A new look at intergenerational mobility in Germany compared to the US

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Abstract

Motivated by the contradictory existing evidence on estimated German intergenerational earnings elasticities (IGE), I present a cross-country comparison of intergenerational earnings mobility in Germany and the US reassessing the question whether intergenerational mobility is higher in Germany compared to the US. In particular I analyze whether the two countries differ in the structure of intergenerational mobility. Therefore, I test for nonlinearities along the distribution of the father’s earnings. In addition I present results from an unconditional quantile regression. This changes the perspective of the analysis to the outcome of the transmission process by providing estimates of the IGE at different percentiles of the son’s unconditional earnings distribution.

According to these contributions, my main results are as follows. Based on comparable international data for father-son pairs, I find no significant differences in the level of intergenerational mobility between Germany and the US. I show that the existing low estimates for the IGE in Germany are not robust against variations in sampling criteria. Regarding the structure of intergenerational mobility, I find no evidence either in Germany or in the US for nonlinearities along the distribution of the father’s earnings. When analyzing the relationship along the distribution of the son’s earnings, I find that both countries show significant higher intergenerational mobility for the sons at the bottom of their earnings distribution. This means that ending up at the bottom of the earnings distribution is a severe risk for the sons of fathers from all parts of the father’s earnings distribution in both countries.

**JEL-Code:** J60

**Keywords:** intergenerational mobility, SOEP, CNEF, Germany, US
1 Introduction

The extent to which a family’s economic advantage or disadvantage persists over generations is widely seen as a key indicator of equality of opportunities. Thus, in both economics and sociology, a large field of research on intergenerational economic mobility has developed.\(^1\) Since the seminal articles by Solon (1992) and Zimmerman (1992), numerous contributions have analyzed intergenerational mobility in most of the developed and even some developing countries. Especially in economics, most contributions focus on the estimation of intergenerational earnings elasticities (hereafter IGEs) or intergenerational earnings correlations (hereafter IGCs) as measures of intergenerational mobility.

However, these estimates are highly sensitive to differences in sampling rules and the nature of the applied data sets (Solon, 2002). Therefore, international comparisons based on the results of single-country studies are difficult to interpret and can be misleading. Given these restrictions, scholars have developed a separate research strand that focuses on cross-country comparisons based on multiple countries in one study (e.g. Couch and Dunn, 1997; Björklund and Jäntti, 1997; Jäntti et al., 2006). The aim is to establish an international ranking system based on the level of intergenerational mobility. As intergenerational mobility is seen as a key indicator of equality of opportunities, which is a normative goal in most developed countries, an international ranking system provides evidence regarding the extent to which the goal of establishing a mobile society is fulfilled.

Existing results from cross-country comparisons provided the widely accepted stylized fact that intergenerational mobility is lowest in the US and highest in the Scandinavian countries (Björklund and Jäntti, 2000; Solon, 2002). The two extremes of the international intergenerational mobility scale, the US and the Scandinavian countries have received substantial attention in the literature. In contrast, empirical evidence on Germany is rare.

Based on theoretical considerations (Becker and Tomes, 1979, 1986; Solon, 2004), which are discussed in more detail in section 2, one would expect Germany to have a higher level of intergenerational mobility than the US. However, the few existing empirical results provide no clear evidence on this point. Couch and Dunn (1997) compared the level of intergenerational mobility in Germany and the US based on data from the German Socio-Economic Panel (SOEP) and the Panel Study of Income Dynamics (PSID). Based on two comparable samples, these researchers estimated IGEs and IGCs for both countries and found no sig-

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\(^1\) See Solon (1999), Björklund and Jäntti (2009) and Black and Devereux (2011) for an overview of the economics literature and Erikson and Goldthorpe (1992) and Breen (2004) for a review of the sociological literature.
significant differences.² Couch and Lillard (2004) compared German estimates that were also based on SOEP data with US estimates based on data from the National Longitudinal Survey (NLS).³ Their results support the findings of Couch and Dunn (1997).

To date, the empirical picture appears to be consistent, but recent methodological contributions have questioned these early findings. Haider and Solon (2006) showed that taking earnings observations too early (or too late) in an individual’s life cycle can cause substantial bias in the estimates of intergenerational mobility. As the authors of the aforementioned studies used SOEP data only up to 1998, the children observed in the German data were still very young. This problem carries over to the US data sets because the researchers had to construct comparable samples for both countries. Thus, the results of the comparisons presented above are only valid if the bias is of the same direction and magnitude in both countries.

