

## Intergenerational Correlation of Household Wealth : Evidence from the JHPS Second-Generation Supplement

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# Intergenerational Correlation of Household Wealth: Evidence from the JHPS Second-Generation Supplement\*

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## Abstract

This study investigates the intergenerational correlation of household wealth and its determinants using the Japan Household Panel Survey and its second-generation supplement. Our main empirical findings are as follows: (1) The marginal effect of parents' financial wealth on their children's wealth is about 0.10 to 0.13, (2) the intergenerational correlation of household wealth is partly, albeit to a lesser extent than previous findings, determined by children's education and income, and (3) the impact of parental wealth on homeownership among children is largely explained by direct wealth transfers across generations. The study also investigates the relationship between future inheritance/gifts and the economic status of the child generation, finding that (1) future inheritance/gifts of financial wealth are largely unrelated to the economic status of the child generation and that (2) future inheritance/gifts of housing are negatively correlated with the economic status of the child generation.

**Keywords:** Household wealth; intergenerational correlation; gifts and inheritance; parent-child survey

**JEL No.:** D12, D31, D64, J62

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## 1. Introduction

The concentration of household wealth and widening inequality have become important policy issues in countries around the world. Recent empirical analyses of long-term estimates of wealth inequality have generally indicated that wealth inequality has tended to increase since the 1980s (Katic and Leigh, 2016; Alvaredo et al., 2018; Kuhn et al., 2020; Garbinti et al., 2021).

Several studies have examined the impact on macroeconomic wealth inequality of intergenerational transfers of wealth through inheritance and gifts. For example, using an overlapping generations model, De Nardi (2004) shows that voluntary bequests and the transmission of earnings ability play an important role in explaining the observed wealth distribution. Piketty and Zucman (2015) also show that inherited wealth accounted for 55%–65% of the total wealth in France in 2010 and that this share has been increasing since the 1970s. However, there have been few examinations using individual data of the way in which wealth concentration and inequality are maintained across generations, partly because of the limitations of available data.

Most of the analyses that have dealt with the intergenerational transmission of economic disparities have focused on the income levels and occupations of parents and children.<sup>1</sup> A representative example of such an analysis is the measurement of the intergenerational elasticity of earnings. For example, in Japan, Ueda (2009) and Lefranc et al. (2014) estimate the intergenerational elasticity of earnings. By contrast, only a few studies have estimated the intergenerational elasticity of wealth holdings using individual data (Charles and Hurst, 2003; Arrondel, 2013; Kubota, 2017).

This study uses newly collected panel data on parents and children to conduct two main analyses. In the first analysis, we present descriptive evidence of wealth distribution and transition across two generations. From this perspective, Kubota (2017), who also used a parent-child survey to measure the intergenerational elasticity of wealth, is an important previous study. Our analysis is novel in that it extends the analysis not only to financial wealth but also to homeownership as a real asset, and by using detailed information on the parental generation, we conduct a more in-depth analysis of the pathways that explain the intergenerational correlation of wealth. Another contribution of this study is that it takes advantage of the characteristics of a panel survey to conduct an analysis that considers the problem of measurement error in wealth holding.

When considering the issue of intergenerational correlation of household wealth, the role of gifts and inheritance is significant, as pointed out by Piketty (2000) and others. However, our first analysis is based on parent-child pairs in which at least one of the parents is still alive, so we cannot fully examine the effect of inheritance on the wealth holdings of the child generation. With this in mind, the second analysis examines how the likelihood of future inheritance (and gifts) is related to the current economic status of children.

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<sup>1</sup> See also Bowles and Gintis (2002) and Black and Devereux (2011) for a survey of intergenerational correlations of socioeconomic attributes of parents and children.

The results of this study can be summarized as follows: The first analysis, which measures the intergenerational correlation of household wealth, shows that (1) the marginal effect of parental wealth on child wealth is about 0.10–0.13, taking into account the age and basic sociodemographic characteristics of parents and children; (2) the intergenerational correlation of financial wealth is partially explained by factors such as the human capital accumulation and income level of the offspring, but its magnitude is smaller than that of existing studies in the United States; and (3) the effect of parental wealth on the child’s housing wealth (i.e., homeownership) is largely explained by past and future intergenerational transfers. The second analysis, which examined the relationship between the economic status of the child generation at the time of the survey and future inheritance and gifts, revealed that (1) future inheritances and gifts of financial wealth have a strong positive correlation with the asset holdings of the parent generation at the time of the survey but are generally unrelated to the economic status of the child generation, and (2) future inheritance and gifts of housing depend on both the asset holding status of the parent generation and the economic status of the child generation at the time of the survey. In other words, the children with lower household income and education tend to benefit from future housing inheritance as parental wealth increases.

The remainder of this paper is organized as follows: Section 2 presents an overview of the survey and its second-generation supplement and describes the main variables used in the analysis. Section 3 reviews the standard analytical framework for intergenerational correlations in household wealth and presents the empirical results. Section 4 concludes the paper.

## 2. Data and Variables

### 2.1 Japan Household Panel Survey and Second-Generation Supplement

In this study, we use the Japan Household Panel Survey and its second-generation supplement to construct data on parent-child pairs. In the following, the main survey, the Japan Household Panel Survey, will be referred to as the JHPS/KHPS, and its second-generation supplement will be referred to as JHPS-G2.

The JHPS/KHPS is a household panel survey of adult males and females that was originally conducted as two independent panel surveys by the Panel Data Research Center (PDRC) at Keio University. The first survey was the Keio Household Panel Survey (KHPS), which has been conducted annually since 2004. The second survey was the JHPS, which has been conducted annually since 2009. The initial sample size was 4,005 households for the KHPS and 4,022 households for the JHPS.<sup>2</sup> These two

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<sup>2</sup> In addition, the KHPS was supplemented by a new sample of 1,419 and 1,012 households in 2007 and 2012, respectively, and the JHPS was supplemented with a new sample of 2,203 households in 2019. In both surveys, the selection of the target population was conducted using a stratified two-stage random sampling method, with the first stratum being the region/city size and the second stratum being the census tract, making the sample representative of the entire country at the time of the first survey. The population in the first survey comprised males and females aged 20–69 in the KHPS, and males and females aged 20 or older in the JHPS.

surveys merged in 2014. The JHPS/KHPS provides a wide range of individual characteristics, such as the employment, income, education, and health status of the survey respondents and their spouses, as well as household characteristics, such as consumption, income, and financial and housing wealth.

