# UNIVERSITYOF 

# Evidence on intergenerational income transmission using complete Dutch population data 

Carmichael, Fiona; Darko, Christian; Ercolani, Marco; Ozgen, Ceren; Siebert, Stan

DOI:
10.1016/j.econlet.2020.108996

License:
Creative Commons: Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)

## Document Version

Peer reviewed version
Citation for published version (Harvard):
Carmichael, F, Darko, C, Ercolani, M, Ozgen, C \& Siebert, S 2020, 'Evidence on intergenerational income transmission using complete Dutch population data', Economics Letters, vol. 189, 108996.
https://doi.org/10.1016/j.econlet.2020.108996

Link to publication on Research at Birmingham portal

## General rights

Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

- Users may freely distribute the URL that is used to identify this publication.
- Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
-User may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
- Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.
When citing, please reference the published version.

## Take down policy

While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.
If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.

# Evidence on intergenerational income transmission using complete Dutch population data 

Fiona Carmichael ${ }^{\text {a }}$, Christian K. Darko ${ }^{\text {a }}$, Marco G. Ercolani ${ }^{\text {b }}$, Ceren Ozgen ${ }^{1}$, Stanley Siebert ${ }^{\text {a }}$


#### Abstract

We estimate the intergenerational elasticity (IGE) of income for the Netherlands using complete population data for around 177,000 28 -year olds. We find that IGEs are much lower when actual individual income data are used rather than proxies or aggregates for income. Though low, daughters' IGEs are higher than sons' indicating lower income mobility for women.


Keywords: intergenerational elasticity, intergenerational mobility, income, equality of opportunity, Great Gatsby curve, Netherlands.

JEL codes: J62, J61, D31

[^0]
## 1 Introduction

Identifying whether all children have equality of opportunity is key to understanding how equitable a society is. Bevis and Barrett (2015, p.233) ask "are all children - perhaps controlling for preferences and ability - equally likely to forge a successful, or unsuccessful, future livelihood? Or are children destined to stand upon the same socio-economic rungs as their parents". The notion of intergenerational elasticity (IGE) explores the relationship between parents' and their children's income levels thus indicating the extent of intergenerational immobility.

The key weakness of existing attempts to calculate IGEs is the lack of comprehensive data on parental income. These data are typically not available or confidential, thus extant research has relied upon fathers' income only, sometimes proxying this using their occupation (OECD, 2018). The result has been mixed estimates of the IGE even for the same country. For example, Statistics Netherlands (CBS, 2011) estimates a parent-son IGE of around 0.30 based on earnings, rather than income, ignoring children who are not earning. This implies that if parents earned $50 \%$ more than the average, their child would earn $15 \%$ above the average. The OECD (2018) estimates an even higher father-son IGE for the Netherlands of 0.39 by using fathers' occupation to impute their earnings and World Bank (2018) records a similar father-son IGE of 0.30. In addition, for many countries an average value of IGE is estimated without properly distinguishing between individual characteristics including gender.

Our analysis overcomes data limitations due to small samples and lack of data on parental income by using full official tax, welfare and income records for the Netherlands. This mitigates problems associated with self-reporting, proxies and reliance on tax returns, where individuals who do not file tax returns are omitted (as in Chetty et al. 2014).

We estimate the IGE of income by regressing 'adult' son's and daughter's log-income at age 28 on their parents' log-income, when the children were aged 15. Our results point to much lower IGEs for the Netherlands than those found in previous studies. However, although the Netherlands appears to be a country with high income mobility, the results indicate that income mobility is lower for daughters than for sons.

## 2 Data and Summary Statistics

We link five confidential datasets obtained from the Statistics Netherlands. These cover all residents who are by law required to register with the nearest municipality to access public services. The data comprise a full record of the population of 15 years old children and their parents from 2003 to-date.

Selecting 15 year olds ensures that the children are likely to have completed compulsory education; are living with at least one of their parents (using location-identifiers of mother-father-child), and are not yet active in the labour market beyond probationary employment. These children are aged 28 when we sample the latest available incomes in 2016. Hence data are unavailable to determine how children's age after 28 affects the IGE, though further research will be possible as this cohort ages.

