Cultural Origins of Investment Behavior*

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Abstract

We study the effect of culturally transmitted economic preferences on individual investment behavior in the financial market by combining data on the asset allocation of second-generation immigrants in Sweden with risk and time preferences in their parents' country of origin. Children of immigrants from more risk-loving cultures invest more in directly-held stocks at the expense of mutual funds. Those descending from more patient cultures invest more in mutual funds and less in stocks. We show that these findings are not driven by the selection of migrating parents, country of origin attributes, or parental and individual socio-economic characteristics and that cultural preferences have sizeable, independent, and direct effects on financial decisions.

Keywords: culture, cultural transmission, risk preference, time preference, investment behavior, stocks, mutual funds.

JEL classification codes: G11, G50, Z10.

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1 Introduction

Research suggests that cultural heritage, transmitted from parents to children, shapes beliefs (Bisin and Verdier, 2001; Fernández, 2011; Fernandez and Fogli, 2009) and it influences both social and economic preferences that are reflected in decisions such as labor force participation, savings behavior, or fertility, among others (Fehr and Hoff, 2011; Fernández et al., 2004; Fernandez and Fogli, 2009; Guiso et al., 2003, 2006).[1]

This paper examines the effects of two distinct culturally transmissible preferences that are front and center in any finance text book –risk and time preferences– on investment behavior in the equity market.[2] Uncovering this potential relationship will not only further our understanding of individual background factors that affect investment behavior but also sheds light on the considerable variation in household financial behavior across countries documented in the literature (Badarinza et al., 2016; Christelis et al., 2013).

Separating the effect of culturally transmitted economic preferences on investment behavior from other institutional and economic factors is challenging. A culture that might drive one type of investment behavior could also result in institutions that accommodate or incentivize that behavior. Under these circumstances one would not be able to distinguish whether a certain investment behavior is due to institutional features or individuals' cultural attributes.

We overcome these concerns by relating the investment behavior of second-generation migrants in Sweden, a subsample of the Swedish population who were born in Sweden but have at least one parent born in a different country, with cultural measures associated to

[1] For our purposes, culture is defined as a set of inter-generationally transmitted preferences and beliefs in a society (Bisin and Verdier, 2001; Fernández, 2011; Fernandez and Fogli, 2009)

[2] E.g. Cochrane (2005), already in the preface, states that "to value an asset, we have to account for the *delay* and for the *risk* of its payments."

their parents' countries of origin. Our identification strategy exploits the opportunity to observe this subsample with varying parental cultural background in a common environment, thus, distinguishing cultural factors from other institutional and economic factors. Since the spatial separation of migrants from country of origin rules out reverse-causality and any other omitted factor must be intergenerationally transmissible, none of the usual confounders can plausibly explain away our estimates.[3]

To investigate individuals' investment behavior, we look at the shares of financial wealth invested directly in stocks and in mutual funds, as well as stock-market and mutual-fund participation. Direct investments in the stock-market generally exhibit higher volatility, with potentially more extreme returns, compared to investments in mutual funds, characteristics clearly more appealing for more risk-loving investors. Investments in mutual funds, on the other hand, could result in more diversified and less volatile portfolios (Calvet et al., 2009) that also offer lower potential upside, reminiscent of more patient behavior.

We combine administrative data on these investment outcomes of second generation migrants in Sweden with risk and time preferences in the country of origin of their parents derived from the Global Preference Survey (Falk et al., 2018). Global Preference Survey (GPS) is an experimentally validated survey data set of economic preferences (risk and time preferences) from 76 countries that represent approximately 90 percent of the world population.[4] We focus on risk and time preferences in the GPS to capture culturally transmitted economic preferences for two reasons. First, these are the two types of preferences that enter virtually any attempt at modeling financial decision-making; indeed, it is difficult to even think of how one would go about modeling inter-temporal decisions under uncertainty

[3]This identification strategy has been dubbed as the epidemiological approach in the literature and is based on the variation in outcomes across different immigrant groups residing in the same country (Carroll et al., 1994; Fernández and Fogli, 2006; Fernandez and Fogli, 2009; Fernández, 2011; Giuliano, 2007).

[4]This data set also contains social preferences (positive and negative reciprocity, altruism, and trust).

without specifying some form of risk and time preferences (Cochrane, 2005). Risk and time preferences have also been shown to be among the drivers of decisions beyond financial decision making. The economics literature suggests that risk and time preferences are associated with choices and behavior such as crime, smoking, conduct at school, and career, among others (Åkerlund et al., 2016; Dohmen et al., 2011; Einav et al., 2012; Falk et al., 2018; Golsteyn et al., 2014; Khwaja et al., 2007; Meier and Sprenger, 2010; Sutter et al., 2013). Second, global data coverage of GPS allows us to assign second generation migrants in Sweden to the measures of economic preferences in the country of ancestry.

We find that while culturally transmitted risk and time preferences have no effect on the decision to participate in the risky asset market, they have significant effects on the composition of portfolios. More specifically, conditional on participation in the equity market, children of immigrants from countries with more willingness to take risk are much more likely to directly hold stocks at the expense of holding less mutual funds and assign more of their financial wealth to directly held stocks. This is consistent with the fact that holding stocks directly could be much riskier than holding mutual funds, as funds are generally better diversified and incorporate less risky instruments. Thus, culturally inherited risk preferences induce individuals to tolerate more risk in their financial portfolios. On the other hand, those descended from more patient cultures are more likely to hold mutual funds, less likely to hold stocks directly, and devote more of their financial wealth to mutual funds. This is in line with forming portfolios for the longer run, since mutual funds typically provide a more diversified portfolio that in the longer run exhibits a superior risk-return profile.[5]

Importantly, our findings are robust to controlling for parental characteristics, such as education, wealth or income. This suggests that economic preferences in the country of

[5]Also, unlike direct stocks, mutual funds are not often traded daily by individuals.

ancestry are not simply capturing parental characteristics and plausibly have a direct effect on children's investment behavior. We also find that the relationships between cultural attributes and children of immigrants' investment behavior remain strong after controlling for children's education, income and wealth, indicating that cultural characteristics may be shaping financial behavior on top of their potential impact on other observable outcomes.

We corroborate our findings on the role of risk-taking heritage by using a separate data set from the Ethnographic Atlas (Murdock, 1965), which allows us to approximate ancestral risk-taking culture. [6] The Ethnographic Atlas includes information gathered by ethnographers reflecting various cultural and socio-economic characteristics of pre-modern societies before industrialization and European contact. Thus, recent literature has utilized the Atlas to capture ancestral cultures from ancient times (Alesina et al., 2013; Giuliano and Nunn, 2013; Michalopoulos, 2012; Nunn and Wantchekon, 2011). We proxy the ancestral culture of risk taking in the parents' country of origin with the prevalence of chance games, as opposed to games relied on physical skills or strategies. Consistent with our baseline findings, we find that children descending from cultures where their ancestors' games often had an element of chance, rather than strategy or physical skills, are more likely to participate in the stock market and also assign more of their financial wealth to directly held stocks.

A potential threat to our identification is that migration from different source countries and across time might happen because of different reasons and could affect the investment behavior of children of immigrants beyond the source country's average cultural characteristics. The fact that our findings are robust to adding parental characteristics as controls mitigates this concern, since one would expect parental features to pick up the effect of selection of migrants from certain countries and across time to a large extent.[7]

[6] There is no information on the culture of patience in this dataset.

[7] Results are also robust to controlling for age at migration of parents.

However, we go beyond this to explicitly address this concern in a number of ways. First, we show that the findings remain unchanged when we control for source continents plus a separate dummy for Scandinavian countries. Additionally, the findings are robust to controlling for the source countries' GDP per capita. This is to be expected, as Falk et al. (2018) show that the correlation between average economic preferences and GDP per capita is small. The results also remain unchanged when we instead control for life expectancy in the source country. These suggest that variations in some of the most important economic and social indicators of the source country do not derive our findings. Finally, trust has been shown to influence financial market behavior, especially among migrants (Guiso et al., 2004). If economic preferences we study are correlated with trust, one might suspect children of migrants from different countries to behave differently due to their differential levels of trust. We show that our results remain unchanged after controlling for trust, a cultural trait reported in the GPS as a social preference.