The first JHPS-G2 was conducted in 2017 as a supplementary survey to the JHPS/KHPS. The first survey was conducted by the Center for Research on Equal Opportunity for Children (CREOC) at Keio University. The targeted respondents were children of JHPS/KHPS subjects and at least 18 years old at the time of the survey. The survey proceeded as follows: First, JHPS/KHPS subjects with children aged 18 years or older were informed of the JHPS-G2 survey implementation plan and asked to provide their children's residential addresses. Second, a request for survey cooperation with the JHPS-G2 was mailed to the targeted children, and then a mail or web-based survey was conducted with those who gave consent.

The second wave of JHPS-G2 was conducted in March 2019 in collaboration with the CREOC and PDRC. As in the first wave of the survey, the targeted respondents were children of JHPS/KHPS subjects who were at least 18 years old at the time of the survey. The survey procedure was the same as for the first wave. However, among the respondents to the first survey in 2017, those who gave permission to be contacted in the future were directly asked to participate in the survey. As a result, 1,001 subjects responded to the first wave of the survey, and 1,072 subjects responded to the second wave. In principle, the survey items of the JHPS-G2 follow those of the JHPS/KHPS so that children's responses to these items are comparable to those of parents obtained from the JHPS/KHPS. However, in comparison to the JHPS/KHPS, the JHPS-G2 includes a limited set of survey items, covering only basic information on the subject's education, employment, and health, as well as the household's income, consumption, and financial and housing wealth. For married children, basic information about their spouses was also obtained, such as their age, education, and employment status.

We constructed a dataset on parent-child pairs by connecting the JHPS/KHPS and JHPS-G2. Compared to other typical household panel surveys, the JHPS/KHPS is unique in its ability to provide a detailed picture of households' asset holdings. Specifically, the JHPS/KHPS provides information on savings and securities holdings, mortgages, debts, and the values of owner-occupied houses. The same information is also available for the JHPS-G2. By connecting the two surveys, it is possible to measure the wealth status of the two generations, parents and children.

The traditional intergenerational analysis is often based on cross-sectional data for either the parent or child generation. For example, if the data are targeted at children, information about the parents is only available for proxy responses by the children. In this case, information that is easy for the child to answer, such as the parent's occupation, can be available, but information about the amount of assets held, for example, is difficult to survey. In addition, there are few surveys that ask for detailed information on asset holdings even if the design surveys both parents and children, and it can be said that there are few datasets in Japan that make it possible to examine the relationship between parent

and child asset holdings.

In the following analysis, the second JHPS-G2 survey conducted in 2019 was used as the main dataset for the analysis, and by connecting JHPS/KHPS to this data using household ID as the key, a dataset of parent-child pairs with children as the unit of observation was constructed. Note that the first JHPS-G2 survey does not include survey items on wealth holdings, so when using the wealth holdings of the child generation, the analysis was effectively based on the second wave of the JHPS-G2.

## 2.2 Variables used in the analysis

### **Income and Wealth**

First, the asset holdings of the two generations of parents and children, which is the main interest of this study, were prepared as follows: For the parent generation, we measured net asset holdings based on savings and marketable securities holdings, outstanding loans, and self-assessed values of their houses, as surveyed in the JHPS/KHPS. Specifically, we calculated the net worth of the parents' generation by subtracting the outstanding balance of loans, including mortgages, from the sum of their financial wealth (savings and securities) and the self-assessed value of their houses. However, since there are concerns about measurement errors in the balance of loans and the self-assessed value of housing, we also use gross financial wealth (i.e., savings and securities holdings) as a measure of parental wealth.

In the estimation of intergenerational correlations of income and wealth, there is a concern that attenuation bias may occur due to measurement errors regarding parental income and wealth (Black and Devereux, 2011). In the following analysis, we follow the standard method and use the average of several previous years for parental income and asset holdings (Charles and Hurst, 2003). Specifically, using the characteristics of the JHPS/KHPS as a panel survey, we use the average of the three years (2016–2018) or five years (2014–2018) prior to the implementation of the 2019 survey.

For child wealth, we constructed variables from the JHPS-G2, which have the same asset-related survey items as the JHPS/KHPS, so that the same asset-related variables can be measured for the child generation as for the parent generation. However, the response rates for outstanding loans and housing assets were not particularly high.<sup>3</sup> For this reason, the following analysis focuses on the amount of financial wealth held and whether or not the respondents owned their own homes as variables representing the asset holdings of the child generation.

In addition, annual pre-tax household income was used for both parent and child income. For the parent generation, as in the case of the asset variable, the average household income for the preceding three years (2016–2018) was used.

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<sup>3</sup> Of the sample of children available for analysis, 58.0% responded with the outstanding debt and 72.5% responded with the self-assessed value of the house.



## **Gifts and Inheritance**

As discussed in Section 1, direct transfers by inheritance and gifts may explain the intergenerational correlation of wealth. On the basis of the information available from the JHPS-G2, we created three types of variable. The first relates to past intergenerational transfers; the JHPS-G2 provides information on financial assistance between parents and children that occurred in the year prior to the survey. These items capture the existence, amount, and purpose of financial assistance in the past year. In the following analysis, the items “How much financial aid did you receive from your parents in the past year?” and “How much financial aid did you give to your parents in the past year?” were used to determine the amount of aid from parents to children and from children to parents, respectively.<sup>4</sup> While these variables have the advantage of being able to measure direct financial transfers between parents and children, they also have some drawbacks. First, parental support here includes not only that provided by the parents of the JHPS-G2 respondents themselves (JHPS/KHPS subjects) but also that provided by the parents of their spouses. In addition, from the perspective of explaining the intergenerational correlation of wealth, it would be desirable to use the accumulated amount up to the time of the survey, but this item only provides information on transfers in the year prior to the survey. To account for this measurement problem, we created a second variable, a dummy variable indicating that one of the parents was deceased. If one of the parents was deceased at the time of the survey, the subject may have inherited from a parent in the past.

The third variable is related to future intergenerational transfers. In the JHPS-G2, respondents were asked whether they expected future gifts and/or inheritance from their parents. There are separate survey items for future transfers of financial wealth and housing. We created dummy variables for financial and housing transfers that take the value of 1 when future inheritance or gifts are expected.