Table 1 illustrates the cross-generational quintile income transition matrix for the Netherlands, suggesting high transition rates. There is a 12 percent probability that a child whose parents were
in the bottom fifth of the 2003 income distribution is in the top fifth of the 2016 child income distribution. The comparable transition probability is 7.5 percent in the US (Chetty et al., 2014), 11.7 percent in Denmark (Boserup et al., 2013) and 13.4 percent in Canada (Corak and Heisz, 1999). Thus, the chance of a child from a relatively poor family background achieving economic success are similar for the Netherlands, Canada and Denmark, and much higher than in the US. Nevertheless, in the Netherlands, as in other countries, the most frequent transitions are still those where a child remains in the same income quintile as their parents (i.e. non-transitions) and this is particularly notable at the top and bottom of the income distribution.

Table 1. Cross-generation income quintile transition matrix

|  | Quintile for 2003 parental income |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Quintile for <br> child 2016 <br> income | 1 | 2 | 3 | 4 | 5 |
| 1 | 0.29 | 0.20 | 0.16 | 0.14 | 0.14 |
| 2 | 0.25 | 0.22 | 0.20 | 0.17 | 0.14 |
| 3 | 0.19 | 0.22 | 0.23 | 0.21 | 0.17 |
| 4 | 0.15 | 0.21 | 0.22 | 0.24 | 0.23 |
| 5 | 0.12 | 0.15 | 0.19 | 0.24 | 0.33 |
| Total | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Before estimating the IGE, we show in Figure 1 the relation between child income and parental income. Panel A illustrates income levels and Panel B percentile income ranks (which are less sensitive to zero incomes). This figure shows a clear, positive relationship between parental and child income and also highlights the gender income gap. The concavity of the relationship for sons additionally suggests more intergenerational mobility for most sons (with parental income rank 35 and over) compared to the linear relationship for daughters.

Figure 1. Daughters' and sons' income and parental income


## 3 Econometric Model and Results

Children's income at age 28 in 2016 are modelled as a log-log function of their parents' incomes when the children were aged 15 in 2003 and other socio-economic characteristics:

$$
\begin{equation*}
\ln \operatorname{Inc}_{i}^{2016}=\alpha_{0}+\alpha_{1} \ln \text { ParentsInc }_{i}^{2003}+\sum_{j=2}^{K} \alpha_{j} x_{j}+\varepsilon_{i} \tag{1}
\end{equation*}
$$

where $\ln \operatorname{Inc} c_{i}^{2016}$ is the natural logarithm of the child's total gross pre-tax income from all sources (so there are no zeros) and $\ln$ ParentsInc $_{i}^{2003}$ is the natural logarithm of total parental income, also from all sources. $\alpha_{1}$ is the estimated IGE of income. The remaining explanatory variables ( $x_{j}$ ) control for demographic characteristics, including gender and the nationality of parents and children. Supplementary Table S1 provides summary statistics for all variables. For 28 year olds in 2016, 51 percent were male and average non-zero annual income was $€ 34,405.95$.

Estimates for the whole sample, pooling men and women, suggest IGEs of 0.1957 and 0.1204 with covariates. Table 2 provides further evidence of the extent to which both sons' and daughters' 2016 income is determined by their parents' 2003 income. Parents-Daughter and Parents-Son IGEs are 0.2312 and 0.1649 respectively, while Father-Daughter and Father-Son IGEs are slightly lower at 0.1942 and 0.1539 . Table 3 presents model estimates including covariates, which reduces the IGEs for both daughters and sons. Tables 4 and 5 show that parent-child IGEs of earnings are comparable although somewhat smaller. Thus, the parental income effect is predominantly due to parental earnings rather than the other unearned components of wealth in the Netherlands. These IGE ranges indicate that, contrary to Chadwick and Solon's (2002) results for the US, the economic advantage of parents passed on to daughters is greater than that passed onto sons, meaning that intergenerational mobility of sons appears greater than that of daughters in the Netherlands.

Table 2. Bivariate regressions for parent-child IGE of income

|  | $\ln$ Inc ${ }^{2016}$ (Log of child income) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | (1) | (2) | (3) | (4) |
| $\ln$ ParentsInc ${ }^{2003}$ | $\begin{gathered} \hline 0.2312^{* * *} \\ (0.0050) \end{gathered}$ |  | $\begin{gathered} \hline 0.1649^{* * *} \\ (0.0045) \end{gathered}$ |  |
| $\ln$ FatherInc ${ }^{2003}$ |  | $\begin{gathered} 0.1942^{* * *} \\ (0.0050) \end{gathered}$ |  | $\begin{gathered} 0.1539^{* * *} \\ (0.0046) \end{gathered}$ |
| Constant | $\begin{gathered} 7.6038^{* * *} \\ (0.0545) \\ \hline \end{gathered}$ | $\begin{aligned} & 8.0659^{* * *} \\ & (0.0532) \\ & \hline \end{aligned}$ | $\begin{gathered} 8.5269^{* * *} \\ (0.0492) \\ \hline \end{gathered}$ | $\begin{gathered} 8.7008^{* * *} \\ (0.0495) \\ \hline \end{gathered}$ |
| Observations | 86,031 | 79,527 | 90,184 | 83,562 |
| $R$-squared | 0.034 | 0.027 | 0.018 | 0.018 |

