

Like Father, Like Son?

A Comparison of Absolute and Relative Intergenerational Labour Income Mobility in Germany and the US

MAXIMILIAN STOCKHAUSEN¹

July 4th, 2018

WORK IN PROGRESS – DO NOT CITE OR QUOTE!

Abstract

Are children better off than their parents? This highly debated question in politics and economics is investigated by analysing the trends in absolute intergenerational labour income mobility in a cross-country comparison of Germany and the US. In Germany, 67 per cent of sons born between 1955 and 1975 earned a significantly higher wage or salary than their fathers. Those with fathers from the lowest earnings bracket were particularly successful in improving their labour income. In contrast, the fraction of sons earning more than their fathers is 60 per cent on average for the same cohorts in the US. The fraction decreased from 66 per cent in the 1956-60 birth cohort to 48 per cent in the 1971-75 birth cohort, while it was relatively stable in Germany. Overall, absolute but also relative labour income mobility is larger in Germany than in the US. This indicates that economic growth has been distributed more widely in Germany than in the US. The majority of the German males has been able to share in the country's rising prosperity. In the US, the American Dream is slowly fading if trends cannot be reversed.

Keywords: Intergenerational mobility, Inequality, Labour income distribution

JEL-Classification: D63, J62

¹ Maximilian Stockhausen is affiliated to the German Economic Institute, Konrad-Adenauer-Ufer 21, 50668 Cologne; Email: stockhausen@iwkoeln.de

1. Introduction

Is the promise of advancement and shared prosperity still alive in Germany and the United States (US)? A recent study by Chetty et al. (2017) creates some serious doubt, at least for the US. The fraction of children receiving a higher income than their parents has significantly fallen over time: 92 per cent of children born in 1940 earned more than their parents compared to 50 per cent in the 1984 birth cohort. They conclude that the American Dream is fading away. One major driver for this development is not a too low GDP growth but the unequal distribution of this growth. Although most indicators of economic inequality show lower levels of economic inequality in Germany over time this does not need to automatically translate into a better situation in Germany regarding the share of better off children (OECD, 2015). Actually, this study is the first to analyse the development of absolute intergenerational mobility for Germany in a comparative framework with the US.

During the last decades both countries were exposed to similar major structural changes which were characterized by increasing global competition, negative impacts of the financial and economic crisis of 2007/2008 on economic growth and public debt, or the increasing digitalization and automatization (industry 4.0). In addition, Germany faced enormous changes due to the German reunification process, has undertaken fundamental reforms of the labour market and the social security system (Agenda 2010), and is facing new challenges by the deepening of the European Union. This offers both opportunities to improve income, for example by opening up new employment opportunities, but also risks of social decline, for example due to job loss. In addition, the life plans of many people have changed over the last decades. Younger cohorts appear to be more individualistic and get older on average, which has tended to increase the number of single-person households or the number of singles with children. All this affects the economic conditions of individuals and households and the distribution of income (Martin, 2006; Peichl et al., 2012, among others). A priori, it is not clear how and to what extent the described changes have affected incomes within and between different generations. Against this background, a simple comparison of annual incomes by repeated cross sections is not meaningful if the hypothesis to be tested is that the promise of shared prosperity still applies across generations.

The literature on absolute intergenerational income mobility is still very limited. This is mainly due to the need of long-lasting, high quality data where parents and children can be linked. Chetty et al. (2017) exploit data from three different sources for the US and combine historical data from Census and CPS cross-sections with panel data for recent birth cohorts from de-identified tax records. Other studies on the US using panel data from the Panel Study of Income Dynamics (PSID) find similar patterns but are limited in time. Among others, Isaacs, Sawhill and Haskins (2008) also find that upward absolute mobility has declined over the 20th century. However, the period from 1947 to 1973 was characterized by an extraordinary large rate of growth, which has attenuated afterwards. This development is more pronounced for men's earnings than for family incomes. Rising female employment explains this difference to some extent. Lopoo and DeLeire (2012),

Bengali and Daly (2013), and Acs, Elliott and Kalish (2016) all find similar patterns for the US; differences appear mostly due to different income definitions and sample periods. No such studies exist for Germany so far. Hence, this paper is the first to calculate rates of absolute mobility for Germany and to directly compare these findings to the US using harmonized panel data.

The main findings of the study are that 1) absolute intergenerational labour income mobility is larger in Germany than in the US and 2) there are remarkable differences in the evolution of absolute mobility over time between countries.² While absolute labour income mobility decreased from 66 per cent in the 1956-60 birth cohort to 48 per cent in the 1971-74 birth cohort in the US, the fraction of sons earning more than their fathers did almost not change in Germany for the same cohorts and varies around 63 per cent on average. In addition, relative mobility is higher in Germany, especially at the lower tail of fathers' labour income distribution. This is also reflected by a lower intergenerational labour income elasticity coefficient that is about 0.3 in Germany compared to about 0.5 in the US. However, the size of the gap depends on the treatment of zero and low-income observations (also see Schnitzlein, 2016).

The rest of the paper is structured as follows: Chapter two describes the methods and data used to estimate absolute and relative intergenerational mobility in Germany and the US. The results are presented in chapter three. Chapter four summarizes and discusses the results. Robustness checks are provided in the Appendix.

2. Method and Data

Measures of absolute intergenerational mobility can be applied to describe the extent of income differences between parents and their descendants at comparable points in time. According to Chetty et al. (2017), let y_i^s denote the permanent labour income of son i and let y_i^f denote the permanent labour income of his father. The rate of absolute mobility A is then the fraction of sons earning more than their fathers:

$$A = \frac{1}{N} \sum_i 1\{y_i^s \geq y_i^f\}, \quad (1)$$

with N being the number of sons. In contrast, the concept of relative income mobility measures the change in income positions between generations. Relative income mobility only takes place when the child's position in the income hierarchy of his generation changes relative to the position of his parents in their generation. Levels do not matter and improvements in the standard of living or shared prosperity measured in real GDP per capita growth are not covered. If all children gain the same absolute amount of income compared to their parents, so that the ranking of the children is not changed, there is absolute but no relative mobility. Relative mobility is estimated by transition

² All results on Germany are actually corresponding on West Germany only due to data limitations for East Germany. Germany and West Germany are used interchangeably.

matrices and intergenerational labour income elasticities. The latter is commonly used in the literature and can be derived from estimating

$$\log(y_i^s) = \alpha_s + \beta \log(y_i^f) + \gamma C_i^f + \delta D_i^s + \varepsilon_i^s, \quad (2)$$

in an OLS framework. The notation is the same as above; in addition, C_i^f and D_i^s encompass control variables including two polynomials of fathers' and sons' age as well as the number of years in the son's labour income average.³ Standard errors are clustered at the family level.

All estimations are based on large and long-running survey data sets: The Socio-Economic Panel (SOEP) is used for Germany and the Panel Study of Income Dynamics (PSID) for the US. The SOEP has been collected annually since 1984 on behalf of the German Institute for Economic Research Berlin (DIW). It captures a large variety of socio-economic characteristics on the individual and household level including different types of income (Wagner et al., 2007). The PSID has been collected since 1968 on behalf of the Michigan State University. It encompasses similar information as the SOEP. Between 1968 and 1995 it was collected annually. Since 1995 it is conducted every two years (PSID, 2018). Both data sets allow information from parents and children to be linked with each other over time. The analysis is focused on labour income which is individual gross annual earnings from work including wages and salaries from dependent employment or self-employment plus bonuses.⁴ All labour incomes are deflated to the base year 2010. For this purpose, the SOEP provides a historical series of consumer prices that can directly be applied on the data. The CPI-U-RS was used for the US.⁵ Thus, real labour incomes of fathers' and sons' are compared throughout the paper unless something else is mentioned.

