On The Origins of Risk-Taking in Financial Markets

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ABSTRACT

Financial investment behavior is highly correlated between parents and their children. Using Swedish data, we find that the decision of adoptees to hold equities is associated with the behavior of both biological and adoptive parents, implying a role for both genetic and environmental influences. However, we find that nurture has a stronger influence on the share of financial assets invested in equities and on portfolio volatility, suggesting that financial risk-taking is substantially environmentally determined. The parental investment variables substantially increase the explanatory power of cross-sectional regressions and so may play an important role in understanding cross-sectional heterogeneity in investment behavior.

INVESTMENT BEHAVIOR VARIES significantly across individuals. At the same time, investment decisions, such as the decision to invest in the equity market and the riskiness of portfolios, are similar across generations; parents who hold riskier financial portfolios tend to have children who themselves hold riskier financial portfolios.[1] But why are

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participation in risky markets and financial risk-taking correlated across generations? Does this have to do with pre-birth characteristics that are correlated across generations (such as a genetic predisposition towards risk-taking), or is it that children learn from parents, and risk-taking behavior is acquired over one's lifetime?[2] Is it nature or is it nurture?

Understanding the intergenerational persistence of participation in risky financial markets and the riskiness of financial portfolios is important, first and foremost, because it sheds light on the origins of differences in investment behavior across individuals. It is also important because of the potential welfare implications; historically, risky market investment has had a higher return compared to safer financial assets such as bonds and money market funds. Thus, to the extent that participation and risk-taking behavior are correlated with wealth, these behaviors can exacerbate or mitigate wealth inequality over time.

To evaluate the role of nature versus nurture, we take advantage of a unique feature of the Swedish adoption system whereby we observe both the biological and adoptive parents of adopted children. We use administrative data on the portfolio choices of a large sample of adopted children born between 1950 and 1980 merged with similar information for their biological and adoptive parents--as well as corresponding data on own-birth children. We disentangle the role of nature versus nurture by looking at how the behavior of adopted children relates to that of both their biological and adoptive parents. Adoption allows us to examine the effects of environmental factors in a situation where children have no genetic relationship with their (adoptive) parents.

We find evidence for important effects of both biological and adoptive parents on

stock market participation, implying a role for both genetic as well as environmental influences.[3] However, while we find evidence that both genes and environment affect portfolio volatility, there is little evidence for any genetic effect on the share of financial wealth invested in equities. Overall, we generally find that nurture has a stronger influence than nature on risk-taking by children irrespective of the precise outcome variable we study. Our conclusions are robust to a variety of robustness and specification checks.

We also examine the mechanisms underlying the environmental effects that we find. Importantly, the relationships between the risky share and portfolio volatility of adoptive parents and their children remains largely intact even when we control for parental financial and real estate wealth, earnings, education, and entrepreneurship status. This suggests that parental investment behavior is not simply proxying for other adoptive parental characteristics and plausibly has a direct effect on child behavior. We also find that the relationships between the risky share and portfolio volatility of adoptive parents and their children remains strong after controlling for child education and wealth, indicating that an important mechanism may be parental influence on child attitudes towards risk. Consistent with this and theories of role modeling, we find suggestive evidence that men are more influenced by their adoptive father and women by their adoptive mother.

While many covariates are strong predictors of stock market participation, regressions for the share of financial wealth allocated to stocks and for portfolio volatility can have relatively low explanatory power (for example, Calvet and Sodini (2014) report an adjusted R^2 for the risky share of about 12%).[4] Having established that parental

investment variables are important predictors of children's investment behavior, we also show that the parental investment variables substantially increase the explanatory power of cross-sectional regressions and so may play an important role in understanding cross-sectional heterogeneity in investment behavior.

Our paper relates to an active literature that documents intergenerational correlations in both risk preferences and asset allocations. Charles and Hurst (2003), Hryshko, Luengo-Prado, and Sorensen (2011), Dohmen, et al. (2012), and Kimball, Sahm, and Shapiro (2009) all document similarities in self-reported attitudes towards risk across generations. The same tendency in the choice of assets across generations has been documented by Chiteji and Stafford (1999) and Charles and Hurst (2003), among others.

To distinguish between genetic and environmental determinants of risky financial behavior, the literature has primarily focused on twin studies.[5] Cesarini et al. (2010) and Barnea, Cronqvist, and Siegel (2010) both use differences between identical and fraternal twins to decompose the cross-sectional variation in investor behavior. Interestingly, they find little role for shared environmental factors, suggesting that parental influences on children operate predominantly through genetic channels. However, the twin approach is fundamentally different from what we do with adoption data in that it decomposes the total variation in asset allocation into genetic and environmental factors; it does so by making relatively strong assumptions about the similarities in environment across fraternal and identical twins. Our approach studies the intergenerational association and relies on an entirely different set of assumptions. Because of the differences in the methodologies and goals, the approaches can be seen as complements rather than substitutes.[6]

Adoption studies have been widely used by economists in other contexts to determine the relative roles of genes and environment in influencing economic behavior. Much of this research has incorporated information on outcomes of adoptive parents but not on the biological parents of adopted children; thus, it does not compare the relative effects on adopted children of the behaviors or outcomes of biological and adoptive parents, but instead compares the correlation of adopted children with adopted parents relative to the correlation of biological children with their biological parents and infers the role of nature as the difference between the two (see Sacerdote (2010) for a survey of this literature).

Recent studies using Swedish data have been able to make the comparison of correlations between adopted children and their biological versus adoptive parents by taking advantage of the availability of data on both biological and adoptive parents. These include the seminal study of Björklund, Lindahl, and Plug (2006) who studied educational attainment and earnings. Since then, the Swedish data have been used to study voting (Cesarini, Johannesson, and Oskarsson, 2014), crime (Hjalmarsson and Lindquist, 2013), entrepreneurship (Lindquist, Sol, and Van Praag, 2015), and health (Lindahl et al. 2016). These studies have found evidence that both characteristics of biological and adoptive parents are predictive of child outcomes.

In concurrent work, Fagereng, Mogstad, and Rønning (2015) use Korean adoptees in Norway to determine the effect of environment on child wealth and asset allocation. The authors find a substantial role for environment. A key advantage of this work is that the assignment of children to families is arguably random. A key limitation, however, is that they do not observe characteristics of the biological family. Also, they

emphasize stock market participation and, unlike us, do not condition on participation when they study the proportion of financial wealth invested in risky assets. Our paper also studies portfolio volatility that broadly captures the riskiness of the equity exposure and may relate more to risk preferences rather than wealth holding. We view this paper as a complement to our own work.[7]

The structure of the paper is as follows. In the next section, we discuss the institutional background both in terms of financial markets and the adoption process. In Section II, we outline the econometric methodology and, in Section III, we describe the data. Section IV has estimates for the intergenerational transmission of participation and risk-taking in financial markets. In Section V, we present a variety of robustness and specification tests, including testing the sensitivity of our results to the potential non-random assignment of children to adoptive parents and the choice of years of data. Section VI discusses the external validity of our results, and Section VII discusses possible mechanisms. In Section VIII, we show that taking account of intergenerational effects adds a lot to the explanatory power of cross-sectional regressions, and Section IX concludes.

I. Institutional Background

A. Financial Wealth in Sweden

Stock market participation rates are higher in Sweden than in many other countries such as the United States (Guiso, Haliassos, and Jappelli, 2001). In addition, a large proportion of financial wealth is held outside of pension funds: Non-retirement wealth accounts for almost 84 percent of aggregate household financial wealth (Calvet,

Campbell, and Sodini 2007), and it is this form of wealth that is the focus of our study. However, it is important to understand the nature of the pension system due to its potential effect on savings.

Relative to countries such as the U.S., Sweden's pension system would be considered quite generous. Sweden has a mix of public and private pension schemes, and individuals are allocated to different pension systems depending on the public or private sector affiliation and year of birth of the individual. The longer one works, the higher the pension one receives. The retirement age is flexible and individuals can claim retirement benefits beginning at age 61.[8]

Because we, for the most part, examine children's investment behavior at the individual level, it is important to understand whether there are incentives to transfer wealth holdings from one spouse to another. There do not appear to be any such incentives. In the event of a divorce, in the absence of a prenuptial agreement, all assets are split equally among spouses. For wealth tax purposes, the value of jointly owned assets was split evenly between the two tax filers. Thus, there were no incentives for husbands and wives to strategically allocate assets between themselves in order to reduce their wealth tax bill.

Finally, people who face greater labor income risk may be less likely to choose risky financial portfolios. Consequently, the unemployment insurance system could potentially affect individuals' risk-taking behavior in financial markets; a more generous system could create an incentive to take more risk with one's portfolio. In the year 2000, while the formal replacement rate was at 80% of wages, the effective replacement rate

taking earnings-ceilings into account was around 65% (Carling, Holmlund, and Vejsiu 2001), suggesting that the unemployment insurance system was not overly generous.[9]

B. The Adoption System[10]

The adoptees we study were born between 1950 and 1980. During this period, private adoptions were illegal, so all adoptions went through the state. The state collected information on both the biological and adoptive parents; while it only required information on the biological mother, in many cases, social workers were also able to identify the biological fathers. About 80% of children were adopted in their first year of life.[11] Typically, adopted children were placed in a nursery home after birth and placed with prospective adoptive parents before six months old. Adoptions generally became legal when the child was about one year old. Biological parents of adoptees were mostly unmarried or divorced women who lacked economic resources to take care of a child or who felt it was a stigma to have a child out of wedlock.

In order to adopt a child, a family had to satisfy certain requirements. The adoptive parents had to be married and be at least 25 years old, have appropriate housing, and be free of tuberculosis and sexually transmitted diseases. The adoptive father was required to have a steady income and the adoptive mother was required to be able to stay home with the child for a certain period of time. Overall, the adoption criteria meant that the adoptive parents were positively selected relative to the general population.

Before adoption, children had a health examination and most children with visible handicaps, severe health problems, or whose parents suffered from severe cases of mental illness, alcoholism, or criminality were not placed with adoptive families. Thus, adoptees

were a positively selected group of children from a set of mothers of lower than average socio-economic status. These offsetting forces led adoptees to be observably similar on average to own-birth children -- Bohman (1970) found that adoptees had average birth weight and health at age 10 that were very close to that for non-adoptees.

While matching of children to adoptive parents was at the discretion of the caseworkers, the evidence from that period suggests that social authorities were not able to systematically match babies to families based on family and child characteristics (see Lindquist, Sol, and Van Praag 2015 for more details).[12] However, we will examine this issue in more detail later.

II. Empirical Strategy

In addition to equity market participation, we use two different measures of the riskiness of the portfolio–the share of financial assets invested in equities conditional on participation, and the volatility of the portfolio conditional on participation. It is often considered that non-participation in the stock market arises due to frictions such as fixed costs or lack of information. Conditional on participation, the level of risk-aversion may explain the equity share and the volatility of the portfolio. In Section III below, we describe how each of these variables is created.

Specification for Equity Market Participation

Our specification uses data on adoptees to relate participation of an adoptee in year t to participation of both his/her biological and adoptive parents in year t. We estimate variants of the following equation:

$$P_{ijt} = \beta_0 + \beta_1 P_{imt} + \beta_2 P_{ift} + \beta_3 P_{jmt} + \beta_4 P_{jft} + X_{ijt}\beta_5 + \epsilon_{ijt} \quad (1)$$

where P is an indicator of whether an individual holds equities, i indexes the biological family, j indexes the adoptive family, m refers to mother and f refers to father, and X refers to the set of control variables. Because asset allocation may vary by age, these include year-of-birth dummies for both parents and children. We also include year dummies along with a dummy variable for the gender of the child. To address the issue of common geographic factors that may affect portfolio behavior, we add controls for county of residence of both parents and children in the relevant year (Sweden is divided into 20 regional county councils). We report marginal effects from probit models but have verified that the marginal effects are very similar when a linear probability model is used (these estimates are in the Online Appendix).

We have data on assets from 1999 to 2006. To maximize efficiency, our baseline specification pools observations for all these years.[13] Because pooling implies that we have multiple observations on individuals, we need to cluster our standard errors by child. However, because there can be multiple adopted children in a family, we go further and cluster the standard errors at the adoptive family level.

Specification for the Risky Share and Portfolio Volatility

To measure the intergenerational relationship in risk-taking in financial markets, we use two alternative measures; risky share -- the proportion of financial wealth invested in equities -- and portfolio volatility, both conditional on participation. We estimate the following equation:

$$S_{ijt} = \beta_0 + \beta_1 S_{imt} + \beta_2 S_{ift} + \beta_3 S_{jmt} + \beta_4 S_{jft} + X_{ijt}\beta_5 + \epsilon_{ijt} \quad (2)$$

When analyzing risky share, S is the share of financial wealth the individual holds in equities, i indexes the biological family, j indexes the adoptive family, m refers to mother and f refers to father, and X refers to the same set of control variables as before. Because the participation decision is likely to depend on different factors from the portfolio allocation decision given participation, in this analysis we restrict the sample to children who participate. We add indicator variables for whether each type of parent participates (4 indicator variables in total) and set the risky share to zero for parents who do not participate.[14]

We also estimate specifications where we use portfolio volatility as the measure of riskiness. Once again, we restrict the sample to children who participate and estimate an analogous specification to equation (2).[15]

A key assumption in our empirical strategy is that adoptees are randomly assigned to adoptive families at birth. Under this assumption, the coefficients on investment behavior of biological parents provide an estimate of the effect of pre-birth factors and the coefficients on investment behavior of adoptive parents provide an estimate of the effects of post-birth factors. While the assumption may not be strictly true in our data, we provide evidence that suggests that violations of the assumption do not have meaningful effects on our estimates.