Recent results from national studies have led scholars to question this assumption. Although Couch and Dunn (1997) estimate that the IGE for both countries is approximately 0.12, the consensus estimate in the literature for the IGE in the US lies between 0.4 and 0.5 (Corak, 2006),⁴ and recent German estimates range between 0.26 and 0.28 (Eisenhauer and Pfeiffer, 2008; Schnitzlein, 2009; Yuksel, 2009), which indicates higher intergenerational mobility in Germany compared with the US. However, because all of these recent contributions are single-country studies and therefore do not provide a US estimate based on a comparable sample, it might be misleading to draw conclusions about the rankings of the two countries. Thus, the empirical evidence remains unclear.

This paper aims to clarify the contradictory evidence on German IGE estimates reported in the literature. I present a cross-country comparison of the intergenerational earnings mobility in Germany and the US that answers the following question: "Is intergenerational mobility higher in Germany than in the US?" In addition, I analyze whether the two countries differ in their structures of intergenerational mobility. Therefore, I extend the classical test for nonlinearities along the distribution of the father’s earnings with the results from an unconditional quantile regression. Doing so changes the perspective of the analysis to the outcome of the transmission process by providing estimates of the IGE at different percentiles of the son’s earnings distribution.

According to these contributions, my main results are as follows. Based on comparable

² The authors update their results in Dunn and Couch (1999) and again find no differences between Germany and the US.
³ Couch and Lillard (2004) present their paper as an update of Lillard’s 2001 work, which also showed results for Germany and the US.
⁴ Based on long-running administrative data, Mazumder (2005) even estimates an IGE of 0.6 for the US.
international data for father-son pairs, I find no significant differences in the level of intergenerational mobility between Germany and the US. I show that the existing low estimates for the IGE in Germany are not robust against variations in sampling criteria. Regarding the structure of intergenerational mobility, I find no evidence either in Germany or in the US for nonlinearities along the distribution of the father’s earnings. When analyzing the relationship along the distribution of the son’s earnings, I find that both countries show significant higher intergenerational mobility for the sons at the bottom of their earnings distribution. This means that ending up at the bottom of the earnings distribution is a severe risk for the sons of fathers from all parts of the distribution in both countries.

The remainder of the paper is structured as follows. Section 2 presents a theoretical model, and Section 3 describes my empirical strategy. Section 4 describes the data, Section 5 presents the results and section 6 concludes.

2 Theoretical background

As mentioned in the introduction, the most often used measure of intergenerational mobility is the IGE (denoted as $\beta$ in the following), which, in most cases, is estimated from a log earnings regression explaining the log earnings of the child with log parental earnings and additional controls. In this section, I review a simple theoretical model of intergenerational mobility developed by Solon (2004) and based on Becker and Tomes (1979, 1986). This model gives a theoretical explanation of the IGE. The results of even this simple framework can be used to determine cross-country differences and to state a hypothesis predicting the result of the comparison between Germany and the US.\(^5\)

2.1 Outline of the model

Assume that family $i$ consists of two generations. For simplicity’ sake, let both generations contain one person: one parent (index $t-1$) and one child (index $t$). The parent’s utility is given as a function of the parent’s own (lifetime-) consumption ($C_{t-1}$) and the (lifetime-) earnings of the offspring ($Y_t$). Following Solon (2004), I assume that the utility function is of the Cobb-Douglas type. In the context of this model, the Cobb-Douglas parameter $\alpha$ can be interpreted as an altruism parameter that compares the relative importance of the parent’s

\(^5\) There is also a discussion of the model in Black and Devereux (2011).
own consumption with the offspring’s future earnings:

\[ U_{i,t-1} = U_{i,t-1}(C_{i,t-1}, Y_{i,t}) = (1 - \alpha) \log C_{i,t-1} + \alpha \log Y_{i,t} \quad (1) \]

In the model, the parent can influence the future earnings of the offspring through investments \((I_{t-1})\) in the child’s human capital \((H_t)\). The parent is not allowed to either borrow against the child’s future earnings or to transfer financial assets. The parent has to divide his or her own earnings between his or her own consumption and investments in the child’s human capital.\(^6\) Thus, the parent maximizes his or her utility with respect to the following budget constraint:

\[ (1 - \tau)Y_{i,t-1} = C_{i,t-1} + I_{i,t-1} \quad (2) \]

where \((1 - \tau)Y_{i,t-1}\) is the parent’s available earnings after taxes, and \(\tau\) is a proportional taxation rate.\(^7\) The offspring’s human capital formation is a function of the monetary investments of the parent and the government \((G_{t-1})\) as well as the inherited endowments \(e_t\) that are independent of the monetary investments.

\[ H_{i,t} = e_{i,t} + \theta \log(I_{i,t-1} + G_{i,t-1}) \quad \text{with } \theta > 0 \quad (3) \]

The assumption \(\theta > 0\) in conjunction with the semi-log functional form ensures a decreasing but positive marginal product of monetary human capital investments.

