysis could be disaggregated by different stratifiers, including urban/rural and provinces, but this could not be estimated because of the likely reduction in estimation power resulting from small numbers. Also, the paper only considered individuals' ages and not active or healthy ageing (Barlund *et al.*, 2019) *per se*. The multidimensional concept of healthy ageing incorporates an individual's quality of life. However, the approach for assessing socioeconomic inequalities in ageing applied in this paper can be generalised to assess socioeconomic inequalities in active or healthy ageing if an appropriate measure of active ageing can be constructed for individuals. Unfortunately, a reliable active or health ageing indicator for everyone could not be constructed from South Africa's GHS due to data paucity. Finally, while the measure of socioeconomic status was computed at the household level, the basic concentration index used in this paper may not explicitly account for age-specific needs, which differ between children and adults. One way of addressing this will be to control for these specific needs in the model for the convenient regression in estimating the concentration index if the dataset contains the relevant variables, which could be explored for future research.

## Conclusion

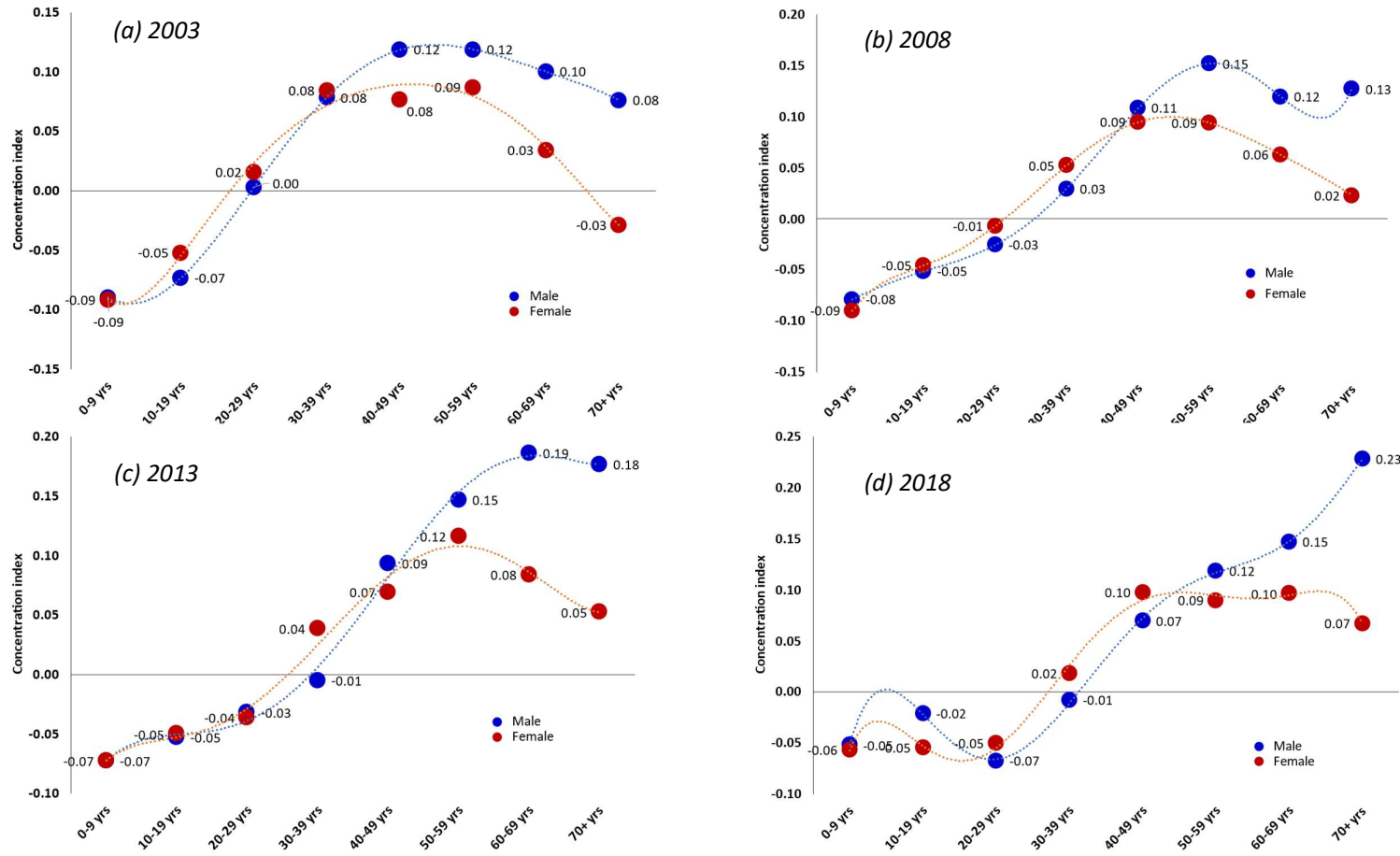
Although women's life expectancy is significantly higher than that of men at older ages, their welfare and quality of life beyond 60 years tend to be lower. Socioeconomic inequalities in ageing greatly favour older men than women in South Africa, despite the government's interventions, such as an old-age pension, targeting more women than men. While the country needs to ensure active or healthy ageing, a gendered approach to mainstreaming ageing into multisectoral policies is required to prioritise women, especially younger ones, to build up resources to reduce socioeconomic disparities in ageing at older ages. Investing in younger populations (i.e., the future older adults), guaranteeing women's agency and ensuring that all women have equal access to resources is the *sine qua non* to reducing socioeconomic disparities in ageing, including between men and women at older ages.