III. Data

We begin with merged administrative data containing information on all Swedish residents born between 1950 and 1980, including information on educational attainment, county of residence, basic demographic information, and detailed wealth data.[16] To this

we merge the Swedish multigenerational register, which contains information on both biological and adoptive parents for adopted children, and enables us to link children born 1980 or earlier to their parents.

For data on asset allocation, we predominantly rely on the Swedish Wealth Data (Förmögenhetsregistret). These data were collected by the government's statistical agency, Statistics Sweden, for tax purposes between 1999 and 2007, at which point the wealth tax was abolished.[17] For the years 1999 to 2006, the data include all financial assets held outside retirement accounts at the end of a tax year, December 31st, reported by a variety of different sources, including the Swedish Tax Agency, welfare agencies, and the private sector. Financial institutions provided information to the tax agency on their customers' security investments and dividends, interest paid or received, and deposits, including nontaxable securities and securities owned by investors, even for persons below the wealth tax threshold. Because the information is based on statements from financial institutions, it is likely to have very little measurement error and, because the entire population is observed, selection bias is not a problem.

From this, we observe the aggregate value of bank accounts, mutual funds, stocks, options, bonds, and capital endowment insurance as well as total financial assets and total assets. Our measure of equity market participation is an indicator variable that captures participation through either direct stock holding or mutual funds with a stock component– we refer to this as equity market participation or risky asset holding. This includes holdings of mutual funds that only include stocks but also includes mutual funds that have a mixture of stocks and other financial instruments such as bonds.

Moving beyond whether or not the individual participates in the equity market, we also study two measures of portfolio riskiness for participators – the risky share and portfolio volatility. To create this latter variable, we follow Calvet, Campbell, and Sodini (2007) in using the monthly price history of individual stocks and mutual funds to calculate the variance-covariance matrix of each asset and hence the standard deviation of individual portfolios at the end of each year. We obtain prices for these assets from a number of sources, including Datastream, Bloomberg, SIX Financial Information, Swedish House of Finance, and the Swedish Investment Fund Association (FondBolagens Förening). The details of this calculation are in the Online Appendix. We refer to this variable as portfolio volatility.

During the 1999 to 2005 period, banks were not required to report small bank accounts to the Swedish Tax Agency unless the account earned more than 100 SEK (about $11) in interest during the year. From 2006 onwards, all bank accounts above 10,000 SEK were reported. In our data, 47% of people do not have a reported bank account.[18] Since almost everybody has a bank account (in surveys, the fraction of Swedes aged 15 and above that have a bank account has consistently been 99 percent (Riksbanken, 2014), in reality the people who are measured as having zero financial wealth probably in fact have some small amount of financial wealth. We follow Calvet, Campbell, and Sodini (2007) and Calvet and Sodini (2014) and impute bank account balances for persons without a bank account using the subsample of individuals for whom we observe their bank account balance even though the earned interest is less than 100 kronor.[19]

We use data from the Income Register to measure income for our sample. Our

measure of income includes earnings from employed labor as well as self-employment income and taxable benefits. The variable we use for parents is the log of average (real) labor income between 1980 and 1999. In the few cases where labor income is zero in all years, we set the log to zero. For children, we measure income as the log of average income aged 34-36.[20]

Our sample includes children born in Sweden between 1950 and 1980 with all applicable parents alive in the year in which we measure asset holdings. We have information on over two million children who are raised by their biological parents and 3187 adopted children who have data available for both biological and adoptive mothers and fathers. In Appendix Table AI, we show how our estimation sample is chosen from the adoptees and how many observations are lost due to each selection criterion.

We report descriptive statistics for our sample in Table I for the year 2000 (we show means conditional on stock market participation in the Online Appendix). The top panel has means for children, both biological and adoptive. In 2000, the average child age is 33 for biological children and 35 for adopted children. Biological children have half a year more education on average and their probability of holding risky assets is higher (57% to 50%). The risky shares and portfolio volatilities are similar for both types of children. However, adopted children have higher financial assets and higher net wealth. Also, adopted children are more likely to have lower birth order and be raised in a slightly smaller family. **[Table I about here]**

The second panel has means for biological parents, both parents who raised their own biological children and parents who gave their children up for adoption. There are large differences in the characteristics of these two types of biological parents with the

biological parents of adoptees having much less wealth and lower years of schooling.

Finally, the bottom panel has descriptive statistics for adoptive parents. For adopted children, adoptive parents are older, wealthier, better educated, and more likely to hold stocks and risky assets than the child's biological parents. When compared to biological parents who raise their own children, adoptive parents also seem positively selected, but the differences here are much smaller. Given these differences, we later discuss the generalizability of our conclusions in Section VI.

IV. Results

A. Equity Market Participation

Table II provides estimates of equation (1) using separate regressions for own-birth and adopted children. All estimates are marginal effects from a probit. The top panel has estimates for own-birth children. In column (1), we include dummies for equity market participation of biological fathers, in column (2) we have the analogous variable for mothers, and, in column (3), we include both variables. As has been documented in the literature, the magnitudes of the intergenerational correlations are quite substantial. About 57% of own-birth children invest in the equity market. The effects for own-birth children imply that having a father who invests in these assets increases child participation by 0.23 or about 40% of the mean. The equivalent figure for mothers is slightly larger at 44%. Comparing column (3) to columns (1) and (2), we see that the marginal effect for each parent is lower when both parents' participation is included in the regression. This arises due to assortative mating. **[Table II about here]**

In the analysis so far, we have included mother and father equity-holding

separately. However, it is plausible that parents make joint decisions about holding risky assets. Therefore, in columns (4) to (6), we report estimates where we combine participation of mothers and fathers. The participation variable now becomes 1 if either parent holds equities and zero otherwise. We find a marginal effect of 0.26 for this variable, which is quite consistent with our earlier findings.

The second panel of Table II has estimates for adopted children. In columns (1) to (4), we place adoptive estimates in bold text if the adoptive estimate is statistically different from the biological one at the 5% level. Column (1) includes indicators for equity market participation for both the biological and adoptive father. Both marginal effects are positive and statistically significant but the adoptive effect is about twice the size of the biological one and is statistically different. We find a similar result for mothers in column (2). In column (3), we allow for assortative mating by including all four variables in the same probit regression. All marginal effects are statistically significant, but the estimates for adoptive parents are larger than those on biological parents, suggesting that pre-birth factors (including genes) have a smaller influence on participation in financial markets than do environmental factors. Now, the adoptive effects (at about 0.13) are about 50% larger than the biological ones (which are about 0.08) and the differences are statistically significant. Interestingly, the marginal effects are almost identical for mothers and fathers, suggesting that gender is not an important component here.

In columns (4) to (6), we report estimates where we combine participation of mothers and fathers. While it may be appropriate to measure adoptive parental participation at the household level, it is less clear how to treat biological parents.

Therefore, we report estimates in column (4) where we combine their participation as we do with adoptive parents and we report estimates in column (5) where we include participation of biological parents individually. Both specifications are consistent with our prior findings that the environmental effects are larger than the biological ones. As described above, we are missing information on a substantial number of biological parents because the identity of the father was not ascertained at the time of the adoption. To maximize the number of observations, in column (6) we exclude biological father participation from the regression. The results remain quite similar. Later, we provide more rigorous evidence that our estimates are unlikely to be much affected by selection due to missing fathers.[21]

B. The Risky Share

We study the intergenerational relationships for the risky share of assets held in Table III, restricting the sample to children who hold some risky assets (participate). As described in Section II, we set the risky share to zero for non-participating parents and include indicator variables for whether each parent holds risky assets. We report the same set of specifications as in Table II. Here the results are quite striking as, in all columns, there is no evidence of any relationship between the risky share of biological parents and the risky share of adopted children. However, the adoptive effects are quite large – if an adoptive mother and father both increase their risky share by 0.1, the risky share of the adoptive child increases by about 0.02 from a mean of 0.49. In column (3), we can reject equality of the adoptive and biological coefficients for fathers but not for mothers. **[Table III about here]**

The dominance of adoptive effects is particularly obvious in columns (4) to (6) where we measure the risky share of adoptive parents at the household level -- this variable becomes the proportion of the total financial wealth of the adoptive mother and father that is invested in equities. At this aggregate level, the findings very clearly show that intergenerational correlations in the risky share are predominantly due to nurture rather than nature.[22]

C. Portfolio Volatility

We study the intergenerational relationships for the portfolio volatility measure in Table IV, once again restricting the sample to children who hold risky assets and including indicator variables for whether each parent holds risky assets. As with the risky share, we find stronger effects for adoptive than for biological fathers. However, unlike with the risky share, there is evidence that the volatility of the biological mother's portfolio is correlated with that of her child, suggesting that, in addition to nurture, biological factors are important here. The magnitudes in column (4) imply that, for a standard deviation increase in the adoptive parents' portfolio, the standard deviation of their child's portfolio will be higher by 0.16 of a standard deviation. **[Table IV about here]**

How can we interpret these results? In a standard portfolio-choice model (assuming constant relative risk aversion (CRRA) and independently and identically distributed returns), the risk preference parameter for an individual is proportional to the share that the individual invests in equities. So, our finding that intergenerational correlations in the risky shares are only evident for adoptive parents could be interpreted,

in the context of this model, as suggesting that intergenerational correlations in risk attitudes may be largely environmentally rather than genetically determined. However, our finding of biological effects for portfolio volatility suggests that there is also a role for genes in determining risk attitudes.

D. Total Transmission for Adoptees Compared to Own-Birth Children

For all three of our outcome variables, we have tested whether the effects of fathers (mothers) of own-birth children equals that of the sum of the effects of biological and adoptive fathers (mothers). We report these sums in columns (1) - (4) of Tables II to IV and, in the bottom panel of each table, we report whether we can reject at the 5% level that the effects for own birth children are the same as the sum of the marginal effects for adopted children (where we sum across both biological and adoptive estimates). In general, we find that the effect of parent investment behavior on that of own birth children is approximately equal to the sum of the biological and adoptive effects for adopted children. There is only one case out of twelve (column (4) of Table II) where we can reject equality. This finding suggests that the total overall intergenerational transmission through nature and nurture may be largely unaffected by the adoption itself.

E. Interaction between Nature and Nurture

We have thus far assumed that the effects of biological and adoptive parents are independent of each other. However, this may be an oversimplification if the genetic component interacts with the environmental component, one building on the other.[23] In Appendix Table AII, we allow for an interaction between the effects of biological and

adoptive mothers and an equivalent interaction for fathers. Because of difficulties in interpreting probit estimates of interactions of continuous variables, we use a linear probability model for equity market participation. In all the specifications, the interaction terms are small and statistically insignificant, suggesting that those with genetic factors "suitable" for investing in equities do not necessarily respond more to an environment in which a parent invests in risky markets.

V. Tests of Model Assumptions and Specification Checks

Our interpretation of the coefficients above as reflecting the nature versus nurture components of intergenerational correlations in financial risk-taking requires a number of assumptions. One of these is that adoptions occur soon after birth—if this was not the case, the coefficient on biological parents might reflect both nature and nurture, and our estimates would be biased in favor of the nature component. Because we do not observe the timing of the adoption in our data, we cannot test this directly; however, we do know that about 80% of adoptions occur within the first year after birth, so there is limited post-birth experience of the biological parents for most adoptees in our sample (Björklund, Lindahl, and Plug 2006).

A. Random Assignment of Adoptees

As noted earlier, adoptees may not be randomly assigned to parents, so we now evaluate how this non-random assignment might affect our estimates.[24] The primary concern is that coefficient estimates may be biased due to correlations between equity market participation or portfolio riskiness of adoptive (biological) parents and

unobserved characteristics of the biological (adoptive) parents that are correlated with child outcomes. While earlier work using similar strategies with Swedish data has demonstrated that non-random assignment is unlikely to be a problem, we conduct a number of robustness checks to verify this.

If there are correlations between holdings of adoptive parents and unobserved characteristics of the biological parents that are correlated with child outcomes, one might expect the coefficients of adoptive parents to vary depending on whether participation or portfolio riskiness of biological parents are included in the regression. The results when we do this are presented in Tables V.A, V.B, and V.C. Table V.A has estimates for participation, Table V.B has estimates for the risky share, and Table V.C has estimates for portfolio volatility. In the exposition we focus on the estimates from Table V.A but the findings from the other panels are very similar.