## **Other Control Variables**

In addition to the variables explained above, we also used parent and child characteristics such as age, marital status, education, and place of residence. We used the attributes of the respondents of the JHPS-G2 for age and educational background of the children.<sup>5</sup> The age of the younger parent was used for the parents’ age. Father’s education was used for education. For residence, we created a dummy variable indicating the city and county size (government-designated city, other city, town, or village)

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<sup>4</sup> Financial support between parents and children in the JHPS-G2 includes support for education and housing purchase but does not include support due to inheritance.

<sup>5</sup> It should be noted that the head of the household in a married-couple household does not necessarily match the respondent in the JHPS-G2. Since the analysis in this paper targets asset holdings and income at the household level, it would be appropriate to use the attributes of the head of the household, but since the JHPS-G2 asks very little about the attributes of spouses, we decided to use the attributes of the respondents themselves. However, we have confirmed that the results obtained are almost the same even if the sample is divided by the gender of the JHPS-G2 respondents.

of the residence of each parent and child, as well as a dummy variable indicating whether the parent and child lived together or in close proximity (same city, town, or village, same prefecture).

The sibling composition of children may also have an effect when analyzing intergenerational transfers, such as gifts and inheritance. For this reason, we created variables representing the number of siblings and whether or not the survey targets in JHPS-G2 were only children.

### 2.3 Descriptive statistics

Table 1 shows the descriptive statistics for the parent and child samples, showing that the proportion of females in the child sample was higher than in the parents sample. In addition, the percentage of parents and children living together was also relatively high. According to the 2015 Census, the percentage of individuals aged 20–59 living with their parents was about 32%, around the same as in the JHPS-G2. However, since the co-residence rate in the census included not only one's own parents but also one's spouse's parents, the co-residence rate with one's own parents was approximately 16%, based on simple calculations. By contrast, the cohabitation rate for the JHPS-G2 sample (Table 1) was 27.0%. The impact of these sampling characteristics on the estimation results is discussed later.

## 3. Empirical Model and Estimation Results

In this section, we present a standard framework for analyzing intergenerational correlations in household wealth and show the results of our analysis using the JHPS-G2. The analysis consists of three major parts. In the first part, we examine the current state of intergenerational mobility in terms of wealth holdings. Specifically, we calculate an intergenerational transition matrix based on the amount of financial wealth held by parents and children. For comparison, we also examine the intergenerational transition matrix of parents and children's annual household income. In the second analysis, we use a regression analysis to estimate the intergenerational correlation of wealth holdings. This is a standard method for analyzing intergenerational correlations in income, and in its simplest formulation, it is obtained as the coefficient of a regression of children's wealth on their parents' wealth. In the analysis, we add additional control variables that mediate the intergenerational correlation in wealth, such as the education level of the child generation, income, and past and future intergenerational transfers, to see how the magnitude of the intergenerational correlation changes. Finally, in the third analysis, we explore the relationship between children's economic status and future intergenerational transfers. We present the results of the first and second analyses in Sections 3.1 and 3.2, and the results of the third analysis in Section 3.3.

### 3.1 Intergenerational correlation of household wealth

Table 2 shows the intergenerational transition matrix for each quartile of the financial asset holdings of the parent and child generations. Each row of the table represents the quartile level of financial

wealth held by the parent generation, and the column represents the quartile level of the child generation. Since the sum of the rows is standardized to 100, the value in each row indicates the distribution of the financial wealth holdings of the children's generation, conditional on the financial wealth held by the parents. In the actual calculations, we took into account the fact that the amount of financial wealth held by households depended on their age and marital status and conducted our analysis using the following procedure. First, using a sample of parents and children, we regressed the amount of financial wealth held on the subject's age and its square, gender, and marital status, and calculated the residuals. Then, on the basis of the respective estimation results, we divided the sample into quartiles based on the size of the residuals. Therefore, the results shown in Table 2 indicate the intergenerational stratification of financial asset holdings adjusted for age, sex, and marital status.

From Table 2, we can point out several aspects of intergenerational mobility in financial wealth holdings. First, there is a clear positive correlation between parents and children's financial wealth holdings. For example, when parents' financial wealth is below the 25th percentile, 42.4% of the children also stay below the 25th percentile, whereas when the parents' financial wealth is above the 75th percentile, only 14.4% do. Kubota (2017) found these figures to be 38% and 15%, respectively, showing roughly similar results. The percentage of parents and children staying in the same asset quartile is substantially larger for parents both at the top and bottom of the wealth distribution.

Second, we see that the intergenerational mobility of financial wealth is smaller than that of household income. Table 3 shows the results of the intergenerational transition matrix of pre-tax household income using the same method for comparison.<sup>6</sup> A comparison of Tables 2 and 3 shows that the proportion of parents and children who remain in the same asset/income quartile is higher in terms of the amount of financial wealth held, especially at the top and bottom of the parental income/asset distribution.

To further examine the relationship between the wealth holdings of the parent and child generations, an analysis using regression analysis is conducted in the following section. The empirical model is as follows:

$$y_c = \alpha + f(w_p) + \beta_c x_c + \beta_p x_p + \varepsilon_c \quad (1)$$

where  $c$  is the index representing the child,  $p$  is the index representing the parent, and  $w_p$  represents the amount of wealth held by the parents. In the following analysis, we used the amount of financial wealth held (savings + securities) or net worth (savings + securities + self-assessed value of housing liabilities);  $y_c$  represents child characteristics influenced by parental wealth. In the following empirical

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<sup>6</sup> In preparing Table 3, the sample was limited to cases in which the younger of the parents was 65 years old or younger, taking into account the inclusion of retired parents.

analysis, we mainly focus on the effect of parental wealth on child wealth, measured either by savings, financial wealth holdings, or homeownership of the child generation, but we also estimate the effects on various aspects of child generation, including college attendance, household income, savings rate, and past and future transfers.

There may be a non-linear relationship between  $w_c$  and  $y_c$ . For this reason, in estimating Equation (1), we assume  $f$  as a quadratic function of  $w_p$ ;  $x_c$  and  $x_p$  are the attributes of the children and parents, respectively.<sup>7</sup> For children, we used age and its square, gender, marital status, and dummy variable for co-residence with parents, and for parents, we used age and its square, gender, and marital status.

