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The Intergenerational Income Elasticity in the NLSY97 Dataset

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Abstract

This paper estimates the intergenerational income elasticity for four differently related groups. The results are IGE's of 0.1368 between fathers and sons, 0.1734 between fathers and daughters, 0.2076 between mothers and sons and 0.2217 between mothers and daughters. These results are compared to previous studies and found to be significantly lower. Possible explanations are the simple passing of time between studies, the financial recession of 2008, and short-run data availability in the dataset. This study includes many control variables to find explanations of the IGE. The level of schooling is of sole importance and explains up to 49 percent of the IGE for fathers and around 33 percent of the IGE for mothers.

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1. Introduction

To this day, the United States of America attracts immigrants hoping for the "American Dream." Unfortunately, people from poor backgrounds becoming rich through sheer hard work are heard of less and less in recent decades. The question is whether or not the American Dream is still attainable?

Recent research on the intergenerational income elasticity (IGE) supports this skeptical view of a decline in the chances for the American Dream. This commonly used measure of elasticity captures the correlation between the amount of income earned across generations, where the higher the IGE the higher the correlation between two generations' incomes. A higher correlation translates into a lesser likelihood of obtaining the American Dream.

Early studies in the field found the IGE to be below 0.2. Once data availability transitioned to the national surveys still used today, including the Panel Study on Income Dynamics (PSID) and the National Longitudinal Survey of Youth, 1979 (NLSY79), the IGE was found to be between 0.3 to 0.4 by Behrman & Taubman (1985) and Solon (1992). More recent papers by Behrman & Taubman (1990) and Mazumder (2005) found estimates of 0.6, which are a result of refined statistical techniques. Long-run averages are used for parental income and child income, instead of single year data, while still using the same datasets.

This paper uses a newer dataset, the National Longitudinal Survey of Youth, 1997 (NLSY97), to see if these high estimates still hold or continue to follow this rising trend. This paper finds a much smaller IGE in the new NLSY97 dataset. The result is an IGE of 0.14 between fathers and sons. Additional research was performed to estimate other less studied parent-child pairings as well. The results for those are an IGE of 0.17 between fathers and daughters, 0.21 between mothers and sons and 0.22 between mothers and daughters.

How can these results be so much lower than suggested by previous research? The NLSY97 dataset covers a new generation of people than the previous national surveys. Therefore the intergenerational income elasticity could simply be declining over time. Other possible reasons include the recent recession in 2008, which happened right when the children's earnings were measured. During that time high unemployment, especially in young adults, added noise, which could decrease the correlation to the parents. Another reason could be a problem caused by the dataset itself. The NLSY97 does not provide enough information for a long-run average of the parental income, only a single year of data is used, possibly leading to a downward bias of the IGE. Further research is needed to determine the cause of the decline and the role of each of the above mentioned effects in the decline. Whichever effect leads to the decline, it suggests that the American Dream is more likely today than it was only one generation ago.

On top of reevaluating the IGE, this paper also adds control variables to determine the impact of personal differences, household differences, and educational decisions on the IGE. This paper found the level of the child's schooling to be the single most important channel through which parental income affects child's wages, other than the pure income effect itself. Schooling explains 47 percent for sons and 49 percent for daughters of the effect of father's income on the child's earnings. Schooling explains 33 percent of the effect of mother's income on the child's earnings for both sons and daughters. Educational decisions are therefore the most important factor. Personal and household differences are insignificant.

2. Literature Review

A. Past Intergenerational Income Elasticity Research

Research about the IGE has been taken seriously since the late 1970s and early 1980s, however, many factors in the research have changed over time, as have the results of the IGE. There is a clear time trend visible in the IGE where the more recent studies result in a higher IGE. The most recent studies find results of up to 0.6 for the IGE, which means that if a family were "75% below the national average

[…][it] will take the descendants of the family 5 to 6 generations (125 to 150 years) before their income would be within 5% of the national average" (Mazumder, 2005, p. 235).

The early studies in this field found an IGE of 0.2 or less (Behrman & Taubman, 1985; Hauser & Sewell, 1975). Solon (1992) shows the problems these early studies faced. They had a very strong downward bias from measurement error and homogenous samples (Solon, 1992). Both of these problems were caused by the lack of national datasets. Instead, researchers had to make their own surveys, which were in the researcher's local area and at only one point in time. Measurement error is caused by using short-run earnings or income instead of long-run data, and homogenous samples because of biased local surveys, such as high school seniors in Wisconsin (Hauser & Sewell, 1975).

The first national survey available to researchers was the PSID, which eliminated the homogeneous sample problem. Solon (1992) used this dataset to find the IGE of 348 father-son pairs. Solon tested the measurement error of this new database by running short- as well as long-run data. If a single year of fathers' earnings data is run, the IGE coefficient is on average 0.3, for each individual year regressed on the sons' earnings. If, however, the fathers' earnings are averaged out over five years the IGE coefficient is 0.413. This dataset was very new at the time, and only five years of data were available. Some measurement bias is still suspected because 5 years is not usually considered long-run (Solon, 1992).

Behrman & Taubman (1990) used an even longer time frame in their research. They accessed the Michigan Panel Survey to search for the optimal timeframe and point in time to obtain parental and child income. Behrman & Taubman (1990) ran the entire available time span of ten years of data for both the parental and child income, which resulted in the largest IGE of 0.6. They tried other points in time and time spans, of which only one resulted in the same high IGE of 0.6. Taking data for parental income at the point in time when the child is 15, and regressed on the ten year average of the child's income, led to this high result. The paper argues that at this point in time "important educational decisions were being made for the offspring" (Behrman & Taubman, 1990, p. 125) by the parents. Therefore parental income during this time replaces the long-run average (Behrman & Taubman, 1990).

Both Solon (1992) and Behrman & Taubman (1990) find that long-run averages lead to a stronger and less biased IGE result. Another conclusion emerged from the paper by Behrman & Taubman (1990). Long-run averages for parental income can be replaced by short-run data, if obtained during the child's teenage years. This finding is crucial for the paper at hand, because the NLSY97 dataset is lacking multiple long-run measurements on parental income. The dataset does, however, collect short-run data on parental income when the children are between 12 and 16. These years are exactly the teenage years found to be able to replace long-run data in the previous study (Behrman & Taubman, 1990). Therefore this replacement of long-run data minimizes the measurement bias of this research.

