Value versus Growth Investing: Why Do Different Investors Have Different Styles?*

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Abstract

We find that several factors explain an investor's style, in the sense of the value versus growth orientation of the investor's stock portfolio. First, an investor's style has a biological basis – a preference for value versus growth stocks is partially ingrained in an investor already from birth. Second, investors who a priori are expected to take more financial risk (e.g., men and wealthier individuals) have a preference for growth, not value, which may be surprising if the value premium reflects risk. Finally, an investor's style is explained by life course theory in that experiences, both earlier and later in life, are related to investment style. Investors with adverse macroeconomic experiences (e.g., growing up during the Great Depression or entering the job market during an economic downturn) and those who grew up in a lower status socioeconomic rearing environment have a stronger value orientation several decades later in their lives. Our research contributes a new perspective to the long-standing value/growth debate in finance.

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I think Warren [Buffett] captured the idea himself in his 1964 article "The Superinvestors of Graham and Doddsville" and in it he talks about – value investing is like an inoculation – you either get it right away, or you never get it. And I think it's just true. I actually think there's just a gene for this stuff, whether it's a value investing gene or a contrarian gene.

— Seth Klarman, in an interview with Charlie Rose, 2011.

I Introduction

The concepts of "value" and "growth" investing have a long history in financial economics. Today, there exist some 2,050 value funds and 3,200 growth funds catering to investors with preferences for these investment styles.[1] For more than two decades, Morningstar has provided a Value-Growth Score to help investors choose a fund with their preferred style. Fidelity, the world's largest provider of employer-sponsored retirement plans such as 401(k) plans, prominently features a description of value and growth funds on their Learning Center website.[2] There are best-selling books about both value and growth strategies, and countless business magazine articles boast recommendations about the "Best Value Funds" and/or the "Best Growth Funds." Wall Street professionals are educated about value and growth investing already in business school, with many MBA programs today offering, e.g., Value Investing courses. Most importantly from the perspective of academic research, one of the most debated issues in the past several decades is the differential returns of investments in value versus growth stock portfolios – the value premium debate (e.g., De Bondt and Thaler (1985), Fama and French (1992, 1993, 1996), Lakonishok, Shleifer, and Vishny (1994), and Daniel and Titman (1997)).[3]

Despite all this attention to value and growth investing, very little research has attempted to explain the determinants of an individual's investment style. That is, why are some investors value oriented, while others are growth oriented? In this paper, we argue that differences in investment styles across individuals, in principle, may stem from either of two non-mutually exclusive sources.

[1] Morningstar.com.

[2] https://www.fidelity.com/learning-center/mutual-funds/growth-vs-value-investing.

[3] The value premium debate has not been limited to only the U.S. stock market, but extends to several international stock markets (e.g., Chan et al. (1991), Fama and French (1998), and Daniel et al. (2001)), and also to other asset classes (e.g., Asness et al. (2013)). We refer to Fama and French (2012) for recent empirical evidence on the prevalence of a value premium in international stock markets.

First, these differences may be biological, in the sense that a genetic predisposition results in a preference for a specific investment style. In recent years, individual characteristics of first-order importance for portfolio choice, e.g., the propensity to take financial risk, have indeed been shown to be partly explained by an individual's genetic composition (e.g., Cesarini et al. (2009), Barnea, Cronqvist, and Siegel (2010) and Cesarini et al. (2010)). As a result, we hypothesize that an individual's investment style has a biological basis, i.e., a preference for value versus growth stocks is partially ingrained in an investor from birth.

Second, based on life course theory, an approach to research in social psychology,[4] which has recently made its way into finance research (e.g., Oyer (2006, 2008), Kaustia and Knüpfer (2008), Malmendier and Nagel (2011, 2013), and Schoar and Zuo (2013)), we hypothesize that an individual's specific life experiences affect behaviors, including the individual's investment style, later in life. We consider several potentially relevant, and likely exogenous, life experiences of individuals. More specifically, we analyze whether experiencing an adverse and significant macroeconomic event, e.g., growing up during the Great Depression, affects an individual's value versus growth orientation. We also examine the impressionable years during an individual's life course, e.g., the economic conditions when an individual entered the job market for the first time. Finally, we also examine the socioeconomic status of the rearing environment in which the individual grew up.

Benjamin Graham and T. Rowe Price, Jr., constitute a colorful illustration of some of our hypotheses. Graham is commonly dubbed the "Father of Value Investing" because he preferred stocks with comparatively low valuation ratios and other characteristics that subsequently came to define value investing. Price, the founder of the large money management company with his name, is often referred to as the "Father of Growth Investing" because of his preference for companies characterized by strong earnings growth, R&D intensity, and innovative technology. Their different investment styles may very well have a biological basis, but this is not possible to examine without data on their genetic differences. Interestingly, Graham grew up very poor, his father passing away unexpectedly when he was young, and his mother losing the family's savings in the stock market crash known as the "Panic of 1907." Among his brothers, Graham was often tasked with "bargain

[4] For further details and references, see, e.g., Giele and Elder (1998) and Elder et al. (2003).

hunting" at different grocery stores (e.g., Carlen (2012)). In comparison, Price had a privileged upbringing, his father being an medical doctor who served as a surgeon his entire professional career for a rapidly expanding railroad company, a growth company at that time. We hypothesize that such differences in life experiences may contribute to differences in investment styles.

Our research contributes a new perspective to the long-standing value/growth debate in finance. First, an investor's style has a biological basis – a preference for value versus growth stocks is partially ingrained in an investor already from birth. We estimate that genetic differences across individuals explain 18% of the cross-sectional variation in value versus growth orientation, if using P/E ratios as an investment style measure, and 25% if using Morningstar's Value-Growth Score. Second, investors who a priori are expected to take more financial risk have a preference for growth, not value, investing. This result is consistently found in data for exogenous proxies for risk taking propensity (e.g., gender and age) and also other individual characteristics (e.g., net worth). If value is riskier than growth, it may be surprising that those who are expected to take more (less) financial risk prefer growth (value) stock portfolios. Finally, an investor's style is explained by life course theory in that experiences, both earlier and later in life, are related to investment style. In particular, investors with adverse macroeconomic experiences have stronger preferences for value investing later in life. For example, those who grew up during the Great Depression have portfolios with average P/E ratios that are 2.2 (or about 10% at the median) lower, controlling for individual characteristics, several decades later in life. Consistent with an impressionable years hypothesis, those who enter the job market for the first time during an economic downturn are also more value oriented later on. We also find that those who grew up in a lower status socioeconomic rearing environment have a stronger value orientation later in life.

The paper is organized as follows. Section II reviews related research. Section III introduces our data and empirical methodology. Section IV reports our results. Section V discusses potential implications of our results, and Section VI concludes.

II Related Research

A Biological Predispositions and Investment Style

A.1 Risk Preferences

A well-established empirical result is that a value/growth risk factor, referred to as HML ("high minus low") following the seminal work by Fama and French (1993), is a significant determinant of cross-sectional returns of stock portfolios. Different stocks and portfolios have different exposures to this HML factor, and as a result, different expected returns. If value-oriented portfolios have outperformed growth-oriented portfolios historically because of differences in risk, we may expect investors with a propensity to take more (less) financial risk to prefer value (growth) stocks and mutual funds.[5]

Several recent studies have shown that a significant portion, or about 30%, of the cross-sectional variation in financial risk preferences is explained by biological predispositions. In those studies risk taking is not defined from the perspective of exposure to a value/growth risk factor, but risk preferences are either elicited from experiments (e.g., Cesarini et al. (2009)) or involve measures such as the share in equities (e.g., Barnea, Cronqvist, and Siegel (2010) and Cesarini et al. (2010)). Some research in the intersection of finance and neuroscience has even identified specific candidate genes involved in explaining differences in financial risk taking across individuals (e.g., Kuhnen and Chiao (2009), Dreber et al. (2009), and Zhong et al. (2009)).[6]

The aforementioned studies all suggest a relation between, on the one hand, biological predispositions, and on the other hand, risk preferences. As a result, if we find that genetic differences across investors explain their value versus growth orientation, differential genetic propensities to financial risk taking is a potential explanation which would be consistent with a risk-based explanation for the value premium.

