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China and the United States

Different economic models but similarly low levels of socioeconomic mobility

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Abstract: The United States and China are the world's largest economies. Together they are responsible for about one-third of the world's economic output. This paper aims to examine whether the two economic giants are also lands of opportunity where resources are allocated in a way that minimizes unrealized human potential. Our analysis shows that despite stark differences in their levels of development, the US and China report remarkably similar levels of socioeconomic mobility; a level that is considered low by international standards. The US's level of socioeconomic mobility has historically been low, with little to no progress over the last three to four decades. Before it embarked on its transition from planned to market economy, socioeconomic mobility was relatively high in China. However, as it underwent a period of rapid economic growth, China's socioeconomic mobility declined significantly. The paper concludes that the world's two major economic powers have converged to a low level of socioeconomic mobility where talent from disadvantaged backgrounds is excluded from opportunities, plausibly implying unrealized human potential and misallocation of resources on a large scale.

Key words: intergenerational mobility, inequality, equality of opportunity, education, income, China, United States

JEL classification: D3, D6, I24, J62

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1 Introduction

The US and China are the world's largest economies, accounting for about one-third of the world's economic output. The two giants are different in a multitude of ways, including in population size, political system, and level of development. The US has historically ranked among the world's richest countries in per capita terms. But China has been catching up. While output per capita is still notably lower in China, rapid economic growth sustained over multiple decades has brought China to parity with the US in terms of aggregate output (Cheremukhin et al. 2015; Song et al. 2011; Zhu 2012; Zilibotti 2017).

The unprecedented economic development in China is said to have fuelled a level of optimism in the country. A recent op-ed in the *New York Times* observes that 'China is still much poorer overall than the US. But the Chinese have taken a commanding lead in that most intangible but valuable of economic indicators: optimism… the Chinese are now among the most optimistic people in the world — much more so than Americans and Europeans, according to public opinion surveys. What has changed? Most of all, an economic expansion without precedent in modern history' (Hernandez and Bui 2018). On the other hand, the US of course is home to the American Dream which embodies a certain degree of optimism. The American Dream represents the belief that with hard work and determination anyone can achieve success and prosperity. In 1931, James Truslow Adams defined it as 'life should be better and richer for everyone, with opportunity for each according to ability and achievement' regardless of the social class one is born into (Adams 1931).

Are these two economic giants indeed lands of opportunities where individuals have the best chances of realizing their human potential? A land of opportunity is a society where an individual's chances of success depend little on the socioeconomic status of the family he or she is born into. To what extent this is true for a country can be measured using indicators of intergenerational mobility. A country with higher intergenerational mobility is one where an individual's chances of success is more aligned with one's innate ability and efforts than with one's family background (a circumstance that is beyond a person's control). Low mobility, on the other hand, indicates an uneven playing field, which leads to a waste of human capital when talented individuals are not given the opportunity to realize their potential and misallocation of resources when rewards are not matched with ability. Resolving this is therefore likely to raise the stock of human capital, improve efficiency, and stimulate economic growth.

Levelling the playing field to stimulate socioeconomic mobility is costly. The large national incomes of the US and China, however, give these giants the necessary fiscal space to achieve exactly that. Yet, the existing empirical literature ranks the US as a country with a relatively low level of intergenerational mobility when compared to other high-income countries, mostly from Europe (Björklund and Jäntti 1997; Corak 2013). How does the US compare to China? And how has mobility co-evolved over time for these two giants?

First, we examine estimates of intergenerational mobility in income for the US and China along with estimates for 73 other countries that have recently been compiled by Equalchances 2018 and Narayan et al. 2018. Having estimates of income mobility for 75 countries representative of over 80 per cent of the world's population allows us to put the difference in income mobility between the US and China in a global perspective. Second, we estimate how intergenerational mobility in the two giants has co-evolved over time by focusing on mobility in education for individuals born in the 1940s up to those born in the 1980s (the youngest cohort that will have had a chance to complete their education at the time the survey data was collected).

The data used to estimate education mobility are the Panel Study of Income Dynamics (PSID) from 2015 for the US and the China Family Planning Survey (CFPS) from 2012. We will distinguish between two different concepts of intergenerational mobility which we refer to as absolute mobility and relative mobility. Absolute mobility measures how much progress the present generation as a whole has made in comparison to the previous generation. Relative mobility measures the degree to which the success of any one individual is contingent on the family background he/she is born into. Our findings are summarized in the concluding remarks.

The paper is organized as follows. Section 2 introduces the different measures of intergenerational mobility and the data we use to estimate these measures. Section 3 places the estimates of income mobility for the US and China into a global context and confirms the strong relationship between income mobility and education mobility. A study of the co-evolution over time of absolute and relative mobility in education is presented in Sections 4 and 5. Section 6 provides a brief history of policy changes and economic conditions in the US and China that will help put the observed trends in economic mobility into context. A comprehensive overview of the literature on policy interventions designed to stimulate mobility, mostly derived from applications to the US, is presented in Section 7. Finally, Section 8 concludes.

2 Measuring intergenerational mobility

2.1 Measures of intergenerational mobility

Socioeconomic mobility has been interpreted in the social science literature in several ways. We consider two distinct concepts of intergenerational mobility often used in the economic literature, which we refer to as absolute mobility and relative mobility. Absolute mobility measures the extent of progress one generation as a whole has made in comparison to the previous generation, while relative mobility measures the degree to which one's success is contingent on the success of one's parents.

Let y_i^c denote the socioeconomic status of individual *i*. Similarly, let y_i^p denote the socioeconomic status of their parents. Examples of socioeconomic status include one's level of income, education, and occupational prestige. The intergenerational transmission of socioeconomic status is often described by the following linear model:

$$y_i^c = c + by_i^p + u_i,$$

where u_i denotes an error term with mean zero. Empirical estimates of *b* generally lie between the values 0 and 1.

We measure absolute mobility as the share of individuals who have been able to surpass their parents: $M_A = Pr\left[y_i^c > y_i^p\right]$. For relative mobility, we consider a variety of different indicators: (a) 1-*b*, i.e. one minus the regression coefficient from eq. (1), (b) 1-ϱ , i.e. one minus the Pearson correlation ϱ between y_i^c and y_i^p, (c) *BHQ4*, i.e. the likelihood that an individual reaches the top quarter of their generation given that he/she is born to parents from the bottom half of their generation, and (d) μ_0^{50}, i.e. the expected rank of a child (in the child education distribution) whose parents are in the bottom 50 per cent of the parent education rank distribution. All these measures are common choices in the literature on intergenerational mobility, each with its own pros and cons. The last measure is one that is advocated by Asher et al. (2019).

Note that all four measures of relative mobility capture the degree to which one's socioeconomic status is determined by the socioeconomic status of one's parents. The highest values of relative mobility are obtained when individual success is independent from the parental background one is born into, in which case 1-b and 1-ϱ would both reach unity (as the regression and correlation coefficients both tend to zero); and all individuals, including those whose parents rank in the bottom half of their generation, would have a 25 per cent likelihood of reaching the top quarter of their generation with an expected rank of 50.

The different measures of relative mobility capture the relationship between parental and individual socioeconomic status in different ways. The measures 1-b and 1-ϱ focus on the strength of the relationship between parental and offspring outcomes, while BHQ4 and μ_0^{50} are also sensitive to the direction of mobility from one generation to the next. Between the four measures, ϱ is the only measure that is invariant to the marginal distributions, i.e. it is the only measure that is not sensitive to changes in the levels of inequality in socioeconomic outcomes across generations.

2.2 Estimating intergenerational mobility

Education mobility

y_i^c and y_i^p in this case denote the level of education of individual i and their parents, measured by years of schooling. Boys and girls are pooled. Parental education is measured by the education level of the parent with higher education. This means that boys and girls are compared against the exact same benchmark, namely their most educated parent.

Focusing on education in the measurement of intergenerational mobility has advantages and disadvantages. One advantage is that an individual's education attainment does not change after a certain age when all education is likely to be completed. The same is not true for income, which varies across a person's life-cycle as he/she accumulates experience.

A potential disadvantage, however, is that education data can be relatively coarse, particularly in countries where large shares of the population have little to no education. This particularly affects the estimation of BHQ4 and μ_0^{50}, which requires the identification of individuals whose parents are in the bottom half of the parent education distribution. If most parents have no education for example, then it is not clear which parents should be considered for the bottom half. Asher et al. (2019) put forward an approach to estimate upper and lower bounds for these mobility measures using coarse parental education data. We will use the midpoint between those two bounds as our point estimate.

The coarseness of education data may also affect the measurement of absolute mobility, and particularly its cross-country comparability, if the extent of coarseness varies between countries. For this reason, we harmonize coarseness by constructing a categorical variable with five categories of completed education that can be defined in a consistent manner in both countries: (i) no education, (ii) primary, (iii) lower secondary, (iv) upper secondary, and (v) tertiary (including higher vocational). This variable is only used to establish whether an individual has surpassed their parent's level of education or not, i.e. to estimate absolute mobility. All measures of relative mobility are estimated using years of schooling as the outcome of interest.

A second limitation of education data is that there is a maximum to the amount of education any given individual can obtain. This education 'ceiling' poses a challenge for the measurement of absolute mobility in particular. When parents have the highest level of education, there is no scope for their children to surpass their education. We resolve this by excluding individuals whose

parents have attained a tertiary degree (i.e. the highest education category considered), such that all individual for whom absolute mobility is evaluated has a positive chance of surpassing their parents.