Behrman & Taubman (1990) used a rather uncommon dataset, the Michigan Panel Survey. Mazumder (2005) shows the credibility and accuracy of this IGE result of 0.6. He used the Survey of Income and Program Participation (SIPP) to get the child's earnings and the father's social security numbers. He then retrieved the father's lifetime earnings from the Social Security Administration's database. Mazumder therefore had 15 years of data on parental earnings and 4 years of data on the child's earnings. If the entire dataset is used, Mazumder gets an IGE of 0.613 between fathers and sons and an IGE of 0.570 between fathers and daughters, creating a pooled IGE of 0.6. If, however, fathers' earnings come from the SIPP database, which has only 4 years of data, the IGE is 0.35 for sons and 0.43 for daughters (Mazumder, 2005). Mazumder's paper again demonstrates the importance of long-run data. It also confirms previous results of 0.6 as the IGE. His study reduces the measurement and sample error to the best ability of today's data availability. Therefore no other national study has found a higher IGE since then. Currently 0.6 is the commonly accepted intergenerational income elasticity by researchers for the United States.

B. Background Information about the IGE and Income

Researchers understand income and wealth variables better today than they did in the 1980s, due to studies conducted about the source of income and income's contribution to the IGE. Large national

surveys allow for a further understanding of the social circumstances surrounding the IGE and help determine the most viable measurement of income.

Gale and Scholz (1994) researched the transfer of wealth between two households, excluding after death transfers. By using the Survey of Consumer Finances, they found that about 75 percent of all transfers are from parents to children and 11 percent from grandparents to grandchildren. Especially interesting is the fact that givers and receivers of these transfers are mostly white and have above average levels of education, income, and net worth. (Gale & Scholz, 1994)

Possible conclusions drawn from these facts are that transfers from parents and grandparents commonly help pay for students to attend college. Gale and Scholz (1994) estimated this parental college support to make up 12 percent of an average student's aggregate annual net worth, but only for white students.

The disadvantage of children being born into poor households was specifically researched by Brooks-Gunn, Yeung, Duncan, & Smith (1998). They used the PSID data to determine children's high school completion rate. A $10,000 increase in annual income for poor families is associated with a 15 times higher likelihood of graduating high school, compared to the same income increase for wealthier families. During the first five years of a child's life an income increase of $10,000 will lead to a 2.5 times higher likelihood of graduating high school. Income during adolescence, however, is found to be most important for college attendance. (Brooks-Gunn, et al., 1998)

The most important finding for this paper is the fact that income during adolescence determines college attendance. The level of schooling of the child is an important control variable in this research. In order for this variable to have accurate estimates, parental income has to be measured during the time in which the child is in adolescence. The data used in this paper is collected parental income observations when the child is between 12 and 16 years of age. As college success is closely linked to later income, it makes sense for Behrman & Taubman (1990) to find a particularly strong correlation between short-run parental income and later child income. This paper by Brooks-Gunn et al., (1998) reiterates the legitimacy of the possible replacement of long-run averages for parental income with short-run data during this time period.

The time to capture parental income is not the only concern. Income can also be defined many different ways and include many different sources. Depending on the inclusions or exclusions of different income sources, results for the IGE could vary greatly. Hill and Duncan (1987) tested the likely variability of the results of the IGE.

Hill and Duncan (1987) tested the most common economic and social hypothesis. They estimated the IGE between parental income and children's later earnings and education using the PSID. Hill and Duncan (1987) found no statistical benefit or disadvantage to having a father in the household, as well as receiving income from assets or welfare instead of a job, beyond their added income effect. There is no role model effect found, meaning children aspire to be like their parents financially, that goes beyond the income effect. Mothers working a full time job, as opposed to none, reduce their sons' schooling by half a year and his wages by 14 percent. This negative effect is offset at least partially by the positive effect the additional income provides. The mother's work hours do not seem to affect daughters. (Hill & Duncan, 1987)

This research indicates that as long as income is defined the same way for parental income and the child's later income, no problems will arise from the income measurement. Therefore this research paper only focuses on earnings from wages. Everything else is excluded. The above research also gives some preliminary expectations for control variables this research adds to better understand what influences the IGE, such as the household size.

C. The Correlation between Income and Education

Education and income are closely related. This paper focuses on income, but it cannot isolate the effect of income from education. Education is commonly required to reach a higher level of income and higher

income allows a higher spending on the child's education. Therefore income cannot be researched without considering education.

Attempts have been made to isolate the income effect from education. Mazumder (2008) researched sibling correlation using the NLSY79 dataset. He found a 49 percent correlation between brothers' earnings and a 34 percent correlation between sisters' earnings, due to larger discrepancies in labor force participation between sisters. Concentrating on the earnings correlation for brothers (49%), parental income explains 36 percent of the relationship, and human capital, of which education counts for almost half (44%), explains 51 percent (Mazumder, 2008).Therefore education makes up 22 percent (44% of 51%) of the correlation in brothers' earnings. This is showing that family background does correlate to levels of education.

Min Zhan researched how family background helps the child achieve his or her level of education. He has written many papers on this subject because he perceives education to be the main predictor of "children's future well being" (Zhan, 2005, p. 961).

Zhan (2005) used family assets in his research instead of income because assets bring economic security. Therefore in the long-run these assets increase parental attitudes, parenting practices, and therefore parental expectations toward the child's education. To test this theory, the paper used the NLSY79 database. The results show that assets have twice the effect of income on test scores (Zhan, 2005). The paper at hand will not discuss parenting or parental expectations but will simply use the outcome of it, the level of education. It is, however, important to understand the correlation between education and parental income, as a correlation between education and both parental income and children's earnings is necessary in order to possibly explain the IGE.

Education can help explain the intergenerational elasticity. Unfortunately many papers do not consider education in order to simplify the research (Behrman & Taubman, 1990; Brooks-Gunn et al., 1998; Solon, 1992). This paper shows that including education can help explain up to 49 percent of the IGE.