[5] For a theoretical model of a possible relation between risk and the value premium, see, e.g., Zhang (2005), and for related empirical evidence, see, e.g., Petkova and Zhang (2005) and Chen, Petkova, and Zhang (2008).

[6] The even deeper question is why risk preferences are genetic in the first place. Some of the theoretical work by Robson (2001b) addresses very fundamental questions in economics such as why nature has endowed individuals with utility functions. For further details and references, we refer to Robson (2001a).

A.2 Behavioral Biases

While there is consensus among most financial economists that value stocks historically have produced higher returns than growth stocks, there is less agreement about why this is the case.[7] Daniel and Titman (1997) show that the return premium on value stocks does not arise because of the comovement of these stocks with a risk factor. Rather, it is the stocks' characteristics that explain the cross-sectional variation in stock returns. For example, Lakonishok, Shleifer, and Vishny (1994) argue that the return of growth, or "glamour," stocks is the result of investor sentiment and provide evidence that value strategies produce higher returns because they exploit some of the behavioral biases of investors, not because of risk. In other behavioral finance models, the value premium may reflect positive feedback trading (e.g., De Long, Shleifer, Summers, and Waldmann (1990), Hong and Stein (1999), and Barberis and Shleifer (2003)), conservatism and representativeness (e.g., Barberis, Shleifer, and Vishny (1998)), or overconfidence (e.g., Daniel, Hirshleifer, and Subrahmanyam (1998) and Daniel, Titman, and Wei (2001)).

Recent research suggests a relation between, on the one hand, biological predispositions, and on the other hand, behavioral biases (e.g., Cesarini et al. (2012) and Cronqvist and Siegel (2013)). As a result, if we find that genetic differences across investors explain their value versus growth orientation, differential genetic behavioral biases is a potential explanation which would be consistent with behavioral finance models.[8]

B Life Course Theory and Investment Style

In addition to biological predispositions we also hypothesize that differences in life experiences may contribute to differences in investment styles across individuals.

[7] For a review of empirical evidence related to value and growth investing, see, e.g., Chan and Lakonishok (2004).

[8] Some of the theoretical work by Rayo and Becker (2007) and Brennan and Lo (2011) addresses why behaviors, even if not rational as defined in standard economic models, may survive human evolution. For further details and references, see, e.g., Cosmides and Tooby (1994), Chen et al. (2006), and Santos and Chen (2009).

B.1 Macroeconomic Experiences

Experiencing an adverse and significant macroeconomic event may have pervasive effects on an individual's behaviors later in life.[9] In their "Depression Babies" study, Malmendier and Nagel (2011) show that individuals who have experienced relatively low stock market returns in their lives subsequently do not participate in the stock market and they take significantly less financial risk if they do participate. Other economists have also found that macro events have long-term effects on individual preferences. For example, Alesina and Fuchs-Schüendeln (2005) that post-reunification East Germans (particularly older cohorts) have stronger preferences for, e.g., redistribution than West Germans. Malmendier and Nagel (2013) show that differences in life experiences of high or low inflation predict differences in subjective inflation expectations.

If an adverse macroeconomic experience results in less risk taking later in life, and if value is riskier than growth investing, we would expect investors who grew up during the Great Depression to prefer growth investing. An alternative hypothesis, not based on a risk explanation, is that those who have more salient experiences of difficult economic conditions develop a value-oriented investment style, with a preference for stocks that seem relatively "cheaper."

B.2 Impressionable Years

A growing number of studies in social psychology suggest that experiences in early adulthood are particularly important for preferences later in life (e.g., Krosnick and Alwin (1989)). An individual's core attitudes, beliefs, and preferences crystallize during a period of great neurological plasticity in early adulthood – the so-called "impressionable years" – and remain largely unchanged afterwards. For example, Giuliano and Spilimbergo (2013) show that experiencing an economic downturn during the impressionable years (18-25 years old) affects redistribution and political preferences later in life.

In this study, we focus on whether an individual started his or her first employment in an economic downturn. This measure comes with the caveat that it is less exogenous compared to a

[9] The Great Depression is the macro event that has so far been studied most in-depth in the social sciences, and a variety of outcomes later in life have been examined. We refer to Elder (1974) for one of the first and most comprehensive studies of the long-term effects of the Great Depression. Many researchers have argued that the Great Depression created a "depression generation," whose behavior affected the macroeconomy for decades after the depression ended. For example, Friedman and Schwartz (1963) suggested that the Great Depression "shattered" beliefs in capitalism.

birth cohort measure such as the Great Depression because individuals may to some extent choose when they enter the job market by increasing their investment in education endogenously. We still find it informative to examine the time of an individual's first employment because it has been shown to be important in several studies for other economic outcomes (e.g., Oyer (2006, 2008), Kahn (2010), Malmendier et al. (2011), Oreopoulos et al. (2012), and Schoar and Zuo (2013)). This is also a period in their lives when many individuals start to invest in stocks and mutual funds for the very first time.

B.3 Rearing Environment

The hypothesis that the rearing environment, and other early-life experiences, may have significant long-term effects on an individual's behaviors later in life has recently made its way into economic research. Most existing studies examine outcomes such as education and earnings. For example, economists have shown that birth order and family size (e.g., Black et al. (2005)) affect educational attainment and earnings later in life.Relatively few studies examine outcomes of primary interest to financial economists. An exception is Chetty et al. (2011) who report that the pre-school (kindergarten) environment explains, e.g., retirement savings behavior later in life.[10]

In this study, we focus on the rearing environment within the family during an individual's upbringing. More specifically, we hypothesize that the socioeconomic status (SES) of the rearing environment in which an individual grows up explains cross-sectional differences in investment style later in life. We also consider whether parents' life experiences transfer to their children and affect the investment style of their children. For example, if parents grew up during the Great Depression, it may affect not only their own investment style late in life, but potentially also their children's value versus growth orientation through parenting; see, e.g., Bisin and Verdier (2000, 2001) for work related to the social transmission of preferences and behavior from parents to their children.

[10]Even the pre-birth, i.e., "in utero," environment has been shown to predict subsequent economic outcomes and behaviors; see, e.g., Black et al. (2007), Almond and Currie (2011), and Cronqvist, Previtero, Siegel, and White (2013).

III Data

A Individual Characteristics

To empirically decompose variation in investment styles across a large sample of individual investors, we employ data on identical and fraternal twins.[11] We construct our data set by matching a large number of twins from the Swedish Twin Registry (STR), the world's largest twin registry, with data from individual tax filings and other databases. In Sweden, twins are registered at birth, and the STR collects additional data through in-depth interviews.[12] STR's data provide us with the zygosity of each twin pair: Identical or "monozygotic" (MZ) twins are genetically identical, while fraternal or "dizygotic" (DZ) twins are genetically different, and share on average 50% of their genes.[13]

Table 1 reports summary statistics for the twins in our data set and their individual characteristics. Panel A shows that we have data on a total of 10,490 identical twins, and 24,486 fraternal twins, who participate in the stock market. Opposite-sex twins are the most common (38%); identical male twins are the least common (13%). Panel B reports summary statistics for individual characteristics, including age, education, net worth, and disposable income, which we include as controls when we estimate models in Section IV. The average size of the portfolios in our data set, about USD 33,500, is comparable to those in other data sets of a broad set of individual investors, e.g., EUR 24,600 in Grinblatt and Keloharju (2009).[14]

[11]Research in economics has a long history of using data on twins; see, e.g., Behrman and Taubman (1976, 1989), Taubman (1976), Ashenfelter and Krueger (1994), and Black et al. (2007).

[12]STR's databases are organized by birth cohort. The Screening Across Lifespan Twin, or "SALT," database contains data on twins born 1886–1958. The Swedish Twin Studies of Adults: Genes and Environment database, or "STAGE," contains data on twins born 1959–1985. In addition to twin pairs, twin identifiers, and zygosity status, the databases contain variables based on STR's telephone interviews (for SALT), completed 1998–2002, and combined telephone interviews and Internet surveys (for STAGE), completed 2005–2006. For further details about STR, we refer to Lichtenstein et al. (2006).

