Birth order and fund manager's trading behavior: Role of sibling rivalry*

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Abstract

This paper investigates the role of birth order on managerial behavior using rich data set on familial background of US mutual fund managers. We find that managers who are born later in the sibling hierarchy take on more investment risks relative to first-born managers. Birth order-induced risk taking originates from sibling rivalry for limited parental resources during childhood, shapes trading behavior, and extends beyond portfolio management. Later-born managers deviate more from their peers and their funds' benchmarks, trade more actively, take extreme style bets, and report more violations of business conduct compared to lower birth order managers.

JEL classifications: G11; G23

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1. Introduction

The question of why some fund managers succeed and others fail has received considerable attention in the finance literature. Prior studies suggest the importance of pre-employment experiences in identifying the determinants of managerial decision-making. That is, attending selective educational institutions (Chevalier and Ellison, 1999), living through the market downturns (Malmendier and Nagel, 2011), growing up in a wealthy family (Chuprinin and Sosyura, 2018), being relatively older in the kindergarten (Bai, Ma, Mullally, and Solomon, 2019), or living through early-life family disruption (Betzer, Limbach, Rau, and Schürmann, 2021), appear to affect strategic decisions and managerial behavior.[1] However, there exists little understanding of the potential impact of family domain experiences on fund managers, even though the family is often perceived as the most important and enduring of all social groupings (Smith and Hamon, 2009). Our study fills this void by investigating the role of birth order and familial background in explaining risk attitudes and investment behavior of mutual fund managers.

There exists an abundance of scholarly evidence on the relation between family structure and subsequent human capital formation, particularly on the role of birth order on the formation of personality attributes.[2] Adler (1927, 1928) is the first to suggest that personality differences are systematically related to birth order. Since then, research in psychology has focused on developing theory and empirically testing birth order effects on common personality traits and subsequent outcomes these traits influence (Sulloway, 1995; Paulhus, Trapnell, and Chen, 1999; Healey and Ellis, 2007; Black, Grönqvist and Öckert, 2018). Importantly, studies have suggested that birth order influences an individual's propensity to take risks across contexts,

[1]Other experiences include: starting the career during a recession (Schoar and Zuo, 2017); serving in the military (Benmelech and Frydman, 2015; Cochardt, Heller, and Orlov, 2021); being exposed to natural disasters (Bernile, Bhagwat, and Rau, 2016); and having prior professional experience (Dittmar and Duchin, 2016; Cici, Gehde-Trapp, Göricke and Kempf, 2018).

[2] See work by Plomin and Daniels (1987) and Plomin (2011).

such that later-born individuals have been associated with relatively risky adolescent behaviors (Argys, Rees, Avarett, and Witoonchart, 2006; Averett, Argys, and Rees, 2011), tendency to participate in risky sports (Sulloway and Zweigenhaft, 2010), making risky financial decisions (Roszkowski, 1999; Gilliam and Chatterjee, 2011), and engaging in self-employment (Black, Grönqvist and Öckert, 2018).

To elucidate the birth order-induced differences in personalities and outcomes, evolutionary theory has been proposed as the dominant explanation for birth order effects (Sulloway, 1995; 1996). This theory views family as a set of niches with limited parental resources to distribute across siblings, which causes siblings to compete for the most resource-rich niche. Growing up subject to such dynamics influences the development of siblings' personalities, particularly risk tolerance. Competing with firstborns who occupy the niche with more resources, later-born managers develop a more pronounced propensity to take risks in order to differentiate themselves from their older siblings and eventually become more risk tolerant than first-born children (Sulloway, 2001; Sulloway and Zweigenhaft, 2010; and Brown and Grable, 2015).

Through the construct of birth order, we investigate whether effects of competitive family dynamics on personality persist into the adult labor market. To do so, we construct a novel dataset of U.S. equity mutual funds that contains biographical information on fund managers and their direct family members, covering close to 80 percent of solo-managed mutual funds. The primary sources of a manager's family background information are obituaries published in a memory of deceased family members of the manager. Our paper is among the first to examine the effects of birth order on adult labor market outcomes and risk taking in a professional business setting.

The main results of the paper indicate that mutual funds run by managers who are born first in their families take on less investment risks relative to those managed by individuals of higher birth ranks. The later a manager is born in the sibling hierarchy, the higher is the propensity to

take risks. This holds for total fund risk, idiosyncratic risk, and active risk. We find that on average each one-unit increase in birth order, all else equal, translates to a 0.37, 0.15, and 0.65 percentage points per annum increase in total risk, idiosyncratic risk, and active risk, respectively. These results are economically significant, e.g., we find that managers who are born fifth or later in their families on average have fund total volatility, idiosyncratic risk, and active risk that are all around 30 percent greater than those of first-born managers.

By carefully compiling detailed data set on managers' biographical information and family background, we overcome main challenges of empirical estimation of birth order effects, outlined in the prior literature (Blake, 1989). Specifically, we show that economically sizeable effect of manager's birth order on risk taking persists even after controlling for family's size and socioeconomic status, cohort effects of the parents, and a set of firm- and manager-specific attributes. We also find that birth order effects on managerial risk tolerance are not attenuated when we introduce controls for manager's marital status, educational attainment, bereavement experience, growing up in depression era, and relative age. Moreover, results of a placebo experiment with a subsample of index funds show no birth order effects, further confirming our main findings.

Our empirical findings are consistent with the broad implications of evolutionary theory in psychology, which emphasizes the role of limited parental resources, specifically wealth and attention, in contributing to the sibling rivalry and influencing the development of risk attitudes. We find that descendants of families in which resource constraints were particularly present, reveal significant birth order-induced differences in risk taking, while managers who grew up in a less constrained environment do not display heterogeneities in risk-taking behavior between first-born and later-born managers. Providing further support for the proposed sibling rivalry mechanism, we find that age gap moderates birth order effect, such that in the presence of competition for limited parental resources due to high density of birth spacing, birth order-

related risk tendencies become more engrained, and thus the relation between birth order and risk taking is more pronounced.

We show that the long-lived effects of birth order on risk-taking shape managerial trading behavior in multiple ways. First, we find that later-born managers trade in a manner that is consistent with greater risk tolerance by choosing extreme investment style positions and inclining toward large factor bets that generate higher volatility with respect to the index. This result holds for common style dimensions, including market, size, value, and momentum. Further, later-born managers turn over their stock portfolio more often, are associated with more active stock selection (Cremers and Petajisto, 2009), and choose more distinctive trading strategies (Sun, Wang, and Zheng, 2012) compared to first-born managers. Lastly, we find that later-born managers exhibit higher propensity for non-pecuniary risk taking such that they tend to more frequently fail to meet expected standards of managerial conduct and have relatively more reported civil or regulatory violations compared to first-born managers. These findings are consistent with the predictions from evolutionary psychology theory about later-born individuals being more rebellious, daring, and untraditional (Sulloway, 1995).

