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Diskussionspapiere
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Intergenerational Correlations in Labor Market Status
A Comparison of the United States and Germany

by

Kenneth A. Couch and Thomas A. Dunn¹⁾

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Deutsches Institut für Wirtschaftsforschung

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**Intergenerational Correlations in Labor Market Status:
A Comparison of the United States and Germany**

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Abstract

This paper uses data from the Panel Study of Income Dynamics and the German Socio-economic Panel to calculate comparable measures of the intergenerational correlations of earnings, hours, and education in the United States and Germany. Our results indicate that there is remarkable similarity across the two countries in the correlations of earnings and of annual work hours of fathers and sons. All of the correlations which involve women appear to weaker in Germany than the United States, perhaps due to the greater integration of women in the United States into the labor market. We find weak correlations in earnings and work hours for parent-child pairs of different sexes in both countries. We also find intergenerational correlations in educational attainment are considerably stronger in the U.S.

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Although a large literature has developed in the past decade concerning the correlation of economic status across generations (Behrman and Taubman (1985), Becker and Tomes (1986), Peters (1992), Altonji and Dunn (1991), Solon (1992), and Zimmerman (1992)), almost no research has been conducted to investigate whether such correlations are of similar magnitudes in different countries. The papers which have looked at intergenerational correlations in countries other than the U.S. have focused on one country.¹ This paper offers a direct comparison across two major industrialized countries using the same estimation technique on similar samples drawn from panel data sets covering the same multi-year time period.

The two countries chosen for this analysis, the United States and Germany, are similar in that they are advanced western industrial economies and thus face many of the same problems as any other advanced society: educational provision, unemployment, poverty, etc. But there are substantial differences between the countries in their responses to these common problems, many of which are manifested in their labor market institutions and public policies. Around these differences, a number of popular stereotypes concerning the social organization and life opportunities in the two countries have developed.

Higher education, for example, is often thought of as being more meritocratic in Germany since it is provided at government expense to those students who are admitted, while American college students and their families are largely responsible for financing their educations. The German educational system is also characterized by a more formal

¹ Björklund and Jäntti (1993) is the only one of which we are aware. They use a methodology similar to ours to compare the intergenerational earnings correlation of fathers and sons in the U.S. and Sweden. Their results are summarized below.

and co-ordinated system of vocational tracking, job training and credentialization than the American system. A popular perception, at least from the American point of view, is that any increases in meritocracy that come from greater government involvement in Germany are paid for with a sacrifice of individual choice. The opportunity for individual risk-bearing in educational choices does not appear to be as feasible in Germany as it is in the U.S.

Similar themes appear in other areas where the two nations face common policy issues. In labor contract negotiations, health care, and social insurance, a common perception is that Germany (and other European countries to an even greater extent) as a society is willing to sacrifice more individual income and autonomy for collective goods. One measure of the sacrifices they are willing to bear comes from relative tax burdens, which are perceived as much higher in Germany. An example of the collective gains from these sacrifices is highlighted in recent research which finds that Germany enjoys a lower poverty rate, a more equal distribution of income, and a lesser degree of "permanent" inequality than U.S.² Abraham and Houseman (1993) provide a detailed comparison of labor adjustment practices in the U.S. and Germany. They conclude that German labor market policies and institutions, which discourage layoffs and plant closings and encourage work sharing and job re-training, afford German workers more employment stability.

² Burkhauser, Smeeding and Merz (1994) find that the U.S. has substantially higher earnings and income inequality and poverty than Germany. Burkhauser and Poupore (1993) use longitudinal data to show that the greater inequality in the U.S. is not due to a greater degree of transitory variation in income in the U.S. but rather to greater inequality in the permanent component of income.

When taken together, however, many of these policies and institutions offset each other in their predicted influence on the comparative degree of *intergenerational* mobility in the two countries. Greater meritocracy in the educational system would tend to lower intergenerational correlations in earnings (as long as the genetic component of ability is less important than the ability to finance higher education), but formal hierarchies based on seniority which often result from collective bargaining would tend to raise correlations in earnings since they would tend to make the experiences of parents and children more similar. Thus, despite popular perceptions of the social organization of the two countries, it is in fact difficult to predict *a priori* the relative strength of the intergenerational correlation in earnings across the U.S. and Germany.³

This paper compares the degree of intergenerational mobility in the U.S. and Germany. That is, we wish to determine to what extent an individual's location in the income distribution is determined by his or her parents' income. Given differences in the two countries' educational systems, labor market and social institutions and policies, we expect to find differences in the influence of parents' income. We estimate the intergenerational correlations using methods that are now well-established, which we describe in the next section. Then, we describe the data sets and the samples drawn from them for the estimations. Finally, we present the estimates of the intergenerational correlations in annual earnings, annual work hours, and educational attainment for parent-child pairs from both countries.

³ Obviously, Germans' opinions of the consequences of policies and institutions in the two countries would lead them to expect differences in mobility for other reasons.

II. Estimation Methods

There are several popular methods of estimating the intergenerational correlation of earnings (see Altonji and Dunn (1991), Solon (1992), and Zimmerman (1992)). These methods each yield estimated correlations of similar magnitude when using panel data and similar sample selection rules. In this paper we use the estimation strategy developed by Solon. Our interest is in determining the extent to which the labor market outcome of a child is correlated with the same characteristic of his or her parent. The analytical problem falls into the class of problems associated with errors in variables.

The case of annual earnings will be used to describe the structure of the estimation technique, which is also applied to annual hours of work and educational attainment. A transmission mechanism is assumed that relates earnings abilities across a parent and child. Let Y_{1i} represent the earnings capacity of a child in generation 1 from family i . It is related to the earnings capacity of the parent, Y_{0i} , according to

$$Y_{1i} = \rho Y_{0i} + \varepsilon_i \tag{1}$$

where ε_i is random measurement error.