Our findings provide insight into the determinants of the cross-country variation in financial behavior. The previous literature has evinced that there is substantial variation in household financial behavior across countries, even after controlling for characteristics such as demographics, educational attainment, income, and wealth (Badarinza et al., 2016; Christelis et al., 2013). Such differences can be conceptually attributed to country institutions and

The paper also contributes to our knowledge on the importance of family background in shaping individual investment and financial behavior (Barnea et al., 2010; Black et al., 2017; Calvet and Sodini, 2014; Cesarini et al., 2010; Charles and Hurst, 2003). To explain this relationship, the literature has predominantly focused on the direct influence of family on children's genetic traits, human capital, wealth or income, as well as the possibility of parents and children learning from each other's behavior in the market, all of which could

in turn affect financial decisions.[8] In this paper, we instead show that family matters over and above such influence and could act as a pathway for the effect of cultural heritage.

Lastly, this paper adds to our understanding of the effects of cultural attributes on economic behavior in general and investments in risky financial markets in particular. In setups similar to ours, the previous literature has studied the role of cultural values in women's labor force participation and fertility behavior (Fernández and Fogli, 2006; Fernandez and Fogli, 2009; Alesina and Giuliano, 2010), savings (Carroll et al., 1994), and education (Figlio et al., 2019). Using more comprehensive administrative data on the wealth of second generation migrants, we show that the cultural heritage of risk taking and patience has significant effects on financial investments.[9] It is also worth noting that, for investigating the impact of cultural values on economic outcomes via migrants, financial decisions are ideal outcomes to study, as they constitute *unrestricted* choices. To vary one's labor supply or fertility behavior, which are other outcomes this literature has investigated, the individual is not independent of finding a willing employer or partner, something that may be easier for certain groups of migrants than others. In deciding what fraction of wealth to be allocated to the stock-market, no such outside interference restricts the individual's choice.

Section 2 describes the datasets. Section 3 presents the empirical strategy. Section 4 presents the baseline results. Section 5 discusses potential confounding factors. Section 6 provides a battery of robustness checks. Section 7 concludes.

[8] See, e.g., Barnea et al. (2010); Black et al. (2005, 2017); Bleakley and Ferrie (2016); Calvet and Sodini (2014); Cesarini et al. (2010); Charles and Hurst (2003); Dahl and Lochner (2012).

[9] In a related, but very different study, Haliassos et al. (2017), focusing on six-country clusters and first- rather than second-generation migrants, look at the impact of cultural (or genetic) differences between migrants and Swedes on the pace of financial-behavior assimilation. We instead add to the literature by looking at the causal influence on the individual financial behavior of specific cultural traits across second-generation migrants from more than 60 countries.

2 Data

Outcome Variables Our outcome variables are various measures of equity market participation and asset allocation of the population of second generation migrants in Sweden. These data come from the Swedish Wealth Registry (Förmögenhetsregistret) and were collected by Statistics Sweden (the government's statistical agency) for tax purposes. 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 financial institutions. Importantly, nontaxable securities and securities owned by investors below the wealth tax threshold were included in the reports (Calvet et al., 2007). With information based on statements from financial institutions and the full coverage of the population, issues of measurement error and selection bias, that are frequently substantial concerns, are negligible in our setting. We have data on assets from 1999 to 2006.

In our analysis of second generation migrants, we focus on wealth in the year 2006. Between 1999 and 2005, banks were not required to report small bank accounts to the Swedish Tax Agency unless the account accrued more than 100 SEK (about 11 USD) in interest during the year. From 2006 onward, banks were required to report all bank accounts above 10,000 SEK. Also, focusing on 2006 allows us to have more second generation migrant children to be old enough to participate in the stock market than earlier in the sample.

Although we analyze equity market participation as an outcome, we are most interested in the analysis of portfolio composition conditional on participation, since that could best reveal the role of preferences (that could be transmitted culturally) on investment behavior.[10] Conditional on participation in the equity market through either stocks or

[10]This choice is also justified technically since, as we show later in the paper, we do not find any effect of cultural traits on participation.

mutual funds, we analyze portfolio compositions using four outcome variables. The first variable is an indicator for whether the individual owns stocks directly —we refer to this as stock market participation. The second is an indicator for participation in mutual funds. This includes holdings of mutual funds that only include stocks, as well as mutual funds that have a mixture of stocks and other financial instruments considered less risky than stocks, such as bonds. Our final two measures are the share of financial assets held in stocks and the share of financial assets held in mutual funds.

Variables of Interest Our variables of interest are measures of risk and time preferences associated with migrants' ancestral countries (i.e. the country of origin of their parents). These data mainly come from the Global Preference Survey (GPS); an experimentally validated survey data set of the global variation in preferences (Falk et al., 2018).[11] GPS provides us with measures specifically designed to capture economic preferences — risk and time preferences — from 80,000 people in 76 countries that represent approximately 90% of the world population.[12] The surveys are carried out on representative samples within each country, and exhibit substantial heterogeneity in preferences across countries.[13]

Risk preferences (risk taking) were elicited through a series of related quantitative questions as well as one qualitative question (see Falk et al. (2018) for details). The quantitative survey measure consists of a series of five interdependent hypothetical binary

[11] Available at https://www.briq-institute.org/global-preferences/home.

[12] Crucially, the authors also validate that variation in economic preferences actually predicts economically important real-life behavior (in addition to being experimentally validated).

[13] An alternative to GPS is the Hofstede data set with various cultural measures based on a set of qualitative survey questions (Hofstede, 2001). Two cultural dimensions are reminiscent of time and risk preferences, respectively: "long-term orientation" and "uncertainty avoidance". However, as Falk et al. (2018) write, both measures include individual components that are distant from time or risk preference and responses to individual items are not available, so one cannot use a subset of components for preference proxies. In contrast, the GPS data has the advantages of employing experimentally validated survey items (as opposed to ad hoc construction) and relying on nationally representative samples, hence, it better captures preferences.

choices, a format commonly referred to as a "staircase" (or "unfolding brackets") procedure (Cornsweet, 1962). Choices were between a fixed lottery, in which the individual could win x or zero, and varying sure payments, y.[14]

The qualitative item asks for the respondents' self-assessment of their willingness to take risks on an 11-point Likert scale, *"In general, how willing are you to take risks?"*. This qualitative subjective self-assessment has previously been shown to be predictive of risk-taking behavior in the field in a representative sample (Dohmen et al., 2011) as well as of incentivized experimental risk taking across countries in student samples (Vieider et al., 2015). The qualitative item and the outcome of the quantitative staircase measure were combined through roughly equal weights.

Time preference (patience) measure is derived from a combination of responses to two survey measures, one with a quantitative and one with a qualitative format. The quantitative survey measure consists of a series of five interdependent hypothetical binary choices between immediate and delayed financial rewards. In each of the five questions, participants had to decide between receiving a payment today or larger payments in 12 months.[15]

The qualitative measure of patience is given by the respondents' self-assessment regarding their willingness to wait on an 11-point Likert scale, asking *"how willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?"*

[14] *"Please imagine the following situation. You can choose between a sure payment of a particular amount of money, or a draw, where you would have an equal chance of getting amount x or getting nothing. We will present to you five different situations. What would you prefer: a draw with a 50% chance of receiving amount x, and the same 50% chance of receiving nothing, or the amount of y as a sure payment?"*

[15] *"Suppose you were given the choice between receiving a payment today or a payment in 12 months. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 12 months is different in every situation. For each of these situations we would like to know which one you would choose. Please assume there is no inflation, i.e., future prices are the same as today's prices. Please consider the following: Would you rather receive amount x today or y in 12 months?"*

Figures 1a and 1b show the distributions of risk taking and patience measures by quartiles across countries in our sample, respectively.[16] Both variables vary substantially geographically, as well as within a set of countries with similar levels of development. For example, within Europe, while France and Austria are in the top patience quartile, Greece and Hungary are in the bottom quartile. Alternatively, while the Netherlands and Canada are in the top risk taking quartile, Spain, South Korea, and Germany are in lower quartiles.

