Intergenerational Social Mobility in Africa Since 1920

by Rasmame Ouedraogo and Nicolas Syrichas
Abstract

The COVID-19 crisis has a severe impact on education and employment and exposed the many social inequities that make some populations more vulnerable to shocks. Despite a vast literature on social mobility in advanced economies, little is known about it in African countries, mainly due to data limitations. Using a large harmonized dataset of more than 72 million individuals, we fill this gap and examine socioeconomic status mobility across generations, measured by educational and occupational attainment. We uncover the substantial geographical variations in the degree of upward/downward educational and occupational mobility across and within African countries, and the gender and rural/urban divide. Additionally, we explore the determinants of social mobility in the African region. We find that social mobility on the continent could be partly explained by observable individual characteristics (gender, marital status, age, etc.), and that educational mobility is a driver of occupational mobility. Lastly, we show that the quality of institutions, the level of public spending on education, social protection coverage, natural resource endowments, and countries' fragility are strong predictors of social mobility in Africa.

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I. INTRODUCTION

The COVID-19 pandemic and ensuing global economic crisis are on course to reverse years of development gains in many countries and undermine international efforts to reduce poverty. In 2013, The Economist magazine dubbed Africa the “hopeful continent” and not by accident. An almost uninterrupted sustainable development since the 90s has replaced decades of sluggish growth rates, and the term “Africa Rising” was coined to explain the rapid economic growth in the continent. Young (2012) estimated annual consumption growth rates in Africa to exceed 3 percent on average, much higher than any developed country, describing it as the “African growth miracle”. Nonetheless, despite the rising optimism, a recent report from the United Nations Development Programme (UNDP) (2019) cautioned that the ripples from the economic success are not equally distributed. Economic opportunities for many individuals remain thin, especially for those at the bottom of the income distribution.

Socioeconomic indicators that shed light on the extent of progress across generations are scarce, prone to measurement error or nonexistent for most African countries. Unlike developed economies, African countries lack matched parent-child income tax administrative records, whereas household consumption data by generation are too noisy and available only for a handful of countries. Several studies recently attempted to circumvent the lack of reliable longitudinal datasets by linking parents to the children educational levels, as a proxy of socioeconomic status (see Alesina et al., 2020; World Bank, 2018). As a proxy of economic status, education has the advantage that its level is relatively easy to measure from survey data and is comparable across countries and generations. Building on the literature, we exploit time variation in education attainment to measure absolute intergenerational mobility in education since 1920. We contrast our measures across birth-cohorts, countries and regions but also within sub-populations and demographic groups. In addition to the education mobility indices, we also constructed novel occupational mobility indices. This paper is the first to study occupational attainment across generations in Africa. Occupational mobility represents a good proxy for income mobility and delivers a better proxy of socioeconomic status than educational mobility. We begin by classifying all occupations into white-collar, blue-collar and broadly defined agricultural occupations. The latter is by far, the biggest category and includes all individuals employed into the farming, fishing and forestry sectors but also all other elementary occupations.

We compile our dataset from harmonized cross-country representative census data covering 20 million parents children matched individuals residing in 28 African countries and around 2800 districts. We begin by documenting rising birth-cohorts intergenerational mobility of education, a significant rural-urban divide and a conspicuous but narrowing

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2 https://www.economist.com/special-report/2013/03/02/a-hopeful-continent
cross-generational gender gap. Moreover, we report a staggering heterogeneity in educational intergenerational mobility rates across but also within African countries. Moving into occupational attainment, we illustrate that, in Africa, a child born (or adopted) from parents working in one of the traditional low skilled agricultural sectors has more than 80 percent likelihood to follow the parents’ footsteps across all birth cohorts. These findings reflect the persistence of poverty rates and lack of opportunities in many African countries. Disaggregating the data by gender and regions shows that children born in rural areas exhibit a 10 percent lower probability of upward mobility in occupational status than their peers born in urbanized areas. On the other hand, a striking finding is that boys have a significantly higher probability than girls for downward occupational intergenerational mobility. Expectedly, we observe a considerable variation on cross-countries and granular district-level occupational mobility.

We also examine the link between literacy and job status for children in which we observe both the parental and own educational and occupational attainment. We demonstrate that while upward mobility across generations in education is rising, upward occupational intergenerational mobility is persistently low over time. On the other hand, looking into downward mobility, the two socioeconomic indicators move hand in hand. This finding suggests that the increase in education level was not translated into better jobs for everyone, thus underscoring the general African unemployment problem. Several factors may drive this divergence, including market and policy failures, the absence of labour opportunities, or the mismatch of skills.

To get further insights into the factors associated with social mobility, we explore the determinants of upward and downward mobility in education and occupations. We regress upward mobility in education/occupation on a set of individual characteristics (age, gender, marital status, place of birth), family characteristics (family size, financial constraints proxied by access to electricity and water), a set of birth-decade for the old generation and time-decade dummies and several macro-variables. We find that higher upward (downward) intergenerational mobility in education and occupation are positively (negatively) associated with access to electricity and water. On the other hand, family size, rural residence and being married are negatively (positively) associated with upward (downward) intergenerational mobility measures in education and occupational attainment. Disaggregating into gender, the results show that women have a higher (lower) probability of upward (downward) mobility in education and occupation attainment, as they start from a low base. We also run the estimates for each country separately and find many heterogeneities between African countries. In general, not only the size of the effects of the different variables on the likelihood of upward and downward social mobility differ between countries, but also some variables (gender status, access to water, etc.) positively affect social mobility in some countries and negatively in other countries.

We then investigate what socioeconomic indicators correlate, at the country level, with upward and downward mobility. We find that after conditioning on individual and family
characteristics, GDP per capita, public spending in education, the quality of institutions and social protection coverage are positively (negatively) associated with upward (downward) education and occupation mobility. On the other hand, the level of fragility of countries and the endowment in natural resources are negatively (positively) associated with upward (downward) education and occupation mobility.

Our overall findings yield three broad lessons. First, the time and place a child lives in in Africa matter markedly. For many children, the place and birth years matter for their future socioeconomic status mostly because of differences in labour market and education opportunities. In this regard, African countries should implement targeted policies to tackle the rural/urban divide, the gender gap and regional inequalities. Sustaining education spending and investing in human and physical capital will be key to bridge the existing gaps, create and share opportunities to all citizens. Second, our analysis shows that opportunities in education and occupation are persistently low for children residing in households who have no access to electricity and water. In many African countries, children are still dropping out of school because of routine household needs such as going to the river to fetch water. This suggests that investment in basic infrastructure could enhance education and employment opportunities in Africa and help lift households out of poverty. Third, our findings imply that good governance and social policies could create educational and employment opportunities for the children. Therefore, African countries should promote good governance, enact policies aiming to extend social protection coverage and reduce the risk of violent conflict, which are all key predictors of social mobility in the continent. The current difficult macroeconomic conditions, the sizeable job loss and the closures of schools following the outbreak of the COVID-19 pandemic could worsen social mobility in Africa and widen the existing gaps.

The paper contributes to the empirical intergenerational social mobility literature in several ways. First, we complement the very limited emerging studies on social mobility in developing countries. Until very recently, no empirical cross-country study on intergenerational mobility existed in Africa using high-quality data. Alesina et al. (2020) is the first paper to use a rich set of Census data to develop simple absolute measures of upward and downward intergenerational mobility in education across and within most African countries. We complement these two studies by constructing intergenerational mobility indicators by 5-year age groups since the 1920s. Second, to the best of our knowledge, for the first time, we develop absolute intergenerational mobility measures for the occupational attainment, a closer proxy to socioeconomic status. Given the enormous unemployment problem in Africa, the occupational attainment mobility indices' availability could benefit policymakers and academics alike. Third, we explore both the micro and macro determinants of intergenerational mobility in education and occupations,
which were not both covered in previous studies. Additionally, we provide, for the first time, estimates for the association between family and individual background characteristics and social mobility in Africa. Finally, we show the correlation of macroeconomic and political aggregates with our social mobility intergenerational indicators that could be used as an input to future research models.

The remainder of the paper is organized as follows. Section 2 describes data sources and limitations. Section 3 and section 4 present the intergenerational mobility indicators across time and space for educational and occupational attainment at the country and district level, respectively. Section 5 probes further into the results by analyzing the determinants of educational and occupational mobility. Section 6 concludes with the final remarks.

II. DESCRIPTION OF THE DATA

Throughout the paper, we use household census data from the Integrated Public Use Microdata Series (IPUMS) international dataset, a project hosted at the University of Minnesota. The complete dataset contains 127,243,163 individual records, retrieved from 76 census survey data covering 28 African economies (i.e., Benin, Botswana, Burkina Faso, Cameroon, Egypt, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Liberia, Malawi, Mali, Mauritius, Morocco, Mozambique, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, South Sudan, Tanzania, Togo, Uganda, and Zambia, Zimbabwe) conducted from the early 1970s up to the beginning of 2010s. The dataset contains a great deal of other information on individual characteristics such as province/district of birth and current residence, birth year, sex and marital status. Table 1 below lists all the countries and Census used and the total number of Households and individuals of the raw dataset.

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5 https://international.ipums.org/international.

6 Of the 76 censuses, all except those from Nigeria, for which only a sequence of labor force surveys are available, are representative samples (typically 10%, but sizes vary) drawn from the full censuses. We did not consider Togo’s 1960s, Burkina’s Faso 1985, Kenya’s 1969, 1979, Rwanda’s 1991 and Liberia 1974 Census surveys because the persons were not organized into households or because of missing information regarding both educational and occupational attainment. In Egypt and Ethiopia some geographical regions are missing from the 1986 and 1984 census respectively. In South Africa in 1996 1.3% of the survey is not organized into households. In Morocco’s 2014 survey the age is organized into groups.
Table 1. Sample of Countries

| No | Country    | Census                | Individuals | Households |
|----|------------|-----------------------|-------------|------------|
| 1  | Benin      | 1979,1992,2002,2010   | 2,524,628   | 446301     |
| 2  | Botswana   | 1981,1991,2001,2010   | 600,289     | 151714     |
| 3  | Burkina Faso| 1996,2006            | 2,498,870   | 393838     |
| 4  | Cameroon   | 1976,1987,2005        | 3,406,084   | 681153     |
| 5  | Egypt      | 1986,1996,2006        | 19,983,770  | 4412601    |
| 6  | Ethiopia   | 1984,1994,2007        | 15,882,990  | 3483999    |
| 7  | Ghana      | 1984,2000,2010        | 5,669,774   | 1218677    |
| 8  | Guinea     | 1983,1996,2014        | 2,237,824   | 366609     |
| 9  | Kenya      | 1989,1999,2009        | 6,323,580   | 1437197    |
| 10 | Lesotho    | 1996,2006             | 368,003     | 78814      |
| 11 | Liberia    | 2008                  | 348,057     | 68836      |
| 12 | Malawi     | 1987,1998,2008        | 3,132,039   | 713882     |
| 13 | Mali       | 1987,1998,2009        | 3,228,570   | 534229     |
| 14 | Mauritius  | 1990,2000,2011        | 352,737     | 94021      |
| 15 | Morocco    | 1982,1994,2004,2014  | 7,131,045   | 1407035    |
| 16 | Mozambique | 1997,2007             | 3,598,565   | 830054     |
| 17 | Nigeria    | 2006,2007,2008,2009,2010 | 426,395 | 96023     |
| 18 | Rwanda     | 2002,2012             | 2,624,679   | 587221     |
| 19 | Senegal    | 1988,2002,2013        | 2,940,312   | 343793     |
| 20 | Sierra Leone| 2004                | 494,298     | 82518      |
| 21 | South Africa| 1996,2001,2007,2011,2016 | 16,141,863 | 4641495    |
| 22 | South Sudan| 2008                  | 542,765     | 92592      |
| 23 | Sudan      | 2008                  | 5,066,530   | 922816     |
| 24 | Tanzania   | 1988,2002,2012        | 10,541,181  | 2265160    |
| 25 | Togo       | 1970,2010             | 608,539     | 125318     |
| 26 | Uganda     | 1991,2002,2014        | 7,552,455   | 1598444    |
| 27 | Zambia     | 1990,2000,2010        | 3,105,551   | 566531     |
| 28 | Zimbabwe   | 2012                  | 654,688     | 160728     |
|    | Total: 76  | 127,243,163           | 27,654,503  |

Notes: the table shows the number of observations in our dataset. In total there are around 127 million individuals residing in 28 million households. The total number of countries used is 28 across 76 censuses.

A. Data limitations

There are three main limitations of using cross-sectional Census data: (i) a cohabitation bias because we link parents to children residing in the same household; (ii) survivorship bias as some individuals may not be alive since the conduct of the Census; (iii) occupational change in a generation bias due to the fact we do not track the occupation or the education of the parents’ children pairs across the life-cycle. The last two biases are relatively small and should not affect the overall intergenerational mobility picture. First, the attrition rates are unlikely to change the overall results so the survivorship bias should be relatively small. As intergenerational mobility indices are measured within households, it is plausible that children who died before the conduct of the Census or the completion of their studies would have the
same level of studies as surviving siblings, assuming that there is no discrimination between kids within the households. Another potential source of attrition concerns household members who have migrated or left the household, but we do not have their data. Second, the occupational change over the lifecycle should also not affect our results as professional training remains limited in many African countries, thus constraining the likelihood of changing occupations vertically or receiving education or formal training later in life. For instance, a farmer may consider switching to an elementary job and vice-versa but is unlikely to receive proper training in mid-life so he/she can switch to a higher skilled job.

The main concern regarding our Census dataset could be considered the cohabitation selection bias. In contrast to administrative data, linking parents to children residing in separate houses is, in our dataset, impossible. One can argue that more educated and better paid children separate from their parents early in adulthood, whereas less privileged children tend to live with their parents. However, while this is a well-known fact for developed economies, in Africa this is more complex. Some disadvantaged African young adults may separate from their parents in search for better job prospects and opportunities. Child brides is also very common in Africa’s poorest regions hindering educational and occupational opportunities: 40% of women aged 20-24 years are child brides (UNICEF, 2014). Table 2 compares the educational levels for the young generation, age 45 years or less, with observed parental educational level vs individuals whose parents’ education is not observed. Table 3 reports the same results for the occupational attainment. In each table, we present the difference in the percentage of individuals for each attainment level and the p-value of the T-test about the significance of the difference. The fraction of the secondary and tertiary education people whose parents’ education is observed is very close to the fraction of those whose parental education status is missing, but the difference is significant. Table 3, on the other hand, suggests that the fraction of individuals occupied in agriculture and whose parent’s occupation is observed is larger than the same group of people whose parents’ occupational status is unobserved. This difference stands at around 11 basis points. The two tables show that the differences in education and occupation attainment between children with observed and unobserved parental education and occupation data are statistically significant, suggesting there may be a bias in the intergenerational mobility results. However, the direction of the bias is unknown as the intergenerational mobility indices are relative to parents’ occupations and education levels, which are unknown for some children.
Table 2. Young Education, Observed vs Unobserved Parental Education

| Educational attainment | Parents education observed | Parents education unobserved | Difference (3-5) | T-test p-value |
|------------------------|-----------------------------|------------------------------|------------------|----------------|
| Less than primary completed | 8,114,822 39.8 | 15,428,248 54.2 | -14.4 | 0.0 |
| Primary completed      | 8,507,298 41.8 | 8,159,540 28.7 | 13.1 | 0.0 |
| Secondary completed    | 3,246,034 15.9 | 3,972,114 14.0 | 2.0 | 0.0 |
| University completed   | 510,959 2.5 | 900,275 3.2 | -0.7 | 0.0 |
| Total                  | 20,379,113 100.0 | 28,460,177 100.0 |                  |                |

Note: Table 2 shows the educational level for individuals, aged 14-45, whose own and parental educational level is observed (i.e. coresiding with their parents) vs individuals, aged 14-45, whose own and parental is unobserved (no coresidence).