According to Solon (2004) and Becker and Tomes (1979), \(e_t\) represents different non-monetary influence factors. For example, it represents the genetic component in the transmission process. In addition it captures the family’s reputation and network but also represents the inherited family values, such as attitudes towards learning. As it is obvious that these endowments do not depend only on the parent’s endowments, but also on former generations, Becker and Tomes (1979) model \(e_t\) in a way that it follows a first-order autoregressive process:

\[ e_{i,t} = \delta + \lambda e_{i,t-1} + \nu_{i,t} \quad \text{with } 0 \leq \lambda \leq 1 \quad (4) \]

where the inheritability coefficient \(\lambda\) is restricted to the interval 0 to 1, and \(\nu_{i,t}\) represents a white noise error term.

\(^6\) Becker and Tomes (1986) present a model that relaxes this assumption.
\(^7\) Note that because of the assumption of proportional taxation, redistributive public policy is included only by progressive investments in children’s human capital (see also Solon, 2004).
Solon (2004) characterizes governmental investments by:

\[
\frac{G_{i,t-1}}{(1-\tau)Y_{i,t-1}} \approx \varphi - \gamma \log Y_{i,t-1} \quad \text{with} \quad \gamma > 0
\]  

with \( \varphi \) being a constant. In this definition, a positive value of \( \gamma \) ensures that the ratio of government investments to after-tax income is decreasing in income. Therefore, \( \gamma \) represents a measure of the progressivity of the government’s spending on children. The more positive \( \gamma \) is, the more progressive the policy.\(^8\)

Finally, I define the offspring’s earnings as:

\[
\log Y_{i,t} = \mu_t + \rho H_{i,t}
\]  

where \( \mu \) is a constant and \( \rho \) is the return to human capital.

Utility-maximizing behavior from the parent then leads to the optimal level of investments, which is given by:

\[
I_{i,t-1} = \left(\frac{\alpha \rho \theta}{1 - \alpha (1 - \rho \theta)}\right)(1 - \tau)Y_{i,t-1} - \left(\frac{1 - \alpha}{1 - \alpha (1 - \rho \theta)}\right)G_{i,t-1}
\]  

Using this result together with equations (3), (4), and (5), I can reformulate equation (6) as:\(^9\)

\[
\log Y_{i,t} = \mu^* + (1 - \gamma)\rho \theta \log Y_{i,t-1} + \rho e_{i,t}
\]  

which looks similar to the standard earnings regressions applied to estimate the IGE in the literature. However, \( \rho e_{i,t} \) is not a proper error term. It is correlated with the regressor \( \log Y_{i,t-1} \) because both depend on the parent’s inherited endowment \( e_{i,t-1} \). Solon (2004) shows that in a steady state, the probability limit of the OLS estimator of the coefficient of the parent’s log earnings (which is the IGE) in equation (8) equals:\(^10\)

\[
\beta = \frac{(1 - \gamma)\rho \theta + \lambda}{1 + (1 - \gamma)\rho \theta \lambda}
\]  

\(^8\) Note that this policy is relatively progressive. Although the absolute value of public investments may be higher or lower for children from high-earning families, the ratio of public investments to after-tax earnings decreases with parental earnings (see also discussion in Solon, 2004).

\(^9\) \( \mu^* = \mu + \varphi \theta \rho + \theta \rho \log(\frac{\alpha \theta (1-\tau)}{1-\alpha (1-\rho \theta)}) \).

\(^10\) In the framework of this simple model the degree of altruism does not influence the degree of mobility. Higher altruism in one society simply leads to higher average earnings for the offspring’s generation.
2.2 Cross-country differences

This result helps clarify the cross-country differences in the estimated IGEs. First, intergenerational mobility is higher (= $\beta$ is lower) if the heritability coefficient $\lambda$ is lower. Second, intergenerational mobility is lower if the efficacy of investments in human capital rises (higher $\theta$). Third, the intergenerational mobility is higher, the lower the returns to human capital ($\rho$) are. Fourth, the intergenerational mobility is higher, the more progressive governmental investments in human capital are (higher $\gamma$).

