The Correlation of Net and Gross Wealth across Generations: The Role of Parent Income and Child Age

By N. MELTEM DAYSAL, MICHAEL F. LOVENHEIM, AND DAVID N. WASSER*

* Daysal: University of Copenhagen Department of Economics and CEBI (email: meltem.daysal@econ.ku.dk); Lovenheim: Cornell University, Department of Economics, Industrial and Labor Relations, and Jeb E. Brooks School of Public Policy and NBER (email: mfl55@cornell.edu); Wasser: Cornell University, Department of Economics and Jeb E. Brooks School of Public Policy (email: dw568@cornell.edu). The activities of CEBI are financed by the Danish Research Foundation, Grant DNRF134. We thank Asger Lau Andersen, Simon Halphen Boserup, Sandy Black, and Kerwin Charles for excellent comments as well as seminar participants at the 2022 ASSA session on Wealth.

A growing body of research examines how wealth is correlated across generations, spurred by growing wealth inequality across the world. If wealth is strongly correlated within families across generations, increases in wealth inequality have the potential to be highly persistent over time. Prior research on the intergenerational correlation of wealth has focused on average correlations in *net* wealth and found evidence of a modest amount of wealth transmission from parents to children ranging between 0.2-0.4 (e.g., Charles and Hurst, 2003; Boserup, Kopczuk, and Kreiner 2018; Black et al. 2020).

Net wealth is defined as household assets minus liabilities at any point in time. If households decide to take on debt in the short-run, then long-run wealth may differ from net wealth. This is particularly true in times of high debt usage, such as when parents are young. As such, estimates of intergenerational transmission based on net wealth may be sensitive to when wealth is measured. In addition, the relative importance of liabilities in comparison to assets may differ by parental income, hiding important variation in how wealth transmission differs across the parental income distribution.

In this paper, we use Danish Register Data to extend the literature on the intergenerational correlation of wealth in three ways. First, we compare the intergenerational correlation of net wealth with the intergenerational correlation of gross housing wealth. Our measure of net wealth is based on third-party-reported measures of assets and liabilities from the Danish tax authorities. We do not have access to individual components making up this variable, but we do have information on the cash value of housing properties owned (measured as the price of the home multiplied by the ownership share). The price of the home is a strong measure of gross housing wealth in the long-run, as eventually the household will own the house outright if the house is not sold and there is no loan default. In addition,

housing wealth is the largest single component of wealth across the income distribution (Daysal, Lovenheim, and Wasser 2022). Thus, our comparisons of intergenerational wealth correlations based on these two measures can provide new insights into the transmission of point-in-time net wealth versus the transmission of permanent household resources. In particular, if intergenerational wealth correlations are driven by factors related to long-run household resources rather than point-in-time debt decisions, then the correlation for housing wealth should be higher than the correlation for net wealth, especially during periods of high debt usage among parents.

Second, we examine the sensitivity of intergenerational wealth correlation estimates to the timing of wealth measurement. All adult children in our sample are aged 29-33, but we measure parental wealth at different childhood ages, tracing out the relationship between the wealth of parents as they age and the wealth of their eventual adult children.

Third, we estimate how the intergenerational correlation of wealth varies across the parental income distribution. Lower-income families tend to have more debt relative to their assets (i.e., lower net vs. gross wealth) and have more of their wealth in housing. Indeed, for most families in Denmark, their only source of wealth is their home (Daysal, Lovenheim, and Wasser 2022).

There are three key insights that emerge from our study. First, we find that the intergenerational wealth correlations based on housing wealth are much more stable as children age in comparison to estimates based on net wealth. We argue that this is due to higher debt levels when parents (and thus children) are younger, which biases net wealth correlations downward. Second, we show that intergenerational correlations of housing wealth are inversely related to household income at all ages, but there is little variation in net wealth correlations across the income distribution. Finally, we show that intergenerational net wealth and gross housing wealth correlations move in opposite directions across the income distribution. These correlations converge at the 70^{th} percentile of parental income, which likely is driven by the higher relative debt burden of lower-income households at the time of measurement.

I. Data and Empirical Approach

We employ Danish Register Data for the 1985-1989 birth cohorts linked to their parents. We focus on these cohorts because they are young enough to observe their outcomes into adulthood, and home prices are only available starting in 1984. Our total sample comprises

444,884 parents and 275,701 children. Throughout the analysis, we measure wealth of the adult children as the average wealth between the ages of 29-33. However, we vary the measure of parental wealth by child age.

