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Bottom-half Intergenerational Mobility Among the Coloured Population in South Africa

De Kock, Tryston

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University of the Witwatersrand, Johannesburg

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Bottom-half Intergenerational Mobility Among the Coloured Population in South Africa

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Tryston De Kock

1826449

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Abstract
I examined the intergenerational mobility of education among the Coloured population in South Africa between 1975 and 1990. I used the National Income Dynamics Study to measure intergenerational mobility among Coloured children born to parents at the bottom of the education distribution-this includes parents with an educational attainment lower than grade 10. I found across the whole population; the median rank of education is grade 10 – making grade 10 my middle point. I compared several intergenerational mobility indices with bottom-half mobility and look at the IGE and IGC indices for sons, as well as the summary statistics for the coloured, African, and White populations. I suggested that Coloured daughters born to mothers in the bottom half of the education distribution have experienced a decrease in upward mobility meanwhile upward mobility has increased for Coloured sons. However, I suggested Coloured daughters born to parents with educational attainment lower than grade 10 have a higher chance of increasing their educational attainment compared to Coloured sons. I also compared mobility estimates between Coloured children born in the Western and Northern Cape with Coloured children born elsewhere. I found that Coloured children born in the former have lower upward mobility compared to Coloured children born elsewhere.

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Introduction

Intergenerational mobility is the idea that a person's economic and social standing can differ from their parents. There is a statistical relationship that exists between a parent's socioeconomic status and their child's outcomes. This can sometimes be difficult for people living in lower socioeconomic positions and this can mean that they struggle to reach their full economic potential. Ideally, there would be no relationship between an individual's economic outcome and their parent's socioeconomic outcomes - this is known as the optimal level of intergenerational mobility (Piketty, 2000). If the optimal level is not reached, it could mean that talent is not being utilized efficiently in the economy.

There are two levels to consider - the individual level and the broader level. At the individual level, someone's socioeconomic status is not related to their parent's socioeconomic status. On the broader level, an individual's socioeconomic outcomes are connected to the amount of inequality in their society, as well as political changes, and social and economic development. Low social mobility usually means there is high inequality. As more economic changes, such as technology and globalisation, occur, policymakers are becoming more concerned about intergenerational mobility and how it relates to economic inequality (OECD, 2018). All economies are trying to figure out how to provide children with the same chance for success regardless of their parent's financial standing.

I followed a similar approach to Asher et al. (2018) who propose a bottom-half approach to measure intergenerational mobility in India by comparing estimates between a minority and majority population group. Under British rule in India, the Hindu and Muslim populations faced religious discrimination and oppression. The Hindu population was particularly targeted for economic and political disadvantages, while the Muslim population did not face the same level and extent of oppression (Siddiqui, 2021). This is similar to the divide between the Coloured and African population in South Africa under Apartheid[1]. Both groups faced hatred, violence and

[1] There are important differences between the Hindu and Muslim populations in India and the African and Coloured populations in South Africa. While the former is differentiated by religious beliefs and distinct cultural practices and traditions, the latter is distinguished by racial identity, cultural practices, and languages. The caste system in India has historically created a hierarchical social order, affecting the social and economic status of different groups, while apartheid policies in South Africa created a clear distinction between African and Coloured populations. Despite these differences, both countries have a history of colonialism and racial discrimination, and both have implemented policies and affirmative action to address historical inequalities and promote equal opportunities.

economic restrictions, but the Coloured population faced it to a lesser degree than the African population.

In this paper, I focused on the Coloured population which has been given less attention by researchers compared to other population groups. In South Africa, most studies have compared educational and labour outcomes between the different racial groups, such as White, African, Coloured, Indian, and Asian people. However, there have been fewer studies that compared the educational and labour outcomes between the Coloured population and another racial group. This is likely because the Coloured population is often grouped with the African population in these studies (Watson, 2010).

Since South Africa changed its laws to end the racist system of apartheid, researchers have conducted studies on topics such as how education can lead to upward social mobility, how education can help fight poverty, and how socioeconomic status can affect the next generation. Louw (2007) did research showing that the Coloured population has the lowest intergenerational mobility across all population groups in South Africa. This indicates that despite increased opportunities since the end of apartheid, the Coloured population has not experienced the same increases in mobility as other population groups in South Africa. Researchers often use methods that include looking at co-residence and measuring aptitude to evaluate this. However, there is not a lot of information about this in South Africa due to limited access to large, high-quality panel data that connects the parents and their children.

I overcame this data problem by implementing a bottom-half mobility approach proposed by Asher et al (2018), a method for calculating intergenerational educational mobility (a measure of how likely a person is to exceed the educational attainment of their parents). This is done by dividing the population into two groups: those with educational attainment lower than grade 10 (the bottom half)[2] and those with educational attainment higher than grade 11 (the top half). It's important to note that due to South Africa's apartheid system, there is unequal access to resources which puts a larger portion of African and Coloured people into the bottom half of the educational

[2] The bottom half of the education distribution refers to people who have completed less education than the median rank of educational attainment in a population. To explain this in simple terms, the median can be thought of as the “middle point” regarding a group's educational attainment. For example, if the 50th percentile of education in a population is grade 10, that means that individuals at this rank are in the "middle" of the educational attainment of the group and that the bottom half of the education distribution of this population would include those who have only completed up to grade 10 or lower. Using the NIDS dataset, we found that across the entire population, the median rank of education is grade 10.

distribution, and more White people in the top half, as, during the apartheid era, the White population generally had better access to higher levels of education. The comparison between the African population and the Coloured population is made because the African population is the majority, and the White population is included because this group has more social and political advantages, even though it is a minority. It is important to mention that the bottom-half mobility estimator was designed to measure educational mobility for children with parents at the bottom half of the education distribution therefore, the estimator does not produce accurate estimates for those at the top half of the distribution.

I looked at intergenerational educational mobility on the national level and found that Coloured sons had considerably lower mobility than daughters although their mobility appeared to increase across cohorts whereas, the upward mobility of daughters decreased. Then, I looked at Coloured children from the Western Cape and Northern Cape and found that children from the Western Cape have higher mobility than those from the Northern Cape. I also compared the Coloured children from the Western and Northern Cape to those from other Provinces and found that those from the former had a lower probability of having higher educational attainment than their fathers. Lastly, I analysed data on the educational attainment of Coloured children between the ages of 27-32 across the five waves of the NIDS dataset and found there was an increase in educational attainment with wave 4 showing the highest majority of tertiary education.

2 Research Problem

This study looks into the intergenerational educational mobility of Coloured children in South Africa born between 1970 and 1990. It uses the National Income Dynamics Study to compare the mobility of both sons and daughters. Furthermore, the study also looks into the differences in mobility across different regions of South Africa. It is however important to remember that the evidence presented is only suggestive because the available data limits the conclusions that can be drawn.

Du Plessis (2013) used data from population censuses to look at why there are still so many Coloured people in poverty, despite being given advantages because of apartheid. I then looked deeper at this question and asked if children of parents who did not have much education have the same opportunity to get an education as those with more educated parents. I specifically wanted to see if there is a chance for upward mobility – meaning, is there a chance for people to improve their lives and gain a better education that their parents?

3 Contextual Background: Inherited Effects of Apartheid in South Africa

3.1 Education During Apartheid South Africa

The Soweto uprising on June 16 1976, was when students in South Africa protested against the apartheid government education policy. It showed that students and schools were important parts of apartheid and the fight against it (Fiske, 2004). The Bantu Education Act of 1953 was a law created by apartheid to ensure that African children wouldn't have the same opportunities as White people. It was designed to train African children to labour for White people so the White economy could advance (Fiske, 2004). The education system was then segregated by race in 1959, creating separate systems for Coloured and Indian people in 1963 and 1964, respectively.

Each racial group had their schools which were funded differently. Samuel (1996) found that in South Africa from 1975 to 1976, the apartheid government spent significantly more money on White students compared to African students. This created a large difference in the quality of education received, with White schools having more resources due to the higher funding. The inadequate education received by non-White students perpetuated the pre-existing inequality by further separating income levels and socioeconomic divisions (Du Plessis, 2013).

In the 1970 census, 23.5% of Coloured children older than 6 years old had no education, while only 2.3% of White children were uneducated. This difference in educational attainment between Coloured and White children led the Theron Commission to introduce compulsory school attendance for the Coloured population. The Theron Commission went on to investigate why so many Coloured children were dropping out of school. In 1964, 85,089 Coloured children were in grade 1, whereas in 1974 only 5,777 Coloured children were in grade 11, signifying a drop in education over the ten-year period. After an investigation, the Theron Commission concluded that the reasons for the decrease in Coloured children completing their education were due to a bad socioeconomic environment, little motivation to continue their school careers, and an increased need for Coloured children to enter the job market.

3.2 The Apartheid Labour Market

The Population Registration Act was a law passed in South Africa in the 1950s, which categorized people according to race. The Group Areas Act further divided communities by race. These two pieces of legislation served as the basis of apartheid, the system of racial segregation and discrimination against non-White citizens (Nimubona and Vencatachellum, 2007). The pass system was put in place, to limit where people from different racial backgrounds were allowed to live and work, and restricted their access to housing. The Bantu Homelands Citizenship Act of 1970 was also passed, which stated that each person of colour was a citizen of one of the ten Bantustans. This led to a disproportionate ratio of people in rural areas - a large number of women and few men, as men were expected to work in metropolitan areas. This presented a challenge, as families had to choose between sending their children to school or having them work in order to make money. Due to the implications of apartheid, the decision of whether to pursue education or work was not made based on personal preference but was often tied to restrictions, poverty, and political issues (Nimubona and Vencatachellum, 2007).

3.3 Background on Coloured Education

The racial categorisation was maintained even after the end of Apartheid and has caused more integration between students of different races. People from poorer backgrounds now want better opportunities for their children and this has become the standard. Parents choose to send their kids to different educational institutions to give them access to better opportunities, cultural experiences, and integration with other races and classes (Hunter, 2013: pp4). The Cape has become a predominant source of research because its population includes a large number of Coloured people. The establishment of a democracy in South Africa created the possibility of different ethnicities being involved in the same activities and creating an inclusive society. The Group Areas Act of 1950 is sometimes blamed for Coloured adolescents choosing to join street and number gangs, which have become an increasingly popular source of social currency and have substituted the mobilisation around important issues such as education (Calix, 2013).

Another challenging issue for Coloureds in secondary school has been learner performance. Overall, there has been room for improvement in terms of school completion. Despite the elimination of racial-based infrastructure disparities, overall academic achievement among Coloured students in the Western Cape are still, at best, average (Lemon, 1999). Research done by

Lemon (1999) suggests that only 10% of Coloured students from the Western Cape were able to pass their final exams (known as matriculation). Furthermore, this research also demonstrates that the quality and effectiveness of teaching in these schools are decreasing. Lam et al., (2011) suggested that the education system for non-White students should be improved by focusing on things like improved management and teacher quality.

Despite having access to reasonably solid educational systems, by the time they are seventeen years old, Coloured students typically repeat at least one grade. Many of them will have performed on par with their peers until they were in their early to late teens (this is addressing advancement to a higher level in the secondary schooling system and not in connection to quality in pass rates) (Lam et al., 2011). However, a sizable portion of secondary school students drop out after repeating a grade. Many others simply quit school to obtain employment and support their families. The ongoing trap in which Coloured people are caught is what is interesting about this situation. Although they are favoured by employers in many parts of South Africa, it appears that loan availability and money accumulation are barriers to social mobility and advancement in schooling (Lam et al., 2011).

4 Review of the Literature

A significant body of literature has shifted the focus to the inequality of outcomes as a result of inequality of opportunity. This indicates that people who have unequal access to resources are unevenly distributed based on the circumstances into which they are born. The implication is that if a person's economic success is largely determined by their parents' economic outcomes, then this creates a problem that could persist over time and lead to unequal outcomes.

The phrase 'if an individual's economic outcomes were entirely independent of factors outside of their control' means that if a person's economic success was only influenced by their own behaviour and decisions, and not things like race, sex, or economic status of their parents, then their economic success would depend solely on how hard they worked. Piraino (2015) used a two-sample two-stage least square (TSTSLS) model to study how a person's economic success in South Africa was impacted by their parent's success. The 'Great Gatsby Curve' is a visual representation of how much a person can move up the economic ladder, comparing them to their parents. Piraino (2015) used the idea of inequality of opportunity to explain why South Africa has low intergenerational mobility, meaning people's opportunities to succeed are limited based on their starting position.

In order to better understand the labour market outcomes of individuals, researchers use educational attainment as a measure of income. This has the advantage of eliminating selection bias, which could potentially happen if researchers try to determine how income affects labour market outcomes by only studying individuals who live with their parents. NIDS allows researchers to get educational data from individuals and their parents, even if they do not live together or if the parent is not alive. Mazumder (2005) found that focusing exclusively on households that have children living with their parents was likely to lead to increased probabilities of downward mobility. Hertz (2001) used the KwaZulu-Natal Income Dynamics Study (KIDS) to compare the earnings of parents to those of their children who co-reside with them. However, this presents two main issues when assessing intergenerational mobility among the Coloured population. Firstly, many Coloured children live with just one parent or do not live with their parents at all, which creates a relatively small sample size when compared to other groups. Secondly, focusing on those children who live with their parents may introduce selection bias, since there could be different qualities about those who do not live with their parents that cannot be observed or are not taken into account.