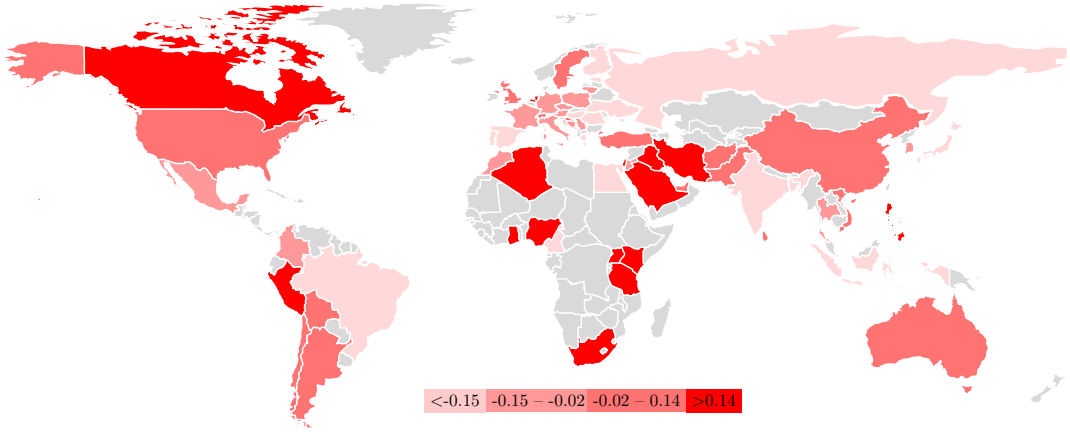
Controls In our baseline regressions, we control for gender, whether the individual has one Sweden born parent, and year of birth. Additionally, in our robustness exercises, we take into account parents' years of birth, parental education, parental income ranks and parental wealth quartile (both within parental birth cohort) as well as individuals' education level, income rank, wealth quartiles, and industrial sector of employment at the 4-digit level.[17] All of the variables are provided by Statistics Sweden and are based on administrative records, mainly from the Swedish tax authority.

Our final baseline sample for the analysis contains 172,033 observations. Table 1 provides summary statistics. In 2006, the average age of the children of migrants is 36 and they have more than 12 years of education. Conditional on participation in financial markets, 43 percent directly hold stocks (with 15 percent holding only stocks) and 85 percent hold mutual funds (with 57 percent investing only in mutual funds). Looking instead at the share of financial wealth invested in risky assets, individuals in our sample allocate 15 and 42 percent, respectively, to direct stock holdings and mutual funds.

[16] Risk taking measure ranges between -0.79 and 0.97, while patience lies between -0.43 and 1.07. For a complete list of countries and their risk taking and patience scores, see Table A.1.

[17] Following the literature on intergenerational mobility, we calculate income ranks for parents as average income rank over several years, specifically 1990-1994.

(a) Risk Taking



(b) Patience

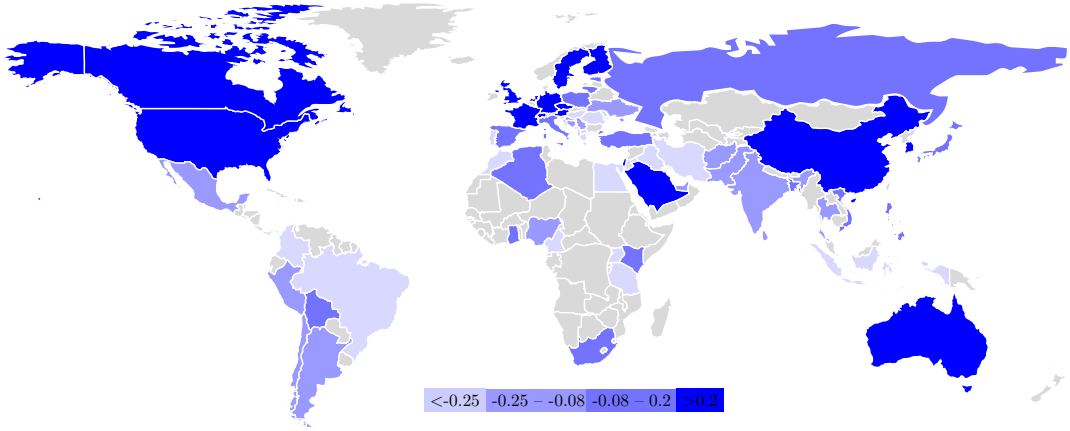


Figure 1 Risk Taking and Patience across Countries

Table 1 Summary Statistics

	Mean	Std. Dev.	Min	Max	Obs.
Outcomes					
Share Stocks	0.15	0.27	0	1	172033
Stock-Market Participation	0.43	0.50	0	1	172033
Share Mutual Funds	0.42	0.37	0	1	172033
Mutual-Fund Participation	0.85	0.36	0	1	172033
Variables of Interest					
Risk taking	0.002	0.289	-0.8	1.0	62
Patience	0.043	0.376	-0.4	1.1	62
Individual Characteristics					
Female	0.47	0.50	0	1	172033
Age	36.54	10.48	19	59	172033
One Native-born Parent	0.78	0.42	0	1	172033
Years of Education	12.74	2.14	8	20	172033
Labor Income	241	214	0	9389	172033
Financial Wealth	300	8935	1	2537637	172033
Parental Characteristics					
Year of Birth, Father	1941.55	10.05	1909	1969	81268
Year of Birth, Mother	1942.78	10.68	1911	1971	92948
Age, Father, 1999	60.38	11.28	30	90	172033
Age, Mother, 1999	57.18	10.97	27	89	172033
Years of Educ., Father	11.27	2.85	8	20	172033
Years of Educ., Mother	11.12	2.63	8	20	172033
Labor Income 1999, Father	1446	1875	0	76310	154177
Labor Income 1999, Mother	1072	1179	0	20244	165629
Financial Wealth Parents	993	134262	0	53599776	172033

Notes: Monetary values for income and wealth are denoted in thousands SEK.

3 Empirical Strategy

Our main specification relates an outcome of interest for the children of migrants in Sweden to the parents' cultural heritage. We estimate the following specification:

$$Y_{ic} = \alpha + \beta_R RiskTaking_c + \beta_P Patience_c + \gamma X_i + \varepsilon_{ic}, \quad (1)$$

where Y_{ic} denotes an outcome of interest for individual i from a heritage of origin c, where c is a mnemonic for *country*. $RiskTaking_c$ and $Patience_c$ are to capture children of migrants' cultural heritage of economic preferences in their parents' country of origin. Where parents come from two different countries, these variables indicate the average preferences of those countries. X_i refers to the set of control variables, which in the baseline regressions includes a dummy variable for the gender of the individual, year-of-birth dummies for the child, and an indicator for having one Sweden-born parent. X_i also includes parental and individual characteristics in subsequent regressions. ε_{ic} is the error term, two-way clustered at the level of parental countries of birth.

Identifying Assumption The key assumption of our empirical strategy is that, by including the economic preference measures in the country of origin of parents, we capture the effect of cultural preferences and not that of potentially omitted variables. By observing second-generation immigrants in a common environment, we are able to distinguish cultural factors from institutional and economic ones, as these latter ones do not vary, while cultural heritage does. The assumption will be violated if proxies for cultural preferences are systematically correlated with other factors that affect financial behavior. One such example is if migrants from relatively risk-loving countries are wealthier (for other reasons than their high tolerance of risk) and children of wealthier parents also invest a greater share of their wealth in the stock market. The fact that we can observe and control for other characteristics of parents greatly mitigates these concerns. In subsequent sections, we address the issue of confounding variables in detail and perform a number of robustness analyses.

4 Baseline Results

4.1 Equity Market Participation

Although in this paper we are primarily interested in the allocation of assets between directly held stocks and mutual funds within the portfolio of risky assets, we start our analysis by showing the effects of ancestral risk and time preferences on equity market participation, regardless of whether participation is through directly stock market or owning mutual funds.

Panel A in Table 2 presents the results. In all specifications, we control for having a Sweden-born parent and year-of-birth fixed effects. We do this because the previous literature has documented that the life cycle has important implications for equity-market participation and those with a Sweden-born parent could systematically differ from those with two immigrant parents.[18] Column (1) also controls for gender. The coefficient estimates suggest that there is no apparent effect of culturally transmitted time and risk preferences on participation. The previous literature has documented that financial market behavior could differ between men and women. As a result, in our baseline analysis, we show findings separately for the groups. The estimates in columns (2) and (3) of Table 2 remain negligible and insignificant.

Considering the null effects in Panel A, in the subsequent Panels B and C, we attempt to understand whether culturally transmitted economic preferences have compositional effects. We limit the sample of analysis to equity market participants and investigate the effects of risk and time preferences on stock-market and mutual-fund participation. All estimates are highly significant and economically meaningful. Coefficient estimates for ancestral risk preferences in Panels B and C indicate that, while a culture of risk taking

[18]We run a robustness analysis on individuals with no Sweden-born parent later in the paper and confirm all our findings.