Earnings capacities are unobserved. Equations are specified which relate these unobserved capacities to observed earnings. Observed earnings, in their natural logarithm, are specified in terms of latent, long-run earnings capacity:

$$Y_{1it} = Y_{1i} + \upsilon_{1it} \tag{2}$$

Y_{1it} is observed earnings for members of generation 1, the children, from family i in period t , and v_{1it} represents a random, i.i.d. error term. The earnings of the parents are similarly specified as

$$Y_{0it} = Y_{0i} + v_{0it} \quad (3)$$

Solving these two expressions in terms of unobserved earnings and substituting yields an estimable equation of the form:

$$Y_{1it} = Y_{1i} + \rho Y_{0it} + v_{1it} + \varepsilon_i + \rho v_{0it} \quad (4)$$

Since earnings of generation 0 are definitionally related to the error term, the estimate of ρ is biased. In particular, when the standard errors of observed earnings for the parents and children differ ($\sigma_0 \neq \sigma_1$), then

$$plim \hat{\rho} = \rho \frac{\sigma_1}{\sigma_0} \quad (5)$$

In the case of earnings, one would theoretically want to align the age-earnings profiles of the generations, so we include regressors for age and age-squared in our estimations. In addition, we argue that due to the volatility of observed earnings, better measures of earnings capacity can be obtained by taking averages over many years of panel data rather than using cross-sectional measures. This averaging yields a less biased measure of ρ by

reducing the effect of measurement error in the bias term.⁴ Practically, this simply implies that averaged variables over a number of years should be inserted into the equations described in the place of the cross-sectional measures. Once the estimate of ρ is obtained, it is scaled by the ratio of the standard errors of observed earnings of fathers and of sons to obtain the partial correlation coefficient. This method is used to obtain all estimates in this paper.

III. Data

The data used in this paper are drawn from two panel data sets. The data for Germany are drawn from the yearly surveys of the German Socio-Economic Panel (GSOEP). The GSOEP began by surveying all individuals in selected households in 1984. Individuals who left the original households were followed to their new locations and retained in the sample. Thus, it is possible to match children with their parents and follow them over time. The sample is nationally representative of households and individuals in all of Germany in all years of the panel, not accounting for immigration. Former East Germans were included in the GSOEP sampling frame beginning in 1990. We use data only for individuals from the former West Germany in this study. The main reason is that the former GDR was a completely different society, not at all a modern industrial society comparable to the U.S. For a fuller discussion of the GSOEP data see Wagner, Burkhauser and Behringer (1993).

The data for the United States come from the Panel Study of Income Dynamics (PSID), a yearly household survey begun in 1968. The PSID is similar in structure to the

⁴ See Solon (1989).

GSOEP in the way individuals and households are followed and in the type of information that is collected. In any year of the PSID, the sample is nationally representative of all households and individuals in the U.S., not accounting for immigration. Hill (1992) provides a detailed discussion of the PSID.

We use the family identifiers and relationship codes to match family members within each data set. We use data only from 1984 to 1989, and exclude earnings and hours observations during any year in which the child was enrolled in school or the parent was enrolled in school or retired. In calculating averages of earnings across years, we include as many years of valid data as were available for each individual. This method has the advantage of not requiring a valid report in each of the six years in order to contribute information to the estimates, and thus increases our sample sizes. A potential problem is created by this method in that averaging over different numbers of years may introduce heteroskedasticity. The problem arises from the fact that the degree of measurement error for each individual is inversely related to the number of years of observations entering his average calculation. We tested for heteroskedasticity and found that it is not a problem in any of our specifications.⁵

Annual labor earnings were constructed for the GSOEP members by combining monthly earnings and weeks worked per year.⁶ For our American sample, we use the annual work hours report in the PSID individual data file in only those cases where no

⁵ We used White's "general test" for heteroskedasticity (Greene (1993), pp. 392-93).

⁶ Daly and Butrica (1994) provide the algorithms for constructing annual labor earnings and annual work hours.

major imputations were made and where the only source of taxable income reported was labor income. All earnings figures were converted to 1984 units using price indices. To retain comparability to the majority of results in this literature, only observations of earnings of at least \$100 dollars or 160 DM per year are used in the calculations.⁷ We work with the *log* of earnings to reduce the influence of outlying observations and to correct for the non-normality of the earnings distribution.

Annual labor hours were calculated for the GSOEP from monthly calendar information.⁸ For the PSID, annual labor hours were reported in the individual's data record. Again, observations that represent major imputations were excluded. Individuals are assigned zero hours in years in which they did not work (and were not in school or retired) and these zeroes are included in our averages.

We used the highest number of completed years of education reported in the interval from 1984 through 1989 as our education measure.

One concern is that since the PSID started much earlier than the GSOEP, our American sample would be much more mature than the German sample. Table 1, which gives summary statistics for the variables used in this paper, shows this not to be the case.

⁷ As documented in Couch and Lillard (1994), the magnitude of the correlations are sensitive to whether one includes or excludes earnings reports of less than \$100. They find that screening out low reports increases the estimated correlation substantially. They also find that using logs, rather than levels, tends to raise the correlation. We follow the practices in previous papers by screening low earnings reports in both samples. The point we make here is that in similarly constructed samples, the estimated correlations are similar for father-son pairs across the two countries, whether or not we screen out the low earnings reports.

⁸ Annual work hours in year t are calculated as the "number of months worked last year" answered in year $t+1$ (in the calendar file) multiplied by "average hours worked per month this year" answered in year t (in the personal file).

The PSID sons and daughters are about two years older than their GSOEP counterparts: the mean age of sons and daughters is 24.9 and 25.2 in the PSID and 22.8 and 22.1 in the GSOEP. Nor are the parents' ages very different. Fathers' mean age in the PSID is 52.6 compared to 51.0 in the GSOEP. Mothers' ages are even closer, 50.5 in the PSID and 50.0 in the GSOEP.