In the case of Germany and the US, one can now formulate hypotheses based on this theoretical model. First, Black and Devereux (2011) argue that the heritability coefficient is unlikely to differ significantly between two developed countries. Second, the returns to human capital (for example, when measured as education) are higher in the US than in Germany (OECD, 2011). Third, because the German educational system is free up to the university-level, governmental investments in human capital can be seen as more progressive in Germany than in the US. The remaining influence factor is the efficacy of the educational system. This indicator is hard to measure because the definitions of a valid input and output measure of the educational system are not clear. Thus, I have to follow Black and Devereux (2011) and base my expectations on the remaining three influence factors. Thus, given the restriction related to the last factor, based on the theoretical model, one should expect Germany to have higher intergenerational mobility than the US.

3 Empirical strategy

Equation (10) represents the basic regression model that is used in the analysis of intergenerational mobility.

$$\log Y_{i,t} = \alpha_t + \beta \log Y_{i,t-1} + \psi Z_{i,t-1} + \epsilon_{i,t} \quad (10)$$

with $\beta$ being the estimated IGE. The vector $Z$ contains control variables. In the standard case, these variables are polynomials of the father’s age. $\log Y_{i,t}$ and $\log Y_{i,t-1}$ are measures of the parent’s and offspring’s log economic status. The theoretical model in section 2 suggests using lifetime earnings or lifetime income as the measure of economic status for both generations. Following most of the literature, I will use earnings.

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11 In recent years, some of the German Federal States (Bundesländer) have introduced moderate fees to attend universities, but the German sample in this study is not affected by this change.

12 Earlier contributions also included the age of the children. However, according to the findings of Haider and Solon (2006), the more recent contributions use children’s observations only from a narrow age window. Thus, I do not include the children’s age in the regression.
As there are no data sets available for the US and Germany that contain the lifetime earnings for two generations together with the necessary information on family relations, I have to approximate the lifetime earnings by using annual earnings observations.

As Solon (1989, 1992) and Zimmerman (1992) point out, the use of annual earnings observations instead of the parent’s lifetime earnings in equation (10) leads to a substantial underestimation of the true intergenerational elasticity because annual status is a noisy measure of lifetime status. Annual status introduces a measurement error in the model that leads to attenuation bias. Solon (1989, 1992) proposed using multiyear averages instead and showed that the estimated IGE for the US rises from 0.2 to 0.4 if one uses a five-year average of parental earnings instead of annual earnings. Mazumder (2005) adds to this discussion and suggests using ten- to fifteen-year averages instead of five-year averages.

Haider and Solon (2006) provided another important methodological contribution addressing the absence of valid observations of lifetime earnings. The authors highlight the potential life-cycle bias arising from a measurement error in the dependent variable, which is the log earnings of the child. According to the classical errors-in-variables model, measurement error in the child’s earnings would only result in higher standard errors for the estimated IGE. The critical assumption in this case is that the noise or error component is random over the life cycle. Haider and Solon (2006) showed that the classical errors-in-variables model is not appropriate and that the association between current and lifetime earnings varies over the life cycle.

The authors point out that, based on their US data, annual earnings are only suited as a proxy for lifetime earnings if these earnings are observed for individuals between the ages of 35-42. Earnings observations taken at younger ages lead to a substantial underestimation of the IGE. These findings are confirmed by Böhlmark and Lindquist (2006) for Sweden and Brenner (2010) for Germany. This argument substantially challenges the early IGE estimates on Germany and the US. As mentioned in the introduction, the observed children in these samples were young. For example, the average age of the sample of oldest sons in the most recent contribution (Couch and Lillard, 2004) was 29.22 years in Germany and 28.61 years in the US. These averages are much younger than the age range suggested above.