Finally, the observed birth order-induced heterogeneities in incremental risk-taking do not translate into a higher risk-adjusted performance. On the contrary, our results suggest that risk-adjusted performance, as measured by Sharpe ratio, information ratio, and four-factor alphas, decreases in manager birth order. Being born by one birth order rank younger reduces average annualized Sharpe ratio, information ratio, and net four-factor alpha by 0.06, 0.06, and 0.05 percentage points per annum, respectively. Interestingly, this finding suggesting sibling rivalry for limited parental resources contributing to greater risk-taking by and worse performance of later-born is consistent with prior research documenting worse performance for funds that increase their portfolio risk to compete with other funds in tournaments (Huang, Sialm, and Zhang, 2011).

Our study contributes to the literature on the determinants of mutual fund performance and risk. We add to the studies that emphasize the role of various pre-employment experiences, including being raised in a wealthy family (Chuprinin and Sosyura, 2018) or incomplete family (Betzer, Limbach, Rau, and Schürmann, 2021), being relatively older in the kindergarten (Bai, Ma, Mullally, and Solomon, 2019), attending selective educational institutions (Chevalier and Ellison, 1999; Li, Zhang, and Zhao, 2011), and getting married or divorced (Lu, Ray, and Teo, 2016). In contrast to these studies, through the construct of birth order, we capture some of the most personal and earliest possible types of experiences, namely family domain experiences. Moreover, the birth order is outside the control of the fund managers, allaying any concerns about reverse causality.[3]

Further, our paper enriches the literature on investor behavior. We complement studies on the origins of differences in investment behavior, i.e., Barnea, Cronqvist, and Siegel (2010) and Cronqvist, Siegel, and Yu (2015), by showing that environmental factors explain later-life investment choices of professional fund managers. Our results also support the evidence that risk-taking tendencies established in childhood continue into the managerial career (Campbell, Jeong, and Graffin, 2019).

More broadly, our paper contributes to the literature that emphasizes the role of personality-forming effects of family environment on later life economic outcomes (e.g., Blake, 1986; Hanushek, 1992, among others). These studies mainly investigate outcomes such as educational attainment and wages. In contrast, our paper focuses on individuals' adult labor market performance and actions. Given that the financial industry requires professional qualifications and has steep barriers to entry, our findings suggest that the birth order effect on economic outcomes is unlikely to be explained by the priming literacy (Conley and Glauber,

[3] Arguably, the birth order is in control of parents in single-child families. Therefore, we exclude them from our main analysis. Later in Section 3.4, we show that our findings are not sensitive to including such families.

2006) and cognitive abilities (Bjerkedal, Kristensen, Skjeret, and Brevik, 2007) as repercussions of being a later-born child. To the best of our knowledge, our paper is the first to investigate the effects of birth order in a large sample of real-world data from a professional business setting.

2. Data and sample design

We obtain data on fund managers' families and mutual funds from multiple sources. This section provides the description of these data sources and discusses the processes of identifying managers' family background. In addition, an Appendix accompanies the paper, providing supplementary details on data collection and construction of main variables used in the empirical analysis.

2.1. Data on mutual funds

We rely on the CRSP Survivor-Bias-Free U.S. Mutual Fund Database (henceforth CRSP MF) and Morningstar Direct Mutual Fund Database (henceforth MS Direct) to obtain data on core fund and manager characteristics. To do so, we aggregate share class characteristics from the CRSP MF at the fund level by weighting different fund share classes by their total net assets. Our sample is restricted to solo-managed domestic equity-only U.S. mutual funds that have been actively managed by a single manager for at least twelve consecutive months (one full year).[4] We exclude index funds from the main sample and only use them in a placebo test. Additionally, to guard against the possibility of our results being affected by the incubation bias (Evans, 2010), we exclude funds with total net assets lower than $1 million. Moreover, we

[4] Funds reportedly managed by anonymous managers are excluded. Following Agarwal, Ma, and Mullally (2018), we also remove cases where an individual simultaneously manages more than four funds as such cases are likely to have a senior person's name for administrative purposes, e.g., Bill Gross in the case of PIMCO funds.

restrict our sample to funds with complete monthly return observations in a given year.[5] In total, our initial sample consists of 2,223 funds managed by 2,015 unique managers and the sample period spans from 1962 to 2017.

The main dependent variables in our study are the total risk, the idiosyncratic risk, and the active risk. Total risk is the time-series standard deviation of monthly mutual fund return observations in a given year. Idiosyncratic risk is the standard deviation of the monthly residuals from the four-factor model estimated for each year by regressing fund's monthly net-of-fee returns on the market, size, book-to-market factors of Fama and French (1993), and the momentum factor of Carhart (1997). Active risk is the standard deviation of monthly mutual fund returns in excess of the fund-specific benchmark.[6] For robustness, we also estimate risk variables using rolling window of 24 months (minimum 20 observations) and 36 months (minimum 30 observations), and find qualitatively similar results. The vector of fund and manager control variables includes lagged fund size, lagged fund age, lagged expense ratio, lagged fund turnover, lagged fund family size, lagged fund flows, manager age, manager gender, manager industry tenure, and manager fund tenure. Table A1 of the Appendix provides descriptions for each of these variables and details on other fund and manager characteristics used in the study.

To construct variables of managerial activeness, we obtain data on fund holdings. To do so, we match the CRSP MF with Thomson Reuters Mutual Fund Holdings Database (henceforth MF Holdings) using the MFLINKS tables. If the match is not established via MFLINKS, we manually merge funds using fund names. Finally, we only consider holdings of common stocks and obtain information on stocks from CRSP and Compustat databases.

[5] Additionally, we considered other sample alterations by excluding funds with total net assets below $5 million and performing analyses with all-inclusive sample. The main results of the paper remain unchanged.

[6] We follow Petajisto (2013) and use the official benchmark index of each fund as stated in its prospectus. These benchmarks are 5 indices from S&P, 12 indices from Russell, and 2 indices from Dow Jones / Wilshire.

2.2. Identifying manager's family profile

Our primary sources of information on mutual fund manager's family background are obituaries published in memory of deceased members of a manager's family. A typical obituary is an article offering a detailed biography of the person who died, including his or her life accomplishments, list of survivors, and those who preceded in death. To be able to locate obituaries of manager's family members, we first establish manager's biographical profile by performing a cross-database search in the following order.