Using the four waves of the NIDS dataset to study intergenerational income mobility, Finn et al. (2016) found that when it comes to improving people's opportunities over the generations, especially for those in the lower income tier, education was the most important thing. However, the positive effect of education on improving intergenerational mobility has not stayed the same across generations. This has an important impact on our research, which looks at whether or not intergenerational mobility has decreased over the years and if this pattern is consistent. The authors use a reduced form of the two-sample two-stage least squares (TSTSLS) estimator to combat co-resident selection bias. This is a significant limitation in studies focused on intergenerational income mobility – co-resident selection bias occurs when parent and child incomes are linked. Although the focus of my study is on education instead of income which eliminates co-resident selection bias, I experienced other data limitations such as attrition bias, recall bias, missing data and limited geographic coverage of the Coloured population across all nine provinces. Finn et al. (2016) experienced similar limitations.

Gardiner (2019) conducted a study about poverty and educational attainment among high school students in Mitchells Plain. Their study concludes factors associated with poverty such as crime

and bad influences in the household harm the educational attainment of learners in Mitchells Plain. Bhorat (2004) found there were significantly high levels of unemployment and low levels of labour force participation among the African and Coloured population.

Population census data was used by Louw et al., (2007) to analyse how parental education level impacted the educational opportunity of younger generations in South Africa. They found that Coloured and African individuals, whose parents had lower educational attainment, tended to have lower educational opportunities than those whose parents had higher levels of education. The study also noted that the lower half of the distribution of those studied, in terms of educational attainment, tended to receive a lower quality of education than the higher half.

Intergenerational mobility and economic persistence across generations are primarily facilitated by education (Hout and DiPrete, 2006). The higher the parent is in the income distribution, the more easily they can afford to provide their children with a better-quality education. Girdwood and Leibbrandt (2009) conducted research using data from NIDS to explore how family background influences a person's socioeconomic status in adulthood. It was discovered that the level of mobility is low in South Africa and having parents with higher incomes is associated with better outcomes in income, education, and occupation for the offspring. Additionally, the mobility levels were different across races, with White individuals having higher mobility than African individuals.

Card (1999) looks at the educational rank of children who were born to parents at different levels of education over two different periods. This method compares educational mobility between children born to parents in the middle of the education distribution in the 1920s and children born to parents in the bottom (25th percentile) of the education distribution in the 1980s. This method makes it possible to differentiate between levels of educational mobility across different socioeconomic groups, however, it does not consider the rank of education compared to the rank of the parent's education. Alesina et al. (2019) research the levels of intergenerational mobility in Africa. Upward mobility is a measure they use to compare the rate at which children, who have parents who did not complete primary school, complete primary school. However, their research is limited due to the availability of data on education in developing countries. To overcome this, the authors use NIDS, which is a data source that provides information on the highest educational attainment of both children and their parents.

Chetty et al. (2014a) did a study to compare the intergenerational income mobility of two population groups in the United States of America: the Black population (the minority group) and the White population (the majority group). The outcome of the study showed that Black children have lower intergenerational income mobility because their life experiences led them to have a disadvantaged economic starting point, which continued to put them at a disadvantage and resulted in poor socioeconomic outcomes.

Chetty et al. (2014b) conducted a study to analyse if the region one grows up in affects their opportunities to move up the economic ladder. They used a dataset which tracked the lives of 5 million American families. They found that certain parts of the US had greater upward mobility than other parts, so the region of the US you live in has a significant impact in terms of what opportunities you have. They also found that things like income inequality, school quality and residential segregation are highly correlated with low economic mobility. Lastly, findings revealed that where you grow up has a strong connection to your future earnings, college attendance, and other outcomes. This paper provides convincing evidence that geography plays a major role in our economic prospects. In this study, I look at intergenerational mobility between Coloured people in different provinces by using educational data. Although my research is not able to measure future earnings and other outcomes like Chetty et al. (2014b) did due to data limitations, it still provides some evidence which can lay the groundwork for future research.

Asher et al. (2018) used data from the India Human Development Survey and the Socioeconomic and Caste Census to measure the mobility of each population group in India. The study found that Muslims, a minority population group, had lower mobility than either Scheduled Castes or Scheduled Tribes and that most of the geographic variation in intergenerational mobility was at a state level or below. Additionally, they found that most of the improved educational mobility in India over the past few decades has been amongst students from Scheduled Castes and Tribes. Asher et al. (2018) expand their research in India through three additional papers. Asher et al. (2019) looked into the theory and applications of interval data to mortality and intergenerational mobility while Asher et al. (2020) focused on the effects of geography. Additionally, the Asher et al. (2020) paper built on the methodology used in Asher et al. (2018). Asher et al. (2022) went a step further and studied the effects of both geography and social groups on intergenerational mobility in India, and also further developed the bottom-half mobility approach.

5 Methodology: A Measurement of Intergenerational Mobility in South Africa

My goal is to better understand if Coloured children born to parents in the lower half of the education distribution have been able to improve their socioeconomic status and if that improvement is maintained across different age groups. This research builds on work done by Asher et al.(2018), Chetty et al.(2014), and Solon(1999), which focused on inequality, economic growth, and educational attainment as it relates to intergenerational mobility.

I used education as the key indicator of relative socioeconomic level, similar to other research conducted in underdeveloped nations (Majego et al., 2014; Asher et al., 2018; Card et al., 2022). For three reasons, it is challenging to evaluate income mobility in these circumstances. First, there is a dearth of high-quality linked parent-child income data. Second, while education levels are more reliably recorded and remain constant throughout a person's life, there is a considerable measurement error in income that causes estimates of mobility to be skewed downward. Third, it can be challenging to assign profits to specific people in multigenerational households where there are joint producers. A major kind of intergenerational investment and conceivably a focus of public policy and human capital investment goes beyond these measuring issues. Therefore, even when income is observed, intergenerational educational mobility is significant.

5.1 Other Measures of Intergenerational Education Mobility

In research on intergenerational educational mobility, a popular measure called the slope of the Conditional Expectation Function (CEF) is used. This measure helps to compare different estimators of intergenerational mobility to find which one gives the most accurate results. The first estimator is called the Intergenerational Elasticity Coefficient (IGE), which employs years of schooling as the measure of educational attainment. The second estimator is the Intergenerational Correlation Coefficient (IGC), which normalizes years of schooling relative to its standard deviation. The third estimator is the Intergenerational Rank-Rank Estimator (IRR), which takes into account the rank of schooling within a generation. Surveys have revealed that IGE and IGC can produce conflicting results, but there is no strong data to confirm if IRR yields similar conclusions (Ahsan et al., 2022).

The intergenerational earnings elasticity model, proposed by Becker and Tomes (1979), has been frequently used in studies of intergenerational mobility. This model seeks to understand the difference between factors an individual can control (such as effort) and those that are out of the

individual's control (such as luck) when it comes to mobility. To figure this out, it looks at the various paths that people take to reach educational and employment outcomes. The foundation of the Becker and Tomes model is the presumption that the child's utility enters the utility function of the parent and that the parent selects the child's level of human capital as a result of the best distribution of permanent income. The relationship between a parent's (p) years of schooling and a child's (c) years of schooling is given by the following equation:

$$Y_i^c = \beta_0 + \beta_1 Y_i^p + \epsilon_i$$

The error term, ϵ_i, captures the determinants of a parent's schooling which is uncorrelated with a child's schooling, such as "effort" and "ability". When implementing this regression, the main analysis is the measurement of β_1, which captures the intergenerational elasticity (IGE), a measurement of persistence. This measurement is related to economic theory which helps us to understand how the effects of policies on intergenerational educational persistence are determined. The main economic factors influencing this include restrictions on credit returns from education and the quality of school inputs. All of these factors can help explain the mechanisms underlying these effects.

There are two transmission mechanisms in this equation. The first is the intergenerational transmission which measures the effects of one's parents on their own academic success. This could be things such as the amount of education their parents had, the financial resources their parents were able to provide, and the type of environment their parents were able to create for them. The second is an individual ability which looks more at the ability of the individual and their access to resources such as their work ethic and luck. It's important to separate these two types of transmission mechanisms because that would greatly shape potential policy implications.

Most of the research using this model does not take into account the two different mechanisms for transmission (the transfer of advantages from one generation to the next) because the data it is analysing does not provide enough information. Combining the two mechanisms into one number, though, could inaccurately estimate the amount of intergenerational mobility among people with lower levels of education (Lefranc and Trannoy, 2005). Therefore, the Becker and Tomes model isn't the most reliable measure for measuring intergenerational mobility among the bottom half of the education distribution.

An increasing amount of economic research shows that relative mobility, as assessed by IGE, is the measurement used to determine how much economic opportunity changes based on the circumstance of an individual's birth. This theory emerged from Rawl's political theory of justice and was later refined by Roemer (2016). This theory suggests that an individual should only have to account for the choices they make and the work they put in, rather than their environmental circumstance or social class. If there is a low variance in error terms, it means that children born into certain conditions have less of a chance of increasing their educational and economic mobility.

Finn et al. (2016) studied the intergenerational mobility of income, which is the ability of a family to have different levels of income from one generation to the next. In order to account for any biases that might arise as a result of selection they used a model that was in a more basic form. The authors used a two-sample two-stage least squares (TSTSLS) estimator and a Heckman two-step approach to account for any selection bias in a society with a high unemployment rate. The researchers concluded that there was lower mobility at the lower end of the income spectrum, indicating that there is a close association between a child's earning potential and the earnings of their parents, even when the younger generation had more education than the elder generation.

Another intergenerational mobility estimator is the intergenerational correlation (IGC), denoted by ρ. As described in Jäntti and Jenkins (2013) the relationship between the measure of intergenerational elasticity (β) and the Pearson correlation is given by the following equation:

$$\rho = \beta \frac{\sigma_{sp}}{\sigma_{sc}}$$

Where σ_{sp} and σ_{sc} are the standard deviations of the log of the parent's years of schooling and the child's years of schooling, respectively. The IGE looks at how changes in economic factors influence intergenerational mobility, but the IGC looks at the unique element of children's schooling, which varies but is unrelated to the family background. The IGC can capture more complexity in intergenerational mobility than the IGE, however, it is limited in its ability to measure relative and absolute mobility and can be influenced by measurement error. Beyond the obvious observation that the units are different, it is challenging to comprehend how these two measurements differ without an explicit theoretical grounding for the IGC.

Hertz et al. (2008) argued that the IGC, which measures the degree of similarity between parents and their children, is better than other methods because it is less likely to be affected by the limitations of the data (such as having only a limited number of parent-child pairs to work with or having some data missing that may not have been randomly chosen). Ahsan et al. (2022) found that the unique environment of schooling children is an important factor in IGC. The authors claim that this helps to explain why, as the economic situation changes, estimates showing the correlation between parents and children don't show any major changes, but measures of how relative mobility changes show that it has improved. They then explain that because the top or bottom of the distribution tends to keep their advantage longer, the IGE estimates that measure relative mobility come out higher than the IGC estimates that measure absolute mobility. Lastly, they explain that both IGE and IGC are limited because they can't distinguish between relative and absolute mobility, and they can be affected by measurement error.

The third estimator is the intergenerational rank-rank (IRR) estimator, which has gained popularity due to the influential work of Chetty et al. (2014), who researched income mobility in the USA. The regression equation is as follows:

$$R_i^c = \alpha_0 + \beta_1 R_i^p + \gamma X_i + \varepsilon_i$$

Where R_i^c is the rank of the child in the education distribution of all children and R_i^p is the rank of the parent in the education distribution for the parent's generation. The estimate of rank correlation, β_1, is our variable of interest which provides an estimate of relative mobility.

Ahsan et al. (2022) describe the rank-rank estimator as a tool to measure income inequality. It first converts individual or household income into percentages, which helps to cancel out any changes in economic growth between different income levels. It then keeps the variance of income constant, which makes measuring inequality harder. Finally, it ensures that all outcomes are equally likely to occur, meaning that each percentile is of equal importance. The authors suggest that the rank-rank estimator might not be the most accurate when trying to compare different generations because it doesn't take the variation between them into account.

According to the research by Ahsan et al. (2022), the rank-rank estimator is the best estimator to measure how policies affect opportunity in the long run because it takes into account an economy's overall growth as well as changes in inequality across generations, which the other two estimators

do not. Additionally, rank-rank analysis performs well even when there are data limitations or in historical settings.

The literature on sociology clearly distinguishes between exchange mobility and structural mobility. The idea of exchange mobility and rank-based measurements of mobility are closely related. The differentiation resulted from an emphasis on mobility analysis using transition matrices. After eliminating changes in the marginal distributions, exchange mobility is a stricter indicator of relative mobility that matches the internal organisation of the transition matrix. Since marginal distribution includes the effects of growth and inequality, many economists and sociologists contend that the rank-based method is preferable. As a result, IRR is a more accurate indicator of relative mobility. However, this estimator can be influenced by measurement error and may not capture the full complexity of intergenerational mobility.

Bottom-half mobility measure refers to a type of measure that was proposed by Asher et al. (2018). It has a unique ability to be meaningfully compared across settings and demographic subgroups. For instance, I can use a scalar measure to compare the upward mobility of Coloured South Africans to Muslims in India. This only holds, of course, to the extent that variations in relative rank have equivalent meanings in other situations. Even though it would result in distinct changes in education and consumption in the two countries, I think it is meaningful to compare a 5-point rank change in India to a 5-point rank change in South Africa. However, this measure only looks at those who are disadvantaged and ignores the upper half of the distribution, or the more privileged people, which means it may not cover the full complexity of intergenerational mobility. Finally, its purpose is to look at how society offers its best opportunities to everyone, even if they may be different in different situations. Naturally, this measure is not a complete description of utility or well-being.

5.2 Comparing IGM indices

This section compares several intergenerational mobility indices with bottom-half mobility. Savegnago (2016) created a special command that calculates up to 20 of these IGM indices. These indices are divided into three categories — single-stage indices that directly compare data from one generation to the next, indices that measure the probability that the child's educational level will be a certain level given the parent's educational level, and indices that measure the magnitude of upward mobility within a given family, or between generations of the same family.