Column (1) of Panel A of Table V.A shows estimates with just the equity holding variables for the adoptive parents included. In column (2), we add equity holding variables for the biological parents, which is the specification previously reported in column (3) of Table II. As we can see in column (2), the coefficients on adoptive parents' equity holding change very little when we include biological parents' equity holding behavior, suggesting that the two variables are not highly correlated. As another check for omitted variable bias, in column (3) we include a number of other controls for characteristics of the biological parents - their schooling, earnings (in logs), financial wealth (in logs), real estate wealth (in logs), and entrepreneurship status. Again, if it were the case that the results were driven by selection of adopted parents, then adding further controls for biological parents' characteristics should reduce our coefficients on adoptive

parents' equity holding. Comparing the coefficients on adoptive parents equity holding in column (3) to column (1), the difference is again very small. Finally, in column (4), we include both equity holding and the other characteristics of biological parents. The resulting estimates are almost identical to those in column (3). Overall, it appears that our adoptive estimates are unlikely to be significantly biased by non-random assignment.

Columns (1) to (4) of Panel B of Table V.A carry out the analogous exercise for equity holding for biological parents. In column (1), we only include the equity holding variables for the biological parents and then, in column (2) we add the equity holding behavior of the adoptive parents. Column (3) adds controls for education, income, financial wealth, real estate wealth, and entrepreneurship status of adoptive parents, and column (4) includes both equity holding behavior for adoptive parents as well as the extra controls for their characteristics. While the coefficients on stock holding of biological parents decrease somewhat in columns (2) to (4) compared to column (1), the differences are not large. This suggests that non-random assignment of adoptees is unlikely to be a problem and, if anything, will lead to an overstatement of the role of biological parents relative to that of adoptive parents. **[Tables V.A, V.B, V.C about here]**

B. Varying Cohorts and Age Groups

Thus far, we have also assumed that the relationships we are estimating are constant across cohorts. However, this may not be the case; the introduction of contraception (the Pill) as well as the legalization of abortion occurred in the late 1960s and early 1970s in Sweden; as a result, the characteristics of children being put up for adoption changed over this time period. To investigate this, we estimate our basic

specification using the subset of cohorts born by 1970; these results, presented in Appendix Table AIII, are quite robust to the choice of cohorts. Note that, by restricting to cohorts born by 1970, we are also excluding children younger than 29 from our sample so now the average child age at measurement is 39. We still find that the environmental coefficients are larger than the biological ones.

As a further check on this issue, in Appendix Table AIV, we split the sample into younger and older adoptees based on the median age of adoptees in our sample (37). The average ages for the younger and older adoptees are 31 and 42, respectively. The coefficient estimates suggest that the effect of parental environment gets smaller as the children get older. However, the nurture effects are still sizeable for the older children and, importantly, the post-birth influences remain larger than the pre-birth ones.[25] Therefore, this check provides reassurance that our estimates are not being heavily influenced by children who are too young to have made independent investment decisions.

C. Varying When Asset-Holding is Measured

There are a number of reasons why one might be concerned about the concurrent measuring of equity holding for parents—both biological and adoptive—and children. The first is that there might be reverse causation-- children are influencing their parents' behavior, and not the other way around. While it seems safe to assume that our estimates of biological effects do not suffer from reverse causation since there is likely little contact between biological parents and their children, it is possible that the environmental effects could partially reflect the influence of adopted children on their adoptive parents. For

example, a risk-loving child could persuade his/her parents to invest in more risky assets.[26] While it is impossible to rule out this mechanism, we can redo the estimation using parental risk-taking in 1999 and child risk-taking in 2006. Because we measure the variables for parents 7 years before the equivalent variables for children, reverse causality is less of an issue than when we measure them contemporaneously.

Another potential issue is that biological parents are on average 9 years younger than the adoptive parents in 2000. Given that there may be life-cycle patterns in stock holding behavior (Fagereng, Gottlieb, and Guiso 2016), our conclusions may be sensitive to this difference. To address this, we can measure the equity holding of adoptive parents in 1999 and biological parents in 2006, thus largely eliminating the age gap at measurement. The results, in the Online Appendix, for both these estimations are generally similar to those in Tables II, III, and IV.

VI. External Validity

While our estimates may distinguish between nature and nurture effects among adopted children, there remains the question of whether they identify the relative importance of nature and nurture more generally. Threats to external validity could arise if adopted children are not representative of children in general or adoptive and biological parents are not representative of the population of parents. In this section, we examine these issues.

A. Missing Fathers

As described above, we are missing information on a substantial number of

biological parents because the identity of the father was not ascertained at the time of the adoption. To assess whether our results are sensitive to this missing information, we have re-run the main specification using all biological mothers for whom we have information, regardless of whether the information for the biological father is present. This also deals with the possibility that paternity may be misattributed to biological fathers.[27] The results, presented in the Online Appendix, show that the environmental effects for mothers are, if anything, stronger in the less selected sample. [28]

B. Are Biological Effects from Adoptees Representative?

While we found no evidence for nature-nurture interactions in Appendix Table AII, there is some evidence in the literature that a supportive environment may help individuals reach their genetic potential (Barnea, Cronqvist, and Siegel, 2010; Cronqvist and Siegel, 2015). As is clear in Table I, biological parents who give their children up for adoption are generally negatively selected in terms of observables. Thus, given our biological parents are a relatively disadvantaged group, it may be the case that their investment behavior is less reflective of their genetic makeup than that of other parents and this might cause us to find a lower pre-birth effect than exists in the whole population. If this is the case, we would expect that pre-birth factors are more important for biological parents of higher socio-economic status than for those of lower status. We have split the sample of biological parents by net wealth and by education (both averaged over the biological mother and father), each at the median. The estimates are in Appendix Table AV. While there are some differences across the samples, there is no systematic pattern and differences are not statistically significant. This suggests that our findings for

biological effects may generalize more broadly.[29]

C. Are Adoptive Parents Representative of Parents in General?

As is clear from Table I, adoptive parents are somewhat positively selected in terms of observables and so may not be representative of parents in general. In addition to the observed differences in Table I, there may be unobserved differences between adoptive and other parents. Adoptive parents might invest less or more in their adopted children than other parents. The former could occur if adoptive parents don't treat their children as well as they would if they were biological children; the latter could occur if adoptive parents are "better" parents than average -- adoptive parents must, for instance, be approved before being able to adopt and may have a particularly strong desire for children. By definition, we are limited in how much we can assess the unobserved differences between adoptive and other parents. We have, however, verified that the effect of parental risk-taking on biological children in the small number of families with both adoptive and biological children is not statistically different to that of parental risk-taking on biological children in general (these estimates are reported in the Online Appendix). This suggests that there may not be systematic differences in parenting behaviors between biological and adoptive parents.[30]

As noted above, adoptees are also more likely to be in smaller families and to be the first-born child than is the case for children in general. If these factors are related to greater post-birth transmission, then our findings might overstate what might be found in the population in general.[31] Therefore, in Appendix Table AVI, we interact the parental variables with an indicator for being the oldest child in the adoptive family and also with

number of siblings in the adoptive family. None of the interaction terms are statistically significant at the 5% level, and the main effects of parental risk-taking remain similar in magnitude to Tables II, III, and IV.[32] Overall, birth order and family size disparities between own-birth and adopted children are unlikely to imply that our findings do not have external validity.

D. Are Adopted Children Representative of Children in General?

While the socio-economic environment of the adoptive parents is on average substantially better than that of the biological parents, developmental psychologists have documented that those being adopted may experience significant stress due to adoption and a confused sense of identity (see, for example, Howe (1998)). While we cannot speak directly to this issue, we note that most are adopted as babies and that, in terms of their outcomes such as education, earnings, and wealth, adopted children look quite similar to the universe of children.[33] Also, as noted in Section I, Bohman (1970) found that adoptees had average birth weight and health at age 10 that were very close to that of non-adoptees.

E. Reweighting for External Validity

As a final check to external validity, we implement a version of inverse probability weighting using observable characteristics to generate the weights. Adoptive families may be different from families in general because (1) characteristics of the raising parents are different or (2) characteristics of the biological parents are different or (3) characteristics of the child/family are different. To address these issues, we weight our

adoptee regressions in order to make characteristics more similar to the general population.

To calculate weights, we pool both adoptive and own-birth children and use a logit model to estimate the probability that a particular child is an adoptive child using biological and raising parental characteristics (for own birth children the biological parents are the raising parents) and child/family characteristics.[34] Using the estimated coefficients, we form the propensity score and use this to weight the sample of adopted children by $\left(\frac{1}{p}\right)$, where p is the estimated propensity score.[35] This re-weighting makes the adopted children and families similar in observables to children and families in general by putting relatively more weight on adoptive families that are similar in characteristics to own-birth families. The estimates, in Appendix Table AVII, are quite similar to baseline but the standard errors are much larger, reflecting the heteroskedasticity induced by the re-weighting. The similarity to our baseline estimates suggests that our finding of important environmental effects may generalize to the general population.

VII. Mechanisms

A. The Role of Other Parental Characteristics

Having determined that there are important environmental effects on risk-taking behavior, in this section we examine potential underlying mechanisms. The relationship between portfolio choices of parents and their adopted children could reflect a direct causal effect of parental asset-holding or environmental transmission of risk preferences. However, it is also possible that parental asset-holding is proxying for other omitted parental characteristics such as parental financial wealth, income, or education, and it is

these characteristics that directly affect the behavior of the child. Therefore, we report estimates for a richer model where we show how risky market participation and portfolio allocation of the child is affected by several parental characteristics (education, earnings, financial wealth, real estate wealth, and entrepreneurship status) in addition to parental risky market variables. These estimates, in Tables VI.A and VI.B, can be compared to the equivalent baseline estimates in column (3) of Tables II, III, and IV. Comparing the estimates to those in Tables II, III, and IV, we see that the addition of parental characteristics reduces the adoptive coefficients but not significantly. The participation effects (column (1) of Table VI.A) fall from about 0.13 to 0.1, the risky share coefficients (column (1) of Table VI.B) fall from about 0.1 to 0.09, and the portfolio volatility estimates (column (4) of Table VI.B) barely change. This suggests that adoptive parental investment behavior is not simply proxying for other family background variables. Interestingly, the coefficients on biological parental participation fall by about 50%, suggesting biological parental participation may be proxying in part for other biological parental characteristics such as IQ (Grinblatt, Keloharju, and Linnainmaa, 2011). **[Table VI.A and VI.B about here]**

Beyond this, this richer model is useful as it allows us to assess the explanatory power of a broad range of parental variables for child investment behavior. Interestingly, we find that these variables are not powerful predictors.[36] Adoptive parent financial wealth and real estate wealth have strong effects on child participation but the evidence that these or other variables matter for the risky share or for portfolio volatility is very weak. One interesting exception is entrepreneurship status of the father. For biological fathers, this is positively related to the child risky share, consistent with a genetic transfer

of risk-tolerance. For adoptive fathers, it is negatively related to child risky share, consistent with the father taking less risk in the financial market because of his higher labor market risk, and the child being environmentally influenced by the father's lower risky share.

In Tables VI.C and VI.D, we decompose the adjusted R^2 of these regressions and see that adoptive parental characteristics (other than risk-taking) do play some role and are more relevant than the analogous variables for biological parents. Also, consistent with the relative magnitudes of the regression coefficients, adoptive parental risk-taking variables explain more than their biological equivalents. **[Tables VI.C and VI.D about here]**

B. The Role of Other Child Outcomes as Mediating Variables

One other possibility is that transmission of participation and risk preferences occurs because parents who participate in risky financial markets and have riskier portfolios invest more in their children's human capital.[37] To assess this possible mechanism, we add a control for child education. We also add controls for child earnings, child financial wealth, child real estate wealth, and child entrepreneurship status to see whether these reflect plausible mechanisms. The estimates, in column (2) of Table VI.A and columns (2) and (5) of Table VI.B, show that the inclusion of these characteristics has a large effect on the participation coefficients but very little effect on the risky share and portfolio volatility regressions. While this type of analysis can only be suggestive due to the endogeneity of the child characteristics, it suggests that these may be important intermediate variables in the intergenerational transmission of equity market participation

but not important mediators of the risk choice, conditional on participation.[38] One interpretation of this finding is that these variables affect frictions that influence participation but have little direct effect on risk preferences that influence portfolio choice conditional on participation.