First, we obtain data on manager's name, education, and fund management dates by cross matching data from MS Direct, Bloomberg, and FINRA. Second, based on this biographical information, we locate managers in a variety of data sources to obtain additional information, including their date of birth, work experience, and potential relatives. These data sources are LexisNexis, Marquis Who's Who Biographies, Morningstar descriptions, LinkedIn, Intelius database, Ancestry.com, SEC filings, articles in U.S. newspapers, and fund company websites. For high accuracy, in the event we get any conflicting information from these sources, we drop the observation from the sample. Finally, with a manager's biographical information at hand, we search for published obituaries of a manager's deceased family members across over 10,000 U.S. newspapers from Newspapers.com and LexisNexis databases, online obituary resources (such as Legacy.com, Findagrave.com), and newsletters put out by local community organizations (such as churches, synagogues, employers, and local social groups).

To be included in our sample, we require an identified obituary to provide information on a manager's direct family structure, including parents' and siblings' names. Next, we perform an additional cross-database search with information on the manager's siblings to complete the family profile. We restrict our sample to families in which we observe dates of birth for all

direct family members.[7] With this information available, we construct an indicator for a manager's *birth order*, which is a manager's rank by age among siblings and *family size* which is defined as the number of children born to the manager's parents. Additionally, using US census data and obituary-reported information, we construct indicators for father's age at manager's birth, mother's age at manager's birth, parental educational attainment, military involvement, job, and variables for family income, which we subsequently use as demographic controls.

In total, we identify personal managerial characteristics for 1,905 managers (94.54% of all managers) that run 2,122 funds (95.46% of all funds), out of which we obtain detailed family background profiles of 1,403 managers who solo-managed 1,767 funds for at least one full year. Our final sample with family background profiles covers 69.62% of solo fund managers and 79.49% of funds.[8]

Panel A of Table 1 provides summary statistics for our sample of mutual fund managers and sample distributions of birth order and family size. First-born managers account for 40 percent of our sample, 34 percent are second-born, 15 percent are third-born, and 10 percent are fourth or later born. About 12 percent of fund managers in our sample grew up as a single child, 31 percent have one sibling, 27 percent have two, 16 percent have three, and 14 percent have four or more. The distribution of family sizes is very similar to that of the United States population in recent decade.[9] The distribution characteristics are also similar to those reported in studies

[7] We also include stepsiblings to family profiles if they lived in one household with the manager for at least nine out of first 18 years of a manager's life. Otherwise, stepsiblings are excluded. In unreported results, we find that results on birth order remain unchanged if we restrict our sample to family profiles without stepsiblings.

[8] Out of the remaining 612 managers without family background details in our sample, 298 managers (48.69%) have conflicting demographic profiles primarily due to very common names and demographics; 47 managers (7.68%) are females who have changed their last name (sometimes multiple times), thus we were unable to unequivocally identify their family profiles; 21 managers (3.43%) are foreign-born individuals and therefore their data is unavailable to us; 101 managers (16.50%) have only name disclosed but no other information in their MS Direct, Bloomberg, or FINRA profiles and essentially are "ghost" managers; finally, for the remaining 145 managers (23.69%), we are unable to identify their family profile for other reasons.

[9] Based on data from Pew Research Center survey 2014, available at https://www.pewresearch.org.

that use data on other developed countries (see Black, Devereux, and Salvanes, 2005). This suggests that the frequency of family sizes and birth orders are mostly picking up general demographic patterns, rather than fund management companies selecting managers based on these characteristics. Panel B of Table 1 reports the descriptive statistics of fund managers' personal and family characteristics while Panel C reports the same for fund characteristics.

3. Empirical results

3.1. Birth order and managerial risk-taking

The existing literature relating birth order to risk tolerance indicates that propensities to take risks is a function of birth order, where younger siblings are more risk tolerant than first-born children (see Roszkowski, 1999; Gilliam and Chatterjee, 2011, and references therein). Birth order is defined as a manager's rank by age among siblings. In this section, we explore the potential relation between fund managers' birth order and their risk-taking behavior.

Table 2 reports the average risk characteristics of funds for each manager birth order group. For each group, we also report the number of observations and the difference in risk characteristics between first-born managers and managers that are born fifth or later to their families. The main takeaway from Table 2 is that later-born mutual fund managers take on more risk than do first-born fund managers. Strikingly, risk-taking increases monotonically in manager birth order. On an annualized basis, the returns of managers that are born fifth or later to their families are 1.36 x $\sqrt{12}$, i.e., 4.72 percentage point higher annual volatility than those of first-born managers. Further, fifth-or-later-born managers take 1.18 percent more idiosyncratic risk than their first-born counterparts. These spread estimates are significant at the one percent level and represent an economically meaningful 29.56 and 29.82 percent increase in total risk and idiosyncratic risk over the first-born managers, respectively. Results on active risk further corroborate that later-born mutual fund managers take more risk by

deviating more from their fund's benchmark. The 1.49 percentage point spread between fifth-or-later-born and first-born managers represents a 29.39 percent increase over that of first-born managers.

To empirically test the conjecture of negative effects of birth order on managerial risk-taking, we conduct a series of tests. First, we perform regression analysis relating observed total risk, idiosyncratic risk, and active risk to a birth order indicator. Birth order is the manager's rank by age among siblings. In this analysis, we investigate whether the birth order effect from Table 2 remains after controlling characteristics of managers, their funds, and their family. Additionally, we check that birth order effects are unlikely to be induced by unobservable factors or any heterogeneous trends by including period, segment (i.e., fund style), fund family, and interaction fixed effects.

The results reported in Table 3, Panel A indicate that later-born mutual fund managers, all else being equal, exhibit higher propensity to take risks relative to firstborns. First, we control for a host of fund characteristics. Results in Models (1), (4), and (7) indicate that on average being born by one birth order rank younger translates to a 0.42, 0.15, and 0.72 percentage points per annum increase in total risk, idiosyncratic risk, and active risk, respectively. The coefficients on the main variable of interest, the birth order, are positive and statistically significant at the one percent level in all specifications. Inclusion of manager-specific controls in Models (2), (5), and (8) slightly reduces the magnitudes of the birth order estimates for total risk and active risk, but the main inferences remain unchanged.

Results of the regressions with demographic controls in Models (3), (6), and (9) further reduces the birth order estimates by 30% and 13% for total risk and idiosyncratic risk (though not for active risk), but our inferences do not change qualitatively. Birth order estimates from all-inclusive models indicate that a unit increase in birth order rank translates to an economically meaningful 0.30, 0.13, and 0.72 percentage points per annum increase in total

risk, idiosyncratic risk, and active risk, respectively. These results compare favorably to the annualized risk measures of the average fund in our sample reported in Table 1, Panel C.