Table 2 Participation in Financial Markets, and Risk- and Time-Preferences

Sample:	All	Males	Females
Panel A:	Risky-Asset Participation		
	(1)	(2)	(3)
Risk taking	0.0204	0.0364	0.00278
	(0.0324)	(0.0335)	(0.0352)
Patience	0.00249	-0.00562	0.0115
	(0.0147)	(0.0141)	(0.0172)
Observations	264719	137465	127254
Panel B:	Stock-Market Participation		
	(1)	(2)	(3)
Risk taking	0.220***	0.220***	0.219***
	(0.0442)	(0.0490)	(0.0410)
Patience	-0.149***	-0.157***	-0.140***
	(0.0183)	(0.0191)	(0.0189)
Observations	172032	90535	81497
Panel C:	Mutual-Fund Participation		
	(1)	(2)	(3)
Risk taking	-0.101***	-0.117***	-0.0830**
	(0.0377)	(0.0432)	(0.0324)
Patience	0.0831***	0.0960***	0.0679***
	(0.0167)	(0.0198)	(0.0137)
Observations	172032	90535	81497
Cohort FE	Yes	Yes	Yes
Gender FE	Yes	No	No
One Native-Born Parent FE	Yes	Yes	Yes

Notes: Ordinary least squares. In Panel A, the dependent variable throughout is a binary variable taking the value 1 if the individual allocates some fraction of financial wealth to risky assets. Panels B and C restrict the sample to those individuals who owns at least some risky assets. In Panel B, the dependent variable is a binary variable taking the value 1 if the individual invests some fraction of financial wealth directly in the stock market; Panel C shows the analogous participation variable for mutual funds. *Risk taking* and *Patience* are the average risk-taking and patience scores associated with the individual's parents' birth countries from the Global Preference Survey; the standard deviation across countries for these two variables are 0.29 and 0.37 for risk-taking and patience, respectively. The sample in all columns are restricted to those individuals with existing data on parental education, income, and wealth. All columns include year-of-birth, gender, and one native-born-parent fixed effects. Column 1 includes both males and females while Column 2 includes only males and Column 3 only females. Standard errors (in parentheses) are two-way clustered by parental country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

increases the likelihood of holding stocks directly, it decreases the probability of participation in mutual-fund market. A one standard-deviation increase in risk taking (0.29) increases the probability of stock-market participation by 6.4 percentage points compared to the mean of 43%, and decreases the likelihood of holding mutual funds by 3 percentage points relative to a mean participation of 85%. These findings suggest that culturally transmitted risk-taking preferences have a compositional effect on individuals' portfolios by inducing people to hold stocks directly and shy away from mutual funds. This is consistent with the fact that holding mutual funds is generally less risky than holding stocks directly, as they are more diversified and incorporate less risky instruments.

Interestingly, the signs of the coefficient estimates reverse when we examine the effects of patience. People from more patient cultures are less likely to hold stocks and more likely to hold mutual funds. This is in line with the idea that mutual funds typically have longer time horizons and they are not traded as frequently as direct stocks. A one standard-deviation increase in patience (0.37) decreases the probability of holding stocks by 5.6 percentage points and increases the likelihood of holding funds by 3.1 percentage points. It is also noteworthy that there is no significant difference in how culturally transmitted economic preferences shape men's and women's participation in the stock or fund markets.

An alternative way to get a sense of the quantitative significance of these effects is to compare individuals from countries in the top quartile of the risk-taking and patience distributions with those at the bottom. For example, if an individual with a Portuguese heritage (-0.79) had the risk taking preferences of someone with Algerian heritage (0.39), her probability of stock-market participation would go up by 26 percentage points. Instead, an individual who inherited Canadian patience (0.71) is 15.8 percentage points less likely to participate in the stock market than someone who inherited Colombian patience (-0.34).

4.2 The "Intensive Margin"

Next, in Table 3, we directly investigate the composition of risky financial assets by asking how culturally inherited preferences affect the intensive margins of investment in risky financial asset market. In order to do so, we look at the shares of financial wealth held directly in stocks or mutual funds, restricting the sample to individuals who participate in the equity market, as we did in Panels B and C of Table 2. Given the distinct features of individual stocks versus mutual funds, investigating these two margins sheds more light on the investment behavior of those descended from different cultures. The degree of riskiness of funds versus stock portfolios makes up a theoretical argument for treating them separately (King and Leape, 1987). Previous work has documented that the mutual-fund component of households' portfolios is much better diversified (Calvet et al. (2009); Von Gaudecker (2015), among others). Instead, investment in individual stocks is riskier and can be motivated on the basis of private and subjective distributions of future returns (Alessie et al., 2004).

The coefficient estimates in the two panels suggest that those descended from more risk-loving cultures assign a larger share of their portfolio to directly held stocks that comes at the expense of their mutual-fund holdings, which is significantly reduced. A one standard-deviation increase in ancestral risk-taking preferences leads to a 3 percentage-point increase in the share of financial wealth held in stocks (compared to a mean of 15% of portfolio in stocks). In light of what the prior literature has established, our findings are interpreted as showing that culturally inherited risk preferences induce individuals to tolerate more risk in their financial portfolios.

The relationship is the opposite for those with a heritage of greater patience; they devote a greater share to mutual funds and a smaller share to stocks. A one standard-deviation increase in patience results in a 2.6 percentage-point reduction in the share of

Table 3 Share of Financial Wealth Allocated directly to the Stock Market and Mutual Funds, and Risk- and Time-Preferences

Sample:	All	Males	Females
Panel A:	Share Stocks		
	(1)	(2)	(3)
Risk taking	0.102***	0.114***	0.0877***
	(0.0217)	(0.0258)	(0.0188)
Patience	-0.0695***	-0.0778***	-0.0598***
	(0.0104)	(0.0129)	(0.00912)
Panel B:	Share Mutual Funds		
	(1)	(2)	(3)
Risk taking	-0.117***	-0.109***	-0.127***
	(0.0269)	(0.0267)	(0.0284)
Patience	0.0880***	0.0875***	0.0880***
	(0.00993)	(0.00974)	(0.0109)
Cohort FE	Yes	Yes	Yes
Gender FE	Yes	No	No
One Native-Born Parent FE	Yes	Yes	Yes
Observations	172032	90535	81497

Notes: Ordinary least squares. In Panel A, the dependent variable is the share of financial wealth allocated directly to the stock-market; Panel B shows the analogous share variable for mutual funds. The sample in both panels is restricted to those individuals whose risky assets (mutual funds or stocks) represent a strictly positive fraction of financial wealth. *Risk taking* and *Patience* are the average risk-taking and patience scores associated with the individual's parents' birth countries from the Global Preference Survey; the standard deviation across countries for these two variables are 0.29 and 0.37 for risk-taking and patience, respectively. The sample in all columns are restricted to those individuals with existing data on parental education, income, and wealth. All columns include year-of-birth, gender, and one native-born-parent fixed effects. Column 1 includes both males and females while Column 2 includes only males and Column 3 only females. Standard errors (in parentheses) are two-way clustered by parental country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

financial wealth held in stocks. Those with a culture characterized by a greater readiness to sacrifice immediate gains for future benefits end up with an arguably more diversified portfolio through holding mutual funds. This is consistent with forming portfolios for the

long run, since mutual funds typically provide a more diversified portfolio that in the longer run exhibits a superior risk-return profile.

5 Confounding Factors

So far, we have interpreted our findings as the effect of cultural preferences. However, potential confounders could be systematically correlated with cultural preferences and affect investment behavior. In this section, we address this concern in a variety of ways.

5.1 Selection of Migrating Parents

In our baseline analysis, we have found that the cultural heritage of second-generation migrants matters for investment behavior. The most important concern in interpreting the coefficients of interest as the effects of ancestral and cultural traits is selection of migrant parents —those who migrate from certain countries in which people have been historically more risk loving or patient could display specific characteristics that affect their children's investment behavior. In other words, cultural traits could be correlated with the socioeconomic status of parents that might in turn determine children's financial-market behavior.

To the extent that parental characteristics are shaped by cultural traits, they do not pose a threat to our identification as those characteristics can be thought of as mechanisms through which cultural traits affect children's behavior. If a parent is wealthy due to her patience and wealth induces greater mutual-fund holdings, then wealth is not a confounder but a channel. Nevertheless, parental characteristics that cause children to behave in a certain way in the financial markets could co-vary with ancestral cultural traits in a non-

random way without having been caused by those cultural traits. To address this concern, we control for the most important parental features that could arguably affect children's financial behavior and investigate how the coefficient estimates change.[19]

The results for equity market participation and risky shares are shown in Tables 4 and 5, respectively. Column (1) in both tables repeat the baseline findings in column (1) of Tables 2 and 3. Table 4 starts out with taking into account parental fixed effects for eight education levels and parental year of birth fixed effects in regressions of stock market and mutual fund participation.[20] The following two specifications add controls for parents' income rank (added separately) and their wealth quartiles in their birth cohorts. Compared to column (1), the coefficients of interest remain largely intact with slight reductions in magnitudes when we control for parental characteristics. This suggests that cultural traits are not simply proxying for and capturing parental characteristics and they could have a direct effect on children's financial behavior beyond inter-generational transmission of parental socio-economic characteristics.