IV. Estimates

In Tables 2 through 8 we present our main set of regression estimates and correlation coefficients. Tables 2 through 5 show earnings correlations for each parent-child pair and Tables 6 through 9 show the corresponding annual hours correlations. In each table, we report the regression coefficient (ρ) and its standard error, the sample standard deviations of the child's variable and the parent's variable (σ_0, σ_1), and the correlation coefficient, $r = \rho(\sigma_0/\sigma_1)$. The child's variable is the average over the six survey years of the child's reports. The parent's outcome is variously defined as an average calculated over one year, two years, and so on, up to six years of the parent's reports.⁹

A. Earnings Correlations

The results in Table 2 for father-son pairs are in some senses remarkable. Generally, estimates based on averages of many years of data are preferred over those in a cross section because of the higher informational content due to the reduction of the effects

⁹ In all tables, the general pattern is that the range of estimated coefficients is larger when using the parent's averages based on fewer observations, confirming the belief that the effects of transitory error in the earnings or hours reports is reduced when more years of observations are averaged. For example, in the top panel of Table 2, the estimates when the single year report of father's earnings is used range from -.007 to .263, whereas the range narrows to .116 to .258 when the two-year average of father's earnings is used.

of transitory variation in the measured variable. Looking at the estimates for the six-year average of earnings for fathers and sons, the estimated correlation in Germany is .121 and in the U.S. is .168. Clearly, the correlations are of a similar order of magnitude, which might surprise those who assume that the U.S. is characterized by a much larger degree of income mobility.¹⁰

Similarly, looking at the individual elements of the two panels, neither country is clearly characterized by a stronger correlation in earnings across generations. Of the 21 estimates of the intergenerational correlation of earnings in Table 2, the correlation is larger in the United States for 10, or approximately half of the estimates. The average of all the estimated correlations in the table for both the U.S. and Germany is identical, .163.¹¹

Table 3 contains earnings correlation estimates for mothers and daughters. Again, looking at the estimates for the six-year average of the mothers' earnings, the estimated correlation, r , for the United States is .137 and for Germany is an insignificant $-.069$. This

¹⁰ Note that the correlations are similar despite the substantially larger standard deviations of both fathers' and sons' earnings in the U.S. compared to Germany, and despite the fact that the *difference* between the standard deviations of fathers and sons is much larger in the U.S. These results are consistent with Burkhauser, Holtz-Eakin and Rhody (1993) who find that despite greater inequality in individual labor earnings in the U.S., mobility in the two countries is very similar.

¹¹ Björklund and Jäntti also use Solon's method to estimate earnings correlations for a sample of matched fathers and sons from the PSID and independent (i.e., unmatched) samples of fathers and sons from the Swedish Level of Living Surveys. Their "corrected" estimated correlations are higher than ours, .210 for Sweden and .278 for the U.S. Part of the explanation for their higher U.S. correlation is that they construct their sample so as to observe the fathers and sons at approximately the same points on the age-earnings profiles. Their fathers are observed when they are only 10 years older on average than the sons, whereas we take earnings observations from the same time period for both fathers and sons and end up with a sample of fathers that are on average more than 20 years older than their sons.

pattern is repeated for all of the estimates in this table. The estimated correlations for the United States are uniformly larger than those in Germany, and none of the estimated correlations for Germany is statistically significant at the 5 percent level. The average over all the estimates in each panel is .128 for the U.S. and -.060 for Germany.¹²

Mother-son earnings correlations are shown in Table 4. Again, the estimated correlations for the U.S. are uniformly larger than those in Germany, and all of the estimates for Germany are statistically insignificant at the 10 percent level. The six-year average correlation for the U.S. is .176 and for Germany is an insignificant .044.

Table 5 presents the estimated earnings correlations for father-daughter pairs in each country. The estimated correlations, on average, across the two countries are similar, .113 for the U.S. and .115 for Germany, while the six-year average results indicate more mobility in the U.S. than in Germany, .108 versus .194. Interestingly, daughters in Germany more closely resemble their fathers in earnings than their mothers, while the opposite is true in the U.S.

To summarize, when children are compared to their fathers in the United States and in Germany, the two societies appear to be characterized by similar degrees of earnings correlations. However, when children's earnings are related to those of their mothers, there appears to be a much weaker association in Germany than in the United States. A weak

¹² Nearly all studies of intergenerational mobility have focussed exclusively on fathers and sons. Altonji and Dunn (1991) is an exception: they estimate correlations in earnings and other labor market outcomes for all parent-child (and sibling) pairs using the four cohorts from the National Longitudinal Surveys. Their estimates are similar to ours for the U.S. They find earnings correlations to be .22 for father-son pairs, .16 for mother-daughter pairs, .14 for mother-son pairs and .21 for father-daughter pairs. Their panels span a 15 year period and so allow more observations to enter the average calculations, tending to raise the correlations.

earnings correlation could arise from a weak wage correlation or a weak work hours correlation, or both. In the next section, we see that the weak earnings correlation between German mothers and daughters is associated with a weak correlation in their work hours.