The estimation results of Equation (1) are summarized in Table 4. The table presents results from a series of simple regressions in which different child attributes shown in the first column are regressed on parental wealth. The marginal effects of parental wealth are presented in Table 4. The results for the other coefficients are omitted. The standard errors in parentheses are robust to correlations in the error term between observations with the same parent.<sup>8</sup>

Looking at the results using children's savings and financial wealth holdings as the dependent variables, both are significantly and positively associated with parental wealth. Comparing the results for savings and financial wealth holdings of the child generation, the estimated marginal effect of parental net worth is larger for the latter. This may be attributed to the non-negligible size of securities holdings in households with a large amount of assets. Comparing the results using different measures of parental wealth, the marginal effect is somewhat smaller when parental net worth is used. Looking at the estimation results when using the financial asset holdings of the child generation as the dependent variable, the estimated marginal effect is approximately 0.10–0.13. The results indicate that an additional 1 million yen increase in parental wealth (financial wealth holdings or net worth) leads to an increase in the financial wealth holdings of the child generation of, on average, about 100,000 to 130,000 yen. This result is somewhat smaller than that of Fagereng et al. (2021), who used data from Norway.<sup>9</sup> Table A1 presents the estimates of the intergenerational elasticity based on the results shown in Table 1. Our results show that the intergenerational elasticity of financial wealth between parent and child generations ranges between 0.54 and 0.59, which is slightly larger than that found by Charles and Hurst (2003) and Arrondel (2013), who conducted similar estimations. Parental wealth is also

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<sup>7</sup> Several existing studies assume a double-log model as the estimating equation equivalent to Equation (1) and interpret the coefficient on the amount of parental assets as an estimate of intergenerational elasticity (Charles and Hurst, 2003; Arrondel, 2013). In such a model, the analysis would be limited to a sample in which asset holdings are non-negative. However, in the data used in this study, approximately 16.4% of the sample of children and 12.6% of the sample of parents have zero financial asset holdings, and in order to include these samples in the analysis, the formulation in Equation (1) was adopted. Alternative methods include performing an inverse hyperbolic transformation (Kubota, 2017) or transforming the asset holdings of each parent and child into percentile ranks for analysis (e.g., Adermon et al., 2018; Boserup et al., 2018; Pfeffer and Killewald, 2018).

<sup>8</sup> If a household of a JHPS/KHPS subject has more than one child in the age group covered by the JHPS-G2, the sample used for estimation in Equation (1) will include siblings with the same parents.

<sup>9</sup> According to Fagereng et al. (2021), the magnitude of the marginal effect of parental asset holdings ranges from 0.20 to 0.28 when the child is adopted, and from 0.47 to 0.58 when the child is not adopted.

positively associated with child homeownership, but the relationship is weaker in terms of statistical significance.

The above results indicate that there is a positive correlation between parent and child asset holdings after controlling for factors such as parent and child age, child marital status and gender, and parent and child cohabitation. There are several possible paths for this intergenerational correlation. The first path is the possibility that parental wealth holdings promote human capital accumulation in their children through the relaxation of borrowing constraints, which in turn leads to increases in income and wealth accumulation. The estimation results in Table 4 show that the education of children (college degree or higher = 1) and household income are both significantly positively correlated with parental net wealth holdings, which is consistent with the above possibility. The second path is the possibility that the preference parameters (risk aversion and time discount rate) that govern the choice of risky assets and the propensity to save are correlated between parents and children; thus, intergenerational correlations also arise in asset holdings. Although it is difficult to test this possibility directly due to data limitations, Table 4 shows the results using the ratio of savings to annual household income as the dependent variable for the propensity of the child to save. This confirms that parental asset holdings are significantly and positively correlated with the savings ratio of the child.<sup>10</sup> The third path is through direct asset transfers from the parents. If parents who own large amounts of assets are transferring assets to their children through gifts during their lifetime, this will directly lead to a positive intergenerational correlation in asset holdings. For this possibility, we estimated the amount of financial support from parents as the dependent variable in Table 4. As a result, parental net worth is positively correlated with the amount of financial support from parents that occurred in the year before the survey, which is consistent with the above possibility. In addition, children's wealth accumulation may be affected by expected future asset transfers from their parents.<sup>11</sup> In Table 4, we also analyze financial wealth and the possibility of future inheritance and gifts of housing as dependent variables, and these also show positive correlations with parental wealth holdings.

### 3.2 Adding mediating variables

In this section, we conduct an analysis that extends the model in Equation (1) to examine the factors behind the intergenerational correlation of household wealth. We check how the magnitude of the marginal effect changes by sequentially adding factors corresponding to the multiple paths described in the previous section as mediating variables to the explanatory variables in Equation (1). Mediating

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<sup>10</sup> Because children's savings percentages may be directly affected by past asset transfers from parents, children's inheritance motives, and the level of asset holdings, caution should be exercised in interpreting these results as solely attributable to correlations between parent and child preference parameters (Dynan et al., 2004). The JHPS/KHPS and JHPS-G2 provide hypothetical question items to measure preference parameters such as time discount rate and risk aversion, and these variables need to be examined in more detail.

<sup>11</sup> Ishino et al. (2020) directly examine such a possibility. According to them, child households that may inherit their parents' housing tend to consume more, while child households that may inherit financial assets tend to save more.

variables include children’s education (college degree or higher = 1), household income, financial support between parents and children, whether one of the parents is deceased, future inheritance/gifts, and child’s savings ratio. Specifically, we estimated the following regression model by adding the mediating variables  $z_c$  in Equation (1)

$$y_c = \alpha + f(w_p) + \beta_c x_c + \beta_p x_p + \gamma z_c + u_c \quad (2)$$

to examine the marginal effect of parental wealth holdings,  $w_p$ . In Equation (2), we use the amount of financial wealth and homeownership (owner-occupied = 1) of the child generation as the dependent variable.

If, for example, the children’s human capital accumulation and the resulting higher income levels are the factors explaining the intergenerational correlation of wealth, then the marginal effect of parental wealth becomes smaller when we control for children’s education and income levels as an additional mediating variable,  $z_c$ . A similar analysis was conducted by Charles and Hurst (2003).

Table 5 presents the estimation results. The table presents the estimated marginal effects of parental wealth  $w_p$  on child wealth (financial wealth and homeownership). The mediating variables in the regression are shown in the first column. Model [1] in the first row shows our baseline results, presented in Table 4, without controlling for the mediating variables. The numbers shown in the “0%” column shows how much of the parental wealth effect is accounted for by the set of mediating variables included in each model compared to our baseline.