In column (3) of Table VI.A and columns (3) and (6) of Table VI.B, we include both parental and child characteristics. The estimates on the parental risk-taking variables remain quite similar to those with just controls for child characteristics.[39]

C. The Role of Information and Role Models

Given the limited role for child education, earnings, and wealth as mechanisms, it is plausible that children are influenced by their adoptive parents' risk attitudes as a result of information sharing or role modeling. These effects may differ systematically by gender – for example, children may be more influenced by the adoptive parent of the same sex.[40] While it is well documented that attitudes towards risk differ between men and women[41], role modeling would imply that the effects of parental risk-taking differs systematically by sex of the parent and the child. Therefore, in Tables VII.A, VII.B, and VII.C, we split the sample by child gender. The coefficient estimates suggest girls are more influenced by their adoptive mother and boys by their adoptive father. For example, for the risky share, the coefficients for boys are 0.12 for fathers and 0.04 for mothers; for girls these are 0.07 for fathers and 0.13 for mothers. As these differences are not individually statistically significant, this evidence is not particularly strong. However, it does suggest that role-model effects may be part of the explanation for the patterns we observe.[42] **[Tables VII.A, VII.B, VII.C about here]**

VIII. Importance of Intergenerational Effects for Understanding Financial Decision Making

A key issue for researchers is whether information on parental risk-taking has a meaningful effect on our ability to predict financial decision-making. The decomposition in Tables VI.C and VI.D shows that, even with several child controls included, the parental risk-taking variables make a significant contribution to the adjusted R^2 -- 7% of the 28% of explained variation for participation, 7% of the 20% for risky share, and 4% of the 15% for portfolio volatility. We explore this further in Appendix Table AVIII by reporting estimates using a fairly standard set of cross-sectional control variables (similar to those used by Calvet and Sodini (2014)) and then adding the intergenerational variables as additional controls. We measure the increase in explanatory power by comparing the adjusted R^2 of the specifications with and without the intergenerational variables.[43]

Consistent with much of the prior literature, we find that participation and risky share are positively related to financial wealth and schooling but negatively related to leverage and being unemployed. Men are more likely to have risky portfolios than women and income risk is negatively related to the risky share (although the effect on portfolio volatility is statistically insignificant). Our primary interest is in the additional explanatory power provided by adding the intergenerational variables. For each outcome, we add the analogous variable for both biological and adoptive parents. We find important increases in explanatory power as a result -- for participation the adjusted R^2 goes from 0.24 to 0.30, for risky share it goes from 0.12 to 0.22, and for portfolio

volatility it goes from 0.12 to 0.17. So, it does appear that taking account of intergenerational factors may have meaningful effects on predicting financial behavior, particularly for the risky share and portfolio volatility.[44] These findings suggest that interventions that increase the willingness of parents to hold riskier portfolios might also have significant long-term effects on the financial decisions of their children.

IX. Conclusions

The previous literature has documented the correlation between risk preferences and asset allocations of parents and their children (Charles and Hurst 2003; Dohmen et al. 2012). However, it is not clear to what extent these similarities are biologically determined, and how much they are influenced by environmental factors. This paper addresses this issue using unique data on adoptees in Sweden.

Our main finding is that both biological and environmental factors are important in determining the intergenerational transmission of equity market participation, the risky share, and portfolio volatility. However, the post-birth effects are generally larger than the pre-birth ones suggesting important environmental influences on investment behavior in financial markets.

Our findings of strong environmental effects contrast with those from existing work using variation induced by twins that shows little role for shared environmental elements in determining risk-taking in financial markets. Twin studies have found that genes explain around 25-33% of the variance in risk-taking in financial markets and that shared environment has little influence (Cesarini et al. 2010; Barnea, Cronqvist, and Siegel 2010). One major difference between the two methodologies is that adoption

studies estimate regression coefficients and twin studies estimate variance components. This implies that, in our context, twin studies decompose the *total variation in risk-taking* in financial markets into genes, shared, and non-shared environment, whereas we decompose the *intergenerational association* into pre- and post-birth factors. Because of this, the estimands of the adoption studies are not directly comparable to the twin-study estimands. Even so, it is difficult to reconcile our finding of strong environmental effects with the lack of role for shared environment in the twins studies given that shared twin environmental factors should include many of the family influences that we consider likely to be responsible for the nurture effects we find.[45]

One possibility is that the different findings arise due to the differences in age of our children and those in the twins literature. Using twins, Barnea, Cronqvist, and Siegel (2010) show that shared environmental influences are detectable before age 30 but disappear after that age. However, even when we restrict our sample to persons who are aged at least 37 at measurement, we still find strong environmental effects. Of course, it is plausible that if we had information on persons who were mostly in their 50s and 60s, we might find smaller environmental effects.[46]

Our investigation of the source of environmental effects shows that controlling for the education, earnings, wealth, and entrepreneurship status of adoptive parents has little impact on the intergenerational coefficients, suggesting that the results we observe are not likely working through these channels. Another possible mechanism is that parents provide information about investing and this increases the involvement of their children in the stock market. While this is a likely avenue, we have found that, even conditional on participation, the risky shares and portfolio volatility of children are correlated with those

of their adoptive parents. These relationships remain strong even after controlling for child education and wealth, indicating that an important mechanism may be parental influence on child attitudes towards risk. Finally, our results by gender suggest that role-modeling is a possibility with women being more influenced by mothers and men by fathers. Overall, our findings imply that, to a large extent, risk preferences of children may be shaped by their parents and influenced by their environment rather than fully determined at birth.

Another important finding is that parental risk-taking has significant explanatory power in cross-sectional regressions of child asset allocation. This is true for both participation in the stock market and for risky share and portfolio volatility and suggests that parents can provide children with skills or resources that enable them to overcome entry barriers or can influence their attitude towards risk. This provides another avenue to help understand the heterogeneity in investment behavior that we observe across people who look similar in many dimensions.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Online Appendix.

Table I
Summary Statistics

The table reports summary statistics for the main financial and demographic characteristics of our sample at the end of 2000. * All monetary values are reported in Swedish Krona on December 31, 2000. At the time, the exchange rate was 1 USD = 9.42 SEK. ** Conditional on participation. *** We measure earnings for children when they are aged 34-36. **** The variable is average earnings between 1980 and 1999 (including zeros).

	Own-birth children			Adopted children		
	Mean	Median	SD	Mean	Median	SD
			Children			
Financial wealth*	106,278	16,522	1,163,278	108,985	10,153	621,846
Net wealth*	206,848	20,722	1,617,122	244,463	18,702	907,311
Equity market participation	0.57	1	0.50	0.50	0	0.50
Risky share**	0.52	0.54	0.30	0.49	0.51	0.31
Portfolio volatility**	0.21	0.17	0.15	0.21	0.17	0.12
Age	32.50	32	8.08	34.96	35	6.56
Earnings***	169,948	171,934	165,940	169,661	169,794	150,500
Years of schooling	12.42	12	2.17	11.94	11	2.08
Birth order (in raising family)	1.65	1	0.84	1.32	1	0.59
Married	0.31	0	0.46	0.34	0	0.47
Household size (own family)	2.39	2	1.62	2.43	2	1.48
Household size (raising family)	4.34	4	1.08	3.80	4	0.83
Female	0.49	0	0.50	0.48	0	0.50
Observations		2,073,412			3,185	
			Biological parents			
Financial wealth, mother*	222,395	59,893	4,150,480	89,721	11,880	273,722
Net wealth, mother*	473,650	202,215	4,448,249	185,178	13,324	497,376
Financial wealth, father*	328,004	72,262	2,417,229	165,978	13,512	688,359
Net wealth, father*	790,081	385,331	4,894,170	311,101	20,896	1,274,546
Equity market participation, mother	0.62	1	0.49	0.35	0	0.48
Equity market participation, father	0.64	1	0.48	0.37	0	0.48
Risky share, mother**	0.54	0.56	0.29	0.48	0.50	0.30
Risky share, father**	0.52	0.54	0.31	0.48	0.47	0.31
Portfolio volatility, mother**	0.16	0.15	0.09	0.17	0.15	0.10
Portfolio volatility, father**	0.18	0.16	0.11	0.20	0.17	0.14
Parents married together	0.70	1	0.46	0.09	0	0.27
Age, mother	58.87	58	9.14	57.53	57	7.76
Age, father	61.63	60	9.51	60.50	60	8.28
Earnings, mother****	46,300	45,847	22,717	42,475	42,406	19,962
Earnings, father****	72,006	63,788	47,404	56,443	54,482	32,601
Years of schooling, mother	10.76	11	2.96	9.79	11	2.50
Years of schooling, father	10.59	11	3.15	9.66	9.5	2.67

continued

Table I -- *Continued*

	Adoptive parents		
Financial wealth, mother*	332,660	119,057	921,032
Net wealth, mother*	611,495	301,895	1,243,514
Financial wealth, father*	476,359	126,714	2,700,893
Net wealth, father*	1,042,091	577,701	3,680,590
Equity market participation, mother	0.67	1	0.47
Equity market participation, father	0.72	1	0.45
Risky share, mother**	0.55	0.58	0.29
Risky share, father**	0.52	0.54	0.30
Portfolio volatility, mother**	0.15	0.15	0.08
Portfolio volatility, father**	0.17	0.15	0.10
Parents married together	0.87	1	0.33
Age, mother	66.45	67	8.15
Age, father	68.88	69	8.29
Earnings, mother****	40,657	38,155	22,701
Earnings, father****	71,945	63,407	46,719
Years of schooling, mother	10.53	11	3.13
Years of schooling, father	10.85	11	3.36

Table II
Intergenerational Transmission of Equity Market Participation

All estimates are marginal effects from a probit relating equity market participation of children to that of their parents. Estimation uses data from years 1999-2006 and assets of parents and children are measured in the same year. Separate regressions are run for own-birth children and adopted children. There are 15,493,001 observations (2,074,779 own-birth children) in the first panel and 20,782 observations (3,187 adoptees) in the second panel. In column (6), the sample size includes 44,150 observations (6,752 adoptees). All specifications include controls for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, year of survey dummies, and dummies for child and parent county of residence. In columns (1) - (4), coefficients for adoptive parents are in bold if they are significantly different to the analogous coefficients for biological parents at the 5% level. Variables "Biological Parents" and "Adoptive Parents" are equal to 1 if either parent participates. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)	(4)	(5)	(6)
Own Birth Children						
Biological Father	0.226***		0.163***			
	(0.001)		(0.001)			
Biological Mother		0.250***	0.197***			
		(0.001)	(0.001)			
Biological Parents				0.255***		
				(0.001)		
Pseudo R-squared	0.121	0.129	0.147	0.129		
Adopted Children						
Biological Father	0.085***		0.078***		0.081***	
	(0.015)		(0.015)		(0.015)	
Biological Mother		0.091***	0.081***		0.081***	0.081***
		(0.016)	(0.016)		(0.016)	(0.011)
Adoptive Father	**0.169*** **		**0.124*** **			
	(0.014)		**(0.015)**			
Adoptive Mother		**0.176*** **	**0.133*** **			
		(0.014)	**(0.015)**			
Sum Biological and Adoptive Fathers	0.254***		0.201***			
	(0.020)		(0.021)			
Sum Biological and Adoptive Mothers		0.267***	0.214***			
		(0.021)	(0.022)			
Biological Parents				0.105***		
				(0.014)		
Adoptive Parents				**0.193*** **	0.193***	0.180***
				(0.015)	(0.015)	(0.011)
Sum Biological and Adoptive Parents				0.297***		
				(0.021)		
Pseudo R-squared	0.124	0.121	0.161	0.151	0.151	0.108
Coefficients for own-birth and adopted children different	NO	NO	NO	YES	N/A	N/A

Table III
Intergenerational Transmission of the Risky Share

All estimates are from linear regressions relating the risky portfolio share of children to that of their parents. Estimation uses data from years 1999-2006 and assets of parents and children are measured in the same year. Separate regressions are run for own-birth children and adopted children. Sample is restricted to children who have investments in Stocks or Mutual Funds. There are 5,733,701 observations (1,302,037 own-birth children) in the first panel and 6,996 observations (1,766 adoptees) in the second panel. In column (6), the sample size includes 15,530 observations (3,841 adoptees). All specifications include controls for parental equity market participation and for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, year of survey dummies, and dummies for child and parent county of residence. In columns (1) - (4), coefficients for adoptive parents are in bold if they are significantly different to the analogous coefficients for biological parents at the 5% level. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)	(4)	(5)	(6)
Own Birth Children						
Biological Father	0.184***		0.135***			
	(0.001)		(0.001)			
Biological Mother		0.194***	0.147***			
		(0.001)	(0.001)			
Biological Parents				0.234***		
				(0.001)		
Adjusted R-squared	0.146	0.148	0.160	0.158		
Adopted Children						
Biological Father	-0.001		-0.027		-0.026	
	(0.028)		(0.028)		(0.028)	
Biological Mother		0.051	0.036		0.030	-0.008
		(0.031)	(0.032)		(0.032)	(0.021)
Adoptive Father	**0.150*** **		**0.100*** **			
	(0.023)		**(0.025)**			
Adoptive Mother		**0.141*** **	0.095***			
		(0.024)	(0.027)			
Sum Biological and Adoptive Fathers	0.149***		0.073*			
	(0.035)		(0.037)			
Sum Biological and Adoptive Mothers		0.192***	0.130***			
		(0.041)	(0.042)			
Biological Parents				0.017		
				(0.027)		
Adoptive Parents				**0.185*** **	0.185***	0.198***
				(0.024)	(0.024)	(0.017)
Sum Biological and Adoptive Parents				0.202***		
				(0.035)		
Adjusted R-squared	0.131	0.135	0.176	0.176	0.176	0.137
Coefficients for own-birth and adopted children different	NO	NO	NO	NO	N/A	N/A