[13]Zygosity is based on questions about intrapair similarities in childhood. One of the questions was: Were you and your twin partner during childhood "as alike as two peas in a pod" or were you "no more alike than siblings in general" with regard to appearance? STR has validated this method with DNA analysis as having 98 percent accuracy on a subsample of twins. For twin pairs for which DNA has been collected, zygosity status is based on DNA analysis.

[14]We use the average end-of-year exchange rate 1999-2007 of 8.0179 Swedish Krona per U.S. dollar to convert summary statistics in the table. When we estimate models in Section IV, all values are in Swedish Krona, i.e., not converted to U.S. dollars.

B Measures of Investment Style

Prior to the abolishment of the wealth tax in Sweden in 2007, all Swedish banks, brokerage firms, and other financial institutions were required by law to report to the Swedish Tax Authority information about individuals' portfolios (i.e., stocks, bonds, mutual funds, and other securities) owned on December 31. We have matched the individuals in our data set with portfolio data between 1999 and 2007, the entire period for which data are available. For each individual, our data set contains all securities owned at the end of the year (identified by each security's International Security Identification Number (ISIN)), the number of each security owned, and the end of the year value. Security level data have been provided by S&P CapitalIQ and Morningstar. In our data set, there is a total of about 2,000 different stocks and about 1,000 different mutual funds.

We do not expect a dichotomous classification of value versus growth investors to be empirically relevant, so we categorize each investor's value versus growth "orientation" on a continuum. For stocks, we construct two measures of value versus growth orientation using different scaled price ratios: Price/Earnings (P/E) and Price/Book (P/B).[15] For each individual, we first compute the value-weighted average ratio for each year. We then average these ratios over those years an individual is in the data set in order to reduce measurement error. Table 2 reports detailed definitions for each of our investment style measures. For mutual funds, we also construct two measures: i) Morningstar's Value-Growth Score, which varies from -100 (value) to +400 (growth); ii) Name-based value/growth measure, which is -1 if a fund's name contains "value," +1 if a fund's name contains "growth" or "technology," and zero otherwise. We use the same method as for stocks to construct an average measure for each individual.

Table 3 Panel A reveals that while identical and fraternal twins are relatively similar with respect to these investment style measures, there is significant variation across different investors with respect to their value versus growth orientation. It is this cross-sectional variation that we decompose and explain in Section IV.

Finally, Panel B of Table 3 shows that all measures of the value versus growth orientation of investors' portfolios are significantly positively correlated, suggesting that investors indeed have a

[15] Following CapitalIQ's practices, the scaled price ratios are censored at 0 and 300. Winsorizing at the 1%-level does not change any of the reported results.

consistent preference for certain investment styles.

IV Results

We first examine to which extent an individual's investment style is determined by biological vs. environmental factors. We then investigate whether specific proxies for (financial) risk taking predict an investor's value vs. growth orientation. Our final set of results analyses specific environmental experiences that according to the life course theory may influences an investor's investment style.

A Biological Predispositions and Investment Style

In this section, we first report separate correlations for identical versus fraternal twins for each of our measures of investment style. We then provide formal estimation results from decomposing the cross-sectional variation in investment style into genetic and environmental components. To do so, we use empirical methods from quantitative behavioral genetics research that have recently been employed also in research in economics (e.g., Cesarini et al. (2009) and Barnea et al. (2010)). The approach involves maximum likelihood estimation (MLE) of a random effects model, but relies on an intuitive and simple insight: Identical twins share 100% of their genes, while the average proportion of shared genes is only 50% for fraternal twins, so if identical twins are more similar with respect to their investment styles than are fraternal twins, then there is evidence that value versus growth orientation is partly explained by genetic predispositions. For further details, we refer to the Appendix of the paper.

A.1 Evidence from Correlations

Figure 1 reports correlations by genetic similarity, i.e., for identical twins and fraternal twins (separately for same- and opposite-sex twins), for measures of value versus growth orientation. Panel A contains results for stocks and Panel B for mutual funds.

Several conclusions emerge from this evidence. First, we find that identical twins' investment styles are significantly more correlated compared to fraternal twins. For example, the Pearson correlation coefficient among identical twins is 0.32 for the average P/E ratio of the stock portfolio, compared to only 0.19 among fraternal twins (0.20 among same-sex fraternal twins). The correlation among identical twins is generally about double the correlation among fraternal twins. A similar conclusion emerges for mutual funds. For example, the Pearson correlation coefficient among identical twins is 0.30 for the average Value-Growth Score by Morningstar for the mutual fund portfolio, compared to only 0.14 among fraternal twins (0.16 among same-sex fraternal twins). That is, genetically more similar investors have more similar investment styles. This evidence strongly suggests that genetic differences affect value versus growth orientation among individual investors.

Second, we find that the correlations among identical twins are significantly below one. That is, even genetically identical investors show significant differences with respect to their investment styles. This evidence shows the importance of the environment (e.g., individual-specific experiences and events) in explaining an investor's value versus growth orientation, and emphasizes the importance of analyzing the effect on investment style of experiences and events during an individual's life course.

A.2 Evidence from Variance Decomposition

Tables 4 and 5 report estimation results from decomposing investment styles into genetic and environmental variation.[16] We report the relative proportions of the cross-sectional variation in investment styles across individuals that are explained by genetic (A), common environmental (C), and individual-specific environmental (E) factors (for details, see equation (5) in the Appendix). More specifically, we first regress each investment style measure on a set of individual characteristics and then we decompose the residual variation. We include the following individual characteristics: Gender, age, education, marriage status, disposable income, and net worth.

The evidence from the variance decomposition in Table 4 confirms the correlation evidence and shows that variation across investors with respect to value versus growth orientation of their stock portfolio is partially genetic.[17] The estimates of the A component vary from 18% to 24%, and

[16]See the Appendix for details on the maximum likelihood estimation of the random effects model specified in equation (1) of the Appendix.

[17]As a robustness check, we have also examined Price/Sales (P/S) and Price/Cash flow (P/C) ratios. The A components for these measures are similar to those reported for standard measures such as P/E and P/B ratios.

are statistically significant for each investment style measure.[18] The C component is significantly smaller, and varies from 8% to 10%. The remaining portion of the cross-sectional variation in investment style is explained by individual-specific experiences and events.[19]

While the evidence reported so far involves individual stocks, we also decompose the cross-sectional variation in investment style using data on mutual funds. We use two measures, the Value-Growth Score by Morningstar and a name-based value/growth measure. These measures provide a salient way for an individual investor to choose exposure based on his or her value versus growth preference. Our conclusions from Table 5 are similar compared to individual stocks. The estimates of the A component vary from 16% to 25%, and are statistically significant for each investment style measure, and the estimate of the C component is smaller, ranging from 0% to 4%.

On the one hand, Tables 4 and 5 show that it is difficult to estimate the A component for value versus growth orientation precisely. On the other hand, it is encouraging that each of the investment style measures paint a very consistent picture in the sense of a statistically significant A component, for both stocks and mutual funds. It should also be emphasized that recent studies related to individual investor behavior have had difficulties explaining even 10% of the cross-sectional variation when including a large set of individual characteristics (e.g., Brunnermier and Nagel (2008)). Overall, based on the reported evidence, we conclude that an individual's investment style has a biological basis, i.e., a preference for value versus growth stocks is partially ingrained in an investor from birth.

An assumption of the model we estimate is the so-called Equal Environments Assumption (EEA). If an individual's parents or others in the environment treat identical twins more similarly than fraternal twins (along dimensions relevant for investment style), then the estimated genetic component (A) may be upward biased. This problem has been long recognized in twin research, and substantial effort has been devoted to addressing it. From research in behavioral genetics, where the EEA has been tested most rigorously, the evidence suggests that any bias from violations of the EEA is not of first order importance (e.g., Bouchard (1998)). Researchers have studied twins reared

[18] One concern is that including opposite-sex twins in our analysis results in an upward bias of the relative importance of genetic factors, as captured by A, because identical twins always have the same sex. As a robustness check, we have re-estimated the models for same-sex twins only, and we find that our results are qualitatively and quantitatively very similar.