Table 5 scrutinizes the robustness of regressions of stock and mutual fund shares in financial wealth to parental characteristics. Results suggest that both sets of regressions are robust to parental education, income, and wealth controls.

Importantly, we also assess the degree of omitted variable bias by studying the stability of the estimates –by comparing baseline estimates to fully controlled specifications with parental characteristics. The method of Altonji et al. (2005) allows us to evaluate how large selection on unobservables would have to be relative to the selection on observables in order to entirely explain away our result by an unobservable selection effect. For example,

[19]See Black et al. (2017) for a discussion of how parents could affect children's behavior in the risky financial markets.

[20]Following the eight-level ISCED11 classification, we create eight categories for the Swedish education system.

Table 4 Participation in Stocks and Mutual Funds, and Risk- and Time-Preferences, Controlling for Parental Characteristics

Panel A:	Stock Market Participation			
	(1)	(2)	(3)	(4)
Risk taking	0.220***	0.176***	0.188***	0.183***
	(0.0442)	(0.0611)	(0.0622)	(0.0579)
Patience	-0.149***	-0.131***	-0.138***	-0.134***
	(0.0183)	(0.0270)	(0.0273)	(0.0265)
Altonji ratio (risk taking)		4	5.87	4.94
Altonji ratio (patience)		7.27	12.54	8.93
Panel B:	Mutual Fund Participation			
	(1)	(2)	(3)	(4)
Risk taking	-0.101***	-0.102**	-0.0977**	-0.0979**
	(0.0377)	(0.0401)	(0.0387)	(0.0387)
Patience	0.0831***	0.0813***	0.0788***	0.0790***
	(0.0167)	(0.0177)	(0.0172)	(0.0172)
Altonji ratio (risk taking)		-102	29.6	31.58
Altonji ratio (patience)		45.16	18.32	19.26
Parental Education fixed effects	No	Yes	Yes	Yes
Income Rank, Father	No	No	Yes	Yes
Income Rank, Mother	No	No	Yes	Yes
Parental Wealth Quartiles	No	No	No	Yes
Parental Cohort FE	No	Yes	Yes	Yes
One Native-Born Parent FE	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes
Individual Cohort FE	Yes	Yes	Yes	Yes
Observations	172032	172032	172032	172032

Notes: Ordinary least squares. In Panel A, the dependent variable throughout is a binary variable taking the value 1 if the individual participates directly in the stock market. In Panel B, the dependent variable throughout is a binary variable taking the value 1 if the individual invests some fraction of financial wealth greater than zero in mutual funds. *Risk taking* and *Patience* are the average risk-taking and patience score associated with the individual's parents' birth countries from the Global Preference Survey; the standard deviation across countries for these two variables are 0.29 and 0.37 for risk-taking and patience, respectively. Parental *Income Rank* is the average percentile labor earnings rank in 1990-1994 by birth cohort. The sample in all columns are restricted to those who allocate some strictly positive fraction of financial wealth to risky assets, and furthermore to individuals with existing data on parental education, income, and wealth. Columns 2–4 include parental and individual year-of-birth fixed effects and parental fixed effects for eight education levels. Standard errors clustered by parental country of birth in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

let us compare the baseline estimates in column (1) of Table 5 including exogenous controls to column (4) controlling for all of the parental characteristics.[21] In the share of stocks regression of Panel A, Altonji et al. (2005) ratios are 4.76 and 7.27 for risk taking and patience, respectively. This suggests that selection on unobservables would have to be much stronger than selection on observables for our main result to be explained away by unobservable selection. In the case of mutual fund share regressions in Panel B, Altonji et al. (2005) ratios are 6.31 and 11.75 for risk taking and patience, respectively. Given that all of these ratios are greater than the rule of thumb of one, our results are very unlikely to be biased by selection on omitted unobservables, and therefore, our identification strategy does a good job.

Overall, the findings presented in Tables 4 and 5 suggest that it is unlikely that parental selection is driving our baseline results.

5.2 Alternative Country of Origin Characteristics

Another possible scenario is that countries with higher measures of cultural risk taking or patience might be different in other ways that affect the investment behavior of children of immigrants from those countries. One should note that, for this to be a threat to our identification, these potential effects should be in addition to their impact on the socioeconomic characteristics of the first generation immigrants themselves, which we account for.

To investigate this, in Tables 6 and 7, we add controls for GDP per capita and life expectancy of the source countries in columns (2) and (3). Data on GDP per capita are from the Penn World Tables, measured in 1995, and data on Life Expectancy are from the

[21] To perform this test, we calculate the ratio of $\beta_F/(\beta_R - \beta_F)$, where β_F is the coefficient of interest from a regression with a full set of controls while β_R is the coefficient of interest from a regression with a restricted set of controls (Altonji et al., 2005). We take β_R from the restricted specification in column (1) of Table 5 with exogenous controls.

Table 5 Share of Financial Wealth Allocated directly to the Stock Market and Mutual Funds, and Risk- and Time-Preferences, Controlling for Parental Characteristics

Panel A:	Share Stocks			
	(1)	(2)	(3)	(4)
Risk taking	0.102***	0.0856***	0.0854***	0.0843***
	(0.0217)	(0.0297)	(0.0292)	(0.0284)
Patience	-0.0695***	-0.0620***	-0.0621***	-0.0611***
	(0.0104)	(0.0135)	(0.0133)	(0.0133)
Altonji ratio (risk taking)		5.2	5.14	4.76
Altonji ratio (patience)		8.26	8.4	7.27
Panel B:	Share Mutual Funds			
	(1)	(2)	(3)	(4)
Risk taking	-0.117***	-0.0995***	-0.103***	-0.101***
	(0.0269)	(0.0353)	(0.0355)	(0.0338)
Patience	0.0880***	0.0806***	0.0830***	0.0811***
	(0.00993)	(0.0143)	(0.0143)	(0.0142)
Altonji ratio (risk taking)		5.68	7.35	6.31
Altonji ratio (patience)		10.89	16.6	11.75
Parental Education fixed effects	No	Yes	Yes	Yes
Income Rank, Father	No	No	Yes	Yes
Income Rank, Mother	No	No	Yes	Yes
Parental Wealth Quartiles	No	No	No	Yes
Parental Cohort fixed effects	No	Yes	Yes	Yes
One Native-born Parent FE	Yes	Yes	Yes	Yes
Gender FE	Yes	Yes	Yes	Yes
Individual Cohort FE	Yes	Yes	Yes	Yes
Observations	172032	172032	172032	172032

Notes: Ordinary least squares. In Panel A, the dependent variable throughout is the share of financial wealth allocated directly to the stock-market, conditional on allocating a fraction greater than 0 to risky assets (mutual funds or stocks). In Panel B, the dependent variable throughout is the share of financial wealth allocated to mutual funds, conditional on allocating a fraction greater than 0 to risky assets (mutual funds or stocks). *Risk taking* and *Patience* are the average risk-taking and patience score associated with the individual's parents' birth countries from the Global Preference Survey; the standard deviation across countries for these two variables are 0.29 and 0.37 for risk-taking and patience, respectively. Parental *Income Rank* is the average percentile labor earnings rank in 1990-1994 by birth cohort. The sample in all columns are restricted to those individuals with existing data on parental education, income, and wealth. Columns 2–4 include parental year-of-birth fixed effects and parental fixed effects for eight education levels. Standard errors clustered by parental country of birth in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

World Bank, WDI, measured in 2016. Column (1) includes continent fixed effects on top of controls we had in the last columns of Tables 4 and 5 showing that a few country clusters do not drive the results. Estimates of the coefficients of interest in the following two columns are very similar to the previous estimates and GDP per capita and life expectancy coefficient estimates are both economically and statistically insignificant. This suggests that the level of development of the source countries is unlikely to drive our findings.

Alternatively one could argue that selection of immigrants from countries with differential levels of development is not what we are picking up in our regressions, but economic preferences could be correlated with social preferences affecting financial behavior. This is not an argument against the role of culturally transmissible traits in general, but the coefficient estimates for our variables of interest could be biased. More specifically, Guiso et al. (2004) suggest that *trust* (or social capital in general) is a cultural factor shaping financial behavior. To address this, in the last column, we account for the *trust* measure from the GPS, which could potentially affect our outcomes independently. Results suggest that controlling for trust has no effect on the coefficients of interest.