Income mobility

Intergenerational income mobility is commonly measured by 1-*b*. Recall the linear intergenerational regression:

$$y_i^c = c + by_i^p + u_i,$$

where y_i^c and y_i^p now [in this case] denote log permanent income (i.e. lifetime earnings) of individual *i* and their parents, respectively. The regression coefficient *b* is often referred to as the income elasticity; *b*=0.4 indicates that 40 per cent of differences in parental incomes are transmitted to the next generation.

We use retrospective data on parental education and age to predict parental earnings, which can then be used as an instrument in the intergenerational earnings regression. This Two-Sample Two-Stage Least Squares (TSTSLS) approach involves the following steps (see e.g. Björklund and Jäntti 1997): (i) estimate an income equation from an older sample that is representative of the current population of parents when they were younger (a sample of 'pseudo-parents'), (ii) use the estimated model coefficients (i.e. returns to education and experience) to predict parent income earnings at reference age using the retrospective data on the age and education of the parents as predictors, and (iii) regress offspring earnings at reference age on predicted parent earnings at reference age. Further details on the estimation of the income elasticity b are included in the Appendix.

2.3 Data

Estimates of intergenerational income elasticity are obtained directly from Equalchances (2018) and GDIM (2018).[1] These sources also provide estimates of the income elasticity for 73 other countries (i.e. 75 countries in total including the US and China), allowing us to place the estimates for the US and China in a global context. To facilitate cross-country comparability, all estimates have been compiled using TSTSLS as outlined in Section 2.2 with parental education and occupation serving as instruments for parental income, including for countries where parental income is in fact observed in the data (the US included). This database includes one estimate of the income elasticity per country, capturing [measuring] the intergenerational transmission of income between the generation born in the 1950/60s and their offspring born in the 1970/80s. These data however do not allow us to track income mobility over time. To estimate intergenerational mobility in education in China and the US, we will be using the China Family Planning Survey (CFPS) from 2012 and the US Panel Study of Income Dynamics (PSID) from 2015, respectively. Both surveys are nationally representative and include parental education data for individuals of all ages.[2]

[1] The Global Database of Intergenerational Mobility (GDIM) was compiled by Narayan et al. (2018).

[2] The sample size of individuals aged 21 or older is about 16,000 in the PSID and 33,000 in the CFPS. In the case of China, the sampling frame does not include Hong Kong, Hainan, Inner Mongolia, Macao, Ningxia, Taiwan, Tibet, Qinghai, and Xinjiang. Data on father's education is available for 85 per cent of the PSID sample and 90 per cent of the CFPS sample. Coverage of mother's education is higher still; about 90 per cent of the PSID sample and 93 per cent of the CFPS sample.

In both surveys, individual education is recorded in two complementary variables: years of schooling completed and grade completed. We treat the former as a continuous variable and the latter as a categorical variable. While each survey distinguishes between eight different grades, the choice of grades does not correspond perfectly, most notably the higher levels. The grades used in the PSID (CFPS) are: (1) less than primary (idem), (2) primary (idem), (3) lower secondary (junior high-school), (4) upper secondary (senior high-school), (5) post-secondary non-tertiary (three year college), (6) short-cycle tertiary (bachelor degree), (7) bachelor (masters), and (8) masters or doctorate (doctorate). In the PSID, parental education is also available as both a continuous (years of schooling) and a categorical (grade completed) variable. In the CFPS however, parental education is only available as a categorical variable. We convert the latter to years of schooling using UNESCO sources containing country- and year-specific mappings on the duration of educational programs.[3]

All four measures of relative mobility are estimated using years of schooling (for both the individual and their parents), which is the most disaggregated indicator for education. For the estimation of absolute mobility or the share of individuals who have surpassed their parents in terms of education, we construct a new categorical education variable that harmonizes the highest grade completed between the two surveys, so as to maximize cross-country comparability of our estimates between the US and China. The harmonized education categories are: (i) no education, (ii) primary, (iii) lower secondary, (iv) upper secondary, and (v) tertiary (including higher vocational). Note that if we were to use the years of schooling variable to estimate absolute mobility in the US along with the categorical education variable available for China, then the threshold for qualifying as absolutely mobile would be comparatively lower in the U.S; one would only need one more year of schooling than one's parents, compared to completing one additional grade of education (i.e. multiple years of schooling) in China.

Using these data, we will track intergenerational mobility in education for those born in the 1950s to those born in the 1980s. The decade cohorts are defined as all individuals born between the first and last day of the relevant decade, i.e. individuals from the 1980s cohort are born between 1 January 1980 and 31 December 1989. The 1980s cohort denotes the youngest cohort for which all members will have had the chance to complete their education at the time of survey data collection. Note however that individuals born in the 1980s will have benefited from public policies effective in the 1990s and 2000s, which means that estimates of intergenerational mobility for the 1980s cohort provide a measure of the extent to which recent policy interventions have been able to level the playing field.

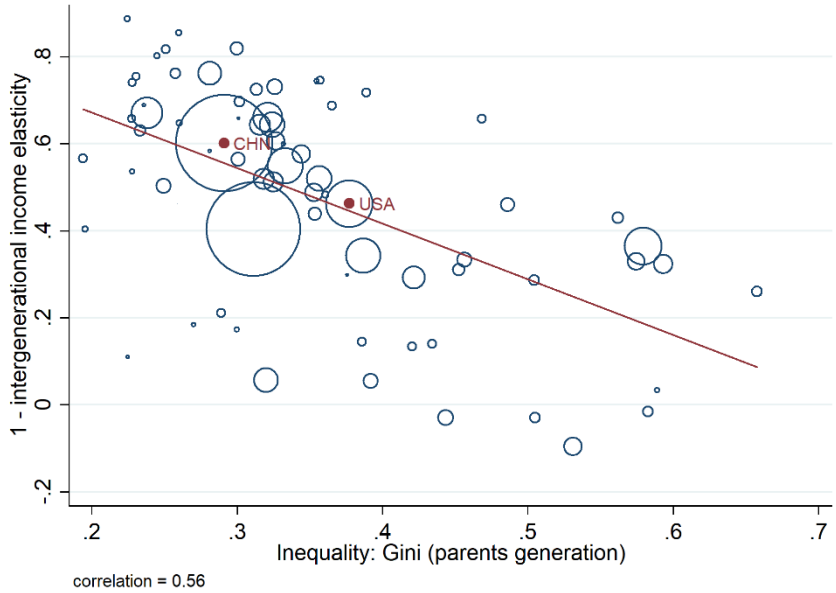
3 Income versus education mobility

In a 2012 speech, Council of Economic Advisers' chairman, Alan Krueger, observed the negative relationship between income inequality and intergenerational income mobility using data from Miles Corak for a select number of mostly developed and emerging countries. This relationship has become known as the Great Gatsby curve, see e.g. Corak (2013). Social democracies such as Denmark, Norway and Finland stand out as countries with low levels of inequality and some of

[3] Two sources of information are used. The first source (http://uis.unesco.org/en/isced-mappings) for the most part only conveys the duration of ISCED categories in 1997 and 2011. This source is supplemented with information from UNESCO's online database (http://data.uis.unesco.org/), which outlines the length of durations of ISCED categories by year from 1970. For further details, see Narayan et al. (2018).

the highest levels of mobility. At the other end of the curve are Brazil and Chile, countries with some of the highest levels of inequality and lowest levels of mobility.

Figure 1: Great Gatsby curve



Source: authors' illustration based on GDIM (2018), Equalchances (2018), and PovcalNet data.

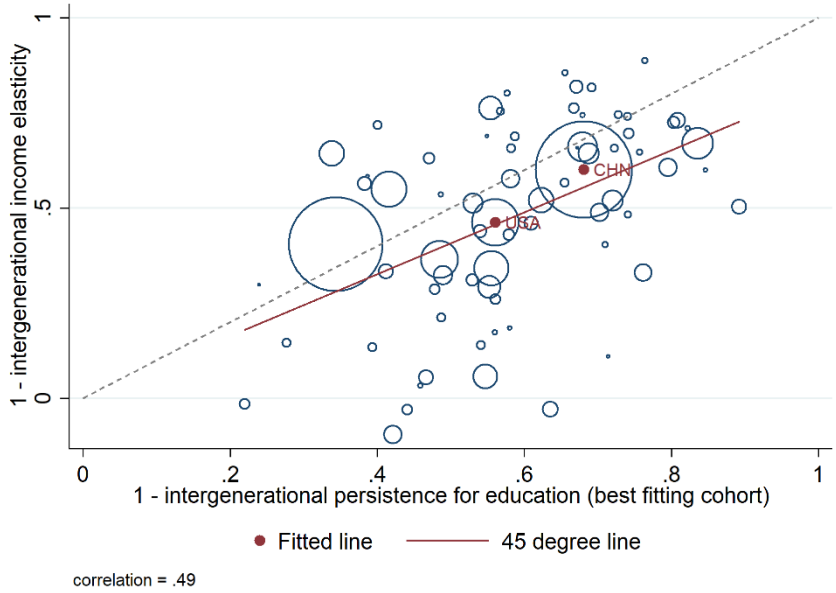
It should be noted that the Great Gatsby curve (GGC) describes a correlation, not a causal relationship. Factors that may be driving both inequality and socioeconomic mobility include large differences in quality of schooling and healthcare and differential access to these elementary services depending on the socioeconomic background children are born into, discrimination in the labour market, imperfect credit markets, etc. One could argue that a country's position on the GGC is (in part) determined by how that country ranks in terms of inequality of opportunity, fairness, and meritocracy. In a 2013 column on the Great Gatsby curve, *The Economist* invokes these concepts as it compares the positions of the US with that of European countries along the curve: 'The argument over the Great Gatsby curve is an argument about whether America's economy is fair… whether you are rich or poor in Europe or America depends to a great extent not on your own qualities of efforts, but on where you happen to be born. America is not a meritocracy…not only do those born rich tend to stay rich and vice versa, just being born in one state or another makes a huge difference to your lifelong earnings' (Mustafa Suleyman 2013). This observation is also highlighted in a recent study by Milanovic (2015).