B. Annual Work Hours Correlations

Tables 6 through 9 contain estimates of the intergenerational correlation in annual hours of work for each of the possible parent-child pairs. Table 6 contains estimates for father-son pairs in the two countries. Again, looking at the estimated correlation in annual work hours using the six-year average of the hours of fathers, the estimated correlations are remarkably similar, .173 for Germany and .193 for the United States. The estimated correlation for the U.S. is greater than the estimate for Germany in 9 of the 21 estimates presented. The average estimate for the U.S. is .159 and for Germany is .170. Neither country has a larger association in hours worked between fathers and sons than the other.¹³

Table 7 contains estimates of the intergenerational correlation in hours worked for mother-daughter pairs. The pattern of estimates is similar to that for the previously presented estimates of their earnings correlations. Looking at the estimate based on a six-year average of the earnings of mothers, the correlation is .142 in the U.S. and -.079 in Germany. The underlying parameter estimates used for the calculation of the correlation coefficient in Germany are uniformly insignificant at the 10 percent level. The average correlation estimated for the U.S. is .126 and for Germany is -.055. This weak correlation of work hours contributes a great deal to understanding the weak earnings correlations seen

¹³ Altonji and Dunn estimate two annual hours correlations for fathers and sons— .10 and .34, depending on the estimation technique— which straddle our estimate. Our mother-daughter correlation (.14) is in the upper range of their estimates of .08 and .15.

earlier. For American daughters, a large part of the earnings correlation can be attributed to a stronger similarity in work hours.¹⁴

Correlations in hours worked for mother-son pairs are shown in Table 8. We see a similar pattern to the one in the earnings estimates for different sex pairs. The estimated correlation based on a six-year average of the mothers' earnings is .099 in the PSID sample and -.007 in the GSOEP sample. Again, in the German sample, all of the underlying parameter estimates from which the correlation coefficient is calculated are statistically insignificant at the 10 percent level. Sons resemble their mothers in hours worked more closely in the U.S. than in Germany, although both countries exhibit considerable mobility.

Finally, Table 9 presents our estimates of the intergenerational correlation of annual hours worked for father-daughter pairs. The pattern observed here is similar to that for earnings. Namely, fathers and daughters in the U.S. and Germany have the same hours correlations, and daughters in Germany resemble their fathers more than their mothers in their hours of work. The correlation estimated using a six-year average of the fathers' earnings is .109 in Germany and .096 in the United States. The average estimate for the U.S. samples is .059 and in Germany, .055.

C. Education Correlations

Table 1 shows the average educational attainment for our sample members. American sons and daughters have 13.1 and 12.9 years of schooling on average, compared to 11.4 and 11.3 for fathers and mothers, respectively. German sons and daughters have

¹⁴ Altonji and Dunn (1994) find strong family similarities in work hours that run along gender lines and that these are due primarily to similarities in work preferences rather than to labor supply responses to similarities in wages.

about the same levels of education, 11.2 and 11.3, while mothers have about a year less education (10.4) than fathers (11.2).¹⁵ We also calculated, for each child-parent pair, the difference between the child's education and the parent's. The mean of these differences appear in the top panel of Table 10. The pattern is not very different from the differences in the group means shown in Table 1. American sons and daughters have more years of education than either parent, while German children have about the same education as their fathers and about a year more than their mothers.

Table 10 also presents a single estimate of the intergenerational correlation in years of educational attainment for each of the possible parent child pairs in the PSID and GSOEP.¹⁶ For all of the pairs, the estimated correlation for the U.S. exceeds that for Germany. Correlations in the U.S. for any of the parent-child pairs are greater than .400, while the strongest correlation in the German sample is .391 for mothers and daughters.¹⁷ Furthermore, German childrens' educations have very weak correlations with their mothers', whereas in the U.S. the correlations are of the same magnitude as the correlations with fathers' education.

¹⁵ We make no argument here that *years* of education are exactly comparable measures across countries or across time in a particular country. Rather, we focus on the correlation across generations in each country, realizing that there are differences in the returns to education and quality of education over time and across countries.

¹⁶ Obtaining "years of education" for Germans requires a complex conversion from the educational degree received. Couch (1994) provides an algorithm for converting German educational *certificates* into U.S. equivalents. A similar algorithm for *years of education* was developed by Couch for distribution with the GSOEP data set.

¹⁷ The U.S. education correlations are in line with those computed by Altonji and Dunn (1995) for the NLS (and the PSID): .46 (.46) for fathers and sons, .43 (.48) for mothers and sons, .40 (.35) for fathers and daughters, .41 (.33) for mothers and daughters. We are unaware of any other existing estimates for Germany.

The strongest education correlation in the GSOEP is for daughter-mother pairs. Oddly, this is the set of parent-child pairs with the weakest earnings correlations and hours correlations. These results are difficult to fit into a standard human capital model. Given the tremendously important role that education plays in determining wages and earnings, one would expect to see strong earnings correlations when educations are strongly correlated. However, the low correlation in work hours across generations of women in Germany may simply speak to generational differences in their integration into the labor force or differences between the two countries in the perceived value of education, beyond its expected labor market return.

This stronger correlation across generations in educational attainment in the United States is consistent with differences in the formal educational system in the two countries. In Germany, access to higher levels of schooling is determined through a series of competitive examinations. With a high enough score for admission, tuition is guaranteed and grants for living expenses are available to children from low-income families. In the United States, admission to higher education is arguably as great a function of capital access as it is of ability.

V. Conclusion

Our estimates of intergenerational correlations in variables that are characteristic and predictive of labor market status demonstrate how outcomes may be similar across dissimilar countries. Some of the estimates presented are remarkable in the sense that, across the two countries, they are virtually identical.

In particular, the estimated correlations in annual work hours and earnings for father-son pairs and father-daughter pairs are almost identical in Germany and the United States. In part, this speaks to traditionally high rates of labor force participation by males of all ages in both countries. The resemblance of daughters to their fathers and not their mothers in Germany, however, speaks to a more recent increase in female labor force participation and work hours in that country. Because rates of labor force participation among women have been higher relative to Germany for a longer period of time in the United States, daughters more closely resemble their mothers in the United States in earnings and hours worked than in Germany. The same pattern appears in the estimates for mother-son pairs in the two countries. This suggests that young workers in the United States share more of the same labor market experiences with their parents of either gender than similar persons in Germany.