Following the analysis of the most prominent intergenerational mobility estimators in economic literature, I employ indices from class 1, the single-stage indices (which include the IGE and IGC coefficients). I included indices from class 2 and class 3 as they are based on a transition matrix and inequality. Although the indices in classes 2 and 3 are not considered rank-rank estimators, the intuition behind the indices is similar. The benefit of igmobil is that it may meet all of these requirements inside the same structure. Statistical inference is a significant aspect of empirical studies on intergenerational mobility. I may anticipate poor inference if igmobil were to use asymptotic arguments to construct some complex IGM indices (like those obtained from the quantile transition matrix, where I have additional variability due to the estimate of quantiles).

The main disadvantage of these indices is the lack of statistical power when comparing a daughter's educational attainment dependent on their parents' educational attainment. Following Table 1 in the appendix, the Bartholomew index which measures the jump in educational attainment is 0.121, which indicates upward mobility for Coloured sons is 12.1%. Whereas upward mobility for sons overall is 0.224, almost double that of Coloured sons. When I use a mother's educational attainment as our dependent variable, the results differ almost significantly for the overall population (0.149) but there appears to be an increase (0.132) for Coloured sons. For Coloured sons, the intergenerational persistence is 0.10 and the intergenerational correlation between a father's educational attainment and a son's educational attainment is 0.243. This indicates about 10% of a father's educational attainment determines a Coloured son's educational attainment and there is a 24.30% correlation between a father's and son's educational attainment. However, it is important to note these estimates should not be interpreted in a purely structural sense, but they do offer a descriptive measure of intergenerational persistence and correlation.

The Shorrock/Prais index is a measure of how likely children are to remain in the same quintile, or category, over time. The index is 0.503, which means that about 50% of Coloured sons remain in the same quintile. This is higher than the 92.1% of sons overall that remain in the same quintile. The index increases to 0.599 for Coloured sons when the mothers' educational attainment is used but decreases significantly overall to 0.598. This index does not tell us if the Coloured sons belonged to parents at the bottom or top half of the education distribution.

5.3 Bottom-half mobility

The outcome of a child born to parents who are in the bottom half of the parent distribution is described by a measure I use called bottom-half mobility, which was developed by Asher et al. (2018). The authors divide the population into two groups—the bottom half, which comprises people whose parents are in the bottom 50% of the education distribution—and the remainder of the population, the approach can identify those who are most likely to be poor. The percentage of the population in each group that experiences upward mobility—that is, who rises to an education level higher than their parents—is then determined using the method in Asher et al. (2018)

To achieve this, Asher first locates a "transition point" in the education distribution, which divides the lower half of the population from the upper half. Then they analyse trends in educational mobility between the 1950s and 1980s cohorts. The authors focus on the father and son relationship due to data availability.

As the bottom half estimator is robust to extreme inequality in educational attainment, it is able to measure the full extent of mobility for people coming from poorer homes. However, this estimator has some drawbacks, such as its assumption of a constant transition point across all countries[3], which can decrease its accuracy across different countries and its lack of capturing overall educational attainment, meaning it may not measure the improvement of educational opportunities over time. Additionally, as the top half of the population generally has lower mobility, this estimator may not fully capture intergenerational mobility among these individuals.

In summary, the bottom half estimator is a useful method for measuring intergenerational educational mobility among individuals from disadvantaged backgrounds, but it should be used in conjunction with other mobility measures to give a more complete picture of social mobility in a given society.

6 Data

I used data on children and parents from the National Income Dynamics Study (NIDS), a nationally representative survey of 28,000 South Africans with rounds (known as waves) in 2008, 2010, 2012, 2014, and 2016/2017. A project of the Department of Planning, Monitoring and Evaluation (DPME), the Southern Africa Labour and Development Research Unit, situated at the

[3] The median rank-the transition point of education- differs across countries which indicates the bottom half of the education distribution in India may not be the same bottom half as in South Africa.

School of Economics at the University of Cape Town, carried out the study's first five iterations between 2008 and 2017. Highly skilled fieldworkers re-interviewed the same subjects every two years to see what, if anything, has changed for them since the previous interview.

Researchers tried to track households if people moved from one place to another. To do this, they gathered a lot of information from both individual and household questionnaires. The adult questionnaire was the main source of data and it had questions about characteristics like educational background, employment, etc. However, a question in which people were retroactively asked about their parental history was the most significant. This was a crucial piece of socioeconomic data and had to be included in the research. Unfortunately, there was a lot of missing data because, during the apartheid regime, many South Africans weren't accounted for in official statistics. Despite this, I was able to maintain a sufficient sample size because the most reliable answers came from people aged 18 to 45 who had been observed over five different waves.

The information on educational attainment is represented in years however, I group them as follows: No schooling, Primary School (Grades 1-7), High School (Grades 8-12), Tertiary education where undergraduate degrees are typically 3 years, diplomas and higher certificates are 1 year, honours degrees are 1 year, and masters and PhD programs are assumed to be two years. I am aware that master's and PhD programs can be obtained over a longer period however, for the purpose of this study and easier comparisons, I assumed there are 2 additional years of study. This implies with the inclusion of tertiary education, an individual may have 13-18 years of education.

I included a race variable as the focus of our study is on the minority population group, the Coloured population. The race variable will categorise the South African population into the standard four categories: Coloured, African, Asian, and White. According to Black and Devereux (2011), the size of a household has been known to have negative effects on the educational attainment of those living in the household, namely children, therefore I include a variable for household size. I included an urban dummy as well, with traditional and farmlands falling under the rural category.

The empirical analysis will consider the bottom-half intergenerational mobility of father-son, father-daughter, mother-son, and mother-daughter pairs. Although I use education as a proxy for income for this study, there is a challenge in measuring the expected outcome of a child born

to a parent at the bottom-half income distribution. Education is coarsely measured and tends to fluctuate. Individual educational attainment is important when estimating the causal effect of education however, the purpose of this study is to measure intergenerational mobility. Due to data concerns, I will not be estimating the causal effect of parental education on a child's education. Instead, I will be estimating the educational attainment of a child given their parent is at the bottom half of the education distribution.

Due to our data concerns and the representation of data at a provincial level, I estimate the intergenerational education mobility among Coloured South Africans using data for individuals born from 1970 to 1990. Note that I am going to compare the cohorts, to determine if there are changes in the intergenerational mobility of education among the Coloured population in South Africa. The number of observations over the first wave and the fifth wave fluctuates, and the resulting panel is unbalanced as a result of including a variable for parental education, limiting the respondents' age, and limiting the analytical sample to those who provided information on the control variables for women and men. I noted there is attrition bias across the different waves. The number of participants fluctuates throughout the five waves which leads to selection bias. To combat this, I include weights to make up for the uneven balance of participants across waves.

Appendix Table 2 provides a summary of statistics describing socioeconomic outcomes for those in the top and lowest half of the educational distribution. Firstly, due to our age restriction, our analytical sample consists of 8 575 observations in wave 1 and 12 124 observations in wave 5. Considering the age restriction on our sample, the average age is 25 in wave 1 and 33 in wave 5, which indicates an individual’s educational attainment is usually observed once most of their formal schooling is completed. In the overall population, the Coloured population and the African population tend to make up 10.62% and 63.48% respectively, but in this more restricted sample, those percentages go up to 13.42% and 82.07%. Additionally, males and females in the sample are respectively represented by 32.21% and 46.47%, but within the restricted sample, those numbers go up to 42.14% and 57.86%. The overall sample has 52.29% of the population living in an urban area, while the analytical sample has 55.11% of the population living in an urban area. So, the percentage of people living in an urban area increased between the overall and analytical samples.

7 Empirical Analysis

7.1 Changes in Educational Attainment, 1970-1990 Birth Cohorts

I begin my analysis by presenting a summary of statistics on the educational attainment of the Coloured population. In wave 1 a very small proportion of Coloured daughters (1.23%) and sons (1.60%) had no schooling. Then, by wave 5 (a later period), this proportion had decreased so there were fewer Coloured daughters (0.85%) and sons (1.31%) with no schooling.

The majority of Coloured daughters report a high school level of educational attainment which increases from 72.30% to 77.18% over the 10-year period and those who reported tertiary levels increased over the 10-year period with the same distribution of results. African daughters reported similar results (80.97% high school educational attainment in wave 5) while the lowest level of education reported by White daughters is grade 5. Contrasting these results for Coloured daughters with those of Coloured mothers and fathers, the results differ. In wave 1, Coloured children reported that 25.81% of their mothers have no schooling with 12.61% reporting grade 8 being the highest school grade completed. The majority of Coloured children reported the highest level of educational attainment for their fathers is grade 12 (10.83%) with 26.67% experiencing no schooling. Meanwhile, in wave 5, the majority of Coloured mothers report a high school level of educational attainment. This rise in education levels was anticipated and is consistent with literature-based predictions and trends in South African attainment levels that have been seen.

I also note how the standard deviation in education has slightly changed over time for Coloured children and their parents. Decreasing by 0.067% (2.5803 in wave 1) and increasing by 0.0575% (2.5328 in wave 1) for daughters and sons respectively over the 10-year period, with the standard deviation slightly increasing for parents. This is likely due to major changes in policy and regulations in the time between the data collection of waves 1 and 5, meaning that more children had access to education - meaning the range of educational ability was lower, as fewer people were lacking formal education. However, for parents who were not able to access formal education, the range of educational achievement was still wide, meaning the variance would rise.

My goal is to find out if children from low-income backgrounds can reach the same level of education as those from more advantaged backgrounds. I also want to know if this educational gain can result in an improvement in the socioeconomic status of these children. Parent-child transition matrices are a way to measure how much children's educational level

has changed compared to their parents. This is done by gathering information from different periods and seeing how education levels have changed from the parent's generation to their child's generation. Appendix Figure 1 collects data from several decades and breaks it down into six different categories so that the change in education levels can be better understood. These categories are Foundation Phase-Primary School (grade R – 3), Intermediate Phase-Middle School (grade 4-6), Senior Phase-Lower Secondary (grade 7-9), Further Education and Training (FET) Phase-Upper Secondary (grade 10-11), Matric (grade 12), and Tertiary. The data is then used to create transition matrices for mother-daughter, daughter-father, mother-son, and father-son pairs so that the change in education levels between parents and their children can be seen.

In summary, between waves 1 and 5, there appears to be a larger percentage of Coloured daughters who have obtained a tertiary education compared to Coloured sons. Meanwhile, there is a larger percentage of Coloured parents who have received a high school level education compared to African parents. This could be due to the more favourable treatment of the Coloured population in comparison to the African population during apartheid. A slightly larger percentage of Coloured fathers had obtained a tertiary education than Coloured mothers. Finally, despite having a larger percentage of tertiary education, the Coloured fathers also had a larger percentage of no education compared to the Coloured mothers.

7.2 Changes in Coloured Bottom Half mobility, 1975-1980 to 1985-1990

Bottom half mobility-upward mobility- for Coloured women, born to mothers at the bottom half of the education distribution, moved from [46.566, 47.358] for the 1975-1980 cohort to [41.946, 44.355] for the 1985-1990 cohort. This result is similar to those of Coloured women born to fathers at the bottom half of the education distribution. There is a decrease in upward mobility among Coloured daughters between 1975 and 1990.

For comparison, this measure for the African population is [43.049, 43.424] for the 1975-1980 cohort and [43.945, 44.799] for the 1985-1990 cohort. There is an increase in upward mobility among African daughters born between 1975 and 1990. Whereas, White daughters appear to have a decrease in upward mobility as well but their estimates remain higher than those of Coloured and African daughters.

There is not a similar pattern to the mother-daughter relationship when compared with the mother-son relationship. The difference between the lower bounds and the upper bounds appears to be

wider (10.245 and 5.702 for the lower and upper bounds, respectively). This leaves open the possibility of any losses of mobility over the period (1975-1990). For comparison when analysing the mother-son relationship, upward mobility increased from [33.562, 38.517] for the 1975-1980 cohort to [43.807, 44.219] for the 1985-1990 cohort. Comparing the two different relationships, I found that the mother-daughter relationship shows a significant decrease in upward mobility, meaning that Coloured daughters born between 1975-1980 are less likely to escape low relative socioeconomic status when compared to sons. The results showed that upward mobility is decreasing between fathers and daughters while increasing between fathers and sons. Furthermore, when conditioned on their fathers' rank, it was found that Coloured sons are more likely to rise in social or economic standing than Coloured daughters.

I calculated the expected probability a child attains a high school education or higher conditional on their parent being in the bottom half. I compared the outcomes with those of parents at the top half of the education distribution. The appears to be a significant increase in high school attainment for both children from underprivileged and privileged backgrounds. Although both Coloured sons and daughters experience gains in educational attainment conditional on their parents being at the bottom half, Coloured daughters appear to have greater gains in educational attainment. Coloured children born in the top half of the education distribution have higher gains, but this is only by a small margin, compared to Coloured children in the bottom half.

To summarise, Coloured children, born to less privileged parents, who have experienced a post-apartheid education system have more opportunities to move up in the education distribution, but they appear to have similar outcomes as those who either did not experience education in the post-apartheid system (the 1975-1980 cohort) or experienced high school in the post-apartheid education system. This suggests that while the end of apartheid should have improved the socio-economic status of the Coloured population, their potential to move up in terms of their education outcomes remained limited. This contradicts the idea that minority populations in South Africa are experiencing greater mobility in terms of their socioeconomic status.