In Table 3, Panel B, we add various fixed effects. Specifically, we first augment the baseline specification with segment, year, and fund firm fixed effects in Models (1), (4), and (7), and with segment-by-year fixed effects in Models (2), (5), and (8). The coefficient estimates on the birth order indicator continue to be positive and significant at the one percent level across these specifications, ranging from 0.36 to 0.38 for total risk, from 0.14 to 0.15 for idiosyncratic risk, and from 0.67 to 0.75 for active risk regressions. This outcome suggests that neither time-invariant unobserved heterogeneity at the segment or the fund firm level, nor time-varying heterogeneous trends drive our results. However, there is still a possibility that fund families with certain risk targets may choose to attract managers with specific characteristics which fit their risk-related needs. To account for this, in Models (3), (6), and (9) we include fund firm-by-year fixed effects to compare risk characteristics of the same-family funds with managers of various birth orders. Comparing within fund family-year, we find similar magnitude of the birth order effect with the point estimate being once again positive and statistically significant (0.31, 0.14, and 0.55 for total risk, idiosyncratic risk, and active risk, respectively). Collectively, these results suggest that fund managers' birth order is positively related to the riskiness of their funds.

3.2. Controlling for family size

In our results so far, we may be confounding the effects of birth order with those of family size. Previous studies suggest negative relation between family size and status outcomes. (Leibowitz, 1977; Blake, 1986; Hanushek, 1992; Sandefur and Wells, 1999; and Conley, 2001). More recently this consensus was challenged by studies showing that once birth order is controlled for, family size has small to no effect, while birth order appears to have the

pervasive role in explaining the differences across a range of outcomes (Black, Devereux, and Salvanes, 2005; Kantarevic and Mechoulan, 2006; and Gary-Bobo, Picard, and Prieto, 2006). Note that unlike the birth order, family size may be optimally chosen by parents and, hence, is likely to be endogenous. Nonetheless, using detailed data on manager's siblings, we next disentangle long-run effects of birth order from the potentially confounding effect of family size.

In Table 3, Panel C we control for family size in all specifications. Family size is defined as the number of children born to a manager's parents. Our results reveal the negligible effect of family size and point to the predominant role of birth order among other family background characteristics. In other words, it is not that fund managers from larger families take more risk, but rather managers with higher rank by age among siblings are more risk tolerant. The coefficient estimates of family size are all statistically indistinguishable from zero across all specifications. In contrast, coefficient estimates on birth order are uniformly positive and significant for all risk measures.[10]

3.3. Birth order dummies

Thus far, our results suggest that managerial risk-taking increases in birth order. We also observe that the spread estimates of the average risk measures between groups of first-born and later-born managers increase disproportionately the larger the birth order gap becomes. To ensure that birth order results are not solely driven by the subset of managers with very high birth order ranks, we next investigate pairwise differences between birth order groups and estimate risk regressions with birth order dummy variables.

[10] In addition, our results on birth order remain unchanged when we include controls for manager's family size at certain cutoff years during manager's childhood (at the ages of two, five, and ten), suggesting that the birth order effect is not subsumed by the size of the manager's family in early childhood.

Table 4, Panel A presents pairwise differences in total risk, idiosyncratic risk, and active risk, across the five categories of birth order ranks by age among siblings. We find that the differences in means are consistently positive across the birth order groups. The magnitudes increase significantly in the birth order gap, such that the differences become larger the more distant the birth ranks are, but all estimates are uniformly positive and majority of them are statistically significant.

Table 4, Panel B, report estimates of risk regressions with birth order dummies. Birth order dummy variables represent second-born, third-born, fourth-born, with the final dummy variable equaling one if the manager is the fifth child or greater, otherwise zero. The excluded category corresponds to the first child. We find that all coefficient estimates are positive and magnitudes again increase in birth order ranks. In addition, we observe analogous birth order estimates when we add family size dummy variables, further suggesting that family size has little effect on managerial risk-taking behavior. Finally, Table 4, Panel C reports differences in birth order rank coefficients. We find that 16 out of 18 pairwise differences are statistically significant, indicating that a fund's risk increases monotonically in a manager's birth order.

3.4. Robustness tests

In this section, we conduct additional tests and closely consider several alternative explanations for our baseline findings. Results are presented in Table 5.

To begin with, we estimate Fama and MacBeth (1973) regressions. First, we estimate monthly cross-sectional regressions. Next, we report the time-series averages of the three risk measures and test the significance using the time-series standard errors of the average slopes. We adopt the rolling windows of 24 months (minimum 20 observations) and 36 months (minimum 30 observations) and adjust for serial correlation using Newey and West (1987) standard errors adjusted for 24- and 36-months lags, respectively. We ensure that the sample

is restricted to observations in which rolling windows match single management period of a corresponding manager, i.e., there is no manager change. Results reported in Panels A and B of Table 5 confirm our previous findings on the birth order effect, i.e., fund managers' birth order is positively related to a fund's total risk, idiosyncratic risk, and active risk.

The data availability in our paper mostly depends on the demise of fund manager's family member. Therefore, it is possible that the birth order effect on risk taking is confounded with bereavement effects on managerial investment decisions. Liu, Shu, Sulaeman, and Yeung (2020) show that parental death affects mutual fund managers' risk attitudes, and bereavement effects last for up to a year after parental death. Thus, we account for this possibility by estimating regressions with control for bereavement indicator, which takes the value of one for the year when death of manager's parent occurs and for the following year of bereavement, and zero otherwise. In total, we have identified 736 bereavement fund-year observations that coincide with the active management period of affected managers. Results in Panel C, Table 5 indicate that bereavement does not materially affect the main inferences of our paper.

Recent studies indicate that several other manager-specific background attributes may also affect managerial decision making. Roussanov and Savor (2014) show that marital status influences managerial attitudes toward taking strategic risks. Thus, we check if managerial marital status affects our results. In total, we are able to collect marital status information for 1,309 managers.[11] Bai, Ma, Mullally, and Solomon (2018) suggest that mutual fund managers that were older during their preschool education relative to other kids display more confident investment behavior. We are able to construct relative age indicator for 345 managers in our

[11] We rely on both obituaries and public records to obtain information on marital status. Note, however, that for most of the managers in our sample, we do not observe the dates of marriage, as only 13 states disclose marriage and divorce records publicly (see Lu, Ray, and Teo (2016) for details on data acquisition).

sample.[12] Malmendier and Nagel (2011) show that individuals who have experienced economic depression in their lives are less willing to take financial risk. In our sample, 724 managers have experienced prolonged negative stock market returns during their childhood.[13] Panels D through F of Table 5 report the results of tests with controls for a manager's marital status, relative age, and depression experience. We continue to find positive and statistically significant coefficient estimates on birth order for all the three risk measures, implying that previously documented attributes related to a manager's background do not drive our findings.