In a first best world, we would have access to complete income histories of the whole (working age) population and, thus, lifetime incomes. Since this is just an utopia and lifetime incomes are usually not fully captured by household surveys they have to be approximated for both parents and children. For this purpose, the existing literature recommends to calculate a multi-year income average in a phase of life in which annual incomes are highly correlated with permanent or lifetime income. If incomes are averaged over multiple years at this stage, a good approximation of lifetime income and the related position in the income distribution should be obtained and life-cycle as well as attenuation biases are reduced but not fully eliminated (Solon, 1989; Haider and

³ Other non-linearities along fathers' labour income distribution are not further investigated in this study, since Schnitzlein (2016) provides sufficient evidence against their importance in Germany and their limited impact in the US.

⁴ After 1994 labour income excludes farm and business income in the PSID. In addition, labour incomes were bottom coded at one USD before 1994 if they were equal to or less than zero. To be consistent over time, labour income from farming and business is added to labour income for all years from 1994 onwards and is bottom coded to zero USD. The asset part of self-employment income is not included in labour income.

⁵ The impact of using different price indices on absolute income mobility is well documented in Chetty et al. (2017) for the US. In general, using the CPI-U-RS results in the most conservative mobility estimates since the index tends to overstate inflation.

Solon, 2006; Grawe, 2006; Nybom and Stuhler, 2016; Schnitzlein, 2016). For Germany Bönke et al. (2015) find that annual earnings from mid-30s to mid-50s correlate most strongly with lifetime earnings. Therefore, there will be a focus on those years for approximating lifetime earnings.

Another major issue in approximating lifetime earnings from a limited number of annual income observations is the treatment of outliers, especially valid zero earnings observations that arise, for example, due to times of unemployment. Average and median income levels, absolute mobility rates as well as intergenerational elasticity coefficients tend to be sensitive to their inclusion, since they affect the variance of income observations (Couch and Lillard, 1998; Dahl and DeLeire, 2008). In general, there are three alternatives to handle this problem: 1) including all zero observations, 2) defining a lower income limit, and 3) dropping all zeros. The first option brings two problems; zero observations might introduce large life-cycle bias. Since only a snapshot of incomes is used for approximating lifetime earnings, we could draw observations from a period in life with extraordinary high unemployment that is not representative for the rest of the working life. Since the deviation from regular earnings to zero earnings is huge in most cases this might distort the true earnings capacity of an individual very much and, thus, measures of absolute and relative mobility are biased. In addition, some model specifications do not allow the usage of zero income observations, for example, the log-linear specification of OLS to estimate intergenerational elasticity coefficients. In this case, the second option might be preferable. However, defining a lower income limit faces similar problems as option one and the choice of the lower limit is arbitrary in most cases, but can have large effects on mobility estimators. The third option might reduce life-cycle biases but is likely to cause sample selection biases.

Nybom and Stuhler (2016) analyse the effects of life-cycle biases in detail and find significant differences. They conclude that it would be preferable to include zero and missing income observations in theory but doing so increases the vulnerability to life-cycle bias. Schnitzlein (2016) investigates the influence of different lower income limits on estimates of intergenerational elasticity coefficients in much detail. He finds a significant influence of different lower cut-off points on the estimates: The higher the cut-off value, the higher the elasticity coefficient and, thus, the lower intergenerational mobility. Having these things in mind, the main analysis is conducted excluding zero labour income observations to reduce potential life-cycle biases. In particular, all annual labour incomes below 1,200 Euro (EUR) and 1,200 US-Dollars (USD) are dropped. The threshold is set in accordance with a proposal by Schnitzlein (2016) and excludes unplausible small annual labour income observations. Nevertheless, the cut-off point is arbitrarily chosen and it is not said to be the ideal cut-off value for analysing absolute income mobility. As a robustness check, the main results are also presented for different income cut-off points (6,000 EUR/USD and 12,000 EUR/USD) and for the case where valid zero labour income observations are included (see appendix). Overall, qualitative results do not change while quantitative results do slightly change. Rates of absolute mobility tend to increase at the bottom while they are almost not affected in the upper

parts of the fathers' distribution. Hence, the results presented in the main section are conservative estimates of absolute mobility.

Furthermore, the main analysis is limited to father-son pairs only. Mothers and daughters are left out since they have undergone severe changes in their employment behaviour and scope, especially in Germany, which would otherwise distort the results. A high rate of absolute mobility would be an expression of the changed integration of women in paid work, but not an indicator of the fulfilment or failure of the promise of prosperity. For a similar reason, the analysis on Germany focuses on West German father-son pairs only. As a result of the German reunification, there have been numerous biographical breaks and opportunities that would otherwise distort the results. Furthermore, labour income of East German fathers could not be observed before 1990 which would further limit the investigation period.

Accordingly, the generation of West German fathers includes the 1928-1954 birth cohorts. Their labour incomes were observed directly in the years 1984 to 1993 in the SOEP, when the fathers were between 30 and 60 years old. The generation of US fathers includes the 1925-1954 birth cohorts, everything else equal. For the calculation of permanent labour incomes, the fathers must have at least five valid income observations during this period, whereby the first income observation has to be from the year 1984 (reference year of the fathers). The generation of the sons consists of the 1955-1975 birth cohorts in both countries. Here, the incomes are observed in the years from 2005 to 2016 in the SOEP and from 2005 to 2015 in the PSID, when the sons were aged between 30 and 55 years. The labour incomes of the sons are also averaged over at least five years, whereby the first income observation has to be from 2005 (reference year of the sons). The determination of a reference year ensures that the samples drawn and the generation-specific permanent average incomes are representative for the population in those years to the largest possible extent (Galler, 1987, 296 ff.). The reference year of fathers' results from the starting year of the SOEP interviews. The same year is also applied on the US sample for reasons of comparability. The chosen year for sons takes into account that the generations do not overlap in time given the specific age intervals and that the number of possible father-son pairs is maximized.

As additional robustness checks show, the choice of baseline years does not affect the qualitative results and the quantitative results are only marginally affected.⁶ However, the restriction that fathers and sons must have at least five valid income observations starting from the reference year, could slightly distort the results, as long as panel mortality is not determined solely by random factors. Using longitudinal weights instead of cross-sectional weights do not alter the results. In fact, using longitudinal weights marginally increase absolute mobility at the lower end of the fathers' distribution and marginally decrease it at the upper tail. Reducing the observation period to three years, for example, and thus lowering the problem of panel mortality at the cost of potential life-cycle and attenuation biases, leads to very similar qualitative and quantitative

⁶ The results are available from the author upon request.

results: Absolute income mobility at the lower end tends to increase such that the presented results can be regarded as conservative estimates for absolute mobility.

3. Results

3.1. Descriptives

Using the data described above, a total of 320 father-son pairs can be identified for Germany and 619 for the US. In Germany, fathers' average real permanent labour income amounts to 40,618 euros per year. Labour income was averaged over nine years on average, while the mean age of fathers was 49 years. Sons' average real permanent labour income is 44,288 euros per year. Labour income was averaged over ten years on average around the mean age of 41. The fathers tend to be slightly older than their sons and have a lower real permanent labour income on average. In the US, fathers' average real permanent labour income amounts to 62,340 USD per year. Labour income was averaged over nine years on average, while the mean age of fathers was 47 years. Sons' average real permanent labour income is 87,540 USD per year. Labour income was averaged over six years on average around the mean age of 43.