5.3 Role of Other Child Outcomes as Mediating Variables

We have so far documented that the cultural legacy of the country of origin is related to, and could have a direct influence on, second generation migrants' financial behavior even after controlling for some of the most consequential parental and country of origin characteristics. One other possibility is that the investment behavior of children is simply a reflection of their other outcomes and is not directly affected by their cultural heritage. From the previous literature we know that education, income, and wealth are directly related to investment behavior. If cultural heritage directly affects these outcomes (and on top of the parental

Table 6 Participation in Stocks and Mutual Funds, and Risk- and Time-Preferences, Other Cross-Country Controls

Panel A:	Stock Market Participation			
	(1)	(2)	(3)	(4)
Risk taking	0.189**	0.175***	0.176***	0.186***
	(0.0921)	(0.0551)	(0.0530)	(0.0598)
Patience	-0.134***	-0.116***	-0.125***	-0.136***
	(0.0498)	(0.0318)	(0.0274)	(0.0305)
Log GDP/Cap.		-0.0202		
		(0.0182)		
Life Expectancy			-0.00145	
			(0.00279)	
Trust				0.0215
				(0.0474)
Panel B:	Mutual Fund Participation			
	(1)	(2)	(3)	(4)
Risk taking	-0.140**	-0.0970**	-0.0962***	-0.103***
	(0.0602)	(0.0381)	(0.0357)	(0.0398)
Patience	0.103***	0.0772***	0.0769***	0.0840***
	(0.0313)	(0.0212)	(0.0190)	(0.0195)
Log GDP/Cap.		0.00207		
		(0.0131)		
Life Expectancy			0.000361	
			(0.00205)	
Trust				-0.0415
				(0.0326)
Continent Fixed Effects	Yes	No	No	No
Parental Education and Cohort fixed effects	Yes	Yes	Yes	Yes
Parental Income and Wealth Rank	Yes	Yes	Yes	Yes
One Native-born Parent	Yes	Yes	Yes	Yes
Gender	Yes	Yes	Yes	Yes
Individual Cohort fixed effects	Yes	Yes	Yes	Yes
Observations	171925	172032	172032	172032

Notes: Ordinary least squares. In Panel A, the dependent variable throughout is a binary variable taking the value 1 if the individual participates directly in the stock market. In Panel B, the dependent variable throughout is a binary variable taking the value 1 if the individual invests some fraction of financial wealth greater than zero in mutual funds. *Risk taking*, *Patience*, and *Trust* are the average scores associated with the individual's parents' birth countries from the Global Preference Survey. Parental *Income Rank* is the average percentile labor earnings rank in 1990-1994 by birth cohort. All columns include parental and individual year-of-birth fixed effects, parental fixed effects for eight education levels, dummies for having one native-born parent and gender. Standard errors (in parentheses) are two-way clustered by parental country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7 Share of Financial Wealth Allocated directly to the Stock Market and Mutual Funds, and Risk- and Time-Preferences, Other Cross-Country Controls

Panel A:	Share Stocks			
	(1)	(2)	(3)	(4)
Risk taking	0.106**	0.0824***	0.0836***	0.0868***
	(0.0464)	(0.0279)	(0.0270)	(0.0289)
Patience	-0.0746***	-0.0571***	-0.0603***	-0.0635***
	(0.0246)	(0.0173)	(0.0151)	(0.0153)
Log GDP/Cap		-0.00462		
		(0.0106)		
Life Expectancy			-0.000145	
			(0.00158)	
Trust				0.0197
				(0.0266)
Panel B:	Share Mutual Funds			
	(1)	(2)	(3)	(4)
Risk taking	-0.111**	-0.102***	-0.104***	-0.104***
	(0.0505)	(0.0331)	(0.0321)	(0.0355)
Patience	0.0820***	0.0817***	0.0851***	0.0838***
	(0.0242)	(0.0156)	(0.0151)	(0.0156)
Log GDP/Cap		-0.000695		
		(0.00941)		
Life Expectancy			-0.000666	
			(0.00176)	
Trust				-0.0223
				(0.0246)
Continent Fixed Effects	Yes	No	No	No
Parental Education and Cohort fixed effects	Yes	Yes	Yes	Yes
Parental Income and Wealth Rank	Yes	Yes	Yes	Yes
One Native-born Parent	Yes	Yes	Yes	Yes
Gender	Yes	Yes	Yes	Yes
Individual Cohort fixed effects	Yes	Yes	Yes	Yes
Observations	171925	172032	172032	172032

Notes: Ordinary least squares. In Panel A, the dependent variable throughout is the share of financial wealth allocated directly to the stock-market, conditional on allocating a fraction greater than 0 to risky assets (mutual funds or stocks). In Panel B, the dependent variable throughout is the share of financial wealth allocated to mutual funds, conditional on allocating a fraction greater than 0 to risky assets (mutual funds or stocks). *Risk taking*, *Patience*, and *Trust* are the average scores associated with the individual's parents' birth countries from the Global Preference Survey. Parental *Income Rank* is the average percentile labor earnings rank in 1990-1994 by birth cohort. All columns include parental and individual year-of-birth fixed effects, parental fixed effects for eight education levels, dummies for having one native-born parent and gender. Standard errors (in parentheses) are two-way clustered by parental country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

characteristics that we analyzed before), one might argue that the coefficients of cultural heritage could reflect the direct effects on these outcomes and not investment behavior.

Before moving on to addressing this potential concern, it should be noted that there is no reason to think that the potentially influential individual characteristics mentioned above affect stock and mutual fund investments in *completely opposite* directions, as we have found to be the case for both patience and risk taking preferences, and also they all increase the likelihood of equity market participation, unlike the evidence we found for the effect of cultural preferences in Panel A of Table 2. For example, those with more wealth are more likely to participate in both asset markets and assign more of their financial wealth to risky assets in general. This suggests that we should not expect that the estimates for cultural variables simply reflect their effects on other characteristics of children of immigrants.

Nevertheless, to assess this possible scenario more formally, we discuss potential mediating factors that could affect investment behavior directly and also be affected by culturally transmitted preferences, and investigate whether adding those controls sequentially change the estimates we found in Tables 4 and 5. We acknowledge that since these variables, by construction, are potentially influenced by cultural traits of patience and risk-taking they could be described as "bad controls" in the terminology of Angrist and Pischke (2009), as the ceteris paribus assumption could be violated.[22] Note, though, that this is a standard mediation analysis, as our goal is to see how the coefficients on risk-taking and patience change when we control for these variables. If adding a particular control changes the estimated coefficients, it suggests that the effects on financial market behavior might be mediated by the effects of cultural traits on the variable included.

[22]In other words, controlling for covariates that are affected by the treatment might bias the estimate of the treatment effect by capturing part of its impact.

The estimates are in Tables 8 and 9 for stock market and mutual fund participation and shares, respectively. Column (1) in both tables repeat the findings in the last columns of Tables 4 and 5, controlling for all parental characteristics. In column (2), we add controls for children's education. The literature suggest that patience increases education (Falk et al., 2018; Figlio et al., 2019), while education affects financial market behavior (Black et al., 2017; Cole et al., 2014; Cooper and Zhu, 2016). However, our coefficients of interest barely change in column (2) of both Tables 8 and 9 and they are not statistically different from those in column (1). Therefore, the effect of our cultural preference variables on financial behavior does not seem to be mediated through education.

Higher earnings could affect financial behavior by acting as a higher stable return to human capital that can partially substitute for bond holding, or because the fixed costs of investment decrease with financial wealth, and hence, with earnings (Black et al., 2017; Calvet and Sodini, 2014; Cooper and Zhu, 2016). Also, the literature suggests that wealth affects participation in the equity markets and the extent of risk taking (Andersen and Nielsen, 2011; Briggs et al., 2021; Calvet and Sodini, 2014).

In columns (3) and (4), we add earnings rank and wealth quartiles in their cohorts as controls. In column (5), we add sector of employment since it could affect financial market behavior above and beyond earnings and be affected by risk-taking and patience. In the last column, we control for all of these potential mediating variables in one specification. While there are slight changes in the coefficients of interest, a large portion of the association remains intact, suggesting that these variables are not the sole mediators and the direct effect of ancestral risk taking and patience on financial behavior remains important.