As noted earlier in the paper, the extant literature documents negative correlation between family characteristics, such as birth order and educational attainment. Therefore, it is possible that elder children simply receive better education, which may affect their risk preferences. To examine whether educational attainment affects our results, we additionally collect data on managers' education and selectiveness of educational institutions they attend. The information on manager's educational background is obtained from Morningstar, Bloomberg, LinkedIn and fund companies' websites. The data on educational institutions is from College Entrance Examination Board.[14] Results in Panel G of Table 5 show that it is unlikely that the observed birth order effect is driven purely by educational attainment. The inclusion of education variables as controls has little effect on the birth order coefficients, which are almost identical to the baseline results in Table 3, indicating no attenuation effect of education on the relation between birth order and funds' risk-taking behavior.

[12] To do so, we first collect information on a manager's place of birth via cross-database matching process and use obituaries to ensure that the manager's family did not move to another state during her childhood. We calculate relative age based on state-specific cut-off dates for school eligibility as in Bai, Ma, Mullally, and Solomon (2018).

[13] To construct the indicator for "depression babies", we calculate the number of years of negative stock returns that fall within the first 18 years of a manager's life.

[14] We use various editions of the College Handbook to obtain information on entry requirements. Results are unaffected if, instead, we use standardized scores from online resources, like https://www.prepscholar.com. In untabulated results, we find that the distribution of education across birth order groups is rather flat. This is not surprising, given that our sample is from an industry with steep barriers to entry, i.e., all individuals in our sample have at least undergraduate education.

Table 5, Panel H presents supplementary empirical findings on the robustness of the birth order effect under various modifications. First, we conduct a placebo test using a subsample of index funds. The idea is that since index funds simply mimic their benchmarks, birth order of managers should have no effect on the risk characteristics of index funds. Results confirm this supposition, as re-estimating baseline regression of total risk on the birth order for the subsample of index funds reveals no significant coefficients on birth order. Next, we alternatively define birth order variable from a full set of manager families by additionally including managers who grew up as single child. Coefficient estimates show same signs and are similar in magnitudes to their counterparts in the baseline analyses in Table 3. Taken together, the findings of this section show that the positive relation between the birth order and manager's risk-taking behavior cannot be due to plausible alternative explanations.

3.5. Limited parental resources and birth order effects

As discussed previously, evolutionary theory in psychology suggests that birth order effects originate from sibling rivalry during childhood (Sulloway, 1996). That is, sibling rivalry – the competition of siblings for the niche with most resources – is the key mechanism behind the birth order effects. In this section, we posit that the extent to which individuals were exposed to such family dynamics influences the development of siblings' behavioral tendencies, particularly their risk tolerance. To capture facets of sibling rivalry, we consider parental financial resources and parental attention as moderators of the relation between a manager's birth order and investment risk.[15] To the extent parental resources influence childhood sibling rivalry, we should observe that individuals who grew up in a less constrained environment display less pronounced birth order-induced propensity to take risks. On the other hand, if an

[15] Studies that embrace evolutionary theory often regard household wealth and parental attention as the key resources that spur sibling rivalry and affect child development (Pleck, 1997; Amato and Rivera, 1999; Zick, Bryant, and Osterbacka, 2001; Price, 2008).

individual's childhood featured scarce financial resources and parental attention, thus more birth order-based niche differentiation among siblings, the birth order effect on risk tolerance should be more salient.

To examine how parental financial resources moderate the observed birth order effect on risk taking, we collect data on parental wealth during a manager's childhood. Specifically, we obtain data on parental income reported in U.S. censuses and parental employment information from obituaries. We are able to identify parental income data for 234 managers (356 funds) and parental job information for 867 managers (1,274 funds) in our sample. Next, we use this data to identify managers that are descendants of wealthy families and those who grew up relatively poor and compare the birth order effects for the two subsamples.[16] Table 6 reports the results.

To begin with, in Table 6, Panel A, we report the average risk characteristics of funds by birth order groups. Result reveal that managers-descendants of relatively wealthy families show almost no evidence that later-born mutual fund managers take on more risk relative to their first-born counterparts. On the contrary, evidence from the subsample of low-income families indicates a clear pattern of increasing risk-taking for higher birth order. To provide more formal evidence, in Table 6, Panel B, we estimate pooled regressions and control for family size, fund, and manager characteristics. We find positive and significant birth order effect only for the subsamples containing funds run by managers who grew up relatively poor. Differences in coefficients between the two subsamples are all positive and significant. Further, when we interact birth order variable with *low income* and *low-paid job* indicators in Table 6,

[16] We follow procedure in Chuprinin and Sosyura (2018) to collect data on parental income. The main source of data is the 1940 census. Due to statutory constraints on data availability (the latest available census is from 1940), parental income data covers relatively older managers. On the contrary, data on parental employment is from obituaries, which entails no such restrictions.

Panel C, we also find that growing up in a household with financial constraints positively moderates the relation between birth order and risk taking.

Next, we investigate the role of limited parental attention in contributing to greater risk-taking behavior among later-born managers. To test this, we rely on two direct proxies for parental attention which are based on physical presence of parent(s) during an individual's childhood. First, we stratify our sample into subsets of one-working-parent and dual-working-parents families. Second, we identify families in which the father has been engaged in a prolonged military service overseas. Building on the evidence in Howe, Fiorentino, and Gariepy (2003), we posit that in dual working families and in families with a military-involved parent, children need to compete more with their siblings for limited parental attention.[17] In total, we obtain information on parental employment for 416 managers (603 funds) and information on military service (absence of it) for 827 managers (1,203 funds).[18] Next, we repeat the analysis from Table 6, and report our findings in Table 7.

Sort analysis in Panel A shows that the magnitude of the birth order effect on risk-taking differ across subsamples of parental attention; in particular, birth order effects are stronger among managers that grew up in families with limited parental attention. Regression results in Panel B confirm that the coefficient estimates on birth order for managers with limited parental attention are all positive and significantly different from those estimated for the samples of managers who received relatively more parental attention during their childhood. Panel C further corroborates these inferences, as all interaction terms are positive and statistically significant at the 5% level or better.