How does the US compare to China in terms of inequality and socioeconomic mobility? Figure 1 shows an updated version of the Great Gatsby curve that provides global coverage by expanding the number of countries to 75, including the developed, emerging and developing countries. The size of the dots is proportional to the size of the country's economy. The US and China, standing out as the world's two largest economies, are seen to closely fit the curve with remarkably little space between them. China is slightly more mobile and reports lower level of inequality during parents' generation. But the differences are small when viewed from a global perspective, and inequality in China has since caught up; present generations in China and the US experience very

similar levels of inequality, see e.g. Piketty et al. (2019) and Li et al. (2018).[4] The US, with income mobility comparable with selected emerging and developing countries, is notably less mobile than most high-income countries.

How has intergenerational mobility co-evolved over time? We will try to answer this question by examining intergenerational mobility in education for both countries. This allows us to estimate and compare time-trends in mobility between the two countries over an extended period of time. Education denotes an important aspect of economic well-being, and education mobility arguably has a strong association with income mobility as human capital is a key determinant of individual wage earnings.

Figure 2: Income mobility versus education mobility



Source: authors' illustration based on GDIM (2018), Equalchances (2018) data.

The last statement is confirmed in Figure 2 which plots estimates of income mobility against estimates of education mobility for the same set of 75 countries. The two distinct measures of mobility are seen to be strongly, but not perfectly, correlated. The imperfect correlation seems intuitive. Abstracting away from estimation error(s), income mobility is also a function of whether factor markets are creating a level playing field in terms of economic opportunities (such as jobs, wages, and access to credit) in addition to reflecting differences in human capital, while education mobility solely captures the degree to which human capital accumulation is fair and efficient.

4 Absolute mobility in education

Without exception, parents would like to see their children have a higher standard of living, and with it a better life, than they had themselves. When children are asked, they too tend to consider

[4] In both the US and China, present inequality levels are high by international standards. This could negatively impact on future growth prospects (Benjamin et al. 2011; van der Weide and Milanovic 2018), particularly where high inequality reflects high inequality of opportunity and low intergenerational mobility. In the case of China, inequality at the national level has also been found to reflect significant intra-provincial inequality (Hussain et al. 1994).

their parents a natural benchmark to compare their economic progress against (Chetty et al. 2017; Goldthorpe 1987; Hochschild 2016). The measure of absolute mobility considered here, the percentage of children who managed to surpass their parents in terms of education, is arguably the simplest possible indicator that captures this notion of progress.

In a recent study, Chetty et al. (2017) estimate that the US did exceptionally well by this measure for the generations born between 1940–60, when over 90 per cent of children managed to do better than their parents in terms of income. Absolute mobility in income in the US has since fallen to around 50 per cent for the generation born in the 1980s, i.e. Millennials are the first generation in the modern US history who will be worse-off on average than their parents.

Figure 3: Absolute mobility in education

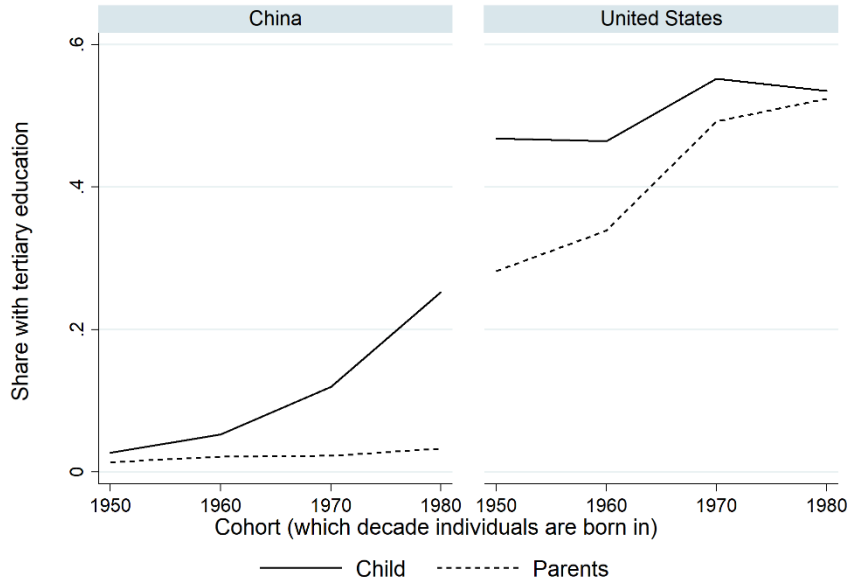
Source: authors' illustration based on GDIM (2018) data.

Does absolute mobility in education show a similarly steep decline in the US? And how does the time-evolution of absolute mobility in China compare? The answers to both questions can be found in Figure 3, which plots the time-trends in absolute mobility in education for both countries over a 40-year period, namely for individuals born in the 1950s up to individuals born in the 1980s. We find that: (1) absolute mobility in education and income show very similar trends in the US (see Chetty et al. (2017) for the time-trend of absolute mobility in income), and (2) while absolute mobility has been declining throughout the period in the US, it increased in China from the 1950s to the 1960s generation and declined slightly since then. Absolute mobility was lower in China for the generation born in the 1950s, but China since surpassed the US in terms of absolute mobility a decade later. The time-trend in absolute mobility for China largely matches the trend observed for the global average of emerging and developing countries (see e.g. Narayan et al. 2018).

The observation that absolute mobility is now higher in China than it is in the US is not entirely surprising, given that the bar for surpassing the education level of one's parents is lower in China as parents in China have on average lower levels of education compared to parents in the US. This is confirmed in Figure 4, which plots the share of parents and offspring with a tertiary degree over time in both countries; about 4 per cent of parents of individuals born in the 1980s completed a tertiary degree in China compared to 55 per cent of parents in the US. The bar for surpassing one's parents is of course not the only factor at play in determining educational mobility. The capacity

to educate children is another factor that is likely to push absolute mobility in the opposite direction as countries get richer — richer nations have a better-resourced education system that leads to a higher capacity to educate its children, as well as a more educated population, which implies a higher bar for surpassing one's parents in terms of education. For the present generation, the net effect of these two opposing forces yields a higher level of absolute mobility in education in China when compared to the US.

Figure 4: Share with a tertiary education



Source: authors' illustration based on GDIM (2018) data.

5 Relative mobility in education

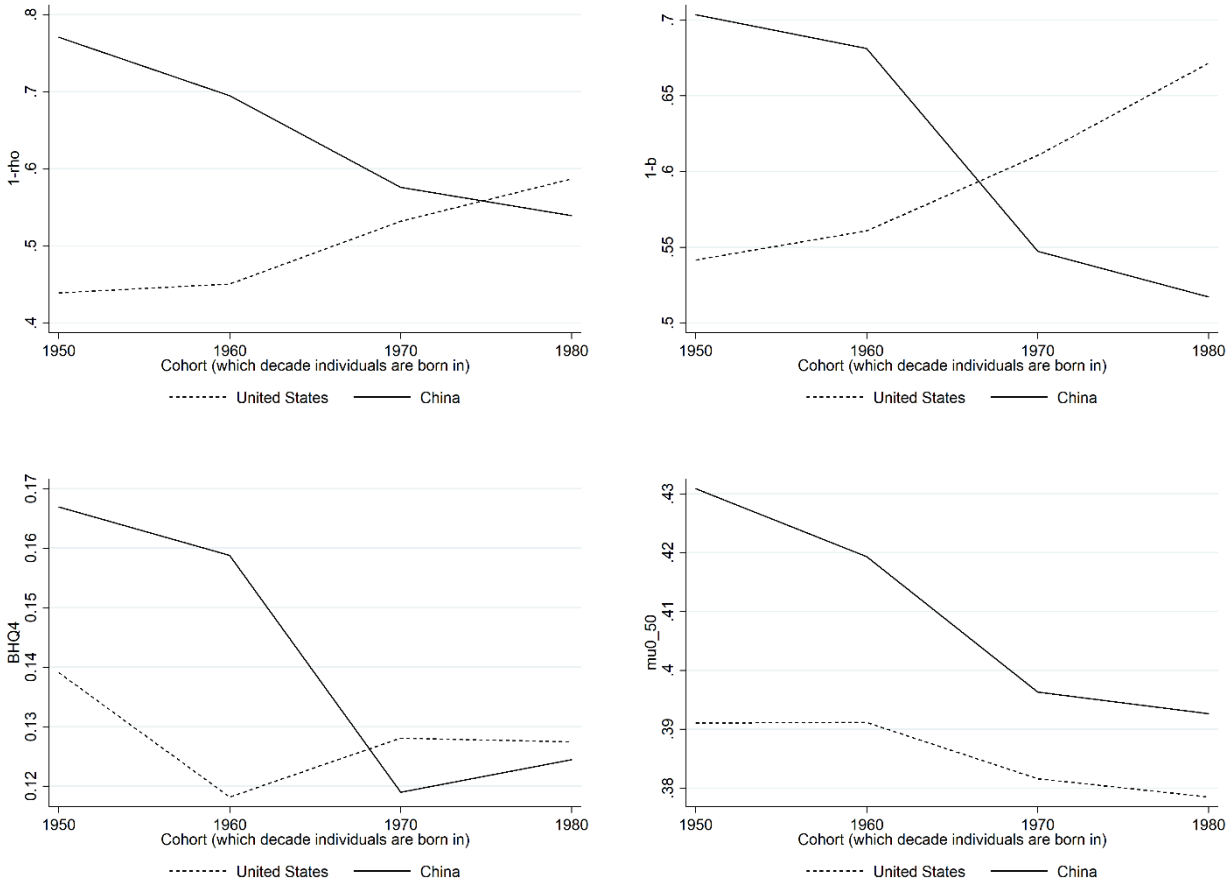
A country with high relative intergenerational mobility is a country where an individual's chances of success is not contingent on the socioeconomic success of his or her parents. Governments may have several reasons for seeking to improve relative mobility. In addition to arguments of fairness, there are economic arguments. When mobility is low, individuals are not operating on a level playing field. The odds of someone born to non-affluent parents will be stacked against him or her. This is not only unfair, but it also leads to a waste of human capital, as talented individuals may not be given the opportunity to reach their full potential. Reducing this inefficiency will arguably raise the stock of human capital and thereby stimulate economic growth. Since the waste of human capital tends to be concentrated toward the bottom of the distribution, the growth brought about by mobility-promoting policy interventions will more likely than not be of an inclusive nature.