3. Data Analysis

A. Sample Overview

This paper uses the National Longitudinal Survey of Youth (NLSY97). The NLSY97 is a dataset that began surveying respondents in 1997. Almost 9000 individuals responded to the questionnaire. The survey was specifically designed to represent the nation and the birth cohorts. It is a heterogeneous sample, which minimizes the sampling error in this research. The respondents were between 12 and 16 years of age as of December 31, 1996. On top of questioning the young respondent, one of his or her parents was also questioned in the first year. The respondent continued the survey yearly after that, up to the present day.

The latest year of data available to the public is 2011. In 2011 these children were 26 to 30 years old. That is the ideal age to calculate a comparable IGE, as the adult children in other studies, using other surveys, are also that age.

The parental interview, which was only conducted once in 1997, is the source for many of the variables used in this research. Therefore only one year of data can be used for some variables, including the main explanatory variable, parental income. Despite the shortcoming of only one year of data, parental income is still representative of the population because it is measured at the crucial point in time, when the children are teenagers.

B. Variables

The IGE estimate comes from regressing parental income on child income. These two variables have to be defined the same way in order to get consistent results using the same measurement. According to Hill and Duncan (1987) the particular income sources do not matter. This paper uses only earnings as an

income source. Earnings are easily obtained, and for most people they are the only source of income available.

The earnings for parental income and child income include only full-time earnings. These earnings capture the full potential and effort put into the labor force by the individual. Full-time employment is defined as working 35 or more hours a week by the NLSY97 survey.

This research measures child earnings as an hourly wage rate in dollars. The wage rate comes from the child's main or first job, if there are multiple jobs. Hourly wages allow the incorporation of the amount of hours worked into earnings, leading to the separation of high earnings into high pay versus long hours, capturing the value of the worker to the company. This is common in IGE research as it leads to more precise results in the long-run. Higher paid individuals are likely to increase this trend, while hard workers are limited by the amount of hours during the day. All respondents earning less than minimum hourly wage are dropped from the sample. Then an average hourly wage rate over 5 years is calculated, from 2007 to 2011.

The parental earnings variable comes from the parental interview in 1997. Some updates on these interview questions were attempted through incorporating more survey questions into the main respondents' questionnaire, but these updates are unreliable and answers are scarce. Therefore this research only uses the data provided by the parents themselves. The parent provided his or her own, as well as the spouse's annual income for 1996 separately and pre-tax. The parents reported their income from all jobs including wages, salaries, commissions, and tips. Observations with less than $10,000 of yearly earnings were dropped due to the conflict with minimum wage restrictions.

Table 1: Summary of variables:

Variable	N	Mean	Min	Max	Med	St. Dev.
Child hourly wage 5 year average in $'s	4923	30.37	5.85	30006.88	13.71	607
Father yearly earnings in $'s	2039	37562	10000	174605	30000	29120
Mother yearly earnings in $'s	2082	33259	10000	174605	26000	26857
Experience in years	5972	9.28	1	19	9	3.19
Child schooling in years	5972	13.67	6	20	13	2.89
Mom highest level of schooling in years	5893	12.60	1	20	12	2.90
Dad highest level of schooling in years	5301	12.75	1	20	12	3.19
Two Parent HH	5972	0.66	0	1	1	0.47
Number of Children in HH	5972	2.45	1	12	2	1.26
Black	5972	0.25	0	1	0	0.44
Hispanic	5972	0.20	0	1	0	0.40
Enrolled now	5972	0.13	0	1	0	0.34
Child has limitations	5972	0.10	0	1	0	0.30
Child gender (male)	5972	0.50	0	1	1	0.50
Parental school help in thousands of $'s	2758	10.44	0	650.50	3.80	20.89

Other variables might also be important if they explain part of the IGE. Variables are helping to explain the correlation between parental and child earnings (IGE), if they are correlated to both earnings variables. The first variables added in the model are schooling and experience. Schooling is measured in years of schooling completed by the respondent. Experience is estimated to be the respondent's age minus the years of schooling plus six. Additional variables, as listed in Table 1 include parental schooling, measuring the maximum years of schooling completed by either the father or mother. The number of parents in the household is a dummy variable in the model. There is a big difference between one or two parents in the household in terms of substitutability of parental earnings. Another dummy variable is the number of children in the household determining the number of individuals between whom

parental earnings must be split. Ethnicity of the child is a dummy variable, separated into Black, Hispanic, and all others. The child's current enrollment status in school is a dummy variable, as well. This simply shows whether the individual is currently pursuing further education and is therefore restrained in the amount of time he or she can spend on the job. The last dummy variable captures any kind of disability that hinders the individual at work or school.

The child's schooling is of special interest in this research, as the level of degree obtained so strongly determines the child's later economic success, as researched by Zhan (2005). This paper will therefore take a closer look at the amount of money parents, and rarely other family members pay as a gift to help their children through college. The variable called "school help" captures the direct financial overlap between parental and child earnings. This variable, however, is only estimated in a separate model as its sample size is much smaller than the generally available sample size. A direct comparison with the other models is therefore not possible.

4. Methodology

In order to estimate the intergenerational income elasticity, this paper uses an OLS model. The OLS model estimates the correlation between child earnings and parental earnings, controlling for other variables.

The control variables, listed in Table 1, are denoted by an X in the base model. This paper tries to include the most influential factors to earnings through these variables, as every variable correlated to parental and child earnings that is omitted will cause a bias in the results. While this is statistically advisable, the term IGE applies to the coefficient of parental earnings, even if those statistical precautions are not met. To calculate the IGE, a very simple model only including parental earnings as the independent variable, is sufficient and, in fact, common in the literature. Therefore the main model consists only of parental earnings regressed on child earnings.

Both child and parental earnings are logged to capture the percent difference between them. This approach is also consistent with the definition of the IGE.

The base model:

$$\ln(\text{Child hourly wages}) = \beta_0 + \beta_1 \ln(\text{parental income}) + \beta_2 X + \varepsilon$$

This paper divides the sample into four sub-samples determined by the gender and relationship of the individuals. Creating sub-samples by gender shows differences between genders more clearly than a dummy variable, especially if the gender affects other independent variables. The most commonly researched sub-sample is father's earnings on son's earnings, but in this paper the IGE for daughters and mothers is also estimated. The division into these four sub-samples generates the main models of this paper.