[17] In addition, we also considered several alternative reasons for parental absence during an individual's childhood, including death of a parent and divorce of parents, but the sample size turned out to be too small, i.e., 49 managers were affected by parental death during childhood. Moreover, these events have been shown to bear long-lived repercussions for children (see, Betzer, Limbach, Rau, and Schürmann (2021) for details).

[18] We restrict the sample to families for which we observe exact dates of employment (clear evidence of unemployment) in obituaries for both parents. Therefore, number of managers with information on employment is smaller than in Table 6. We obtain dates of fathers' military service from the Department of Veteran Affairs and US military registries, available on https://www.ancestry.com.

Collectively, results in this section highlight that the limited parental resources (financial and attention) channel contributes to greater risk-taking behavior among later-born managers, providing an economic explanation for the observed birth order-induced heterogeneities in risk-taking behavior between first-born and later-born managers. These findings are consistent with the broad implications of evolutionary theory in psychology, which emphasizes the role of limited parental resources in contributing to the sibling rivalry and influencing the development of risk attitudes. However, we acknowledge the potential existence of other mechanisms, e.g., simple parental preferences or differences in parenting style across siblings, which we are not able to address within our setting and leave for future research.

3.6. Age spacing

In this section, we investigate whether age spacing influences the observed birth order effects. Research has suggested that wider age spacing between siblings may cause less dilution of parental resources, resulting in a less competition for resource-rich niches (Sulloway 1996; 2001). Conversely, the closer in age the siblings are, the more likely they are to compete for scarce resources (Stocker, Lanthier, and Furman, 1997). It follows that if there is greater competition for resources during childhood, niche differentiation behaviors based on birth order become more engrained. Therefore, to the extent the age gap influences sibling rivalry, we should observe that managers further apart in age with their siblings should display less birth order-induced tendencies for risk taking.

To investigate how age spacing moderates the birth order effect on a fund manager's propensity to take risk, we augment total risk, idiosyncratic risk, and active risk regressions with an interaction term of birth order with age spacing indicator. Age spacing is measured by the number of full years to the closest sibling based on their birthdates. Thus, to identify age gap, we collect information on birthdates of the focal manager siblings. In total, we are able to

collect age spacing variable for 552 managers (870 funds) in our sample. Results are reported in Table 8.

We find that age spacing negatively influences the relation between a manager's birth order and risk taking. Regardless of the risk variable we choose, the moderating effect of closest sibling age gap is negative and significant. The coefficient estimates on *Birth order* × *Age gap* interaction term are –0.13 (*t*-stat = –2.31), –0.04 (*t*-stat = –1.96), –0.22 (*t*-stat = –2.70), for total risk, idiosyncratic risk, and active risk, respectively. These results provide further support for the proposed sibling rivalry mechanism, such that in the presence of competition for resources due to high density of birth spacing, birth order-related risk tendencies become more engrained, and thus the relation between the birth order and risk taking is more pronounced.

4. Additional evidence on risk-taking behavior and implications for fund performance

4.1. Trading behavior

Thus far, in our empirical analysis, we only considered fund risks as measures of managerial output. Next, we posit that, to the extent that the birth order is associated with a propensity to take more risk, we should observe that later-born managers deviate more from the average fund in the sector, trade more actively, and choose more unconventional trading strategies.

To investigate this possibility, we consider the following trading behavior metrics: *Style extremity* measures; *Distinctiveness*; *NRsquared*; *Turnover*; and *Active share*. To construct style extremity measures, we follow Bär, Kempf, and Ruenzi (2011). Specifically, we compute for each fund and year, the absolute difference between a fund's style, as determined by the loadings on the four style factors (market, size, value, and momentum) from Carhart (1997) and the average style of all funds in the same segment and year, and normalize this figure by dividing it by the average absolute style difference in the corresponding market segment and respective year. *Distinctiveness* is the Sun, Wang, and Zheng (2012) strategy distinctiveness

index measure, defined as one minus the correlation of a fund's return with the average return of all funds belonging to the same investment style. *NRsquared* is one minus the R-squared from the regression of fund excess returns on four style factors from Carhart (1997). *Active share* is defined as in Cremers and Petajisto (2009) and represents the fraction of fund's portfolio holdings that differ from the fund-specific benchmark index. *Turnover* is the annual portfolio turnover of a fund as reported in the CRSP MF database.

Results in Panel A of Table 9 indicate that later-born managers behave in ways that are consistent with greater risk tolerance by choosing relatively risky investment styles. We find that later-born managers are more likely to take extreme style bets and deviate from their peers than first-born managers. In other words, greater risk tolerance of later-born managers converges into large factor bets, rather than a diversified portfolio. This result holds for all style dimensions: the influence of the birth order variable is always positive and statistically significant at the 1% level. These inferences remain qualitatively unchanged when we control for family size. The coefficients are also economically sizable, and the magnitudes compare favorably to the mean.

Consistent again with a positive relation between the birth order and managerial propensity to take risks, Panel B shows that later-born fund managers are more likely to deviate from their benchmarks, choose unconventional trading strategies, and engage in more portfolio churning. Controlling for family size, coefficient estimates on birth order indicator from regressions with trading behavior metrics that capture unconventional portfolio, *distinctiveness*, and *NRSquared*, equal to 0.01 (*t*-stat = 2.98) and 0.01 (*t*-stat = 1.65), respectively. Further, we find that later-born managers trade more and are associated with more active stock selection. Birth order estimates from turnover and active share regressions are 0.14 (*t*-stat = 1.97) and 0.01 (*t*-stat = 1.87), respectively.

4.2. Managerial violations

To the extent the birth order-induced risk-taking behavior is present in adult life, we should expect that non-pecuniary risk-taking extends beyond riskiness of the fund portfolio. In this section, we test whether later-born managers are also more likely to be associated with failures to meet expected standards of managerial conduct and have relatively more reported civil or regulatory violations compared to first-born managers. To test this conjecture, we estimate multivariate cross-sectional regressions on the determinants of managerial violations. Data on managerial violations is from FINRA BrokerCheck, including those on civil violations, regulatory events, total fines paid, and disclosed investigations.[19]

To explore the relation between the birth order and violations of expected standards of business conduct, we consider several dependent variables. *Violations* is a dummy variable that equals one if manager is found liable in any violation case (civil or regulatory), and zero otherwise. *Regulatory* is a dummy indicator that equals one if any regulatory disciplinary event(s), i.e., late or incorrect reporting, are disclosed, and zero otherwise. *Customer disputes* is a dummy indicator that equals one if a manager has a record of resolved customer disputes not in his/her favor, and zero otherwise. *Number of violations* is the total number of all violations that are reported in FINRA BrokerCheck. *Fines paid* is the USD dollar amount of total fines and compensations paid by the manager at fault. Results are reported in Table 10.