Table IV
Intergenerational Transmission of Portfolio Volatility

All estimates are from linear regressions relating the portfolio volatility of children to that of their parents. Estimation uses data from years 1999-2006 and assets of parents and children are measured in the same year. Separate regressions are run for own-birth children and adopted children. Sample is restricted to children who have investments in Stocks or Mutual Funds. There are 5,733,701 observations (1,302,037 own-birth children) in the first panel and 6,996 observations (1,766 adoptees) in the second panel. In column (6), the sample size includes 15,530 observations (3,841 adoptees). All specifications include controls for parental equity market participation and for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, year of survey dummies, and dummies for child and parent county of residence. In columns (1) - (4), coefficients for adoptive parents are in bold if they are significantly different to the analogous coefficients for biological parents at the 5% level. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)	(4)	(5)	(6)
Own Birth Children						
Biological Father	0.073***		0.068***			
	(0.001)		(0.001)			
Biological Mother		0.101***	0.092***			
		(0.001)	(0.001)			
Biological Parents				0.135***		
				(0.001)		
Adjusted R-squared	0.120	0.120	0.122	0.121		
Adopted Children						
Biological Father	0.011		0.012		0.014	
	(0.019)		(0.019)		(0.019)	
Biological Mother		0.064*	0.062*		0.068**	0.048**
		(0.034)	(0.034)		(0.034)	(0.023)
Adoptive Father	**0.078*** **		**0.071*** **			
	(0.021)		**(0.021)**			
Adoptive Mother		0.076***	0.064**			
		(0.025)	(0.025)			
Sum Biological and Adoptive Fathers	0.089***		0.083***			
	(0.027)		(0.027)			
Sum Biological and Adoptive Mothers		0.140***	0.126***			
		(0.044)	(0.044)			
Biological Parents				0.041*		
				(0.024)		
Adoptive Parents				**0.158*** **	0.157***	0.160***
				(0.030)	(0.030)	(0.018)
Sum Biological and Adoptive Parents				0.171***		
				(0.034)		
Adjusted R-squared	0.124	0.119	0.128	0.130	0.130	0.126
Coefficients for own-birth and adopted children different	NO	NO	NO	NO	N/A	N/A

Table V.A

Addressing the Non-random Assignment of Adoptees: Equity Market Participation

All estimates are marginal effects from a probit relating equity market participation of children to that of their parents. Estimation uses data from years 1999-2006. There are 20,782 observations (3,187 adoptees). All specifications include controls for child gender, child birth cohort FE, dummies for child county of residence, and birth cohort FE and dummies for parent county of residence for included adoptive and biological parents when appropriate. Parental Characteristics include Schooling, Income (in logs), Financial wealth (in logs), Real estate wealth (in logs) and a dummy indicating if they are entrepreneurs. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)
Panel A: Sensitivity of Adoptive Parents' Coefficients to Specification				
Biological Father		0.078***		0.037**
		(0.015)		(0.016)
Biological Mother		0.081***		0.049**
		(0.016)		(0.016)
Adoptive Father	0.124***	0.124***	0.123***	0.122***
	(0.015)	(0.015)	(0.015)	(0.015)
Adoptive Mother	0.135***	0.133***	0.130***	0.130***
	(0.015)	(0.015)	(0.015)	(0.015)
Control for Biological Parents' Char.	NO	NO	YES	YES
Control for Adoptive Parents' Char.	NO	NO	NO	NO
Panel B: Sensitivity of Biological Parents' Coefficients to Specification				
Biological Father	0.094***	0.078***	0.078***	0.075***
	(0.015)	(0.015)	(0.015)	(0.015)
Biological Mother	0.090***	0.081***	0.072***	0.075***
	(0.016)	(0.016)	(0.016)	(0.016)
Adoptive Father		0.124***		0.089***
		(0.015)		(0.016)
Adoptive Mother		0.133***		0.101***
		(0.015)		(0.015)
Control for Biological Parents' Char.	NO	NO	NO	NO
Control for Adoptive Parents' Char.	NO	NO	YES	YES

Table V.B
Addressing the Non-random Assignment of Adoptees: Risky Share

All estimates are from linear regressions relating the risky portfolio share of children to that of their parents. Estimation uses data from years 1999-2006. There are 6,996 observations (1,766 adoptees). Sample is restricted to children who have investments in Stocks or Mutual Funds. All specifications include controls for parental equity market participation and for child gender, child birth cohort FE, dummies for child county of residence, and birth cohort FE and dummies for parent county of residence for included adoptive and biological parents when appropriate. Parental Characteristics include Schooling, Income (in logs), Financial wealth (in logs), Real estate wealth (in logs) and a dummy indicating if they are entrepreneurs. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)
Panel A: Sensitivity *of Adoptive Parents' Coefficients to Specification*				
Biological Father		-0.027		-0.027
		(0.028)		(0.028)
Biological Mother		0.036		0.036
		(0.032)		(0.032)
Adoptive Father	0.106***	0.100***	0.098***	0.098***
	(0.025)	(0.025)	(0.025)	(0.025)
Adoptive Mother	0.084***	0.095***	0.091***	0.093***
	(0.027)	(0.027)	(0.026)	(0.026)
Control for Biological Parents' Char.	NO	NO	YES	YES
Control for Adoptive Parents' Char.	NO	NO	NO	NO
Panel B: Sensitivity of Biological Parents' Coefficients to Specification				
Biological Father	0.007	-0.027	-0.022	-0.027
	(0.029)	(0.028)	(0.029)	(0.028)
Biological Mother	0.030	0.036	0.024	0.034
	(0.033)	(0.032)	(0.032)	(0.032)
Adoptive Father		0.100***		0.085***
		(0.025)		(0.025)
Adoptive Mother		0.095***		0.089***
		(0.027)		(0.026)
Control for Biological Parents' Char.	NO	NO	NO	NO
Control for Adoptive Parents' Char.	NO	NO	YES	YES

Table V.C
Addressing the Non-random Assignment of Adoptees: Portfolio Volatility

All estimates are from linear regressions relating the portfolio volatility of children to that of their parents. Estimation uses data from years 1999-2006. There are 6,996 observations (1,766 adoptees). Sample is restricted to children who have investments in Stocks or Mutual Funds. All specifications include controls for parental equity market participation and for child gender, child birth cohort FE, dummies for child county of residence, and birth cohort FE and dummies for parent county of residence for included adoptive and biological parents when appropriate. Parental Characteristics include Schooling, Income (in logs), Financial wealth (in logs), Real estate wealth (in logs) and a dummy indicating if they are entrepreneurs. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)
Panel A: Sensitivity of Adoptive Parents' Coefficients to Specification				
Biological Father		0.012		0.011
		(0.019)		(0.019)
Biological Mother		0.062*		0.064*
		(0.034)		(0.034)
Adoptive Father	0.075***	0.070***	0.071***	0.070***
	(0.021)	(0.021)	(0.021)	(0.021)
Adoptive Mother	0.063**	0.064**	0.065**	0.064**
	(0.025)	(0.025)	(0.025)	(0.025)
Control for Biological Parents' Char.	NO	NO	YES	YES
Control for Adoptive Parents' Char.	NO	NO	NO	NO
Panel B: Sensitivity of Biological Parents' Coefficients to Specification				
Biological Father	0.011	0.012	0.017	0.015
	(0.019)	(0.019)	(0.019)	(0.019)
Biological Mother	0.062*	0.062*	0.065*	0.062*
	(0.034)	(0.034)	(0.033)	(0.034)
Adoptive Father		0.070***		0.069***
		(0.021)		(0.021)
Adoptive Mother		0.064**		0.062**
		(0.025)		(0.025)
Control for Biological Parents' Char.	NO	NO	NO	NO
Control for Adoptive Parents' Char.	NO	NO	YES	YES

Table VI.A
General Model of Intergenerational Transmission Mechanisms for Adoptees: Equity Market Participation

All estimates are marginal effects from a probit relating equity market participation of children to various characteristics of their parents and of themselves. Estimation uses data from years 1999-2006. There are 20,782 observations (3,187 adoptees). All specifications include controls for child gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. The *Entrepreneur* variable is an indicator variable that equals 1 if the person is an entrepreneur and 0 otherwise. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)
Equity Market Participation			
Biological Father	0.041***	0.031***	0.021*
	(0.016)	(0.011)	(0.012)
Biological Mother	0.042***	0.029**	0.018
	(0.016)	(0.012)	(0.012)
Adoptive Father	0.094***	0.061***	0.069***
	(0.016)	(0.012)	(0.012)
Adoptive Mother	0.097***	0.071***	0.068***
	(0.015)	(0.012)	(0.012)
Parental Education			
Biological Father	0.004		0.003
	(0.003)		(0.002)
Biological Mother	0.006**		-0.000
	(0.003)		(0.002)
Adoptive Father	-0.002		-0.001
	(0.003)		(0.002)
Adoptive Mother	0.002		0.003
	(0.003)		(0.002)
Parental Earnings (logs)			
Biological Father	0.002		0.002
	(0.002)		(0.002)
Biological Mother	-0.001		-0.001
	(0.003)		(0.002)
Adoptive Father	-0.000		-0.002
	(0.002)		(0.002)
Adoptive Mother	0.002		-0.002
	(0.003)		(0.002)
Parental Financial Wealth (logs)			
Biological Father	0.007***		0.001
	(0.002)		(0.002)
Biological Mother	0.007***		0.003
	(0.002)		(0.002)
Adoptive Father	0.013***		-0.003
	(0.005)		(0.003)

continued

Table VI.A -- *Continued*

Adoptive Mother	0.018***		0.003
	(0.004)		(0.002)
Parental Real Estate Wealth (logs)			
Biological Father	0.001		0.000
	(0.001)		(0.001)
Biological Mother	0.002**		0.001
	(0.001)		(0.001)
Adoptive Father	-0.000		0.001
	(0.001)		(0.001)
Adoptive Mother	-0.001		-0.001
	(0.001)		(0.001)
Parental Entrepreneurship			
Biological Father	0.026		0.020
	(0.024)		(0.016)
Biological Mother	-0.005		0.012
	(0.025)		(0.021)
Adoptive Father	0.004		-0.002
	(0.024)		(0.019)
Adoptive Mother	-0.035		-0.009
	(0.033)		(0.024)
Child's Characteristics			
Education		0.018***	0.017***
		(0.003)	(0.003)
Earnings (logs)		0.024***	0.024***
		(0.007)	(0.007)
Financial wealth (logs)		0.090***	0.090***
		(0.003)	(0.003)
Real estate wealth (logs)		0.002**	0.002**
		(0.001)	(0.001)
Entrepreneur		-0.012	-0.014
		(0.019)	(0.019)

Table VI.B
General Model of Intergenerational Transmission Mechanisms for Adoptees: Risky Share and Portfolio Volatility

All estimates are from linear regressions relating the risky share and portfolio volatility of children to various characteristics of their parents and of themselves. The risk variables for parents are their risky shares in columns (1) – (3) and their portfolio volatilities in columns (4) – (6). Estimation uses data from years 1999-2006. There are 6,996 observations (1,766 adoptees). Sample is restricted to children who have investments in Stocks or Mutual Funds. All specifications include controls for parental equity market participation and for child gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. The *Entrepreneur* variable is an indicator variable that equals 1 if the person is an entrepreneur and 0 otherwise. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)	(5)	(6)
	Risky Share			Portfolio Volatility		
Risk Variables						
Biological Father	-0.025	-0.022	-0.021	0.013	0.011	0.013
	(0.028)	(0.028)	(0.028)	(0.019)	(0.019)	(0.019)
Biological Mother	0.034	0.032	0.030	0.064*	0.064*	0.063*
	(0.032)	(0.031)	(0.032)	(0.034)	(0.034)	(0.033)
Adoptive Father	0.088***	0.093***	0.088***	0.071***	0.069***	0.070***
	(0.025)	(0.024)	(0.024)	(0.021)	(0.021)	(0.021)
Adoptive Mother	0.089***	0.086***	0.083***	0.059**	0.064**	0.059**
	(0.026)	(0.026)	(0.026)	(0.025)	(0.026)	(0.025)
Parental Education						
Biological Father	0.004		0.004	0.001		0.001
	(0.003)		(0.002)	(0.001)		(0.001)
Biological Mother	0.002		0.003	0.001		0.001
	(0.003)		(0.003)	(0.001)		(0.001)
Adoptive Father	0.001		0.001	0.001*		0.001*
	(0.002)		(0.002)	(0.001)		(0.001)
Adoptive Mother	-0.002		-0.002	0.000		-0.000
	(0.002)		(0.002)	(0.001)		(0.001)
Parental Earnings (logs)						
Biological Father	0.002		0.002	0.001		0.001
	(0.002)		(0.002)	(0.001)		(0.001)
Biological Mother	0.000		-0.000	-0.001		-0.001
	(0.002)		(0.002)	(0.001)		(0.001)
Adoptive Father	0.005*		0.005*	0.000		0.000
	(0.003)		(0.003)	(0.001)		(0.001)
Adoptive Mother	0.003*		0.003	0.001		0.001
	(0.002)		(0.002)	(0.001)		(0.001)
Parental Financial Wealth (logs)						
Biological Father	-0.002		-0.003	-0.000		0.000
	(0.002)		(0.002)	(0.001)		(0.001)

continued

Table VI.B -- *Continued*

Biological Mother	0.001		0.001	-0.001	-0.001
	(0.002)		(0.002)	(0.001)	(0.001)
Adoptive Father	0.009**		0.004	0.001	0.003
	(0.005)		(0.004)	(0.002)	(0.002)
Adoptive Mother	0.002		0.000	-0.000	0.000
	(0.004)		(0.004)	(0.002)	(0.002)
Parental Real Estate Wealth (logs)					
Biological Father	-0.001		-0.001	-0.000	-0.000
	(0.001)		(0.001)	(0.000)	(0.000)
Biological Mother	0.000		0.000	0.000	0.000
	(0.001)		(0.001)	(0.000)	(0.000)
Adoptive Father	-0.002*		-0.001	-0.000	-0.000
	(0.001)		(0.001)	(0.000)	(0.000)
Adoptive Mother	0.001		0.001	-0.000	-0.000
	(0.001)		(0.001)	(0.000)	(0.000)
Parental Entrepreneurship					
Biological Father	0.044*		0.045**	0.002	0.002
	(0.022)		(0.022)	(0.009)	(0.009)
Biological Mother	-0.001		-0.003	-0.009	-0.008
	(0.024)		(0.025)	(0.011)	(0.011)
Adoptive Father	-0.050**		-0.054**	-0.008	-0.007
	(0.022)		(0.022)	(0.009)	(0.009)
Adoptive Mother	-0.004		-0.010	-0.015	-0.015
	(0.029)		(0.027)	(0.010)	(0.010)
Child's Characteristics					
Education		0.002	0.001	0.002*	0.001
		(0.003)	(0.003)	(0.001)	(0.001)
Earnings (logs)		0.046***	0.046***	0.003	0.002
		(0.009)	(0.009)	(0.004)	(0.004)
Financial wealth (logs)		0.026***	0.025***	0.008***	0.009***
		(0.005)	(0.005)	(0.002)	(0.002)
Real estate wealth (logs)		0.001	0.001	0.000	0.000
		(0.001)	(0.001)	(0.000)	(0.000)
Entrepreneur		-0.080***	-0.079***	-0.003	-0.001
		(0.025)	(0.025)	(0.011)	(0.011)

Table VI.C
Variance Decomposition of the Adjusted R^2: Equity Market Participation

Decomposition is carried out based on the regressions in Table VI.A. Estimates of the adjusted R^2 come from a linear probability model.