The main models:

$$\ln(\text{son hourly wage}) = \beta_0 + \beta_1 \ln(\text{father's earnings}) + \beta_2 X + \varepsilon \quad (1)$$

$$\ln(\text{daughter hourly wage}) = \beta_0 + \beta_1 \ln(\text{father's earnings}) + \beta_2 X + \varepsilon \quad (2)$$

$$\ln(\text{son hourly wage}) = \beta_0 + \beta_1 \ln(\text{mother's earnings}) + \beta_2 X + \varepsilon \quad (3)$$

$$\ln(\text{daughter hourly wage}) = \beta_0 + \beta_1 \ln(\text{mother's earnings}) + \beta_2 X + \varepsilon \quad (4)$$

To evaluate the importance of education on the IGE further, this paper includes additional education specific models. The data is split into four different sub-samples incorporating the level of education received by the respondents and gender of the parent. The gender of the respondent has to be added as a control variable because further divides of the data are not possible.

The education specific models:

$$\ln(\text{higher education hourly wage}) = \beta_0 + \beta_1 \ln(\text{father's earnings}) + \beta_2 X + \varepsilon \quad (5)$$

$$\ln(\text{high school hourly wage}) = \beta_0 + \beta_1 \ln(\text{father's earnings}) + \beta_2 X + \varepsilon \quad (6)$$

$$\ln(\text{higher education hourly wage}) = \beta_0 + \beta_1 \ln(\text{mother's earnings}) + \beta_2 X + \varepsilon \quad (7)$$

$$\ln(\text{high school hourly wage}) = \beta_0 + \beta_1 \ln(\text{mother's earnings}) + \beta_2 X + \varepsilon \quad (8)$$

5. Results

A. Correlation between Father and Sons' Earnings

Table 2 Y=Logged 5 year average son's hourly wage rate

Lnfather yearly earnings in $'s	0.1368*** (0.0254)	0.0724*** (0.0258)	0.0723*** (0.0251)	0.0748*** (0.0255)	0.0775*** (0.0253)	0.1076*** (0.0346)	0.0818** (0.0356)	0.0691** (0.0349)
Experience in years			0.0698*** (0.0253)	0.0653*** (0.0253)	0.0547** (0.0253)			0.0200 (0.0348)
Experience squared			-0.0014 (0.0012)	-0.0012 (0.0012)	-0.0007 (0.0012)			0.0013 (0.0021)
Level schooling in years		0.0441*** (0.0051)	0.0892*** (0.0113)	0.0882*** (0.0115)	0.0835*** (0.0116)			0.0713*** (0.0162)
Father level of schooling				-0.0029 (0.0055)	-0.0033 (0.0055)			0.0081 (0.0075)
Two parents in HH				0.0751 (0.0524)	0.0575 (0.0527)			0.2324*** (0.0844)
HH number of Children				-0.0110 (0.0112)	-0.0065 (0.0111)			-0.0121 (0.0170)
Black					-0.1393*** (0.0442)			-0.0624 (0.0697)
Hispanic					-0.0034 (0.0386)			-0.0271 (0.0539)
Enrolled now					-0.1323*** (0.0471)			-0.1916*** (0.0630)
Limitations to work/school					-0.1128*** (0.0349)			-0.1458** (0.0626)
School help in thousands of $'s							3.0525** (1.4169)	1.4439 (1.3831)
Rsquared	0.0343	0.1021	0.1217	0.1216	0.1428	0.0195	0.0282	0.1002
N	902	902	902	902	902	495	495	495

Level of significance: *** 99% **95% *90%; LN sons wage rate 5yr average as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

Table 2 shows the results from model 1, the correlation between father and sons' earnings. Most other papers focus on father-son relationships only. Therefore the father-son IGE will be the only result comparable to other research.

The first regression estimates the IGE as 0.1368. This means that a 100 percent increase in fathers' earnings leads to a 13.68 percent increase in sons' hourly wages. This result can be directly compared to the IGE of 0.6 found by Mazumder (2005).

In all other regressions, additional variables are included to understand their contribution to the IGE. The first additional variable is the level of schooling the son has obtained, which is overall significant. The coefficient of fathers' earnings changes to 0.0724. This 47 percent decrease in the coefficient of fathers' earnings is the percentage amount of the IGE that can be explained by the son's schooling. Therefore a 100 percent increase in father's income increases the son's earnings directly by 7.24 percent and another 6.44 percent through the increased schooling the son receives.

All other added variables in the following regressions in Table2 do not significantly change the coefficient of the fathers' earnings variable. This means all other variables do not contribute to the explanation of the IGE.

Experience is lacking any kind of contribution to the IGE. According to Mincer's model, experience is equally as important as schooling to earnings. A closer look at the data reveals a 90 percent correlation between schooling and experience in this sample, making even its significance on sons' earnings unreliable. The high correlation between the variables makes sense for such a young dataset with most respondents below 30 years of age. Experience is kept in the model for its theoretical importance and because it has no influence on the rest of the variables and therefore the model.

The addition of the fathers' level of schooling causes slight changes in the IGE, but that change is not significant statistically or empirically. This variable is already included in the fathers' earnings, and therefore has no effect on the child's wages, explaining its overall insignificance. The previous inclusion also causes the lack of explanation of the IGE, as only variables that affect both fathers' earnings and child wages can explain the IGE.

The household variables have no effect, on the model or the coefficient of fathers' earnings. The low importance of the two-parent household variable corresponds with the research of Hill & Duncan (1987), who found no benefit in multiple parents beyond the added income. The second parent's income is not included in this paper's regression. It is, however, surprising to find the number of children in the household to be insignificant. Mazumder (2008) found that a larger number of children lead to a decrease in the share of income benefiting each individual child. This effect is not found here.

The final added control variables are ethnicity, current school attendance, and disabilities. All of these are significant for the dependent variable and the model but insignificant in explaining the IGE, as they are unrelated to fathers' earnings.