We use two measures of wealth. The first is net wealth, defined as the difference between assets and liabilities. Assets include bank deposits, stocks, bonds, real estate, and deposited mortgages, while liabilities include debt in financial institutions, credit/debit card debt, mortgage debt, debt to financial corporations, and debt to municipalities. This net wealth variable is identical to the one used in Boserup, Kopczuk, and Kreiner (2018) and is similar to the definition used in Charles and Hurst (2003). The second measure is gross housing wealth, which is the cash value of all real estate holdings weighted by the ownership share of each holding.

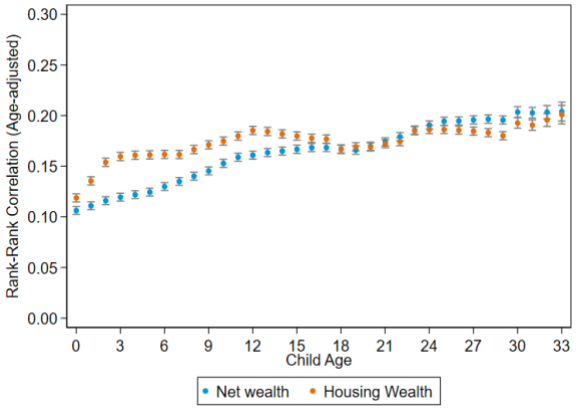
We examine rank-rank correlations between parental wealth and adult child wealth for both net and housing wealth and how these correlations vary by child age and parent income. Rank-rank correlations are useful in this context because they can handle zero and negative wealth outcomes. Renters have zero housing wealth, while a number of families have zero net wealth. In cases where people have the same housing or net wealth, we follow Boserup, Kopczuk, and Kreiner (2018) and randomly assign them a rank within the relevant range for the size of the identical wealth group. Descriptive statistics for our analysis sample are presented in Online Appendix Table A.1. Below, we show rank-rank correlations graphically. All correlation estimates are presented in the Online Appendix.

II. Results

Figure 1 presents the rank correlation between parent and adult child housing and net wealth by child age (estimates are shown in Online Appendix Tables A.2 and A.3). As noted above, child outcomes are always measured at ages 29-33, and correlations at different child ages compare wealth of adult children to parents of different ages. As shown in Online Appendix Table A.1., parents of the youngest children are of a similar age to the adult children when we measure their wealth.

There is a strongly upward-sloping correlation for net wealth as children age. At birth, the correlation is 0.10, and it grows to 0.15 by age 10, 0.19 by age 25, and 0.20 by age 33. As parents age, their net wealth is increasingly correlated with the net wealth of their adult children at ages 29-33.

Figure 1. Rank-Rank Correlations of Net Wealth and Housing Wealth



Note: Age-adjusted percentile rank correlations of the child's wealth (housing or net) averaged over ages 29-33 and the parents' wealth (housing or net) at the given child age. Estimates are obtained from regressions that include fixed effects for each parent's age at the given child age. 95% confidence intervals also are shown.

The slope for housing wealth is much flatter, especially after age 2. The correlation is about 0.16 at age 3 and is 0.20 at age 33. Prior to age 18, the housing wealth correlation is larger than the net wealth correlation, and starting at age 18 they converge.

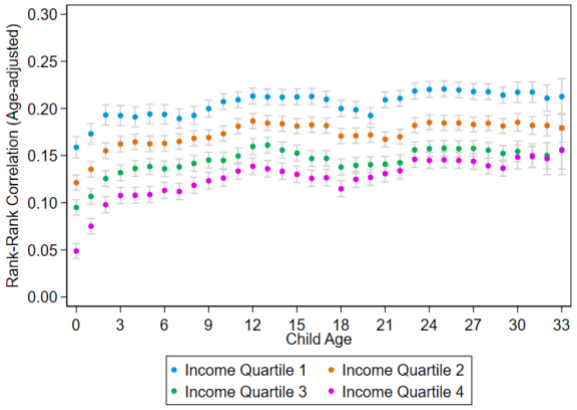
One likely explanation for this convergence is that when children are young, parents have more debt, which decreases their net wealth. A growing body of research argues that the intergenerational correlation of wealth is driven by parental and household characteristics, such as preferences for different assets, savings behavior, and debt default behavior (e.g., Charles and Hurst 2003; Black et al. 2017; Black et al. 2020; Fagereng, Mogstad, and Rønning 2015; Kreiner, Leth-Petersen, and Willerslev-Olsen 2020; Daysal, Lovenheim, and Wasser 2022). These savings behaviors and preferences of the parents are likely to be more strongly related to longer-run savings behavior than to point-in-time debt. Hence, in periods of high transitory debt, such as when parents have young children, the correlation with eventual adult child wealth is lower. When we examine gross housing wealth correlations, however, the estimates are more stable as children age. These results highlight the importance of focusing on gross wealth measures and on the relevance of the timing of measurement when examining net wealth.