[19] The E component is also absorbing idiosyncratic measurement error. Because our data set comes from the Swedish Tax Agency, which obtains the data directly from financial institutions, reporting errors should be relatively rare.

apart for which there is no common parental environment, and these studies generally produce estimates similar to those using twins who were reared together (e.g., Bouchard et al. (1990)). Recent progress in genotyping has enabled researchers to construct DNA-based measures of pairwise genetic relatedness and to compare genetic similarity to similarity with respect to, foe example, height and IQ (Jian et al. (2010) and Davies et al. (2011)). These studies use unrelated subjects, not twins, and show that at least 50% of the variation in the studied outcomes is due to genetic variation, supporting existing evidence from twin studies.

B Risk Preferences and Investment Style

If value-oriented portfolios have outperformed growth-oriented portfolios historically because of differences in risk, we may expect investors with a preference for more (less) financial risk to prefer value (growth) stocks and mutual funds. In this section, we therefore examine whether several proxies which a priori are expected to correlate with risk preferences also explain individuals' investment styles. The results are reported in Table 6.

We start by examining whether gender is related to value versus growth orientation. Several previous studies in economics have found that men generally take more risk compared to women (see, e.g., Croson and Gneezy (2009) and Bertrand (2011) for extensive literature reviews). As a result, if value is riskier than growth investing, we would expect that men, on average, are more value orientated than women. Table 6 shows that we find the opposite result in data: Men have a stronger preference for growth investing compared to women. We find that men's stock portfolios have a P/E ratio that is on average 0.4 higher than women's, about 2% higher compared to the median P/E. Another way to quantify the size of this effect is to report that the median P/E ratio for a value fund based on the fund's name is 15.7, compared to 21.0 for growth funds, which means that an effect of 0.4 corresponds to about 8% of the difference between value and growth funds, which is an economically significant effect.

We also examine age because older investors are generally found to take less financial risk compared to younger investors (e.g., Barsky, Juster, Kimball, and Shapiro (1997) and Paulsen et al. (2012)). A risk preference explanation would predict that older investors are more growth oriented.

Again, Table 6 shows that we find the opposite result in data: Older investors have a significantly stronger preference for value investing. The average P/E ratio of the stock portfolio of a 65 year old investor is 4.4 (or about 19% compared to the median) lower compared to a 25 year old.[20]

We also examine a larger set of proxies potentially related to an individual's risk taking propensity, including education, marriage status, disposable income, net worth, and share in equities. Table 6 first includes these variables one by one, and then all at the same time. We find that those with a college education have more growth oriented portfolios compared to lower-education investors, with an average P/E ratio that is 2.3 (or about 11% compared to the median) higher. Investors who have higher disposable incomes and net worth have a stronger preference for growth. A one standard deviation increase in the log of disposable income corresponds to an average P/E that is about 1.4 higher. Finally, those with a higher equity share, a measure of financial risk taking propensity, prefer growth oriented portfolios. A 10 percentage points increase in the share in equities corresponds to an average P/E that is about 0.3 higher.

The overall conclusion from the above analysis is that investors who a priori are expected to take more financial risk have a preference for growth investing, not value investing. This result is consistently found in data for both more exogenous variables (e.g., gender and age) and also other individual characteristics (e.g., net worth) we examine.

C Life Course Theory and Investment Style

In this section, we examine to what extent differential life experiences and events of individuals explain cross-sectional differences in investment styles later in life. Based on pre-existing research in social psychology we consider several types of potentially relevant, and exogenous, life experiences of individuals: 1) Macroeconomic experiences, 2) Impressionable years, and 3) Rearing environment.

[20]Because some studies have found that the very oldest individuals in their samples do take more financial risk (e.g., Barsky et al. (1997)), we have checked that our conclusion is robust to excluding those over 70 years. Our results are indeed somewhat stronger when we drop the very oldest investors in our data.

C.1 Macroeconomic Experiences

First, we analyze whether there is a persistent effect on an individual's investment style of growing up during the Great Depression. More specifically, we examine the effect on value versus growth orientation of being born between 1920 and 1929, using the same "Depression Baby" definition as Schoar and Zuo (2013).[21] If an adverse macroeconomic experience results in less risk taking later in life, and if value is riskier than growth investing, we may expect investors who grew up during the Great Depression to prefer growth investing. An alternative hypothesis, not based on a risk explanation, is that those who have more salient experiences of difficult economic conditions develop a value-oriented investment style, with a preference for stocks that seem relatively "cheaper." The results in Table 7 are consistent with the latter hypothesis: Individuals who grew up during the Great Depression show significantly more value-orientation in their stock portfolios several decades later in life. More specifically, we find that those who grew up during the Great Depression have portfolios with average P/E ratios that are 2.2 (or about 10% at the median) lower compared to those of other investors. It is important to emphasize that we control for disposable income and net worth, which may also be affected by a Great Depression experience, so our results are not simply reflecting long-term wealth differences. As a robustness check, we also analyze only old investors, defined as those born before 1940, i.e., we include Depression Babies with only somewhat older and somewhat younger individuals. Table 7 shows that the results do not change significantly (the estimated coefficient drops from -2.2 to -1.8 but is still statistically significant).

Second, as an alternative measure of macroeconomic experiences, we also analyze an individual's GDP growth experiences during his or her life so far. More specifically, we measure the average GDP growth from an individual's birth year until year 2000, i.e., the start of our data set. Experiencing poor GDP growth may reduce an individual's propensity to take risk later in life. A risk explanation for investment style may then suggest that individuals with more negative GDP growth experiences become growth investors. In contrast, we find that experiencing stronger GDP growth results in a growth oriented investment style. We find that for a 100 basis points per year higher average GDP growth experience during the life, the average P/E ratio of the stock portfolio of the investor is 1.2

[21] Sweden was affected by the Wall Street Crash of 1929, and was also the origin of the Kreuger Crash of 1932, with adverse international macroeconomic consequences deepening the Depression in several countries, including the U.S.

(or about 6% at the median) higher compared to those of other investors, controlling for individual characteristics. While economically significant, we recognize that the effect is statistically weaker (t-statistic = 1.81) compared to the Great Depression, the most severe macro event someone in our sample experienced.

Finally, we examine whether "Individual HML Experience," based on the returns of HML factor portfolios, explains subsequent investment styles (e.g., Malmendier and Nagel (2011)). That is, do those who have experienced higher HML returns develop into more value oriented investors? We construct our measures in a similar way to our "Individual GDP Growth Experience" measure, for the U.S. stock market (see Fama and French (1993)) as well as for the Swedish stock market (using data provided by Kenneth French).[22] We do not find a robust and statistically significant relation between "Individual HML Experience" and value versus growth orientation.

Our results are supportive of life course theory partially explaining an investor's value or growth orientation. An individual's GDP growth experiences, particularly adverse and significant macroeconomic experiences (e.g., the Great Depression) affect an individual's investment style later in life. The evidence is consistent with those who have more salient experiences of difficult economic conditions developing a value-oriented investment style, with a preference for stocks that seem relatively "cheaper."

C.2 Impressionable Years

We also analyze impressionable years during an individual's life. More specifically, we consider whether an individual started his or her first employment in an economic downturn. There exists no similar classification of recessions to the NBER's business cycle database for Sweden, so we have analyzed a broad set of alternative measures of economic downturns. First, we define a recession as a period with a year with negative GDP growth +/− 1 years.[23] Table 8 shows that individuals who entered the job market during a recession have portfolios with an average P/E ratio that are 0.3

[22] We compute HML returns from the year an individual entered the job market for the first time. This increases the sample size for the HML factor portfolio for Sweden for which we only have data starting in 1975. Our results are also robust to using data for the HML factor portfolio for Europe (see Fama and French (2012)) for which we only have data starting in 1990.

[23] Our results are stronger if we only include the years of negative GDP growth. A concern, though, is that such a measure is more susceptible to criticism of exogeneity compared to a measure that also includes +/– 1 years.

lower, but the effect is not statistically significant.