The last three columns in Table 2 show the estimation of the parental school help variable. The regressions have a different sample size due to the low response to the question. Parental school help is the amount of money the respondents received towards their schooling (in thousands of dollars). In the first regression, the IGE is estimated to be 0.1076. The next regression reveals that school help explains 24 percent of the IGE. The level of schooling in the previous analysis explained 47 percent of the IGE. This is a coincidental find that school help has half the explanatory power of the level of schooling, because about half of the parents contribute to their sons schooling in some amount. The correlation between school help and the level of schooling is only 27 percent, which did not forecast this match. The coefficient of school help is also significant in the model, showing that parents supporting their children through college contribute to the child's later economic success. In the third regression all other control variables from Table 1 are added, including the level of schooling, which results in the insignificance of school help.

B. Correlation between all other Main Pairs

In addition to estimating the IGE for fathers and sons, this paper estimates three other IGE's. The earnings correlation for fathers and daughters, mothers and sons and mothers and daughters, are all estimated the exact same way, as the father-son earning's correlation in Table 2. All four pairings result in one IGE each, which can be compared and therefore ensure consistency in the data. It also shows the influence of the different relationships on the IGE.

The results for the IGE are different for every pairing. The IGE is 0.1368 between fathers and sons, 0.1734 between fathers and daughters, 0.2076 between mothers and sons and 0.2217 between mothers and daughters.

Results are presented in Tables 3–5:

Table 3 Y= Logged 5 year average daughter's hourly wage rate

Lnfather yearly income in $'s	0.1734*** (0.0235)	0.0888*** (0.0220)	0.0861*** (0.0216)	0.0781*** (0.0224)	0.0739*** (0.0223)	0.1455*** (0.0280)	0.1166*** (0.0298)	0.0806*** (0.0294)
Experience in years			0.0504** (0.0252)	0.0495* (0.0255)	0.0457* (0.0242)			0.0997*** (0.0337)
Experience squared			-0.0011 (0.0014)	-0.0011 (0.0015)	-0.0011 (0.0014)			-0.0049** (0.0021)
Level schooling in years		0.0706*** (0.0056)	0.1022*** (0.0121)	0.1007*** (0.0123)	0.1017*** (0.0121)			0.0983*** (0.0151)
Father level of schooling				0.0049 (0.0047)	0.0094* (0.0051)			0.0115* (0.0063)
Two parents in HH				0.0043 (0.0522)	0.0137 (0.0532)			-0.0240 (0.0845)
HH number of Children				-0.0011 (0.0120)	0.0054 (0.0116)			0.0141 (0.0145)
Black					-0.0687* (0.0413)			-0.0947* (0.0558)
Hispanic					0.1112*** (0.0406)			0.1210** (0.0520)
Enrolled now					-0.1621*** (0.0317)			-0.1699*** (0.0400)
Limitations to work/school					-0.0758 (0.0581)			-0.1021 (0.0995)
School help in thousands of $'s							3.7161*** (1.1037)	1.1771 (1.0460)
Rsquared	0.0612	0.2253	0.2340	0.2319	0.2629	0.0446	0.0600	0.1892
N	764	764	764	764	764	531	531	531

Level of significance: *** 99% **95% *90%; LN daughters wage rate 5yr average as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

Table 4 Y= Logged 5 year average son's hourly wage rate

Lnmother yearly income in $'s	0.2076*** (0.0324)	0.1395*** (0.0334)	0.1410*** (0.0335)	0.1286*** (0.0347)	0.1152** (0.0346)	0.1775*** (0.0462)	0.1548*** (0.0494)	0.1104** (0.0498)
Experience in years			0.0153 (0.0291)	0.0166 (0.0293)	0.0161 (0.0293)			0.0030 (0.0417)
Experience squared			0.0011 (0.0014)	0.0011 (0.0014)	0.0011 (0.0014)			0.0022 (0.0024)
Level schooling in years		0.0434*** (0.0059)	0.0783*** (0.0120)	0.0763*** (0.0125)	0.0742*** (0.0124)			0.0708*** (0.0188)
Mother level of schooling				0.0079 (0.0071)	0.0112 (0.0074)			0.0120 (0.0113)
Two parents in HH				0.0735* (0.0407)	0.0306 (0.0420)			0.1012 (0.0694)
HH number of Children				0.0028 (0.0142)	0.0071 (0.0140)			0.0109 (0.0208)
Black					-0.1964*** (0.0402)			-0.1388** (0.0556)
Hispanic					-0.0193 (0.0438)			0.0156 (0.0729)
Enrolled now					-0.0689* (0.0552)			-0.0720 (0.0792)
Limitations to work/school					-0.0888** (0.0400)			-0.1184 (0.0844)
School help in thousands of $'s							3.8412** (1.5841)	1.6517 (1.7467)
Rsquared	0.0646	0.1165	0.1254	0.1271	0.1480	0.0450	0.0576	0.0968
N	867	867	867	867	867	447	447	447

Level of significance: *** 99% **95% *90%; LN sons wage rate 5yr average as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

Table 5 Y= Logged 5 year average daughter's hourly wage rate

Lnmother yearly income in $'s	0.2217*** (0.0257)	0.1484*** (0.0238)	0.1410*** (0.0226)	0.1442*** (0.0243)	0.1434*** (0.0239)	0.1920*** (0.0328)	0.1562*** (0.0335)	0.1332*** (0.0313)
Experience in years			0.0412* (0.0231)	0.0421* (0.0233)	0.0308 (0.0230)			0.0696* (0.0394)
Experience squared			0.0003 (0.0012)	0.0003 (0.0012)	0.0007 (0.0012)			-0.0009 (0.0029)
Level schooling in years		0.0671*** (0.0054)	0.1136*** (0.0116)	0.1155*** (0.0122)	0.1135*** (0.0122)			0.1261*** (0.0157)
Mother level of schooling				-0.0025 (0.0053)	0.0015 (0.0056)			-0.0011 (0.0069)
Two parents in HH				0.0039 (0.0337)	-0.0168 (0.0349)			-0.0333 (0.0508)
HH number of Children				0.0100 (0.0120)	0.0103 (0.0115)			0.0441*** (0.0149)
Black					-0.0461 (0.0350)			-0.0018 (0.0478)
Hispanic					0.0918** (0.0407)			0.1299** (0.0531)
Enrolled now					-0.1681*** (0.0305)			-0.1746*** (0.0397)
Limitations to work/school					-0.1193** (0.0552)			-0.1037 (0.0953)
School help in thousands of $'s							5.5635*** (1.1613)	4.5109*** (1.1151)
Rsquared	0.0867	0.2474	0.2662	0.2641	0.2912	0.0648	0.0970	0.2460
N	773	773	773	773	773	489	489	489

Level of significance: *** 99% **95% *90%; LN daughters wage rate 5yr average as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

At first glance the results suggest that children respond more to increases in the mother's income than the father's income, as those coefficients are larger. Further analysis does not support this assessment. After running a linear combination test for the part of the data that has both a mother and father in the household, the different magnitude in response to changes in earnings by the children was found to be insignificant.