Using a novel dataset for the US, Chetty et al. (2014) is able to estimate relative intergenerational mobility down to the commuting zone and county level, observing that mobility varies considerably within the country and within states.[5] Some parts of the US are found to be just as mobile as some of the most mobile countries in Europe, while in other parts of the country,

[5] Corak (2019) has extended this analysis to Canada.

children face a steep uphill struggle to escape poverty when born into it. They also find that the more mobile areas within the US tend to be areas that are less residentially segregated (i.e. households from different socioeconomic backgrounds and different race reside in the same neighbourhoods), have less inequality, higher quality public school systems, stronger social networks, and stronger family structures.

Figure 5: Relative mobility in education

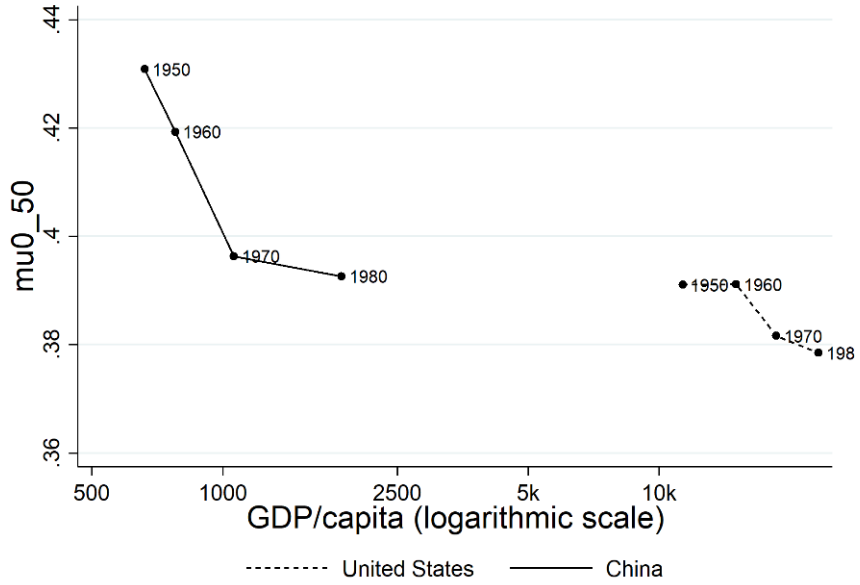


Source: authors' illustration based on GDIM (2018) data.

Focusing on intergenerational mobility in education, we are able to compare the time-trends in relative mobility between the two giants, the US and China, see Figure 5. While the three different measures of relative mobility show slightly different trends for the US, we identify a number of conclusive observations: (1) relative mobility is declining in China while it is stagnating in the US (mobility in the US is increasing by one measure (the correlation coefficient) and decreasing by another (the two measures of relative upward mobility)), (2) relative mobility was historically higher in China but the two giants appear to be converging to a similar level of mobility. The stagnation in intergenerational mobility observed in the US for individuals born after 1950 is consistent with estimates obtained in the existing literature, see e.g. Hilger (2015). For perspective, Narayan et al. (2018) establish that the developing and emerging world dominate the list of countries with the lowest rates of relative upward mobility (BHQ4) for the 1980s generation. Among the bottom 50 countries, 46 are developing or emerging countries, while only four are high-income, including the US. In the median developing and emerging country, less than 15 per cent of those born into the bottom half make it to the top quarter, while more than two-thirds stay in the bottom half.

The observation that intergenerational mobility in China has steadily decreased over the past decades is consistent with the existing literature. Fan et al. (2015) study intergenerational mobility for two cohorts — individuals born between 1949–70 and those born after 1970 — and find that mobility is lower for the younger cohort. Using the 1990 and 2000 Chinese Population Censuses, Magnani and Zhu (2015) find that intergenerational persistence in education increased between individuals born between 1966–70 to individuals born between 1976–80. Chen et al. (2015) find that intergenerational has been declining for individuals born after 1950, but that it has been increasing before that (i.e. for older generations). Golley and Kong (2013) similarly observe a decline in mobility during that period, most notably for rural households.

Figure 6: Relative mobility versus GDP per capita



Source: authors' illustration based on GDIM (2018) and Maddison Project Database data.

Interestingly, the decline in intergenerational mobility in China and stagnation in the US was accompanied by large economic expansions in both countries, see Figure 6. This contrast is particularly obvious in China. It is one of few countries where mobility has declined significantly during a time of rapid economic growth (see e.g. Narayan et al. 2018). In general, a larger economic output and national income implies an increased fiscal space that would permit the funding of policy interventions that would stimulate socioeconomic mobility. It may be of course that the latter has not been a policy priority in both China and the US.

China underwent a massive expansion in educational attainment and achieved an unprecedented reduction in poverty over the last three to four decades (Montalvo and Ravallion 2010; Ravallion 2009; Ravallion and Chen 2007). Several explanations for why relative mobility in education has worsened while educational attainment has increased have been suggested. Chen et al. (2019) argue that the expansion of education has not sufficiently reached children from disadvantaged backgrounds. Conceivably, the expansion of higher education in particular would have primarily benefitted the elites. Chen et al. (2019) argue that many children did not meet the requirements for enrolment in higher education establishments.

The move from a planned to a market economy may also have played a part. It has shifted responsibility from the state to the individual and the family, which may have led to an increase in the importance of family networks impeding intergenerational mobility (Gong et al. 2012). The

decline in intergenerational mobility could also be related to rising returns to higher education and rising costs of higher education. Magnani and Zhu (2015) and Fan et al. (2015) both find that returns to education have increased in recent decades, which can increase the incentives of better-off parents to invest even more in children's education. Fan et al. (2015) find that tuition fees for tertiary education have increased significantly, which can make it harder for children from low-income backgrounds to access and complete a higher education.

6 Policy changes in China and the US underlying the trends in socioeconomic mobility

6.1 US

Socioeconomic mobility in the US has historically been low relative to high-income countries with comparable levels of national income per capita and has shown little to no progress over the last three decades. Chetty et al. (2017) also finds that there has been a large decline in the rate of absolute *upward* mobility in income across successive US birth cohorts — just half of children born in 1984 were earning more than their parents compared to 92 per cent of children born in 1940. The stagnation in mobility (and decline in absolute income mobility) has occurred along with rising income inequality. Katz and Krueger (2017), for example, links the decline in absolute mobility to the well-documented stagnant growth in real median household income and rise in income inequality beginning in the mid-1970s. Public debate on the causes of stagnating socioeconomic mobility and rising income inequality in the US has focused on several overlapping explanations — a vast body of literature that is selectively summarized below, focusing on a few key explanations on which there appears to be broad consensus.

The literature suggests that interplay between an intricate set of factors related to the supply and demand for human capital have contributed to rising income inequality and declining economic mobility in the US On the supply side, Katz and Krueger (2017) highlight slower growth of human capital among children from low-income families across generations. While children born in the early 1940s had around two more years of average schooling at age 30 than their parents' generation, this advantage drops to 0.75 years of schooling for children born in the early 1980s. This decline may in part stem from the fact that the average cost of college in the US has more than doubled between 1974–2012, with real implications for higher education equity (Cahalan and Perna 2015). In 2012, the average net price of college less grants and aid as a percentage of average family income is 84 per cent for low-income families (bottom quartile), compared to 15 per cent for high-income families (top-quartile). Children from high-income families are on average 8 times more likely to obtain a bachelors' degree by the age of 24 than children from low-income families in 2012 (77 per cent versus 9 per cent), up from 4 times more likely in the early 1970s (34 per cent versus 8 per cent). As a result of this trend, 'the US has gone from leading the world in educational attainment for those born in the mid-20th century to being in the middle of the pack for rich nations for those born since the 1970s' (Katz and Krueger 2017: 382).