Consistent with the baseline findings of the paper, we find that later-born managers, all else equal, are more likely to have records of past violations relative to first-born managers. Results of the cross-sectional logit regressions of *Violations* and *Customer disputes* reveal that birth order estimates are positive and significant at the 1% level. In accordance, results of the cross-sectional OLS regressions on a number of violations per manager and total paid fines

[19] FINRA BrokerCheck also reports criminal charges, but no manager in our sample has criminal records. We are able to collect data on individuals who solo-managed funds at any time from 2008 until 2018, because FINRA stores data for ten years. In total, we collect data for 303 fund managers.

(compensations) by a fund manager, further suggest that greater risk-taking by later-born managers extends beyond portfolio management, such that later-born managers have greater number of violations and end up paying more in total fines and compensations.

4.3. Performance

In this section, we investigate whether birth order-induced heterogeneities in risk-taking translate into different risk-adjusted performance. To do so, we focus on three risk-adjusted measures of performance, namely Sharpe ratio, information ratio, and four-factor alphas. Table 11 reports averages of these performance measures by manager birth order along with the percentages of managers that are categorized as superstars (i.e., those that were short-listed for "Fund Manager of the Year" award by Morningstar).

To investigate whether heightened incremental risk taking of later-born managers results in better performance, we first focus on Sharpe and information ratios. Results of birth order sorting exercise reported in Table 11 reveal that the birth order is negatively related to these two ratios (see Columns (1) and (2)). We find that average ratios decrease as we move from first-born to later-born managers. The spread estimates are significant at the one percent level and indicate that first-born managers deliver 0.46 and 0.22 higher annualized Sharpe and information ratios, respectively. Columns (3) and (4) tell a similar story using other risk-adjusted performance measure, four-factor alpha, on a pre-fee (i.e., gross) or post-fee (i.e., net) basis. Moreover, we find no manager that were born fifth or above in their families receive Morningstar "Fund Manager of the Year" award, while 50% of finalist managers in the history of this award are firstborns (see Column (5)).

We next estimate regressions for the four performance measures. Results in Table 12 are consistent with the conjecture that later-born individuals, all else equal, deliver lower risk-adjusted performance. The significant coefficient on the main variable of interest, the *birth*

order, implies that a unit increase in the birth order rank reduces average annualized Sharpe ratio and information ratio by 0.06 and 0.07, respectively (see Models (1) and (4) in Panel A). This effect is economically significant and compares favorably to the mean Sharpe ratio of 0.89 and information ratio of −0.14. Estimating within segment-year (Models (2) and (5) in Panel A) has little effect on the magnitudes and significance, while estimation within fund family-year (Models (3) and (6) in Panel B) shows no meaningful birth order effect on Sharpe ratio and reduces the effect on information ratio by a third but it remains statistically significant and economically meaningful. This evidence is further strengthened by the results for four-factor net-of-fee and post-fee alphas. The coefficients on birth order are once again uniformly negative and significant at the 10% level or better across all specifications.

Interestingly, our finding suggesting sibling rivalry for limited parental resources contributing to greater risk-taking by and worse performance of later-born resonates well with prior evidence of worse performance for funds that increase their portfolio risk to compete with other funds in tournaments (Huang, Sialm, and Zhang, 2011).

5. Conclusion

This paper provides the first empirical test of the role of birth order and familial background on adult life outcomes using professional business data from the mutual fund industry. Through the construct of birth order, we find that risk-taking tendencies established in childhood continue into the adult labor market, such that the manager's birth order is positively related to risk-taking behavior. The later a manager is born in the sibling hierarchy, greater investment risk she undertakes, without being compensated with better performance. Results indicate that fund manager birth order is positively related to various measures of fund's risk (total risk, idiosyncratic risk, and active risk).

Drawing on evolutionary theory arguments, we suggest that sibling rivalry for parental resources is the key mechanism behind the birth order effects on risk taking. To capture facets of sibling rivalry, we consider limited parental financial resources, limited parental attention, and age spacing as moderators of the relation between a manager's birth order and risk-taking. Results reveal that the more sibling rivalry is present during childhood, the more birth order-related niche differentiation behaviors become engrained.

Long-lived effects of birth order also shape the trading behavior of fund managers. Later-born managers tend to choose investment strategies with greater risk of underperforming the benchmark, deviate more from the average fund in the segment/style, and trade more actively compared to first-born managers. Birth order is also positively related to the likelihood of developing unique investment strategies. Later-born managers also have more extreme investment style positions, which converges into large factor bets that generate greater volatility. The incremental risk-taking by later-born managers extends beyond portfolio management, as they are also more likely to report civil or regulatory violations of expected standards of managerial conduct.

To the extent that birth order effects are time invariant, we observe long-lived effects of family environment on personality. This adds to the debate on the relative importance of environmental factors in explaining later life outcomes. Moreover, we find the effects of birth order on adult labor market outcomes in a highly competitive business setting, pointing to the pervasive nature of birth order as one of the most fundamental life experiences and engrained determinant of behaviors. Finally, the results of our study on fund risk and performance should be of interest to the broad public as mutual funds account for a large fraction of financial wealth of an average household.

Although our findings are consistent with the broad implications of evolutionary theory in psychology, which emphasizes the role of limited parental resources in contributing to the

sibling rivalry and influencing the development of risk attitudes, we acknowledge the potential existence of other mechanisms, e.g., parental preferences or differences in parenting style across siblings, which we are unable to address within our setting and leave for future research.

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Table 1. Descriptive statistics - Full Sample

This table reports descriptive statistics. Sample consists of fund managers who single-managed U.S. domestic equity non-index funds for at least one full year between 1962 and 2017. Panel A describes the sample by birth order and family size. Panel B reports individual manager and family-related characteristics. Panel C reports annualized fund risk and performance characteristics. All variables are described in the Appendix.