Another visible difference in the estimates is the increased response of daughters to changes in parental earnings compared to sons. This difference is also insignificant. There might be a visible variation, but daughters do not react significantly more to changes in parental earnings than sons.

All of the other results for the control variables in the above Tables 3-5 are rather similar to the Table 2. Experience does not change the IGE estimate significantly. The level of schooling is always significant and explains a large part of the IGE for every pair. The parents' level of schooling, the number of parents in the household, and the number of children in the household is always insignificant for the model and the IGE. Ethnicity is significant in the model most of the time, but does not explain the IGE. The two control variables for disabilities and current school enrollment are not always significant and never help explain the IGE.

The level of schooling has a large explanatory power on the IGE, but how much of the IGE is explained varies by regression model. The IGE for fathers' earnings can be explained by 47 percent with the son's schooling and 49 percent with the daughter's schooling. The IGE for mothers' earnings on the other hand can be explained by 33 percent with both the son's and daughter's level of schooling. An increase in fathers' earnings has, according to these results, a larger impact on the child's level of schooling than an increase in mothers' earnings. This finding is, however, insignificant and the different results for the child's level of schooling on the IGE cannot be explained by the difference between mothers' and fathers' earnings.

The last three columns of Tables 2-5 show the results for the school help variable. All four results are very similar. The coefficient is significant without the inclusion of all other variables in the model. The school help variable explains a large part of the IGE, usually between 20 and 25 percent. It is insignificant once all other variables are included, particularly caused by the inclusion of the level of schooling in three models. This insignificance is not the case for mothers' earnings being regressed on the daughters' earnings. In this model the coefficient of school help is also much larger than in the three other models. It is unclear why this jump happens in the last model. Schooling and school help cannot be fully understood with the previous tables.

C. The Education Specific Models

In an attempt to understand the relationship between schooling and earnings better, this paper separates the data into four different categories. These categories are determined by the amount of school completed by the child and the gender of the parent. The amount of schooling is split into children that attended college, including Associates, Bachelor and higher degrees, and into children with no college experience, having either dropped out of high school or completed high school.

Controlling for the level of schooling also allows for comparison between groups. These groups are rather general, being separated only into students that attended college and students that did not. Nevertheless some meaningful conclusions can be drawn and logically explained by these groups. The split at this point creates two sub-samples that are similar in size, allowing further splitting by mother and father for each group.

Table 6 Y= Logged 5 year average hourly wage rate for respondents that went to college

Lnfather yearly income in $'s	0.1105*** (0.0231)	0.1077*** (0.0232)	0.1010*** (0.0232)	0.0981*** (0.0230)	0.0889*** (0.0244)	0.0900*** (0.0243)	0.0987*** (0.0240)	0.1126*** (0.0243)	0.1050*** (0.0262)
Sex (male)		0.0665** (0.0292)	0.0740** (0.0291)	0.0737** (0.0290)	0.0709** (0.0291)	0.0676** (0.0291)	0.0621** (0.0291)		
Experience in years				0.0675* (0.0393)	0.0667* (0.0392)	0.0686* (0.0391)	0.0378 (0.0383)		
Experience squared				-0.0027 (0.0029)	-0.0026 (0.0029)	-0.0026 (0.0029)	-0.0004 (0.0028)		
Level schooling in years			0.0257*** (0.0099)	0.0586*** (0.0144)	0.0576*** (0.0145)	0.0578*** (0.0145)	0.0613*** (0.0145)		
Father level of schooling					0.0063 (0.0054)	0.0068 (0.0054)	0.0063 (0.0056)		
Two parents in HH						0.1292 (0.0803)	0.1218* (0.0804)		
HH number of Children						0.0234 (0.0153)	0.0262 (0.0151)		
Black							-0.0553 (0.0509)		
Hispanic							0.0612 (0.0447)		
Enrolled now							-0.1533*** (0.0384)		
Limitations to work/school							-0.1503** (0.0611)		
School help in thousand of $'s									0.7949 (1.0410)
Rsquared	0.0258	0.0309	0.0383	0.0482	0.0486	0.0517	0.0730	0.0269	0.0265
N	816	816	816	816	816	816	816	723	723

Level of significance: *** 99% **95% *90%; LN wage rate 5yr average for college students as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

Table 7 Y= Logged 5 year average hourly wage rate for respondents that never exceeded high school

Lnfather yearly income in $'s	0.0718*** (0.0251)	0.0591** (0.0244)	0.0405* (0.0287)	0.0392 (0.0239)	0.0490** (0.0239)	0.0488** (0.0238)	0.0429* (0.0235)
Sex (male)		0.1988*** (0.0258)	0.2135*** (0.0265)	0.2123*** (0.0263)	0.2154*** (0.0265)	0.2156*** (0.0265)	0.2194*** (0.0267)
Experience in years				0.1077*** (0.0301)	0.1084*** (0.0301)	0.1050*** (0.0301)	0.0992*** (0.0294)
Experience squared				-0.0032** (0.0014)	-0.0033** (0.0013)	-0.0031** (0.0014)	-0.0030** (0.0013)
Level schooling in years			0.0273*** (0.0071)	0.0716*** (0.0147)	0.0743*** (0.0139)	0.0729*** (0.0138)	0.0720*** (0.0139)
Father level of schooling					-0.0083* (0.0047)	-0.0089* (0.0047)	-0.0052 (0.0050)
Two parents in HH						0.0179 (0.0431)	0.0111 (0.0433)
HH number of Children						-0.0172* (0.0096)	-0.0120 (0.0097)
Black							-0.1059*** (0.0360)
Hispanic							0.0355 (0.0343)
Enrolled now							-0.0851** (0.0377)
Limitations to work/school							-0.0757** (0.0342)
Rsquared	0.0091	0.0693	0.0827	0.1050	0.1070	0.1082	0.1251
N	850	850	850	850	850	850	850