The steep growth in wage premium to college education in the US has been identified by many researchers as the most important contributor to rising income inequality. By some estimates, roughly two-thirds of the overall rise of earnings dispersion between 1980 and 2005 in the US is 'proximately accounted for by the rising returns to schooling — primarily the growing premium to postsecondary education.' (Autor 2014: 2). The wage premium for college education does not just reflect returns to investment in high education, but also a fall in real earnings among non-college educated workers, which is a cause for particular concern. While real hourly earnings of college-educated males in the US rose substantially between 1980–2012, that of males with high school or lower educational levels fell by 11 to 22 per cent, along with a modest growth in real

earnings among females without at least some college education. The wage premium was not the only labour market driver of rising inequality. There was also a large drop in labour force participation rates among less educated males relative to males with post-secondary education between 1979 and 2007 (Autor 2014: 16-17).

From the perspective of socioeconomic mobility in the US, the rising college premium arguably denotes an important factor, in addition to the rising cost of college and decline in higher education equity. Cross-country evidence as well as economic theory suggest that countries with higher returns to education are likely to have lower intergenerational mobility of income (Corak 2013; Narayan et al. 2018). Intuitively, the main reason for this is the link between children's educational attainment and parental education and income. Higher returns to education provide multiple advantages to children of more educated parents — having educated parents *and* more resources available for investments in education, along with higher incentives for parents to make those investments.

Earning declines for less educated workers in the US has been linked to labour demand shifts against middle-skill jobs, which have polarized the US labour market. Increased domestic outsourcing and use of independent contractors have limited the availability of good jobs that offer a path of upward mobility (Katz and Krueger 2017). Technological change has led to substitution of machines for workers for some routine medium-skill occupations and reduced the demand for less educated workers (Autor 2014). Globalization, particularly the rapid increase in imports from China, has led to large-scale job losses in local labour markets where the industries exposed to foreign competition are concentrated (Autor et al. 2016). A decline in unionization has reduced the bargaining power of labour unions– the share of private-sector workers belonging to unions in the US has seen a decline of almost 70 per cent in the three decades between 1973 and 2011 (Autor 2014). The different demand-side factors work in tandem to reinforce each other. Policy choices have also played a role in strengthening these trends, such as policies that have contributed to the decline in minimum wage in real terms and in the bargaining power of unions, and the successive decline in top federal marginal tax rates that has increased both post-tax inequality and the incentive of highly paid workers to seek still higher compensation (Autor 2014).

There is an extensive literature examining other possible drivers of rising economic inequality and stagnating social mobility in the US Katz and Krueger (2017) associate rising US income inequality with residential economic segregation, which is likely to reduce economic mobility, given the evidence of neighbourhood effects on long-run outcomes of children (Chetty et al. 2016). Local drivers of social mobility are clearly important in the US, and there is some evidence to suggest they matter in many other parts of the world as well (see Narayan et al. 2018). For the US, at least half of the high variance in mobility across geographic areas is attributable to the causal effect of location. Neighbourhood characteristics that matter for mobility include income segregation and concentrated poverty, racial segregation, quality of schools, crime rates, and the share of two-parent families (Chetty and Hendren 2018a, 2018b). Kearney and Levine (2016) find that youth from disadvantaged socioeconomic backgrounds are more likely to drop out of school if they live in a place with a greater gap between the bottom and middle of the income distribution, suggesting that they perceive a lower rate of return to investment in their own human capital when living in a more unequal place.[6] Family structures also matter for intergenerational mobility. People raised

[6] Evidence is unclear on whether there has been increase in social (or racial) segregation of schools since the 1970s, although there is some evidence that students are more segregated by income across schools and districts today than in 1990 (Reardon and Owens 2014).

outside stable two-parent homes are relatively likely to become low-income adults and less likely to become high-income adults than people from stable two-parent homes (Bloome 2017).

Finally, the rising prevalence of economic rents and a shift in rents away from labour to capital is likely to have contributed to rising income inequality in the US (Stiglitz 2015). Stiglitz (2016) links the rise in inequality to the growth in rents, including what he calls 'land and exploitation rents', which arise from monopoly power and political influence. People who enjoy privileged connections to rent-providing assets or jobs tend to become more well off, which in turn reduces social mobility by increasing the incentives among parents to pass on such connections to their offspring. Furman and Orszag (2018) argue that increase in income inequality in the US is also linked to increased dispersion of earnings between firms, with more and more firms enjoying super-normal returns to capital. Increasing market consolidation may be contributing to the increasing prevalence of firms with unusually high returns to capital.

A potential consequence of increased rent-seeking in the US economy could be a reduction in the overall dynamism of US labour markets, which can reduce social mobility over time. Several studies have documented that job creation and job destruction in the US fell from the late 1980s or 1990s to the late 2000s.[7] Long-distance migration, which often implies changes in employer and industry, has fallen by as much as 50 per cent since the late 1970s (Furman and Orszag 2018). Katz and Krueger (2017) argue that declining geographic mobility in the US may have contributed to reduced income mobility, since internal migration to locations with better opportunities has traditionally provided a path to upward mobility.

Given the rise in income inequality, it is interesting that educational mobility in the US, while consistently lower than comparator countries, has not declined between the generations born in the 1950s and 1980s. Autor (2014) finds that rising income inequality has not reduced intergenerational *income* mobility so far, although that may change as income among those born after 2000 can be observed.[8] While the stability of socioeconomic mobility can be seen as a glass half-full, it is a worrying trend when combined with rising income inequality, as it implies that 'the lifetime relative disadvantage of children born to low- versus high-income families has increased substantially…… the rungs of the economic ladder have pulled farther apart but the chance of ascending the ladder has not improved' (Autor 2014: 15). The decline in absolute upward mobility in income mentioned earlier heightens this concern (Chetty et al. 2017).

Bloome et al. (2018) offers some explanations for why intergenerational income mobility in the US did not decline in the recent decades even though education-based inequalities in the labour market increased. They find that growing educational inequality by parental income and rising returns to education did reduce income mobility, as one would expect. This effect was only partly offset by the expansion of higher education that improved upward mobility among low-income children. The other key offsetting factor was parental income becoming less predictive of adult income *within* educational groups. Thus, an increase in the 'indirect effect' of parental income on adult income via education occurred with a decreasing 'direct effect' of parental income on adult income via pathways other than education. The latter implies a decline in the effect of parental status on the earnings of offspring through channels such as connections and networks in the labour market.

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[7] Decker et al. (2017); Davis and Haltiwanger (2014); and Hyatt and Spletzer (2013).

[8] Autor (2014: 15) cites data from Chetty et al. (2014) to conclude that there is 'no evidence that mobility in the US has appreciably changed among children born prior to the historic rise of US inequality (1971-1974) and those born afterward (1991-1993)'.

Some also argue that mobility in the US could have declined had it not been for other policy initiatives, such as expanding the Earned Income Tax Credit (EITC) for low-income workers in the 1980s and the early childhood education Head Start program in the 1990s, and increasing federal support to college-going low-income students (Autor 2014). Narayan et al. (2018) finds compelling evidence in the literature that exposure in teenage years to EITC has a positive effect on test scores, high school and college completion, being employed, and earnings as a young adult.[9] The Head Start Program — one of the largest pre-school programs in the world for low-income children — is found to have positive impacts on several long-term outcomes for children, such as high school graduation, college attendance, behaviours (self-control and self-esteem) and social outcomes (crime, teen parenthood and health status).[10]

Decline in racial and gender discrimination in the US over the last five decades, which was at least partly aided by social policies, are also likely to have been positive forces for socioeconomic mobility. Hsieh et al. (2019) document big changes in the distribution of social groups among high-skilled occupations between 1960 and 2010, such as a fall of more than 30 per cent in the share of white men among doctors and lawyers. They interpret this to suggest that many of the innately talented blacks and women in 1960 were not pursuing their comparative advantage, which amounts to a severe mis-allocation of talent for a society. The improved allocation of talent between 1960 and 2010, they estimate, explain about one-quarter of growth in aggregate output per person over this period, suggesting that improving fairness in a society produces economic benefits for the society as a whole.

Katz and Krueger (2017) summarizes the broad priorities for policy action to improve social mobility that are consistent with the overall evidence for the US Their overarching message, echoing Chetty et al. (2017), is that faster growth is necessary but not sufficient to restore higher intergenerational income mobility in the US They highlight five classes of policy interventions: fostering faster productivity growth; raising investments in human capital for children born into low-income families; raising wages and employment of low-income households; updating taxes and transfers to make them more progressive; and making place-based policies to strengthen local drivers of mobility and improve geographic mobility. Bloome et al. (2018) advocate for reforms that address all stages of the education pipeline in the US, including transitions both before (graduating from high school) and after (e.g., completing graduate degrees) college, as well as progression *within* levels of education.

6.2 China

In the decades prior to the late 1970s, the first part of our period under consideration, China adopted social planning that involved collective farming, price controls, state-directed labour allocation and setting of wages, limited labour mobility (either across occupations or geographically) — but also the provision of universal healthcare, child care, pensions, and schooling. Social planning allowed for relatively high levels of intergenerational mobility (IGM) and low levels of income inequality; IGM was notably higher and inequality notably lower than what was observed in the US. During the Maoist period, China went to extremes to eliminate the advantage of being born into a privileged family background (reflected in parent education). During the Cultural Revolution, which affected individuals born between late 1940s and early 1960s, admission to higher education favoured children from the poor or lower social classes

[9] See Narayan et al. (2018: ch6) citing evidence from Dahl and Lochner (2012); Chetty et al. (2011); and Bastian and Michelmore (2018).

[10] See Narayan et al. (2018: ch5) citing evidence from Bauer and Schanzenbach (2016); Carneiro and Ginja (2014); Garces et al. (2002); Deming (2009).