Second, we also report results for the most severe economic downturns someone in our sample experienced, corresponding to World War I, the Great Depression, and World War II. We find that those who entered the job market in a significant economic downturn have portfolios with average P/E ratios that are 2.2 (or about 10% at the median) lower compared to those of other investors, controlling for individual characteristics. Our result that the preference for value investing among those with their first employment in an economic downturn is robust to controlling for disposable income and net worth implies that there is a direct effect of economic downturns on investment style later in life, in addition to any indirect effect from lower income of those who entered the job market in economic downturns (e.g., Oreopoulos et al. (2012)). We find an even stronger effect (P/E ratios that are 3.8 lower) if we examine whether an individual experienced a severe economic downturn when 18-25 years old, rather than examining the macroeconomic conditions during the years of an individual's first employment (e.g., Giuliano and Spilimbergo (2013)).

While all specifications continue to control for income as well as net-worth, we also show the impressionable year effects remain significant when we include cohort (by decade of birth) fixed effects. Our results are therefore supportive of the impressionable years hypothesis. The economic conditions at the time of an individual's first job market entry and when an individual is 18-25 years old partially explain an individual's investment style later in life; the more severe the economic downturn, the more value oriented the individual is later on in life.

C.3 Rearing Environment

We also examine whether the rearing environment has significant long-term effects on an individual's investment style later in life. First, we examine the socioeconomic status (SES) of an individual's parents. We are not able to measure parents' SES exactly when an individual grew up, so we use parents' net worth at the start of our data set as a proxy. The results are reported in Table 9. We find that individuals who grew up in a lower SES environment, i.e., relatively poor, show significantly more value-orientation in their stock portfolios later in their lives. Investors at the bottom of the parental wealth distribution (10th percentile) have portfolios with average P/E ratios that are 1.0 (or about 5% at the median) lower compared to investors at the top of the distribution (90th percentile). We show that this effect is robust within each generation by controlling for birth cohort (decade) fixed effects, so this result is not specific to, e.g., the Great Depression cohort.

Second, we examine if parents' life experiences transfer to their children and affect the investment style also of the next generation. We find evidence consistent with an inter-generational transfer of life experiences. Investors whose parents were born between 1920 and 1929, i.e., grew up during the Great Depression, show significantly more value orientation. Comparing the Great Depression effect on an individual's own investment style (-2.2 in Table 7) to the one of the next generation (-1.2 in Table 9) we conclude that about 50% of the effect is transmitted to the next generation.

The overall conclusion from the above analysis is that individuals' investment styles are affected also by the rearing environment in which they grew up, in particular their parents' socioeconomic status and their parents' life experiences.

V Discussion

In this section, we discuss some of the potential implications of our results.

<u>Asset prices and the value premium.</u> First, we find that investors who a priori are expected to take more financial risk have a preference for growth, not value, investing. If the value premium is the result of risk (e.g., Fama and French (1993) and Petkova and Zhang (2005)), it is surprising that risk-taking investors prefer growth stocks and mutual funds.[24] Some of our results seem more consist with a behavioral biases explanation than a risk explanation. For example, some have argued that the value premium is a result of investor overconfidence (e.g., Daniel, Hirshleifer, and Subrahmanyam (1998) and Daniel, Titman, and Wei (2001)), and some of the investors who have a preference for growth stocks, e.g., men and younger investors have been found to be more overconfident (e.g., Barber and Odean (2001)). Second, our results imply that the overall composition of a market may affect the demand for value versus growth stocks, and in the end potentially equilibrium asset

[24]Some may argue that individual investors use growth investing as a "hedging" approach. We believe that hedging arguments are problematic. First, growth investing seems to be a costly and imprecise approach to offset human capital risk. Second, we are not aware of any empirical evidence suggesting that individuals estimate their human capital risk exposure and then hedge such risks in the stock market. In practice, individuals often do the opposite of hedging (e.g., Benartzi (2001)).

prices. For example, our result that gender and age are significantly related to value versus growth orientation implies that the gender and age distributions in a market may partially explain the value premium. Similarly, the life experiences of the participants in a particular market may affect the demand for value versus growth stocks, resulting in "legacy effects" of macro events that occurred a long time ago also for the value premium, similar to the implications of Friedman and Schwartz (1963) and Cogley and Sargent (2008) for the equity premium.

Suboptimal investor portfolios. One possible explanation of our findings is that individual investors do not perceive value as riskier than growth portfolios. Many mutual fund companies indeed instill this view into investors. To provide only one example, Fidelity explains the difference between value and growth funds to investors as follows on their website: "While *growth funds* are expected to offer the potential for *higher returns*, they also generally represent a *greater risk* when compared to value funds (emphasis added)."[25] If value is riskier than growth, though, for example because asset prices are set by institutions as the marginal investors who affect prices, individuals' mis-calibration imply that value (growth) investors may end up with significantly more (less) risk than they would have done if they were appropriately calibrated (because they believe value if less risky). As a result, many individual investors may end up with suboptimal portfolios.

Mechanisms. While we find that an individual's investment style is explained by both biological predispositions as well as experiences and events during the course of life, the paper does not uncover the specific mechanisms that explain these effects. The use of gene-candidate studies or genome-wide association studies (GWAS) to identify the specific set of gene(s) that explain value versus growth orientation may be a productive next step for researchers. Several specific genes related to financial risk-taking and long-short risk have recently been identified (e.g., Kuhnen and Chiao (2009) and Zhong et al. (2009)). Examining whether the very same risk-taking genes also explain value versus growth orientation among investors may provide additional evidence on whether the value premium is related to risk or not. Also, as the number of studies related to finance that support life course theory continues to increase (e.g., Oyer (2008), Malmendier and Nagel (2011), and Schoar and Zuo (2013)), another next step for researchers is to uncover the specific mechanisms than explain

[25] https://www.fidelity.com/learning-center/mutual-funds/growth-vs-value-investing.

why macroeconomic and other events are related to financial behavior decades later in life. Recent research on neurological development shows that, in the developing brain, the volume of gray matter in the cortex gradually increases until about the age of adolescence, but then sharply decreases as the brain prunes away neuronal connections that are deemed superfluous to the adult needs of the individual (e.g., Spear (2000)). Such evidence may provide a mechanism for early life experiences explaining an individual's investment behavior later in life, but more research is certainly required.

VI Conclusion

We report that several factors explain an investor's style, i.e., the value versus growth orientation of the investor's stock portfolio. First, an investor's style has a biological basis – a preference for value versus growth stocks is partially ingrained in an investor already from birth. We estimate that genetic differences across individuals explain 18% of the cross-sectional variation in value versus growth orientation, if using P/E ratios as an investment style measure, and 25% if using Morningstar's Value-Growth Score. This evidence contributes to a growing number of studies which show that individual characteristics of importance for portfolio choice are partly explained by an individual's biological predispositions and genetic composition (e.g., Cesarini et al. (2009), Kuhnen and Chiao (2009), and Barnea, Cronqvist, and Siegel (2010)).

Second, investors who a priori are expected to take more financial risk have a preference for growth, not value, investing. This result is consistently found in data for exogenous proxies for risk taking propensity (e.g., gender and age) and also other individual characteristics (e.g., wealth). If value is riskier than growth, it may be surprising that those who are expected to take more (less) financial risk prefer growth (value) stock portfolios. This evidence suggests that either value is not riskier than growth, or that the average individual investor in mis-calibrated about the risk of value versus growth investing. In this sense, our research contributes a new perspective to the long-standing value/growth debate in finance (e.g., Fama and French (1992, 1993) Lakonishok, Shleifer, and Vishny (1994)). More specifically, we provide a new perspective on the source of the value premium by showing that individual investors' portfolio choices do not seem to be consistent with a risk explanation.

Finally, an investor's style is explained by life course theory in that experiences, both earlier and later in life, are related to investment style. In particular, investors with adverse macroeconomic experiences have stronger preferences for value investing later in life. For example, those who grew up during the Great Depression have portfolios with average P/E ratios that are 2.2 (or about 10% at the median) lower, controlling for individual characteristics, several decades later in life. Consistent with an impressionable years hypothesis, those who enter the job market for the first time during an economic downturn are also more value oriented later on. We also find that those who grew up in a lower status socioeconomic rearing environment have a stronger value orientation later in life. This evidence contributes to several recent studies which show the importance of life experiences and events for economic behaviors later in life (e.g., Oyer (2006), Kaustia and Knüpfer (2008), Malmendier and Nagel (2011), and Giuliano and Spilimbergo (2013)).