Estimating equation (10) via OLS provides an estimate for the IGE at the mean of the

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13 A similar discussion can be found in Jenkins (1987), Björklund (1993) and Grawe (2006).
14 Again, taking the long-term averages of the child’s observed annual earnings would at least partly solve this problem. However, in contrast to the father’s earnings observations most data sets do not provide enough yearly observations on the children to calculate such multi-year averages.
father’s and son’s earnings distributions. In a further step, I want to analyze whether the structure of intergenerational mobility differs between the two countries. Therefore, I must first determine whether equation (10) represents the appropriate functional form in the association between the parent’s and child’s earnings. For example, Bratsberg et al. (2007) showed that the relationship between the father’s and son’s earnings is highly nonlinear in the Scandinavian countries. However, they did not find evidence for nonlinearities in the UK and the US. I will address this question by adding higher polynomials of the father’s earnings to the regression equation.

Additionally I estimate equation (10) by applying an unconditional quantile regression (UQR) approach, which is a method that was recently developed by Firpo et al. (2009). In contrast to the standard conditional quantile regression (CQR) developed by Koenker and Bassett (1978), UQR estimates provide information on the marginal effect of parental earnings at a given percentile of the unconditional distribution of the child’s earnings. Thus, this method allows me to determine whether the effect of parental earnings differs along the child’s earnings distribution.15

4 Data

Cross-country comparisons are highly dependent on reliable and comparable data sets. For this analysis, I apply data from the SOEP (Wagner et al., 2007) and the PSID, both of which are long-running household surveys that are widely used in economic and sociological research. Both panels start with an initial set of households and track their members over time. Because the individuals are also followed when they leave their initial households and form new ones, it is possible to observe the children when they leave their parental homes and found their own families.

Additionally, both surveys are included in the Cross-National Equivalent File (CNEF) project (Frick et al., 2007). This project is conducted at Cornell University and provides a subset of the information included in the SOEP and the PSID that has already been prepared for international comparisons. I use the information on the parent-child relations from the family tables in the original surveys and take the outcome variables from the CNEF data sets. For the fathers, I use their earnings information from the years 1984-1993 that were taken

15 In contrast, the estimates from a CQR represent the effect at the conditional quantile of the child’s earnings distribution irrespective of the position of the child in the offspring’s unconditional distribution. Grawe (2004) discusses estimating CQR as a test for the existence of credit-constraints in the parent’s generation. For CQR estimates see Eide and Showalter (1999) for the US and Schnitzlein (2009) for Germany.
when the fathers were 35-55 years old. Following the suggestions of Solon (1989, 1992), I restrict my sample of fathers in both countries to the individuals with at least five valid annual earnings observations in the period from 1984-1993. I use an average of the earnings observations available in the ten years observed. On average I can use 8.89 yearly earnings observations for the German fathers and 8.53 yearly earnings observations for the US fathers (see Table 1). In addition, I add the number of years included in the father’s average earnings as control variable in equation (10).

A valid annual earnings observation is defined as an earnings observation above a certain earnings limit to exclude implausibly low values. In the next section, I will show the initial results for three different lower earnings limits. First, I follow the literature and apply an annual earnings limit of 1200 EUR / 1200 USD. Second I present the results for an annual earnings limit of 4800 EUR / 4800 USD and third I present results based on a sample with a lower earnings limit of 9600 EUR / 9600 USD.

Following Bratsberg et al. (2007) I restrict my analysis to father-son pairs. The observations of the son’s earnings are taken from the most recent survey years. For Germany, this period lasts from 2000-2010. Because the PSID has only been biannually performed since 1997 and because the most recent available year in the US CNEF data is 2007, the corresponding period is 1999-2007. I restrict the sample to the individuals with at least 2 valid yearly observations. To avoid life-cycle bias, I follow Haider and Solon’s (2006) suggestions and restrict the analysis to the sons aged between 35-42 years in the year that their earnings are observed. This age range is substantially older than the sample of sons in the prior cross-national studies that include Germany. Finally, to prevent the analysis on nonlinearities from being driven by outliers, I follow the literature and exclude the top and the bottom percentages of the distributions of the father’s and son’s average earnings.

The resulting sample consists of 352 father-son pairs from 284 different families in Germany and 276 father-son pairs from 211 families in the US. The main descriptive statistics of this sample are shown in Table 1. As can be seen in the table, the father’s age is similar in the two samples, and the samples of both countries meet the age requirements for the sons suggested by Haider and Solon (2006).