(considered the 'good class' backgrounds) and punished children from the rich or upper-classes ('bad class' backgrounds) by restricting their access to higher education institutions and limiting their opportunities, see e.g. Giles et al. (2019). During this period, access to education in China expanded at the elementary and middle school levels, and lower classes gained preferred access to limited higher education opportunities, both leading to positive human capital accumulation. At the same time, continued reliance on collective farming under the commune system and central planning in industry led to declining productivity.

In 1978 China initiated a transition from social planning towards a more market-oriented system. Agrarian reforms came first, moving the rural economy away from collective farming. This involved the privatization of land rights and relaxing of agricultural price controls, providing incentives by shifting responsibilities for farming to households (Li et al. 2018; Ravallion 2009; Ravallion and Chen 2007; Zhang et al. 2005). Mid-1980s China's reform agenda addressed the non-farm sector. The first wage reform introduced in 1984 allowed firm wages to reflect firm profitability. Labour contracts were formally introduced shortly thereafter with reforms that ended the system of permanent employment. The percentage of contract workers increased from 4% of workers in the mid-1980s to almost 40% ten years later. Subsequent reforms included enterprise restructuring, privatization, laying-off of state-sector workers, internal and external trade liberalization, and the liberalization of its regime for foreign direct investment (Ravallion 2009; Zhang et al. 2005; Zhu 2012).[11] Milanovic (2020) observes that: 'In 1978, almost 100 per cent of China's economic output came from the public sector; that figure has now dropped to less than 20 per cent. In modern China, as in the more traditionally capitalist countries of the West, the means of production are mostly in private hands, the state doesn't impose decisions about production and pricing on companies, and most workers are wage laborers.'

Shortly before China initiated its economic reform agenda it also started a campaign to reduce fertility. China formally began its one child policy (OCP) in 1979, but the campaign started in 1971 (Rosenzweig and Zhang 2009). The policy was relaxed late 2013. The smaller number of children allowed for larger private investments per child. While this has been confirmed empirically (see also Li et al. 2008), the effect on the overall development of China's human capital has been relatively modest (Rosenzweig and Zhang 2009).

The reforms put China on a path of unprecedented economic growth as they fostered investments, a more efficient allocation of resources, and technology adoption from abroad (Song et al. 2011; Zilibotti 2017). China's high growth rates primarily reflect productivity growth (Zhu 2012). With wages no longer set by the government, workers earnings have become more aligned with workers productivity. While human capital accumulation and the increase in labour participation also contributed to growth, their impacts are believed to have been more modest. The increase in the demand for skilled workers was seemingly large enough to offset the increase in the supply of skilled workers, leading to an increase in the returns to education that has been most notable in the 1990s (Zhang et al. 2005). The economic growth and efforts to stimulate labour absorption by non-farm sectors, in addition to the growth of opportunities for migrant employment (de Brauw and Giles 2018), has lifted a large share of China's population out of poverty. Ravallion (2009) reports that headcount poverty declined from around 65 per cent in 1981 to 10 per cent in 2004.

[11] During this period China also made large investments in infrastructure including the construction of its national highway system (Faber 2014).

For comparison, for the developing world excluding China, poverty declined from 30 to 20 per cent during this period.[12]

The effect of OCP on economic growth is more debatable. While it has increased average human capital, it has arguably depressed the overall stock of human capital (Wang and Zhang 2018).[13] Estimating the exact magnitude of OCP's impact is complicated in part by the fact that it coincided with China's reforms towards a more market-oriented system, which too may have impacted on fertility to the extent that fertility is influenced by economic wellbeing (Zhang 2017). The OCP is not without costs. Its unintended consequences include rapid aging of the population, imbalanced gender ratios, and it has almost certainly increased inequality in private investments in the human capital of children.

China's economic reforms and efforts to reduce fertility have had distributional implications: 'The flipside of China's astronomical growth has been its massive increase in inequality. From 1985 to 2010, the country's Gini coefficient leapt from 0.30 to around 0.50 — higher than that of the US and closer to levels found in Latin America. Inequality in China has risen starkly within both rural and urban areas, and it has risen even more so in the country as a whole because of the increasing gap between those areas.' (Milanovic 2020) This trend is confirmed by Li et al. (2018) and Piketty et al. (2019). Key drivers of this increase in inequality include the rise in returns to education and increase in wage differentials based on productivity, the emerging inequalities in schooling and health, and the geographic disparities in public investments, see e.g. Zhang et al. (2005), Ravallion (2009), and Li et al. (2018).

The decline in socioeconomic mobility can similarly be rationalized by China's transition to a more market-oriented system. Socialism provided universal healthcare and schooling, and comparatively low levels of income inequality. As China departed from socialism, inequalities in access to schooling and healthcare and gaps in their quality emerged, with children from more privileged backgrounds arguably having access to higher quality education compared to children born into less privilege. Other plausible determinants of the decline in socioeconomic mobility include: (a) rising costs of education, (b) geographic disparities in public investments, (c) increases in income inequality, and (d) reductions in fertility, which combined with the increases in income inequality enabled an increase in inequality in private investments in children. The high levels of mobility prior to the transition were perhaps unlikely to prevail, 'given the concentration of ownership of capital, the rising cost of education, and the importance of family connections — the intergenerational transmission of wealth and power should begin to mirror what is observed in the West.' (Milanovic 2020).

Another factor that may contribute to lower socioeconomic mobility for individuals born after the 1980s are incentives created with opportunities to migrate from rural to urban areas for work, see e.g. Giles and Huang (2020) and de Brauw and Giles (2017). Some youth from less advantaged rural areas with middle school education choose to pursue job opportunities in urban China over enrolling in high school. Migration of parents also has implications for education mobility to the

[12] China's transition entailed large urbanization and substantial growth in the export-oriented manufacturing sector. The labour absorption by non-farm sectors have been key drivers of this poverty reduction with poverty declining faster in areas and time-periods where the manufacturing sector was labor intensive (Lin and Liu 2008; Montalvo and Ravallion 2010; Ravallion 2009).

[13] As OCP was more strictly enforced in urban areas (where high human capital investments are comparatively high) than in rural areas, it may have negatively impacted on the overall human capital stock (Wang and Zhang 2018). Beyond this urban-rural divide, the OCP and its enforcement also exhibited notable variation over time and across provinces.

extent that it has negative impacts on the human capital accumulation of the children they leave behind (Meng and Yamauchi 2017). Children that migrate together with their parents will similarly be negatively impacted as they face obstacles to enrolling in urban public schools (Chen and Feng 2013). Public policy options that could help reduce these negative effects include subsidizing higher education and eliminating barriers to enrolling children of migrants in urban schools.

Low levels of IGM and equality of opportunity may slow down the accumulation of human capital when individuals are not given the opportunities needed to reach their full potential, which in turn may become an impediment to future growth. 'High inequality is a double handicap; depending on the sources of inequality — notably how much comes from inequality of opportunity — it means lower growth and that the poor share less in the gains from that growth.' (Ravallion 2009) As observed in Li et al. (2018), after pursuing economic growth during the first decades of the economic reforms, China has recently shifted its development strategy to address concerns about rising inequality and declining socioeconomic mobility. Examples of these policy changes include efforts to expand rural secondary education and increase university enrolments, increasing the affordability of healthcare, cash transfers to the poor, increases in minimum wage, and extending pensions to rural China (see e.g. Li et al. 2018). This policy shift, while designed to address inequality, may ultimately also help increase the stock of human capital and future economic growth.

7 Drivers of intergenerational mobility and implications for policy

Improving socioeconomic mobility requires public policies that equalize opportunities, i.e. interventions that reduce disadvantages faced by individuals because of circumstances they have no control over, such as parental education or economic status, gender, ethnicity, or location. The success of such interventions will naturally depend on their magnitude and on how they are targeted. A growing empirical literature concludes that public interventions are more likely to increase socioeconomic mobility when: (a) public investments are sufficiently large (Iyigun 1999), (b) are targeted to benefit disadvantaged families/neighbourhoods (Blankenau and Youderian 2015; Herrington 2015; Mayer and Lopoo 2008), (c) focus on early childhood (Blankenau and Youderian 2015; Herrington 2015), and (d) when political power is not captured by the rich unless the rich have the interests of the poor at heart (Uchida 2018).

Li et al. (2018: Section 6) provides a comprehensive overview of the public policies China has started to put in place in an effort to moderate inequality and stimulate socioeconomic mobility. The objective of this section is to review the determinants of socioeconomic mobility and public interventions that have been considered across the world to improve mobility. While most of the evidence on the drivers of mobility reviewed below come from research on the US and other developed economies, they are relevant for a middle-income country like China, particularly as the Chinese economy rapidly approaches high-income status. Pursuing these policy objectives sits well with the growth strategy advocated by Stiglitz (2018), which underscores that future economic growth is more likely to be sustained if it is inclusive.

7.1 Pre-natal and early childhood interventions

A pre-ponderance of evidence suggests that building ladders to opportunities at the early stages of an individual's life, starting even before a child's birth, is critical for improving children's long-term outcomes that matter for mobility in education and income. Improving the early life environment is critical because gaps that emerge early in life are difficult to offset through interventions later in life.