7.3 Changes in Mobility Across Population Groups

This study focuses on one particular population group, known as the Coloured population. To compare mobility across different population groups, the same technique used by Asher et al. (2018) was used. This technique involves comparing the bottom-half mobility estimates between

a group in the majority, the African population, and a group in the minority, the Coloured population. The appendix includes Figure 2, which illustrates that the measure of upward mobility tends to change from one cohort to the next and Table 3 which shows the changes in upward mobility over time.

The expected rank for African daughters born to mothers at the bottom half of the education distribution increased from [43.049, 43.424] for the 1975-1980 cohort to [43.945, 44.799] for the 1985-1990 cohort. The expected rank for White daughters born to mothers at the bottom half of the education distribution decreased from [46.467, 52.729] for the 1975-1980 cohort to [44.543, 47.163] for the 1985-1990 cohort. In contrast, as mentioned in the previous section, the expected rank for Coloured daughters born to mothers at the bottom half decreased significantly from the 1975-1980 cohort to the 1985-1990 cohort. This change indicates a significant decline in mobility making Coloured daughters appear to be the least upwardly mobile group in South Africa. Overall Coloured mobility appears to be low in comparison to another marginalised group in South Africa, the African population. Despite a larger majority of the African population living in rural areas, that are geographically distant from major economic centres in South Africa, they appear to have greater upward mobility. The fact that Coloured daughters from a bottom-half family can expect a decrease in upward mobility implies that Coloured daughters born into a low socioeconomic status are most likely to remain at a low socioeconomic status.

Downward mobility measures the persistence of high socioeconomic status for children born to parents at the top half of the education distribution. There appears to be a small but significant convergence between Coloured, African, and White daughters from the 1975-1980 cohort to the 1985-1990 cohort. There appears to be no significant divergence in downward mobility among the three population groups.

7.4 Changes in Coloured Mobility: Western Cape vs. Northern Cape

I examined changes in Coloured mobility across the different provinces. The majority of the Coloured respondents in the NIDS dataset live in the Western Cape and the Northern Cape. For this reason, I first compared the bottom half mobility between Coloured sons and daughters who were born in the Western Cape with those who were born in the Northern Cape.

It is important to differentiate between the different provinces for several reasons: first, it acknowledges the complexity and diversity of the Coloured population; second, it allows for a

more nuanced understanding of the economic and social challenges faced by different Coloured communities which can inform policy and intervention strategies; and finally, when recognising the regional differences I can contribute to a broader sense of unity and solidarity within the Coloured community and across South Africa more broadly.

Before I provide estimates of mobility between Coloured people from the Western Cape and the Northern Cape I acknowledge the differences between them. Coloured people in the Western Cape have a history and culture connected to Dutch colonialism as well as to the Khoikhoi, San, and Asian slaves who lived in that region. In comparison, the Coloured people in the Northern Cape have a culture and history that has been influenced by the presence of copper and diamond mines, as well as by African and Indian workers that were brought there.

Utilizing education ranks for parents and children within provinces and districts, I recalculated mobility statistics. These estimates show how disadvantaged children do in comparison to other children in their provinces and districts. Upward mobility for Coloured daughters in the Western Cape, born to mothers at the bottom half, has decreased from [44.434, 45.601] for the 1975-1980 cohort to [39.513, 44.085] for the 1985-1990 cohort. These results are similar to those of the same group in the Northern Cape. There is a decrease from [43.742, 45.452] for the 1975-1980 cohort to [31.133, 33.945] for the 1985-1990 cohort. Although the 1975-1980 cohort for Coloured daughters in the Western Cape has a higher rank than Coloured daughters in the Northern Cape, the education ranks appear to slightly converge for the 1985-1990 cohort.

Upward mobility conditional on a Coloured child's educational level decreases significantly with the lower and upper bounds having values of -12.609 and -11.507, respectively, in the Northern Cape. In the Western Cape, this value decreased although the difference in the bounds is smaller than in the Northern Cape (-4.921 and -1.516 for the lower and upper bounds, respectively).

Panels A to D of Figure 3 in the appendix, provide the ranks of bottom half mobility of those born in the Western and Northern Cape. Panel D demonstrates a lower rank for Coloured sons in the Northern Cape conditional on their father’s education rank compared to Coloured sons in the Western Cape. Coloured sons born in 1980 in the Northern Cape to fathers at the bottom of the rank distribution appear to have the same conditional rank as those born in 1985 and 1990 in the Western Cape. Coloured sons born in 1990 in the Western Cape to fathers at the top of the rank distribution appear to have the highest estimated upward mobility. This is as expected, children

born to parents at the top of the education distribution will have a greater probability of remaining at the top of the distribution.

7.5 Changes in Coloured Mobility: Western and Northern Cape vs. Other Provinces

There are differences between Coloured people in the Western and Northern Cape in terms of their history, language, and culture. In other provinces like Gauteng, many Coloured people have moved there due to its strong economy, which might cause them to have different cultural experiences. It is important to note that the proportion of Coloured people in the other seven provinces is smaller compared to the Western and Northern Cape. Therefore, I pulled together the data from the other seven provinces and compared it to the data from the Western and Northern Cape.

When I pooled data for the Western Cape and the Northern Cape, upward mobility for Coloured daughters decreases but upward mobility for Coloured sons increase. These results contrast with those of the other provinces. Coloured sons born to mothers in the bottom half and Coloured daughters born to fathers in the bottom half, in the other seven provinces experience significant increases in upward mobility. There appear to be significant gaps between upward mobility among Coloured children in the Western and Northern Cape and Coloured children from the other seven provinces. This indicates Coloured children in the Western and Northern Cape experience lower ranks in the education distribution compared to Coloured children elsewhere. My results show that compared to the overall mobility of the Coloured population, the mobility in the Western and Northern Cape is higher. This indicates mobility may not be entirely geographically dependent. However, it is important to note these results do not rule out the possibility that districts and urban neighbourhoods could explain the reasons for the differences in mobility among Coloured children from different provinces. Unfortunately, the data available at this time does not allow us to do a higher-resolution analysis.

Panel D of Figure 4 in the appendix indicates Coloured sons in the Western and Northern Cape born to fathers at the bottom of the rank distribution have the lowest rank compared to Coloured sons born in other Provinces. However, it is important to note Coloured sons born in 1990 in the Western Cape to fathers at the top half of the distribution have the highest educational attainment compared to Coloured sons born in other Provinces.

7.6 Changes in Educational Attainment across the 27-32 year age group

I analysed changes in educational attainment for the Coloured population since South Africa's first democratic elections in 1994. To do this, I focused on the educational attainment of a specific age group (27-32-year-olds) over 5 different 'waves' of data. This is important because educational attainment can be affected by life experiences and age, and so comparing the same age group at different points in time is important to get a clearer picture of educational attainment trends. I noted there is attrition bias across the different waves. The number of participants fluctuates throughout the five waves which leads to selection bias. To combat this, I included weights to make up for the uneven balance of participants across waves.

For example, individuals born between the 1985 and 1990 birth cohort may have completed more years of formal education than individuals born between 1975 and 1980 due to increased access to education and changing social and economic conditions such as the end of apartheid in 1994. Focusing on a specific age group allows researchers and policymakers to more accurately assess the educational attainment of a particular cohort and understand the factors that have influenced their education levels. This can provide valuable insight into the impact of policy interventions, changes in economic and social conditions, and other factors that may have influenced educational outcomes over time.

I used the 27-32 year age group as there are enough observations to guarantee enough statistical power to use the bottom-half mobility estimator. I considered 1994 as my point of reference as there were significant changes in the post-apartheid education system. There should have been more inclusion and more opportunities for disadvantaged groups such as the Coloured, African, and Indian/Asian populations. There should have been changes in the education system that assisted Coloured, African, and Indian/Asian populations in increasing mobility.

I focused on those who were in the 27-32 year age group in wave 1 as they would have experienced some of the old education system as well as some of the new education system. I describe my analysis as follows: I started with wave 1, measure educational attainment and estimate mobility for those aged between 27 to 32 (they were born between 1975 and 1980) – the 32-year-old would not have experienced the new education system but those aged 27 would have experienced the new education system in high school. Next, I did the same for wave 2, focusing again on those aged between 27 to 32 (they were born between 1978 and 1983) – they would have also experienced the new education system in high school.

Then I did the same for wave 3, focusing on those born between 1980 and 1985 – they would have experienced the new education system during primary school and high school, respectively. I did the same for wave 4, this time focusing on those born between 1982 -1987 – they would have experienced the new education system in high school and primary school, respectively. Finally, I did the same for wave 5, focusing on those born between 1985-1990 – they would have experienced the new education system in primary school.

Figure 6 demonstrates the changes in educational attainment from waves 1 to 5. Naturally, there appears to be an increase in educational attainment from those born in 1975 to those born in 1990. Across these 5 waves, the number of Coloured people who have achieved matric increases significantly, with those aged 27 to 32 years old during wave 4 (2014) having the highest number of those who have completed 14 or more years of schooling (some equate this to an honours level degree and above). Those aged between 27 to 32 during wave 5 (2017) have the lowest amount of those who have studied tertiary education. This suggests that there is generally a pursuit of gaining a tertiary education among Coloured people, but the rate at which they can move up the educational ladder may be slowing.

8 Data Limitations

While NIDS has been used extensively to study intergenerational mobility, there are some limitations to using it to measure bottom half mobility among the Coloured population: 1) the sample size is relatively small, which limits the representativeness of the Coloured population; 2) there is a limited geographic coverage as there isn't enough data to measure bottom half mobility for Coloured people in each province; 3) NIDS only measures education in terms of highest grade completed and does not capture other important dimensions such as quality of education (which can be difficult to measure); 4) educational attainment data is self-reported, which may be subject to recall bias and may not accurately reflect the actual educational attainment of individuals or their parents.

I also highlighted the number of missing education data. To combat the effect of missing education data on my estimation, I selected the highest level of education for either mother or father. This was done to reduce the number of missing data and to demonstrate missing education data does not significantly change my results. I also noted, the fluctuation between waves 1 and 5.

The proportion of missing education data reduces with the younger cohort (wave 5). This results in upward bias when comparing education estimates with those that don't know the educational attainment of their parents and those that do. This is one of the key limitations when doing an empirical study in a developing country such as South Africa.

Overall, while NIDS is a valuable source of data for studying intergenerational mobility in South Africa, it is important to consider its limitations when interpreting the results. Although there are limitations this study does a better job of estimating intergenerational mobility in a developing country such as South Africa, compared to studies that focus on cohabiting pairs.

9 Additional Indicators of Socioeconomic Status

Although the bottom half of intergenerational mobility is the focus of this paper, there is a significant body of related literature on opportunity inequality (IOP) that provides an alternative strategy for combining various indicators of family background to comprehend the role played by birth circumstances in determining opportunities later in life. Inequality of opportunity refers to the extent to which a person's life chances are affected by circumstances beyond their control, such as their race, gender, or socioeconomic status. It is related to bottom-half mobility in South Africa because if a significant portion of the population faces limited opportunities due to their circumstances, then intergenerational mobility may be constrained, particularly for those in the lower half of the income distribution.

For example, if a child is born into a family that is living in poverty and lacks access to quality education and healthcare, they may be at a disadvantage in terms of their ability to succeed in life compared to a child born into a wealthy family with access to these resources. This can lead to limited upward mobility, particularly for those in the lower half of the income distribution. Additionally, inequality of opportunity can also contribute to a lack of diversity in certain professions or fields, further limiting upward mobility for those in marginalized groups.

Policies that address inequality of opportunity, such as affirmative action programs, can potentially improve bottom-half mobility by providing opportunities for those who may otherwise be excluded or marginalized. However, the effectiveness of such policies may be limited by factors such as implementation challenges and resistance from those who perceive them as unfair.

10 The Effects of Policy on Intergenerational Mobility

A number of recent contributions concentrate on estimating the effects of policy on intergenerational mobility in developing countries. The emphasis is not on the biases caused by unobserved genetic transmissions, but rather on the potential endogeneity in the placement and implementation of policies. Without attempting to separate the role of genetics in the estimated intergenerational mobility, the focus on the causal effects of policy on the measures of intergenerational mobility might offer answers to issues about policy. For instance, policymakers must consider whether investments in roads and schools increase mobility by reducing intergenerational persistence in schooling and work (Emran and Shilpi, 2019).

The effects of policy on intergenerational mobility among the Coloured population in South Africa can be significant. Policies that aim to reduce poverty and inequality, improve access to education and healthcare, and promote economic growth can have a positive impact on intergenerational mobility. For example, policies that increase access to quality education and skills training can help break the cycle of poverty and increase social mobility.

However, policies that are poorly designed or implemented, or that fail to address structural barriers to social and economic mobility, can have negative effects on intergenerational mobility. For example, policies that perpetuate racial and economic segregation, or that do not address the legacy of apartheid, can limit opportunities for upward mobility among the Coloured population.

It is important to note that policies targeting intergenerational mobility should be tailored to the specific needs and challenges faced by the Coloured population in South Africa. This includes addressing historical and current inequalities in access to education, healthcare, and economic opportunities, as well as addressing the social and cultural factors that may hinder mobility. Additionally, policies should be monitored and evaluated to ensure they are having the desired impact on intergenerational mobility.

Conclusion

Using data from NIDS I have given a set of techniques that are suitable for gauging intergenerational mobility in poor nations or other settings. The education data is provided in years so this eliminated the challenge of estimating mobility based on bins. I used a measure of bottom- half mobility that Asher et al., (2018) proposed and developed, which (i) is similar to the well- known absolute upward mobility measure; (ii) separates intergenerational mobility from

inequality and economic growth; (iii) is simple to calculate; (iv) has an easy interpretation for different population groups; and (v) is informative about intergenerational mobility even when there is only coarse education data. Although the bottom half mobility estimator is specifically designed for coarse education data, it does a better job of explaining educational mobility compared to conventional intergenerational mobility estimates such as the IGE and IGC.