Table 3. Multivariate regressions for parent-child IGE of income

|  | $\ln$ Inc $^{2016}$ (Log of child income) |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
| Regressors $^{\dagger}$ | $(1)$ | $(2)$ | $(3)$ | $(4)$ |
| lnParentsInc ${ }^{2003}$ | $0.1544^{* * *}$ |  | $0.0872^{* * *}$ |  |
|  | $(0.0056)$ |  | $(0.0051)$ |  |
| lnFatherInc ${ }^{2003}$ |  | $0.1256^{* * *}$ |  | $0.0913^{* * *}$ |
|  |  | $(0.0051)$ |  | $(0.0049)$ |
| Constant | $3.6460^{* * *}$ | $3.7337^{* * *}$ | $7.6600^{* * *}$ | $7.7005^{* * *}$ |
|  | $(0.2293)$ | $(0.2393)$ | $(0.1992)$ | $(0.2070)$ |
| Observations | 81,331 | 77,019 | 85,215 | 80,801 |
| $R$-squared | 0.057 | 0.054 | 0.043 | 0.043 |

Robust standard errors in parentheses. Significance: ${ }^{* * *} \mathrm{p}<0.01$, ${ }^{* *} \mathrm{p}<0.05,{ }^{*} \mathrm{p}<0.1$ ${ }^{\dagger}$ Including controls for province, Foreign-born child, Foreign-born parents, Mother's\&Father's age, Mother's\&Father's age squared, birth order, single-parent families and number of brothers and sisters.

The supplementary models in Tables S2 and S3 use the natural logarithm of parental income and earnings averaged across 2003-2006 to account for idiosyncratic temporal variation (Lee and Solon, 2009; Mazumder, 2005; Haider and Solon, 2006). These results are similar to those in Tables 3 and 5. Supplementary Tables S4 and S5 present similar models to those in Tables 3 and S2 but with child earnings instead of income as the dependent variable to explore the influence of parental income on earnings. The IGE estimates for sons remain largely unchanged while for daughters they increase.

Table 4. Bivariate regressions for parent-child IGE of earnings

|  | ln Earn ${ }^{2016}$ (Log of child earnings) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | (1) | (2) | (3) | (4) |
| lnParentsEarn ${ }^{2003}$ | $\begin{gathered} \hline 0.1780^{* * *} \\ (0.0052) \end{gathered}$ |  | $\begin{gathered} \hline 0.1170^{* * *} \\ (0.0046) \end{gathered}$ |  |
| $\ln$ FatherEarn ${ }^{2003}$ |  | $\begin{gathered} 0.1535 * * * \\ (0.0055) \end{gathered}$ |  | $\begin{gathered} 0.1043^{* * *} \\ (0.0050) \end{gathered}$ |
| Constant | $\begin{gathered} 8.1692 * * * \\ (0.0573) \\ \hline \end{gathered}$ | $\begin{aligned} & 8.4779^{* * *} \\ & (0.0596) \end{aligned}$ | $\begin{gathered} 9.0640^{* * *} \\ (0.0507) \\ \hline \end{gathered}$ | $\begin{aligned} & 9.2403^{* * *} \\ & (0.0540) \\ & \hline \end{aligned}$ |
| Observations | 74,078 | 67,987 | 78,936 | 72,564 |
| $R$-squared | 0.023 | 0.015 | 0.011 | 0.008 |