Table 2. Young Occupation, Observed and Unobserved Parental Occupation

| Occupational attainment | Parents education observed | Parents education unobserved | Difference (3-5) | T-test p-value |
|-------------------------|-----------------------------|------------------------------|------------------|----------------|
| Agricultural and Elementary | 3,423,662 72.3 | 10,679,883 61.0 | 11.3 | 0.0 |
| Blue collars            | 1,020,271 21.5 | 4,884,936 27.9 | -6.4 | 0.0 |
| White collars           | 292,515 6.2 | 1,942,578 11.1 | -4.9 | 0.0 |
| Total                   | 4,736,448 100.0 | 17,507,397 100.0 |                  |                |

Note: Table 3 shows the occupational level for individuals, aged 45 or less, whose own and parental occupational level is observed (i.e. coresiding with their parents) vs individuals, aged 45 or less, whose own and parental occupation is unobserved (no coresidence).

B. Educational attainment

We restrict our sample to all individuals, born between 1920-2000, aged 14 years or above for whom we observe their education and parental education, following Alesina et al. (2020). We also dropped households with more than 20 members (approximately 2% of the sample) to reduce dispersion and outliers, and children whose age is very close or exceeds their parents’ average age. The final sample consists of around 72 million individuals; 23 million parents-children matched pairs across 28 countries. Roughly 2/3 (14 million) of the matched parents have not completed primary school and are considered non-educated. Each country’s sample size in each survey is given in Table A1 and A2 in Appendix A. The educational levels are classified into four categories: no school certificate, primary, secondary, and tertiary education, with primary education referring to the compulsory education. For the parents education we take the average attainment of individuals one generation older in the household, rounded to the nearest integer. Table 4 summarises the share of educated and non-educated parents and the sample size for each country.

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7 As robustness, we increase the minimum age to 18 and 25. The results are in Appendix E.

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Table 3. Parents’ Literacy Rate

| Country   | Illiterate parents (percent) | Literate parents (percent) | Total |
|-----------|------------------------------|---------------------------|-------|
| Benin     | 80.59                        | 19.41                     | 372,130 |
| Botswana  | 57.34                        | 42.66                     | 110,337 |
| Burkina Faso | 92.67                   | 7.33                      | 366,416 |
| Cameroon  | 58.46                        | 41.54                     | 458,587 |
| Egypt     | 76.84                        | 23.16                     | 5,635,419 |
| Ethiopia  | 94.46                        | 5.54                      | 1,372,629 |
| Ghana     | 58.10                        | 41.90                     | 1,052,808 |
| Guinea    | 84.39                        | 15.61                     | 337,771  |
| Kenya     | 50.54                        | 49.46                     | 1,027,329 |
| Lesotho   | 74.08                        | 25.92                     | 93,114   |
| Liberia   | 59.40                        | 40.60                     | 59,122   |
| Malawi    | 71.68                        | 28.32                     | 329,560  |
| Mali      | 89.74                        | 10.26                     | 509,439  |
| Mauritius | 42.26                        | 57.74                     | 96,427   |
| Morocco   | 87.15                        | 12.85                     | 2,229,031 |
| Mozambique | 87.32                    | 12.68                     | 451,955  |
| Nigeria   | 49.21                        | 50.79                     | 74,474   |
| Rwanda    | 69.98                        | 30.02                     | 329,988  |
| Senegal   | 80.16                        | 19.84                     | 608,154  |
| Sierra Leone | 75.75                  | 24.25                     | 86,567   |
| South Africa | 36.36                   | 63.64                     | 3,506,219 |
| South Sudan | 89.74                    | 10.26                     | 88,568   |
| Sudan     | 87.75                        | 12.25                     | 972,688  |
| Tanzania  | 52.16                        | 47.84                     | 1,534,897 |
| Togo      | 67.59                        | 32.41                     | 43,100   |
| Uganda    | 56.99                        | 43.01                     | 1,072,014 |
| Zambia    | 44.68                        | 55.32                     | 584,921  |
| Zimbabwe  | 32.62                        | 67.38                     | 83,844   |

Note: Table 4 shows the parents’ literacy rate for children aged 14 years or older residing with their parents across the 28 countries. Column (2) and (3) report the percentage rate of each category and column (4) the total number of observations. Parent’s education comprises the average attainment of parents and extended family members one generation older than the immediately previous generation living in the same household.

C. Occupational attainment

The construction of occupational measures of intergenerational mobility is more challenging. Occupational choice naturally follows the completion of the school studies and in many African countries, it is illegal before age 18. Nevertheless, to maximize coverage
and comparability we maintained the minimum age of 14 to maximize the sample size and better take onboard those individuals who drop out early from school. As robustness, we increase the age limit to 18 and 25 and the results remain broadly unchanged (see Table C4 in Appendix C). Our final dataset includes around 5 million individuals, obtained from 65 harmonized censuses and 27 countries, in which both their occupational status and parents are observed. For a detailed description of samples and countries see tables A3 and A4 in Appendix A. The occupational categories in IPUMS data are classified according to the ISCO-80\(^8\) which consists of 11 occupational types. To reduce the sparseness of mobility tables we reduced the classified/merged ISCO categories into three groups a) white-collar jobs (high skill jobs), b) blue-collar jobs (medium skill jobs) and c) agricultural/elementary jobs\(^9\) (low skill jobs) (see Table 5 and 6 for the classification and the size of each category, respectively).

| Table 4. Occupational Attainment |
|----------------------------------|
| **Occupation, ISCO general** | **White collar (high skill)** | **Blue collar (medium skill)** | **Agricultural and Elementary (low skill)** |
| Legislators, senior officials and managers | ✓ | | |
| Professionals | ✓ | | |
| Technicians and associate professionals | | ✓ | |
| Clerks | | ✓ | |
| Service workers and shop and market sales | | ✓ | |
| Skilled agricultural and fishery worker | | | ✓ |
| Crafts and related trades workers | ✓ | | |
| Plant and machine operators and assemble | | ✓ | |
| Elementary occupations | | | ✓ |

Note: The table displays the grouping of the nine broad ISCO-08 occupational categories into white collar (high skills), blue collar (medium skills) and agricultural & elementary jobs (low skills). Military and other unclassified professions are excluded.

\(^8\) The employment modules of IPUMS international database contain information on the industry of affiliation (based on an adaptation of 3-digit ISIC), occupation (based on ISCO-8), and ownership category (self-employed, working for other households, state-owned economic sector, collective economic sector, private economic sector, foreign-invested sector). ISCO-08 refers to the international standard of classification of occupations endorsed by the international labor organization (ILO) in March 2008.

\(^9\) We dropped from our sample all military related professions and occupations that are not classified.
Table 5. Parents’ Occupational Status

| Country       | Low skills (percent) | Medium skills (percent) | High skills (percent) | Total (number of individuals) |
|---------------|----------------------|-------------------------|-----------------------|-------------------------------|
| Benin         | 61.02                | 37.25                   | 1.73                  | 134,983                       |
| Botswana      | 51.29                | 37.23                   | 11.48                 | 12,372                        |
| Burkina Faso  | 96.17                | 3.74                    | 0.09                  | 115,074                       |
| Cameroon      | 87.29                | 9.81                    | 2.90                  | 89,794                        |
| Egypt         | 52.88                | 35.15                   | 11.97                 | 746,259                       |
| Ethiopia      | 95.73                | 3.97                    | 0.29                  | 643,764                       |
| Ghana         | 69.33                | 27.05                   | 3.61                  | 431,017                       |
| Guinea        | 75.15                | 23.04                   | 1.81                  | 140,727                       |
| Kenya         | 85.19                | 12.96                   | 1.85                  | 46,190                        |
| Lesotho       | 62.83                | 31.84                   | 5.33                  | 12,581                        |
| Malawi        | 87.52                | 10.66                   | 1.82                  | 91,951                        |
| Mali          | 86.43                | 12.09                   | 1.48                  | 201,761                       |
| Mauritius     | 49.37                | 40.19                   | 10.44                 | 41,334                        |
| Morocco       | 62.26                | 34.68                   | 3.06                  | 474,017                       |
| Mozambique    | 90.37                | 8.14                    | 1.49                  | 171,037                       |
| Nigeria       | 80.58                | 11.62                   | 7.80                  | 10,604                        |
| Rwanda        | 96.96                | 2.43                    | 0.61                  | 117,068                       |
| Senegal       | 65.34                | 29.68                   | 4.98                  | 178,450                       |
| Sierra Leone  | 81.33                | 15.28                   | 3.39                  | 35,275                        |
| South Africa  | 38.67                | 39.64                   | 21.68                 | 105,924                       |
| South Sudan   | 80.98                | 15.80                   | 3.22                  | 36,562                        |
| Sudan         | 81.49                | 9.88                    | 8.63                  | 193,490                       |
| Tanzania      | 92.79                | 3.86                    | 3.35                  | 607,224                       |
| Togo          | 79.29                | 20.09                   | 0.61                  | 2,772                         |
| Uganda        | 91.71                | 6.19                    | 2.10                  | 145,063                       |
| Zambia        | 86.33                | 11.09                   | 2.58                  | 124,368                       |
| Zimbabwe      | 84.99                | 10.18                   | 4.84                  | 18,755                        |

Note: Table 6 shows the parents’ skill level for children aged 14 years or older that residing with at least one older generation individual across the 27 countries. Columns (1), (2) and (3) report the percentage rate of each category and column (4) the total number of observations. Parent’s occupation comprises the average attainment of parents and extended family members one generation older than the immediately previous generation living in the same household.

D. Transition matrices

Figure 1 below provides descriptive transition matrices for educational and occupational attainment in our sample and across two distinctly different countries, Botswana and Guinea (see Appendix B figure B1 for the remaining countries). On the left hand, we show the transition matrices for educational attainment, while on the right hand the transition matrices for occupational attainment. The horizontal axis displays the parents’ cohort. The bar width
reflects the fraction of the old cohort in each educational and occupational level respectively. The y-axis displays the average conditional probability of the child to end up in each category.

Considering the top right chart representing education attainment in Africa across 28 countries across all years, around 65% of the old generation is non-educated. Another 20% has finished primary school with only 15% graduated from at least a secondary school. In the first category, kids born from non-educated parents have a 55% probability of following their parents’ footsteps and remaining non-educated. In contrast, for children with educated parents, the probability drops down to less than 25%. Disparities across countries are sizable. In Guinea the likelihood that a kid born from non-educated parents completes primary school is less than 25% while for their peers born in Botswana, that probability is more than 70%.

As for occupational attainment on the right-hand side panel of figure 1 the results are more striking. Most African parents are employed in agricultural jobs and 80% of their children end up in the same sector. Again, considerable heterogeneity exists among countries e.g., in Botswana the number drops around 55% while it reaches almost 85% in Guinea. (See in Appendix B figure B2 for the remaining countries).

III. Measuring Social Mobility

Our primary goal is to (i) assess the differences in social mobility across generations in Africa; (ii) contrast the two measures of social mobility, educational and occupational attainment; (iii) compare the evolutions across countries, regions and demographic groups; (iv) uncover the determinants of mobility rates; and (v) exemplify the link between generational social mobility and economic development.

To measure intergenerational social mobility, we must characterize the joint distribution of parental social status and child opportunities. The standard approach in the literature has focused on the joint distribution of child and parent income. The latter was summarized by the intergenerational elasticity of (lifetime) earnings (IGE) (e.g., Zimmerman, 1992, Solon, 1999, Mazumder, 2005, Black and Devereux, 2010) or, more recently, by rank-rank correlations (Dahl and Deleire, 2008). Nonetheless, in Africa income indicators sources are scarce and prone to estimation errors.

Two recent studies use primary educational attainment as a proxy of economic status (Alesina et al., 2020; Azomahou and Yitbarek, 2020). Both studies document a declining cohort trend in the intergenerational persistence of primary education since independence. Nevertheless, the education of parents remains a strong determinant of the educational outcomes of children. Based on these studies, we construct absolute measures of upward and downward mobility in education across countries. Furthermore, we complement the literature by developing absolute measures of upward and downward mobility in occupational status. Occupation is a more reflective indicator of social status than education alone and is correlated with lifetime earnings.
Figure 1. Intergenerational Mobility Transition Matrices

Panel A

Panel B

Panel C

Panel D

Panel E

Panel F

Note: Education (left) and occupation (right) Transition Matrices in social status. The x-axis represents the old generation with the width of bars reflecting the fraction of old individuals in each segment. The y axis displays the likelihood of the young generation to achieve the corresponding social status. The sample consists of individuals aged 14 or older coresiding with at least one older generation individual. The sample for education consists of 28 countries and 76 censuses, whereas the occupation sample includes 27 countries and 65 censuses.

A. Education attainment

We map within a household all the children above 14 with their parents. We describe an individual as educated if they have completed at least primary school and non-educated otherwise. We then construct absolute measures of intergenerational mobility (IM) as follows:
Upward IM: we assign a value of 1 if the child born or adopted from non-educated parents has completed primary school and zero otherwise.

Downward IM: we assign a value of 1 if the child born or adopted from educated parents has not completed primary school and zero otherwise.

We pool all observations together and we compute means among all individuals from whom we observe the parents’ education attainment by the decade of birth. Following Alesina et al., (2020), we maximize coverage by mapping young individuals to the mean educational level (rounded up to the nearest integer) of the generation immediately above within the household and not only with the head of the family. We characterize as parental education the mean educational level of the head of the family, the spouse and the siblings of the head of the family. This helps to better capture orphan and abandoned children who live with the siblings of their biological parents, and the potential impact of other family members on the child development (Mkhize, 2006; Madhavan et al., 2012).

A.1. Intergenerational mobility in education status

We examine heterogeneity across birth cohorts for the entire African region. In this section we report pan-African averages across cohorts and cohort averages across countries. For brevity we report average mobility rates for each country across birth cohorts in Appendix C1. Figure 2 plots the average upward and downward intergenerational mobility in educational attainment for selected cohorts. The birth-cohorts are aged by 5-year intervals, beginning in 1920 up to the last cohort born in the 2000s. The top panel looks at boys and girls’ educational mobility separately, while the middle pane contrasts educational mobility in rural and urban areas.

The chart indicates that educational attainment in Africa has improved significantly over the period. The likelihood of upward mobility increases over recent cohorts reaching up to 50% for children born after the millennium. On the other side, downward mobility is falling over time with a small rebound after the 1990s. In general, the unconditional likelihood that a child born from educated parents in Africa does not complete primary education is less than 20%. A striking result is that the gender gap in educational mobility has vanished for kids born in the 1990s, reflecting improved educational opportunities for boys and girls. Nevertheless, the rural-urban divide is strong across all birth-cohorts without signs of shrinkage across time. On average, children living in urban regions have a 10% higher probability of upward mobility than their rural regions’ peers. Nonetheless, there is an increasing (decreasing) trend for upward (downward) mobility in both groups of people over the period.

In the bottom panel we distinguish between parents born at different time intervals. We see that parents’ age, children’s age and year of birth contribute to Africa’s intergenerational mobility. If this were the only cohort observed, these effects would be hard to disentangle as time and age evolve in parallel and we only observe one cohort. We could not claim whether the increase in education rate is cohort-specific, a pure age effect, or if it reflects a common time trend that affects all cohorts in all the years.
Figure 2. Intergenerational Mobility Evolution in Africa, Education

Panel A

Upward IM
Africa, aged 14+

Panel B

Downward IM
Africa, aged 14+

Panel C

Upward IM
Africa, aged 14+

Panel D

Downward IM
Africa, aged 14+

Panel E

Upward IM, education by parent cohort
Africa, aged 14+

Panel F

Downward IM, education by parent cohort
Africa, aged 14+

Notes: The left panel shows the pan African upward intergenerational mobility (IM up) and the right panel the downward intergenerational mobility (IM down). The sample consists of 28 countries and 76 censuses. The IM up (down) is the average probability of children, aged 14+ born from non-educated (educated) parents to (fail) complete primary school. The x-axis corresponds to the birth-year of the children in intervals of 5 years. The top panel distinguishes between boys and girls, the middle panel between urban vs rural residence. Finally, the bottom panel shows the intergenerational mobility for different parents age birth cohorts.
A.2. The geography of intergenerational mobility in education

Table 7 shows the intergenerational mobility across countries averaged across all birth-cohorts. The table reveals a variation of intergenerational mobility in education across countries. On average, in Africa, less than 41% of children from non-educated parents have completed primary education. Downward IM is considerable, as approximately one out of four children born to educated parents does not complete primary education. Heterogeneity in mobility across countries is staggering; while the top countries including Botswana, Nigeria, South Africa, Mauritius and Zimbabwe are reporting upward IM above 60%, the bottom countries including Burkina Faso, Ethiopia and South Sudan, upward IM’s likelihood is less than 15% on average. In general, all the countries that exhibit higher upward mobility numbers also show significantly lower downward mobility figures. The gender gap is conspicuous, especially for low upward mobility countries. Lastly, urban-rural divide, as expected, is noticeable across all the African countries.