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Table 1: Summary Statistics for PSID and SOEP Samples

	mean (std dev)			
	PSID		SOEP	
	<u>Fathers</u>	<u>Mothers</u>	<u>Fathers</u>	<u>Mothers</u>
Age in 1984	52.6 (6.9)	50.5 (7.3)	51.0 (6.1)	50.0 (6.8)
Education	11.4 (3.5)	11.3 (2.5)	11.2 (2.0)	10.4 (1.8)
Log Earnings				
1984	9.46 (0.93)	8.75 (1.10)	10.54 (0.45)	9.64 (0.81)
1985	9.61 (0.84)	8.77 (1.05)	10.56 (0.35)	9.58 (0.84)
1986	9.53 (0.86)	8.86 (1.05)	10.48 (0.56)	9.52 (0.92)
1987	9.45 (1.10)	9.01 (0.88)	10.56 (0.45)	9.51 (0.84)
1988	9.62 (0.86)	8.93 (1.05)	10.56 (0.52)	9.65 (0.87)
1989	9.65 (0.80)	8.92 (0.98)	10.57 (0.50)	9.44 (1.04)
Log Avg Earnings 84-89	9.42 (1.11)	8.47 (1.37)	10.39 (0.69)	9.17 (1.12)
Annual Hours				
1984	1622 (1026)	909 (933)	2118 (687)	1297 (1218)
1985	1675 (1082)	943 (918)	2157 (659)	1159 (1127)
1986	1608 (1034)	897 (929)	2096 (682)	1063 (1182)
1987	1630 (1044)	888 (929)	2191 (412)	1114 (1213)
1988	1602 (1085)	925 (986)	2065 (581)	1100 (1267)
1989	1549 (1085)	908 (988)	2142 (485)	1003 (1121)
Avg Annual Hours 84-89	1588 (937)	940 (843)	2112 (561)	1112 (1086)
	<u>Sons</u>	<u>Daughters</u>	<u>Sons</u>	<u>Daughters</u>
Age in 1984	24.9 (4.7)	25.2 (5.2)	22.8 (3.5)	22.1 (4.3)
Education	13.1 (2.3)	12.9 (2.2)	11.2 (1.7)	11.3 (2.2)
Log Avg Earnings 84-89	9.41 (0.84)	8.67 (1.18)	10.16 (0.64)	9.70 (0.75)
Avg Annual Hours 84-89	1941 (690)	1318 (765)	1951 (613)	1594 (702)

TABLE 4 Sons & Mothers Earnings Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.096 (.034) .126 (1.08, .82) 476	.101 (.030) .139 (1.13, .82) 522	.102 (.028) .149 (1.21, .83) 542	.102 (.029) .138 (1.21, .83) 534	.121 (.029) .177 (1.23, .84) 526	.115 (.028) .176 (1.30, .85) 521
	1985	.139 (.037) .176 (1.05, .83) 446	.144 (.029) .208 (1.20, .83) 502	.145 (.032) .199 (1.14, .83) 495	.148 (.031) .205 (1.18, .85) 490	.143 (.030) .208 (1.25, .86) 487	
	1986	.134 (.036) .174 (1.09, .84) 412	.129 (.035) .169 (1.10, .84) 450	.143 (.034) .192 (1.13, .84) 439	.138 (.033) .192 (1.18, .85) 438		
	1987	.171 (.043) .193 (.95, .84) 372	.163 (.035) .216 (1.10, .83) 408	.132 (.032) .189 (1.20, .84) 433			
	1988	.136 (.043) .163 (.98, .82) 345	.115 (.037) .157 (1.15, .84) 369				
	1989	.105 (.042) .136 (1.09, .84) 326					
ρ (s.e.) r (σ_1, σ_0) N							
SOEP	1984	.077 (.065) .085 (.84, .76) 174	.041 (.049) .057 (1.02, .74) 193	.043 (.046) .062 (1.06, .72) 201	.046 (.042) .073 (1.15, .72) 202	.026 (.039) .045 (1.25, .72) 207	.025 (.038) .044 (1.27, .72) 211
	1985	.021 (.058) .030 (.87, .60) 138	-.006 (.049) -.010 (.94, .58) 153	-.008 (.039) -.016 (1.15, .58) 156	-.003 (.039) -.006 (1.15, .57) 159	.005 (.038) .010 (1.16, .57) 164	
	1986	.020 (.045) .039 (.88, .45) 125	.009 (.041) .018 (.96, .47) 130	-.018 (.036) -.041 (1.07, .47) 134	-.021 (.034) -.056 (1.12, .47) 140		
	1987	.016 (.048) .031 (.95, .49) 110	-.034 (.047) -.067 (.94, .48) 114	-.036 (.039) -.078 (1.06, .49) 121			
	1988	-.123 (.049) -.238 (.91, .47) 99	-.089 (.040) -.207 (1.07, .46) 108				
	1989	-.069 (.054) -.138 (.98, .49) 84					