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Appendix

In this appendix, we describe the empirical methodology employed to decompose the cross-sectional variation in individual investors' investment styles into genetic and environmental components. Specifically, we model the value/growth orientation, vg_{ij}, for twin pair i and twin j (1 or 2) as a function of observable socioeconomic individual characteristics $\mathbf{X}_{ij}$ and three unobservable random effects, an additive genetic effect, a_{ij}, an effect of the environment common to both twins (e.g., upbringing), c_i, and an individual-specific effect, e_{ij}, which also absorbs idiosyncratic measurement error:

$$vg_{ij} = \beta_0 + \beta_1 \mathbf{X}_{ij} + a_{ij} + c_i + e_{ij}. \tag{1}$$

In quantitative behavioral genetics research, this model is referred to as an "ACE model," where "A" stands for additive genetic effects, "C" for common environment, and "E" for individual-specific environment.[26] The additive genetic component a_{ij} in Equation (1) represents the sum of the genotypic values of all "genes" that influence an individual's behavior. Each individual has two, potentially different, versions (alleles) of each gene (one is from each parent), and each version is assumed to have a specific, additive effect on the individual's behavior. The genotypic value of a gene is the sum of the effects of both alleles present in a given individual. Consider, for example, two different alleles $A1$ and $A2$ for a given given gene and assume that the effect of the $A1$ allele on investment style is of magnitude α_1, while the effect of the $A2$ allele is α_2. An individual with genotype $A1A1$ would experience the genetic effect $2\alpha_1$, while genotype $A1A2$ would have a genetic effect of $\alpha_1 + \alpha_2$.[27] We also assume that a_{ij}, c_i, and e_{ij} are uncorrelated with one another and across twin pairs and normally distributed with zero means and variances σ_a^2, σ_c^2, and σ_e^2, so that the total residual variance σ^2 is the sum of the three variance components ($\sigma^2 = \sigma_a^2 + \sigma_c^2 + \sigma_e^2$).

Identification of variation due to a_{ij}, c_i, and e_{ij} is possible due to constraints on the covariance matrices for these effects. These constraints are the result of the genetic similarity of twins and assumptions about upbringing and other aspects of the common environment. Consider two twin pairs $i = 1, 2$ with twins $j = 1, 2$ in each pair, where the first is a pair of identical twins and the second is a pair of fraternal twins. The additive genetic effects are: $a = (a_{11}, a_{12}, a_{21}, a_{22})'$. Identical and fraternal twin pairs differ in their genetic similarity, i.e., the off-diagonal elements related to identical twins in the matrix in (2) are 1 as the proportion of shared additive genetic variation is 100% between identical twins. In contrast, for fraternal twins the proportion of the shared additive genetic variation is on average only 50%, i.e., the off-diagonal elements related to fraternal twins in the matrix in (2) are 1/2.[28] As a result, for these two twin pairs, the covariance matrix with respect

[26] See, e.g., Falconer and Mackay (1996) for a more detailed discussion of quantitative behavioral genetics research.

[27] The extent to which the effect of two different alleles deviates from the sum of their individual effects is called "dominance deviation."

[28] For an intuitive explanation of the proportion of the shared additive genetic variation for fraternal twins as well as non-twin siblings, consider a single gene, of which one parent has allele A1 and A2, while the other parent has allele A3 and A4. Any of their off-spring will have one of the following combinations as they get one allele from each parent: A1A3, A1A4, A2A3, or A2A4. Suppose one fraternal twin is of A1A3 type. The overlap with the fraternal twin sibling will be: 1 if the sibling is of A1A3 type, 1/2 if type A1A4, 1/2 if type A2A3, and 0 if the type is A2A4. This implies an average overlap of 1/2. For a formal derivation, see, e.g., Falconer and Mackay (1996).

to a_{ij} is:

$$\mathrm{Cov}(a) = \sigma_a^2 \begin{bmatrix} 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1/2 \\ 0 & 0 & 1/2 & 1 \end{bmatrix}. \tag{2}$$

The common environmental effects are: $c = (c_{11}, c_{12}, c_{21}, c_{22})'$. The model assumes that identical and fraternal twins experience the same degree of similarity in their common environments (the "Equal Environments Assumption"). That is, the off-diagonal elements related to either identical or fraternal twins in the matrix in (3) are 1. Assuming that identical and fraternal twins experience the same degree of similarity in their common environment, any excess similarity between identical twins is due to the greater proportion of genes shared by identical twins than by fraternal twins. As a result, for the two twin pairs, the covariance matrix with respect to c_i is:

$$\mathrm{Cov}(c) = \sigma_c^2 \begin{bmatrix} 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix}. \tag{3}$$

The individual-specific environmental effects are: $e = (e_{11}, e_{12}, e_{21}, e_{22})'$. These error terms represent for example life experiences, but also idiosyncratic measurement error. That is, the off-diagonal elements related to either identical or fraternal twins in the matrix in (4) are 0. As a result, for the two twin pairs, the covariance matrix with respect to e_{ij} is:

$$\mathrm{Cov}(e) = \sigma_e^2 \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}. \tag{4}$$

We use maximum likelihood to estimate the model in equation (1). Finally, we calculate the variance components A, C, and E. A is the proportion of the total residual variance that is related to an additive genetic factor:

$$A = \frac{\sigma_a^2}{\sigma^2} = \frac{\sigma_a^2}{\sigma_a^2 + \sigma_c^2 + \sigma_e^2} \tag{5}$$

The proportions attributable to the common environment (C) and individual-specific environmental effects (E) are computed analogously. Standard errors reported in the tables are bootstrapped with 1,000 repetitions.

Table 1
Summary Statistics: Individual Characteristics

Panel A: Number of Twins by Zygosity and Gender

	All Twins	**Identical Twins**			**Fraternal Twins**			
		Male	Female	Total	Male	Female	Sex	Total
Number of twins (*N*)	34,976	4,496	5,994	10,490	5,064	6,300	13,122	24,486
Percentage	100%	13%	17%	30%	14%	18%	38%	70%

Panel B: Individual Characteristics

	All Twins	**Identical Twins**			**Fraternal Twins**		
	N	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Age	34,976	47.08	48.00	17.64	53.06	55.00	15.51
High School	34,976	22%	0%	41%	26%	0%	44%
College or More	34,976	58%	100%	49%	47%	0%	50%
No Education Data Available	34,976	6%	0%	23%	6%	0%	24%
Married	34,976	46%	0%	50%	54%	100%	50%
Net Worth (USD)	34,976	87,554	39,661	210,778	103,892	51,634	480,174
Disposable Income (USD)	34,976	31,305	25,443	24,944	34,797	27,563	33,425

Table 1 reports summary statistics for the individuals (Panel A) in our data set and their characteristics (Panel B). The variables are defined in detail in Table 2.