Table 6. Average Intergenerational Mobility in Education by Country

| Country     | Census years | Upward IM All | Upward IM Males | Upward IM Females | Upward IM Urban | Upward IM Rural | Downward IM All | Downward IM Males | Downward IM Females | Downward IM Urban | Downward IM Rural |
|-------------|--------------|---------------|-----------------|-------------------|----------------|----------------|-----------------|-------------------|-------------------|----------------|-----------------|
| Benin       | 1979,1992,2002,2010 | 0.31 | 0.36 | 0.24 | 0.45 | 0.25 | 0.22 | 0.17 | 0.26 | 0.18 | 0.31 |
| Botswana    | 1981,1991,2001,2010 | 0.64 | 0.59 | 0.68 | 0.69 | 0.51 | 0.08 | 0.09 | 0.06 | 0.12 | 0.23 |
| Burkina Faso| 1996,2006       | 0.15 | 0.16 | 0.13 | 0.52 | 0.12 | 0.25 | 0.24 | 0.26 | 0.22 | 0.55 |
| Cameroon    | 1976,1987,2005  | 0.47 | 0.50 | 0.43 | 0.69 | 0.43 | 0.13 | 0.13 | 0.13 | 0.08 | 0.25 |
| Egypt       | 1986,1996,2006  | 0.54 | 0.59 | 0.47 | 0.63 | 0.48 | 0.10 | 0.09 | 0.11 | 0.09 | 0.14 |
| Ethiopia    | 1984,1994,2007  | 0.15 | 0.16 | 0.13 | 0.58 | 0.08 | 0.28 | 0.28 | 0.29 | 0.15 | 0.67 |
| Ghana       | 1984,2000,2010  | 0.49 | 0.54 | 0.45 | 0.64 | 0.44 | 0.15 | 0.13 | 0.17 | 0.11 | 0.22 |
| Guinea      | 1983,1996,2014  | 0.26 | 0.30 | 0.21 | 0.53 | 0.15 | 0.29 | 0.24 | 0.35 | 0.24 | 0.51 |
| Kenya       | 1989,1999,2009  | 0.53 | 0.53 | 0.52 | 0.65 | 0.51 | 0.18 | 0.19 | 0.17 | 0.11 | 0.21 |
| Lesotho     | 1996,2006       | 0.48 | 0.38 | 0.61 | 0.66 | 0.46 | 0.24 | 0.31 | 0.18 | 0.13 | 0.30 |
| Liberia     | 2008           | 0.32 | 0.37 | 0.27 | 0.45 | 0.25 | 0.44 | 0.41 | 0.46 | 0.36 | 0.58 |
| Malawi      | 1987,1998,2008  | 0.21 | 0.24 | 0.17 | 0.39 | 0.20 | 0.46 | 0.46 | 0.46 | 0.30 | 0.54 |
| Mali        | 1987,1998,2009  | 0.18 | 0.20 | 0.14 | 0.41 | 0.12 | 0.26 | 0.24 | 0.29 | 0.21 | 0.43 |
| Mauritius   | 1990,2000,2011  | 0.87 | 0.88 | 0.86 | 0.90 | 0.86 | 0.03 | 0.03 | 0.02 | 0.02 | 0.03 |
| Morocco     | 1982,1994,2004,2014 | 0.46 | 0.52 | 0.40 | 0.71 | 0.44 | 0.09 | 0.08 | 0.10 | 0.05 | 0.19 |
| Mozambique  | 1997,2007      | 0.15 | 0.18 | 0.12 | 0.30 | 0.08 | 0.45 | 0.44 | 0.47 | 0.39 | 0.68 |
| Nigeria     | 2006,2007,2008,2009,2010 | 0.67 | 0.67 | 0.67 | 0.77 | 0.65 | 0.06 | 0.06 | 0.07 | 0.04 | 0.08 |
| Rwanda      | 2002,2012      | 0.30 | 0.30 | 0.29 | 0.42 | 0.28 | 0.46 | 0.47 | 0.45 | 0.25 | 0.52 |
| Senegal     | 1988,2002,2013 | 0.28 | 0.30 | 0.26 | 0.46 | 0.18 | 0.22 | 0.21 | 0.24 | 0.21 | 0.37 |
| Sierra Leone| 2004           | 0.23 | 0.28 | 0.18 | 0.46 | 0.15 | 0.35 | 0.32 | 0.39 | 0.26 | 0.62 |
| South Africa| 1996,2001,2007,2011,2016 | 0.76 | 0.74 | 0.78 | 0.82 | 0.73 | 0.05 | 0.07 | 0.04 | 0.04 | 0.08 |
| South Sudan | 2008           | 0.07 | 0.09 | 0.05 | 0.15 | 0.06 | 0.65 | 0.63 | 0.68 | 0.60 | 0.70 |
| Sudan       | 2008           | 0.20 | 0.18 | 0.21 | 0.52 | 0.13 | 0.28 | 0.30 | 0.27 | 0.22 | 0.40 |
| Tanzania    | 1988,2002,2012 | 0.61 | 0.62 | 0.59 | 0.70 | 0.57 | 0.19 | 0.20 | 0.17 | 0.12 | 0.23 |
| Togo        | 1970,2010      | 0.42 | 0.47 | 0.33 | 0.67 | 0.38 | 0.29 | 0.29 | 0.34 | 0.20 | 0.40 |
| Uganda      | 1991,2002,2014 | 0.44 | 0.48 | 0.40 | 0.62 | 0.43 | 0.29 | 0.29 | 0.28 | 0.15 | 0.34 |
| Zambia      | 1990,2000,2010 | 0.47 | 0.51 | 0.44 | 0.66 | 0.39 | 0.22 | 0.22 | 0.23 | 0.17 | 0.42 |
| Zimbabwe    | 2012           | 0.75 | 0.75 | 0.75 | 0.92 | 0.72 | 0.12 | 0.13 | 0.10 | 0.04 | 0.16 |
| Average     |               | 0.41 | 0.42 | 0.39 | 0.59 | 0.36 | 0.24 | 0.24 | 0.25 | 0.18 | 0.36 |

Notes: the table demonstrates the simple country level estimates of IM up and IM down in education. Columns (1) to (5) measure the IM up, the likelihood a child aged 14+ born from non-educated parents finishes primary school. Column (2) and (3) shows the IM up for boys and girls respectively, whereas (4) and (5) the IM up separated for urban and rural regions. Columns (6) to (10) measure the IM down, the likelihood a child aged 14+ born from educated parents fails to finish primary school. Column (7) and (8) shows the IM up for boys and girls respectively, whereas (9) and (10) the IM down separated for urban and rural regions. The last rows report simple unweighted averages across the 28 countries.
Table 7. Average Intergenerational Mobility from Educated Parents

| Country    | Census years         | Upward IM | Downward IM |    |
|------------|----------------------|-----------|-------------|----|
|            |                      | Secondary | Tertiary    | Secondary | Tertiary |
| Benin      | 1979,1992,2002,2010  | 0.05      | 0.006       | 0.70      | 0.93      |
| Botswana   | 1981,1991,2001,2010  | 0.13      | 0.017       | 0.60      | 0.88      |
| Burkina Faso | 1996,2006             | 0.02      | 0.003       | 0.77      | 0.93      |
| Cameroon   | 1976,1987,2005        | 0.07      | 0.011       | 0.75      | 0.96      |
| Egypt      | 1986,1996,2006        | 0.31      | 0.058       | 0.43      | 0.75      |
| Ethiopia   | 1984,1994,2007        | 0.03      | 0.001       | 0.72      | 0.96      |
| Ghana      | 1984,2000,2010        | 0.10      | 0.006       | 0.67      | 0.92      |
| Guinea     | 1983,1996,2014        | 0.05      | 0.005       | 0.73      | 0.94      |
| Kenya      | 1989,1999,2009        | 0.10      | 0.004       | 0.70      | 0.91      |
| Lesotho    | 1996,2006             | 0.08      | 0.005       | 0.61      | 0.90      |
| Liberia    | 2008                 | 0.05      | 0.004       | 0.85      | 0.96      |
| Malawi     | 1987,1998,2008        | 0.04      | 0.001       | 0.72      | 0.96      |
| Mali       | 1987,1998,2009        | 0.02      | 0.007       | 0.73      | 0.88      |
| Mauritius  | 1990,2000,2011        | 0.16      | 0.025       | 0.58      | 0.83      |
| Morocco    | 1982,1994,2004,2014   | 0.13      | 0.017       | 0.51      | 0.86      |
| Mozambique | 1997,2007             | 0.01      | 0.001       | 0.83      | 0.94      |
| Nigeria    | 2006,2007,2008,2009,2010 | 0.28  | 0.029       | 0.53      | 0.81      |
| Rwanda     | 2002,2012             | 0.04      | 0.004       | 0.76      | 0.92      |
| Senegal    | 1988,2002,2013        | 0.05      | 0.006       | 0.74      | 0.92      |
| Sierra Leone | 2004                | 0.01      | 0.006       | 0.89      | 0.90      |
| South Africa | 1996,2001,2007,2011,2016 | 0.24  | 0.014       | 0.57      | 0.87      |
| South Sudan | 2008                | 0.01      | 0.003       | 0.90      | 0.96      |
| Sudan      | 2008                 | 0.04      | 0.035       | 0.74      | 0.77      |
| Tanzania   | 1988,2002,2012        | 0.08      | 0.012       | 0.68      | 0.88      |
| Togo       | 1970,2010             | 0.04      | 0.005       | 0.82      | 0.96      |
| Uganda     | 1991,2002,2014        | 0.05      | 0.009       | 0.75      | 0.89      |
| Zambia     | 1990,2000,2010        | 0.08      | 0.008       | 0.70      | 0.94      |
| Zimbabwe   | 2012                 | 0.05      | 0.011       | 0.76      | 0.89      |
| Average    |                      | **0.08**  | **0.011**   | **0.71**  | **0.90**  |

Notes: the table demonstrates the simple country level estimates of IM up and IM down in secondary and tertiary education. IM up in secondary education is the likelihood a child aged 25+ to complete secondary school if the parents’ educational level is up to the primary. IM up in the tertiary education is the likelihood a child aged 25+ to complete tertiary education if the parents’ educational level is up to secondary school. IM down in secondary education is the likelihood a child aged 25+ to not complete secondary school if the parents’ have completed secondary school. IM down in the tertiary education is the likelihood a child aged 25+ to not complete tertiary education if the parents’ have complete tertiary education. The last rows report simple unweighted averages across the 28 countries.
The upward and downward intergenerational mobility heterogeneity across countries is much more striking for higher educational attainment. Table 8 shows the average probability of the children’s upward and downward educational mobility to complete secondary and tertiary educational levels. It shows that the likelihood of upward mobility to complete secondary and tertiary education is 8% and 1.1% across the 28 African countries, respectively. Egypt, Nigeria and South Africa poses the highest likelihood, standing at around 31, 28% and 24%, respectively. On the other hand, in Burkina Faso, Mali and South Sudan, the likelihood of upward mobility to complete secondary and tertiary is very low, averaging 2% and 1%, respectively. The downward mobility is high exceeding 70%, indicating that lower mobility is much more likely outcome even among the most educated families. These figures contrast with several developed countries in which higher education level is rising among younger generations.

To have a glimpse of intergenerational mobility in education across countries and cohorts in Africa, we compare two age cohorts two generations (start and end period). Figure 3 shows the educational mobility indices for the birth-cohorts 1920-30 and in 1980-90. Two lessons can be drawn from this chart. First, all African countries have made progress towards improving educational mobility in recent decades compared to decades before independence. In general, upward educational mobility of individuals born in recent decades is higher than those born in 1920-30, while downward educational mobility has declined. The implementation of compulsory primary education and free, and the increase in schooling infrastructure in many countries has undoubtedly contributed to this educational mobility improvement. Second, progress has been uneven in Africa. Countries like Burkina Faso, Mozambique, and Ethiopia, who had low educational mobility in 1920-30, have made less progress than Botswana, South Africa, and Tanzania. Upward educational mobility increased from 10% for the birth-cohort 1920-30 in Botswana to 84.7% for the birth-cohort 1980-90, and downward educational mobility declined from 47% to 4.6% between the two birth-cohorts. In Mozambique, upward educational mobility has increased only from 1.6% to 17.5% between the 1920-30 and 1980-90 birth-cohorts, while downward educational mobility has declined from 60% to 45.6% between the two cohorts.
Figure 3. Educational Mobility for Birth-cohorts 1920-30 and 1980-90

Panel A. Upward educational mobility

Panel B. Downward educational mobility

Note: This figure shows the IM up (top panel) and IM down (bottom panel) for two selected birth age cohorts, 1920-30(blue) and 1980-90(red). The countries are sorted in ascending order based on the 1920s estimates.
B. Occupational attainment

Occupational mobility across generations has attracted considerable attention across many countries. Societies where occupations and positions are fixed and set at birth and are transmitted from parents to children through rigid schemes have little room for innovation and fulfillment at either the individual or collective level (Bourdieu et al., 2009). The subject is broadly covered for developed countries by a considerable existing literature (Ferrie, 2005; Hellerstein and Morrill, 2011; Ermisch and Francesconi, 2002). On the contrary, no such measures and studies have been conducted for the African region to our knowledge.

We use our rich dataset to deliver the first set of intergenerational occupational indices across 26 countries. We adopt the same methodology used to construct the educational IM indices. We pool together blue-collar and white-collar professions and we characterize them as higher occupational status, against the remaining agricultural, forestry, fishing and elementary professions. We define absolute measures of intergenerational occupational mobility (IM) as follows:

**Upward IM**: We assign a value of 1 if the child born or adopted from agricultural occupied (including the informal sector) parents has taken a blue-collar or white-collar occupation and zero otherwise.

**Downward IM**: We assign a value of 1 if the child born or adopted from parents working in white-collar or blue-collar professions has an agricultural occupation and zero otherwise.

We compute IM as the mean among the individuals whose parental occupational status are available. We maximize coverage by mapping young individuals to the mean occupational level (rounded up to the nearest integer) of the generation immediately above within the household rather than of the occupation of the head of the family only.

B.1. Intergenerational mobility in occupation status

We start by presenting average results for the entire African region (see Figure 4). The first emerging finding is that upward occupational IM figures are much lower than what emerged for educational mobility. Over time, upward IM follows an inverted U-shape pattern, modestly increasing for children born until independence, around the 1960s, and falling after to rise again in the very last cohort. The decline in the 1960s could be due to the political instability and civil wars in many African countries in the immediate aftermath of independence. At the beginning of the new millennium the unconditional probability of an upward mobility was less than 20% for both boys and girls. On the other hand, the downward IM results are striking with a significantly higher value for boys than girls. Historically, the likelihood for downward mobility hovers around 20% for girls. On the other hand, for boys the IM dropped from more than 50% in the mid 1920s to around 35% in 2000s. As expected, upward mobility is higher in urban regions, and downward mobility is higher in rural regions, but has significantly declined in recent decades as increasing urbanization is driving people out of the agriculture sector, particularly boys.