Table 5. Multivariate regressions for parent-child IGE of earnings

| Regressors ${ }^{\dagger}$ | Ln Earn ${ }^{2016}$ (Log of child earnings) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | (1) | (2) | (3) | (4) |
| lnParentsEarn ${ }^{2003}$ | $\begin{gathered} \hline 0.1162^{* * *} \\ (0.0054) \end{gathered}$ |  | $\begin{gathered} \hline 0.0726^{* * *} \\ (0.0050) \end{gathered}$ |  |
| lnFatherEarn ${ }^{2003}$ |  | $\begin{gathered} 0.1017 * * * \\ (0.0056) \end{gathered}$ |  | $\begin{gathered} 0.0673^{* * *} \\ (0.0052) \end{gathered}$ |
| Constant | $\begin{gathered} 2.3344^{* * *} \\ (0.3320) \\ \hline \end{gathered}$ | $\begin{gathered} 2.1896^{* * *} \\ (0.3599) \\ \hline \end{gathered}$ | $\begin{gathered} 7.5388^{* * *} \\ (0.2793) \\ \hline \end{gathered}$ | $\begin{gathered} 7.6042^{* * *} \\ (0.2976) \\ \hline \end{gathered}$ |
| Observations | 70,687 | 65,823 | 75,294 | 70,183 |
| $R$-squared | 0.048 | 0.045 | 0.031 | 0.029 |

The results imply approximately 20 percent of the income advantage of parents in the Netherlands is passed on to their children in adulthood. This IGE is lower compared with most previous estimates, although in line with Jerrim's (2017) finding that the Netherlands has a relatively low income gap between sons of more and less educated parents. The results enable us to position the Netherlands on Krueger's (2012) "Great Gatsby Curve" which traces a positive relationship between inequality and the IGE of earnings. The curve suggests that countries with high income inequality also have intergenerational income persistence. Figure 2 illustrates the Great Gatsby Curve based on Corak's (2016) compilation of other's estimates for father-son IGEs of earnings. Our comparable earnings IGEs for the Netherlands, for both daughters and sons, lie below the Great Gatsby Curve.

Figure 2. Great Gatsby Curve for selected OECD countries


## 5 Conclusion

We report intergenerational elasticity (IGE) of income estimates for the full population of 28 year olds in the Netherlands in 2016. These IGEs are relative to their parents' income in 2003 when they were aged 15. An important contribution of this paper is to show that when actual individuallevel income is used, instead of proxies or aggregate data, estimated IGEs for the Netherlands' are comparatively low, approximately half those found for the US and UK. The father-son earnings IGE of 0.1043 is comparable with father-son estimates for Denmark (Corak, 2016) where income inequality is also relatively low (OECD, 2019). IGEs for daughters are larger than those for sons, irrespective of whether we include regression covariates. Thus, despite overall high income mobility in the Netherlands, there are notable gender differences in that daughters are more likely than sons to remain at the same income level as their parents, a result which requires further research.

## References

Bevis L. E. M Barrett, C. B. (2015) Decomposing Intergenerational Income Elasticity: The Gender-differentiated Contribution of Capital Transmission in Rural Philippines, World Development, 74:233-252

Boserup, S. H., Kopczuk, W., Kreiner, C. T. (2013). Intergenerational wealth mobility: Evidence from Danish wealth records of three generations. Univ. of Copenhagen mimeo.
Chadwick, Laura, Gary Solon. (2002) Intergenerational income mobility among daughters. American Economic Review 92.1:335-344.
Chetty, R., Hendren, N., Kline, P., \& Saez, E. (2014). Where is the land of opportunity? The geography of intergenerational mobility in the United States. The Quarterly Journal of Economics, 129(4):1553-1623.

Corak, M. (2013). Income inequality, equality of opportunity, and intergenerational mobility. Journal of Economic Perspectives. 27.3: 79-102.

Corak, M. (2016). Inequality from generation to generation: The United Sates in Comparison, IZA DP, 9929.

Corak, M., Heisz, A. (1999). The intergenerational earnings and income mobility of Canadian men: Evidence from longitudinal income tax data. Journal of Human Resources, 34(3):504533.

CBS (Statistics Netherlands) (2011), Measuring Intergenerational Income Mobility, The Hague.
Haider, S., Solon G. (2006). Life-cycle variation in the association between current and lifetime earnings. American Economic Review, 96:1308-1320.
Jerrim J. (2017) The Link between Family Background and Later Lifetime Income: How Does the UK Compare with Other Countries? Fiscal Studies, 38(1):49-79

Krueger, A.B. (2012) The Rise and Consequences of Inequality in the United States, https://obamawhitehouse.archives.gov/sites/default/files/krueger cap speech final re marks.pdf (Accessed 24 May 2019)

Lee, C, Solon. G. (2009) Trends in intergenerational income mobility. The Review of Economics and Statistics, 91.4: 766-772.