Evidence from the US suggests that policy measures aimed at disadvantaged women of childbearing age, including health insurance, measures to curb domestic violence, and family-planning services, can have positive impacts on infant health and longer-term outcomes among children, see e.g. Aizer and Currie (2014). Food supplementation programs also appear to show benefits. For example, studies have found positive impacts of the introduction of the Special Supplemental Nutrition Program for Women, Infants, and Children and the Supplemental Nutrition Assistance Program on the incidence of low-birthweight babies among disadvantaged mothers in the US, see e.g. Aizer and Currie (2014), who report the findings of Hoynes et al. (2011), Hoynes and Schanzenbach (2012), and Rossin-Slater (2013).

Programs that build the awareness and knowledge of mothers are among examples of successful prenatal interventions. The Nurse-Family Partnership Program in the US provides home visits by nurses to poor, unmarried young women who are pregnant for the first time. Nurses visit monthly during the pregnancy and during the first two years of the child's life and provide guidance to pregnant women and new mothers on healthy behaviours, competent care of children, and personal maternal development. The program has been found to reduce child abuse and adolescent criminal activity and improve academic achievement among the children; the greatest improvements are among children with mothers with cognitive and mental health disadvantages, see e.g. Eckenrode et al. (2010), Olds et al. (2007), as reported by Aizer and Currie (2014).

Intervening in the postnatal period is particularly effective if the intervention occurs early in a child's life. Programs targeting nutritional and health improvements in early childhood can yield long-term benefits in education outcomes and wages. Universal preschool programs can play an important equalizing role because skill formation is a dynamic process in which early inputs strongly affect the productivity of later inputs (Heckman 2006). Intervening during preschool years is more effective than later interventions, and only programs that start before children reach the age of 3 years seem to have long-lasting effects on cognitive abilities (Heckman et al. 2013).

Intensive preschool programs such as the Perry Preschool and Abecedarian projects in the US had large long-term effects also because they improved *non-cognitive* skills among children, starting around age three (Heckman and Kautz 2014). Research on the long-term impacts of the Head Start Program in the US — one of the longest running and largest preschool programs targeting low-income children in the world — offers key insights on what might be possible if such programs were to be scaled up, despite all the challenges of implementation associated with scaling-up. The benefits of such a program can still be substantial: as much as 80 per cent of the gains in young adult outcomes induced by the model programs such as Perry according to one study (Deming 2009).

Head Start was launched in 1965 and provides early childhood education, health care, nutrition, and parent involvement services to low-income children ages 5 or below, benefiting millions of children since its inception. Deming (2009) finds large impacts on a wide range of young adult outcomes among African-Americans and relatively disadvantaged children, which occur even though gains in test scores at ages 5–6 fade among many Head Start children in these groups by age 14. This seems to suggest that the long-term impacts of such programs are due in large part to their contributions to noncognitive development among children. Thus, relying on test score gains alone to assess the future benefits of such programs could greatly understate their impacts.

7.2 Interventions in child health, nutrition and childcare

An example of child health intervention is offered by the Infant Health and Development Program in the US, a randomized intervention with an intensive preschool program on low-birthweight infants, whereby the treatment is compared against a less-intensive program among a control

group. This intensive preschool program had a significant and sustained (till the age of 18 years) positive impact on cognitive test scores, but only among children at the higher end of the low birthweight spectrum and almost no impact among children at the other end of the spectrum, see e.g. McCormick et al. (2006). Such complementarity can potentially explain why the long-term impact of low birthweight is greater if children are born into poverty. It also underscores the importance of the health endowments of children at birth, and this calls for a focus on the health of mothers from disadvantaged backgrounds.

School meal programs can be potentially effective for improving nutrition and educational outcomes. There is limited evidence, however, on their long-run impacts. The School Breakfast Program in the US is found to have positive effects on learning achievements in mathematics and reading. The program offers breakfast to any student who attends a school participating in the program. Children from households with incomes below 130 per cent and 185 per cent of the poverty rate receive free meals and subsidized prices, respectively. Many states mandate that schools with a specified share of eligible students participate in the program. Frisvold (2015) exploits the variation in this share across states and the inherent discontinuity to estimate impacts on mathematics and reading test scores.

While the evidence on the long-term impacts of subsidized childcare is somewhat thin, the experience of Norway is illuminating. In the four years following a reform in 1975 in Norway, childcare coverage almost tripled among 3- to 6-year-olds. The program led to an increase in life-cycle labour income and educational attainment, with the largest effects occurring among girls and the children of less well-educated mothers (Havnes and Mogstad 2011).

7.3 Neighbourhoods and local environments

While the family environment is a crucial determinant of child development in early childhood, neighbourhoods can influence children even at this early age through multiple pathways. Neighbourhood characteristics, such as income segregation and concentrated poverty, inequality, racial segregation, school quality, crime rates, and the share of two-parent families, are found to be key determinants of intergenerational mobility in the US (Chetty et al. 2014). Chetty and Hendren (2018a) find that at least half the variance in mobility across areas in the US is attributable to the effects of location. The same study also shows that the effect of neighbourhoods on mobility depends on the length of exposure in childhood and is thus more likely to derive from peer effects and local resource investments, rather than factors such as access to jobs in adulthood. Another study finds children in low-income households in US counties with high mobility to have better developmental trajectories between the ages of 3 and 9 (Donnelly et al. 2017).

The Moving to Opportunity Project (MTO) in the US has highlighted the important effect of better neighbourhoods and local environments on long-term outcomes among children, including their incomes as adults, if the change occurs at an early age, see Chetty et al. (2016). The project shows that the earlier a child is exposed to better neighbourhoods and more stable circumstances, the more long-lasting the effects will be, including the greater likelihood of more upward mobility. Some have used such evidence to argue for policies, such as housing policies, that seek to reduce segregation (e.g., social housing), see for example Chetty (2016); Chetty et al. (2016).

The effect of neighbourhood and local environments can also be mediated through the presence (or absence) of *role models and mentors*. Children in the US who grow up in areas with more inventors and who thus enjoy more exposure to innovation are much more likely to become inventors themselves, and children in families of low socioeconomic status are less likely to benefit from such exposure. Bell et al. (2019) study the lives of more than one million inventors in the US to identify the key factors that determine who becomes an inventor, as measured by the filing of a patent. They find

that children from the top income percentile families are 10 times as likely to become inventors as children in families below the median income, and the gaps by race and gender are similarly large. Differences in innate ability as measured by test scores in early childhood explain relatively little of these gaps. Children at the top of their 3rd grade mathematics class are much more likely to become inventors, but only if they live in high-income families.

In explaining the differences, the authors explain that children who grow up in areas with more inventors and who are thus more exposed to innovation are much more likely to become inventors. Children in low-income families or minority families are less likely to enjoy such exposure through their families and neighbourhoods. Exposure influences not only whether children grow up to become inventors, but also the type of inventions they produce, and this varies by gender. Girls are more likely to become inventors in a class of technology if they grow up in an area in which there are more women inventors in that class of technology, while the opposite is true for men. The authors argue that such exposure effects are more likely to be driven by mechanisms such as mentoring, the transmission of information, and networks rather than, say, neighbourhood differences in school quality. This in turn suggests the role of mentoring programs, interventions through social networks, and internships at local companies as ways to motivate and help children from disadvantaged backgrounds to pursue certain career paths.

7.4 Family and social networks

Social networks can distort labour markets even in economies with healthy, growing labour demand, reducing income mobility across generations even in the presence of educational mobility. In China, social networks or *guanxi* are critical in the allocation of nonfarm labour opportunities, see Zhang and Li (2003). Social networks acquired through the marriage market have also been shown to improve labour market outcomes among young men in China, see Wang (2013). Parental networks are an important reason why privilege persists across generations at the top end of the income distribution even in relatively mobile societies. In Canada, a study finds that sons inheriting the employers of their fathers is one way in which parental advantage in the labour market is passed on to the next generation, see Corak and Piraino (2011). By the age of 30, approximately 40 per cent of sons have worked for an employer who had also employed their fathers in the past. This is much more common among the rich: close to 70 per cent of the sons of top percentile fathers had the same employers as their fathers at some point. Other studies provide evidence on the inheritance of jobs from self-employed fathers and on the family-based succession of chief executive officers, see e.g. Bennedsen et al. (2007), Dunn and Holtz-Eakin (2000), Pérez-González (2006).

7.5 The role of race and gender

Hertz (2008) find that the persistent presence of African-Americans at the lower end of the income distribution in the US generates a high share of the overall degree of intergenerational income persistence. A study of all births in five large states in the US found that African-American and less well-educated women are more likely to live in environmentally hazardous sites and less likely to move to cleaner areas between births. In addition to experiencing poorer health because of conditions such as diabetes or hypertension, disadvantaged women in the US might also be disproportionately affected by contagious diseases such as influenza, which can negatively affect foetal development.

Disadvantages associated with race and gender carry over to the labour market. Several empirical studies on the US conclude that minorities and women are victims of significant wage discrimination, see Altonji and Blank (1999), Bertrand and Mullainathan (2004), Darity and Mason (1998), Goldin and Rouse (2000), Lang and Lehmann (2012), Johnson and Neal (1996), O'Neill and O'Neill (2006). Less discrimination seems to be associated with jobs entailing more technical

skills and formal qualifications or if the scale of operations of a firm is large, which may derive from corporate ethics standards or the likelihood that normative anti-discriminatory provisions are less likely to cover small employers. For similar evidence in the US, see, for example, Chay (1998) and Holzer (1998). A recent review of the literature shows a substantial reduction of the gender wage gap, an increase in female labour force participation, and a reduction in occupational segregation in the US; the biggest gains occurred during the 1980s, see Blau and Kahn (2017). Still, in 2014, among full-time workers, women earned about 79 per cent of the earnings of men on an annual basis and about 83 per cent on a weekly basis.