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10 We drop Liberia from our sample as it clearly stands out as outlier. In the remaining 10 omitted censuses the occupational status is missing.
Figure 4. Intergenerational Mobility (IM) Evolution in Africa, Occupation

Panel A
Upward IM, occupation
Africa, aged 14+

Panel B
Downward IM, occupation
Africa, aged 14+

Panel C
Upward IM, occupation
Africa, aged 14+

Panel D
Downward IM, occupation
Africa, aged 14+

Panel E
Upward IM, occupation by parent cohort
Africa, aged 14+

Panel F
Downward IM, occupations by parent cohort
Africa, aged 14+

Note: the left panel shows the upward intergenerational mobility (IM up) and the right panel the downward intergenerational mobility (IM down) in occupation. The IM up (down) is the average probability of children, aged 14+ born from parents occupied in agriculture (non-agriculture) sectors to be occupied (not occupied) in a non-agricultural job. The x-axis corresponds to the birth-year of the children in intervals of 5 years. The top panel distinguishes between boys and girls, the middle panel between urban vs rural residence. Finally, the bottom panel shows the intergenerational mobility for different parents age birth cohorts.
B.2. The geography of intergenerational mobility in occupation

Table 9 shows simple (unconditional) measures occupational IM across countries. As in educational attainment, we observe that the occupational IM index disguise sizeable variation across countries. On average, less than 20% of children managed to climb up the occupational ladder. On the other side, around 30% of the children born from parents occupied in non-agricultural sectors end up in agricultural professions. In terms of the distribution, the top three countries in terms of upward mobility are Botswana, South Africa and Egypt while the bottom three are Ethiopia, Mali and Burkina Faso. In these three countries, it is highly probable (almost 95%) that the children born from parents employed in agricultural will also be occupied in the same sectors. There is a negative correlation of 46% between the average measures of upward mobility and downward mobility across countries.

Table 8. Intergenerational Occupational Mobility for Each Country

| Country      | Census Years                  | All Males | Females | Urban | Rural | All Males | Females | Urban | Rural |
|--------------|-------------------------------|-----------|---------|-------|-------|-----------|---------|-------|-------|
| Benin        | 1979,1992,2002,2010           | 0.24      | 0.16    | 0.40  | 0.37  | 0.21      | 0.19    | 0.31  | 0.06  |
| Botswana     | 1981,1991,2001,2010           | 0.46      | 0.43    | 0.50  | 0.59  | 0.21      | 0.23    | 0.25  | 0.20  |
| Burkina Faso | 1996,2006                     | 0.02      | 0.01    | 0.02  |       |           |         |       |       |
| Cameroon     | 1976,1987,2005                | 0.12      | 0.13    | 0.09  | 0.38  | 0.07      | 0.18    | 0.19  | 0.17  |
| Egypt        | 1986,1996,2006                | 0.31      | 0.29    | 0.51  | 0.52  | 0.26      | 0.18    | 0.21  | 0.06  |
| Ethiopia     | 1984,1994,2007                | 0.03      | 0.01    | 0.05  | 0.33  | 0.02      | 0.28    | 0.36  | 0.17  |
| Ghana        | 1984,2000,2010                | 0.24      | 0.21    | 0.18  | 0.53  | 0.18      | 0.23    | 0.34  | 0.14  |
| Guinea       | 1983,1996,2014                | 0.16      | 0.16    | 0.15  | 0.68  | 0.13      | 0.12    | 0.14  | 0.09  |
| Kenya        | 1989,1999,2009                | 0.21      | 0.22    | 0.18  | 0.42  | 0.20      | 0.36    | 0.38  | 0.32  |
| Lesotho      | 1996,2006                     | 0.29      | 0.22    | 0.43  | 0.54  | 0.27      | 0.37    | 0.48  | 0.19  |
| Malawi       | 1987,1998,2008                | 0.08      | 0.11    | 0.05  | 0.33  | 0.07      | 0.44    | 0.41  | 0.49  |
| Mali         | 1987,1998,2009                | 0.05      | 0.04    | 0.07  | 0.26  | 0.04      | 0.29    | 0.33  | 0.17  |
| Mauritius    | 1990,2000,2011                | 0.75      | 0.73    | 0.80  | 0.80  | 0.73      | 0.10    | 0.11  | 0.07  |
| Morocco      | 1982,1994,2004,2014          | 0.27      | 0.27    | 0.28  | 0.61  | 0.25      | 0.25    | 0.27  | 0.20  |
| Mozambique   | 1997,2007                     | 0.12      | 0.19    | 0.05  | 0.35  | 0.08      | 0.32    | 0.23  | 0.44  |
| Nigeria      | 2006,2007,2008,2009,2010      | 0.16      | 0.15    | 0.19  | 0.31  | 0.14      | 0.22    | 0.25  | 0.14  |
| Rwanda       | 2002,2012                     | 0.08      | 0.11    | 0.05  | 0.19  | 0.08      | 0.37    | 0.32  | 0.41  |
| Senegal      | 1988,2002,2013                | 0.23      | 0.27    | 0.14  | 0.56  | 0.17      | 0.21    | 0.16  | 0.33  |
| Sierra Leone | 2004                          | 0.08      | 0.07    | 0.08  | 0.25  | 0.05      | 0.16    | 0.21  | 0.12  |
| South Africa | 1996,2001,2007,2011,2016      | 0.48      | 0.51    | 0.44  | 0.60  | 0.29      | 0.14    | 0.15  | 0.14  |
| South Sudan  | 2008                          | 0.22      | 0.18    | 0.27  | 0.31  | 0.21      | 0.46    | 0.53  | 0.38  |
| Sudan        | 2008                          | 0.09      | 0.09    | 0.10  | 0.58  | 0.06      | 0.37    | 0.38  | 0.30  |
| Tanzania     | 1988,2002,2012                | 0.05      | 0.06    | 0.05  | 0.15  | 0.03      | 0.32    | 0.33  | 0.32  |
| Togo         | 1970,2010                     | 0.11      | 0.10    | 0.15  | 0.64  | 0.13      | 0.38    | 0.48  | 0.19  |
| Uganda       | 1991,2002,2014                | 0.08      | 0.09    | 0.07  | 0.38  | 0.08      | 0.45    | 0.47  | 0.43  |
| Zambia       | 1990,2000,2010                | 0.07      | 0.07    | 0.06  | 0.38  | 0.04      | 0.25    | 0.25  | 0.27  |
| Zimbabwe     | 2012                          | 0.17      | 0.18    | 0.16  | 0.61  | 0.14      | 0.30    | 0.29  | 0.30  |
| Average      |                               | 0.19      | 0.19    | 0.21  | 0.45  | 0.16      | 0.28    | 0.31  | 0.24  |

Note: The table demonstrates the simple country level estimates of IM up and IM down in occupation. The sample consists of 27 countries and 65 censuses. Columns (1) to (5) measure the IM up, the likelihood a child aged 14+ born from agricultural parents is occupied in a non-agricultural job. Column (2) and (3) shows the IM up for boys and girls respectively, whereas (4) and (5) the IM up separated for urban and rural regions. Columns (6) to (10) measure the IM down, the likelihood a child aged 14+ born from parents occupied in the non-agricultural sector to work in the agricultural sector. Column (7) and (8) shows the IM up for boys and girls respectively, whereas (9) and (10) the IM down separated for urban and rural regions. The last rows report simple unweighted averages across the 27 countries.
Figure 5: Occupational Mobility for Birth-cohorts 1920-30 and 1980-90

Panel A. Upward occupational mobility

Panel B. Downward occupational mobility

Note: this figure shows the IM up (top panel) and IM down (bottom panel) for two selected birth age cohorts, 1920-30 (blue) and 1980-90 (red). The countries are sorted in ascending order based on the 1920s estimates.
In Figure 5, we compare the upward and downward mobility indices for the birth-cohorts 1920-30 and 1980-90 for each country. Contrary to Figure 3 where upward educational mobility has significantly increased for many countries between the two birth-cohorts, Figure 4 shows that upward occupational mobility has marginally increased in several countries, including Sierra Leone, Sudan and Tanzania, or remained broadly the same (Burkina Faso, Mali and Zambia). Yet, in Botswana and Mauritius, the likelihood of upward occupational mobility has doubled between 1920-30 and 1980-90. In addition, Figure 5 reveals that downward occupational mobility has significantly declined in Africa, particularly in countries where it was high in the 1920-30s.

C. The interplay of education and occupation intergenerational mobility

Figure 6 contrasts the educational and occupational mobility intergenerational indicators in Africa. The outstanding fact is the divergent trends of occupational and educational IM. This pattern indicates that more and more children of non-educated parents are completing primary school. At the same time fewer children born from parents with agricultural occupations are employed in higher level occupations. The right-hand chart documents downward occupational mobility. We observe that the two social mobility indicators move hand in hand, although downward educational mobility went up in the 2000s contrary to downward occupational mobility. Appendix D contains the figures comparing subpopulation.

| Figure 6. Intergenerational Mobility Evolution in Africa, Occupation vs Education |
|---|---|
| **Panel A** | **Panel B** |

Note: the left panel shows the *upward* intergenerational mobility (IM up) and the right panel the *downward* intergenerational mobility (IM down) in children for which both occupation and education is observed (and their parents).
We further examine the conditional probability of a child born from non-educated parents working in the agricultural sector finishes primary school to get employed in a higher occupational job. In other words, we examine the likelihood of moving up in occupation conditional to the fact that the child had managed to move up in education. Also, we examine the likelihood to move downward in occupation conditional to moving downward in education, relative to your parents. Figure 7 shows that the joint upward mobility in education and occupation decline over younger cohorts, suggesting that the occupational reward or premium from better education is declining over time. This disconnect between educational and occupational mobility indices in recent decades could be linked to two factors including the increasing high number of graduates while the creation of jobs remains weak, and the mismatch between labor market needs and the skills of graduates. The joint downward mobility is also declining over time, implying children who fail in education are less and less likely to work in the agriculture sector and are probably unemployed.

However, one surprising finding is that the probability for a child who upgraded in education attainment to experience a downward mobility in occupation is higher in the 1980s-90s than in the 1920s-30s. This finding could be explained by the lack of employment opportunities or not enough jobs creation in Africa. Figure 7 highlights that there no gender differences seem to emerge.

![Figure 7: Intergenerational Mobility Evolution in Africa, Occupation and Education](image_url)
IV. INTERGENERATIONAL MOBILITY AT THE DISTRICT LEVEL

In this section, we calculate the intergenerational mobility indices at the district level to explore within-country heterogeneities. The administrative divisions differ between countries (regions, states, provinces, counties, districts, etc.), and for simplicity, we will call them districts. Also, some districts have not been identified, therefore the average values in Table 10 and 11 could differ from those in Tables 7-8. Table 10 summarizes the key indicators/statistics for upward and downward mobility in educational attainment for each country, while Table 11 presents the indices for occupational mobility. Both tables shed light that there are substantial within-country heterogeneities. For example, there are some districts in Nigeria where almost all children experienced upward mobility in education. In other regions, less than 1% of children upgraded in terms of education attainment (see Figure 8). In Mali, there are some regions where children’s probability of being less educated than their parents is more than 70%, while in other regions the probability falls to about 18%. In Ghana, the northern districts have the lowest upward occupational mobility and the highest downward occupational mobility (Figure 9).

| Country name | Upward | Downward |
|--------------|---------|----------|
|              |         |          |
| Mean | Median | Max | Min | Mean | Median | Max | Min |
| Benin | 77 | 0.28 | 0.29 | 0.60 | 0.09 | 0.32 | 0.31 | 0.57 | 0.15 |
| Botswana | 21 | 0.65 | 0.62 | 0.78 | 0.50 | 0.09 | 0.09 | 0.19 | 0.04 |
| Burkina Faso | 45 | 0.11 | 0.10 | 0.47 | 0.02 | 0.43 | 0.43 | 0.77 | 0.21 |
| Cameroon | 39 | 0.54 | 0.58 | 0.83 | 0.16 | 0.20 | 0.17 | 0.58 | 0.05 |
| Egypt | 235 | 0.58 | 0.59 | 0.86 | 0.32 | 0.12 | 0.11 | 0.25 | 0.02 |
| Ethiopia | 62 | 0.13 | 0.10 | 0.80 | 0.00 | 0.47 | 0.45 | 1.00 | 0.08 |
| Ghana | 102 | 0.53 | 0.57 | 0.74 | 0.16 | 0.23 | 0.21 | 0.50 | 0.09 |
| Guinea | 166 | 0.13 | 0.10 | 0.61 | 0.01 | 0.57 | 0.55 | 1.00 | 0.00 |
| Kenya | 35 | 0.50 | 0.57 | 0.75 | 0.09 | 0.24 | 0.24 | 0.38 | 0.07 |
| Lesotho | 61 | 0.58 | 0.58 | 0.86 | 0.33 | 0.23 | 0.23 | 0.49 | 0.07 |
| Malawi | 183 | 0.24 | 0.22 | 0.55 | 0.08 | 0.53 | 0.55 | 0.81 | 0.24 |
| Mali | 47 | 0.13 | 0.11 | 0.53 | 0.02 | 0.44 | 0.44 | 0.71 | 0.18 |
| Morocco | 53 | 0.33 | 0.32 | 0.62 | 0.11 | 0.16 | 0.15 | 0.35 | 0.04 |
| Mozambique | 143 | 0.12 | 0.08 | 0.51 | 0.03 | 0.64 | 0.66 | 0.94 | 0.18 |
| Nigeria | 729 | 0.70 | 0.78 | 1.00 | 0.00 | 0.11 | 0.05 | 1.00 | 0.00 |
| Rwanda | 30 | 0.35 | 0.34 | 0.61 | 0.24 | 0.45 | 0.48 | 0.56 | 0.15 |
| Senegal | 28 | 0.24 | 0.17 | 0.60 | 0.07 | 0.30 | 0.29 | 0.49 | 0.13 |
| Sierra Leone | 107 | 0.22 | 0.17 | 0.66 | 0.03 | 0.55 | 0.58 | 0.88 | 0.11 |
| South Africa | 26 | 0.77 | 0.78 | 0.84 | 0.67 | 0.06 | 0.05 | 0.11 | 0.03 |
| South Sudan | 72 | 0.08 | 0.05 | 0.46 | 0.00 | 0.76 | 0.76 | 1.00 | 0.43 |
| Sudan | 129 | 0.21 | 0.14 | 0.76 | 0.00 | 0.49 | 0.50 | 1.00 | 0.12 |
| Tanzania | 113 | 0.63 | 0.62 | 0.85 | 0.36 | 0.20 | 0.19 | 0.37 | 0.06 |
| Togo | 37 | 0.42 | 0.45 | 0.72 | 0.17 | 0.38 | 0.40 | 0.58 | 0.13 |
| Uganda | 148 | 0.40 | 0.39 | 0.71 | 0.02 | 0.38 | 0.39 | 0.70 | 0.11 |
| Zambia | 55 | 0.48 | 0.46 | 0.75 | 0.30 | 0.30 | 0.32 | 0.49 | 0.09 |
| Zimbabwe | 88 | 0.80 | 0.80 | 1.00 | 0.51 | 0.13 | 0.13 | 0.39 | 0.00 |
| Africa | 2831 | 0.39 | 0.38 | 0.71 | 0.17 | 0.34 | 0.34 | 0.62 | 0.11 |