Lefranc, A., Ojima, F., \& Yoshida, T. (2014). Intergenerational earnings mobility in Japan among sons and daughters: levels and trends. Journal of Population Economics, 27(1):91-134.

Mazumder, B. (2005). Fortunate sons: New estimates of intergenerational mobility in the United States using social security earnings data. Review of Economics and Statistics, 87(2):235255.

OECD (2018) A Broken Social Elevator? How to Promote Social Mobility, Paris: OECD.
OECD (2019) Income inequality (indicator), Paris: OECD. doi: 10.1787/459aa7f1-en
World Bank (2018) Fair Progress? Economic Mobility across Generations around the World, Washington: World Bank Group.

## Supplementary file: Summary statistics and auxiliary regressions

## Table 3 including all covariates

Table 3. Multivariate regressions for parent-child IGE of income

|  | $\ln$ Inc $^{2016}$ (Log of child income) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | (1) | (2) | (3) | (4) |
| $\ln$ ParentsInc ${ }^{2003}$ | $\begin{gathered} \hline 0.1544^{* * *} \\ (0.0056) \end{gathered}$ |  | $\begin{gathered} 0.0872^{* * *} \\ (0.0051) \end{gathered}$ |  |
| $\ln$ FatherInc ${ }^{2003}$ |  | $\begin{gathered} 0.1256 * * * \\ (0.0051) \end{gathered}$ |  | $\begin{gathered} 0.0913^{* * *} \\ (0.0049) \end{gathered}$ |
| Foreign-born child | $\begin{aligned} & -0.0326^{*} \\ & (0.0175) \end{aligned}$ | $\begin{gathered} -0.0465^{* *} \\ (0.0189) \end{gathered}$ | $\begin{gathered} -0.0445 * * * \\ (0.0165) \end{gathered}$ | $\begin{gathered} -0.0552^{* *} \\ (0.0179) \end{gathered}$ |
| Foreign-born parents | $\begin{gathered} -0.1579 * * * \\ (0.0131) \end{gathered}$ | $\begin{gathered} -0.1508^{* * *} \\ (0.0140) \end{gathered}$ | $\begin{gathered} -0.3751^{* * *} \\ (0.0120) \end{gathered}$ | $\begin{gathered} -0.3638^{* * *} \\ (0.0127) \end{gathered}$ |
| Mother's age | $\begin{gathered} 0.1318^{* * *} \\ (0.0110) \end{gathered}$ | $\begin{gathered} 0.1376 * * * \\ (0.0114) \end{gathered}$ | $\begin{gathered} 0.0688^{* * *} \\ (0.0097) \end{gathered}$ | $\begin{gathered} 0.0651^{* * *} \\ (0.0102) \end{gathered}$ |
| Mother's age squared | $\begin{gathered} -0.0014^{* * *} \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0014^{* * *} \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0008^{* *} \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0008^{* * *} \\ (0.0001) \end{gathered}$ |
| Father's age | $\begin{gathered} 0.0699^{* * *} \\ (0.0077) \end{gathered}$ | $\begin{gathered} 0.0747 * * * \\ (0.0083) \end{gathered}$ | $\begin{aligned} & 0.0128^{*} \\ & (0.0067) \end{aligned}$ | $\begin{aligned} & 0.0140^{*} \\ & (0.0074) \end{aligned}$ |
| Father's age squared | $\begin{gathered} -0.0007 * * * \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0007 * * * \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0002^{* * *} \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0002^{* *} \\ (0.0001) \end{gathered}$ |
| Additional regressors ${ }^{\dagger}$ Constant | $\begin{gathered} 3.6460^{* * *} \\ (0.2293) \\ \hline \end{gathered}$ | $\begin{gathered} 3.7337^{* * *} \\ (0.2393) \\ \hline \end{gathered}$ | $\begin{gathered} 7.6600^{* * *} \\ (0.1992) \\ \hline \end{gathered}$ | $\begin{gathered} 7.7005^{* * *} \\ (0.2070) \\ \hline \end{gathered}$ |
| Observations | 81,331 | 77,019 | 85,215 | 80,801 |
| $R$-squared | 0.057 | 0.054 | 0.043 | 0.043 |
| Robust standard errors in ${ }^{\dagger}$ Including controls for pro of brothers and sisters. | parentheses. S ince, birth or | ignificance: ** er, single-par | $\mathrm{p}<0.01,^{* *} \mathrm{p}<$ <br> nt families an | $0.05, * p<0.1$ <br> number |