Level of significance: *** 99% **95% *90%; LN wage rate 5yr average for high school students as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

Table 8 Y= Logged 5 year average hourly wage rate for respondents that went to college

Lnmother yearly income in $'s	0.1579*** (0.0330)	0.1530*** (0.0328)	0.1382*** (0.0332)	0.1404*** (0.0331)	0.1322*** (0.0332)	0.1261*** (0.0332)	0.1257*** (0.0331)	0.1650*** (0.0359)	0.1461*** (0.0381)
Sex (male)		0.0662** (0.0331)	0.0844*** (0.0326)	0.0863*** (0.0323)	0.0850*** (0.0322)	0.0766** (0.0322)	0.0758** (0.0316)		
Experience in years				0.0362 (0.0419)	0.0354 (0.0417)	0.0428 (0.0417)	0.0217 (0.0406)		
Experience squared				0.0001 (0.0031)	0.0002 (0.0031)	-0.0001 (0.0031)	0.0012 (0.0030)		
Level schooling in years			0.0500*** (0.0109)	0.0852*** (0.0158)	0.0837*** (0.0160)	0.0840*** (0.0162)	0.0866*** (0.0160)		
Mother level of schooling					0.0092 (0.0068)	0.0105 (0.0067)	0.0118* (0.0069)		
Two parents in HH						0.1212*** (0.0391)	0.0957** (0.0405)		
HH number of Children						0.0326** (0.0160)	0.0346** (0.0158)		
Black							-0.0292 (0.0428)		
Hispanic							0.0484 (0.0464)		
Enrolled now							-0.1578*** (0.0420)		
Limitations to work/school							-0.1431* (0.0835)		
School help in thousand of $'s									2.9142*** (1.1083)
Rsquared	0.0437	0.0477	0.0770	0.0866	0.0877	0.1003	0.1165	0.0476	0.0575
N	730	730	730	730	730	730	730	631	631

Level of significance: *** 99% **95% *90%; LN wage rate 5yr average for college students as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

Table 9 Y= Logged 5 year average hourly wage rate for respondents that never exceeded high school

Lnmother yearly income in $'s	0.1622*** (0.0256)	0.1560*** (0.0246)	0.1400*** (0.0241)	0.1339*** (0.0239)	0.1395*** (0.0248)	0.1404*** (0.0266)	0.1294*** (0.0261)
Sex (male)		0.1975*** (0.0260)	0.2098*** (0.0264)	0.2089*** (0.0262)	0.2101*** (0.0260)	0.2119*** (0.0260)	0.2088*** (0.0262)
Experience in years				0.0798*** (0.0303)	0.0775** (0.0302)	0.0760** (0.0310)	0.0807*** (0.0309)
Experience squared				-0.0018 (0.0014)	-0.0017 (0.0014)	-0.0017 (0.0014)	-0.0019 (0.0014)
Level schooling in years			0.0244*** (0.0074)	0.0690*** (0.0127)	0.0703*** (0.0128)	0.0687*** (0.0129)	0.0681*** (0.0128)
Mother level of schooling					-0.0065 (0.0057)	-0.0076 (0.0059)	-0.0014 (0.0063)
Two parents in HH						-0.0216 (0.0351)	-0.0548 (0.0367)
HH number of Children						-0.0116 (0.0113)	-0.0076 (0.0113)
Black							-0.1547*** (0.0335)
Hispanic							0.0614 (0.0384)
Enrolled now							-0.0381 (0.0411)
Limitations to work/school							-0.0802** (0.0330)
Rsquared	0.0416	0.0933	0.1028	0.1212	0.1214	0.1208	0.1465
N	910	910	910	910	910	910	910

Level of significance: *** 99% **95% *90%; LN wage rate 5yr average for high school students as dependent variable; heteroskedasticity consistent standard errors in parentheses; adjusted R squared reported

The results for the IGE in each group vary greatly. For fathers' earnings the IGE is 0.1105 for respondents who went to college and 0.0718 for respondents with no college experience. For mothers' earnings the IGE is 0.1579 for respondents with college experience and 0.1622 for respondents with no obtained college classes. Overall the measures for the IGE decreased compared to the previous main models between sons, daughters and fathers and mothers. This decrease is due to the explanatory power that the level of schooling has on the IGE, which has been partially accounted for in the education specific models.

The IGE for mothers' earnings is very similar between both education groups. Increased earnings from the mother lead to increased earnings for the child independent of the level of schooling. This indicates a value transfer of some sort from the mother to the child that is not captured by education. A possible explanation and example for such an attribute is a hard-working mother, who passes that attribute on to her children, which in turn helps them to earn higher hourly wages.

The IGE for fathers' earnings is very dissimilar, on the other hand. The coefficient of fathers' earnings is 0.111 for college children and 0.072 for non-college children. Despite the large visible difference in the estimate for IGE, no significance is found. College and non-college respondents do not earn a significantly different amount based on their fathers' earnings. In addition both of the IGE estimates based on the father are much lower than the estimates for mothers' earnings. This is not significant either, however, as mentioned in Section V.B. Respondents in general respond insignificantly more to changes in mothers' earnings than fathers' earnings. Overall, these large visible differences are insignificant, and the general finding of larger parental earnings leading to higher wages for the respondents is of sole significance.

In all four models the IGE stays very similar as controls are added. Therefore the addition of other variables does not contribute much to the explanation of the IGE. The respondents' gender is the first included variable. It is highly significant and explains at most 17.7 percent of the IGE in the second model between fathers' earnings and hourly wage of non-college students. In all other models, however, gender only explains 3 to 5 percent of the IGE, which is in accordance with female and male

respondents not reacting significantly differently to changes in parental earnings, as mentioned in Section V.B.

The addition of schooling still explains some amount of the IGE, but less than the 47 percent it explained in the main models. For the high school group the level of schooling explains up to 31 percent of the IGE. The level of schooling explains up to 10 percent of the IGE for the college group.