Table 1
Sample Statistics for Sons and Fathers (Weighted)

	GER					USA				
	Median	Mean	Std. Dev.	Min	Max	Median	Mean	Std. Dev.	Min	Max
Sons' real labour income	€41,802	€44,288	€18,929	€2,868	€142,094	\$60,145	\$87,540	\$120,524	\$7,647	\$1,278,717
Fathers' real labour income	€35,517	€40,618	€18,669	€10,757	€149,768	\$54,561	\$62,340	\$47,872	\$10,191	\$625,464
Average number of years of sons' income observations	11.00	9.94	2.49	5	12	6.00	5.70	0.46	5	6
Average number of years of fathers' income observations	10.00	9.18	1.44	5	10	10.00	9.00	1.69	5	10
Sons' average age	41.50	41.16	4.52	32	53	43.00	43.07	5.05	34	52
Fathers' average age	49.50	49.18	5.66	35	58	46.50	46.69	7.10	34	59
Number of father-son pairs	320					619				

Notes: Labour incomes are reported in 2010 EUR for Germany and in 2010 USD for the US. Annual earnings observations below 1200 EUR/USD per year are excluded.

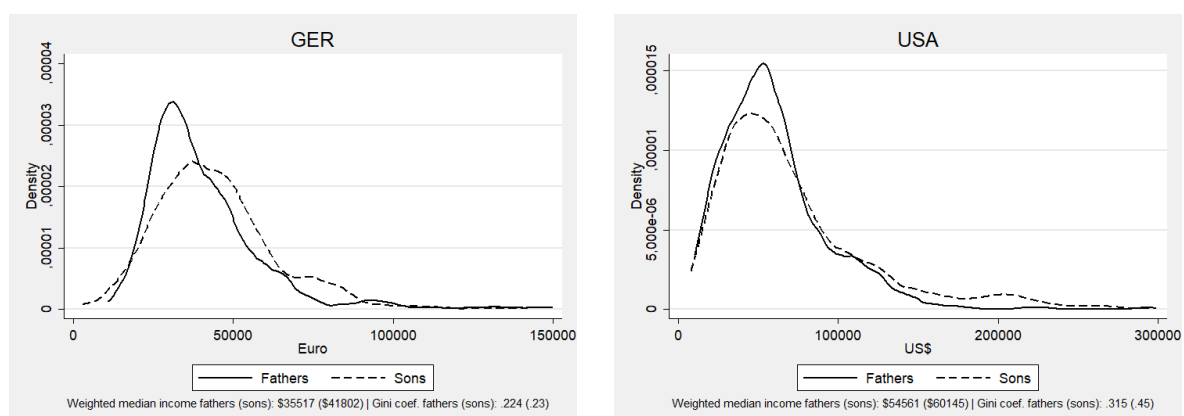
Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

Again, the fathers tend to be slightly older than their sons and show a lower mean real permanent labour income on average. Due to the age differences, fathers' lifetime incomes may tend to be slightly overestimated compared to their sons, if earnings continue to rise with age neglecting early retirement plans. In this case, the results represent a lower bound for absolute income mobility: If the fathers' incomes are overestimated, then the fraction of sons with incomes larger than their fathers' incomes would actually be larger and is underestimated in this study. The problem would be more severe if fathers would be younger than their sons.

However, averages are only of limited information when analysing income distributions. In order to better understand what the margins of the generation specific lifetime income distributions look like, kernel density functions are used as depicted in Figure 1. Permanent labour income is more unequally distributed in the generation of sons than among fathers in both countries, although the change is more pronounced in the US. In addition, lifetime labour income inequality is remarkably lower than annual income inequality that is usually used in distributive analyses. This is not a new finding but it highlights once more that income mobility equalizes distributions over time and that age-income profiles are heterogeneous and should be kept in mind when looking at cross sectional analyses of income distribution (Bönke et al., 2015).

Labour income at the tails, especially at the upper tail is more often observed among sons. The right shift in the density function is especially pronounced in the sons' generation in Germany. This induces an improvement of the sons' generation over their fathers, which is also reflected by the increase of real median labour incomes across generations in both countries. Although the relative increase of median income is larger in the US, it comes at the cost of an increase of inequality between generations.

Figure 1
Distribution of Permanent Labour Incomes



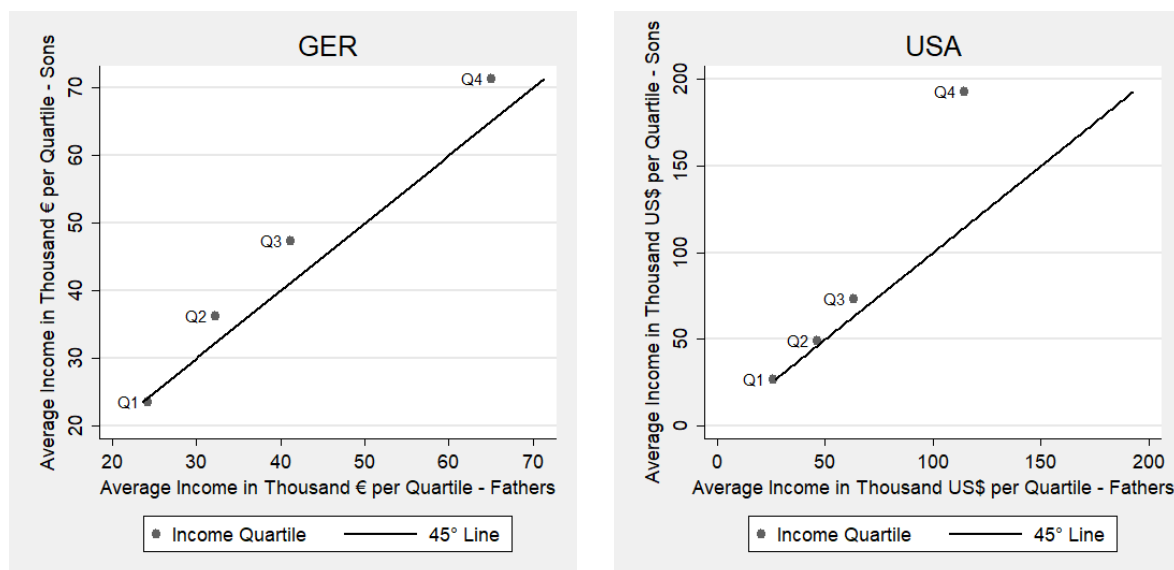
Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded. For scaling purposes, labour incomes above 300,000 USD are excluded.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

In the US, the generation specific Gini coefficient rises from 0.315 for fathers to 0.450 for sons. In Germany, the Gini coefficient slightly increases from 0.224 to 0.230 across generations. This is a remarkable difference between countries and another hint that economic growth and prosperity was shared more broadly in Germany than in the US.

Figure 2 compares average labour incomes of sons' and fathers' by labour income quartiles. Quartiles are formed by dividing the ascending labour incomes into four equally sized groups. This is done for fathers and sons separately. Hence, this does not indicate any mobility. The 45-degree line helps to show that average permanent labour income has increased in almost all quartiles across generations in both countries. If a son ends up in the same quartile as his father, he would still be better off in absolute terms. The only exception is the lowest quartile in Germany where the average permanent labour income of sons is marginally lower compared to the fathers' generation. Overall patterns are quite similar in the US. However, the improvements at the top are disproportionality higher than in the middle and the lower parts of the income distribution and the income distance between the third and fourth quartile is much more pronounced in the US than in Germany. Again, this is another hint that rising economic prosperity is more equally distributed in Germany than in the US.