Figure 2 examines how these correlations vary across the parental income distribution. Estimates and standard errors are shown in Online Appendix Tables A.4 and A.5. Parental income is measured in the year prior to the birth of the child. Panel A shows rank-rank wealth correlations in housing wealth. While the stability of the rank-rank correlations documented in Figure 1 holds within each parental income quartile, we find that the intergenerational transmission of housing wealth is much larger among lower-income households. On average, the correlation is 0.20 among the lowest-income families, while it is 0.13 among the top quartile earners. The fact that housing wealth transmission is inversely related to parental income and does not vary as children (and thus parents) age is a novel

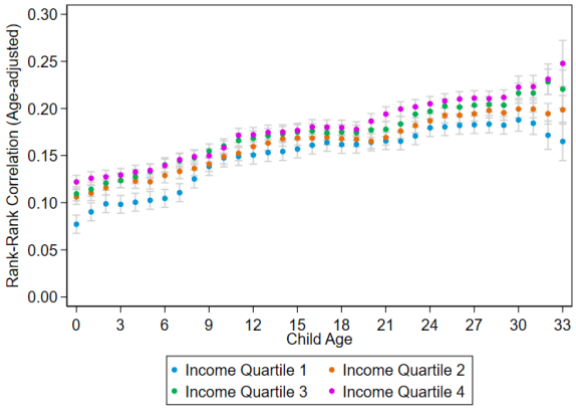
finding. That these correlations are stronger for lower-income households highlights the importance of housing wealth for less-advantaged households, whose wealth is predominantly in housing.

Figure 2. Housing Wealth and Net Wealth by Child Age and Parent Income

Panel A. Housing Wealth



Panel B. Net Wealth



Note: Age-adjusted percentile rank correlations of the child's wealth (housing or net) averaged over ages 29-33 and the parents' wealth (housing or net) at the given child age. Estimates are obtained from regressions that include fixed effects for each parent's age at the given child age. Income quartiles are based on total parental income in the year prior to the birth of the child. 95% confidence intervals also are shown.

Panel B of Figure 2 shows correlations in net wealth by parental income and child age. As in Figure 1, there is a pattern of increasing correlation with child age that is evident across the income distribution. There is far less variation across the parental income distribution in net wealth correlations than in the housing wealth correlations. While gross housing wealth of low-income parents is more strongly tied to their adult children's housing wealth than is the case for their higher-income counterparts, the same is not the case for net wealth, especially when parental wealth is measured before children are teenagers. When children (and thus parents) age, however, we see a clear divergence between the rank-rank correlations for the top parental income quartile and the rest of the distribution.

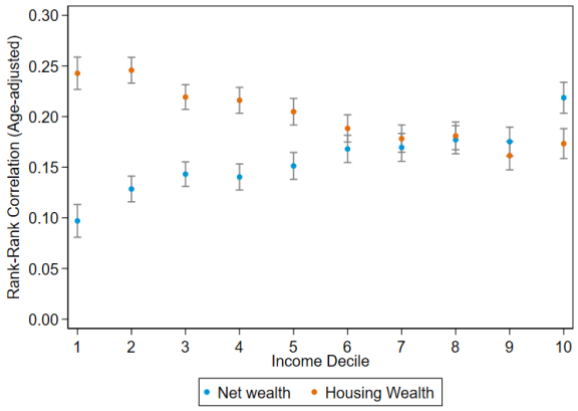
That the net wealth correlations are more compressed across the parental income distribution than are the housing wealth correlations is a novel finding in this literature. This fact as well as the finding of higher wealth transmission among highest-income families as parents age aligns with the role of point-in-time debt biasing downward intergenerational wealth correlations. Lower-income households have more debt conditional on gross assets. The existence of this debt decreases the intergenerational wealth correlations such that the lower-income and higher-income

households now exhibit the same correlations in net wealth. Similarly, higher-income families likely accumulate more wealth and have more types of assets, and they reduce their debt as parents age.