Table 2
Variable Definitions

Category / Variable	Description
Individual Characteristics	
Male	An indicator variable that equals 1 if an individual is male, and 0 otherwise. Data from Statistics Sweden.
Age	Average age across the years an individual is in the data set. Data from Statistics Sweden.
College or More	An indicator variable that equals 1 if an individual has attended university, and 0 otherwise. Data from Statistics Sweden.
High School	An indicator variable that equals 1 if an individual has completed high school ("gymnasium"), and 0 otherwise. Data from Statistics Sweden.
No Education Data Available	An indicator variable that equals 1 if no educational data are available for an individual, and 0 otherwise. Data from Statistics Sweden.
Married	Average of an annual indicator variable that equals 1 if an individual is married, and 0 otherwise. Averaged across those years an individual is in the data set. Data from Statistics Sweden.
Disposable Income	Average individual disposable income, i.e., the sum of income from labor, business, and investment, plus received transfers, less taxes, and alimony payments. Averaged across those years an individual is in the data set. Expressed in nominal Swedish Krona (SEK). Data from Statistics Sweden.
Net Worth	Average difference between the end-of-year market value of an individual's assets and liabilities. Averaged across those years an individual is in the data set. Expressed in nominal Swedish Krona (SEK), unless stated otherwise. Data from Statistics Sweden.
Share in Equities	The market value of direct and indirect equity investments divided by the market value of all financial assets. Data from Statistics Sweden.
Investment Style	
P/E	The value-weighted price to earnings ratio for each year, averaged across those years an individual is in the data set. Data from CapitalIQ.
P/B	The value-weighted market value to book value of equity ratio for each year, averaged across those years an individual is in the data set. Data from CapitalIQ.
Morningstar's Value-Growth Score	Morningstar's score of value/growth from -100 (value) to +400 (growth). The variable is value-weighted for each year and averaged across those years an individual is in the data set.
Name-based Value/Growth Measure	A variable that equals -1 if a fund's name contains "value," equals +1 if a fund's name contains "growth" or "high tech," and zero otherwise. The variable is value-weighted for each year and averaged across those years an individual is in the data set.
Experience and Events	
Depression Baby	An indicator variable that equals 1 if a individual was born 1920-1929, and otherwise 0.
Individual GDP Growth Experience	The average of GDP growth in Sweden from an individual's birth to year 2000.
Individual US (Sweden) HML Experience	The average of Fama-French's US (Sweden) HML return from the year an individual entered the job market for the first time (if after 1927 (1975)) to year 2000.
First Job in Recession	A "Recession Year" is a year with negative GDP growth. The variable is an indicator variable that equals 1 if an individual entered the job market for the first time during a recession year +/- 1 year, and 0 otherwise.
First Job in Severe Recession	The variable is an indicator variable that equals 1 if an individual entered the job market for the first time during World War I, the Great Depression, or World War II, and 0 otherwise.
Parents' Net Worth	An individual's parents' net worth.
Depression Baby Parents	An indicator variable that equals 1 if both parents of an individual were born 1920-1929, and 0 otherwise.

Table 3
Summary Statistics: Investment Style Measures

Panel A: Summary Statistics

		Identical Twins			Fraternal Twins		
	N	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Stocks							
P/E	17,952	24.2	22.8	14.6	23.0	21.3	13.1
P/B	18,337	3.3	2.8	2.4	3.2	2.5	2.3
Mutual Funds							
Morningstar's Value-Growth Score	25,729	156.4	149.2	21.4	155.2	148.6	21.0
Name-Based Value/Growth Measure	27,397	0.09	0.00	0.21	0.08	0.00	0.20

Panel B: Correlations

(*N* = 13,075)	P/E	P/B	Morning-star
P/B	0.45***		
Morningstar's Value-Growth Score	0.07***	0.07***	
Name-Based Value/Growth Measure	0.04***	0.30***	0.53***

Table 3 reports summary statistics for the measures of investment style. Panel A shows the summary statistics and Panel B shows the correlations. The variables are defined in detail in Table 2.

Table 4
Evidence from Variance Decomposition of Investment Style: Stocks

	P/E	**P/B**
A Share	0.181**	0.241**
	0.076	0.118
C Share	0.101*	0.080
	0.056	0.096
E Share	0.718***	0.679***
	0.030	0.046
N	10,618	10,640

Table 4 reports results from maximum likelihood estimation. The different investment style measures are modeled as linear functions of observable individual characteristics (gender, age, education, marriage status, disposable income, and net worth) and unobservable random effects representing additive genetic effects (A), shared environmental effects (C), as well as an individual-specific error (E). For each estimated model, we report the variance fraction of the residual explained by each unobserved effect (*A* Share – for the additive genetic effect, *C* Share – for common environmental effect, *E* Share – for the individual-specific environmental effect) as well as the bootstrapped standard errors (1,000 resamples). The variables are defined in detail in Table 2.

Table 5
Evidence from Variance Decomposition of Investment Style: Mutual Funds

	Morningstar's Value-Growth Score	Name-Based Value/Growth Measure
A Share	0.249***	0.159**
	0.026	0.065
C Share	0.000	0.036
	0.009	0.040
E Share	0.751***	0.805***
	0.022	0.031
N	17,534	17,650

Table 5 reports results from maximum likelihood estimation. The different investment style measures are modeled as linear functions of observable individual characteristics (gender, age, education, marriage status, disposable income, and net worth) and unobservable random effects representing additive genetic effects (A), shared environmental effects (C), as well as an individual-specific error (E). For each estimated model, we report the variance fraction of the residual explained by each unobserved effect (*A* Share – for the additive genetic effect, *C* Share – for common environmental effect, *E* Share – for the individual-specific environmental effect) as well as the bootstrapped standard errors (1,000 resamples). The variables are defined in detail in Table 2.

Table 6
Cross-Sectional Evidence: Investment Style and Proxies for Risk Preferences

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Male	0.88***							0.41*
	0.21							0.22
Age		-0.07***						-0.11***
		0.01						0.01
College or More			3.56***					2.25***
			0.28					0.31
High School			1.11***					0.67**
			0.31					0.32
No Education Data Available			0.6					1.73***
			0.43					0.48
Married				0.16				0.66***
				0.22				0.23
Log (Disposable Income)					0.78***			2.03***
					0.16			0.20
Log (Net Worth)						0.04		0.14***
						0.03		0.04
Share in Equities							3.28***	2.96***
							0.3	0.29
Constant	22.85***	26.97***	21.26***	23.24***	23.28***	13.71***	21.44***	-1.08
	0.15	0.45	0.23	0.17	0.12	2.06	0.19	2.24
N	17,952	17,952	17,952	17,951	17,952	17,943	17,009	17,001
R-squared	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.03

Table 6 reports results from linear regressions of P/E ratio onto individual characteristics. For each estimated model, we report the coefficient estimates as well as the corresponding standard errors. Robust standard errors are adjusted based on correlation between twins in a twin pair. The variables are defined in detail in Table 2.

Table 7
Life Course Theory and Investment Style: Macroeconomic Experiences

	(1)	(2)	(3)	(4)	(5)
Depression Baby	-2.17***	-1.79***			
	0.53	0.57			
Individual GDP Growth Experience			1.23*		
			0.68		
Individual US HML Experience				0.00	
				0.04	
Individual Sweden HML Experience					0.04
					0.03
Constant	2.12	16.35**	-0.48	3.48	11.92
	2.17	6.75	2.61	2.31	5.13
Sample	All	Born before 1940	All	First Job after 1927	First Job after 1975
N	17,943	4,774	17,943	16,462	5,335
R-squared	0.02	0.05	0.02	0.02	0.01

Table 7 reports results from linear regressions of P/E ratio onto macroeconomic experience variables as well as observable individual characteristics (gender, age, education, marriage status, disposable income, and net worth). For each estimated model, we report selected coefficient estimates as well as the corresponding standard errors. Robust standard errors are adjusted based on correlation between twins in a twin pair. The variables are defined in detail in Table 2.

Table 8
Life Course Theory and Investment Style: Impressionable Years
(*N* = 16,462)

	(1)	(2)	(3)
First Job in Recession	-0.30		
	0.33		
First Job in Severe Recession		-2.18***	
		0.57	
18-25 Years Old in Severe Recession			-3.83***
			0.71
Constant	3.58	3.87*	3.86*
	2.32	2.32	2.31
N	16,462	16,462	16,462
R-squared	0.02	0.02	0.02

Table 8 reports results from linear regressions of P/E ratio onto impressionable years variables as well as observable individual characteristics (gender, age, education, marriage status, disposable income, and net worth). For each estimated model, we report selected coefficient estimates as well as the corresponding standard errors. Robust standard errors are adjusted based on correlation between twins in a twin pair. The variables are defined in detail in Table 2.

Table 9
Life Course Theory and Investment Style: Rearing Environment
(N = 8,101)

	(1)	(2)	(3)	(4)
Log (Parents' Net Worth)	0.26**	0.27**	0.30***	0.30***
	0.11	0.11	0.11	0.11
Depression Baby Parents			-1.33***	-1.20**
			0.47	0.50
Constant	5.12	4.94	4.74	4.69
	3.59	4.73	3.59	4.73
Birth Cohort (Decade) Fixed Effects	No	Yes	No	Yes
R-squared	0.02	0.02	0.02	0.02

Table 9 reports results from linear regressions of P/E ratio onto rearing environment variables observable individual characteristics (gender, age, education, marriage status, disposable income, and net worth). For each estimated model, we report selected coefficient estimates as well as the corresponding standard errors. Robust standard errors are adjusted based on correlation between twins in a twin pair. The variables are defined in detail in Table 2.