Table 8 Participation in Stocks and Mutual Funds, and Risk- and Time-Preferences, Controlling for Individual Characteristics

Panel A:	Stock Market Participation					
	(1)	(2)	(3)	(4)	(5)	(6)
Risk taking	0.183***	0.178***	0.189***	0.166***	0.134***	0.117***
	(0.0579)	(0.0562)	(0.0583)	(0.0555)	(0.0449)	(0.0444)
Patience	-0.134***	-0.125***	-0.135***	-0.115***	-0.102***	-0.0858***
	(0.0265)	(0.0254)	(0.0266)	(0.0246)	(0.0204)	(0.0193)
Panel B:	Mutual Fund Participation					
	(1)	(2)	(3)	(4)	(5)	(6)
Risk taking	-0.0979**	-0.0976**	-0.0962**	-0.0952**	-0.105***	-0.101**
	(0.0387)	(0.0388)	(0.0385)	(0.0392)	(0.0402)	(0.0403)
Patience	0.0790***	0.0795***	0.0786***	0.0760***	0.0839***	0.0800***
	(0.0172)	(0.0173)	(0.0172)	(0.0173)	(0.0179)	(0.0179)
Individual Education fixed effects	No	Yes	No	No	No	Yes
Individual Income Rank	No	No	Yes	No	No	Yes
Individual Wealth Quartiles	No	No	No	Yes	No	Yes
Employment Industry fixed effects	No	No	No	No	Yes	Yes
Parental Education fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Income Rank, Father	Yes	Yes	Yes	Yes	Yes	Yes
Income Rank, Mother	Yes	Yes	Yes	Yes	Yes	Yes
Parental Wealth Quartiles	Yes	Yes	Yes	Yes	Yes	Yes
Parental Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
One Native-born Parent	Yes	Yes	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes	Yes	Yes
Individual Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	172032	172032	172032	142879	172032	142879

Notes: Ordinary least squares. In Panel A, the dependent variable throughout is a binary variable taking the value 1 if the individual participates directly in the stock market. In Panel B, the dependent variable throughout is a binary variable taking the value 1 if the individual invests some fraction of financial wealth greater than zero in mutual funds. *Risk taking* and *Patience* are the average risk-taking and patience scores associated with the individual's parents' birth countries from the Global Preference Survey; the standard deviation across countries for these two variables are 0.29 and 0.37 for risk-taking and patience, respectively. Parental *Income Rank* is the average percentile labor earnings rank in 1990-1994 by birth cohort. The sample in all columns are restricted to those individuals with existing data on parental education, income, and wealth. All columns include parental and individual year-of-birth fixed effects and parental fixed effects for eight education levels. Columns 2 and 6 include education fixed effects also for the individual; Columns 5 and 6 include industry fixed effects for the individual's employer at the 4-digit level. Standard errors clustered by parental country of birth in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9 Share of Financial Wealth Allocated directly to the Stock Market and Mutual Funds, and Risk- and Time-Preferences, Controlling for Individual Characteristics

Panel A:	Share Stocks					
	(1)	(2)	(3)	(4)	(5)	(6)
Risk taking	0.0843***	0.0834***	0.0834***	0.0700**	0.0837***	0.0684**
	(0.0284)	(0.0282)	(0.0282)	(0.0274)	(0.0282)	(0.0269)
Patience	-0.0611***	-0.0600***	-0.0609***	-0.0511***	-0.0607***	-0.0498***
	(0.0133)	(0.0131)	(0.0132)	(0.0128)	(0.0133)	(0.0127)
Panel B:	Share Mutual Funds					
	(1)	(2)	(3)	(4)	(5)	(6)
Risk taking	-0.101***	-0.0992***	-0.107***	-0.101***	-0.0606***	-0.0627**
	(0.0338)	(0.0332)	(0.0346)	(0.0350)	(0.0233)	(0.0265)
Patience	0.0811***	0.0772***	0.0827***	0.0765***	0.0547***	0.0540***
	(0.0142)	(0.0138)	(0.0143)	(0.0144)	(0.00988)	(0.0110)
Individual Education fixed effects	No	Yes	No	No	No	Yes
Individual Income Rank	No	No	Yes	No	No	Yes
Individual Wealth Quartiles	No	No	No	Yes	No	Yes
Employment Industry fixed effects	No	No	No	No	Yes	Yes
Parental Education fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Income Rank, Father	Yes	Yes	Yes	Yes	Yes	Yes
Income Rank, Mother	Yes	Yes	Yes	Yes	Yes	Yes
Parental Wealth Quartiles	Yes	Yes	Yes	Yes	Yes	Yes
Parental Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
One Native-born Parent	Yes	Yes	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes	Yes	Yes
Individual Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	172032	172032	172032	142879	172032	142879

Notes: Ordinary least squares. In Panel A, the dependent variable throughout is the share of financial wealth allocated directly to the stock-market, conditional on allocating a fraction greater than 0 to risky assets (mutual funds or stocks). In Panel B, the dependent variable throughout is the share of financial wealth allocated to mutual funds, conditional on allocating a fraction greater than 0 to risky assets (mutual funds or stocks). *Risk taking* and *Patience* are the average risk-taking and patience scores associated with the individual's parents' birth countries from the Global Preference Survey; the standard deviation across countries for these two variables are 0.29 and 0.37 for risk-taking and patience, respectively. Parental *Income Rank* is the average percentile labor earnings rank in 1990-1994 by birth cohort. The sample in all columns are restricted to those individuals with existing data on parental education, income, and wealth. All columns include parental and individual year-of-birth fixed effects and parental fixed effects for eight education levels. Columns 2 and 6 include education fixed effects also for the individual; Columns 5 and 6 include industry fixed effects for the individual's employer at the 4-digit level. Standard errors clustered by parental country of birth in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6 Robustness

6.1 Ancestral Risk Taking Proxied by Ethnographic Chance Games in Parental Birth Country

Part of the literature that studies the impact of cultural values on economic outcomes has focused on cultural variables that are measured before modernization and that predate economic outcomes by a very long time (Alesina et al., 2013; Giuliano and Nunn, 2013; Michalopoulos, 2012; Nunn and Wantchekon, 2011). The advantages of using cultural variables measured very far back in time are twofold. Firstly, it rules out reverse causality; for example, gender norms today cannot have caused plough usage centuries ago (Alesina et al., 2013). Secondly, it provides an intuitive understanding of where the differing cultural norms come from as these measures capture characteristics of ancestral tribes or communities before any modernization and industrialization took place.

In our setup, with the spatial separation that our identification strategy relies on, reverse causality is already ruled out —there is no plausible mechanism by which cross-sectional variance in financial decision-making in Sweden has a material impact on measured average risk- and time-preferences across countries. Furthermore, as we are mainly concerned with the impact of cultural values on financial decision-making, and not how those cultural values are formed, we prefer using a direct measure of risk- and time-preferences as our baseline. Nevertheless, using a "deeper" measure of cultural risk-taking provides an intuitive justification for where these differences may come from.

Therefore, we draw on the Ethnographic Atlas from Murdock (1965) which allows us to approximate ancestral risk-taking culture (no information available on the culture of patience). It further buttresses the interpretation of the GPS measure of risk-taking

as capturing deeper cultural differences with an actual bearing on economic decisions, as opposed to solely reflecting some economic or institutional difference across countries that induces differences in survey-respondents' lottery certainty-equivalence.

The Ethnographic Atlas includes information gathered by ethnographers reflecting various cultural and socio-economic characteristics of pre-modern societies before industrialization and European contact.[23] Thus, recent literature utilized the Atlas to capture ancestral cultures from ancient times (Alesina et al., 2013; Giuliano and Nunn, 2013; Michalopoulos, 2012; Nunn and Wantchekon, 2011). The Atlas provides us with the information on what types of games a given society had in their cultures. It classifies societies' games when any combination of the following three elements were present: i. chance, ii. physical skills, iii. strategy.[24] We proxy the ancestral culture of risk taking in the parents' country of origin with the share of people whose ancestors played chance games.[25]

In Table 10, we present results using the alternative cultural measure of risk-taking described above. Namely, we investigate to what extent children descended from cultures in which their ancestors' games were more heavily based on chance, rather than strategy or physical activities, are more likely to take more risks in the financial markets, keeping the institutional setting constant.

Indeed, we find that to be the case. Consistent with the baseline findings, in columns (1) and (3) we find that children with an ancestral culture of risk taking are more likely to participate in the stock market and also have a greater share of their financial wealth

[23]Most of the societies are observed in the 19th and early 20th centuries.