Note: The table demonstrates the summary statistics of district level estimates of IM up and IM down in education. The sample consists of 26 African countries. The last row reports simple unweighted averages of the summary statistics.
Table 10: Occupational Mobility at the District Level

| Country name | Regions | Upward | | | | Downward | | | |
|--------------|---------|--------|---|---|---|---|---|---|---|
|              | Mean    | Median | Max | Min | Mean | Median | Max | Min | |
| Benin        | 77      | 0.31   | 0.26 | 0.90 | 0.02 | 0.32   | 0.31 | 0.72 | 0.02 |
| Botswana     | 21      | 0.44   | 0.41 | 0.70 | 0.22 | 0.29   | 0.28 | 0.48 | 0.15 |
| Burkina Faso | 45      | 0.01   | 0.01 | 0.10 | 0.00 | 0.66   | 0.70 | 1.00 | 0.17 |
| Cameroon     | 39      | 0.16   | 0.12 | 0.73 | 0.01 | 0.31   | 0.29 | 0.83 | 0.08 |
| Egypt        | 235     | 0.44   | 0.40 | 0.89 | 0.10 | 0.23   | 0.21 | 0.76 | 0.01 |
| Ethiopia     | 60      | 0.04   | 0.02 | 0.57 | 0.00 | 0.42   | 0.37 | 1.00 | 0.12 |
| Ghana        | 102     | 0.28   | 0.27 | 0.78 | 0.05 | 0.30   | 0.29 | 0.59 | 0.08 |
| Guinea       | 166     | 0.15   | 0.08 | 0.92 | 0.00 | 0.39   | 0.36 | 1.00 | 0.00 |
| Kenya        | 35      | 0.21   | 0.17 | 0.75 | 0.02 | 0.42   | 0.45 | 0.72 | 0.04 |
| Lesotho      | 61      | 0.27   | 0.24 | 0.71 | 0.04 | 0.53   | 0.53 | 1.00 | 0.08 |
| Malawi       | 183     | 0.12   | 0.09 | 0.80 | 0.02 | 0.58   | 0.60 | 1.00 | 0.07 |
| Mali         | 47      | 0.06   | 0.04 | 0.64 | 0.01 | 0.45   | 0.48 | 0.70 | 0.07 |
| Morocco      | 53      | 0.26   | 0.23 | 0.68 | 0.06 | 0.31   | 0.30 | 0.54 | 0.13 |
| Mozambique   | 143     | 0.13   | 0.08 | 0.68 | 0.02 | 0.56   | 0.59 | 1.00 | 0.00 |
| Rwanda       | 30      | 0.14   | 0.13 | 0.34 | 0.09 | 0.46   | 0.47 | 0.68 | 0.07 |
| Senegal      | 28      | 0.26   | 0.18 | 0.75 | 0.06 | 0.27   | 0.27 | 0.51 | 0.08 |
| Sierra Leone | 107     | 0.12   | 0.06 | 0.75 | 0.01 | 0.34   | 0.31 | 1.00 | 0.00 |
| South Africa | 26      | 0.43   | 0.41 | 0.72 | 0.24 | 0.17   | 0.17 | 0.34 | 0.00 |
| South Sudan  | 72      | 0.24   | 0.23 | 0.68 | 0.02 | 0.51   | 0.50 | 1.00 | 0.17 |
| Sudan        | 129     | 0.18   | 0.09 | 0.68 | 0.00 | 0.48   | 0.45 | 1.00 | 0.08 |
| Tanzania     | 113     | 0.08   | 0.05 | 0.57 | 0.02 | 0.35   | 0.35 | 0.63 | 0.19 |
| Togo         | 36      | 0.21   | 0.14 | 1.00 | 0.00 | 0.53   | 0.51 | 1.00 | 0.00 |
| Uganda       | 148     | 0.11   | 0.07 | 0.65 | 0.00 | 0.58   | 0.58 | 1.00 | 0.14 |
| Zambia       | 55      | 0.10   | 0.04 | 0.60 | 0.01 | 0.44   | 0.42 | 0.82 | 0.15 |
| Zimbabwe     | 86      | 0.28   | 0.20 | 0.78 | 0.00 | 0.41   | 0.40 | 1.00 | 0.00 |
| **Africa**   | 2097    | 0.20   | 0.16 | 0.69 | 0.04 | 0.41   | 0.41 | 0.81 | 0.07 |

Note: The table demonstrates the summary statistics of district level estimates of IM up and IM down in occupation. The sample consists of 26 African countries. The last row reports simple unweighted averages of the summary statistics.
Figure 8. Intergenerational Mobility in Education in Nigeria and Mali
Figure 9. Intergenerational Mobility in Occupation in Ghana and Kenya

IM up Ghana, Occupation

IM down Ghana, Occupation

IM up Kenya, Occupation

IM down Kenya, Occupation

Legend:
- 0 - .11
- .11 - .26
- .26 - 1
- No data

Legend:
- 0 - .22
- .22 - .38
- .38 - 1
- No data

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V. Determinants of Educational and Occupational Mobility

The stylized facts we presented so far highlight the strong correlations between parents’ and children’s educational and occupational choices. We now turn to empirical analysis to understand how observable individual and family characteristics influence the IM rates. In the absence of external instruments, our analysis is about correlations and not causation.

A. Empirical strategy

The dependent variable is a binary variable taking the value of 1 if the child experienced upward/downward mobility and 0 otherwise. We estimate the determinants of upward and downward educational and occupational mobility using the following equation:

\[
\text{Mobility}_{ijt} = \alpha + \gamma X'_{ijt} + \pi_j + \theta_t + \mu_{ijt}
\]  

Where, for survey conducted at year \( t \), individual \( i \) from country \( j \), \( \text{Mobility}_{ijt} \) is a binary variable taking the value of 1 if the individual has experienced an upward or downward educational and occupational mobility, and 0 otherwise. We estimate separately the determinants for upward/downward educational mobility and those of upward/downward occupational mobility. \( \pi_j \) are the country fixed effects. The inclusion of country fixed effects will account for observable and unobservable country-specific characteristics that may explain intergenerational educational and occupational mobility. The country level fixed effects remove bias due to omitted variables at the country-level. \( \theta_t \) represents the time fixed effects of the years of the surveys. \( \mu_{ijt} \) is the error term. Vector \( X'_{ijt} \) includes a set of control variables on the socio economic and demographic of individuals, and macroeconomic conditions. These variables include:

- Gender status: we define a binary variable taking the value of 1 if the individual is a female and 0 otherwise. As gender inequality is high in sub-Saharan Africa (Gonzales et al., 2015), we expect female gender to be negatively (positively) correlated with upward (downward) mobility.

- Family size: it represents the number of individuals in the household. High number of children in a household could result in low level of education as parents may not have the financial capabilities to send all children to school. The uneducated children are expected to not be able to upgrade in terms of occupations. We thus expect the sign of the coefficient associated with family size to be negative (positive) in the estimate of upward (downward) educational and occupational mobility.

- Rural area: we create a binary variable taking the value of 1 if the individual lives in rural area and 0 otherwise. The place of living is found to affect the likelihood of intergenerational mobility (Alesina et al. 2021), with individuals living in rural areas having the lowest probability to upgrade in terms of education and occupations because of poverty and the lack of infrastructure. Therefore, we expect that the coefficient associated with this variable in the estimate of upward (downward) mobility will be negative (positive).
• Age: it represents the age of the individual at the time of the survey. We also added age square to capture any potential generational effects. On the one hand, individuals born in recent decades could benefit from better schooling as infrastructure availability has improved. On the other hand, the poverty rate has remained persistent in many sub-Saharan African countries, and this persistence in lack of income could prevent some children to go to school. Therefore, the coefficients associated with both age and age square is unknown.

• Access to infrastructure: we include access to electricity and clean water, which are all binary variables taking the value of 1 if the individual has access to electricity or clean water, and 0 otherwise. Access to electricity and water could be considered as a proxy of the household’s level of income, but also as a measure of the state capacity to provide public infrastructure given that states remain the main providers of electricity and water in many sub-Saharan African countries. The expected sign in the estimate of upward (downward) mobility is positive (negative).

• GDP per capita: it captures the level of development of countries. While richer countries could have more financial capacities to afford more school infrastructure and create jobs, mismanagement or misallocation of resources can undermine the performance of the education system and the labor markets. Therefore, the expected sign associated with GDP per capita is not known. GDP per capita data are from the IMF’s World Economic Outlook (WEO).

• Oil rents: expressed in percentage of GDP, it is a proxy of natural resource endowment. While natural resources can allow a government to invest in education and job creation, some studies have found that rent-seeking activities and corruption could divert resources away from social sectors (Tornell and Lane, 1999). The sign of the coefficient associated with oil rents is thus unknown. The data are extracted from the World Bank’s World Development Indicators (WDI) dataset.

• Education spending: this variable measures public spending in the education sector and is expressed as a percentage of GDP. Higher education spending can translate into better schooling infrastructure and improved education conditions, which could increase (decrease) the likelihood of upward (downward) educational mobility. The data are extracted from the World Bank’s WDI dataset.

• Pupils/teacher ratio: it captures education conditions, with high pupils/teacher ratio suggesting poor education conditions. We expect the sign of the coefficient associated with this variable to be negative (positive) in the estimate of upward (downward) mobility given that poor education conditions reduce learning abilities and could increase children drop-out. Pupils/teacher ratio data are from the World Bank’s WDI dataset.

• Quality of institutions: it is a simple average composite index using three governance indicators from the World Bank’s Worldwide Governance Indicators, including regulatory quality, the rule of law and corruption control. As studies have shown (North, 1990; Mauro, 1995), good quality of institutions is correlated with better
economic performances and resource allocation in social sectors, which could lead to higher (lower) probability of upward (downward) intergenerational mobility.

- **Conflict**: we define a binary variable taking the value of 1 if the country is affected by a conflict, and 0 otherwise. Conflict can lead to an economic and humanitarian crisis, create huge unemployment, destroy infrastructure (school, hospitals, etc.), and prevent children to attend school (IMF, 2019). In this regard, the expected sign of the coefficient associated with this variable is negative (positive) in the estimate of upward (downward) intergenerational mobility. The data are from the Uppsala Conflict Data Program (UCDP) provided by the Department of Peace and Conflict Research, Uppsala University.

- **Marital status**: we include the marital status in the estimate of occupation mobility to account for the reduction in freedom of movement as family reasons could add more constraints for married couples to move for better job opportunities. Furthermore, the inclusion of the marital status also helps account for the potential effect of child marriage, which is a concern in many sub-Saharan African countries. Therefore, being married could reduce (increase) the likelihood of upward occupational mobility.

- **Social protection**: Through the provision of essential health care and income security along the life course, social protection plays a critical role in boosting human capital and preventing poverty. Social protection programs empower people to be healthy, pursue their education and seek better job opportunities (World Bank, 2012), which in return could increase (reduce) upward (downward) educational and occupational mobility. The data are from the World Bank’s WDI dataset.

- **Labor market flexibility**: by enabling firms to adjust their workforce in response to market fluctuations and economic conditions, less stringent labor market regulations reduce hiring costs, provide better employment prospects and more productive matches between workers and firms. Therefore, we expect labor market flexibility to positively (negatively) affect upward (downward) occupational mobility. The data are from the IMF’s structural reforms database.

We use a conditional fixed effect model to explore the determinants of intergenerational mobility. The conditional fixed effect model allows for the inclusion of fixed effects, contrary to traditional simple probit/logit model as “incidental parameter problem” arises with these models (Neyman and Scott, 1948). Andersen (1970) and Chamberlain (1980) noted that the conditional fixed effect estimator is obtained by conditioning the likelihood function on minimal sufficient statistics for the incidental parameters and then maximizing the conditional likelihood function, allowing the estimator to be consistent.

**B. Determinants of educational mobility**

We report in columns (1) and (6) of table 12 the (observable) determinants of upward and downward mobility in education attainment, respectively. We included covariates individual characteristics such as a female gender dummy, age and age squared, and rural residence.
Moreover, we added covariates that are characterizing household composition such as family size and some proxies of household’s financial constraints such as access to electricity and water. Columns (2-5) and (7-10) of table 12 show the same probit regressions augmented with time-varying country-level variables. We included GDP per capita to capture the level of development of countries, oil rents in the percentage of GDP as a proxy of natural resources endowment, public spending in education (expressed in percentage of GDP), the ratio of pupils over teachers to capture education conditions, the quality of institutions and a binary variable taking the value of 1 if the country is in conflict and 0 otherwise. The quality of institutions variables is a simple average composite index using three governance indicators from the World Bank’s Worldwide Governance Indicators, including regulatory quality, the rule of law and corruption control. GDP per capita is from the IMF’s World Economic Outlook, while the other variables are from the World Bank’s World Development Indicators. In all specifications, we include the birth-cohort of the old and year fixed effects. Note that the marginal effects are presented in all Tables.

We find that individual and household characteristics matter, and most variables have a reverse sign in upward and downward mobility estimates. Table 12 shows that all the variables of interest are statistically significant at the 1% level. The marginal effects of rural residence and family size are negative and highly significant in columns 1-5 and positive in columns 6-10, suggesting that children from rural areas and larger families in size are less (more) likely to experience upward (downward) educational mobility. On average, the likelihood of experiencing upward mobility is lower by 11.4 % if you live in the rural area (average of columns 1-5). The downward mobility is higher by 6.6% (average of columns 6-10). This result could be explained by the lack of infrastructure and poverty in rural areas and the financial difficulties to send kids to school for big families. The marginal effects of access to electricity and water are positive and significant in columns 1-5, suggesting that financial constraints or lack of necessary infrastructure are associated with lower (higher) upward (downward) mobility rates in parents’ the education status to kids. On average, the probability of children from families who have access to electricity to experience an upward educational mobility is 15.8% higher than those from families without electricity access. The marginal effect associated with female gender is positive in columns 1-5 and positive and significant in columns 6-10, implying that girls tend to be more (less) likely to upgrade (downgrade) in educational attainment. We believe this is because of the fact that they start from a low base and there has been a recent push in several countries to promote gender equality in education. For instance, the Government of Rwanda National Gender Policy, adopted in 2008, introduced special measures to improve girls’ enrollement and to increase their performance.

Regarding the macro variables, the results are in line with expectations, and the sign of the marginal effects are reverse for upward and downward mobility. Table 12 shows that the marginal effects associated with GDP per capita, education spending and quality of institutions are positive and significant in columns 1-5. In contrast, those associated with oil rents, the pupils/teacher ratio and conflict are negative and significant. This finding
indicates that children from countries with good quality of institutions, high education spending and income are more likely to experience upward educational mobility, contrary to children from countries with low education conditions, conflict affected countries and resource rich countries.

### Table 11. Determinants of Educational Mobility

| Variables          | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (8)  | (9)  | (10) |
|--------------------|------|------|------|------|------|------|------|------|------|------|
|                    | Upward mobility | Downward mobility |
| Female             | 0.0093*** | 0.0205*** | 0.0378*** | 0.0233*** | -0.0002 | -0.0188*** | -0.0200*** | -0.0149*** | -0.0201*** | -0.0168*** |
|                    | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Rural              | -0.1189*** | -0.1196*** | -0.1226*** | -0.1204*** | -0.0874*** | 0.0715*** | 0.0703*** | 0.0595*** | 0.0690*** | 0.0689*** |
|                    | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Age                | 0.0563*** | 0.0574*** | 0.0533*** | 0.0579*** | 0.0457*** | -0.0302*** | -0.0396*** | -0.0281*** | -0.0311*** | -0.0410*** |
|                    | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Age square         | -0.0006*** | -0.0006*** | -0.0006*** | -0.0006*** | -0.0006*** | 0.0005*** | 0.0006*** | 0.0006*** | 0.0005*** | 0.0007*** |
|                    | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Family size        | -0.0055*** | -0.0092*** | -0.0064*** | -0.0092*** | -0.0077*** | 0.0004*** | 0.0041*** | 0.0041*** | 0.0043*** | 0.0039*** |
|                    | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Access to electricity | 0.1828*** | 0.1586*** | 0.1530*** | 0.1603*** | -0.1011*** | -0.0803*** | -0.0959*** | -0.0958*** | -0.1223*** | -0.1223*** |
|                    | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Access to water    | 0.1062*** | 0.1026*** | 0.0639*** | 0.1052*** | 0.0784*** | -0.0521*** | -0.0467*** | -0.0331*** | -0.0490*** | -0.0509*** |
|                    | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| GDP per capita, Log | 0.0681*** | 0.0076*** | 0.0050*** | 0.0076*** | 0.0050*** | 0.0076*** | 0.0050*** | 0.0076*** | 0.0050*** | 0.0076*** |
|                    | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Oil rents (% of GDP) | -0.0141*** | -0.0141*** | -0.0141*** | -0.0141*** | -0.0141*** | -0.0141*** | -0.0141*** | -0.0141*** | -0.0141*** | -0.0141*** |
|                    | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Pupils/teacher ratio | 0.0057*** | 0.0022*** | 0.0057*** | 0.0022*** | 0.0057*** | 0.0022*** | 0.0057*** | 0.0022*** | 0.0057*** | 0.0022*** |
|                    | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Quality of institutions | 0.0929*** | 0.0929*** | 0.0929*** | 0.0929*** | 0.0929*** | 0.0929*** | 0.0929*** | 0.0929*** | 0.0929*** | 0.0929*** |
|                    | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Conflict           | -0.1151*** | -0.1151*** | -0.1231*** | -0.1231*** | -0.1231*** | -0.1231*** | -0.1231*** | -0.1231*** | -0.1231*** | -0.1231*** |
|                    | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Observations       | 4,116,227 | 4,116,227 | 4,116,227 | 4,116,227 | 4,116,227 | 4,116,227 | 4,116,227 | 4,116,227 | 4,116,227 | 4,116,227 |
| R2                 | 0.19 | 0.21 | 0.19 | 0.17 | 0.20 | 0.18 | 0.16 | 0.24 | 0.15 | 0.14 |
| Birth-cohort FE    | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE            | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country FE         | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Notes: The table reports estimates of the intergenerational mobility of children aged 14+ on individual and household characteristics augmented by a macroeconomic variable at a time. The standard errors are shown in parentheses.