The findings indicate that by adding the child’s final education and household income as explanatory variables, the estimated value of the marginal effect on  $w_p$  becomes smaller. Specifically, when the amount of financial wealth held by the child is used as the dependent variable, the estimated value of the marginal effect becomes approximately 35% smaller, from 0.1016 to 0.0659. However, Charles and Hurst (2003), who used data from the United States, found the coefficient estimate to be about 54% smaller, from 0.37 to 0.17, in a similar estimation, and the additional effects of children’s final education and household income were small. One possible interpretation of this result is that the financial burden of attending college is relatively small in Japan compared to the U.S., and that parental wealth ownership has less of an impact on children’s college education by easing borrowing constraints.<sup>12</sup> The same result was confirmed when homeownership was used as an explanatory variable, and the marginal effect was reduced by approximately 35%, from 0.0012 to 0.0007, by

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<sup>12</sup> On the other hand, the possibility of bias due to measurement error cannot be ruled out because the cross-sectional values observed in the JHPS-G2 conducted in 2019 are used here as the household income of children. By contrast, in Charles and Hurst (2003), which used the PSID, information on household income of children was also available at multiple time points, and estimates were made using historical averages. To deal with this problem, we can consider using the projected annual household income of the child generation, and we will study this issue in more detail in the future.

adding children’s final education and annual household income as explanatory variables.

From the addition of more explanatory variables to the above models (Models [3] through [8]), the following results are confirmed. First, when the amount of financial wealth held by children is used as the dependent variable, the marginal effect on  $w_p$  decreases almost monotonically. As a result, in the case where all variables are added (Model [8]), the estimated value is 0.0345, which is approximately 66% smaller than the original value, and loses its statistical significance. These changes are similar to the results of Charles and Hurst (2003).<sup>13</sup>

On the other hand, when child homeownership is the dependent variable, the marginal effect estimate becomes insignificant by adding the household income of the child generation as an explanatory variable. In addition, we find that the values become significantly smaller by adding the death of one of the parents (past inheritability) and the possibility of future inheritance or gifts as explanatory variables in particular. This suggests that homeownership as a real asset is strongly affected by direct intergenerational transfers, such as inheritance and gifts.

### 3.3 Future inheritance/gifts

The results of the previous section show that the wealth holdings of the child generation at the time of the JHPS-G2 survey are positively correlated with parental wealth. Since the subjects of JHPS-G2 are individuals with at least one parent still alive, they may have gifts or inheritance from their parents in the future. Therefore, future inheritance (or gifts) from parents may affect the eventual wealth distribution of the child generation.

In this section, with this in mind, we examine the relationship between the likelihood of future inheritance and the economic status of children at the time of the survey. If households that are economically disadvantaged at the time of the survey have a lower likelihood of gifts or inheritance in the future, the intergenerational wealth transfers may increase the wealth inequality of the child generation more than indicated in the previous section. Conversely, if households that are economically disadvantaged are more likely to have gifts or inheritance in the future, then intergenerational wealth transfers can mitigate the wealth inequality of the child generation.

Our model of the likelihood of future inheritance is given as follows:

$$Pr(trans_c = 1) = \alpha + g(w_p, y_c) + \beta_c x_c + \beta_p x_p + v_c \quad (3)$$

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<sup>13</sup> On the other hand, there are still some problems related to the measurement of variables in the results of our analysis. For example, asset transfers from parents in the past are considered to be one of the important factors in the intergenerational correlation of assets, but since the JHPS-G2 can only capture financial transfers that occurred in the preceding year, it may not fully reflect these factors. In addition, the financial transfers here include not only those by the parents of the JHPS/G2 subjects (JHPS/KHPS subjects) but also those by the parents of their spouses, which may also have an impact. We also cannot rule out the possibility that factors not taken into account here, such as genetic correlations of ability and skill transmission between parents and children (which affect the growth rate of income), intergenerational correlations of occupation, and business succession, may be the pathway for intergenerational correlations of asset holdings (Okumura and Usui, 2016; Fagereng et al., 2021).

where  $trans_c$  is a dummy variable indicating that a child can expect future inheritance from their parents,  $w_p$  indicates parental net worth, and  $y_c$  is a variable representing the economic status of the child generation measured by the current household income. The dummy variable for future inheritance is defined separately for financial wealth and housing.

In Equation (3), future inheritance from parents depends on both parental net worth ( $w_p$ ) and the child's economic status at the time of the survey. It is likely that wealthy parents will bequeath wealth to their children, and the current net worth of parents is positively associated with future inheritance. The bequest decision can also be affected by a child's economic status. For example, altruistic parents might bequeath more to economically disadvantaged children. We expect such an altruistic division of bequests to be more likely when parents have sufficient net worth. By contrast, less wealthy parents may have no room for an altruistic division of bequests. Consequently, our empirical model includes parental net worth ( $w_p$ ), child's economic status ( $y_c$ ), and their interaction term ( $w_p \times y_c$ ) as explanatory variables, which is represented by  $g(w_p, y_c)$  in Equation (3). We also control for the characteristics of parents and children ( $x_p$  and  $x_c$ ), which include the number of siblings and homeownership of JHPS-G2 subjects, in addition to variables such as sex, age, marital status, co-residence, and location of parents and children, as in the previous sections.

The results of the logit model estimation using Equation (3) are shown in Table 6. This table shows the marginal effect of parental net worth on the probability of future gifts and inheritance, and how this effect varies with the level of current household income of the children. Specifically, we evaluate the average marginal effect of parental net wealth holdings for children in the bottom 10%, median average, and top 10% of the income distribution. Columns [1] and [2] show the results when the future inheritance of financial wealth is used as the dependent variable, while columns [3] and [4] show the results when future housing inheritance is used as the dependent variable. In addition, we estimate the model for the self-reported value of the parent's house, which is expected to be inherited. These results are presented in columns [5] and [6].<sup>14</sup> In this case, we restricted our sample to children who expect to inherit their parents' houses.