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16 Earnings are measured in 2005 real values.
17 I do so to prevent the results from being driven by differences in labor market participation.
18 Because of this limitation the US sample contains only five survey years. I did not extend the observation period for the US sons to ensure that observations in both countries are taken in the same period.
5 Results

5.1 The standard model

Table 2 contains estimates for the IGE that are comparable to the standard estimates in the existing literature. These findings are the result of estimating equation (10) without including higher-order polynomials of the father’s earnings. I present the results for three cases. In the upper panel, all annual earnings observations that are higher than 1200 Euro / 1200 USD are included in the calculations of the father’s and son’s average earnings. Based on this sample, I estimate the IGE to be 0.262 in Germany and 0.459 in the US. This finding is in line with the recent results from national studies on both countries. Based on the point estimate, these results indicate that the intergenerational mobility in Germany is higher than that in the US. Thus these results are in line with the expectations generated by the theoretical model in section 2. According to these estimates, a German son whose father’s earnings are 100 percent above the mean in the parent’s generation can expect, on average, his own earnings to be 26 percent above the average in his generation. In the US, the same son could expect an earnings advantage of 46 percent. Thus, the regression to the mean is stronger in Germany than in the US. However, the difference between the countries fails to be statistically significant.

Additionally, one may ask how robust this finding is. The second panel in Table 2 contains the estimates for the IGE based on a sample for which the lower earnings limit is varied. Increasing the lower earnings limit to 4800 EUR / 4800 USD leaves the IGE estimate for the US unaffected but increases the IGE for Germany up to 0.332. Thus, the gap between the two estimates is reduced. In the third panel, the estimates are based on a sample that only included the earnings observations above 9600 EUR / 9600 USD. Again, the US estimate remains stable, but the German estimate further increases to 0.417.

So, I can reproduce the standard result from the prior literature, which states that the German IGE estimates are lower than the US ones. However, even a reasonable degree of variation in the sampling rules leads to similar estimates in both countries. The differences in the reaction of the estimated IGE to a variation in the lower earnings limit highlight the need for a cross-country comparison. Based on these results there is no evidence for a significant difference between the two countries.

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19 See Schnitzlein (2009) for an overview on the results for Germany and Corak (2006) for an overview on the US results.

20 Note that this finding is a correlation, not a causal effect.
One may now ask which earnings limit to choose. A lower earnings limit of 1200 EUR / 1200 USD is very low in an analysis including Germany. In Germany individuals whose earnings are around 100 EUR per month will receive social benefits or unemployment benefits in most cases. As an analysis of the intergenerational transmission of welfare benefits is not within the scope of this paper (for results on this topic see for example, Baron et al., 2008; Pepper, 2000) I chose a higher earnings threshold. However, an earnings limit of 9600 EUR / 9600 USD is very restrictive as monthly earnings of 800 EUR or 800 USD are not unreasonably low. Therefore, I decided to apply the medium lower threshold to the further analysis.

5.2 Structure of the intergenerational mobility

To analyze the structure of the intergenerational relationship I present a graphical representation of the data. Figure 1 depicts the data of the two countries. The figure provides the average of the son’s log earnings by the father’s earnings percentile together with a linear regression through these data points. The upper part of the figure represents the German data, and the lower part represents the US data.

In both countries there is no evidence for nonlinearities along the distribution of the father’s earnings. This finding is in line with the result of Bratsberg et al. (2007) who, based on NLSY data, also present a graphical representation of the intergenerational transmission process in the US and who also found no evidence for a nonlinear relationship.

Thus, the first examination of the data did not provide evidence on nonlinearities in either country. This finding is supported by the results of a RESET test that I performed on the model in equation (10). In both countries, the test fails to reject the null hypothesis. Nevertheless I reestimated equation (10) for both countries including the second- and third-order polynomials of the the father’s log earnings. The results of these estimations are presented in Table 3. All of the cases including the higher-order polynomials lead to insignificant coefficient estimates for the father’s log earnings variables. A joint F-test for the significance of the higher-order polynomials also fails to reject the null hypothesis in both countries. In sum there is no evidence that the IGE differs along the distributions of the father’s earnings in both countries.

Adding the polynomials of the father’s earnings to the standard earnings equation answers the question of whether intergenerational mobility is higher or lower for the children of parents with higher incomes. Another important but less analyzed question is whether there are
differences with respect to the distribution of the son’s earnings. The focus on the distribution of the children’s earnings changes the perspective of the analysis. Whereas parental earnings are the origin of the transmission process, the offspring’s earnings are the outcome.

To assess this question, I apply a UQR approach to equation (10). The results are shown in Table 4, which presents the OLS estimate as well as the UQR estimates at the 20th, the 40th, the 60th and the 80th percentile of the son’s earnings.