Figure 2
Permanent Incomes by Labour Income Quartiles



Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

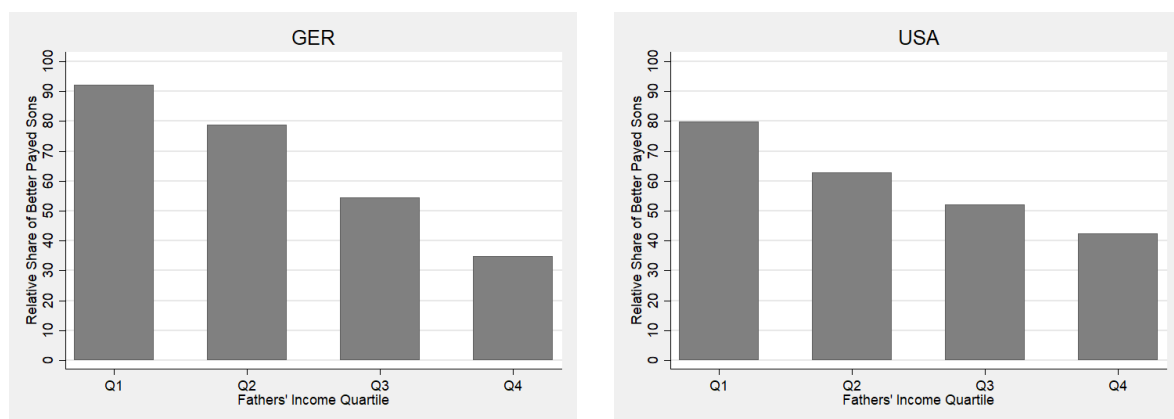
3.2. Absolute Income Mobility

The positive income development between generations is reflected directly in the degree of absolute income mobility. On average, around 67.3 per cent of sons earn a higher permanent labour income than their fathers in Germany, compared to 59.6 per

cent in the US. These are real incomes such that differences in the purchasing power of the generations are already taken into account.

Differentiating by the fathers' income quartile in Figure 3 reveals that the share of better paid sons is significantly larger in the lower quartiles than in the upper ones in both countries. In particular, about 92 per cent of German sons with a father from the lowest quartile receive a higher labour income than their fathers. It is about 35 per cent for sons with fathers from the highest quartile. In the US, the same shares are 80 per cent and 42 per cent, respectively. However, the most remarkable difference is to be found in the second quartile: While 79 per cent of sons in Germany receive a higher income than their fathers from this quartile, the same share is only 63 per cent in the US. Thus, absolute mobility is higher in the lower parts of the fathers' earnings distribution in Germany and higher in the upper part in the US. Shares are almost identical in the third quartile and account to 52 per cent in the US and to 55 per cent in Germany.

Figure 3
Absolute Income Mobility by Fathers' Labour Income Quartile



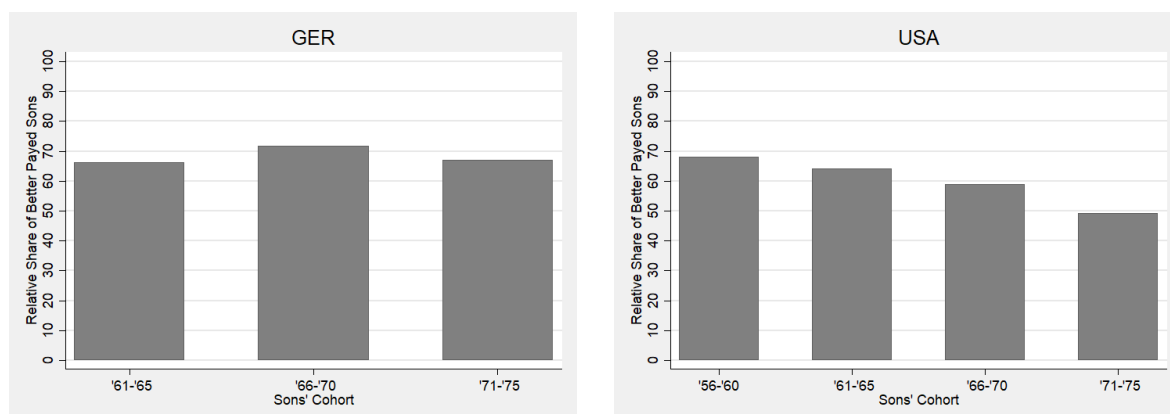
Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

A differentiation by the sons' birth cohorts as depicted in Figure 4 also shows that the trend in labour income is quite stable over time in Germany. In the sons' 1961-65 birth cohort about two thirds achieve a higher labour income than their fathers. In the cohort born ten years later (1971-75), this proportion is still at 67 per cent, in the intermediate cohort at about 72 per cent. However, caution should be exercised when comparing the cohort results, as the number of observations in each cohort is relatively small and amount to slightly above 100 or even less. That is why the 1956-60 birth cohort is not depicted for Germany but for the US where the number observation per cohort is between 100 and 200. In the US, the fraction of sons exceeding the labour incomes of their fathers is 68 per cent in the sons' 1956-60 birth cohort. In the sons' 1961-65 birth cohort, absolute labour income mobility is 64 per cent and, thus, about as high as in Germany. The major difference is that absolute mobility continues to decline with younger cohort in the US, while it remains almost constant in Germany. In the sons'

1971-75 birth cohort, the fraction of sons exceeding their fathers' labour income is about 48 per cent in the US compared to 67 per cent in Germany.

Figure 4
Absolute Labour Income Mobility by Sons' Birth Cohort



Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded.

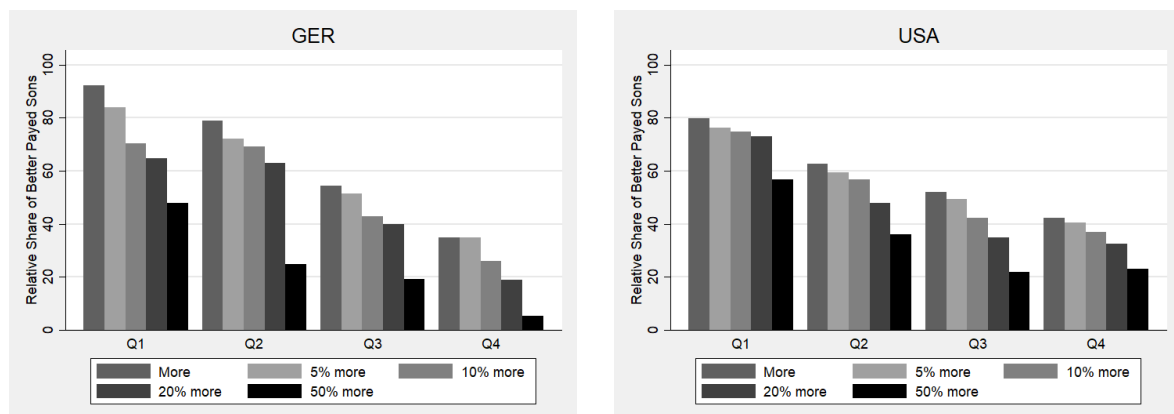
Sources: SOEP v33.1 (1984–2016); PSID (1984–2015); own calculations

This decline in the US is largely in line with the findings in Chetty et al. (2017) for similar income definitions, samples, and cohorts. However, absolute mobility estimates from the PSID tend to be slightly higher, whereas overall trends over time point into the same direction: Less Americans are living the American Dream. The results are robust for different cut-off points and also persist when zero income observations are included (see appendix). Nevertheless, sample selection might still be an issue and could bias the estimates in both panel data sets. In addition, more recent cohorts of sons tend to be younger on average than earlier ones, which might lead to lower absolute mobility rates due to age effects. However, fathers of more recent birth cohorts of sons are younger on average, too, such that both generations should suffer under similar life-cycle biases. Finally, this phenomenon is observed in both countries to the same extent, but still leads to the described differences in absolute mobility rates. More research and better data is needed to clarify this point.