Figure 1 Panel A
Correlations by Genetic Similarity (Stocks)

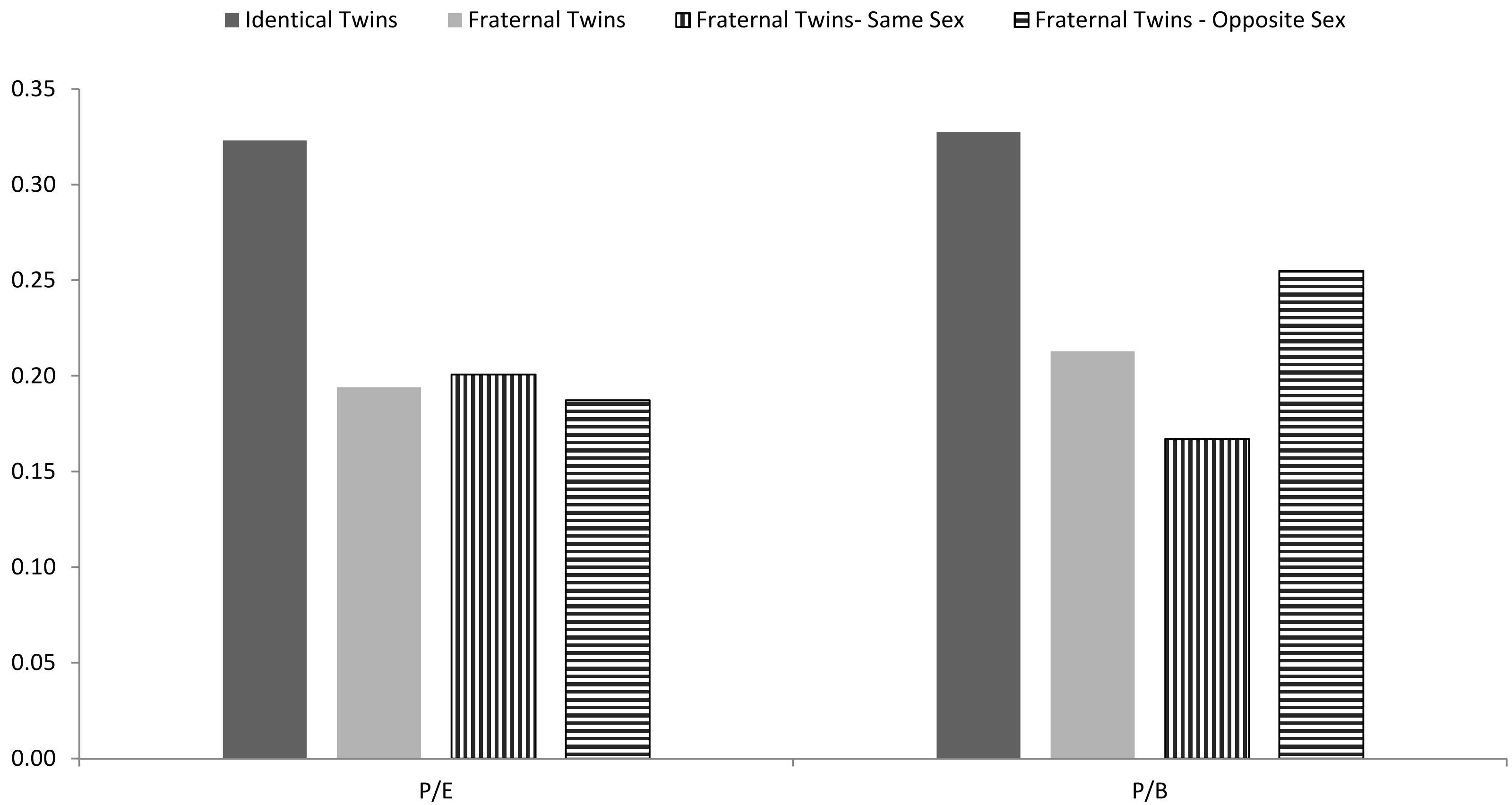

Figure 1 Panel A reports Pearson correlation coefficients for investment style for different types of twin pairs. The investment style measures are calculated using direct stock holdings only. All variables are defined in Appendix Table A1.

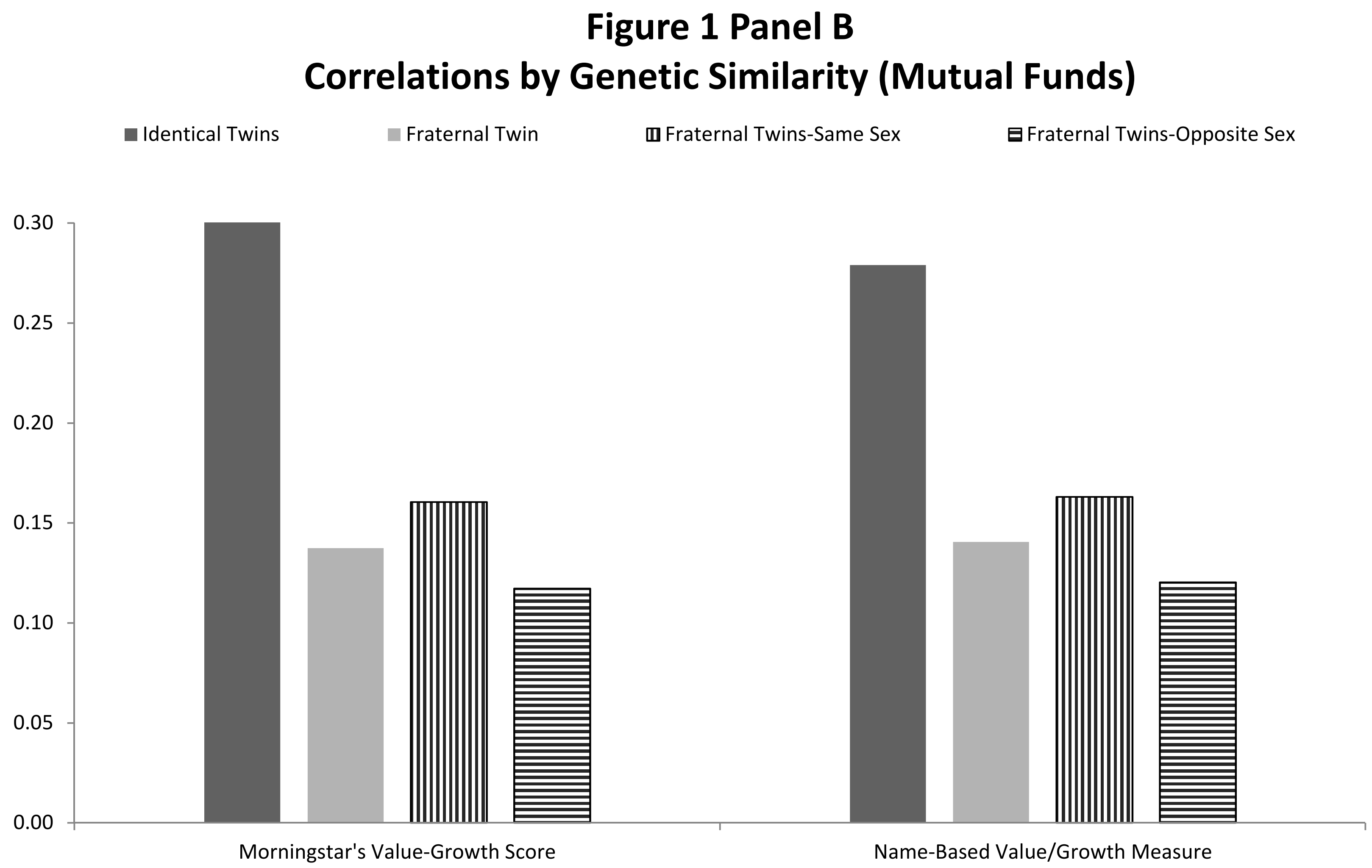

Figure 1 Panel B reports Pearson correlation coefficients for investment style for different types of twin pairs. The investment style measures are calculated using mutual fund holdings only. All variables are defined in Table 2.