In South Africa, I found that despite significant political and economic changes due to the end of Apartheid, upward mobility among the Coloured population seems to remain significant and has barely changed from the 1970s to 1990s birth cohorts. Upward mobility for Coloured daughters seems to have decreased while upward mobility has increased for Coloured sons. Despite the increase in upward mobility for Coloured sons, this remains significantly low, when contrasted with the upward mobility of African and White sons. Although mobility has decreased for Coloured daughters, they appear to have higher estimates compared to Coloured sons.

When estimating the geographic differences in bottom half mobility for Coloured children across the different nine provinces, I found that Coloured children born in the Western Cape and the Northern Cape have lower mobility than Coloured children born elsewhere. Coloured sons in the Western Cape born to parents at the top of the distribution, appear to have the highest educational attainment. More research is needed to compare bottom-half mobility within and across all nine provinces, however, my data is limited in estimating mobility in individual provinces (aside from the Northern Cape and the Western Cape).

The standard of education in South Africa is one topic I did not cover. Both the typical quality and the variation in quality among educational institutions need to be researched further. Although there has been a constant expansion in South Africa's educational access, it is questionable if there has also been a gain in educational quality. Finding out how education quality versus quantity influences intergenerational mobility and persistent inequality may one day be conceivable.

Even in post-apartheid South Africa's context of rapid economic growth and increases in income for all population groups, intergenerational mobility is arguably a crucial policy goal. The finest possibilities are still hard to come by, and there is a lot of dispute about who will qualify for social programmes and positions in universities and places of employment that give access to those prospects. Additionally, even if there is average development, the degree of intergenerational mobility between groups determines whether Coloureds, Africans, Whites, and Indians/Asians

will have a lasting disadvantage over time. Policies that increase inequality of opportunity in South Africa may be influenced by research on the factors that produce differences in upward mobility by geography and social group.

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Appendix

Table 1

IGE and IGC indices for Sons

A. Coloured Sons' Education Conditional on Their Fathers' Education

Child generation: son = Y — Type of variables: continuous
Parent generation: dad = X

Type of indices	IGM estimate	Bootstrap Std. Err.	[95% Conf. Interv.] normal approx.	
Single-stage Indices				
(1) 1/N * sum |X - Y|	0.884	0.149	0.592	1.176
(2) 1/N * sum (X - Y)^2	3.095	0.768	1.589	4.600
(3) 1/N * sum |ln X - ln Y|	0.100	0.018	0.065	0.134
(4) 1/N * sum |X/mu(X) - Y/mu(Y)|	0.126	0.016	0.095	0.156
(5) 1 - Pearson coef. (on logs)	0.243	0.070	0.106	0.380
(6) 1 - Spearman coef. (on logs)	0.283	0.061	0.163	0.403
(7) 1/N * sum |CDF X - CDF Y|	0.161	0.022	0.118	0.204
(8) 1/N * sum (CDF X - CDF Y)^2	0.051	0.012	0.027	0.076
(9) 1 - OLS(Y,X)	0.185	0.071	0.046	0.325
(10) 1 - OLS(ln Y,ln X)	0.311	0.104	0.108	0.514
Transition matrix Indices (based on 5 quantiles)				
(11) Shorrock/Prais	0.503	0.174	0.162	0.843
(12) Bartholomew	0.121	0.039	0.043	0.198
(13) 1-Second largest eigenvalue	0.893	0.297	0.310	1.475
(14) Determinant index	0.968	0.054	0.863	1.074
Inequality related Indices				
(15) Fields - Gini	0.890	0.028	0.834	0.946
(16) Fields - GE(0)	0.638	0.075	0.491	0.785
(17) Fields - GE(1)	0.138	0.062	0.015	0.260
(18) Fields - Atkinson(.5)	0.096	0.068	-0.037	0.229
(19) Fields - Atkinson(2)	0.291	0.089	0.117	0.465

Table 1, Panel A shows the IGE and IGC indices for Coloured sons.

B. Coloured Sons' Education Conditional on Their Mothers' Education

Child generation: son = Y Type of variables: continuous
Parent generation: mom = X

Type of indices	IGM estimate	Bootstrap Std. Err.	[95% Conf. Interv.] normal approx.	
Single-stage Indices				
(1) 1/N * sum |X - Y|	0.677	0.092	0.497	0.857
(2) 1/N * sum (X - Y)^2	2.051	0.338	1.390	2.713
(3) 1/N * sum |ln X - ln Y|	0.072	0.010	0.051	0.092
(4) 1/N * sum |X/mu(X) - Y/mu(Y)|	0.101	0.010	0.082	0.120
(5) 1 - Pearson coef. (on logs)	0.103	0.040	0.025	0.180
(6) 1 - Spearman coef. (on logs)	0.171	0.034	0.105	0.237
(7) 1/N * sum |CDF X - CDF Y|	0.123	0.015	0.095	0.152
(8) 1/N * sum (CDF X - CDF Y)^2	0.031	0.007	0.018	0.044
(9) 1 - OLS(Y,X)	0.164	0.039	0.087	0.240
(10) 1 - OLS(ln Y,ln X)	0.142	0.064	0.016	0.267
Transition matrix Indices (based on 5 quantiles)				
(11) Shorrock/Prais	0.599	0.182	0.242	0.955
(12) Bartholomew	0.132	0.036	0.062	0.203
(13) 1-Second largest eigenvalue	0.000	0.368	-0.720	0.720
(14) Determinant index	0.985	0.085	0.818	1.152
Inequality related Indices				
(15) Fields - Gini	0.911	0.018	0.876	0.945
(16) Fields - GE(0)	-0.108	0.042	-0.191	-0.025
(17) Fields - GE(1)	0.181	0.035	0.112	0.250
(18) Fields - Atkinson(.5)	0.206	0.038	0.131	0.280
(19) Fields - Atkinson(2)	-0.005	0.058	-0.119	0.108

C. Total Population: Sons' Education Conditional on Their Fathers' Education

Child generation: son = Y — Type of variables: continuous
Parent generation: dad = X

Type of indices	IGM estimate	Bootstrap Std. Err.	[95% Conf. Interv. normal approx.	
Single-stage Indices				
(1) 1/N * sum |X - Y|	0.905	0.060	0.786	1.023
(2) 1/N * sum (X - Y)^2	3.248	0.361	2.540	3.956
(3) 1/N * sum |ln X - ln Y|	0.094	0.007	0.080	0.109
(4) 1/N * sum |X/mu(X) - Y/mu(Y)|	0.115	0.008	0.101	0.130
(5) 1 - Pearson coef. (on logs)	0.277	0.040	0.198	0.356
(6) 1 - Spearman coef. (on logs)	0.345	0.036	0.273	0.416
(7) 1/N * sum |CDF X - CDF Y|	0.186	0.011	0.164	0.208
(8) 1/N * sum (CDF X - CDF Y)^2	0.066	0.007	0.052	0.080
(9) 1 - OLS(Y,X)	0.301	0.043	0.218	0.385
(10) 1 - OLS(ln Y,ln X)	0.364	0.056	0.255	0.474
Transition matrix Indices (based on 5 quantiles)				
(11) Shorrock/Prais	0.921	0.177	0.575	1.267
(12) Bartholomew	0.224	0.034	0.157	0.291
(13) 1-Second largest eigenvalue	0.748	0.238	0.281	1.214
(14) Determinant index	0.991	0.044	0.905	1.077
Inequality related Indices				
(15) Fields - Gini	0.915	0.017	0.882	0.949
(16) Fields - GE(0)	0.163	0.040	0.084	0.241
(17) Fields - GE(1)	0.253	0.034	0.185	0.320
(18) Fields - Atkinson(.5)	0.254	0.037	0.181	0.326
(19) Fields - Atkinson(2)	0.165	0.048	0.070	0.259

D. Total Population: Sons' Education Conditional on Their Mothers' Education

Child generation: son = Y — Type of variables: continuous
Parent generation: mom = X

Type of indices	IGM estimate	Bootstrap Std. Err.	[95% Conf. Interv.] normal approx.	
Single-stage Indices				
(1) 1/N * sum |X - Y|	0.821	0.036	0.751	0.892
(2) 1/N * sum (X - Y)^2	3.211	0.186	2.847	3.576
(3) 1/N * sum |ln X - ln Y|	0.087	0.005	0.078	0.097
(4) 1/N * sum |X/mu(X) - Y/mu(Y)|	0.112	0.004	0.105	0.119
(5) 1 - Pearson coef. (on logs)	0.177	0.022	0.134	0.220
(6) 1 - Spearman coef. (on logs)	0.252	0.016	0.222	0.283
(7) 1/N * sum |CDF X - CDF Y|	0.153	0.006	0.143	0.164
(8) 1/N * sum (CDF X - CDF Y)^2	0.050	0.003	0.044	0.056
(9) 1 - OLS(Y,X)	0.265	0.024	0.217	0.312
(10) 1 - OLS(ln Y,ln X)	0.281	0.039	0.205	0.357
Transition matrix Indices (based on 5 quantiles)				
(11) Shorrock/Prais	0.598	0.133	0.338	0.858
(12) Bartholomew	0.149	0.024	0.103	0.195
(13) 1-Second largest eigenvalue	0.029	0.240	-0.441	0.500
(14) Determinant index	0.995	0.033	0.930	1.060
Inequality related Indices				
(15) Fields - Gini	0.910	0.009	0.891	0.928
(16) Fields - GE(0)	0.038	0.029	-0.019	0.095
(17) Fields - GE(1)	0.260	0.023	0.216	0.305
(18) Fields - Atkinson(.5)	0.281	0.025	0.231	0.331
(19) Fields - Atkinson(2)	0.150	0.040	0.071	0.229

Table 2

Summary statistics

A. Coloured Summary Statistics

	Women		Men	
Wave	Wave 1	Wave 5	Wave 1	Wave 5
Mean age	30.058	36.28	30.466	36.101
Child mean education	9.25	9.88	9.49	9.79
Child education standard deviation	2.5803	2.5131	2.5328	2.5903
Gender Proportions	59.74	57.78	40.26	42.22
Educational Category:				
No Schooling	1.23	0.85	1.6	1.31
Primary School	20.77	14.85	17.81	15.86
High School	72.3	77.18	75.8	76.85
Tertiary	5.69	7.02	4.8	5.97
Urban Proportion	79.38	79.47	78.08	78.17
Rural Proportion	20.62	20.53	21.92	21.83
Average household size	5.5	5.31	5.51	4.9
Parents' average education	5.56	5.98	6.15	6.24
Parents' education standard deviation	4.0096	4.0603	4.5438	4.5737
Parents' educational category:				
No Schooling	25.81	21.86	26.67	25.3
Primary School	36.67	35.58	26.67	27.43
High School	35.77	39.88	42.49	42.99
Tertiary	1.76	2.65	4.16	4.26

B. African Summary Statistics

	Women		Men	
Wave	Wave 1	Wave 5	Wave 1	Wave 5
Mean age	27.572	35.071	27.232	33.815
Child mean education	9.69	10.4	9.19	10.36
Child education standard deviation	2.6984	2.9579	2.9322	2.76
Gender Proportions:	56.4	58.03	43.6	41.97
Educational category:				
No Schooling	2.27	2.11	3.33	1.6
Primary School	14.68	8.82	19.28	9.2
High School	78.65	80.97	73.87	81.6
Tertiary	4.4	8.11	3.52	7.59
Urban Proportion	40.75	46.8	41.07	52.54
Rural Proportion	59.25	53.2	58.93	47.46
Average household size	5.8	5.55	5.13	4.51
Parents' average education	4.84	5.09	4.26	4.19
Parents' education standard deviation	4.4866	4.71	4.5652	4.704
Parents' educational category:				
No Schooling	37.47	37.78	45.19	47.83
Primary School	28.35	22.862	25.39	21.94
High School	31.62	33.67	26.87	27.33
Tertiary	2.55	3.7	2.55	2.92

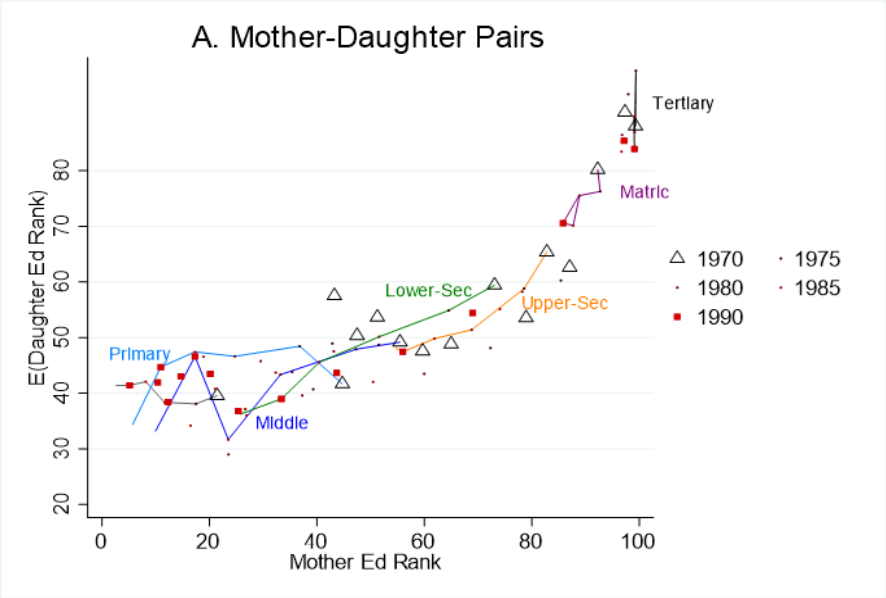
C. White Summary Statistics

	Women		Men	
Wave	Wave 1	Wave 5	Wave 1	Wave 5
Mean age	30.813	36.88	30.458	36.462
Child mean education	11.7	12.13	11.5	12.29
Child education standard deviation	1.6411	1.606	1.4476	1.4244
Gender Proportions:	53.93	53.3	46.07	46.7
Educational category:				
No Schooling	0	0	0	0
Primary School	0	0.52	0.78	0.59
High School	70.19	58.75	77.53	59.41
Tertiary	29.8	40.72	21.7	40
Urban Proportion	91.39	95.36	92.25	92.94
Rural Proportion	8.61	4.64	7.75	7.06
Average household size	3.52	3.61	3.23	3.38
Parents' average education	11.31	11.68	11.35	11.88
Parents' education standard deviation	2.2277	1.7078	2.2252	1.992
Parents' educational category:				
No Schooling	1.69	0	1.03	0.37
Primary School	2.24	2.57	4.1	1.11
High School	76.98	71.74	72.83	61.33
Tertiary	19.1	25.64	22.05	37.17