TABLE 3 : Daughters & Mothers Earnings Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.133 (.045) .122 (1.10, 1.20) 604	.106 (.043) .098 (1.09, 1.18) 644	.104 (.039) .105 (1.19, 1.18) 666	.106 (.038) .110 (1.22, 1.18) 659	.121 (.035) .134 (1.31, 1.18) 661	.119 (.034) .137 (1.37, 1.19) 656
	1985	.116 (.049) .102 (1.05, 1.19) 556	.109 (.039) .113 (1.22, 1.18) 614	.109 (.041) .111 (1.20, 1.18) 602	.093 (.036) .106 (1.33, 1.17) 613	.109 (.036) .126 (1.36, 1.18) 603	
	1986	.117 (.049) .106 (1.05, 1.16) 513	.181 (.049) .162 (1.05, 1.17) 532	.135 (.041) .140 (1.20, 1.16) 543	.129 (.039) .138 (1.24, 1.16) 543		
	1987	.202 (.061) .153 (.88, 1.16) 445	.128 (.043) .131 (1.18, 1.15) 491	.123 (.041) .133 (1.24, 1.15) 518			
	1988	.122 (.053) .112 (1.05, 1.14) 416	.164 (.044) .171 (1.20, 1.15) 460				
	1989	.219 (.058) .187 (.98, 1.15) 401					
ρ (s.e.) r (σ_1, σ_2) N							
SOEP	1984	-.133 (.089) -.152 (.81, .73) 102	-.074 (.078) -.090 (.89, .73) 111	-.083 (.069) -.111 (.98, .73) 115	-.073 (.063) -.104 (1.03, .72) 122	-.076 (.058) -.113 (1.07, .72) 129	-.046 (.058) -.069 (1.12, .75) 134
	1985	-.061 (.090) -.075 (.84, .68) 83	-.043 (.075) -.062 (.96, .67) 89	-.043 (.062) -.066 (1.02, .66) 103	-.030 (.061) -.048 (1.05, .66) 103	.0001 (.059) .0002 (1.15, .71) 110	
	1986	-.105 (.093) -.146 (.92, .66) 69	-.113 (.089) -.155 (.88, .64) 78	-.080 (.076) -.120 (.96, .64) 85	-.026 (.067) -.042 (1.11, .69) 93		
	1987	-.050 (.082) -.079 (.84, .53) 65	.003 (.067) .006 (.99, .54) 74	.022 (.063) .039 (1.13, .63) 82			
	1988	-.006 (.065) -.012 (.87, .42) 60	.061 (.074) .102 (1.04, .62) 69				
	1989	.017 (.087) .027 (1.04, .65) 56					

TABLE 4 Sons & Mothers Earnings Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.096 (.034) .126 (1.08, .82) 476	.101 (.030) .139 (1.13, .82) 522	.102 (.028) .149 (1.21, .83) 542	.102 (.029) .138 (1.21, .83) 534	.121 (.029) .177 (1.23, .84) 526	.115 (.028) .176 (1.30, .85) 521
	1985	.139 (.037) .176 (1.05, .83) 446	.144 (.029) .208 (1.20, .83) 502	.145 (.032) .199 (1.14, .83) 495	.148 (.031) .205 (1.18, .85) 490	.143 (.030) .208 (1.25, .86) 487	
	1986	.134 (.036) .174 (1.09, .84) 412	.129 (.035) .169 (1.10, .84) 450	.143 (.034) .192 (1.13, .84) 439	.138 (.033) .192 (1.18, .85) 438		
	1987	.171 (.043) .193 (.95, .84) 372	.163 (.035) .216 (1.10, .83) 408	.132 (.032) .189 (1.20, .84) 433			
	1988	.136 (.043) .163 (.98, .82) 345	.115 (.037) .157 (1.15, .84) 369				
	1989	.105 (.042) .136 (1.09, .84) 326					
ρ (s.e.) r (σ_1, σ_0) N							
SOEP	1984	.077 (.065) .085 (.84, .76) 174	.041 (.049) .057 (1.02, .74) 193	.043 (.046) .062 (1.06, .72) 201	.046 (.042) .073 (1.15, .72) 202	.026 (.039) .045 (1.25, .72) 207	.025 (.038) .044 (1.27, .72) 211
	1985	.021 (.058) .030 (.87, .60) 138	-.006 (.049) -.010 (.94, .58) 153	-.008 (.039) -.016 (1.15, .58) 156	-.003 (.039) -.006 (1.15, .57) 159	.005 (.038) .010 (1.16, .57) 164	
	1986	.020 (.045) .039 (.88, .45) 125	.009 (.041) .018 (.96, .47) 130	-.018 (.036) -.041 (1.07, .47) 134	-.021 (.034) -.056 (1.12, .47) 140		
	1987	.016 (.048) .031 (.95, .49) 110	-.034 (.047) -.067 (.94, .48) 114	-.036 (.039) -.078 (1.06, .49) 121			
	1988	-.123 (.049) -.238 (.91, .47) 99	-.089 (.040) -.207 (1.07, .46) 108				
	1989	-.069 (.054) -.138 (.98, .49) 84					

TABLE 5: Daughters & Fathers Earnings Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.157 (.065) .132 (.99, 1.18) 332	.087 (.053) .082 (1.09, 1.15) 407	.072 (.051) .070 (1.12, 1.15) 428	.090 (.053) .083 (1.07, 1.16) 418	.092 (.052) .087 (1.10, 1.16) 417	.112 (.052) .108 (1.14, 1.18) 403
	1985	.146 (.069) .115 (.92, 1.17) 334	.112 (.063) .090 (.94, 1.17) 381	.120 (.059) .101 (.98, 1.16) 386	.145 (.061) .120 (.97, 1.17) 386	.153 (.057) .136 (1.05, 1.18) 379	
	1986	.054 (.083) .040 (.87, 1.16) 269	.136 (.057) .136 (1.16, 1.16) 351	.113 (.062) .101 (1.03, 1.15) 329	.140 (.059) .130 (1.07, 1.15) 329		
	1987	.135 (.075) .115 (.98, 1.15) 237	.108 (.069) .095 (.99, 1.13) 265	.158 (.056) .186 (1.33, 1.13) 332			
	1988	.188 (.102) .124 (.76, 1.15) 216	.194 (.081) .155 (.91, 1.14) 251				
	1989	.189 (.087) .172 (1.03, 1.13) 190					
ρ (s.e.) r (σ_1, σ_0) N							
SOEP	1984	.269 (.116) .166 (.45, .73) 175	.346 (.117) .210 (.45, .74) 173	.239 (.111) .155 (.48, .74) 171	.241 (.106) .191 (.58, .73) 173	.206 (.094) .181 (.64, .73) 172	.199 (.089) .194 (.71, .73) 171
	1985	.167 (.157) .089 (.38, .71) 136	.071 (.132) .047 (.46, .70) 137	.128 (.120) .101 (.55, .70) 139	.113 (.118) .095 (.59, .70) 137	.119 (.112) .114 (.67, .70) 136	
	1986	.046 (.141) .031 (.47, .69) 116	.030 (.119) .023 (.54, .69) 122	.067 (.105) .063 (.61, .69) 121	.072 (.099) .068 (.65, .69) 119		
	1987	.034 (.103) .033 (.56, .58) 103	.095 (.089) .106 (.65, .58) 105	.109 (.085) .133 (.71, .58) 103			
	1988	.102 (.131) .089 (.53, .61) 87	.181 (.138) .154 (.52, .61) 85				
	1989	.188 (.144) .173 (.58, .63) 74					