The table shows that in both countries mobility is significantly higher at the bottom quintile than at the top quintile. In Germany for low-earning sons, the estimated IGE is 0.102 and is not statistically different from 0. Hence, there is virtually no association between the father’s earnings and the son’s own earnings in this part of the son’s earnings distribution. The estimate at the 20th percentile is also the lowest in the US. In contrast to the German estimate, the US estimate is significantly different from 0. In both countries the estimate at the 20th percentile is significantly lower than the estimate at the 80th percentile. Thus, Table 4 indicates that the intergenerational mobility in both countries is higher for the low-earning sons than the high-earning sons.

However, in an analysis along the distribution of the father’s earnings this finding would be positive. Higher intergenerational mobility for sons whose father’s are at the bottom of the earnings distribution would indicate that the sons can improve their position. In contrast, the finding in this analysis indicates higher mobility for sons at the bottom of their distribution of earnings. As the son’s earnings are the outcome of the intergenerational transmission process, that result means that ending up at the bottom of the distribution of son’s earnings is a severe risk for sons with fathers from all parts of the distribution.

The results in Table 4 further show, that the remaining structure is different. The 20th percentile estimate is a clear outlier among the German results. The remaining estimates all range from 0.5 to 0.6, which suggests that the intergenerational mobility is low. These results suggest that the low OLS estimate for Germany might be driven by high mobility at the lower end of the son’s earnings distribution. In contrast to Germany, the IGE estimates increase with the son’s earnings in the US up to an estimate of 0.767 at the 80th percentile. This finding also shows a low level of intergenerational mobility in the US. However, even if the structure of the intergenerational mobility differs between the US and Germany both countries show a low level of mobility.
6 Conclusion

In this paper I present estimates of intergenerational mobility in Germany and the United States based on recent comparable data sets. Although the point estimate for the IGE derived from the standard estimation indicates that intergenerational mobility is higher in Germany, this difference fails to be significant and appears not to be robust against variation in sampling criteria. I find no evidence for nonlinearities along the father’s earnings distribution. In contrast, I find that intergenerational mobility is higher for the sons at the lowest quintile of the son’s earnings distribution in both countries. Thus ending up at the bottom of the earnings distribution is an actual risk for the sons of fathers from all parts of their earnings distribution.

Based on these results I conclude that although the two countries may differ in their structures of intergenerational mobility, there is no clear evidence of one being more mobile than the other. In particular, the UQR estimates show high intergenerational persistence in both countries.
7 Figures and tables

Figure 1: The relationship between the father’s and son’s earnings in Germany and the US

Note: the figure contains the regression line and mean log earnings of sons and fathers for each percentile of father’s earnings distribution. The upper part presents German data and the lower part presents data from the US.

Table 1: Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median/Mean</td>
<td>Med/Mean</td>
<td></td>
</tr>
<tr>
<td>son’s earnings</td>
<td>53,803.65</td>
<td>50,467.08</td>
</tr>
<tr>
<td>father’s earnings</td>
<td>45,165.29</td>
<td>53,617.57</td>
</tr>
<tr>
<td>number of years in average</td>
<td>8.89</td>
<td>8.53</td>
</tr>
<tr>
<td>father’s age</td>
<td>47.66</td>
<td>48.05</td>
</tr>
<tr>
<td>son’s age</td>
<td>37.77</td>
<td>38.20</td>
</tr>
<tr>
<td>sample size</td>
<td>352</td>
<td>276</td>
</tr>
<tr>
<td>number of families</td>
<td>284</td>
<td>211</td>
</tr>
</tbody>
</table>

Note: the table contains descriptive statistics of the sample used in the analysis. The table presents the median of the earnings and the mean for all of the other variables. The applied lower earnings limit is 4800 EUR / 4800 USD. For better comparability earnings are given in USD using the following exchange rate: 1 EUR=1.3992 USD.
Table 2: Estimated intergenerational elasticities