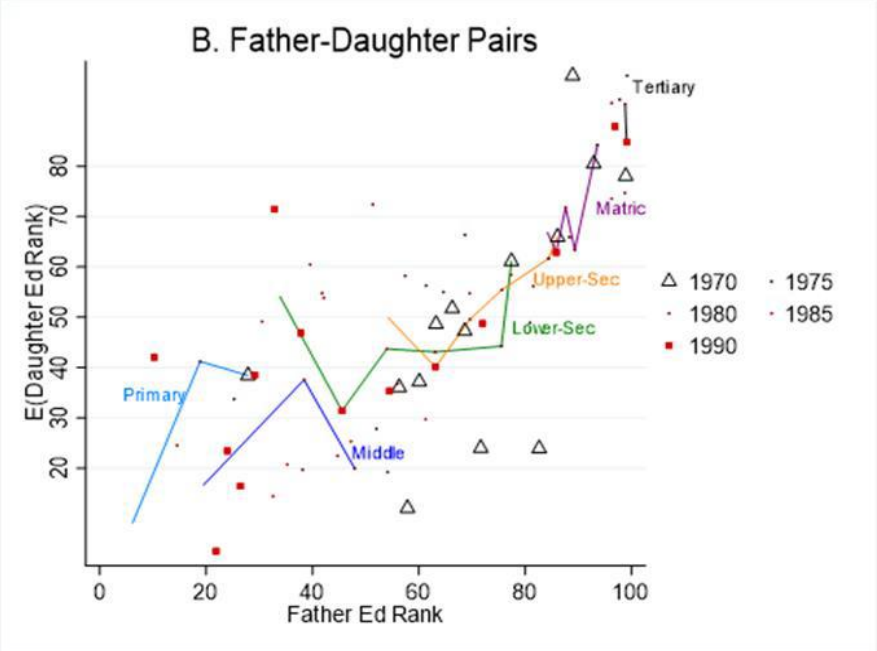
Figure 1

Joint Parent-Child Education Ranks Across Birth Cohorts

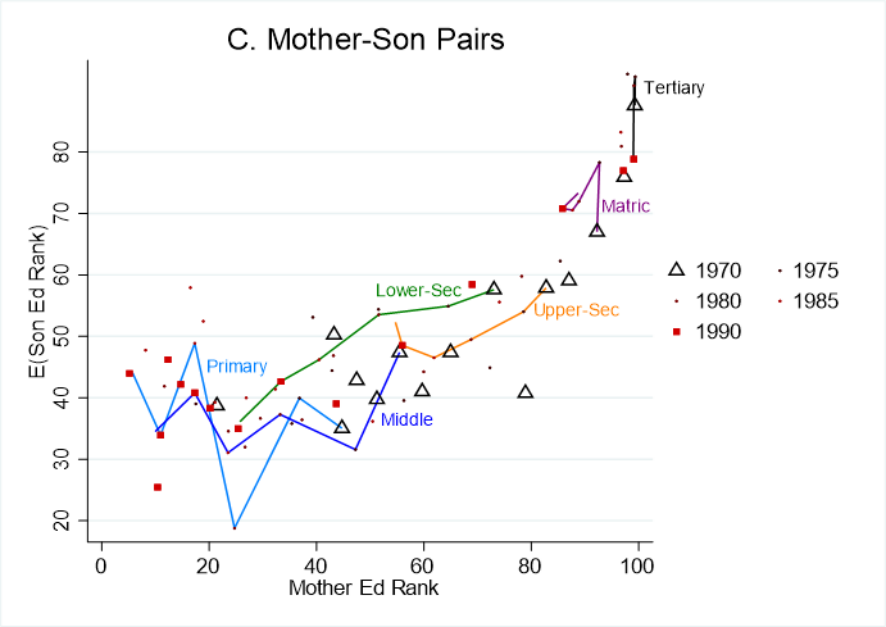
A. Mother-Daughter Pairs



B. Father-Daughter Pairs



C. Mother-Son Pairs



D. Father-Son Pairs

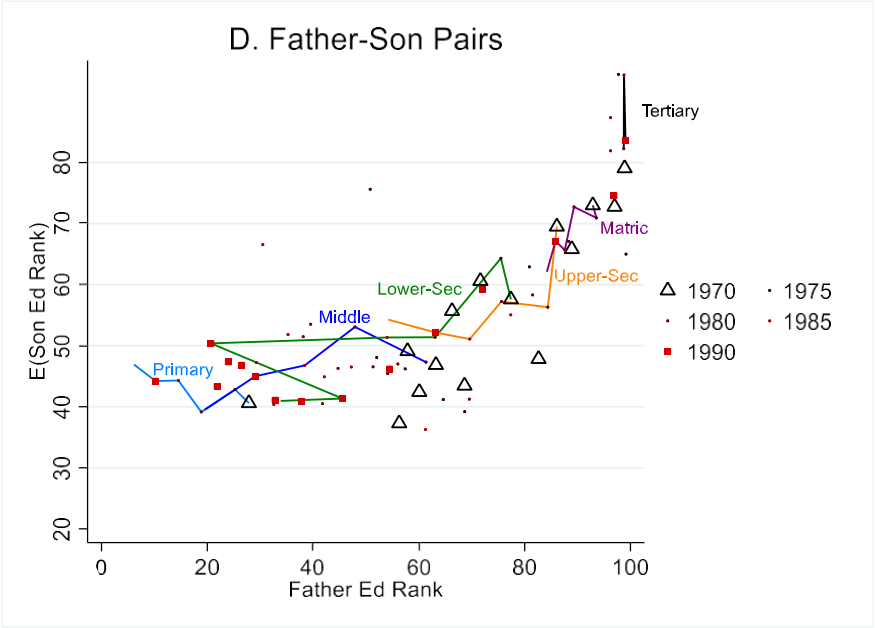
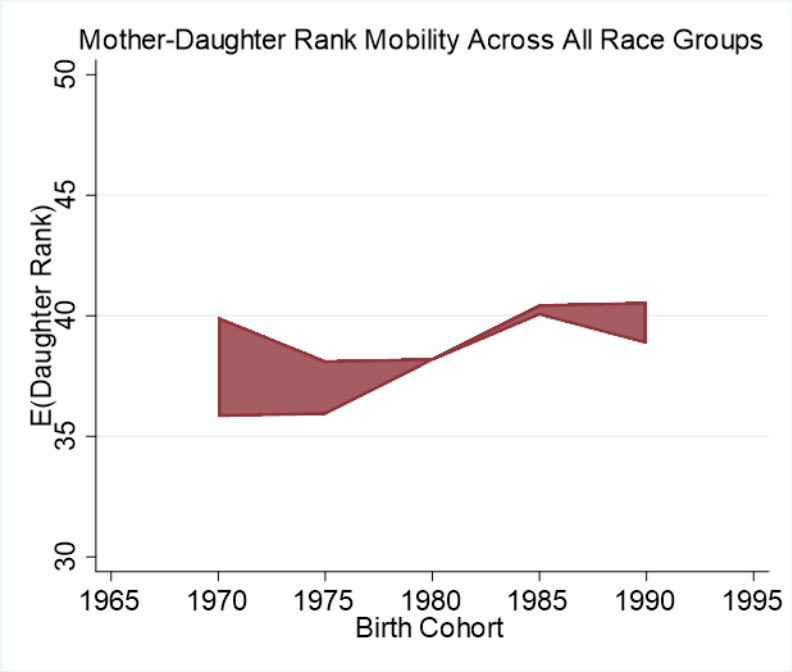


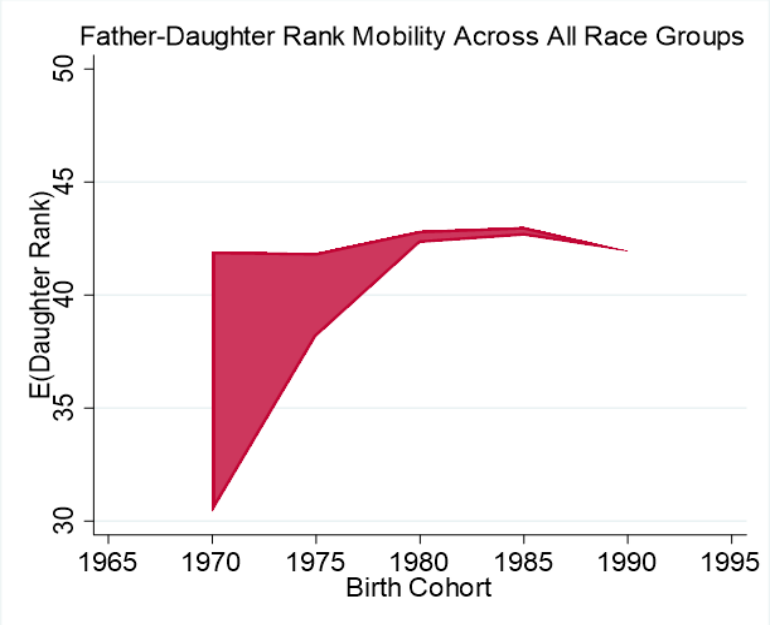
Figure 2

Bottom Half Mobility, 1970-1990 Birth Cohorts

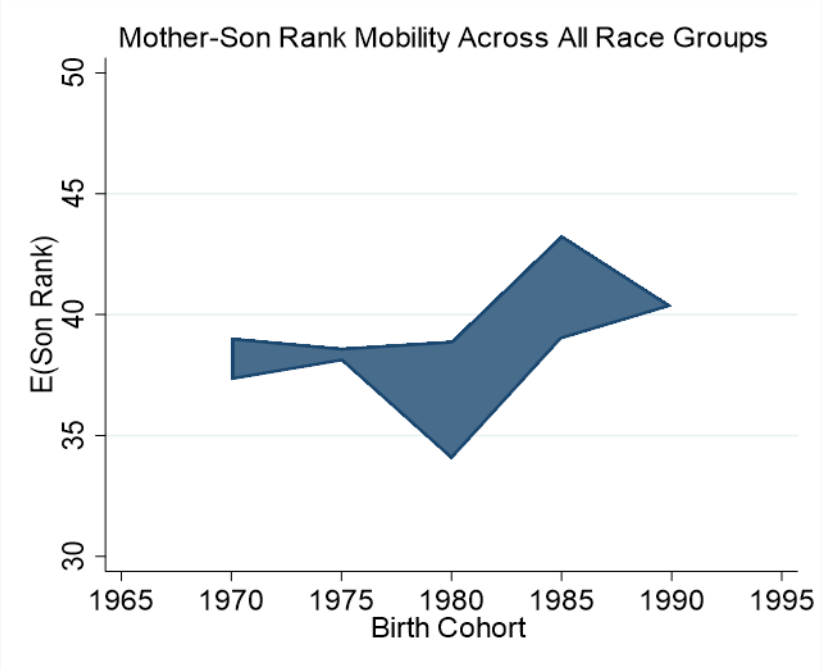
A. Mother-Daughter Bottom Half Mobility



B. Father-Daughter Bottom Half Mobility



C. Mother-Son Bottom Half Mobility



D. Father-Son Bottom Half Mobility

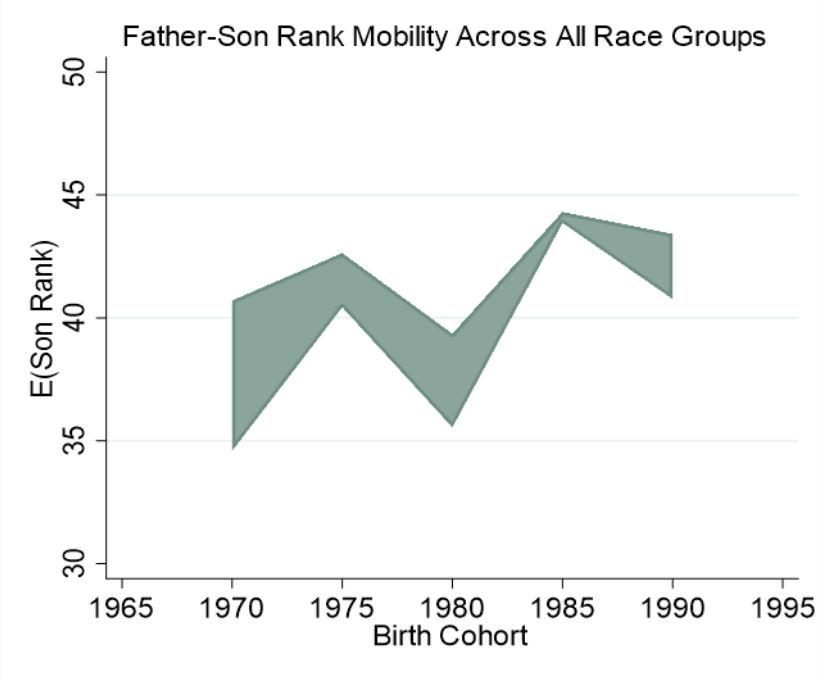


Table 3

Changes in mobility across all population groups

A. Mother-Daughter Pairs

Mother-Daughter Pairs				
Cohort	**All Groups**	**Coloured**	**African**	**White**
1975-1980	[42.176, 42.457]	[43.243, 43.536]	[43.173, 43.923]	[47.201, 49.832]
	[42.934, 43.189]	[49.889, 51.179]	[42.924, 42.924]	[45.732, 55.625]
	{42.555, 42.823}	{46.566, 47.358}	{43.049, 43.424}	{46.467, 52.729}
1985-1990	[43.126, 44.381]	[40.654, 41.827]	[43.369, 44.560]	[41.761, 45.311]
	[44.871, 45.107]	[43.237, 46.883]	[44.520, 45.038]	[47.325, 49.015]
	{43.999, 44.744}	{41.946, 44.355}	{43.945, 44.799}	{44.543, 47.163}
Change over time	[1.444, 1.921]	[-4.620, -3.003]	[0.896, 1.375]	[-1.924, -5.566]

Table 3 shows estimates of the population group and full sample. I show the estimates for each cohort (in square brackets) and the average (in curly braces).