	Col. (1)	Col. (2)	Col. (3)
Adjusted R-squared	18.5%*	28.3%*	28.4%*
Contribution of the variance of:			
Child characteristics except cohort, gender, and county of residence	N/A	16.2%	15.0%
Child's cohort, gender, and county of residence	1.3%	1.1%	1.1%
Biological parent's characteristics except cohort and county of residence	2.4%	N/A	1.5%
Adoptive parent's characteristics except cohort and county of residence	2.5%	N/A	1.6%
Biological parent's equity market participation	1.9%	1.8%	1.4%
Adoptive parent's equity market participation	5.3%	4.8%	3.9%
Biological parent's risky share	N/A	N/A	N/A
Adoptive parent's risky share	N/A	N/A	N/A
Biological parents' portfolio volatility	N/A	N/A	N/A
Adoptive parents' portfolio volatility	N/A	N/A	N/A
Parent's cohort and county of residence	0.5%	0.5%	0.5%
Year effect	4.6%	3.9%	3.4%

Table VI.D
Variance Decomposition of the Adjusted R^2: Risky Share and Portfolio Volatility

Decomposition is carried out based on the regressions in Table VI.B.

	Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6)
	Risky Share			Portfolio Volatility		
Adjusted R-squared	17.5%	19.6%	21.0%	12.9%	15.0%	16.3%
Contribution of the variance of:						
Child characteristics except cohort, gender, and county of residence	N/A	4.9%	4.7%	N/A	4.6%	4.1%
Child's cohort, gender, and county of residence	1.8%	1.6%	2.0%	1.7%	1.5%	1.8%
Biological parent's characteristics except cohort and county of residence	0.8%	N/A	0.6%	0.4%	N/A	0.4%
Adoptive parent's characteristics except cohort and county of residence	2.0%	N/A	1.6%	1.6%	N/A	1.4%
Biological parent's equity market participation	0.4%	0.4%	0.3%	0.5%	0.4%	0.5%
Adoptive parent's equity market participation	1.8%	1.8%	1.6%	1.2%	1.2%	1.1%
Biological parent's risky share	0.7%	0.7%	0.7%	N/A	N/A	N/A
Adoptive parent's risky share	4.4%	4.4%	4.0%	N/A	N/A	N/A
Biological parents' portfolio volatility	N/A	N/A	N/A	0.4%	0.4%	0.4%
Adoptive parents' portfolio volatility	N/A	N/A	N/A	2.3%	2.2%	2.0%
Parent's cohort and county of residence	0.6%	0.5%	0.5%	0.5%	0.4%	0.4%
Year effect	5.0%	5.3%	5.0%	4.3%	4.3%	4.2%

Table VII.A
Intergenerational Transmission of Equity Market Participation: Male and Female Children

All estimates are marginal effects from a probit relating equity market participation of children to that of their parents. Estimation uses data from years 1999-2006. Separate regressions are run for own-birth children and adopted children. In the top panel, there are 7,956,812 observations (1,065,554 own-birth children) in columns (1) - (3) and 7,536,189 observations (1,009,225 own-birth children) in Columns (4)-(6). In the bottom panel, there are 10,870 observations (1,667 adoptees) in columns (1) - (3) and 9,912 observations (1,520 adoptees) in columns (4) - (6). All specifications include controls for child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)	(4)	(5)	(6)
	Male Children			Female Children		
Own Birth Children						
Biological Father	0.239***		0.179***	0.208***		0.144***
	(0.001)		(0.001)	(0.001)		(0.001)
Biological Mother		0.249***	0.193***		0.245***	0.198***
		(0.001)	(0.001)		(0.001)	(0.001)
Adopted Children						
Biological Father	0.080***		0.068***	0.089***		0.089***
	(0.022)		(0.020)	(0.022)		(0.020)
Biological Mother		0.099***	0.091***		0.074***	0.067***
		(0.022)	(0.023)		(0.021)	(0.022)
Adoptive Father	0.176***		0.138***	0.163***		0.106***
	(0.020)		(0.021)	(0.020)		(0.020)
Adoptive Mother		0.168***	0.117***		0.190***	0.137***
		(0.020)	(0.021)		(0.019)	(0.020)

Table VII.B
Intergenerational Transmission of Risky Share: Male and Female Children

All estimates are from linear regressions relating the risky portfolio share of children to that of their parents. Estimation uses data from years 1999-2006. Separate regressions are run for own-birth children and adopted children. In the top panel, there are 3,303,417 observations (750,156 own-birth children) in columns (1) - (3) and 2,430,284 observations (551,881 own-birth children) in columns (4) - (6). In the bottom panel, there are 3,947 observations (997 adoptees) in columns (1)-(3) and 3,049 observations (769 adoptees) in columns (4)-(6). Sample is restricted to children who have investments in Stocks or Mutual Funds. All specifications include controls for parental equity market participation and for child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)	(4)	(5)	(6)
	Male Children			Female Children		
Own Birth Children						
Biological Father	0.187***		0.141***	0.181***		0.127***
	(0.001)		(0.001)	(0.001)		(0.001)
Biological Mother		0.186***	0.137***		0.203***	0.159***
		(0.001)	(0.001)		(0.001)	(0.001)
Adopted Children						
Biological Father	0.007		-0.004	-0.010		-0.051
	(0.040)		(0.020)	(0.040)		(0.040)
Biological Mother		0.038	0.035		0.075	0.048
		(0.044)	(0.044)		(0.046)	(0.044)
Adoptive Father	0.143***		0.115***	0.138***		0.067*
	(0.032)		(0.034)	(0.031)		(0.034)
Adoptive Mother		0.094***	0.038		0.191***	0.133***
		(0.033)	(0.037)		(0.035)	(0.038)

Table VII.C
Intergenerational Transmission of Portfolio Volatility: Male and Female Children

All estimates are from linear regressions relating the portfolio volatility of children to that of their parents. Estimation uses data from years 1999-2006. Separate regressions are run for own-birth children and adopted children. In the top panel, there are 3,303,417 observations (750,156 own-birth children) in columns (1) - (3) and 2,430,284 observations (551,881 own-birth children) in columns (4) - (6). In the bottom panel, there are 3,947 observations (997 adoptees) in columns (1) - (3) and 3,049 observations (769 adoptees) in columns (4) - (6). Sample is restricted to children who have investments in Stocks or Mutual Funds. All specifications include controls for parental equity market participation and for child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)	(4)	(5)	(6)
	Male Children			Female Children		
Own Birth Children						
Biological Father	0.089***		0.082***	0.055***		0.050***
	(0.001)		(0.001)	(0.001)		(0.001)
Biological Mother		0.114***	0.104***		0.088***	0.082***
		(0.002)	(0.001)		(0.001)	(0.001)
Adopted Children						
Biological Father	0.026		0.026	-0.004		0.008
	(0.028)		(0.029)	(0.028)		(0.028)
Biological Mother		0.038	0.052		0.072	0.067
		(0.046)	(0.046)		(0.044)	(0.048)
Adoptive Father	0.097***		0.091***	0.062***		0.045
	(0.030)		(0.031)	(0.030)		(0.029)
Adoptive Mother		0.060*	0.057		0.100***	0.086***
		(0.055)	(0.037)		(0.035)	(0.033)

Appendix: Additional Tables

Table AI
Choosing the Sample of Adoptees

Applied Criteria	Number of observations remained
Adoptees born in Sweden between 1950 and 1980 who are alive at the end of 1999 and for whom we can identify adoptive parents	23,332
Biological mother known and alive at the end of 1999	17,449
Biological father known and alive at the end of 1999	7,278
Adoptive parents alive at the end of 1999	4,330
Not adopted by relatives	4,248
Information available on child and all parents in the same year	3,626
Have information on child schooling	3,601
Have information on schooling of all parents	3,187

Table AII
Nature-Nurture Interactions for Adoptees

All estimates are from linear regressions relating the portfolio choices of children to that of their parents. Panel A regresses equity market participation of children on that of their parents. Panel B regresses risky share of children on that of their parents. Panel C regresses portfolio volatility of children on that of their parents. Estimation uses data from years 1999-2006 and assets of parents and children are measured in the same year. There are 20,782 observations (3,187 adoptees) in Panel A and 6,996 observations (1,766 adoptees) in Panels B and C. All specifications control for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, year of survey dummies, and dummies for child and parent county of residence. In panels B and C, sample is restricted to children who have investments in Stocks or Mutual Funds and the specifications include controls for parental equity market participation. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)
	Panel A: Equity Market Participation		
Biological Father	0.063***		0.059***
	(0.020)		(0.019)
Biological Mother		0.090***	0.080**
		(0.020)	(0.020)
Adoptive Father	0.144***		0.103***
	(0.014)		(0.015)
Adoptive Mother		0.164***	0.123***
		(0.015)	(0.015)
Interaction Biological-Adoptive Father	0.031		0.023
	(0.025)		(0.025)
Interaction Biological-Adoptive Mother		-0.000	-0.002
		(0.026)	(0.026)
	Panel B: Risky Share		
Biological Father	0.007		-0.022
	(0.037)		(0.036)
Biological Mother		0.076*	0.052
		(0.040)	(0.040)
Adoptive Father	0.153***		0.101***
	(0.025)		(0.027)
Adoptive Mother		0.152***	0.102***
		(0.027)	(0.029)
Interaction Biological-Adoptive Father	-0.021		-0.013
	(0.056)		(0.054)
Interaction Biological-Adoptive Mother		-0.069	-0.044
		(0.060)	(0.060)
	Panel C: Portfolio Volatility		
Biological Father	0.028		0.030
	(0.027)		(0.027)
Biological Mother		0.040	0.035
		(0.034)	(0.034)
Adoptive Father	0.087***		0.080***
	(0.022)		(0.022)

continued

Table AII -- *Continued*

Adoptive Mother		0.061**	0.046*
		(0.028)	(0.028)
Interaction Biological-Adoptive Father	-0.088		-0.086
	(0.085)		(0.084)
Interaction Biological-Adoptive Mother		0.169	0.191
		(0.178)	(0.172)

Table AIII.A
Intergenerational Transmission of Equity Market Participation for Children Born 1970 or Earlier

All estimates are marginal effects from a probit relating equity market participation of children to that of their parents. Estimation uses data from years 1999-2006. Separate regressions are run for own-birth children and adopted children. There are 8,919,232 observations in the top panel and 16,430 observations in the bottom panel. All specifications include controls for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)
Own Birth Children			
Biological Father	0.207***		0.150***
	(0.001)		(0.001)
Biological Mother		0.222***	0.171***
		(0.001)	(0.001)
Adopted Children			
Biological Father	0.088***		0.081***
	(0.017)		(0.017)
Biological Mother		0.087***	0.076***
		(0.017)	(0.017)
Adoptive Father	0.168***		0.124***
	(0.017)		(0.018)
Adoptive Mother		0.168***	0.125***
		(0.017)	(0.018)

Table AIII.B
Intergenerational Transmission of Risky Share, and Portfolio Volatility for Children Born 1970 or Earlier

All estimates are from linear regressions relating the risky share and portfolio volatility of children to the analogous variable for their parents. Estimation uses data from years 1999-2006. Separate regressions are run for own-birth children and adopted children. There are 3,524,824 observations in the top panel and 5,778 observations in the bottom panel. Sample is restricted to children who have investments in Stocks or Mutual Funds. All specifications include controls for parental equity market participation and controls for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by raising family.