Figure 5 shows that about 92 per cent of German sons earn more than their fathers when the father comes from the lowest income quartile (Q1) of his distribution. Moreover, absolute mobility decreases with higher quartiles of fathers. The proportion of sons with a higher labour income falls to an average of 35 per cent in the fourth quartile. In the US, absolute mobility is smaller in the lowest quartile but larger at the top. Only 80 per cent of sons receive a higher labour income than their father if the latter comes from the lowest quartile. The country difference is even more pronounced in the second quartile: 79 per cent of sons do better than their fathers in Germany compared to 63 per cent in the US. In contrast, absolute mobility is higher in the fourth quartile (Q4) where the share is about 42 per cent in the US. This is seven percentage points higher than in Germany. Overall, there is less absolute mobility at the bottom in the US than in Germany but more absolute mobility at the top.

Figure 5 also depicts the specific scope or intensity of sons' gains against their fathers. About 70 per cent of sons with fathers from the lowest quartile were able to earn at least ten per cent more than their fathers in Germany. The effect size decreases as before with higher quartiles. It is also noteworthy that still 48 per cent of sons with a father from the lowest quartile manage to earn at least 50 per cent more than their fathers. In the top quartile, this share is only about five per cent. In the US, about 75 per cent of sons with fathers from the lowest quartile earned at least ten per cent more than their fathers. This is five percentage points more than in Germany. The difference is even more pronounced at the top: about 22 per cent of sons earn at least 50 per cent more than their fathers if the latter comes from Q4. Hence, there are some remarkable differences at the tails of the distribution and the effect sizes. If American sons can do better than their fathers they gain much more than in Germany. Accordingly, the share of sons earning 50 per cent or more is remarkably higher in the US across all quartiles of the fathers' distribution. This is line with the previous finding that labour income is more unequally distributed in the US in both generations.

Figure 5
Scope of Absolute Labour Income Mobility by Fathers' Labour Income Quartile



Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded.

Sources: SOEP v33.1 (1984–2016); PSID (1984–2015); own calculations

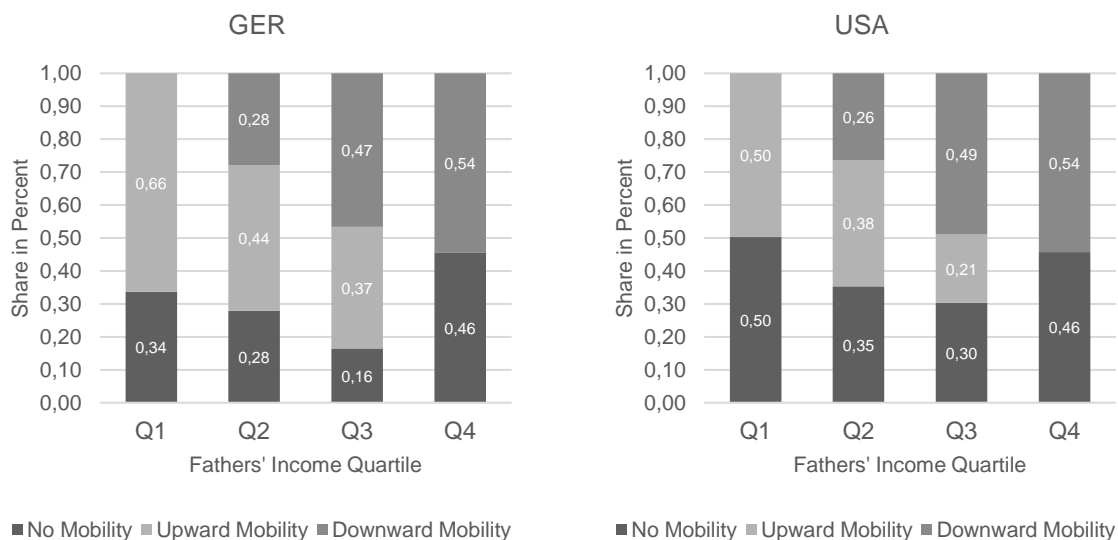
3.3. Relative Income Mobility

Although absolute income mobility is still high in Germany and decreasing in the US, this says nothing about changes in the income hierarchy across generations. Hence, measures of relative income mobility are applied in this chapter which are a better indicator for equal opportunities. Figure 6 shows the relative share of sons who end up in the same, higher, or lower quartile as their fathers. This takes into account whether a son could improve his income position towards the position of his father in the income distribution of his time. In Germany, 34 per cent of the sons with fathers from the lowest quartile remain in the same quartile. At the top (Q4) it is 46 per cent of the sons. The

same share is 28 per cent and 16 per cent for sons with fathers from the second and third quartile, respectively. At the same time, 66 per cent of the sons from the lowest income quartile of the fathers manage to rise to a higher quartile. It is 44 per cent for quartile two and 37 per cent for quartile three. A rise beyond the fourth quartile is not possible by construction of the four income groups. Therefore, the share is zero per cent. In the case of downward mobility, a son cannot descend below the lowest quartile of the fathers. Accordingly, 28 per cent of the sons with fathers from quartile two earn less than their fathers. Up to quartile four, this value rises to 54 per cent. In the US, every second son remains in the lowest labour income quartile if his father also belongs to this group. This share decrease to about 30 per cent in the third quartile and rises to 46 per cent in Q4. Accordingly, relative labour income mobility is significantly larger at the bottom in Germany than in the US and similar at the top.

In addition, the results also illustrate that relative mobility works both ways and there are not only winners. However, the consideration of absolute mobility has shown that losses are often only relative ones within a generation and less absolute losses against the parents' generation. The results on relative income mobility, thus, support the outcomes on absolute mobility, which showed that the majority of sons could improve against their fathers. Even within their own generation, many sons were able to do better. This is especially true for persons with fathers from the lower part of the labour income distribution, especially in Germany.

Figure 6
Income Transition Matrix of Sons by Fathers' Labour Income Quartile



Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded.
Sources: SOEP v33.1 (1984–2016); PSID (1984–2015); own calculations

Next, the elasticity coefficients of labour incomes (β) shown in Table 1 can be used to answer the question of how large the general relationship between the (logarithmic)

labour incomes of fathers and their sons is. The larger the reported coefficient, the stronger the relationship between the labour income of the two generations and the lower relative intergenerational income mobility. In Germany, around 30 per cent of the income inequality in the fathers' generation is passed on to the sons, compared to 48 per cent in the US. The results on labour income mobility are very close to the latest results presented in Schnitzlein (2016) and Corak (2006, 2017).