Estimation results for the future inheritance of financial wealth (columns [1] and [2]) show that parental net worth is significantly and positively associated with the likelihood of inheriting financial wealth, regardless of the level of children's current income. On the other hand, results on the future inheritance of a parent's house (columns [3] and [4]) show that parental net worth is also positively associated with the probability of future housing inheritance, but these effects are more pronounced for children with lower current income. The estimation results show that a one million yen increase in parental net worth increases the probability of housing inheritance by 0.18%–0.45% for children in

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<sup>14</sup> Estimates in columns [5] and [6] are based on linear regression models.



the bottom 10% of income distribution, whereas the corresponding estimates are almost zero and not statistically significant for children in the top 10% of income distribution. Thus, as parental net worth increases, the likelihood of inheriting a house in the future increases for economically disadvantaged children. This result is consistent with Hirayama (2019), who showed that low-income children are more likely to choose to live with their parents and inherit their houses, suggesting that housing inheritance plays a role in mitigating wealth inequality.

The above results are also supported by the results when we use children's education as an alternative measure of a child's economic status. We estimate models that allow for different effects of parental net worth depending on the child's education (high school or less, junior/technical college, college/graduate school). The results are presented in Table 7. Much as in Table 6, columns [1] and [2] of Table 7 show that parental net worth is positively associated with future inheritance of financial wealth regardless of children's education levels. Columns [3] and [4] show that less educated children are more likely to inherit housing as their parents' net worth increases.

Finally, the results on the value of parents' houses to be inherited (columns [5] and [6] in Tables 6 and 7) show that the self-reported value of the house to be inherited tends to be higher as the child's income and education levels are higher and the amount of the parent's wealth holdings increases. These results suggest that, unlike the inheritability of housing, the value of inherited housing may be more favorable for economically advantaged children.

#### 4. Conclusion

Using the JHPS-G2, we created new individual-level data for parents and children. In addition to the basic attributes of each parent and child, these data are unique in that they include detailed information on wealth holdings. In this study, we use the data to measure the intergenerational correlation between parents and children's wealth holdings and discuss the potential factors that explain this correlation. In addition, we confirm how the economic status of the child generation at the time of the survey is related to the likelihood of inheritance from parents.

The main results of the analysis are as follows: First, we confirmed the positive correlation between the amount of financial wealth held by parents and children and found that the marginal effect of parental wealth on child wealth is about 0.10–0.13. The magnitude of the corresponding intergenerational elasticity of household wealth is approximately the same as or slightly larger than the values in previous studies in the U.S. and other countries. This result clearly shows the intergenerational correlation of household wealth in Japan. In addition, when we consider mediating factors, such as the income and education of the child generation, intergenerational transfers of wealth, propensity to save, and location, as potential pathways to explain the correlation between parent and child wealth holdings, the size of the marginal effect is reduced by up to 66%. This result suggests that the wealth holdings of the parental generation may affect the wealth accumulation of the child

generation through human capital investment in children, direct wealth transfers, and correlations in the propensity to save.

Second, parental net wealth holdings have been shown to be positively correlated with homeownership by children, confirming the intergenerational correlation of household wealth not only with financial wealth but also with real assets. In addition, the analysis considering the attributes of the child generation as a mediating variable suggests that the influence of parental wealth on homeownership of the child generation may arise mostly through the direct intergenerational transfer of wealth.

Third, an analysis of the relationship between the economic status of the child generation at the time of the survey and future inheritance from their parents showed (1) that the future inheritance of financial wealth has a strong positive correlation with the wealth-holding status of the parent generation at the time of the survey but is generally unrelated to the economic status of the child generation and (2) that the likelihood of inheriting a house depends on both the wealth-holding status of the parent generation and the economic status of the child generation at the time of the survey, with the child generation with a lower household income and education tending to have a higher likelihood of inheriting a house as the wealth holding of the parent generation increases.

As mentioned in Section 1, there has been a dearth of microdata with detailed information on the wealth holdings of parents and children, and this situation has made it difficult to analyze the intergenerational correlation of household wealth in Japan. The main contribution of this study is that it presents the current state of the intergenerational correlation of wealth holdings in Japan. However, there are some limitations to it and future issues that need to be addressed. One of the most significant problems is related to the survey design of the JHPS-G2. The JHPS-G2 survey can only be conducted if the parent generation (JHPS/KHPS subjects) provides the residential address of the child and the child generation (JHPS-G2 subjects) gives consent. Therefore, the obtained sample of the child generation is not necessarily randomly selected, which may pose sample-selection issues. Specifically, compared to the population average, the sample of children in the JHPS-G2 is more likely to be female and to live with their parents. Although the direction and magnitude of the bias caused by this sample selection are not necessarily clear, it is possible that our estimates of the intergenerational wealth correlation are biased upward. We believe that more careful consideration will be required.

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**Table 1: Descriptive statistics**

	Children		Parents' generation	
	Mean	(S.D.)	Mean	(S.D.)
Age	36.05	(9.585)	62.003	(10.054)
Female = 1	0.641	(0.480)	0.569	(0.496)
Marital status = 1	0.527	(0.500)	0.844	(0.363)
Last educational background <sup>(1)</sup>				
Junior and senior high school	0.197	(0.398)	0.486	(0.500)
Junior college/College of technology	0.313	(0.464)	0.13	(0.337)
University and graduate school	0.49	(0.500)	0.384	(0.487)
Annual household income <sup>(2)</sup>	6.941	(5.345)	7.476	(4.505)
Savings <sup>(3)</sup>	6.269	(10.999)	11.87	(15.479)
Financial wealth held <sup>(4)</sup>	8.105	(15.175)	14.811	(20.161)
Homeownership = 1	0.667	(0.472)	0.913	(0.282)
Financial support between parents and children <sup>(5)</sup>	21.996	(142.111)	8.119	(70.083)
Place of residence (dummy variable)				
Ordinance-designated city	0.359	(0.480)	0.305	(0.460)
Other cities	0.571	(0.495)	0.59	(0.492)
Towns and villages	0.07	(0.255)	0.105	(0.307)
Number of siblings <sup>(6)</sup>	2.373	(0.756)		
Only child = 1 <sup>(6)</sup>	0.101	(0.301)		
Location of parents and children (dummy variable)				
Living together	0.27	(0.444)		
Within the same prefecture <sup>(6)</sup>	0.743	(0.437)		
Within the same city, town, or village <sup>(6)</sup>	0.583	(0.493)		
N	715		962	

Note: The age of the child is that of the subject of the JHPS-G2. Parents' age is that of the younger of the parents. Annual household income, savings, and financial asset holdings are all in millions of yen. Annual household income, savings, and financial asset holdings of the parent generation are all averages for 2016–2018. Financial support of the child generation is the amount received from the parent; financial support of the parent generation is the amount received from the child (in millions of yen). Annual household income, savings, financial wealth holdings, financial assistance, and sibling composition and parent-child location of the child generation are for the sample excluding missing values. The final educational background of the parents is that of the surviving father. (1) Parent: N = 830; (2) Child: N = 670; (3) Child: N = 478; (4) Child: N = 374; (5) Child: N = 700, Parent: N = 886; (6) Child: N = 665.