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>lower earnings limit 1200 EUR / 1200 USD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGE</td>
<td>0.262</td>
<td>0.459***</td>
</tr>
<tr>
<td>se</td>
<td>0.096</td>
<td>0.070</td>
</tr>
<tr>
<td>N</td>
<td>357</td>
<td>278</td>
</tr>
<tr>
<td><strong>lower earnings limit 4800 EUR / 4800 USD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGE</td>
<td>0.332***</td>
<td>0.454***</td>
</tr>
<tr>
<td>se</td>
<td>0.088</td>
<td>0.068</td>
</tr>
<tr>
<td>N</td>
<td>352</td>
<td>276</td>
</tr>
<tr>
<td><strong>lower earnings limit 9600 EUR / 9600 USD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGE</td>
<td>0.417***</td>
<td>0.482***</td>
</tr>
<tr>
<td>se</td>
<td>0.074</td>
<td>0.070</td>
</tr>
<tr>
<td>N</td>
<td>295</td>
<td>262</td>
</tr>
</tbody>
</table>

Note: the table contains estimates of intergenerational elasticities. The figures in italics are standard errors clustered at family level. "***": significance at 1 percent level, "**": significance at 5 percent level, ":" significance at 10 percent level.
Table 3: Estimated intergenerational elasticities - different functional forms

<table>
<thead>
<tr>
<th></th>
<th>Germany (1)</th>
<th>Germany (2)</th>
<th>Germany (3)</th>
<th>US (1)</th>
<th>US (2)</th>
<th>US (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln (father’s earnings)</td>
<td>0.332</td>
<td>1.853</td>
<td>35.026</td>
<td>0.454</td>
<td>***</td>
<td>35.026</td>
</tr>
<tr>
<td>se</td>
<td>0.088</td>
<td>3.601</td>
<td>119.553</td>
<td>0.068</td>
<td>2.122</td>
<td>44.595</td>
</tr>
<tr>
<td>ln (father’s earnings)$^2$</td>
<td>-0.072</td>
<td>-3.226</td>
<td>0.130</td>
<td>0.100</td>
<td>0.099</td>
<td>4.106</td>
</tr>
<tr>
<td>se</td>
<td>0.172</td>
<td>11.394</td>
<td>0.099</td>
<td>0.362</td>
<td>0.126</td>
<td></td>
</tr>
<tr>
<td>ln (father’s earnings)$^3$</td>
<td>0.100</td>
<td></td>
<td></td>
<td>0.190</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>352</td>
<td>352</td>
<td>352</td>
<td>276</td>
<td>276</td>
<td></td>
</tr>
<tr>
<td>adj.-$R^2$</td>
<td>0.062</td>
<td>0.06</td>
<td>0.057</td>
<td>0.159</td>
<td></td>
<td>0.159</td>
</tr>
<tr>
<td>p-value RESET test</td>
<td>0.217</td>
<td>-</td>
<td>-</td>
<td>0.528</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>p-value joint F-test</td>
<td>-</td>
<td>0.674</td>
<td>0.857</td>
<td>-</td>
<td>0.190</td>
<td>0.219</td>
</tr>
</tbody>
</table>

Note: the table contains estimates of intergenerational elasticities. The figures in italics are standard errors clustered at family level. "***": significance at 1 percent level, "**": significance at 5 percent level, "*": significance at 10 percent level. Source: SOEP (1984-2010), PSID(1984-2007).
Table 4: Estimated intergenerational elasticities - results from unconditional quantile regressions

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OLS</strong></td>
<td>0.332</td>
<td>0.454***</td>
</tr>
<tr>
<td><em>se</em></td>
<td>0.088</td>
<td>0.068***</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>352</td>
<td>276</td>
</tr>
</tbody>
</table>

**results from UQR:**

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Germany</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>20th percentile</td>
<td>0.102</td>
<td>0.239**</td>
</tr>
<tr>
<td><em>se</em></td>
<td>0.112</td>
<td>0.093**</td>
</tr>
<tr>
<td>40th percentile</td>
<td>0.518***</td>
<td>0.383***</td>
</tr>
<tr>
<td><em>se</em></td>
<td>0.093</td>
<td>0.072***</td>
</tr>
<tr>
<td>60th percentile</td>
<td>0.562***</td>
<td>0.494***</td>
</tr>
<tr>
<td><em>se</em></td>
<td>0.080</td>
<td>0.078***</td>
</tr>
<tr>
<td>80th percentile</td>
<td>0.506***</td>
<td>0.767***</td>
</tr>
<tr>
<td><em>se</em></td>
<td>0.115</td>
<td>0.104***</td>
</tr>
</tbody>
</table>

Note: the table contains estimates of intergenerational elasticities based on unconditional quantile regressions. "***": significance at 1 percent level, "**": significance at 5 percent level, ": significance at 10 percent level. Source: SOEP (1984-2010), PSID(1984-2007).
8 References