Table 2
Relative Labour Income Mobility

	Sons	
	GER	USA
β	0.299***	0.483***
Standard Error	0.073	0.053
Controls	Yes	Yes
R ²	0.083	0.213
#Observations	320	619

Notes: Standard errors are clustered at family level. Control variables include the number of years in sons' income average and two polynomials of mean age for fathers and sons. Annual earnings observations below 1200 EUR/USD per year are excluded. Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US.

* p<0.05, ** p<0.01, *** p<0.001.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

As Schnitzlein (2016) comprehensively discusses, the results are especially sensitive to the choice of the lower cut-off value.⁷ This finding can be confirmed. The impact of varying the lower cut-off points are depicted in Table A1 in the appendix. The higher the cut-off value, the higher the intergenerational elasticity (IGE) estimate for Germany: Estimated elasticities are ranged between 0.232 (no lower limit) and 0.371 (limit of 12,000 EUR). However, at a cut-off value of 12,000 EUR a year, the elasticity does not further increase; it even slightly decreases again. The latter is not the case if all imputed earnings observations are excluded from the analysis before. In this case, the results are similar to Schnitzlein. In the US, excluding all zero observations leads to a large jump in the elasticity coefficient from 0.229 to 0.483 if the lower limit is set to 1,200 USD. Further increasing the cut-off value lowers the IGE estimate. In contrast to Schnitzlein (2016), the estimated IGE tends to stabilize between 0.46 to 0.47 for a cut-off value larger than 4,800 USD. This different behaviour might be due to different sample compositions (for example the minimum number of income years differs) or examination periods (using more recent income data). Using nominal instead of real valued cut-off points (the latter is done here) gives the same qualitative results at slightly lower levels. All in all, it is a normative question where to cut the data off but the effects should be kept in mind since the results can differ a lot and the direction of the effect is not clear a priori. Using the "preferred" IGE coefficient of 0.32 for Germany from Corak (2006, 2017), Germany takes a middle position in the ranking of relative intergenerational earnings mobility in a broader international comparison and is ranked between Sweden

⁷ The treatment of imputed values is also an important issue, which is not further discussed in this paper.

(0.27) and France (0.41). Although mobility in Germany is lower than in the Scandinavian countries (Denmark: 0.15, Norway: 0.17), it is significantly higher than in the US (0.47) or the United Kingdom (0.50).

Finally, table 2 shows the results of cross-tabulating information on absolute and relative labour income mobility. This enables us to answer the question to what extent absolute and relative mobility are related. The combination of both measures reveals that about 56 per cent of sons in Germany that were able to increase their labour income above the level of their fathers could also climb the income ladder by at least one income quartile of their generation. If sons lost in absolute terms against their fathers, about 85 per cent also lost in relative terms. In the US, patterns are quite similar. If a son was able to earn more than his father then about 52 per cent of them were able to move up the income ladder by at least one quartile. Since the US has shown to be less mobile in both directions than Germany, we also find that less sons move down the income ladder (relative mobility) if they lost against their fathers in absolute terms: The share is about 70 per cent and, thus, 15 percentage points lower than in Germany.

Table 3
Cross-tabulation of Absolute and Relative Labour Income Mobility
(Share in %)

Panel A: Germany		Relative Mobility			
		Upward	No	Downward	Total
Absolute	Upward	55.99	40.23	3.78	100
Mobility	Downward	0.00	15.10	84.90	100
Panel B: USA		Relative Mobility			
		Upward	No	Downward	Total
Absolute	Upward	52.36	45.46	2.18	100
Mobility	Downward	0.00	30.62	69.38	100

Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded.

Sources: SOEP v33.1 (1984–2016); PSID (1984–2015); own calculations

4. Summary and Discussion

Social inequalities are complex and multidimensional. What makes a good life and what is fair is judged very differently. The same applies to social mobility, which in economics usually means the relationship between the income of parents and their children. Ultimately, it's about the ideal that children should do better than their parents. Therefore, the degree of absolute and relative income mobility across generations is of great interest and was investigated in this paper.

It turned out that about 67 per cent of sons born between 1955 and 1975 in (West) Germany earned a higher wage or salary than their fathers. The same share is about 60 per cent in the US. Those with fathers from the lowest earnings bracket were

particularly successful in improving their status in both countries. However, absolute mobility is higher in the lower part of fathers' labour income distribution in Germany and slightly higher in the upper part in the US. Another important difference between both countries is that absolute mobility is constant across sons' cohorts in (West) Germany while it has slightly decreased in the US. The results for the US are, hence, largely in line with the findings in Chetty et al. (2017), which are able to cover an even longer time period. They find a remarkable decline in absolute labour income mobility across time: About 92 per cent of sons born in 1940 earned more than their fathers compared to about 50 per cent for sons born in 1984. This gives them good reason to say that the American Dream is fading away. According to these findings in combination with the findings on relative labour income mobility, it cannot be said that American conditions prevail in Germany since both mobility indicators show a more positive picture in Germany. Social advancement is possible to a larger extent in Germany than in the US but the majority of today's sons is still better off than their fathers. The qualitative results are also robust to the choice of different cut-off points and the inclusion of zero labour income observations used for approximating permanent labour incomes. Nevertheless, the quantitative results are affected by treating zeros differently, especially in the lower parts of the income distribution. The treatment of zeros should, thus, always be made explicit.

A limitation of the study is its focus on fathers and sons only, since there is no sufficient data on women that would allow a differentiated analysis of absolute and relative labour income mobility by employment types. This would be a necessary precondition because women have undergone marked changes in their employment behaviour and scope, especially in Germany, which would otherwise distort the results. A high rate of absolute mobility would be an expression of the changed integration of women in paid work, but not an indicator of the fulfilment or failure of the promise of prosperity. Nevertheless, results from Chetty et al. (2017) indicate for the US that the share of daughters who earn more than their fathers tends to be remarkably lower compared to sons. This is very likely to be the result of differences in working hours (part time work) and payment. The share of women working in lower paid service sectors is still larger than for men. It is likely that the similar results hold for Germany. However, there is also convergence between genders across time that should not be neglected and is another indicator of social advancement.

In any case, labour income mobility could be further increased by promoting educational mobility, especially in the lower income brackets. Labour market demands and social conditions will continue to change, for example through digitalization, and the ability to lifelong learning will become even more important. Employment biographies and income of people from different cohorts will be affected differently by these new challenges. It is therefore not possible at present to estimate how absolute and relative intergenerational income mobility will develop in future. The favourable economic development of the past years, however, should encourage that the promise of social advancement and increasing prosperity that is inherently connected with the concept of