**Table 2: Intergenerational transition matrix of financial wealth holdings**

Household income quartile of parents' generation (adjusted for sex, age, and marital status)	Quartile of annual household income of children (adjusted for sex, age, and marital status)				Total
	I	II	III	IV	
I	42.4	37	12	8.7	100
II	24.7	24.7	36	14.6	100
III	20	25.6	22.2	32.2	100
IV	14.4	11.1	30	44.4	100
Total	25.5	24.7	24.9	24.9	100

Note: The quartiles of financial asset holdings for the parent and child generations were determined on the basis of the residuals from regressing the respective financial wealth holdings on age and its square, gender, and marital status. Each cell in the table then shows the result of calculating the proportions from the results of cross-tabulation by parent and child (sex-, age-, and marital status-adjusted) financial asset value quartiles so that the row sum is 100.

**Table 3: Intergenerational transition matrix of household income**

Household income quartile of parents' generation (adjusted for sex, age, and marital status)	Quartile of annual household income of children (adjusted for sex, age, and marital status)				Total
	I	II	III	IV	
I	36.1	28.9	24.1	10.8	100
II	23.2	29.3	28	19.5	100
III	24.1	22.9	26.5	26.5	100
IV	17.1	18.3	22	42.7	100
Total	25.2	24.8	25.2	24.8	100

Note: The household income quartiles for the parent and child generations were determined on the basis of the residuals from regressing the respective household income on age and its square, gender, and marital status. Each cell in the table then shows the results of calculating the percentages from the results of cross-tabulation by (sex-, age-, and marital status-adjusted) income quartiles for parents and children so that the row sum is 100. For the parent generation, the sample is limited to those in which the younger of the parents is 65 years old or younger.

**Table 4: Intergenerational correlation between parental wealth and child attributes**

Attributes of the child generation (dep. var.)	Parent generation's wealth holdings (explanatory variable)								
	Financial wealth holdings (average of past three years)			Financial wealth holdings (average of the past five years)			Net wealth holdings (average of the past three years)		
	Coef. (S.E.)	Adj. R <sup>2</sup>	N	Coef. (S.E.)	Adj. R <sup>2</sup>	N	Coef. (S.E.)	Adj. R <sup>2</sup>	N
Amount of deposits and savings	0.1088 *** (0.0370)	0.197	457	0.1253 *** (0.0374)	0.194	457	0.0688 *** (0.0195)	0.135	438
Financial wealth	0.1088 ** (0.0483)	0.303	360	0.1259 ** (0.0510)	0.308	360	0.1016 *** (0.0255)	0.181	346
Homeownership = 1	0.0012 (0.0012)	0.136	673	0.0013 (0.0012)	0.135	673	0.0012 * (0.0006)	0.136	639
College degree or higher = 1	0.0065 *** (0.0013)	0.075	893	0.0066 *** (0.0014)	0.076	893	0.0028 *** (0.0007)	0.09	852
Annual household income	0.0272 (0.0168)	0.093	634	0.0242 (0.0177)	0.092	634	0.0244 *** (0.0081)	0.081	608
Savings ratio (%)	0.222 *** (0.0511)	0.052	458	0.2381 *** (0.0548)	0.055	458	0.0516 * (0.0269)	0.039	441
Financial support from parents (over the last year)	0.4554 (0.3272)	0.019	855	0.4278 (0.3534)	0.019	855	0.213 ** (0.1027)	0.019	814
With future gifts/inheritance = 1									
Financial wealth	0.0081 *** (0.0013)	0.058	738	0.0087 *** (0.0014)	0.062	738	0.0032 *** (0.0009)	0.058	700
Housing	0.0039 *** (0.0014)	0.038	734	0.0043 *** (0.0016)	0.039	734	0.0021 *** (0.0007)	0.042	696

Note: Marginal effects and standard errors of the parental generation's asset variables on the dependent variable in the table side are reported. Figures in parentheses are cluster-robust standard errors with respect to the household ID of the parent generation. \*\*\*, \*\*, and \* indicate that the estimated coefficients are significant at the 1%, 5%, and 10% levels, respectively. In all estimations, parent and child age and their squared terms, child gender, marital status, and parent-child cohabitation dummies are added as explanatory variables. The units for savings, financial wealth holdings, and net asset holdings are all in millions of yen. The unit for financial support from parents is 10,000 yen.

**Table 5: Intergenerational correlation between net wealth holdings of parents and financial wealth holdings and homeownership of children**

Added explanatory variables		Asset holdings of the child generation (dependent variable)			
		Financial wealth held		Homeownership = 1	
		Coef. (S.E.)	(%)	Coef. (S.E.)	(%)
[1]	Age, gender, marital status, living together	0.1016 *** (0.0255)	(100)	0.0012 * (0.0006)	(100)
[2]	+ Final education	0.0843 *** (0.0261)	(83)	0.0011 * (0.0006)	(93)
[3]	+ Income	0.0659 *** (0.0248)	(65)	0.0007 (0.0006)	(65)
[4]	+ Financial support between parents and children	0.0551 ** (0.0250)	(54)	0.0007 (0.0006)	(58)
[5]	+ Death of parents	0.0591 ** (0.0268)	(58)	0.0004 (0.0006)	(31)
[6]	+ Future gifting and inheritance	0.0553 ** (0.0275)	(54)	0.0001 (0.0006)	(9)
[7]	+ Savings ratio	0.0364 (0.0281)	(36)	0.0001 (0.0006)	(10)
[8]	+ Parent-child location	0.0345 (0.0290)	(34)	0.0002 (0.0006)	(20)

Note: Results using net asset holdings as the variable for asset holdings of the parent generation. The table summarizes the changes in marginal effects when the explanatory variables are added sequentially. The “%” column shows the change when the magnitude of the coefficient in Model [1] is set to 100. Figures in parentheses are cluster-robust standard errors for the household ID of the parent generation. \*\*\*, \*\*, and \* indicate that the estimated coefficients are significant at the 1%, 5%, and 10% levels, respectively. In all estimations, parent-child age and its squared term, child gender, marital status, and parent-child cohabitation dummies are added as explanatory variables.