Experience and the parent's level of schooling fail to explain the IGE. The coefficients of these variables are often insignificant as well. Adding the rest of the control variables, does not lead to any meaningful changes in the IGE, either. Level of schooling is the only control variable explaining the IGE.

The school help variable is only included in the two models capturing respondents going to college. Interestingly the coefficient is only significant in the model including mothers' earnings and not fathers' earnings. The IGE between mothers' earnings and the college absolvent can be explained by school help with 11.5 percent, a surprisingly low result. The decrease in explanatory power of the IGE is unexplained by this data and shows that this relationship to the IGE still requires further research.

6. Discussion

Overall the results found here for the different IGEs are very low compared to other studies. As established before an IGE of 0.6 is the estimate for fathers' earnings regressed on sons' earnings, found by Behrman & Taubman (1990) and Mazumder (2005). In this paper this same IGE estimate is 0.1368.

However, these regressions are comparable to Behrman & Taubman (1990) and Mazumder (2005) since this paper uses the same statistical methods. There are two main differences between this research paper and previous studies, the use of the new dataset NLSY97 and the fact that only a single year of data was used for parental earnings due to the dataset restrictions.

A. New Data from a New Generation

The new NLSY97 dataset surveys the parents about their earnings in 1997. Therefore parental earnings are reported for 1996. The children's earnings are gathered from 2007 to 2011, which covers the fiscal years 2006 to 2010 to create a five year average. The data used by previous research is older by at least one entire generation, making different results plausible due to this time difference.

The data used by Mazumder (2005) spans over the previous two generations. Fathers' earnings are captured from 1970 to 1985 and child's earnings are reported from 1995 to 1998. Behrman & Taubman (1990) also retrieved their data two generations prior to this papers data, as the dataset underlying their research surveyed people between 1968 and 1984. The paper by Gary Solon (1992) found a smaller IGE in the same generation, due to shorter time spans available in that particular dataset. Solon obtained earnings for fathers from 1967 to 1971 and sons' earnings in 1985.

The previous examples use different datasets to get these high estimates including the PSID, SIPP, Social Security Administration and Michigan Panel Survey. All of the previous research stretches over the same time span, which is two generations older than the time span used in this paper. New results from current generational data in this paper therefore do not contradict the old estimates. The only difference is that the old results have been tested and retested in different datasets, while these new results cannot be compared with other current results.

A new generation comes with new challenges. The NLSY97 dataset surveyed respondents during the 2008 financial crisis. The data obtained for children's earnings, 2006 to 2010, is right in the midst of the financial crisis. During this time period it was especially hard for inexperienced workers to find jobs, which describes almost all of the respondents, due to their young age. Respondents who worked right after high school only had a few years to get experience before the crisis, and respondents who went to college hit the labor force right around the outbreak of the crisis.

The fathers' earnings, on the other hand, were obtained in 1996, long before the financial crisis or even the dot com boom. Those earnings do not underlie any special circumstances and reflect parental

earnings representatively. Although personal circumstances can still make a single year observation unrepresentative of a life time.

The difference in the business cycle between the two points in time could potentially create a real problem. Children's earnings could underlie increased noise, as higher unemployment also affects some employees through lower wages or a lack of better job opportunities. The resulting lower wage rate of some employed children reduces the correlation between the variables and therefore reduces the estimated coefficients. At least part of the decrease in the IGE could be explained this way. The magnitude of the distortion will remain unknown for a couple more years, until the Bureau of Labor Statistics updates the NLSY97 database beyond the years of the financial crisis.

B. Single Year Data versus Long-run Data

Using only a single year of data for parental earnings is against the advice of Solon (1992) and Mazumder (2005). This paper used findings from Behrman & Taubman (1990) and Brooks-Gunn, et al. (1998) to establish single year data as representative for long-run data. It is possible that this reasoning does not hold for this new NLSY97 dataset or that the original findings by Behrman & Taubman (1990) simply do not apply outside their work. Assuming that this single year data is not representative of long-run data, new possibilities open up.

Some of the papers estimating an IGE have done so in steps to test the effect the time span of parental earnings and child earnings has on the IGE. The end results presented were always the estimates from the longest time span available. Looking back at the intermediate short-run results of different papers, a pattern emerges.

If one uses only short-run data for parental earnings, the results for the IGE were approximately half of the final result, which is based on long-run data. Mazumder (2005) found an IGE of 0.31 for both sons and daughters combined if parental earnings were measured over only two years. The same database also provided Mazumder with 15 years of data for parental earnings, which resulted in an IGE of 0.60. Solon (1992) estimated different single years of parental earnings data on sons' earnings in his paper to get an average IGE of about 0.3. The results fluctuated between 0.25 and 0.39. He did not have long-run data available, but his results match the short-run results of Mazumder (2005). Even Behrman & Taubman (1990) have results supporting this hypothesis if data is taken from a time period when the children are not teenagers. Unfortunately child earnings were also only measured for one year to get the 0.37 estimate of IGE. The same dataset provided long-run data of 10 years for both children and parents' earnings, resulting in an estimate of 0.6 for the IGE.

This pattern of short-run data providing estimates that are half of the long-run data results has a large amount of fluctuation but seems to be the case, on average. Assuming that the results in this paper are close to the average short-run result, a long-run analysis could then lead to a doubling of the results. This paper's results would then be an IGE of about 0.3 for fathers' earnings on child's earnings and 0.4 for mothers' earnings on child's earnings.

7. Conclusion

This paper finds the Intergenerational Income Elasticity to be 0.1368 between fathers and sons, 0.1734 between fathers and daughters, 0.2076 between mothers and sons and 0.2217 between mothers and daughters. Previous research papers found an IGE of 0.6 between fathers and sons by using data that is two generations older (Mazumder, 2005; Behrman & Taubman, 1990). The decrease in the IGE measure is associated with a higher mobility of income. Children from both poor families and rich families are now more likely to fall into a different income bracket than their parents. This decline is possibly explained by, but not limited to the simple passing of time, the financial recession of 2008 and short-run data availability in the dataset. Many other control variables were added in this paper to observe possible explanations of the IGE. The different regression analyses showed that the amount of schooling a child receives is the sole explanatory factor found to explain the IGE up to 49 percent.

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