[24]E.g. dice games are chance games. Foot racing or wrestling are physical skill games. Chess would be an example of a strategy game.

[25]We rely on the data from Giuliano and Nunn (2018) who aggregate the Ethnographic Atlas to the country level from the ethnographic society level.

directly in stocks. Whereas, columns (2) and (4) indicate that they are less likely to own mutual funds and have a smaller share of mutual funds.

Table 10 Financial Decision-Making and Ancestral Chance Games

	Stock-Market Participation	Mutual Fund Participation	Share Stocks	Share Mutual Funds
	(1)	(2)	(3)	(4)
Ancestral Chance Games	0.0994***	-0.0484**	0.0395**	-0.0566***
	(0.0331)	(0.0215)	(0.0161)	(0.0188)
Parental Education fixed effects	Yes	Yes	Yes	Yes
Income Rank, Father	Yes	Yes	Yes	Yes
Income Rank, Mother	Yes	Yes	Yes	Yes
Parental Wealth Rank	Yes	Yes	Yes	Yes
Parental Cohort fixed effects	Yes	Yes	Yes	Yes
One Native-born Parent	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes
Individual Cohort fixed effects	Yes	Yes	Yes	Yes
Observations	172032	172032	172032	172032

Notes: Ordinary least squares. The dependent variable in columns 1–4 are, respectively, stock-market participation, mutual-fund participation, share of financial wealth invested directly in the stock market, and share of financial wealth invested in mutual funds. *Ancestral Chance Games* is a measure of ancestral risk taking constructed from the Ethnographic Atlas of Murdock (1965), capturing to what extent chance games were played historically in the parental countries of origin. Parental *Income Rank* is the percentile labor earnings rank by birth cohort, averaged over the years 1990–1994. All columns include parental and individual year-of-birth fixed effects, and parental fixed effects for eight education levels. Standard errors (in parentheses) are two-way clustered by parental country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

In sum, this analysis reassures that cultural traits, defined in this analysis based on those descended from centuries ago, influence individuals' financial behavior today and the effect is very similar to traits drawn from contemporary societies.

6.2 Two foreign born parents

So far, our analysis includes individuals with at least one foreign-born parent. Like all other individuals in our sample, for those with one parent born in Sweden we have averaged the cultural traits of the two parents. However, one might argue that those with one parent born

in Sweden could be different in systematic ways from the rest of the sample. For example, they would face less language barrier growing up or assimilation into the society might happen in a more smooth way that could affect their behavior. To address this concern, we repeat our main empirical analyses on a sample of children with both migrant parents.

Table 11 Financial Decision-Making and Risk- and Time-Preferences, with Both Parents Foreign-Both

	Stock-Market Participation	Mutual Fund Participation	Share Stocks	Share Mutual Funds
	(1)	(2)	(3)	(4)
Risk taking	0.197***	-0.0912**	0.0938***	-0.106***
	(0.0638)	(0.0384)	(0.0277)	(0.0373)
Patience	-0.144***	0.0931***	-0.0660***	0.0819***
	(0.0260)	(0.0150)	(0.0126)	(0.0148)
Parental Education fixed effects	Yes	Yes	Yes	Yes
Income Rank, Father	Yes	Yes	Yes	Yes
Income Rank, Mother	Yes	Yes	Yes	Yes
Parental Wealth Rank	Yes	Yes	Yes	Yes
Parental Cohort fixed effects	Yes	Yes	Yes	Yes
One Native-born Parent	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes
Individual Cohort fixed effects	Yes	Yes	Yes	Yes
Observations	38702	38702	38702	38702

Notes: Ordinary least squares. The dependent variable in columns 1–4 are, respectively, stock-market participation, mutual-fund participation, share of financial wealth invested directly in the stock market, and share of financial wealth invested in mutual funds. *Risk taking* and *Patience* are the average risk-taking and patience scores associated with the individual's parents' birth countries from the Global Preference Survey; the standard deviation across countries for these two variables are 0.29 and 0.37 for risk-taking and patience, respectively. Parental *Income Rank* is the percentile labor earnings rank by birth cohort, averaged over the years 1990–1994. All columns include parental and individual year-of-birth fixed effects, and parental fixed effects for eight education levels. Standard errors (in parentheses) are two-way clustered by parental country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11 presents results analogous to those in column (4) of Tables 4 and 5. Results are very similar and previous conclusions carry over, with a positive relationship between risk taking and stock-market investment, and patience and mutual-fund investment, respectively.

7 Conclusion

This paper investigates the cultural origins of investment behavior. More specifically, by combining Swedish wealth registry data on second-generation immigrants with risk and time preferences in their parents' country of origin, we examine the influence of culturally transmitted economic preferences on individual investments in the equity market. Children of immigrants from more risk-loving cultures are more likely to hold stocks directly, invest a greater share of their financial wealth in stocks, and a smaller share in mutual funds. On the other hand, those descending from cultures that are more patient invest more in mutual funds and less in stocks. We show that our results are not driven by the selection of migrating parents and culturally transmitted preferences have an independent and direct effect on individual's financial decisions beyond their potential impact on parental and individual socio-economic characteristics.

In addition to advancing our knowledge on the effects of cultural heritage on economic behavior, this paper sheds more light into our understanding of the vast differences in investment behavior across different countries and the potential role of culture in shaping that. We also emphasize the role of culture, and intergenerational nature of it, as another mechanism through which parents influence their children's economic behavior and outcomes: cultural attitudes towards risk and patience, (partially) shaped by transmission from parents, have economically and statistically significant effects on investment behavior.

This paper remains silent about the possibility that some cultural traits might be associated with better expected returns on investment. For instance, more patient individuals might act less on impulse that could generate higher returns over the longer run. However, we do not observe prices in our data and cannot judge whether individuals from more risk-loving or patient cultures are more successful in their investment decisions. Thus, whether

certain cultural characteristics are more conducive to financial success is a question left for future research.

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Online Appendix for "Cultural Origins of Investment Behavior"

A. Figures and Tables

Table A.1 List of Countries and their Risk- and Time- Preferences

Country	Patience	Risk taking
Afghanistan	-0.2013	0.1207
Algeria	0.0598	0.3915
Argentina	-0.2293	0.0415
Australia	0.6570	0.1371
Austria	0.6082	-0.0618
Bangladesh	0.0811	-0.1980
Bolivia	0.0713	0.1030
Bosnia Herzegovina	-0.2472	-0.1256
Brazil	-0.2600	-0.2505
Cameroon	-0.4274	-0.5350
Canada	0.7184	0.1835
Chile	-0.1554	0.1253
China	0.3981	-0.0198
Colombia	-0.3459	-0.0451
Croatia	-0.0937	0.0684
Czech Republic	0.3843	-0.0204
Egypt	-0.3831	-0.2808
Estonia	0.0253	-0.2954
Finland	0.5995	-0.2827
France	0.3568	-0.0301
Germany	0.6243	-0.0444
Ghana	0.0846	0.6184
Greece	-0.3600	-0.1570
Hungary	-0.4309	-0.4984
India	-0.1087	-0.2752
Indonesia	-0.3618	-0.3216
Iran	-0.3807	0.3378
Iraq	-0.4169	0.1657
Israel	0.4568	0.2437
Italy	0.1084	-0.0936
Japan	0.1084	-0.3558
Jordan	-0.4184	-0.1248
Kenya	-0.0762	0.2439
Lithuania	-0.0617	-0.0459
Mexico	-0.1084	-0.1389
Morocco	-0.3107	-0.0689
Netherlands	0.9517	0.1893
Nigeria	-0.2004	0.3859
Pakistan	-0.0831	0.0196
Peru	-0.1089	0.1549
Philippines	0.0991	0.2946
Poland	0.0716	-0.0735
Portugal	-0.3116	-0.7924
Romania	-0.2681	-0.2295
Russia	-0.0752	-0.3233
Saudi Arabia	0.2001	0.6957
Serbia	-0.1378	-0.1296
South Africa	0.0579	0.9705
South Korea	0.3692	-0.0393
Spain	0.1984	-0.1584
Sri Lanka	-0.1009	0.0627
Sweden	1.0714	0.0518
Switzerland	0.6697	-0.0193
Tanzania	-0.3249	0.4918
Thailand	-0.2297	-0.1235
Turkey	-0.0473	0.0234
Uganda	-0.2552	0.1625
Ukraine	-0.1816	-0.2186
United Arab Emirates	-0.0913	0.0865
United Kingdom	0.5350	0.0486
United States	0.8112	0.1165
Vietnam	0.1104	-0.0086