TABLE 6: Sons & Fathers Hours Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.103 (.022) .153 (1026, 692) 1016	.111 (.022) .161 (1005, 694) 984	.107 (.023) .152 (964, 678) 954	.115 (.024) .163 (951, 673) 922	.129 (.025) .174 (924, 684) 887	.142 (.026) .193 (937, 690) 873
	1985	.093 (.021) .146 (1082, 690) 957	.091 (.023) .134 (995, 674) 912	.101 (.024) .147 (973, 668) 881	.114 (.025) .158 (943, 680) 846	.131 (.026) .183 (961, 689) 840	
	1986	.085 (.023) .134 (1034, 658) 877	.101 (.029) .154 (993, 651) 842	.108 (.025) .156 (961, 665) 812	.125 (.026) .181 (977, 675) 806		
	1987	.100 (.023) .160 (1043, 645) 820	.099 (.024) .150 (1000, 658) 783	.114 (.025) .172 (1007, 668) 777			
	1988	.080 (.024) .131 (1085, 665) 757	.107 (.025) .168 (1049, 670) 741				<div style="border: 1px solid black; padding: 5px; text-align: center;"> ρ (s.e.) r (σ_1, σ_0) N </div>
	1989	.101 (.024) .164 (1085, 670) 721					
SOEP	1984	.148 (.055) .175 (687, 581) 237	.225 (.059) .237 (631, 598) 249	.193 (.062) .192 (611, 615) 250	.187 (.068) .172 (573, 622) 248	.187 (.069) .171 (562, 613) 246	.189 (.069) .173 (561, 613) 246
	1985	.174 (.064) .189 (659, 607) 206	.272 (.068) .264 (562, 579) 219	.291 (.080) .239 (481, 585) 219	.287 (.081) .235 (469, 572) 218	.293 (.082) .236 (461, 573) 218	
	1986	.166 (.065) .195 (682, 582) 177	.193 (.083) .168 (514, 592) 194	.196 (.085) .165 (486, 578) 193	.208 (.085) .172 (478, 577) 195		
	1987	.111 (.108) .081 (412, 564) 161	.116 (.091) .099 (469, 550) 171	.111 (.086) .097 (479, 547) 176			
	1988	.124 (.072) .146 (580, 492) 144	.102 (.078) .106 (535, 515) 156				
	1989	.065 (.090) .064 (485, 494) 131					

Table 7: Daughters & Mothers Hours Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.116 (.023) .141 (933, 766) 1352	.134 (.025) .153 (875, 765) 1331	.122 (.025) .138 (860, 763) 1329	.126 (.026) .141 (853, 762) 1293	.127 (.027) .141 (848, 762) 1261	.129 (.027) .142 (843, 765) 1219
	1985	.119 (.024) .143 (918, 765) 1299	.103 (.025) .120 (890, 763) 1295	.107 (.025) .123 (879, 762) 1258	.109 (.026) .125 (873, 763) 1226	.115 (.027) .130 (865, 767) 1186	
	1986	.071 (.025) .143 (930, 764) 1257	.086 (.026) .102 (901, 763) 1221	.094 (.026) .110 (890, 763) 1190	.104 (.027) .119 (877, 767) 1150		
	1987	.084 (.025) .102 (929, 765) 1196	.090 (.026) .108 (917, 764) 1162	.102 (.027) .119 (898, 767) 1122			
	1988	.086 (.025) .111 (986, 766) 1137	.103 (.027) .125 (933, 770) 1097				
	1989	.089 (.025) .114 (988, 768) 1075					
ρ (s.e.) r (σ_1, σ_0) N							
SOEP	1984	.006 (.067) .010 (1219, 714) 83	-.037 (.063) -.060 (1140, 698) 100	-.036 (.063) -.056 (1119, 716) 107	-.055 (.060) -.086 (1098, 704) 115	-.050 (.060) -.081 (1103, 682) 110	-.051 (.059) -.079 (1086, 702) 122
	1985	-.084 (.073) -.139 (1127, 679) 76	-.065 (.063) -.110 (1150, 682) 93	-.055 (.060) -.090 (1118, 680) 104	-.050 (.059) -.081 (1103, 682) 110	-.051 (.059) -.082 (1099, 680) 111	
	1986	-.004 (.063) -.008 (1182, 562) 70	-.015 (.059) -.028 (1156, 616) 87	-.044 (.060) -.079 (1153, 643) 95	-.045 (.059) -.080 (1140, 640) 96		
	1987	-.008 (.058) -.017 (1213, 570) 71	-.026 (.057) -.052 (1221, 606) 83	-.017 (.057) -.033 (1201, 609) 86			
	1988	-.002 (.058) -.005 (1267, 552) 63	-.0002 (.083) -.0004 (1121, 619) 52				
	1989	-.0002 (.083) -.0004 (1121, 619) 52					