B. Father-Daughter Pairs

Father-Daughter Pairs				
Cohort	**All Groups**	**Coloured**	**African**	**White**
1975-1980	[40.445, 40.458]	[40.605, 40.615]	[40.875, 40.881]	[39.027, 42.931]
	[41.720, 41.923]	[44.307, 44.694]	[40.906, 41.470]	[48.235, 55.724]
	{41.083, 41.191}	{42.456, 42.655)	{40.891, 41.176}	{43.631, 49.328}
1985-1990	[43.972, 43.975]	[39.040, 39.154]	[44.606, 44.632]	[45.394, 47.196]
	[44.451, 44.799]	[39.224, 41.327]	[43.956, 45.471]	[40.890, 46.749]
	{44.212, 44.387}	{39.132, 40.241}	{44.281, 45.052}	{43.142, 46.973}
Change over time	[3.129, 3.196]	[-3.324, -2.414]	[3.390, 3.876]	[-0.489, -2.355]

C. Mother-Son Pairs

Mother-Son Pairs				
Cohort	**All Groups**	**Coloured**	**African**	**White**
1975-1980	[43.496, 43.777]	[35.042, 37.108]	[44.488, 45.819]	[49.708, 50.339]
	[41.355, 41.463]	[32.081, 39.926]	[40.790, 40.932]	[38.853, 41.536]
	{42.426, 42.620}	{33.562, 38.517}	{42.639, 43.376}	{44.281, 45.938}
1985-1990	[45.726, 45.858]	[40.493, 41.084]	[44.152, 45.519]	[40.747, 46.030]
	[44.703, 44.795]	[47.121, 47.353]	[44.221, 44.441]	[39.723, 41.102]
	{45.215,43.327}	{43.807, 44.219}	{44.185, 44.980}	{40.235, 43.566}
Change over time	[2.79, 0.707]	[10.245, 5.702]	[1.546, 1.604]	[-4.046, -2.372]

D. Father-Son Pairs

Father-Son Pairs				
Cohort	**All Groups**	**Coloured**	**African**	**White**
1975-1980	[39.837, 40.152]	[36.312, 36.776]	[41.228, 41.306]	[13.272, 22.667]
	[40.742, 40.787]	[38.210, 39.813]	[41.142, 41.156]	[34.256, 43.565]
	{40.290, 40.470}	{37.261, 38.295}	{41.185, 41.231}	{23.764, 33.116}
1985-1990	[44.928, 44.990]	[40.675, 46.693]	[44.871, 44.879]	[48.338, 49.897]
	[43.231, 43.249]	[38.109, 39.178]	[43.885, 43.974]	[26.496, 29.968]
	{44.080, 44.120}	{39.392, 42.936}	{44.378, 44.427}	{37.417, 39.936}
Change over time	[3.790, 3.650]	[2.131, 4.641]	[3.193, 3.196]	[13.653, 6.820]

Table 4

Changes in mobility for Coloured population

A. Mother-Daughter Pairs

Mother-Daughter Pairs				
Cohort	**WC**	**NC**	**WCNC**	**Others**
1975-1980	[38.620, 39.744]	[40.159, 41.705]	[40.326, 42.300]	[51.373, 51.373]
	[50.247, 51.457]	[47.324, 49.198]	[52.691, 53.009]	[38.972, 41.794]
	{44.434, 45.601}	{43.742, 45.452}	{46.509, 47.655}	{45.173, 46.584}
1985-1990	[39.881, 39.881]	[20.787, 25.558]	[38.964, 39.283]	[50.676, 56.369]
	[39.144, 48.289]	[41.479, 42.331]	[44.283, 46.295]	[38.626, 39.332]
	{39.513, 44.085}	{31.133, 33.945}	{41.624, 42.789}	{44.651, 47.986}
Change over time	[-4.921, -1.516]	[-12.609, -11.507]	[-4.885, -4.886]	[-0.522, 1.402]

B. Father-Daughter Pairs

Father-Daughter Pairs				
Cohort	**WC**	**NC**	**WCNC**	**Others**
1975-1980	[42.745, 43.569]	[29.862, 32.392]	[41.529, 41.589]	[41.925, 42.068]
	[38.487, 43.395]	[44.805, 44.968]	[45.221, 45.236]	[27.549, 27.886]
	{40.616, 43.482}	{37.334, 38.950}	{43.375, 43.413}	{34.737, 34.977}
1985-1990	[39.961, 41.550]	[42.408, 43.064]	[39.554, 40.900]	[42.223, 43.808]
	[39.614, 42.701]	[41.692, 42.230]	[38.227, 41.931]	[29.134, 31.128]
	{39.788, 42.126}	{42.050, 42.647}	{38.891, 41.416}	{35.679, 37.468}
Change over time	[-0.828, -1.356]	[4.716, 3.697]	[-4.484, -1.997]	[0.942, 2.491]

C. Mother-Son Pairs

Mother-Son Pairs				
Cohort	WC	NC	WCNC	Others
1975-1980	[36.862, 37.038]	[27.011, 27.168]	[34.690, 35.482]	[41.739, 41.739]
	[42.322, 46.975]	[40.825, 42.535]	[31.633, 41.280]	[5.938, 17.065]
	{39.592, 42.007}	{33.918, 34.852}	{33.162, 38.381}	{23.839, 29.402}
1985-1990	[39.634, 39.888]	[43.064, 43.157]	[40.012, 40.406]	[38.485, 41.053]
	[41.340, 42.711]	[52.524, 52.634]	[44.615, 44.673]	[44.697, 48.636]
	{40.487, 41.300}	{47.794, 47.896}	{42.314, 42.540}	{41.591, 44.845}
Change over time	[0.895, -0.707]	[13.876, 13.044]	[9.152, 4.159]	[17.752, 15.443]

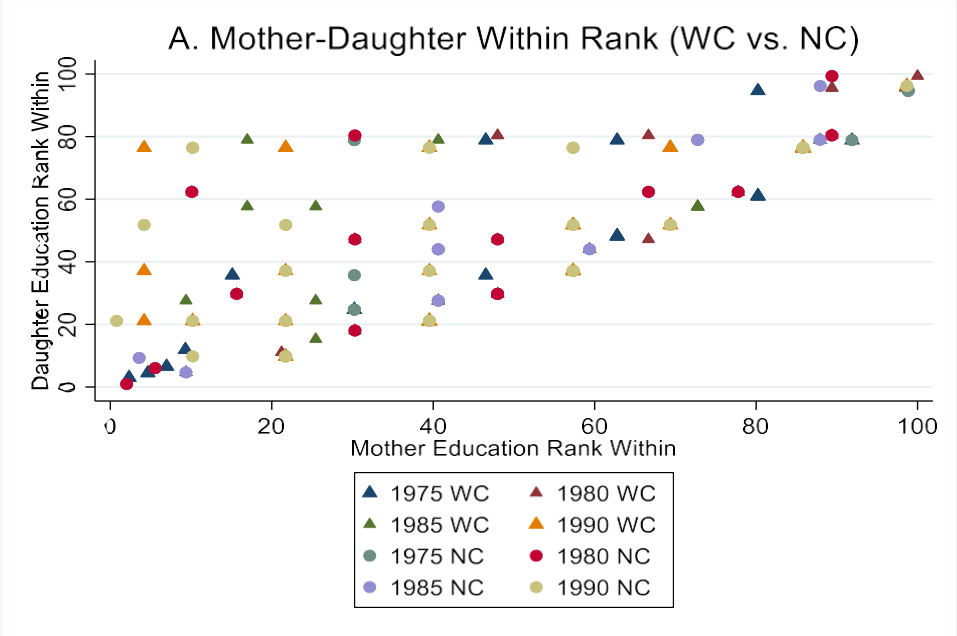
D. Father-Son Pairs

Father-Son Pairs				
Cohort	WC	NC	WCNC	Others
1975-1980	[0.000, 17.025]	[22.414, 32.716]	[41.046, 41.139]	[70.072, 80.048]
	[41.680, 42.792]	[24.515, 24.777]	[36.832, 38.196]	[41.667, 41.688]
	{20.840, 29.909}	{23.465, 28.743}	{38.939, 39.668}	{55.870, 60.868}
1985-1990	[40.898, 44.027]	[54.877, 55.602]	[37.441, 44.336]	[41.408, 41.944]
	[33.129, 33.534]	[43.582, 43.675]	[37.543, 38.045]	[59.135, 62.197]
	{37.014, 38.781}	{49.230, 49.639}	{37.492, 41.191}	{50.272, 52.071}
Change over time	[16.174, 8.872]	[25.765, 20.896]	[-1.447, 1.523]	[-5.598, -8.797]

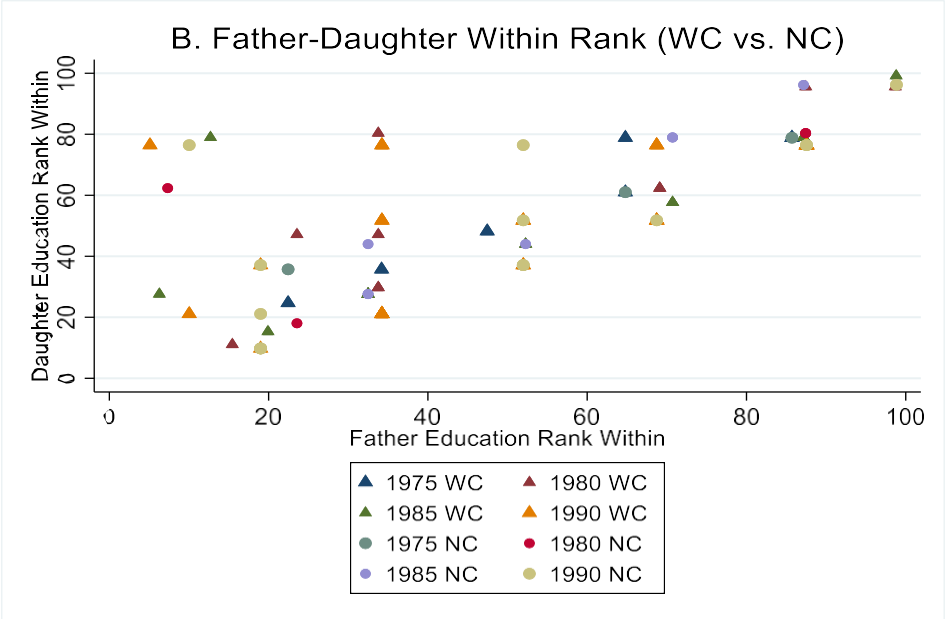
Figure 3

Changes in Coloured Mobility: Western Cape vs. Northern Cape

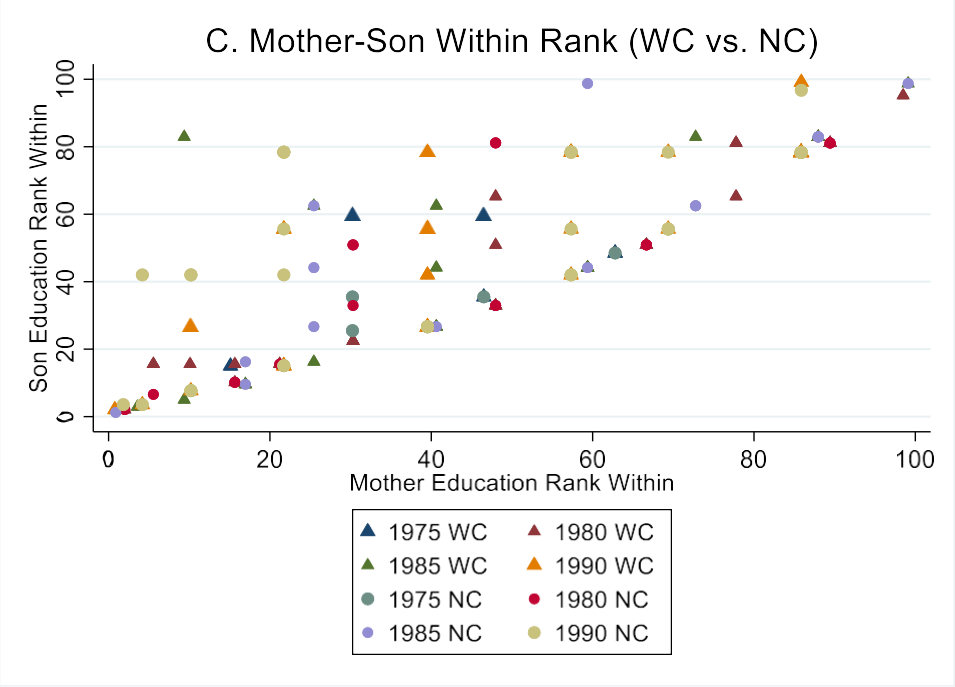
A. Mother-Daughter Education Rank Within (WC vs. NC)