Affirmative action may have important redistributive labour market effects that act to the advantage of workers experiencing discrimination at relatively small cost, if any, in efficiency, see e.g. Holzer and Neumark (2000). Such findings hinge, however, on the possibility of effectively enforcing affirmative action. Labour market discrimination can have effects that persist despite affirmative action, especially if the discrimination is perpetuated through social networks or residential segregation.

7.6 Fiscal policy, redistribution, and transfers

Higher total direct government spending has been associated with greater relative income mobility in the US; similar results are found using per child public expenditures on elementary and secondary schooling, see Mayer and Lopoo (2008). Public spending has an equalizing effect: the difference in mobility between advantaged and disadvantaged children is smaller in high-spending states than in low-spending states in the US, and expenditures aimed at low-income populations increase the future income of low-income, but not high-income children.

In the US, the earned income tax credit — a tax benefit targeted on low-income households, is one of the largest transfer programs in the country. A recent study finds that an additional US$1,000 in exposure to the tax credit as a teenager increases the likelihood an individual will complete high school, complete college, and find employment and earnings as a young adult, see Bastian and Michelmore (2018). Other studies have found a positive impact of the transfer on children's test scores, see e.g. Chetty et al. (2011) and Dahl and Lochner (2012).

While tax credits have been shown to increase labour supply in the US, leading to additional income, they may also reduce the time spent with children at home, which could have a negative influence on educational outcomes if the quality of care that children receive declines because their parents are working (Bastian and Michelmore 2018; Meyer and Rosenbaum 2001). The effects of fiscal policy on parental investment are crucial, including the extent to which taxes lower parental investment and to which transfers crowd out parental investments and the efficiency of public investments in improving children's human capital compared with direct investments by parents (Mayer and Lopoo 2008).

8 Concluding remarks

The US and China are found to exhibit remarkably similar levels of relative intergenerational mobility for individuals born in the 1980s — both in income and education, with mobility levels that are considered low by international standards. Before China embarked on its transition from planned to market economy, intergenerational mobility in education was relatively high, notably higher than it was in the US at the time. Since then, intergenerational mobility has declined significantly in China while it has been stagnating in the US, such that the two giants have now converged to a comparable level of both mobility and inequality.

The decline in intergenerational mobility in China and the stagnation in the US happened during a time of robust economic expansion in both countries. This contrast is particularly strong in China, which is one of few countries in the world where mobility underwent a significant decline during a time of rapid economic growth. Since an economy that is getting richer has access to more resources for funding policy interventions that could stimulate socioeconomic mobility, it would seem that improving mobility has not been a policy priority in either country in recent decades. This could, however, be changing as rising inequality in both countries is increasingly drawing attention to the need for raising economic mobility as a pathway to a more fair and equitable society over time. Examples of policy changes that have been adopted in China in recent years can be found in Li et al. (2018: Section 6).

To promote economic mobility, governments can play a proactive role in 'compensating' for differences in individual and family starting points to level the playing field in opportunities. This includes policies that aim to equalize opportunities across space, given the contribution of location to inequalities in most countries. The state also has a prominent role to play in making markets work more efficiently and equitably, since discrimination, anti-competitive behaviour and market concentration are likely to constrain economic mobility. Fiscal policy is an important tool for realizing many of these objectives, by raising resources for investments in public goods and reducing inequality through redistribution.

Local characteristics that influence pathways to socioeconomic mobility include socioeconomic integration, the quality and availability of educational institutions, childcare, healthcare, recreational facilities, safety, and access to good jobs and opportunities. All of these are shaped by public policy. Interventions aimed at reducing the concentration of poverty and the socioeconomic segregation of neighbourhoods can be particularly beneficial for mobility. Going beyond the more traditional interventions, programs can also attempt to bridge the deficit of role models and mentors in poor communities that constrain the aspirations of youth, possibly in partnership with the private sector and civic organizations.

A policy agenda that promotes economic mobility sits well with the growth strategy advocated by Stiglitz (2018), which underscores that future economic growth is more likely to be sustained if it is inclusive. Ignoring the timeliness of such a policy shift in the case of the US and China, and leaving inequality and lack of mobility unchecked, may end up undermining future growth. Milanovic (2020) makes a similar observation: 'What does the future hold for Western capitalist societies? The answer hinges on whether liberal meritocratic capitalism will be able to move toward a more advanced stage, what might be called 'people's capitalism', in which income from both factors of production, capital and labour, would be more equally distributed. This would require broadening meaningful capital ownership way beyond the current top ten per cent of the population and making access to top schools and the best-paying jobs independent of one's family background.'[14] The scope for implementing public interventions that would increase socioeconomic mobility and reduce inequality naturally requires the necessary political support. This applies equally to the Unites States and China.

[14] Milanovic (2020) continues with 'To achieve greater equality, countries should develop tax incentives to encourage the middle class to hold more financial assets, implement higher inheritance taxes for the very rich, improve free public education, and establish publicly funded electoral campaigns… this model would seek greater equality in assets, both financial and in terms of skills…. It would require only modest redistributive policies (such as food stamps and housing benefits) because it would have already achieved a greater baseline of equality'.

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Appendix on the measurement of intergenerational income mobility

The estimation of the income elasticity b involves several challenges. The first challenge is that data on permanent incomes are rarely available. Surveys typically collect data on current income earned (over a certain reference period, such as over the last 12 months) and current wages. A commonly adopted solution is to evaluate wage earnings at a reference age; income earned around the age of 40 is found to provide a reasonable approximation to permanent income (Haider and Solon 2006).

Restricting the survey sample to individuals whose age is around the reference age severely reduces the number of observations that can be used for estimation, which poses a second challenge. This can be dealt with by accounting for age in the regression model, such that all income earners (between the age of 20 and 60, say) can be included in the regression analysis (Lee and Solon 2009). Because age is now part of the model, β_y can be evaluated at a choice of reference age. This still however denotes an approximation and hence does not fully resolve the life-cycle bias problem, see e.g. Nybom and Stuhler (2016a, 2016b).

The third challenge is that retrospective data on incomes of parents of adults is almost never available from surveys interviewing those adults — for good reason as it is unreasonable to expect survey respondents to recall their parents' income from decades ago. While in some cases, data on parental earnings can be extracted from long panel surveys, these are but rare exceptions. If such data are in fact available, then β_y can be estimated by means of ordinary least squares (OLS). Retrospective data on education and age (and sometimes occupation) of parents are more common and used in this study. These parental characteristics can be used to predict parental earnings, which can then be used as an instrument in the intergenerational earnings regression. This approach, which is referred to as two-sample two-stage least squares (TSTSLS), involves the following steps (see e.g. Björklund and Jäntti (1997): (i) estimate an income equation from an older sample that is representative of the current population of parents when they were younger (a sample of 'pseudo-parents'), (ii) use the estimated model coefficients (i.e. returns to education and experience) to predict parent income earnings at reference age using the retrospective data on the age and education of the parents as predictors, and (iii) regress offspring earnings at reference age on predicted parent earnings at reference age.

Formally, the income equation that accounts for age of the respondent (pseudo-parent) takes the following form:

$$y_{P,i} = a_P + \gamma S_{P,i} + \sum\nolimits_k \alpha_{P,k}\left(A_{P,i} - \bar{A}\right)^k + \sum\nolimits_k \tau_{P,k}\left(A_{P,i} - \bar{A}\right)^k S_{P,i} + e_{P,i},$$

where $S_{P,i}$ denotes education of the respondent (either years of schooling or a vector indicating grade completed), $A_{P,i}$ and $\bar{A}$ denote age of the respondent and a choice of reference age respectively, and γ denotes the coefficient of interest ($\alpha_{P,k}$ and $\tau_{P,k}$ are also estimated but do not feature in the prediction of parental earnings). The degree of the polynomial of age is set by the modeler and may vary with the number of observations available for the regression (larger number of observations allow for higher degree polynomials). In the present analysis, a second-degree polynomial is used. Since the polynomial equals zero for $A_{P,i} = \bar{A}$, predicted earnings at the reference age solves: $\hat{y}_{P,i} = \hat{a}_P + \hat{\gamma} S_{P,i}$. Note that $\hat{a}_P$ may be omitted as it will get absorbed by the intercept in the intergenerational earnings regression. Given this predictor of parental income, an estimate of intergenerational persistence in earnings (β_y) can be obtained by means of the following TSTSLS regression:

$$y_{C,i} = c_y + \beta_y \hat{y}_{P,i} + \sum\nolimits_k \alpha_{C,k} \left(A_{C,i} - \bar{A}\right)^k + \sum\nolimits_k \tau_{C,k} \left(A_{C,i} - \bar{A}\right)^k \hat{y}_{P,i} + \tilde{\varepsilon}_i.$$

The adopted estimation approach relies on a variety of assumptions: (a) income earnings at the chosen reference age provide an accurate approximation of permanent income, (b) the residual from the intergenerational earnings regression is uncorrelated with predicted parental earnings, and (c) for economies where a single survey is used, income shocks incurred by pseudo-parents in years prior to the survey year are implicitly assumed to have carried over (i.e. are reflected in income earnings observed at the time of survey). Finally, it is important to note that any earnings data is observed for a select subset of the population, as it excludes individuals that do not engage in waged employment. This excluded group, comprising of the self-employed, unemployed, and individuals that are not part of the labour force, tends to be larger in low-income economies.