	(1)	(2)	(3)	(4)	(5)	(6)
		Risky Share			Portfolio Volatility	
Own Birth Children						
Biological Father	0.161***		0.118***	0.063***		0.057***
	(0.001)		(0.001)	(0.001)		(0.001)
Biological Mother		0.158***	0.114***		0.089***	0.082***
		(0.001)	(0.001)		(0.001)	(0.001)
Adopted Children						
Biological Father	-0.028		-0.044	0.008		0.009
	(0.031)		(0.031)	(0.020)		(0.021)
Biological Mother		0.048	0.032		0.069*	0.071*
		(0.034)	(0.034)		(0.037)	(0.037)
Adoptive Father	0.124***		0.075***	0.084***		0.076***
	(0.026)		(0.028)	(0.023)		(0.023)
Adoptive Mother		0.119***	0.075**		0.079***	0.065**
		(0.028)	(0.030)		(0.026)	(0.027)

Table AIV
Intergenerational Transmission of Equity Market Participation, Risky Share, and Portfolio Volatility - Split Based on the Adoptees' Median Age

All estimates are from specifications relating the portfolio choices of children to the analogous variable for their parents. Estimation uses data from years 1999-2006 and assets of parents and children are measured in the same year. The sample is split based on the adoptees' median age of 37 with Older being defined as aged 37 or more. There are 10,013 observations in column (1) and 10,769 observations in column (2). There are 3,432 observations in columns (3) and (5) and 3,566 observations in columns (4) and (6). All specifications include controls for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, year of survey dummies, and dummies for child and parent county of residence. In columns (3) - (6), the sample is restricted to children who have investments in Stocks or Mutual Funds and specifications include controls for parental equity market participation. Coefficients in columns (1) and (2) are marginal effects from a probit. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)	(5)	(6)
	Equity Market Participation		Risky Share		Portfolio Volatility	
	Younger	Older	Younger	Older	Younger	Older
Biological father	0.081***	0.078***	-0.009	-0.057	-0.023	0.044
	(0.019)	(0.020)	(0.037)	(0.042)	(0.028)	(0.029)
Biological mother	0.094***	0.083***	0.028	0.046	0.061	0.053
	(0.022)	(0.021)	(0.043)	(0.043)	(0.049)	(0.047)
Adoptive father	0.154***	0.103***	0.121***	0.066*	0.081***	0.064**
	(0.020)	(0.021)	(0.029)	(0.039)	(0.030)	(0.029)
Adoptive Mother	0.145***	0.127***	0.088***	0.107***	0.065*	0.060
	(0.019)	(0.021)	(0.032)	(0.041)	(0.036)	(0.038)

Appendix Table AV
Intergenerational Transmission of Equity Market Participation, Risky Share, and Portfolio Volatility - Split Based on Biological Parents' Characteristics

All estimates are from specifications relating the portfolio choices of children to the analogous variable for their parents. Estimation uses data from years 1999-2006. The sample in columns (1) and (2) is split based on the biological parents' median net wealth and the sample in columns (3) and (4) is split based on the biological parents' median years of schooling. The median average net wealth of biological mothers and fathers is 93,196 SEK (deflated to 2000 values). The median average education of biological mothers and fathers is 9.5 years. In Panel A, there are 10,387 observations in column (1), 10,395 observations in column (2), 10,802 observations in column (3), and 9,980 observations in column (4). In Panels B and C, there are 2,972 observations in column (1), 4,024 observations in column (2), 3,515 observations in column (3), and 3,481 observations in column (4). All specifications include controls for child gender, child birth cohort FE, dummies for child county of residence, and birth cohort FE and dummies for parent county of residence for included adoptive and biological parents. In panels B and C, the sample is restricted to children who have investments in Stocks or Mutual Funds and specifications include controls for parental equity market participation. Coefficients in Panel A are marginal effects from a probit. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)
	Poorer Biological families	Richer Biological families	Less Educated Biological Families	More Educated Biological Families
		Panel A: Equity Market Participation		
Biological Father	0.073***	0.036*	0.083***	0.072***
	(0.021)	(0.020)	(0.022)	(0.021)
Biological Mother	0.078***	0.060***	0.072***	0.073***
	(0.022)	(0.021)	(0.022)	(0.023)
Adoptive Father	0.125***	0.109***	0.151***	0.094***
	(0.018)	(0.023)	(0.020)	(0.023)
Adoptive Mother	0.119***	0.154***	0.111***	0.164***
	(0.017)	(0.023)	(0.020)	(0.022)
		Panel B: Risky Share		
Biological Father	-0.073	-0.048	-0.025	0.005
	(0.052)	(0.032)	(0.042)	(0.037)
Biological Mother	0.003	0.013	0.065	-0.002
	(0.058)	(0.037)	(0.047)	(0.044)
Adoptive Father	0.147***	0.092***	0.140***	0.048
	(0.036)	(0.032)	(0.036)	(0.035)
Adoptive Mother	0.080**	0.071**	0.050	0.143***
	(0.039)	(0.035)	(0.040)	(0.037)
		Panel C: Portfolio Volatility		
Biological Father	0.046	0.014	0.050	-0.012
	(0.043)	(0.023)	(0.037)	(0.023)
Biological Mother	0.065	0.066*	0.027	0.082*
	(0.071)	(0.036)	(0.047)	(0.048)
Adoptive Father	0.075**	0.064**	0.054**	0.092***
	(0.033)	(0.027)	(0.027)	(0.032)
Adoptive Mother	0.038	0.098***	0.032	0.078**
	(0.036)	(0.034)	(0.031)	(0.039)

Table AVI
Intergenerational Transmission of Equity Market Participation, Risky Share, and Portfolio Volatility - Interactions with Raising Family Characteristics

All estimates are from specifications relating the portfolio choices of children to the analogous variable for their parents. Estimates for Equity Market Participation come from a linear probability model. Estimation uses data from years 1999-2006 and assets of parents and children are measured in the same year. Later-born dummy is equal to 1 if the adoptee is not the oldest child in the raising family. Number of siblings is the adoptee's number of siblings in the raising family. There are 20,782 observations (3,187 adoptees) in columns (1) - (2) and 6,996 observations (1,766 adoptees) in columns (3) - (6). All specifications include controls for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, year of survey dummies, and dummies for child and parent county of residence. In columns (3) - (6), the sample is restricted to children who have investments in Stocks or Mutual Funds and specifications include controls for parental equity market participation. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)	(5)	(6)
	Equity Market Participation		Risky Share		Portfolio Volatility	
Biological Father	0.073***	0.072***	-0.027	-0.026	0.012	0.012
	(0.014)	(0.014)	(0.028)	(0.028)	(0.019)	(0.019)
Biological Mother	0.079***	0.081***	0.036	0.037	0.063*	0.063*
	(0.015)	(0.015)	(0.032)	(0.032)	(0.034)	(0.034)
Adoptive Father	0.109***	0.117***	0.100***	0.130***	0.070***	0.059**
	(0.013)	(0.019)	(0.025)	(0.034)	(0.021)	(0.025)
Adoptive Mother	0.123***	0.140***	0.095***	0.073**	0.067***	0.076**
	(0.014)	(0.019)	(0.027)	(0.034)	(0.026)	(0.033)
Adoptive Father*later-born dummy		-0.008		-0.084*		0.019
		(0.031)		(0.049)		(0.050)
Adoptive Mother* later-born dummy		-0.019		0.049		0.005
		(0.031)		(0.053)		(0.050)
Adoptive Father*number of siblings		-0.010		-0.014		0.007
		(0.016)		(0.030)		(0.025)
Adoptive Mother* number of siblings		-0.014		0.011		-0.012
		(0.016)		(0.030)		(0.025)
Later-born dummy		0.056**		0.023		-0.004
		(0.023)		(0.024)		(0.010)
Number of siblings		-0.026**		-0.016		0.001
		(0.011)		(0.012)		(0.006)

Table AVII.A
Intergenerational Transmission of Equity Market Participation- Reweighted Sample

All estimates are marginal effects from a probit relating equity market participation of children to that of their parents. Estimation uses data from years 1999-2006. Regressions are run for adopted children only. There are 20,782 observations (3,187 adoptees). All specifications include controls for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. Each observation is weighted by the inverse of the estimated probability that, conditional on observable characteristics, the individual is an adoptive child. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)
Biological father	0.064**		0.054**
	(0.026)		(0.022)
Biological mother		0.102***	0.091***
		(0.027)	(0.026)
Adoptive father	0.113***		0.096***
	(0.025)		(0.026)
Adoptive Mother		0.147***	0.120***
		(0.026)	(0.028)

Table AVII.B
Intergenerational Transmission of Risky Share and Portfolio Volatility- Reweighted Sample

All estimates are from linear regressions relating the risky share and portfolio volatility of children to the analogous variable for their parents. Estimation uses data from years 1999-2006. Regressions are run for adopted children only. There are 6,996 observations (1,766 adoptees). Sample is restricted to children who have investments in Stocks or Mutual Funds. All specifications include controls for parental equity market participation and controls for child's gender, child birth cohort FE, birth cohort FE for adoptive and biological parents, and dummies for child and parent county of residence. Each observation is weighted by the inverse of the estimated probability that, conditional on observable characteristics, the individual is an adoptive child. *** p<0.01, ** p<0.05, * p<0.1. Standard errors clustered by adoptive family.

	(1)	(2)	(3)	(4)	(5)	(6)
		Risky Share			Portfolio Volatility	
Biological father	-0.029		-0.050	0.062*		0.066*
	(0.040)		(0.035)	(0.037)		(0.038)
Biological mother		0.047	0.024		0.055	0.060
	0.140***	(0.049)	(0.040)		(0.048)	(0.049)
Adoptive father	(0.032)		0.082**	0.082*		0.094*
			(0.034)	(0.049)		(0.052)
Adoptive Mother		0.144***	0.114***		0.053	0.060
		(0.039)	(0.038)		(0.046)	(0.044)

Table AVIII
Pooled-Cross Section Regressions with and without the Intergenerational Variables

All estimates are from linear regressions relating portfolio choices of children to their characteristics and to the portfolio choices of their parents. There are 20,782 observations (3,187 adoptees) in columns (1)-(2) and 6,996 observations (1,766 adoptees) in columns (3)-(6). All specifications include controls for, child birth cohort FE, year dummies, and dummies for child county of residence. In columns (2), (4), and (6), the specifications also include controls for birth cohort FE for adoptive and biological parents, and parents' county of residence. There are 16,361 observations in columns (1) and (2) and 5,759 observations in columns (3) - (6). In columns (3) - (6), the sample is restricted to children who have investments in Stocks or Mutual Funds. Columns (4) and (6) include controls for parental equity market participation. Estimates for Equity Market Participation come from a linear probability model. See the Online Appendix or Calvet and Sodini (2014) for variable definitions.

	(1)	(2)	(3)	(4)	(5)	(6)
	Equity Market Participation		Risky Share		Portfolio Volatility	
Financial characteristics						
Log (fin. wealth)	0.046***	0.042***	0.025***	0.018***	0.007***	0.007***
	(0.002)	(0.002)	(0.007)	(0.006)	(0.001)	(0.001)
Log (real wealth)	0.001	-0.001	0.002	0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Leverage ratio	-0.079***	-0.075***	-0.032**	-0.047***	-0.010**	-0.009*
	(0.011)	(0.010)	(0.014)	(0.013)	(0.005)	(0.005)
Demographics						
Schooling	0.034***	0.031***	0.005	0.003	0.002*	0.002*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)
Household size	-0.011***	-0.006	-0.006	-0.004	0.001	0.001
	(0.005)	(0.005)	(0.006)	(0.006)	(0.002)	(0.002)
Female	-0.074***	-0.071***	-0.009	-0.003	-0.048***	-0.046***
	(0.015)	(0.015)	(0.016)	(0.015)	(0.005)	(0.005)
Human capital and Income Risk						
Log human capital	0.003	0.003	0.009*	0.009**	0.001	0.000
	(0.003)	(0.003)	(0.005)	(0.004)	(0.002)	(0.002)
Permanent income risk	-0.105	-0.147	-0.330**	-0.331**	-0.001	-0.028
	(0.093)	(0.100)	(0.130)	(0.132)	(0.053)	(0.054)
Transitory income risk	-0.014	-0.022	-0.080***	-0.078***	-0.003	-0.006
	(0.016)	(0.016)	(0.023)	(0.026)	(0.011)	(0.013)
Child entrepreneur	0.009	-0.016	-0.038	-0.051**	-0.003	-0.002
	(0.026)	(0.022)	(0.034)	(0.030)	(0.012)	(0.012)
Child unemployed	-0.031**	-0.030*	-0.028	-0.036*	-0.010	-0.013**
	(0.016)	(0.015)	(0.022)	(0.020)	(0.008)	(0.008)
Intergenerational variables for participation and risk-taking						
Biological father participates		0.045***				
		(0.015)				
Biological mother participates		0.039***				
		(0.015)				

continued

Table AVIII -- *Continued*

Adoptive father participates		0.057***				
		(0.015)				
Adoptive mother participates		0.078***				
		(0.015)				
Biological father risky share				-0.030		
				(0.032)		
Biological mother risky share				0.029		
				(0.034)		
Adoptive father risky share				0.055*		
				(0.029)		
Adoptive mother risky share				0.095***		
				(0.030)		
Biological father portfolio volatility						0.022
						(0.023)
Biological mother portfolio volatility						0.046
						(0.038)
Adoptive father portfolio volatility						0.081***
						(0.025)
Adoptive mother portfolio volatility						0.062**
						(0.028)
Adj. R squared	0.236	0.295	0.118	0.223	0.124	0.169
Controls for Parental Risky Holding	N/A	N/A	N/A	YES	N/A	YES

[1] For example, Charles and Hurst (2003) document similarities in asset holdings between children and their parents.