## Table 5 including all covariates

Table 5. Multivariate regressions for parent-child IGE of earnings

|  | ln Earn ${ }^{2016}$ (Log of child earnings) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | (1) | (2) | (3) | (4) |
| $\ln$ ParentsEarn ${ }^{2003}$ | $\begin{gathered} 0.1162^{* * *} \\ (0.0054) \end{gathered}$ |  | $\begin{gathered} 0.0726^{* * *} \\ (0.0050) \end{gathered}$ |  |
| lnFatherEarn ${ }^{2003}$ |  | $\begin{gathered} 0.1017 * * * \\ (0.0056) \end{gathered}$ |  | $\begin{gathered} 0.0673^{* * *} \\ (0.0052) \end{gathered}$ |
| Foreign-born child | $\begin{gathered} -0.0357 \\ (0.0254) \end{gathered}$ | $\begin{gathered} -0.0608^{* *} \\ (0.0276) \end{gathered}$ | $\begin{gathered} -0.0866 * * * \\ (0.0238) \end{gathered}$ | $\begin{gathered} -0.1084^{* * *} \\ (0.0258) \end{gathered}$ |
| Foreign-born parents | $\begin{gathered} -0.1951^{* * *} \\ (0.0190) \end{gathered}$ | $\begin{gathered} -0.1892^{* * *} \\ (0.0206) \end{gathered}$ | $\begin{gathered} -0.3692^{* * *} \\ (0.0164) \end{gathered}$ | $\begin{gathered} -0.3710^{* * *} \\ (0.0175) \end{gathered}$ |
| Mother's age | $\begin{gathered} 0.1861^{* * *} \\ (0.0158) \end{gathered}$ | $\begin{gathered} 0.1856^{* * *} \\ (0.0172) \end{gathered}$ | $\begin{gathered} 0.0667 * * * \\ (0.0133) \end{gathered}$ | $\begin{gathered} 0.0596 * * * \\ (0.0144) \end{gathered}$ |
| Mother's age squared | $\begin{gathered} -0.0019 * * * \\ (0.0002) \end{gathered}$ | $\begin{gathered} -0.0019 * * * \\ (0.0002) \end{gathered}$ | $\begin{gathered} -0.0008^{* * *} \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0007 * * * \\ (0.0002) \end{gathered}$ |
| Father's age | $\begin{gathered} 0.0867^{* * *} \\ (0.0118) \end{gathered}$ | $\begin{gathered} 0.1013 * * * \\ (0.0146) \end{gathered}$ | $\begin{aligned} & 0.0269^{* *} \\ & (0.0106) \end{aligned}$ | $\begin{gathered} 0.0345^{* * *} \\ (0.0125) \end{gathered}$ |
| Father's age squared | $\begin{gathered} -0.0008^{* * *} \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0010^{* * *} \\ (0.0002) \end{gathered}$ | $\begin{gathered} -0.0003^{* * *} \\ (0.0001) \end{gathered}$ | $\begin{gathered} -0.0004^{* * *} \\ (0.0001) \end{gathered}$ |
| Additional regressors ${ }^{\dagger}$ |  |  |  |  |
| Constant | $\begin{gathered} 2.3344^{* * *} \\ (0.3320) \\ \hline \end{gathered}$ | $\begin{gathered} 2.1896^{* * *} \\ (0.3599) \\ \hline \end{gathered}$ | $\begin{gathered} 7.5388^{* * *} \\ (0.2793) \\ \hline \end{gathered}$ | $\begin{gathered} 7.6042^{* * *} \\ (0.2976) \\ \hline \end{gathered}$ |
| Observations | 70,687 | 65,823 | 75,294 | 70,183 |
| $R$-squared | 0.048 | 0.045 | 0.031 | 0.029 |