However, these estimates for the whole African sample may obscure some country heterogeneities. To address this, we run the estimates for each country. The results are reported in appendix F Table F2. As can be observed, there are substantial country heterogeneities in the determinants of upward and downward mobility in education. For instance, although the estimate for the whole sample in Table 12 shows that girls have a higher (lower) probability than boys to upgrade (downgrade), the results in Table F1 and F2 highlight that the marginal effects of female gender differ between countries. In Botswana, Lesotho and Nigeria, girls have a higher probability than boys to experience upward educational mobility, while that probability is lower in Guinea, South Sudan and Togo (F1). In Mozambique and Ghana, girls are more likely than boys to experience downward educational mobility, contrary to girls from Zimbabwe and Lesotho who are
less likely than boys to downgrade in educational attainment. A striking result is that regardless of the country, children from rural areas are less (more) likely than those from urban areas to experience upward (downward) educational mobility, thus emphasizing the rural/urban divide as shown in Figure 2. Similarly, access to electricity and water appears to have the same effect in almost all countries, underscoring the importance of infrastructure access.

C. Determinants of occupational mobility

We report the results of the estimates of the determinants of intergenerational mobility in occupations in Table 13. In addition to the individual characteristics included for educational mobility estimates in Table 13, we control individuals’ marital status. We include GDP per capita, oil rents, the quality of institutions, conflict and social protection coverage (% of working population) for the country-level variables. We also include the time and birth-cohort fixed effects.

Table 13 shows that, as for educational mobility, the variables have a reserved sign for upward and downward occupational mobility. The results show that individuals living in rural areas and those married have the lower (higher) probability of upward (downward) occupational mobility. Furthermore, individuals with access to electricity and water are more (less) likely to upgrade (downgrade) in terms of occupations. Likewise educational mobility, Table 13 shows that girls are more (less) likely than boys to upgrade (downgrade) in terms of occupations. Turning our attention to the macro-variables, the results highlight that individuals from countries with high coverage of social protection coverage, labor market flexibility and good quality of institutions have a high (low) probability of experiencing upward (downward) occupational mobility. Oil rents are positively associated with upward occupational mobility and negatively with downward occupational mobility. That said, oil production can create new jobs and allow some children to work in the non-agriculture sector. As expected, children from countries with higher unemployment rate are less (more) likely to experience upward (more) occupational mobility, while those from countries where the industry sector is developed are more (less) likely to upgrade (downgrade) in terms of occupations. High unemployment rate can make it harder for children from disadvantaged households to find jobs outside agriculture, thus reducing their probabilities to upgrade in terms of occupations. On the other hand, the industry sector offer a window of opportunities for better jobs, which could allow children born from parents working in the agriculture sector to work outside agriculture. We also observe that the marginal effect associated with GDP per capita is positive and significant in column (2) and in column (6).
Table 12. Determinants of Occupational Mobility

| VARIABLES                   | (1)     | (2)     | (3)     | (4)     | (5)     | (6)     | (7)     | (8)     | (9)     | (10)    | (11)    | (12)    |
|-----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                             | Upward mobility | Downward mobility |
| Female                      | 0.0010*  | -0.0007 | 0.0130*** | 0.0045*** | 0.0048*** | -0.0007 | -0.0506*** | -0.0505*** | -0.0366*** | -0.0492*** | -0.0393*** | -0.0502*** |
| Rural                       | -0.1255*** | -0.1259*** | -0.1269*** | -0.1227*** | -0.1253*** | 0.1594*** | 0.1596*** | 0.1588*** | 0.1596*** | 0.1650*** | 0.1573*** |
| Age                         | 0.0176*** | 0.0178*** | 0.0200*** | 0.0180*** | 0.0183*** | -0.0126*** | -0.0128*** | -0.0113*** | -0.0126*** | -0.0146*** | -0.0130*** |
| Age square                  | -0.0002*** | -0.0002*** | -0.0003*** | -0.0003*** | -0.0003*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** |
| Family size                 | -0.0006*** | -0.0005*** | -0.0007*** | -0.0006*** | -0.0014*** | -0.0007*** | 0.0022*** | 0.0022*** | 0.0022*** | 0.0022*** | 0.0024*** |
| Access to electricity       | 0.0823*** | 0.0796*** | 0.0905*** | 0.0812*** | 0.0800*** | 0.0850*** | -0.0560*** | -0.0571*** | -0.0447*** | -0.0561*** | -0.0613*** |
| Access to water             | 0.0504*** | 0.0526*** | 0.0565*** | 0.0494*** | 0.0474*** | 0.0532*** | -0.0314*** | -0.0332*** | -0.0366*** | -0.0314*** | -0.0303*** |
| Married                     | -0.0162*** | -0.0171*** | -0.0175*** | -0.0186*** | -0.0135*** | -0.0189*** | 0.0112*** | 0.0122*** | 0.0131*** | 0.0118*** | 0.0166*** |
| Education                   | 0.0843*** | 0.0848*** | 0.0908*** | 0.0829*** | 0.0860*** | 0.0840*** | -0.0650*** | -0.0657*** | -0.0647*** | -0.0661*** | -0.0666*** |
| GDP per capita, Log         | 0.0112*** | 0.0113*** | 0.0109*** | 0.0109*** | 0.0109*** | 0.0109*** | 0.0109*** | 0.0109*** | 0.0109*** | 0.0109*** | 0.0109*** |
| Oil rents (% of GDP)        | 0.0037*** | 0.0019*** | 0.0037*** | 0.0037*** | 0.0037*** | 0.0037*** | 0.0037*** | 0.0037*** | 0.0037*** | 0.0037*** | 0.0037*** |
| Social protection           | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** | 0.0006*** |
| Labor market flexibility    | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** | 0.1996*** |
| Quality of institutions     | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** | 0.0450*** |
| Conflict                    | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** | -0.0113*** |
| Industry                    | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** | 0.0005*** |
| Unemployment                | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** | -0.0019*** |
| Observations                | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 | 2,528,074 |
| R2                          | 0.22     | 0.23     | 0.24     | 0.23     | 0.21     | 0.23     | 0.15     | 0.15     | 0.15     | 0.15     | 0.14     |
| Birth-cohort FE             | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      |
| Year FE                     | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      |
| Country FE                  | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      | Yes      |

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
To explore whether educational mobility is a predictor of occupational mobility, we run the estimates, including upward (downward) educational mobility in Table 14. The results indicate that upward mobility in education is a strong determinant of upward mobility in occupation and the opposite holds for downward mobility. The probability for children who experienced educational mobility upward to upgrade in terms of occupations is 20% higher than children who experienced downward educational mobility. Also, children who are less educated than their parents (downward educational mobility) are more likely to experience downward occupation mobility. These findings emphasize the strong link between education and occupations.

Finally, we run the estimates for each country to gauge country heterogeneities. The results reported in Appendix Table F3 for upward occupational mobility and Appendix Table F4 for downward occupational mobility shed light that the effect of each variable differs between countries. For instance, girls have higher probability than boys to experience upward occupational mobility in Benin, Ethiopia and Togo, contrary to girls

| Variables                      | (1)       | (2)       | (3)       | (4)       |
|-------------------------------|-----------|-----------|-----------|-----------|
| Upward mobility in education  | 0.1112*** |           |           | -0.0825***|
|                               | (0.001)   |           |           | (0.001)   |
| Downward mobility in education|           | -0.0739***| 0.0753*** |           |
|                               |           | (0.001)   | (0.001)   |           |
| Female                        | 0.0027*** | -0.0038***| -0.0339***| -0.0803***|
|                               | (0.001)   | (0.001)   | (0.001)   | (0.001)   |
| Rural                         | -0.1247***| -0.1284***| 0.1236*** | 0.1877*** |
|                               | (0.001)   | (0.001)   | (0.001)   | (0.001)   |
| Age                           | 0.0203*** | 0.0256*** | -0.0174***| -0.0169***|
|                               | (0.000)   | (0.000)   | (0.000)   | (0.000)   |
| Age square                    |           | -0.0004***| 0.0003*** | 0.0002*** |
|                               |           | (0.000)   | (0.000)   | (0.000)   |
| Family size                   | -0.0007***| -0.0013***| 0.0032*** | 0.0031*** |
|                               | (0.000)   | (0.000)   | (0.000)   | (0.000)   |
| Access to electricity         | 0.0852*** | 0.1033*** | -0.0612***| -0.0642***|
|                               | (0.001)   | (0.001)   | (0.002)   | (0.002)   |
| Access to water               | 0.0567*** | 0.0426*** | -0.0180***| -0.0471***|
|                               | (0.001)   | (0.001)   | (0.001)   | (0.001)   |
| Married                       |           | -0.0251***| 0.0178*** | 0.0199*** |
|                               |           | (0.001)   | (0.001)   | (0.001)   |
| Observations                  | 2,040,178 | 487,896   | 457,642   | 661,946   |
| R2                            | 0.2225    | 0.2821    | 0.1587    | 0.1331    |
| Birth-cohort FE               | Yes       | Yes       | Yes       | Yes       |
| Year FE                       | Yes       | Yes       | Yes       | Yes       |
| Country FE                    | Yes       | Yes       | Yes       | Yes       |

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
from Guinea, Malawi and Mozambique where their chances to upgrade in terms of occupations are lower than boys. However, the sign of the marginal effect associated with upward/downward educational mobility is the same for most countries, meaning that education is a strong predictor of occupations in most African countries. In few exceptions such as Malwi, Sierra Leone and Togo, the upward educational mobility is not a significant determinant of upward occupational mobility, which may be due to market faillures or mismatch between trainings and labor market needs.

VI. Concluding Remarks

Using a rich dataset covering 28 African countries and more than 120 million individuals, this paper provides strong economic mobility evidence across generations in Africa. In the absence of longitudinal consumption and income data, we focus on educational and occupational attainment two salient economic status measures. Our findings are threefold.

First, we demonstrate that intergenerational educational mobility has increased dramatically in Africa. Nowadays, almost 50% of pupils born in the 90s from non-educated parents have completed complete at least primary school, against less than 10% in the 1920s. Moreover, the gender gap has declined substantially. nonetheless, children born in rural regions have a significantly lower (higher) likelihood of upward (downward) mobility in educational status than their urban peers. We document substantial across and within-country variation in upward and downward mobility.

Second, we show that the African region exhibits intergenerational persistence in occupational status. The offspring of parents employed in the agricultural sector has less than a 20% likelihood of upward job mobility. Upward mobility is the same for both genders while downward occupational mobility is smaller for girls than boys. The urban-rural divide is conspicuous and mobility rates are higher for more economically developed countries and districts. We also find that upward occupational mobility is declining for the most recent birth cohorts, while downward mobility increases.

Third, we take advantage of the richness of the data to shed some light on the drivers of educational and occupational mobility in Africa. We present evidence that observable individual and household characteristics can partly explain the variation in mobility rates across individuals for educational and occupational mobility. We find that all individual characteristics (age, gender, marital status, place of birth), and all family characteristics (family size, financial constraints proxied by access to electricity and water) impact upward and downward mobility rates. We also investigate how the macro-economic environment and policies are correlated with occupational and educational mobility indices. Our findings indicate that the quality of institutions, public spending and social protection coverage have a positive (negative) impact on upward (downward) educational and occupational mobility. Good quality of institutions and sound social policies are instrumental for better education outcomes and job creation. On the other hand, conflict
and poor education conditions have a reverse impact as they tend to reduce the likelihood of upward educational and occupational mobility. Thus, children from countries with better macro and socio-political environment have more chances to climb up the social ladder.

This pandemic crisis led to school closures and jobs loss for many people, and this paper is topical. The policy implications of the findings could be useful to revive the African economies. As some studies have shown, the COVID-19 pandemic could exacerbate the pre-existing social inequalities, which are well highlighted in this paper regarding educational and occupational mobility. The paper provides strong evidence of inequalities in social mobility in Africa that policymakers should consider as they put in place policies to address the effects of the pandemic. Policymakers should implement targeted policies to address the gender gap and the rural/urban divide and the social inequalities between districts within countries. Improving access to necessary infrastructure such as electricity and water and social protection are essential to boost educational and occupational mobility. Policies aiming to enhance education conditions, significantly reducing pupils’ ratio to teachers, and the quality of institutions should be pursued.
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Supplementary Online Appendix

The Supplementary appendix contains additional results omitted from the main text. Section A breaks down the number of parents-children matched pairs used in the analysis by country and sample. Section B shows the transition matrices for the full sample of countries, first for educational attainment and then for the occupational attainment. Section C shows country level estimates of IM up and IM down across birth cohorts. Section D displays additional evidence of our analysis that is not shown in the main text. Section E shows country level estimates of intergenerational mobility for education and occupation when we restrict the minimum age to be 18 and 25, respectively.
Appendix A. Data by Country and Sample Education

| Nr | Country       | Observations |
|----|---------------|--------------|
| 1  | Botswana      | 110,337      |
| 2  | Cameroon      | 458,587      |
| 3  | Benin         | 372,130      |
| 4  | Ethiopia      | 1,372,629    |
| 5  | Ghana         | 1,052,808    |
| 6  | Guinea        | 337,771      |
| 7  | Kenya         | 1,027,329    |
| 8  | Lesotho       | 93,114       |
| 9  | Liberia       | 59,122       |
| 10 | Malawi        | 329,560      |
| 11 | Mali          | 509,439      |
| 12 | Mauritius     | 96,427       |
| 13 | Morocco       | 2,229,031    |
| 14 | Mozambique    | 451,955      |
| 15 | Nigeria       | 74,474       |
| 16 | Rwanda        | 329,988      |
| 17 | Senegal       | 608,154      |
| 18 | Sierra Leone  | 86,567       |
| 19 | South Africa  | 3,506,219    |
| 20 | Zimbabwe      | 83,844       |
| 21 | South Sudan   | 88,568       |
| 22 | Sudan         | 972,688      |
| 23 | Togo          | 43,100       |
| 24 | Uganda        | 1,072,014    |
| 25 | Egypt         | 5,635,419    |
| 26 | Tanzania      | 1,534,897    |
| 27 | Burkina Faso  | 366,416      |
| 28 | Zambia        | 584,921      |