Figure 4: Socioeconomic inequality in ageing, South Africa, 2003-2018



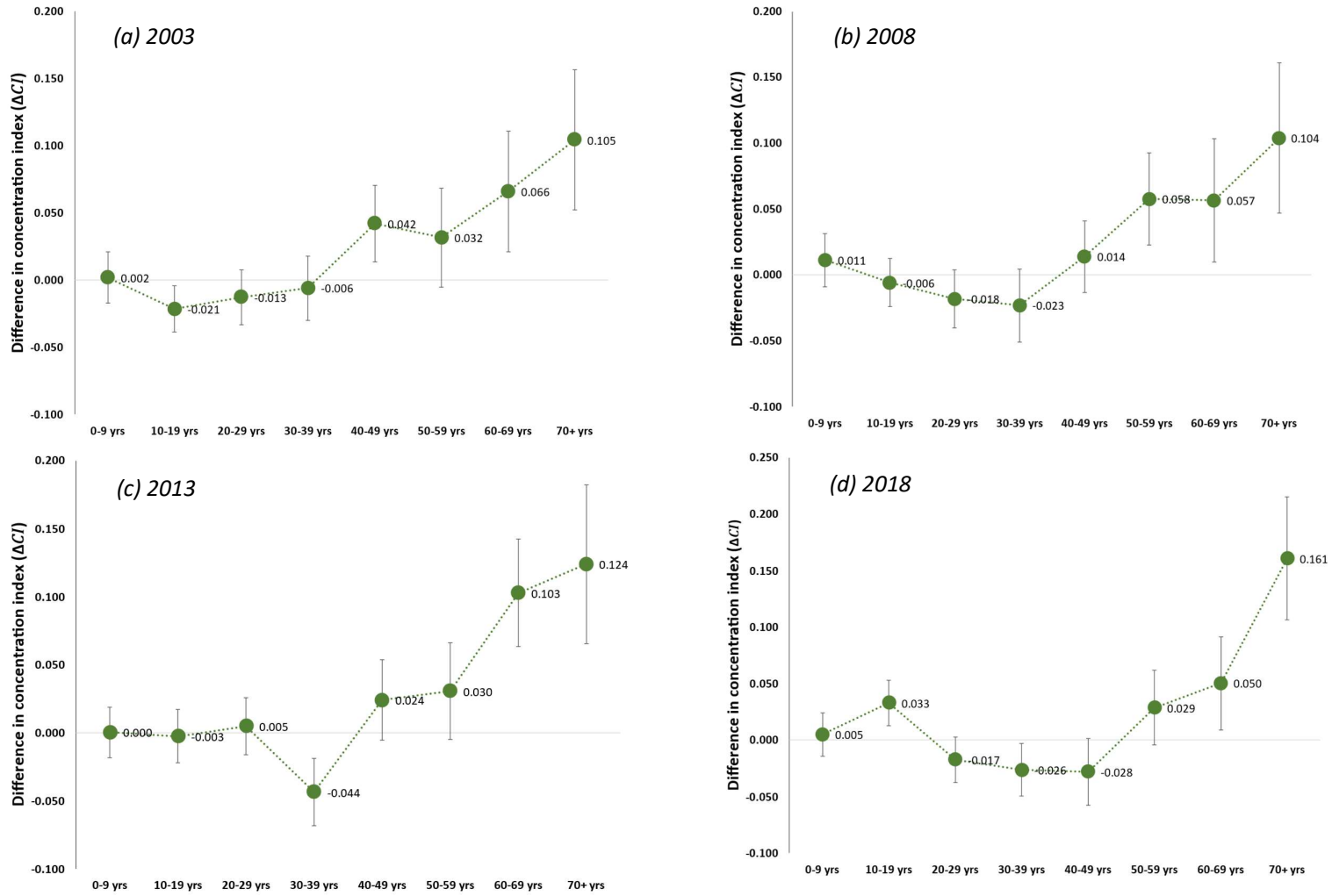
Notes: (1) the error bars represent the 95% confidence intervals  
 (2) the fitted lines represent higher-order polynomials

Figure 5: Gender-related socioeconomic inequalities in ageing, South Africa, 2003-2018



Note: the fitted lines represent higher-order polynomials

Figure 6: Gendered differences in the socioeconomic inequalities in ageing, South Africa, 2003-2018



Notes: (1) Error bars represent the 95% confidence interval  
 (2) Bootstrapped standard errors computed for  $\Delta CI_{X_j} = CI_{X_j}^{\text{Male}} - CI_{X_j}^{\text{Female}}$  using 500 replication

## Ethics approval

This paper uses publicly available data. Therefore, no ethics approval was required.

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