B. Father-Daughter Education Rank Within (WC vs. NC)



C. Mother-Son Education Rank Within (WC vs. NC)



D. Father-Son Education Rank Within (WC vs. NC)

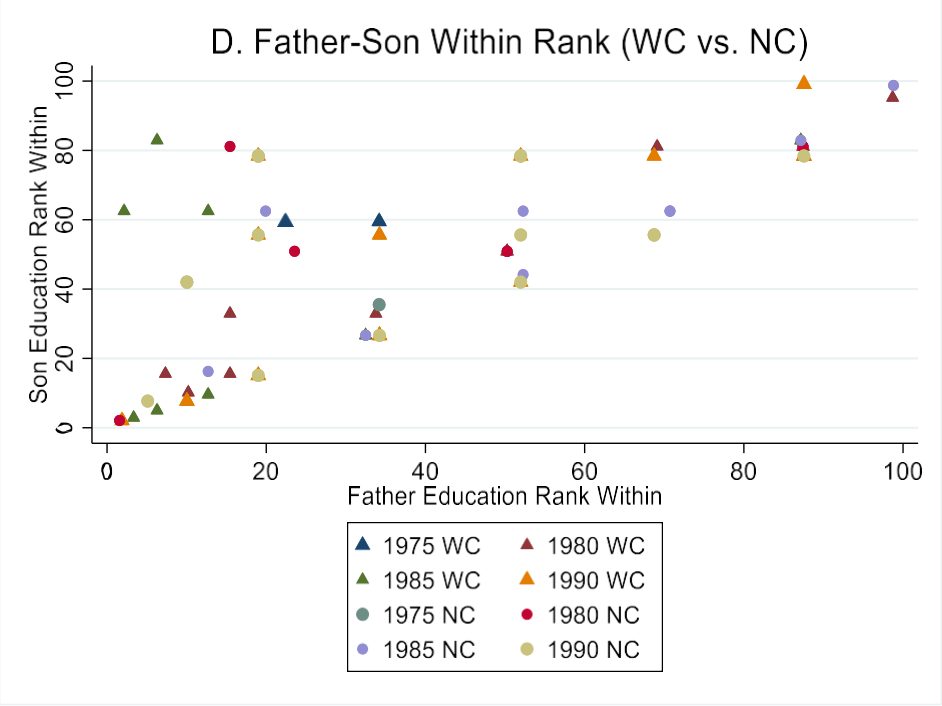
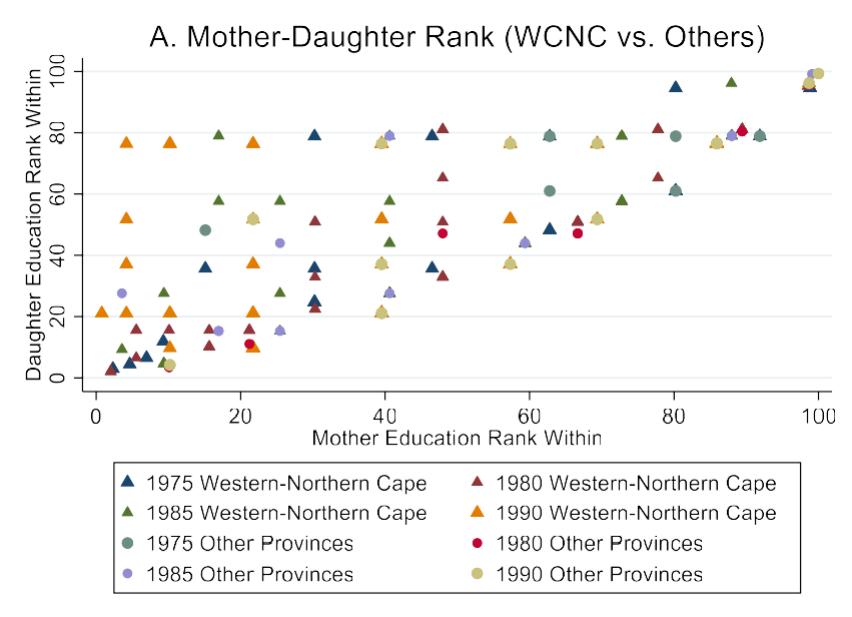


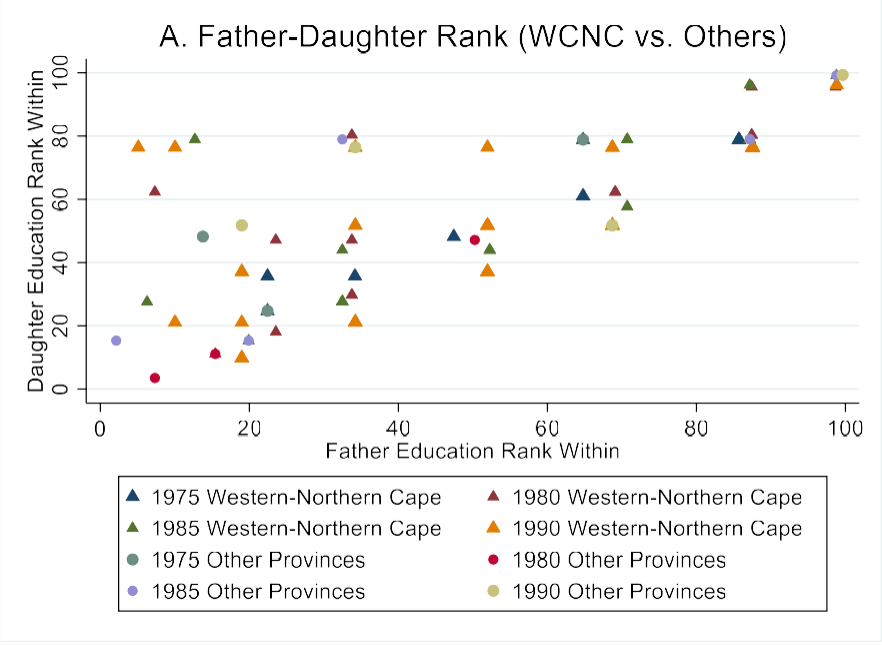
Figure 4

Changes in Coloured Mobility: Western and Northern Cape vs. Other Provinces

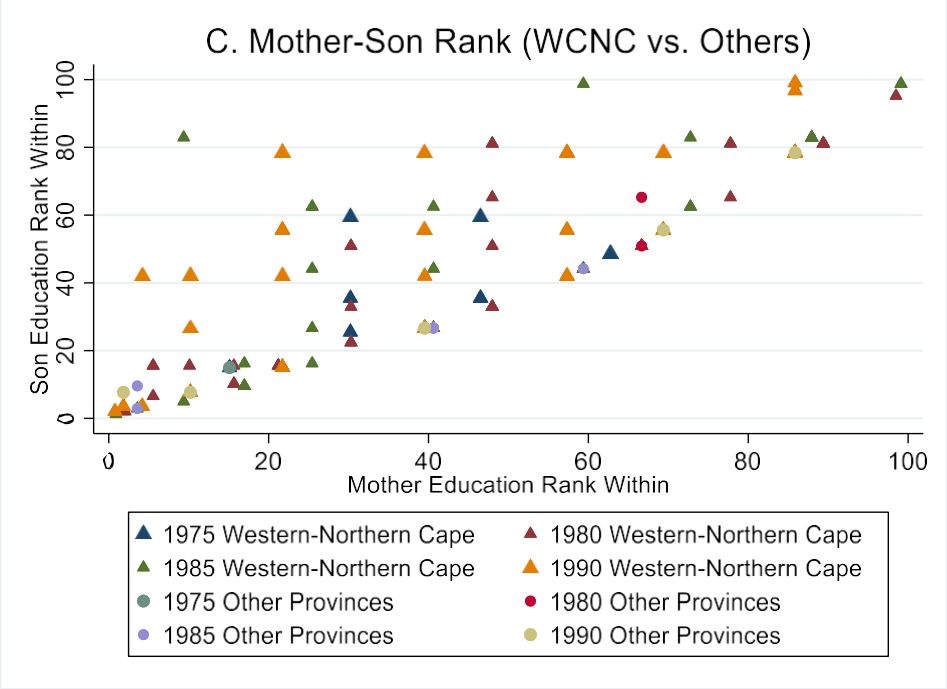
A. Mother-Daughter Education Rank Within (WCNC vs. Others)



B. Father-Daughter Education Rank Within (WCNC vs. Others)



C. Mother-Son Education Rank Within (WCNC vs. Others)



D. Father-Son Education Rank Within (WCNC vs. Others)

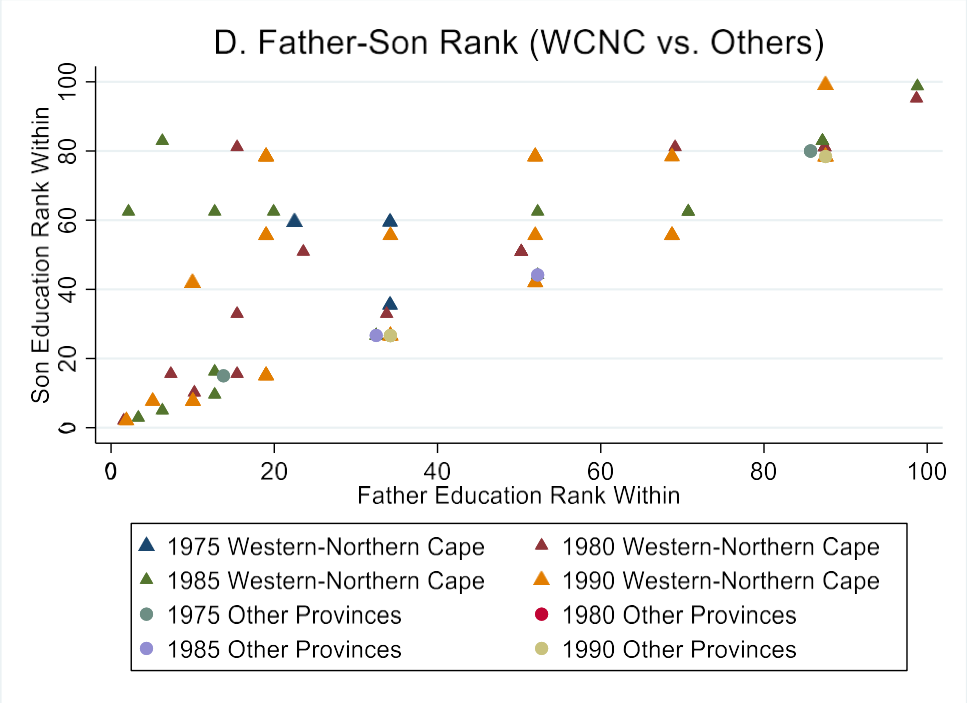
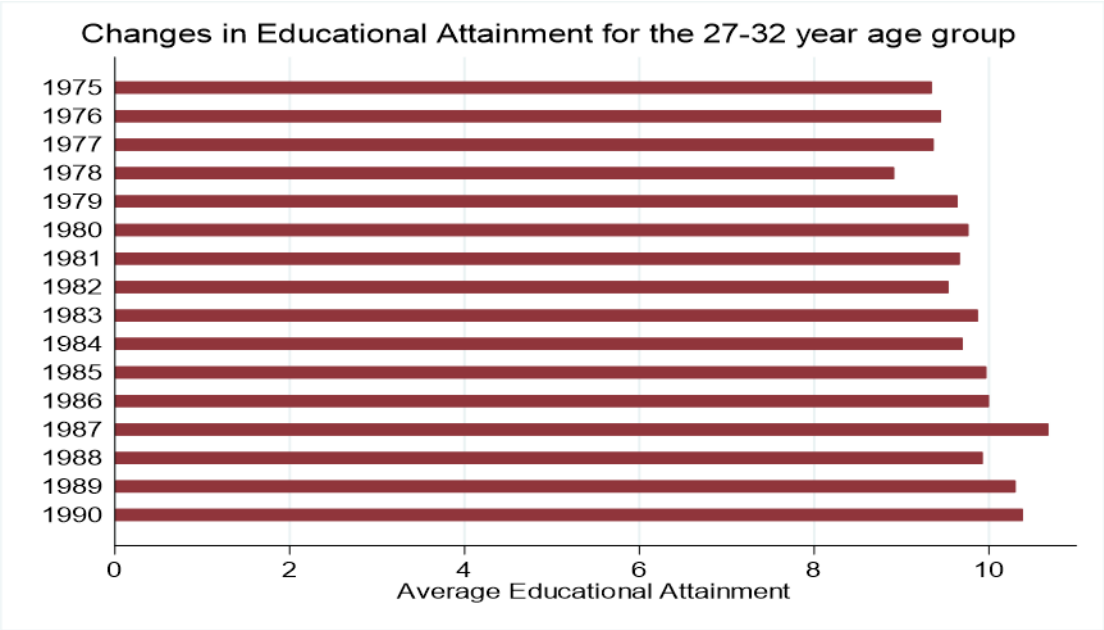


Figure 5

Changes in Educational Attainment for the 27-32 year age group

A. Horizontal Bar Graph showing changes in education



B. Boxplot showing changes in education