Total: 23,487,508
Appendix Table A2. Educational Mobility by Sample

| Nr Census | Observations |
|-----------|--------------|
| 1         | Botswana 1981 13,609 |
| 2         | Botswana 1991 22,194 |
| 3         | Botswana 2001 35,156 |
| 4         | Botswana 2011 39,378 |
| 5         | Cameroon 1976 73,983 |
| 6         | Cameroon 1987 88,993 |
| 7         | Cameroon 2005 295,611 |
| 8         | Benin 1979 33,555 |
| 9         | Benin 1992 60,327 |
| 10        | Benin 2002 100,418 |
| 11        | Benin 2013 177,830 |
| 12        | Ethiopia 1984 368,449 |
| 13        | Ethiopia 1994 793,522 |
| 14        | Ethiopia 2007 210,658 |
| 15        | Ghana 1984 267,498 |
| 16        | Ghana 2000 301,504 |
| 17        | Ghana 2010 483,806 |
| 18        | Guinea 1983 40,647 |
| 19        | Guinea 1996 103,251 |
| 20        | Guinea 2014 193,873 |
| 21        | Kenya 1989 160,194 |
| 22        | Kenya 1999 214,603 |
| 23        | Kenya 2009 652,532 |
| 24        | Lesotho 1996 48,449 |
| 25        | Lesotho 2006 44,665 |
| 26        | Liberia 2008 59,122 |
| 27        | Malawi 1987 72,032 |
| 28        | Malawi 1998 107,897 |
| 29        | Malawi 2008 149,631 |
| 30        | Mali 1987 107,586 |
| 31        | Mali 1998 147,125 |
| 32        | Mali 2009 254,728 |
| 33        | Mauritius 1990 29,944 |
| 34        | Mauritius 2000 32,598 |
| 35        | Mauritius 2011 33,885 |
| 36        | Morocco 1982 232,533 |
| 37        | Morocco 1994 401,157 |
| 38        | Morocco 2004 508,592 |
| 39        | Morocco 2014 1,086,749 |
| 40        | Mozambique 1997 195,098 |
| 41        | Mozambique 2007 256,857 |
| 42        | Nigeria 2006 13,923 |
| 43        | Nigeria 2007 14,192 |
| 44        | Nigeria 2008 19,683 |
| 45        | Nigeria 2009 12,650 |
| 46        | Nigeria 2010 14,026 |
| 47        | Rwanda 2002 141,669 |
| 48        | Rwanda 2012 188,319 |
| 49        | Senegal 1988 94,407 |
| 50        | Senegal 2002 200,390 |
| 51        | Senegal 2013 313,357 |
| 52        | Sierra Leone 2004 86,567 |
| 53        | South Africa 1996 730,804 |
| 54        | South Africa 2001 870,921 |
| 55        | South Africa 2007 232,413 |
| 56        | South Africa 2011 914,863 |
| 57        | South Africa 2016 757,218 |
| 58        | Zimbabwe 2012 83,844 |
| 59        | South Sudan 2008 88,568 |
| 60        | Sudan 2008 972,688 |
| 61        | Togo 1970 2,192 |
| 62        | Togo 2010 40,908 |
| 63        | Uganda 1991 181,306 |
| 64        | Uganda 2002 309,798 |
| 65        | Uganda 2014 580,910 |
| 66        | Egypt 1986 1,895,172 |
| 67        | Egypt 1996 1,660,644 |
| 68        | Egypt 2006 2,079,603 |
| 69        | Tanzania 1988 260,793 |
| 70        | Tanzania 2002 555,283 |
| 71        | Tanzania 2012 718,821 |
| 72        | Burkina Faso 1996 195,229 |
| 73        | Burkina Faso 2006 171,187 |
| 74        | Zambia 1990 139,532 |
| 75        | Zambia 2000 198,491 |
| 76        | Zambia 2010 246,898 |

Total: 23,487,508
Table A3. Occupational Mobility Sample by Country

| Nr | Country         | Observations |
|----|-----------------|--------------|
| 1  | Botswana        | 13,535       |
| 2  | Cameroon        | 92,846       |
| 3  | Benin           | 152,114      |
| 4  | Ethiopia        | 652,852      |
| 5  | Ghana           | 480,737      |
| 6  | Guinea          | 147,508      |
| 7  | Kenya           | 50,596       |
| 8  | Lesotho         | 12,622       |
| 9  | Malawi          | 98,933       |
| 10 | Mali            | 210,014      |
| 11 | Mauritius       | 41,470       |
| 12 | Morocco         | 487,381      |
| 13 | Mozambique      | 183,908      |
| 14 | Nigeria         | 11,583       |
| 15 | Rwanda          | 121,493      |
| 16 | Senegal         | 193,428      |
| 17 | Sierra Leone    | 37,032       |
| 18 | South Africa    | 119,706      |
| 19 | Zimbabwe        | 19,895       |
| 20 | South Sudan     | 42,368       |
| 21 | Sudan           | 198,964      |
| 22 | Togo            | 2,782        |
| 23 | Uganda          | 153,362      |
| 24 | Egypt           | 764,120      |
| 25 | Tanzania        | 627,889      |
| 26 | Burkina Faso    | 116,429      |
| 27 | Zambia          | 131,273      |

Total: 5,164,840
| Nr Census       | Observations | Nr Census       | Observations |
|-----------------|--------------|-----------------|--------------|
| 1 Botswana 1981 | 667          | 34 Morocco 2014 | 192,905      |
| 2 Botswana 1991 | 3,585        | 35 Mozambique 1997 | 87,290      |
| 3 Botswana 2001 | 3,749        | 36 Mozambique 2007 | 96,618      |
| 4 Botswana 2011 | 5,534        | 37 Nigeria 2008 | 4,873        |
| 5 Cameroon 1976 | 26,563       | 38 Nigeria 2009 | 1,934        |
| 6 Cameroon 2005 | 66,283       | 39 Nigeria 2010 | 4,776        |
| 7 Benin 1979    | 14,079       | 40 Rwanda 2002  | 58,662       |
| 8 Benin 1992    | 35,183       | 41 Rwanda 2012  | 62,831       |
| 9 Benin 2002    | 51,429       | 42 Senegal 1988 | 34,956       |
| 10 Benin 2013   | 51,423       | 43 Senegal 2002 | 59,805       |
| 11 Ethiopia 1984| 182,358      | 44 Senegal 2013 | 98,667       |
| 12 Ethiopia 1994| 470,494      | 45 Sierra Leone 2004 | 37,032   |
| 13 Ghana 1984  | 155,518      | 46 South Africa 1996 | 52,766    |
| 14 Ghana 2000  | 142,768      | 47 South Africa 2001 | 49,442     |
| 15 Ghana 2010  | 182,451      | 48 South Africa 2007 | 17,498    |
| 16 Guinea 1983 | 19,359       | 49 Zimbabwe 2012 | 19,895      |
| 17 Guinea 1996 | 51,392       | 50 South Sudan 2008 | 42,368     |
| 18 Guinea 2014 | 76,757       | 51 Sudan 2008   | 198,964     |
| 19 Kenya 1989  | 50,596       | 52 Togo 1970    | 1,020        |
| 20 Lesotho 1996| 5,861        | 53 Togo 2010    | 1,762        |
| 21 Lesotho 2006| 6,761        | 54 Uganda 1991  | 75,990       |
| 22 Malawi 1987 | 26,936       | 55 Uganda 2002  | 77,372       |
| 23 Malawi 1998 | 40,550       | 56 Egypt 1986   | 238,042      |
| 24 Malawi 2008 | 31,447       | 57 Egypt 1996   | 238,120      |
| 25 Mali 1987   | 54,302       | 58 Egypt 2006   | 287,958      |
| 26 Mali 1998   | 71,508       | 59 Tanzania 1988| 143,915      |
| 27 Mali 2009   | 84,204       | 60 Tanzania 2002| 223,525      |
| 28 Mauritius 1990| 13,260     | 61 Tanzania 2012| 260,449      |
| 29 Mauritius 2000| 13,430     | 62 Burkina Faso 1996 | 116,429   |
| 30 Mauritius 2011| 14,780     | 63 Zambia 1990  | 17,620       |
| 31 Morocco 1982| 80,673       | 64 Zambia 2000  | 54,925       |
| 32 Morocco 1994| 88,322       | 65 Zambia 2010  | 58,728       |
| 33 Morocco 2004| 125,481      |                |              |

Total: 5,164,840
Appendix B. Transition Matrices

Figure B10. Intergenerational Mobility Transition Matrices in Education

- Benin
- Burkina Faso
- Cameroon
- Egypt
- Ethiopia
- Ghana

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Figure B11. Intergenerational Mobility Transition Matrices in Education (Continued)
Figure B12. Intergenerational Mobility Transition Matrices in Education (Continued)
Figure B13. Intergenerational Mobility Transition Matrices in Education
(Concluded)
Figure B2. Intergenerational Mobility Transition Matrices in Occupation

- Benin
- Burkina Faso
- Cameroon
- Egypt
- Ethiopia
- Ghana

Matrices show the likelihood of child occupation by parental occupation, with colors indicating different occupational categories.
Figure B2. Intergenerational Mobility Transition Matrices in Occupation (Continued)
Figure B2. Intergenerational Mobility Transition Matrices in Occupation (Continued)
Figure B2. Intergenerational Mobility Transition Matrices in Occupation (Concluded)
Appendix C. Intergenerational Mobility Across Birth-cohorts

Figure C14. Intergenerational Mobility in Education

Educational mobility

Notes: Intergenerational mobility for birth cohorts with at least 100 observations in upward mobility.
### Figure C15. Intergenerational Mobility in Occupation

#### Occupational Mobility

| Botswana | Cameroon | Benin | Ethiopia | Ghana | Senegal | Guinea |
|----------|----------|-------|----------|-------|---------|--------|
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |
|          |          |       |          |       |         |        |

#### Birth-cohort young

- **Upward**
- **Downward**

**Notes:** Intergenerational mobility for birth cohorts with at least 100 observations in upward mobility.
Appendix D. Further Analysis

Literacy of the Old and IM

We examine the association between IM and literacy rates of the old generation. We demonstrate the results at the district level. The left graph shows the positive correlation between the share of parents’ literacy and upward educational mobility and the right figure the negative link between parents’ literacy and downward educational mobility. Note that each dot corresponds to a district color-coded.

Cross check with World Bank’s GDIM Index

The World Bank has recently published estimates of intergenerational mobility across 148 economies (see World bank 2018). This database (GDIM) contains estimates of absolute and relative intergenerational mobility (IGM) by 10-year cohorts, where individuals born in the 10-year range of cohorts between 1940 and 1989 are estimated. These IGM measures are also available by type (subpopulation) of parental educational attainment (Mothers/Fathers/Average/Max) and type (subpopulation) of child’s educational attainment (Sons/Daughters/All, individuals of the surveys). In the figure below, we contrast our upward IM index with the figures reported by the World Bank. We construct the IM upwards index across countries and cohorts and compare it with the World Bank estimates. As can be noted from the 45-line degree line the results are comparable, suggesting a strong correlation between our index and that of the World Bank despite the differences in the methodology and data sources.
Correlations of educational mobility with key economic indicators

We present sensitivity analysis between IM indices and poverty rates. We look at the correlation between the different intergenerational education and occupation mobility indices and the poverty rates in African countries. The chart below shows that there is a negative (positive) relationship between upward (downward) educational and occupational mobility and poverty. Further analysis could be done to explore empirically this relationship, but at this point income data are not available for several African countries.
Relationship Between Social Mobility and Poverty

**Upward educational mobility and poverty rate**

**Downward educational mobility and poverty rate**

**Upward occupational mobility and poverty rate**

**Downward occupational mobility and poverty rate**

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Appendix E. Educational and Occupational Mobility with Different Age Limit

Table E1. Educational Mobility with Minimum Age of 18 and 25

| country   | Minimum age: 18 |          | Minimum age: 25 |          |
|-----------|-----------------|----------|-----------------|----------|
|           | Upward IM       | Downward IM | Upward IM       | Downward IM |
| Botswana  | 0.69            | 0.08     | 0.70            | 0.07     |
| Cameroon  | 0.48            | 0.14     | 0.50            | 0.13     |
| Benin     | 0.36            | 0.22     | 0.35            | 0.21     |
| Ethiopia  | 0.12            | 0.35     | 0.15            | 0.29     |
| Ghana     | 0.54            | 0.17     | 0.54            | 0.15     |
| Guinea    | 0.22            | 0.37     | 0.22            | 0.34     |
| Kenya     | 0.43            | 0.25     | 0.50            | 0.19     |
| Lesotho   | 0.44            | 0.31     | 0.50            | 0.25     |
| Liberia   | 0.22            | 0.58     | 0.30            | 0.46     |
| Malawi    | 0.13            | 0.58     | 0.20            | 0.47     |
| Mali      | 0.20            | 0.27     | 0.20            | 0.25     |
| Morocco   | 0.40            | 0.11     | 0.38            | 0.12     |
| Mozambique| 0.10            | 0.58     | 0.15            | 0.47     |
| Nigeria   | 0.62            | 0.09     | 0.67            | 0.07     |
| Rwanda    | 0.20            | 0.57     | 0.28            | 0.47     |
| Senegal   | 0.25            | 0.25     | 0.26            | 0.23     |
| Sierra Leone | 0.24       | 0.41     | 0.25            | 0.36     |
| South Africa | 0.78        | 0.08     | 0.80            | 0.06     |
| Zimbabwe  | 0.65            | 0.17     | 0.72            | 0.13     |
| South Sudan | 0.04         | 0.79     | 0.07            | 0.69     |
| Sudan     | 0.11            | 0.44     | 0.16            | 0.31     |
| Togo      | 0.41            | 0.28     | 0.45            | 0.25     |
| Uganda    | 0.33            | 0.38     | 0.37            | 0.33     |
| Egypt     | 0.63            | 0.08     | 0.62            | 0.08     |
| Tanzania  | 0.58            | 0.21     | 0.62            | 0.18     |
| Burkina Faso | 0.17        | 0.26     | 0.17            | 0.24     |
| Zambia    | 0.45            | 0.24     | 0.48            | 0.22     |
### Appendix F. Determinants of Social Mobility at the Country Level

**Table F1. Determinants of Upward Educational Mobility by Country**

| Variables | Benin | Botswana | Egypt | Ethiopia | Ghana | Guinea | Kenya | Lesotho | Liberia | Malawi | Mali | Mozambique |
|-----------|------|----------|-------|----------|-------|--------|-------|---------|---------|--------|------|------------|
|           | (1)  | (2)      | (3)   | (4)      | (5)   | (6)    | (7)   | (8)     | (9)     | (10)   | (11) | (12)       |
| Female    | -0.068*** | 0.189*** | 0.218*** | -0.094*** | -0.084*** | -0.038*** | -0.045*** | 0.280*** | -0.128*** | -0.049*** | -0.025*** | -0.059*** |
| Rural     | -0.084*** | -0.125*** | -0.099*** | 0.383*   | -0.079*** | -0.088*** | -0.026**  | -0.024*** | -0.165*** | -0.110*** | -0.087*** | -0.088*** |
| Age       | 0.017***  | 0.014***  | 0.055*** | 0.052***  | 0.055*** | 0.016*** | 0.061*** | 0.050***  | 0.018***  | 0.047*** | 0.007*** | 0.019*** |
| Age square| -0.0003*** | -0.0004*** | -0.001*** | -0.001*** | -0.0001*** | -0.002*** | -0.001*** | -0.0002*** | -0.001*** | -0.0002*** | -0.001*** | -0.0001*** |
| Family size| -0.004*** | -0.004**  | -0.016*** | 0.013***  | -0.015*** | 0.001***  | 0.008***  | -0.0002  | 0.007***  | 0.006***  | 0.002***  | 0.002*** |
| Electricity| 0.130***  | 0.262***  | 0.158*** | 0.263***  | 0.185*** | 0.047***  | 0.297***  | 0.230***  | 0.114***  | 0.199***  | 0.079***  | 0.085*** |
| Water     | 0.085***  | 0.180***  | 0.152*** | 0.109***  | 0.056***  | 0.016***  | 0.109***  | 0.078***  | 0.038***  | 0.060***  | 0.023***  | 0.043*** |
| Observations | 148,252 | 4,704     | 1,445,930 | 37,755   | 2,474,583 | 47,294  | 19,521   | 12,761   | 58,592   | 101,058  | 189,073  |

| Variables | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Nigeria   | 0.039*** | -0.009*** | -0.015*** | -0.063*** | -0.041*** | 0.028*** | -0.055*** | -0.182*** | -0.120*** | -0.095*** | -0.019** |
| Rwanda    | -0.039** | -0.060*** | -0.147*** | -0.149*** | -0.057*** | -0.067*** | -0.089*** | -0.152*** | -0.153*** | -0.172*** | -0.185*** |
| Senegal   | 0.048*** | 0.044*** | 0.015*** | 0.019*** | 0.018*** | 0.024*** | 0.037*** | 0.004    | 0.029*** | 0.058*** | 0.046*** |
| Sierra Leone | -0.001*** | -0.001*** | -0.002*** | -0.002*** | -0.0003*** | -0.0006*** | -0.0001   | -0.0005*** | -0.001*** | -0.001*** |
| South Sudan| -0.009*** | 0.008*** | -0.003*** | 0.001** | 0.0005  | 0.0001   | 0.0005**  | -0.012*** | 0.010***  | 0.004***  | 0.001 |
| Sudan     | 0.199*** | 0.162*** | 0.126*** | 0.063*** | 0.064*** | 0.131*** | 0.240***  | 0.224***  | 0.280***  | 0.205***  | 0.054*** |
| Tanzania  | -0.051** | 0.016*** | -0.008*** | 0.041*** | 0.038*** | 0.076*** | 0.091***  | 0.073***  | 0.109***  | 0.134***  | 0.058*** |
| Togo      | 7,668 | 105,219 | 201,683 | 35,990 | 45,079 | 280,109 | 376,673 | 3,462 | 138,963 | 55,202 | 10,438 |