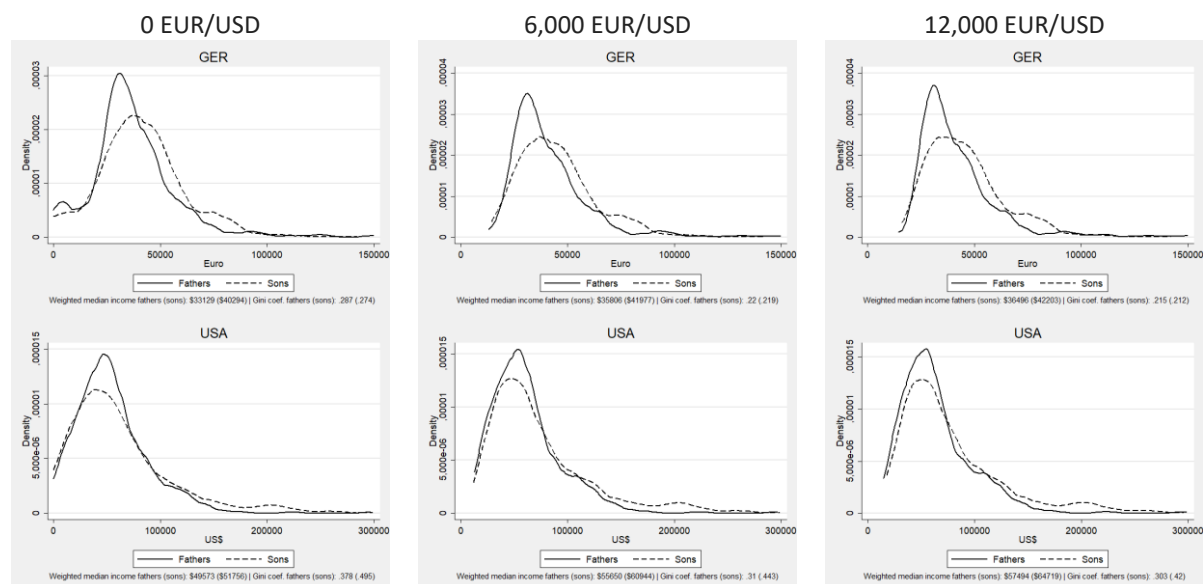
a social market economy will continue to be fulfilled in the future, at least in (West) Germany.

5. Appendix

Varying Lower Labour Income Cut-Off Point

Figure A1

Impact of Varying Lower Cut-Off Point on the Distribution of Permanent Labour Incomes

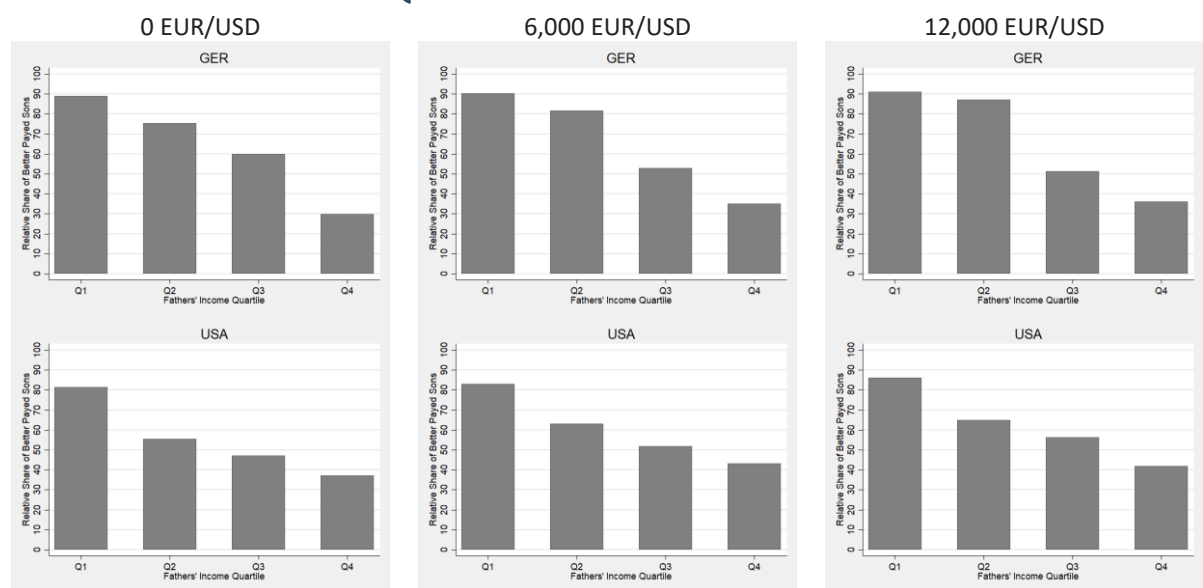


Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. Annual earnings observations below 1200 EUR/USD per year are excluded. For scaling purposes, labour incomes above 300,000 USD are excluded.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

Figure A2

Impact of Varying Lower Cut-Off Point on Absolute Income Mobility by Fathers' Labour Income Quartile

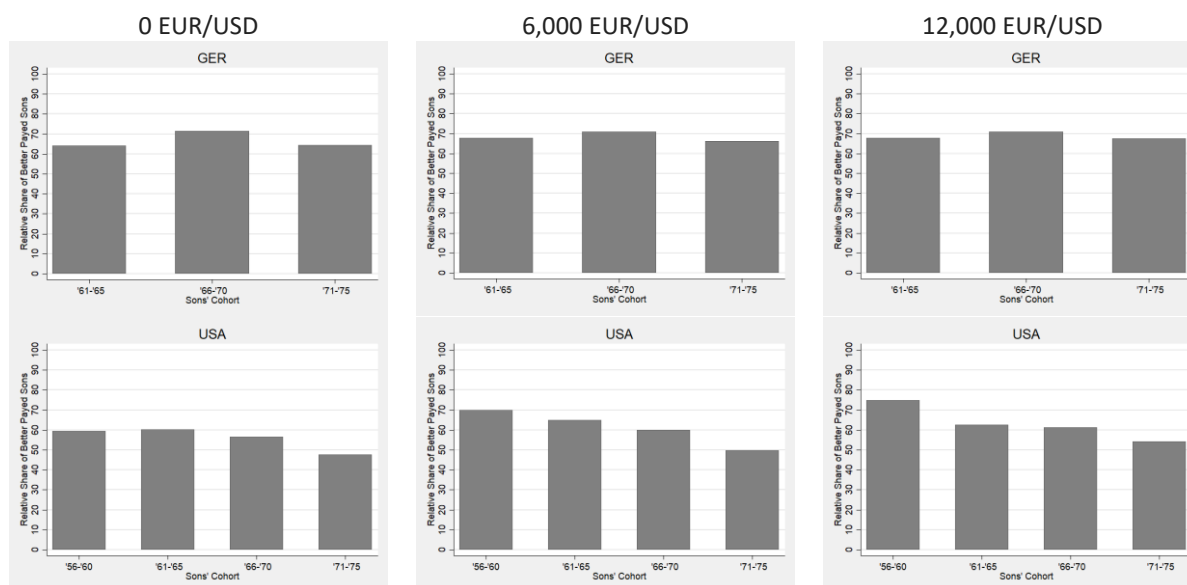


Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

Figure A3

Impact of Varying Lower Income Limit on Absolute Labour Income Mobility by Sons' Birth Cohort