**Table 6: Net wealth holdings of parents' generation and future gifts and inheritance classified by child's income**

	Gifts and inheritance of financial wealth		Gifts and inheritance of housing		Housing wealth	
	[1]	[2]	[3]	[4]	[5]	[6]
Annual household income (child)						
Bottom 10%	0.0042 ** (0.0019)	0.0045 ** (0.0020)	0.0043 *** (0.0011)	0.0045 *** (0.0012)	0.0042 ** (0.0017)	0.0037 ** (0.0017)
Median	0.0044 *** (0.0012)	0.0046 *** (0.0012)	0.0019 ** (0.0008)	0.0021 *** (0.0008)	0.0051 *** (0.0014)	0.0047 *** (0.0014)
Top 10%	0.0043 *** (0.0010)	0.0044 *** (0.0010)	0.0002 (0.0010)	0.0001 (0.0010)	0.0053 *** (0.0015)	0.0052 *** (0.0015)
Control variable						
Child attributes	No	Yes	No	Yes	No	Yes
Location attributes	No	Yes	No	Yes	No	Yes
N	586	583	586	583	278	277

Note: Marginal effects are shown for parental net wealth holdings. Figures in parentheses are cluster-robust standard errors for parental household ID. \*\*\*, \*\*, and \* indicate that the estimated coefficients are significant at the 1%, 5%, and 10% levels, respectively. In all estimations, parent and child age and their squared terms, child gender, marital status, and parent-child cohabitation dummies are added as explanatory variables. The control variables comprise child attributes (number of siblings, only child dummy, and homeownership dummy) and location attributes (city and county size of child's residence [government-designated city, other city, and township dummies], city and county size of parents' residence, dummy for parent and child living in the same city and county, and dummy for parent and child living in the same prefecture).

**Table 7: Net wealth holdings of parents' generation and future gifts and inheritance classified by child's education**

	Financial wealth		Housing		Housing wealth	
	[1]	[2]	[3]	[4]	[5]	[6]
Final education (child)						
Junior and senior high school	0.0026 (0.0020)	0.0055 *** (0.0020)	0.0045 *** (0.0016)	0.0054 *** (0.0019)	0.0016 *** (0.0005)	0.0019 ** (0.0008)
Junior college/College of technology	0.0028 ** (0.0012)	0.0034 *** (0.0013)	0.0018 (0.0012)	0.002 (0.0013)	0.0029 *** (0.0009)	0.0022 *** (0.0008)
University and graduate school	0.0035 ** (0.0015)	0.0035 ** (0.0015)	0.001 (0.0007)	0.0012 * (0.0007)	0.0059 *** (0.0018)	0.0049 *** (0.0017)
Control variable						
Child attributes	No	Yes	No	Yes	No	Yes
Location attributes	No	Yes	No	Yes	No	Yes
N	686	601	685	602	330	283

Note: Marginal effects are shown for parental net wealth holdings. Figures in parentheses are cluster-robust standard errors for parental household ID. \*\*\*, \*\*, and \* indicate that the estimated coefficients are significant at the 1%, 5%, and 10% levels, respectively. In all estimations, parent and child age and its squared term, child gender, marital status, education, and parent and child cohabitation dummies are added as explanatory variables. The control variables comprise child attributes (number of siblings, only child dummy, and homeownership dummy) and location attributes (city and county size of the child's residence [government-designated city, other city, and township dummies], city and county size of the parents' residence, dummy for parent and child living in the same city and county, and dummy for parent and child living in the same prefecture).

**Table A1: Intergenerational elasticity of household wealth**

Attributes of the child generation (dep. var.)	Parent generation's wealth holdings (explanatory variable)								
	Financial wealth holdings (average of past three years)			Financial wealth holdings (average of the past five years)			Net wealth holdings (average of the past three years)		
	Coef. (S.E.)	Adj. R <sup>2</sup>	N	Coef. (S.E.)	Adj. R <sup>2</sup>	N	Coef. (S.E.)	Adj. R <sup>2</sup>	N
Amount of deposits and savings	0.5522 *** (0.1396)	0.197	457	0.591 *** (0.1310)	0.194	457	0.5889 *** (0.2075)	0.135	438
Financial wealth	0.5353 *** (0.1833)	0.303	360	0.5896 *** (0.1767)	0.308	360	0.7582 *** (0.2611)	0.181	346
Homeownership = 1	0.0327 (0.0320)	0.136	673	0.0346 (0.0321)	0.135	673	0.0595 * (0.0310)	0.136	639
College degree or higher = 1	0.1866 *** (0.0388)	0.075	893	0.1823 *** (0.0385)	0.076	893	0.1633 *** (0.0411)	0.09	852
Annual household income	0.0836 (0.0509)	0.093	634	0.0714 (0.0512)	0.092	634	0.1355 *** (0.0484)	0.081	608
Savings ratio (%)	0.2612 *** (0.0582)	0.052	458	0.268 *** (0.0588)	0.055	458	0.1193 * (0.0633)	0.039	441
Financial support from parents (over the last year)	0.4573 (0.3621)	0.019	855	0.418 (0.3681)	0.019	855	0.3779 (0.2372)	0.019	814
With future gifts/inheritance = 1									
Financial wealth	0.2259 *** (0.0371)	0.058	738	0.2329 *** (0.0371)	0.062	738	0.1845 *** (0.0485)	0.058	700
Housing	0.118 *** (0.0428)	0.038	734	0.1235 *** (0.0439)	0.039	734	0.128 *** (0.0416)	0.042	696

Note: We report the elasticities and standard errors of the parental generation's asset variables for the dependent variables in the table side. Figures in parentheses are cluster-robust standard errors with respect to the parental household ID. \*\*\*, \*\*, and \* indicate that the estimated coefficients are significant at the 1%, 5%, and 10% levels, respectively. In all estimations, parent and child ages and their squared terms, child gender, marital status, and parent-child cohabitation dummies are added as explanatory variables.