Table S1: Summary statistics

| Definition | Obs. | Mean | s.d. |
| :---: | :---: | :---: | :---: |
| Child total income at the age of 28 (euros in 2016) | 176215 | 34405.95 | 24393.03 |
| Child earnings ${ }^{\text {a }}$ at the age of 28 (euros in 2016) | 176215 | 32332.13 | 25974.53 |
| Parental total income ${ }^{\text {b }}$ (euros in 2003) | 176215 | 63991.87 | 43831.21 |
| Parental total income (euros; 2003-2006 average) | 176215 | 67470.49 | 43988.36 |
| Parental earnings (euros in 2003) | 176215 | 59453.90 | 45843.28 |
| Parental earnings (euros; 2003-2006 average) | 176215 | 62324.05 | 46343.72 |
| Mother's total income (euros in 2003) | 173561 | 16170.52 | 17913.67 |
| Mother's total income (euros; 2003-2006 average) | 173936 | 17512.18 | 17122.85 |
| Father's total income (euros in 2003) | 165600 | 51145.87 | 38638.99 |
| Father's total income (euros; 2003-2006 average) | 166280 | 53183.28 | 39075.82 |
| Father's earnings (euros in 2003) | 165600 | 48531.57 | 40283.21 |
| Father's earnings (euros; 2003-2006 average) | 166280 | 50133.94 | 40923.41 |
| $\ln$ (Child total income at the age of 28 (euros in 2016)) | 176215 | 10.22 | 0.82 |
| $\ln$ (Child earnings ${ }^{\text {a }}$ at the age of 28 (euros in 2016)) | 162341 | 10.20 | 0.96 |
| $\ln$ (Parental total income ${ }^{\text {b }}$ (euros in 2003) | 176215 | 10.88 | 0.66 |
| $\ln$ (Parental total income (euros; 2003-2006 average)) | 176034 | 10.95 | 0.62 |
| $\ln$ (Parental earnings (euros in 2003)) | 164126 | 10.83 | 0.84 |
| $\ln$ (Parental earnings (euros; 2003-2006 average)) | 167128 | 10.82 | 0.96 |
| $\ln$ (Mother's total income (euros in 2003)) | 142714 | 9.55 | 0.96 |
| $\ln$ (Mother's total income (euros; 2003-2006 average)) | 152144 | 9.48 | 1.27 |
| $\ln$ (Father's total income (euros in 2003)) | 163089 | 10.66 | 0.69 |
| $\ln$ (Father's total income (euros; 2003-2006 average)) | 164995 | 10.68 | 0.70 |
| Birth order of the child with the same couple_id | 176215 | 1.86 | 1.10 |
| 1 =second child; $0=0$ therwise | 176215 | 0.35 | 0.48 |
| Number of siblings per couple_id | 175001 | 1.68 | 1.31 |
| Number of brothers per couple_id (male) | 175001 | 0.86 | 0.93 |
| Number of sisters per couple_id (female) | 175001 | 0.82 | 0.93 |
| 1-if single parent; $0=$ otherwise | 176215 | 0.04 | 0.19 |
| 1 =if child was born abroad; $0=$ otherwise | 176215 | 0.06 | 0.23 |
| 1 =if at least one parent was born abroad; $0=0$ therwise | 176215 | 0.20 | 0.40 |
| $1=$ if both parents were born abroad; $0=0$ therwise | 176215 | 0.13 | 0.33 |
| $1=$ if both parents were born in the Netherlands; $0=$ otherwise | 176215 | 0.80 | 0.40 |
| Age of the mother (years) | 176034 | 43.73 | 4.55 |
| Age of the father (years) | 172031 | 46.57 | 5.24 |
| Gender (1-if male; $0=$ otherwise) | 176215 | 0.51 | 0.50 |

## Notes:

${ }^{\text {a }}$ Earnings correspond to annualised wage income before tax; in other words the wage received as a result of actively working in a job. Income includes all forms of income.
${ }^{\text {b }}$ Parental income/earnings equals to the sum of mother's and father's income/earnings.

Table S2. IGE of income conditional on average 2003-2006 parental income

|  | Log of child income $\left(\ln I^{2016}\right)$ |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | $(1)$ | $(2)$ | $(3)$ | $(4)$ |
| lnParentsInc $2003-2006$ | $0.2417^{* * *}$ | $0.1685^{* * *}$ | $0.1768^{* * *}$ | $0.0999^{* * *}$ |
|  | $(0.0055)$ | $(0.0058)$ | $(0.0047)$ | $(0.0055)$ |
| Constant | $7.4769^{* * *}$ | $3.6010^{* * *}$ | $8.3876^{* * *}$ | $7.6078^{* * *}$ |
|  | $(0.0605)$ | $(0.2274)$ | $(0.0516)$ | $(0.1985)$ |
| Covariates $^{\dagger}$ | No | Yes | No | Yes |
| Observations $^{R}$ squared | 86,031 | 82,017 | 90,184 | 85,904 |
| Robust standard errors in parentheses. | 0.058 | 0.018 | 0.044 |  |
| Covariates are the same as in Table 3. |  |  |  |  |