Table 8: Sons & Mothers Hours Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.036 (.022) .046 (915, 715) 1258	.056 (.024) .068 (869, 717) 1237	.069 (.029) .083 (854, 713) 1221	.078 (.025) .092 (845, 716) 1185	.089 (.025) .105 (842, 714) 1152	.084 (.026) .099 (834, 709) 1122
	1985	.061 (.023) .078 (916, 712) 1215	.079 (.022) .104 (927, 702) 1173	.079 (.025) .097 (871, 712) 1165	.092 (.025) .112 (866, 710) 1132	.087 (.025) .105 (855, 707) 1109	
	1986	.077 (.022) .102 (927, 701) 1175	.095 (.029) .121 (893, 704) 1141	.109 (.029) .137 (885, 703) 1112	.103 (.025) .128 (870, 700) 1089		
	1987	.095 (.023) .130 (936, 700) 1121	.107 (.024) .140 (915, 700) 1089	.098 (.025) .125 (890, 696) 1066			
	1988	.099 (.022) .138 (973, 699) 1066	.089 (.024) .117 (914, 695) 1042				
	1989	.068 (.024) .091 (925, 692) 1016					
ρ (s.e.) r (σ_1, σ_0) N							
SOEP	1984	-.062 (.049) -.112 (1200, 665) 140	-.039 (.047) -.068 (1118, 639) 158	-.028 (.046) -.049 (1096, 628) 166	-.015 (.047) -.025 (1051, 624) 167	-.018 (.046) -.031 (1056, 619) 171	-.004 (.046) -.007 (1056, 625) 174
	1985	-.009 (.050) -.017 (1130, 603) 124	-.006 (.047) -.011 (1107, 596) 142	.014 (.049) .024 (1048, 615) 149	.007 (.049) .012 (1049, 609) 153	.011 (.048) .019 (1042, 606) 155	
	1986	.007 (.049) .014 (1123, 552) 106	.029 (.052) .052 (1051, 588) 123	.017 (.050) .031 (1053, 580) 128	.021 (.049) .038 (1041, 574) 131		
	1987	-.002 (.052) -.004 (1077, 544) 103	-.012 (.048) -.024 (1089, 535) 113	-.006 (.046) -.012 (1078, 526) 118			
	1988	-.029 (.049) -.068 (1173, 500) 89	-.033 (.046) -.075 (1137, 500) 98				
	1989	-.071 (.058) -.142 (1040, 520) 75					

Table 9: Daughters & Fathers Hours Correlations

YEAR	Same Year	2-year Average	3-year Average	4-year Average	5-year Average	6-year Average	
PSID	1984	.079 (.024) .107 (1024, 754) 1095	.066 (.025) .085 (975, 756) 1062	.063 (.026) .080 (959, 757) 1051	.068 (.027) .085 (950, 757) 1015	.071 (.028) .087 (931, 759) 978	.078 (.029) .096 (934, 760) 961
	1985	.025 (.024) .045 (1016, 757) 1035	.030 (.026) .039 (973, 758) 1013	.037 (.027) .047 (956, 758) 979	.038 (.028) .047 (936, 760) 942	.050 (.030) .062 (943, 763) 927	
	1986	.045 (.026) .061 (1013, 752) 973	.047 (.027) .061 (978, 748) 932	.044 (.028) .056 (949, 750) 896	.055 (.029) .070 (953, 753) 881		
	1987	.048 (.026) .067 (1033, 745) 893	.035 (.026) .046 (975, 749) 850	.046 (.029) .059 (971, 752) 835			
	1988	.0004 (.026) .0006 (1052, 747) 823	.021 (.028) .028 (1011, 748) 797				
	1989	.006 (.027) .008 (1053, 746) 775					
					ρ (s.e.) $r(\sigma_1, \sigma_0)$ N		
SOEP	1984	.089 (.076) .094 (708, 673) 153	.129 (.087) .118 (609, 665) 159	.099 (.081) .096 (642, 663) 161	.160 (.091) .140 (580, 663) 160	.134 (.095) .112 (552, 663) 159	.127 (.098) .109 (570, 665) 158
	1985	.094 (.088) .094 (634, 632) 133	.059 (.080) .063 (666, 625) 141	.107 (.094) .098 (569, 624) 140	.051 (.101) .044 (531, 621) 140	.045 (.102) .039 (552, 641) 140	
	1986	.028 (.077) .034 (726, 591) 120	.083 (.089) .086 (605, 585) 122	.023 (.092) .023 (583, 579) 124	.007 (.094) .007 (568, 579) 123		
	1987	.141 (.097) .151 (625, 583) 95	.049 (.091) .054 (612, 559) 107	.018 (.083) .021 (650, 555) 108			
	1988	-.087 (.112) -.082 (547, 581) 98	-.045 (.089) -.051 (648, 573) 101				
	1989	-.077 (.101) -.088 (658, 579) 80					

Table 10

Mean Differences in Education
(Standard Deviation)

	Son-Father	Son-Mother	Daughter-Father	Daughter-Mother
PSID	1.69 (3.30)	1.46 (2.76)	2.01 (3.28)	1.67 (2.68)
SOEP	.005 (2.27)	1.05 (2.60)	.019 (2.91)	.957 (2.80)

Correlation of Education Attainment

ρ (s.e.)
 r (σ_1, σ_0)

	Son-Father	Son-Mother	Daughter-Father	Daughter-Mother
PSID	.273 (.018) .418 (3.46, 2.26)	.368 (.021) .423 (2.68, 2.33)	.255 (.017) .402 (3.39, 2.15)	.317 (.020) .431 (2.53, 2.17)
	1139	1451	1209	1536
SOEP	.197 (.039) .237 (2.03, 1.69)	.111 (.052) .097 (1.48, 1.70)	.025 (.101) .016 (1.42, 2.24)	.482 (.071) .391 (1.78, 2.19)
	384	467	245	270