[2] Recent research in gene-mapping suggests that specific genes are associated with risk attitudes and risk-taking behavior. See, for example, Kuhnen and Chiao (2009).

[3] We can only distinguish between pre-birth and post-birth effects using adoptees so what we refer to as genetic or biological effects will also include the effects of the in-utero environment.

[4] Calvet and Sodini (2014) use a sample of twins and find greater explanatory power when they include twin fixed effects.

[5] Also, Dohmen et al. (2012) use data from the German Socio-Economic Panel Study (SOEP) and find evidence of environmental influences in the determination of child risk attitudes net of parental risk attitudes, suggesting that both nature and nurture play a role.

[6] We discuss in more detail how our estimates compare to those from twin studies later in the paper.

[7] Our paper also differs in that we document the importance of the parental risk-taking variables in explaining cross-sectional variation in investment behavior.

[8] Until 1999, the public pension system almost entirely consisted of a national pension plan financed on a pay-as-you-go basis (an individual account system known as the Premium Pension System (PPS) was introduced in 1999). In addition, most people receive an occupational pension from their employer. According to the Swedish Pensions Agency, about 90% of employees receive some pension benefits from their employer as a

condition of employment. On average, around 4.5% of the employee's salary is put into employer provided schemes (Thörnqvist and Vardardottir, 2014). Swedish residents also have tax incentives to invest in private pension savings that are only accessible after retirement. However, as mentioned earlier, individuals still hold a substantial fraction of their wealth in non-retirement wealth. There is also a guaranteed pension for those who have had little or no income from work, and the size of this guaranteed pension is based on how long the person has lived in Sweden. In 2000, the maximum guaranteed pension, which applies to those who have lived in Sweden for at least 40 years, is 2394 SEK per month ($254) before taxes for those who are married, and 2928 SEK per month ($311) for a single person. A tax rate of 30 percent is then applied.

[9] There is an earnings ceiling above which no additional benefits are paid. In 1996, it was estimated that 75 percent of employees had monthly earnings exceeding the ceiling (Bharadwaj et al. 2014).

[10] See Bjorklund, Lindahl, and Plug (2006) and Lindquist, Sol, and Van Praag (2015) for more details.

[11] Upon turning 18, an adopted child has the legal right to obtain information from public authorities about the identity of his or her biological parents (Socialstyrelsen 2014). However, according to Swedish law, there is no legal requirement for parents to inform adopted children that they are adopted (SOU 2009).

[12] While children could be adopted by relatives, in practice this was very rare. Nordlöf (2001) reports that of 1186 adoptions taking place in Stockholm for children born between 1960 and 1973, in only 4 cases was an adoptive parent related to the child. We

remove 82 adoptees whose adoptive parents are biological aunts, uncles, or grandparents of adoptees.

[13] In the Online Appendix, we show that alternative approaches that use a single observation per child (defining people as participators if they participate at all in the 1999 to 2006 period) give similar but less precise estimates. We prefer the pooling approach as it allows us to naturally control for year and county effects and to maximize the efficiency of the estimates.

[14] This ensures that identification comes only from parents who participate. An alternative would be to restrict the sample to cases where the child and all four parents participate. We show in the Online Appendix that this leads to almost identical estimates for the large sample of own-birth children. For adoptees, in some specifications the sample sizes become too small to be informative.

[15] In the Online Appendix, we show estimates where we use one observation per person by averaging the risky share and portfolio volatility over all years in which the individual participates in the stock market. Conclusions are similar using this approach. We prefer the pooling approach as it allows us to naturally control for year and county effects and to maximize the efficiency of the estimates.

[16] The register contains information on highest educational degree completed, which we use to impute years of schooling. We follow Holmlund, Lindahl, and Plug (2011) and impute years of schooling in the following way: 7 for (old) primary school, 9 for (new) compulsory schooling, 9.5 for (old) post-primary school (realskola), 11 for short high school, 12 for long high school, 14 for short university, 15.5 for long university, and 19

for a PhD university education. Since the education register does not distinguish between junior-secondary school (realskola) of different lengths (9 or 10 years), it is coded as 9.5 years. For similar reasons, long university is coded as 15.5 years of schooling.

[17] During this time period, the wealth tax was paid on all the assets of the household, including real estate and financial securities, with the exception of private businesses and shares in small public businesses (Calvet, Campbell, and Sodini, 2007) and, in year 2000, was levied at a rate of 1.5 percent on net household wealth exceeding SEK 900,000. The Swedish krona traded at $0.106 at the end of 2000, so this threshold corresponds to $95,400. After 2000, the tax threshold was raised to SEK 1,500,000 for married couples and non-married cohabitating couples with common children and 1,000,000 for single taxpayers. In 2002 the threshold rose again, this time to SEK 2,000,000 for married couples and non-married cohabitating couples and 1,500,000 for single taxpayers. In 2005 the threshold rose once more but this time only for married couples and cohabitating couples, this time to SEK 3,000,000.

[18] This is consistent with Calvet, Campbell and Sodini (2007) who find that 2 million out of a total of 4.8 million households do not have a reported bank account in 2002.

[19] Details are in the Online Appendix. We also report estimates in the Online Appendix where we use a constant imputation method that distributes uniformly the aggregate bank account balances that are missing in the data (based on the difference between the aggregate total of bank balances in our data and Statistics Sweden's estimate of the total amount in Swedish banks in that year). Estimates for the risky share using this imputation

method are similar (by definition, our other dependent variables - participation and portfolio volatility – are unaffected by bank balance imputations).

[20] For children born after 1976, we measure income in 2011, the last available year.

[21] One could also measure child asset allocation at the household level. We show in the Online Appendix that doing so gives similar estimates.

[22] In the Online Appendix, we report estimates where we use a narrower definition of equity market participation and the risky share that includes only direct ownership of individual stocks. The findings are very similar using this measure.

[23] There are mixed findings in the literature about these types of interactions – Bjorklund, Lindahl, and Plug (2006) finds evidence of these interactions for mothers' education and fathers' earnings but Lindquist, Sol, and van Praag (2015) finds no evidence for these interactions when studying entrepreneurship.

[24] The non-random assignment is evident from the small but positive correlations between the outcomes of biological and adoptive parents. The correlations are 0.072 for equity market participation, 0.014 for the risky share, 0.019 for portfolio volatility, 0.133 for log financial wealth, and 0.077 for log earnings. All are statistically significant at the 5% level except for the risky share correlation.

[25] The tendency of environmental effects to get smaller with age is consistent with findings in the twins literature such as Barnea, Cronqvist, and Siegel (2010). Our children are aged between 19 and 56 at measurement so we cannot speak to whether environmental effects exist at older ages.

[26] We have used the panel structure of the data to look at this issue. We define non-participant adoptive "families" as those in which neither the child nor the adoptive parents participate in the market in 1999, 2000, and 2001. We have 488 families like that. Out of those, in only 30 cases does the child participate in the market in any of the subsequent years (2002-2006). Out of those cases, in 5 cases the parents enter the market at the same time or after the child enters. We have also looked at cases between 1999 and 2005 where neither adoptive parent holds equities in a given year but the child does (there are 1116 such cases). Out of those, in 70 cases we see that the parents hold equities the following year.

[27] There are no data on the rate of misattributed paternity but we know that biological fathers of adopted children are identified in the registers in the same way as fathers of non-adopted children. For women who were married at the time of birth, the husband was automatically assumed to be the biological father. For unmarried women, a written certification from the partner where he admits fatherhood was used to assign the biological father. In rare cases where the partner does not admit fatherhood, the court can assign fatherhood.

[28] A proportion of adoptive parents subsequently split up and, thus, the adoptive father may have limited influence on the child. Of our sample of adopted children with parents alive in 2000, 87% have adoptive parents who are still together in 2000. When we allow the effects of parents to differ depending on whether the adoptive parents are still together, we find some evidence that the effects are larger for adoptive mothers and smaller for adoptive fathers if the adoptive couple has split. This is consistent with

mothers being more likely to have custody of children. The estimates are in the Online Appendix.

[29] Note that the biological parents with wealth above the median have similar average wealth to the population of own-birth parents. The mean and median of total net wealth for the richer biological parents are 1,211,080 and 735,523 SEK respectively. The equivalent numbers for own-birth parents are 1,414,252 and 798,595 SEK.

[30] There is no agreement in the theoretical literature about whether one would expect adoptive parents to be more or less nurturing than own-birth parents (Dawkins, 1976; Silk, 1990). Hamilton, Cheng, and Powell (2007) find little significant difference in parenting behavior between adoptive and biological parents once they control for the socio-economic status of the parents.

[31] Using a behavioral genetics model of savings behavior, Cronqvist and Siegel (2015) find evidence of shared environmental effects only for smaller families.

[32] In the Online Appendix, we further show that there are no significant differences in estimates between adoptees raised as only children and adoptees who have siblings.

[33] It is also possible that adopted children experienced harsher pre-natal conditions than children in general and this could affect the nature-nurture split given that outcomes such as birth weight have been found to correlate with educational and labor market outcomes (Black, Devereux, and Salvanes, 2007). We do not have birth weight data that would enable us to explore this further.

[34] The exact variables included in the logit are a dummy for the child being first-born in the raising family, a dummy for not having any siblings in the raising family, 4 categories

of biological parents' financial assets, 4 categories of raising parents' financial assets, 4 categories of biological parents' schooling, 4 categories of raising parents' schooling, 5 categories of biological parents' age, and 5 categories of raising parents' age. We report coefficient values from the logit in the Online Appendix.

[35] The logit model has strong predictive power. The pseudo R^2 is 0.63 and the predicted probability of being adoptive is over 0.9 for 68% of adoptees and over 0.5 for 81% of adoptees.

[36] It is also possible that wealthier adoptive families may be more able to transmit intergenerationally to their children. We examine this in the Online Appendix and find no strong support. We also find little evidence of a relationship between the age difference between adoptive parents and children and the degree of transmission.

[37] In earlier work, we used exogenous variation in education due to compulsory schooling laws to show that there is a positive effect of educational attainment on risky market participation of men (Black et al. 2015).

[38] In the Online Appendix, we implement a Fairlie-Blinder-Oaxaca decomposition of the secondary effects of adoptive parental participation on children's equity market participation. Consistent with Table VI.A, we find important roles for child characteristics such as financial wealth, earnings, and schooling but little role for adoptive parental characteristics other than financial wealth.

[39] Unlike Charles and Hurst (2003) who find the intergenerational correlation in stock ownership can be explained away once parent and child incomes are controlled for, we do

not find such an effect. An advantage of this study compared to Charles and Hurst (2003) is that we have earnings data for a longer period of time.

[40] Gibson (2004, p.149) suggests that role models provide three interrelated functions: "to provide learning, to provide motivation and inspiration and to help individuals define their self-concept". In economics, evidence for gender-specific role modelling has been found by Carrell, Page, and West (2010) and Bettinger and Long (2005), among others, with stronger effects found for girls.

[41] See, Eckel and Grossman (2008) for a survey of the literature. Also, using data for over 35,000 households from a large discount brokerage, Barber and Odean (2001) analyze the investment behavior of men and women from 1991 to 1997 and document that men trade 45% more than women.

[42] Holding individual stocks may be more salient and observable to children than holding mutual funds. Therefore, in the Online Appendix, we report estimates for directly held stocks by child gender. These estimates also suggest role model effects, particularly for girls.

[43] For detailed variable definitions see Calvet and Sodini (2014).

[44] In the Online Appendix we show a formal decomposition of the adjusted R^2 for these regressions.

[45] Interestingly, a similar dichotomy is found for entrepreneurship with twin findings suggesting little role for shared environmental factors but the adoption approach finding environmental factors to be more important than biological ones (Lindquist, Sol, and van Praag 2015).

[46] More likely, though, is that differences in findings between the methods reflect differing assumptions. We have already discussed the assumptions underlying the interpretation of our adoptive coefficients; for the twin methodology, one important assumption is that monozygotic and dizygotic twins are not treated differently by parents and society in general so higher correlation in outcomes of monozygotic twins are solely due to their greater genetic likeness. This assumption has been questioned on the basis that identical twins communicate more (Betermier, Calvet, and Sodini, 2015) or because they were treated more similarly in the environment in which they grew up (Björklund, Jäntti, and Solon, 2007). Björklund, Jäntti, and Solon (2005) show that relaxing this assumption lowers the estimated genetic effect on earnings and increases the estimated effect of shared environment.