Table S3. IGE of earnings conditional on average 2003-2006 parental earnings

|  | Log of child earnings $\left(\ln E^{2016}\right)$ |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | $(1)$ | $(2)$ | $(3)$ | $(4)$ |
| lnParentsEarn |  |  |  |  |
|  | $0003-2006$ | $0.1717^{* * *}$ | $0.1160^{* * *}$ | $0.1217^{* * *}$ |
| Constant | $(0.0048)$ | $(0.0050)$ | $(0.0043)$ | $\left(0.00477^{* * *}\right.$ |
|  | $8.2310^{* * *}$ | $2.5643^{* * *}$ | $9.0067^{* * *}$ | $7.6655^{* * *}$ |
|  | $(0.0528)$ | $(0.3232)$ | $(0.0467)$ | $(0.2744)$ |
| Covariates $\dagger$ | No | Yes | No | Yes |
| Observations | 75,873 | 72,256 | 80,898 | 77,013 |
| R-squared | 0.028 | 0.051 | 0.016 | 0.035 |

Robust standard errors in parentheses. ${ }^{* * *} \mathrm{p}<0.01, * * \mathrm{p}<0.05$, * $\mathrm{p}<0.1$
${ }^{\dagger}$ Covariates are the same as in Table 3.

Table S4. IGE of earnings conditional on 2003 parental income

|  | Log of child earnings $\left(\ln E^{2016}\right)$ |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | $(1)$ | $(2)$ | $(3)$ | $(4)$ |
| lnParentsInc ${ }^{2003}$ | $0.2703^{* * *}$ | $0.1741^{* * *}$ | $0.1684^{* * *}$ | $0.0865^{* * *}$ |
|  | $(0.0066)$ | $(0.0070)$ | $(0.0055)$ | $(0.0060)$ |
| Constant | $7.1265^{* * *}$ | $2.1417^{* * *}$ | $8.4720^{* * *}$ | $7.3633^{* * *}$ |
|  | $(0.0723)$ | $(0.3099)$ | $(0.0600)$ | $(0.2643)$ |
| Covariates $^{\dagger}$ | No | Yes | No | Yes |
| Observations $^{78,416}$ | 74,421 | 83,932 | 79,590 |  |
| R-squared | 0.032 | 0.054 | 0.014 | 0.037 |

Robust standard errors in parentheses. ${ }^{* * *} \mathrm{p}<0.01,{ }^{* *} \mathrm{p}<0.05,{ }^{*} \mathrm{p}<0.1$
${ }^{+}$Covariates are the same as in Table 3.

Table S5. IGE of earnings conditional on average 2003-2006 parental earnings

|  | Log of child earnings (lnE $\left.{ }^{2016}\right)$ |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | Daughters |  | Sons |  |
|  | $(1)$ | $(2)$ | $(3)$ | $(4)$ |
| lnParentsInc ${ }^{2003-2006}$ | $0.2875^{* * *}$ | $0.1942^{* * *}$ | $0.1797^{* * *}$ | $0.0957^{* * *}$ |
|  | $(0.0072)$ | $(0.0073)$ | $(0.0057)$ | $(0.0064)$ |
| Constant | $6.9223^{* * *}$ | $2.0598^{* * *}$ | $8.3395^{* * *}$ | $7.3503^{* * *}$ |
|  | $(0.0796)$ | $(0.3073)$ | $(0.0630)$ | $(0.2631)$ |
| Covariates $^{\dagger}$ | No | Yes | No | Yes |
| Observations $^{\text {R-squared }}$ | 79,126 | 75,037 | 84,670 | 80,231 |
| R-s | 0.036 | 0.056 | 0.016 | 0.038 |

Robust standard errors in parentheses. ${ }^{* * *} \mathrm{p}<0.01,{ }^{* *} \mathrm{p}<0.05,{ }^{*} \mathrm{p}<0.1$
${ }^{+}$Covariates are the same as in Table 3.


[^0]:    ${ }^{1}$ Corresponding author c.ozgen@bham.ac.uk. Department of Economics, University of Birmingham; IZA, Bonn; GLO. Ceren Ozgen gratefully acknowledges the Marie-Sklodowska Curie Individual Grant for MAStErS project (H2020-MSCA-IF-2015, No. 705366) from the European Commission. Stanley Siebert and Marco Ercolani gratefully acknowledge Quality Outputs Support Scheme funding from University of Birmingham.
    a Department of Management, University of Birmingham.
    ${ }^{\text {b }}$ Department of Economics, University of Birmingham.