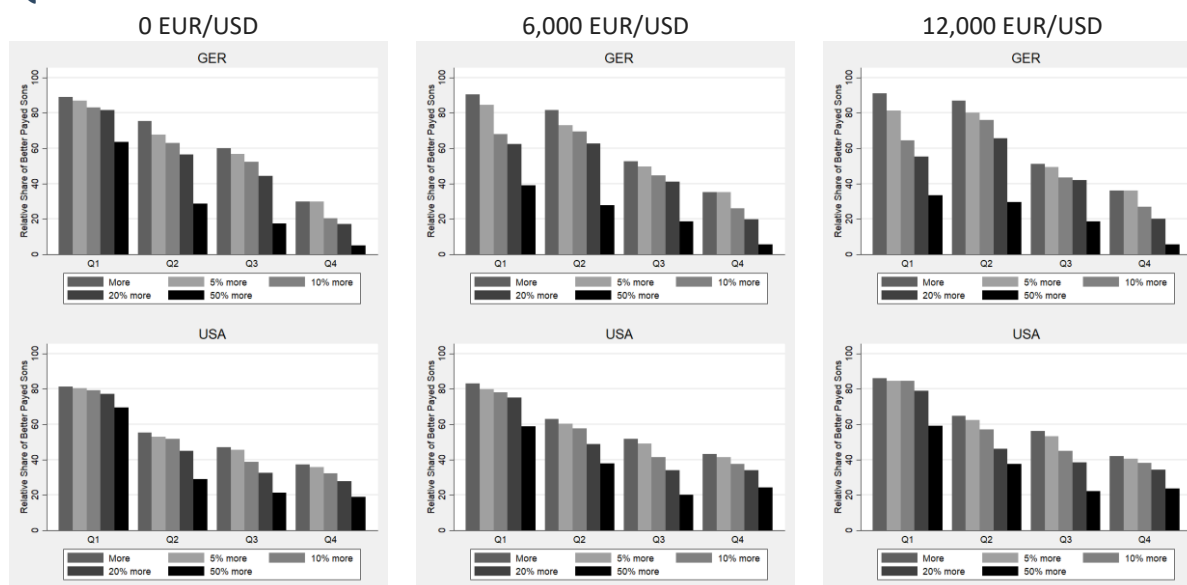


Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

Figure A4

Scope of Absolute Labour Income Mobility by Fathers' Labour Income Quartile



Notes: Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

Table A1
Impact of Varying Lower Income Limit on Relative Labour Income Mobility

Country	Sons											
	GER (EUR)						USA (USD)					
Lower Limit	No	1,200	4,800	6,000	9,600	12,000	No	1,200	4,800	6,000	9,600	12,000
β	0.232***	0.299***	0.348***	0.351***	0.374***	0.371***	0.229***	0.483***	0.466***	0.448***	0.467***	0.462***
Standard Error	0.072	0.073	0.066	0.066	0.068	0.069	0.075	0.053	0.053	0.056	0.057	0.061
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.069	0.083	0.121	0.125	0.138	0.146	0.054	0.213	0.203	0.194	0.202	0.187
#Observations	356	320	311	308	296	292	767	619	593	580	532	508

Notes: Standard errors are clustered at family level. Control variables include the number of years in sons' income average and two polynomials of mean age for fathers and sons. Labour incomes are reported in 2010 Euros for Germany and in 2010 US-Dollars for the US. In case where no lower limit is set, all zero labour incomes are excluded from the regression since labour incomes are log transformed for this purpose.

* p<0.05, ** p<0.01, *** p<0.001.

Sources: SOEP v33.1 (1984-2016); PSID (1984-2015); own calculations

6. References

- Acs, Gregory, Elliott, Diana, and Kalish, Emma, 2016, What Would Substantially Increased Mobility From Poverty Look Like?, Working Paper, The Urban Institute
- Bengali, Leila, and Daly, Mary, 2013, U.S. Economic Mobility: The Dream and the Data, Federal Reserve Bank of San Francisco Economic Letter 06
- Bönke, Timm, Corneo, Giacomo, and Lüthen, Holger, 2015, Lifetime Earnings Inequality in Germany, *Journal of Labor Economics* 33, No. 1, S. 171–208
- Couch, Kenneth A., and Lillard, Dean R., 1998, Sample Selection Rules and the Intergenerational Correlation of Earnings, *Labour Economics* 5, No. 3, S. 313–329
- Bratberg, Espen et al, 2017, A Comparison of Intergenerational Mobility Curves in Germany, Norway, Sweden, and the US, *The Scandinavian Journal of Economics* 119, No. 1, S. 72–101
- Chetty, Raj et al, 2017, The fading American dream: Trends in absolute income mobility since 1940, *Science (New York, N.Y.)* 356, No. 6336, S. 398–406
- Corak, Miles, 2006, Do Poor Children Become Poor Adults? Lessons from a Cross Country Comparison of Generational Earnings Mobility, *Research on Economic Inequality* 13, S. 143–188
- Corak, Miles, 2017, ‘Inequality is the root of social evil,’ or Maybe Not? Two Stories about Inequality and Public Policy, IZA Discussion Paper, No. 11005, S. 1–82
- Dahl, Molly, and DeLeire, Thomas, 2008, The Association Between Children’s Earnings And Fathers’ Lifetime Earnings: Estimates Using Administrative Data, Discussion Paper No. 1342-08, Institute for Research on Poverty, University of Wisconsin-Madison
- Fischer, Kristin, and Niehues, Judith, 2016, Der Blick auf die Markteinkommen führt in die Irre, *IW-Kurzberichte*, No. 47, Cologne
- Galler, Heinz P., 1987, Zur Längsschnittgewichtung des Sozio-ökonomischen Panels. In: Hans-Jürgen Krupp (Hrsg.): *Lebenslagen im Wandel: Analysen 1987*, Bd. 2. Frankfurt/Main, Sozio-ökonomische Daten und Analysen für die Bundesrepublik Deutschland, 2, S. 295–317
- Grawe, Nathan D., 2006, Lifecycle Bias in Estimates of Intergenerational Earnings Persistence, *Labour Economics* 13, No. 5, S. 551–570
- Haider, Steven, and Solon, Gary, 2006, Life-Cycle Variation in the Association between Current and Lifetime Earnings, *American Economic Review* 96, No. 4, S. 1308–1320

Isaacs, Julia B., Sawhill, Isabel, and Haskins, Ron, 2008, *Getting Ahead or Losing Ground: Economic Mobility in America*, The Brookings Institution

Lopoo, Leonard, and DeLeire, Thomas, 2012, *Pursuing the American Dream: Economic Mobility Across Generations*, The Pew Charitable Trusts

Martin, Molly A., 2006, Family Structure and Income Inequality in Families with Children, 1976 to 2000, *Demography* 43, No. 3, S. 421–445

Nybo, Martin, and Stuhler, Jan, 2016, Heterogeneous Income Profiles and Lifecycle Bias in Intergenerational Mobility Estimation, *Journal of Human Resources* 51, No. 1, S. 239–268

OECD, 2015, *In It Together: Why Less Inequality Benefits All*, OECD Publishing, Paris.
<http://dx.doi.org/10.1787/9789264235120-en>

Peichl, Andreas, Pestel, Nico, and Schneider, Hilmar, 2012, Does Size Matter? The Impact of Changes in Household Structure on Income Distribution in Germany, *Review of Income and Wealth* 58, No. 1, S. 118–141

PSID, 2018, Panel Study of Income Dynamics, public use dataset. Produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI.

Schäfer, Holger, and Schmidt, Jörg, 2017, Einmal unten - immer unten? Empirische Befunde zur Lohn- und Einkommensmobilität in Deutschland, *IW-Trends* 44, No. 1, Köln

Schnitzlein, Daniel D., 2016, A New Look at Intergenerational Mobility in Germany Compared to the U.S, *Review of Income and Wealth* 62, No. 4, S. 650–667

Socio-Economic Panel (SOEP), data for years 1984-2016, version 33.1, SOEP, 2016, doi:10.5684/soep.v33

Solon, Gary, 1989, Biases in the Estimation of Intergenerational Earnings Correlations, *Review of Economics* 71, S. 172–174

Wagner, Gert G., Frick, Joachim R., and Schupp, Jürgen, 2007, The German Socio-Economic Panel Study (SOEP) - Scope, Evolution and Enhancements, *Schmollers Jahrbuch* 127, No. 1, Berlin, S. 139–169