*** p<0.01, ** p<0.05, * p<0.1. Birth-cohort and year fixed effects are included.
Table F2. Determinants of Downward Educational Mobility by Country

| Variables | (1) Benin | (2) Botswana | (3) Egypt | (4) Ethiopia | (5) Ghana | (6) Guinea | (7) Kenya | (8) Lesotho | (9) Liberia | (10) Malawi | (11) Mali | (12) Mozambique |
|-----------|----------|-------------|----------|-------------|---------|-----------|---------|-----------|-----------|------------|---------|-----------|
| Female    | 0.074*** | -0.159***   | -0.152***| 0.033***    | 0.052***| -0.004    | -0.009  | -0.221*** | 0.096***  | 0.0001     | -0.006  | 0.080***  |
| Rural     | 0.089*** | 0.043*      | 0.039*** | 0.062***    | 0.139***| 0.061***  | 0.133***| 0.199***  | 0.168***  | 0.071***   | 0.091***| 0.091***  |
| Age       | -0.061***| -0.019***   | -0.039***| -0.054***   | -0.016***| -0.064*** | -0.068***| -0.046*** | -0.060*** | -0.094***  | -0.037***| -0.063*** |
| Age square| 0.001*** | 0.0003***   | 0.001*** | 0.0003***   | 0.001***| 0.001***  | 0.001***| 0.001***  | 0.001***  | 0.002***   | 0.0005***| 0.001***  |
| Family size| -0.001  | 0.004      | 0.009*** | -0.003***   | 0.008***| 0.002     | -0.001  | 0.004*    | -0.003    | -0.002     | -0.001  | 0.002*    |
| Electricity| -0.143***| -0.207***   | -0.081***| -0.116***   | -0.098***| -0.057*** | -0.209***| -0.221*** | -0.180*** | -0.224***  | -0.170***| -0.186*** |
| Water     | -0.053***| -0.123***   | -0.096***| -0.047***   | -0.029***| -0.061*** | -0.050***| -0.044*** | -0.072*** | -0.079***  | -0.051***| -0.077*** |
| Observations | 19,422 | 1,377      | 270,448  | 6,230       | 137,427  | 3,240     | 9,604   | 4,863     | 4,008     | 16,450     | 7,594   | 12,037    |

| Variables | (13) Nigeria | (14) Rwanda | (15) Senegal | (16) Sierra Leone | (17) South Sudan | (18) Sudan | (19) Tanzania | (20) Togo | (21) Uganda | (22) Zambia | (23) Zimbabwe |
|-----------|--------------|-------------|--------------|------------------|----------------|-----------|-------------|---------|------------|-----------|-------------|
| Female    | 0.004        | -0.022***   | -0.023***    | 0.074***         | 0.051***       | -0.088***| -0.017***   | 0.132** | 0.053***   | 0.026***  | -0.028***   |
| Rural     | 0.013        | 0.110***    | 0.101***     | 0.213***         | 0.089***       | 0.059***  | 0.055***    | 0.091   | 0.128***   | 0.152***  | 0.059***    |
| Age       | -0.018***    | -0.065***   | -0.045***    | -0.044***        | -0.075***      | -0.045*** | -0.028***   | -0.017  | -0.034***  | -0.068*** | -0.027***   |
| Age square| 0.0003***    | 0.001***    | 0.001***     | 0.001***         | 0.001***       | 0.0005*** | 0.0002      | 0.001***| 0.001***   | 0.001***  | 0.0004***   |
| Family size| 0.001       | -0.009***   | 0.000***     | 0.002            | -0.001         | 0.005***  | -0.001***   | 0.011   | -0.014***  | -0.006*** | 0.004***    |
| Electricity| -0.053***    | -0.210***   | -0.152***    | -0.115***        | -0.122***      | -0.129*** | -0.152***   | -0.222***| -0.273***  | -0.173*** | -0.046***   |
| Water     | 0.014        | -0.021***   | 0.003        | -0.118***        | -0.105***      | -0.069*** | -0.059***   | -0.092  | -0.133***  | -0.068*** | -0.029***   |
| Observations | 5,069     | 25,403      | 32,199       | 5,177            | 3,826          | 18,084   | 276,810    | 270     | 41,634     | 28,047    | 10,758      |

*** p<0.01, ** p<0.05, * p<0.1. Birth-cohort and year fixed effects are included.
Table F3. Determinants of Upward Occupational Mobility by Country

| Variables                        | Benin | Botswana | Egypt | Ethiopia | Ghana | Guinea | Kenya | Lesotho | Liberia | Malawi | Mali | Mozambique |
|----------------------------------|-------|----------|-------|----------|-------|--------|-------|---------|---------|--------|------|------------|
| Upward mobility in education     | 0.122** | 0.555*** | 0.064*** | 0.126*** | 0.018*** | 0.066*** | 0.095*** | 0.041* | 0.063*** | -0.01 | 0.032*** | 0.037*** |
| Female                           | 0.228*** | -0.054*** | 0.131*** | 0.188*** | 0.087*** | -0.056*** | -0.027*** | 0.121*** | 0.028*** | -0.047*** | 0.016*** | -0.124*** |
| Rural                            | -0.098*** | -0.168*** | -0.190*** | -0.121*** | -0.175*** | -0.127*** | -0.117*** | -0.056** | -0.095*** | -0.095*** | -0.112*** | -0.096*** |
| Age                                             | 0.014*** | 0.034*** | 0.026*** | 0.019*** | 0.017*** | 0.013*** | 0.022*** | 0.044*** | -0.004* | 0.012*** | 0.009*** | 0.017*** |
| Age square                                     | -0.0002*** | -0.0005*** | -0.0003*** | -0.0003*** | -0.0002*** | -0.0002*** | -0.0002*** | 0.001* | -0.0002*** | -0.0001*** | -0.0002*** | 0.0002*** |
| Family size                                  | -0.006*** | 0.002 | -0.008*** | 0.003 | -0.004*** | 0.0006** | 0.003*** | 0.002 | 0.0005 | -0.001* | -0.0003 | 0.004*** |
| Electricity                                 | 0.092*** | 0.111 | 0.111*** | 0.103*** | 0.088*** | 0.067*** | 0.115*** | 0.014 | 0.092*** | 0.056*** | 0.043*** | 0.047*** |
| Water                                           | 0.141*** | 0.149*** | 0.087*** | 0.045*** | 0.059*** | 0.006 | 0.026*** | 0.008 | -0.017** | 0.029*** | 0.031*** | 0.066*** |
| Married                                         | -0.071*** | -0.03 | -0.018*** | -0.002 | -0.009*** | -0.041*** | -0.014*** | 0.007 | 0.003 | 0.002 | -0.023*** | -0.002 |
| Observations                             | 81,025 | 1,814 | 480,729 | 6,429 | 157,187 | 35,499 | 6,545 | 8,065 | 49,679 | 58,524 | 152,860 |

| Variables                        | Nigeria | Rwanda | Senegal | Sierra Leone | South Sudan | Sudan | Tanzania | Togo | Uganda | Zambia | Zimbabwe |
|----------------------------------|---------|--------|---------|--------------|-------------|-------|----------|------|--------|--------|-----------|
| Upward mobility in education     | 0.044** | 0.114*** | -0.014 | -0.024 | -0.005 | 0.031*** | 0.018*** | -0.04 | 0.067*** | 0.022*** | 0.171*** |
| Female                           | 0.031*** | -0.052*** | -0.207*** | 0.010*** | 0.076*** | 0.012*** | -0.019*** | 0.093*** | -0.017*** | -0.009*** | -0.023*** |
| Rural                            | -0.053*** | -0.050*** | -0.162*** | -0.078*** | -0.072*** | -0.099*** | -0.051*** | -0.168*** | -0.121*** | -0.061*** | -0.135*** |
| Age                                             | 0.017*** | 0.013*** | 0.023*** | 0.002** | -0.005*** | 0.009*** | 0.005*** | 0.004 | 0.016*** | 0.005*** | 0.013*** |
| Age square                                     | -0.0002*** | -0.0002*** | -0.0003*** | -0.0002* | 0.0001 | -0.0001*** | -0.0005*** | -0.0001 | -0.0002*** | -0.0006*** | -0.0002*** |
| Family size                                  | -0.006*** | 0.002*** | -0.0003 | 0.002*** | 0.001 | 0.001*** | -0.001*** | -0.009*** | 0.001*** | -0.0003 | -0.001 |
| Electricity                                 | 0.081*** | 0.035*** | 0.101*** | 0.042*** | 0.133*** | 0.053*** | 0.051*** | 0.193*** | 0.092*** | 0.032*** | 0.012 |
| Water                                           | 0.016 | 0.009*** | 0.082*** | 0.005 | 0.078*** | 0.023*** | 0.024*** | 0.053 | 0.024*** | 0.0386*** | 0.047*** |
| Married                                         | 0.033** | -0.017*** | -0.059*** | -0.013*** | 0.084*** | -0.001 | -0.001 | 0.021 | -0.006*** | 0.004* | 0.003 |
| Observations                             | 5,555 | 89,171 | 94,604 | 25,689 | 32,422 | 144,533 | 267,009 | 1,166 | 113,110 | 41,617 | 6,551 |

*** p<0.01, ** p<0.05, * p<0.1. Birth-cohort and year fixed effects are included.
Table F4. Determinants of Downward Occupational Mobility by Country

| Variables                        | Benin (1) | Botswana (2) | Egypt (3) | Ethiopia (4) | Ghana (5) | Guinea (6) | Kenya (7) | Lesotho (8) | Liberia (9) | Malawi (10) | Mali (11) |
|----------------------------------|-----------|--------------|-----------|---------------|-----------|------------|-----------|-------------|-------------|-------------|-----------|
| Downward mobility in education  | 0.038***  | 0.068        | 0.070***  | 0.060***      | 0.002     | 0.037      | 0.088**   | 0.024       | 0.004       | 0.024       | 0.039**   |
| Female                           | -0.014*** | -0.023       | -0.097*** | -0.007        | -0.036*** | -0.003     | -0.027    | -0.117***   | -0.031      | 0.038***    | -0.003    |
| Rural                            | 0.043***  | -0.016       | 0.134***  | 0.096***      | 0.083***  | 0.223**    | 0.114***  | 0.162***    | 0.119***    | 0.087***    |          |
| Age                              | -0.003**  | -0.049***    | -0.008*** | -0.006        | -0.014*** | -0.004     | -0.025**  | -0.034***   | -0.029**    | -0.077***   | -0.014*** |
| Age square                       | 0.0008*** | 0.001***     | 0.0001*** | 0.0006        | 0.0002*** | 0.001**    | 0.0003**  | 0.0005***   | 0.0004***   | 0.001***    | 0.0002*** |
| Family size                      | -0.004*** | 0.007*       | 0.004***  | -0.001        | 0.002***  | -0.0001    | 0.008***  | 0.011***    | -0.004      | -0.004**    | -0.004*** |
| Electricity                      | -0.005    | -0.052       | -0.013**  | 0.008         | -0.059*** | -0.011     | -0.195**  | -0.039      | -0.076**    | -0.018      | -0.014    |
| Water                            | -0.0004   | -0.244***    | -0.032*** | -0.016        | -0.028*** | 0.004      | 0.028     | -0.02       | 0.028       | -0.053***   | -0.005    |
| Married                          | 0.002     | -0.066       | -0.002    | -0.016        | 0.028***  | 0.025*     | 0.029     | -0.099***   | 0.013       | 0.033**     | 0.052***  |
| Observations                     | 11,942    | 657          | 202,972   | 3,697         | 59,529    | 1,897      | 2,536     | 1,506       | 1,566       | 5,379       | 3,678     |

| Variables                        | Mozambique (12) | Nigeria (13) | Rwanda (14) | Senegal (15) | Sierra Leone (16) | South Sudan (17) | Sudan (18) | Tanzania (19) | Uganda (20) | Zambia (21) | Zimbabwe (22) |
|----------------------------------|----------------|--------------|-------------|---------------|-------------------|------------------|------------|---------------|-------------|-------------|---------------|
| Downward mobility in education  | 0.091***       | 0.104*       | 0.156***    | 0.061***      | 0.012             | 0.018            | 0.008      | 0.037***      | 0.014       | 0.079***    | 0.211***      |
| Female                           | 0.093***       | -0.034       | 0.086***    | 0.152***      | -0.067***         | 0.004            | -0.025**   | 0.017***      | 0.016       | 0.040***    | 0.023          |
| Rural                            | 0.115***       | 0.139***     | 0.170***    | 0.086***      | 0.093***          | 0.073***         | 0.109***   | 0.036***      | 0.238***    | 0.179***    | 0.117***      |
| Age                              | -0.029***      | -0.033***    | -0.017**    | 0.002         | -0.007*           | -0.016*          | -0.011***  | -0.025***     | -0.046***   | -0.030***   | -0.006         |
| Age square                       | 0.0006***      | 0.0005***    | 0.0003***   | -0.0006*      | 0.0001*          | 0.0002           | 0.0002*    | 0.0004***     | 0.0007***   | 0.0005***   | -0.0001       |
| Family size                      | -0.001         | 0.012***     | -0.001      | 0.001         | 0.001             | 0.008**          | -0.001     | 0.0004        | -0.0002     | 0.002       | 0.004          |
| Electricity                      | -0.081***      | -0.008       | -0.072***   | -0.077***     | -0.006            | -0.120***        | -0.031***  | -0.075***     | -0.086***   | -0.021*     | -0.038         |
| Water                            | -0.057***      | -0.111***    | -0.067***   | -0.009        | -0.057***         | -0.021           | -0.040***  | -0.018***     | -0.083***   | -0.071***   | -0.02          |
| Married                          | 0.011          | -0.049       | 0.002       | 0.035***      | -0.005            | -0.101***        | -0.013     | 0.007         | 0.036**     | -0.0005     | 0.017          |
| Observations                     | 4,628          | 1,075        | 1,949       | 16,220        | 2,323             | 1,602            | 8,431      | 33,413        | 7,050       | 6,756       | 2,027          |

*** p<0.01, ** p<0.05, * p<0.1. Birth-cohort and year fixed effects are included.