Taken together, the panels of this figure demonstrate the importance of considering long-run wealth of the household when estimating intergenerational wealth correlations, especially when examining variation across the parental income distribution.[1]

Finally, Figure 3 presents both net wealth and housing wealth correlations by parental income decile. These estimates represent average rank-rank correlations based on parental wealth when children are aged 29-33. See Table A.8 for estimates and standard errors. Consistent with the hypothesis that short-run debt drives a wedge between net and gross wealth correlations across generations, the figure shows much larger correlations among lower-income households for housing wealth relative to net wealth. For the lowest income decile, the net wealth correlation is 0.10, while it is 0.24 for housing wealth. As parental income increases, the correlations converge, reaching full convergence at the 70th percentile of the income distribution. For the top decile, net wealth is more highly correlated across generations than is housing wealth, which (consistent with Figure 2) likely reflects the lower debt levels among this group and the wider variety of financial assets to which they have access (Black et al. 2020).

Figure 3. Net Wealth and Housing Wealth Correlations across the Income Distribution



Note: Age-adjusted percentile rank correlations of the child's wealth (housing or net) averaged over ages 29-33 and the parents' wealth (housing or net) at the given child age. Estimates are obtained from regressions that include fixed effects for each parent's age at the given child age. Income deciles are defined using total parental income averaged over ages 0-33. 95% confidence intervals also are shown.

III. Discussion and Conclusion

This paper uses Danish Register Data on the 1985-1989 birth cohorts to estimate intergenerational net wealth and gross housing wealth correlations by child age and parental income. Taken together, our results indicate that the existence of debt in the net wealth measure biases the intergenerational wealth

[1] Estimates by median parental educational attainment are shown in Online Appendix Figure A.1, Table A.6, and Table A.7. The patterns are similar to those by income, suggesting that transmission rates of housing wealth but not net wealth are higher for less-educated parents.

correlation downward for lower-income households. The larger correlations for gross housing wealth shows that this debt effect is transitory and does not reflect the availability of more permanent resources. When we employ a longer-run measure of wealth – cash value of housing– the correlations become stronger for lower income households relative to higher income households. This evidence suggests that using net wealth measures to estimate intergenerational wealth correlations provides a misleading picture of how wealth is transmitted across generations. Especially for households with large short-run debt holdings, using a gross rather than a net measure of wealth indicates that lower-income households experience larger transmission of wealth than do their higher-income counterparts.

The results from this analysis underscore the importance of examining gross wealth measures that better reflect long-run household resources when estimating the intergenerational correlation of wealth. Prior research has focused predominantly on net wealth. Our results show that net wealth correlations can be misleading during periods when households have high debt loads. Examining gross wealth, and in particular focusing on one important asset (housing), provides a cleaner picture of how wealth is correlated across generations. Our results also point to important differences across the income (and education) distribution in the intergenerational correlation of wealth. Future work examining the intergenerational correlations of specific assets across the income distribution as well as examining the causal effect of parental assets on the wealth of their adult children would be of high value.

REFERENCES

Black, Sandra E., Paul J. Devereux, Petter Lundborg, and Kaveh Majlesi. 2020. "Poor Little Rich Kids? The Role of Nature versus Nurture in Wealth and Other Economic Outcomes and Behaviors." *Review of Economic Studies* 87(4): 1683-1725.

Black, Sandra E., Paul J. Devereux, Petter Lundborg, and Kaveh Majlesi. 2017. "On the Origins of Risk-taking in Financial Markets." *Journal of Finance* 72(5): 2229-2278.

Boserup, Simon Halphen, Wojciech Kopczuk, and Claus Thustrup Kreiner. 2018. "Born with a Silver Spoon? Danish Evidence on Wealth Inequality in Childhood." *The Economic Journal* 128(612): F514-F544.

Daysal, N. Meltem, Michael F. Lovenheim, and David Wasser. 2022. "The Intergenerational Transmission of Housing Wealth." Working Paper.

Fagereng, Andreas, Magne Mogstad, and Marte Rønning. 2021. "Why Do Wealthy Parents have Wealthy Children?" *Journal of Political Economy* 129(3): 703-756.

Kreiner, Claus Thustrup, Søren Leth-Petersen, and Louise Charlotte Willerslev-Olsen. 2020. "Financial Trouble across Generations: Evidence from the Universe of Personal Loans in Denmark." *The Economic Journal* 130(625): 233-262.