Panel A: Distribution of birth order and family size

	Birth order (2+ children)		Family size	
	Frequency	Percentage	Frequency	Percentage
1	304	40	102	12
2	261	34	277	31
3	113	15	236	27
4	48	6	141	16
5+	34	4	126	14
Total	760	100	882	100

Panel B: Fund managers' personal and family characteristics

Variable	Mean	Median	Std. Dev.	N of obs.
Manager's personal characteristics				
Age	48.38	47.45	9.79	13644
Manager female (0/1)	0.07	0	0.26	16783
Industry tenure (years)	11.41	8.17	12.12	16783
Fund tenure (years)	6.59	4.67	6.44	16783
Marital status (0/1)	0.96	1	0.18	11882
Graduate degree (0/1)	0.69	1	0.46	15729
Manager's family background				
Birth order (2+ children)	1.97	2.00	1.10	7112
Family size	2.91	3.00	1.49	8370
Age gap	3.65	3.00	2.02	5355
Father's year of Birth	1921.40	1923	15.17	10611
Father's age at Birth	31.56	30.92	6.55	10368
Mother's year of Birth	1923.63	1925	14.08	8609
Mother's age at Birth	28.65	28.33	4.86	8441
Parents' college degree (0/1)	0.63	1	0.48	7910
Parents' graduate degree (0/1)	0.23	0	0.42	7910
Father's military service (0/1)	0.77	1	0.42	8041
Father at war during childhood (0/1)	0.19	0	0.39	6103
Parents executive job (0/1)	0.17	0	0.38	8811
Parents low paid job (0/1)	0.17	0	0.38	8811
Parents' monthly income (USD)	2244.88	1800.00	1733.71	2307
Panel C: Fund risk and performance characteristics				
Total risk, %	16.20	14.58	7.62	16783
Idiosyncratic risk, %	3.97	3.34	2.62	16783
Active risk, %	18.23	16.35	8.93	16325
Sharpe ratio	0.89	0.84	1.36	16783
Information ratio	-0.14	-0.13	1.31	16783
Gross 4-factor alpha, %	0.48	0.34	9.24	16783
Net 4-factor alpha, %	-0.62	-0.69	9.28	16783

Table 2: Risk metrics by birth order

This table reports risk characteristics for our sample of fund managers by manager birth order. Birth order is a manager's rank by age among siblings. Total risk is the time-series standard deviation of monthly mutual fund return observations in a given year. Idiosyncratic risk is the standard deviation of the monthly residuals from the four-factor model. Active risk is the tracking error, i.e., the standard deviation of monthly mutual fund returns in excess of the fund-specific benchmark. Coefficients are in percentage points. 5+ vs 1 is the percentage difference for 5+ versus 1 birth order group. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

	Total risk	Idiosyncratic risk	Active risk	N of obs.
		Birth order (2+ children)		
1	4.60	1.14	5.07	2900
2	4.68	1.17	5.23	2505
3	4.78	1.19	5.28	1049
4	4.97	1.26	5.48	481
5+	5.96	1.48	6.56	177
5+ vs 1	1.36***	0.34***	1.49***	

Table 3: The effect of birth order on managerial risk-taking

This table relates a manager's birth order to fund's total risk, idiosyncratic risk, and active risk. The dependent variable is either total risk, idiosyncratic risk, or active risk. Dependent variables are annualized. Total risk is the time-series standard deviation of monthly mutual fund return observations in a given year. Idiosyncratic risk is the standard deviation of the monthly residuals from the four-factor model. Active risk is the standard deviation of monthly mutual fund returns in excess of the fund-specific benchmark. Birth order is a manager's rank by age among siblings. The set of fund control variables include: Fund size as natural logarithm of the fund's total net assets in million USD; Fund family size as natural logarithm of combined fund family total net assets; Fund age measured as the natural logarithm of fund age in years in a given year; Turnover ratio; Expense ratio; Fund flows are the net percentage flows of the fund. All fund control variables are lagged. The set of manager controls is comprised of manager age, gender, fund tenure and industry tenure. All regressions with demographic controls include indicators for mother's age, father's age, parent's education, parent's employment, and parental household wealth. Regressions in Panel B include year, segment, family, fund, and/or interaction fixed effects. Panel C introduces family size control to the setup. Family size is defined as the number of children born to the manager's parents. Standard errors are double-clustered by fund and year. The corresponding t-statistics are reported in parentheses. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

Variable	*Total risk*			*Idiosyncratic risk*			*Active risk*		
Panel A: The effect of birth order on risk characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Birth order	0.424***	0.371***	0.295**	0.145***	0.154***	0.126**	0.717***	0.650***	0.719***
	(3.27)	(2.99)	(2.30)	(2.89)	(3.05)	(2.03)	(2.91)	(3.02)	(2.87)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Demographic controls	No	No	Yes	No	No	Yes	No	No	Yes
Segment and Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.58	0.59	0.60	0.31	0.31	0.34	0.57	0.57	0.58
N of funds	1,031	1,009	685	1,031	1,009	685	1,029	1,006	683
Observations	6,448	6,316	4,467	6,448	6,316	4,467	6,221	6,099	4,299
Variable	*Total risk*			*Idiosyncratic risk*			*Active risk*		
Panel *B: Alternative specifications*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Birth order	0.384***	0.358***	0.312*	0.153***	0.144***	0.144***	0.745***	0.670***	0.549***
	(3.23)	(2.99)	(1.87)	(3.37)	(2.86)	(2.60)	(3.49)	(3.31)	(2.02)
Fund and Manager controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Segment and Year FE	Yes	No	No	Yes	No	No	Yes	No	No
Fund firm FE	Yes	No	No	Yes	No	No	Yes	No	No
Segment FE x Year FE	No	Yes	No	No	Yes	No	No	Yes	No
Fund firm FE x Year FE	No	No	Yes	No	No	Yes	No	No	Yes
Adj. R-squared	0.64	0.64	0.63	0.45	0.41	0.45	0.61	0.63	0.46
N of funds	976	1,009	771	976	1,009	771	978	1,006	771
Observations	6,283	6,268	4,034	6,283	6,268	4,034	6,071	6,078	3,913

Table 3 - continued

Variable	*Total risk*			*Idiosyncratic risk*			*Active risk*		
Panel C: Controlling for family size	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Birth order	0.329**	0.290**	0.297*	0.120**	0.111*	0.115*	0.641**	0.625***	0.774***
	(2.02)	(2.10)	(1.93)	(1.96)	(1.85)	(1.66)	(2.44)	(2.67)	(2.96)
Family size	–0.014	0.133	–0.003	0.025	0.072	0.107	–0.138	0.040	–0.078
	(–0.09)	(1.32)	(–0.02)	(0.43)	(1.29)	(0.26)	(–0.83)	(0.39)	(–0.77)
Fund and Manager controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic controls	No	No	Yes	No	No	Yes	No	No	Yes
Segment and Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Adj. R-squared	0.04	0.59	0.61	0.12	0.31	0.34	0.08	0.58	0.58
N of funds	1,009	1,009	685	1,009	1,009	685	1,006	1,006	683
Observations	6,312	6,312	4,467	6,312	6,312	4,467	6,095	6,095	4,300

Table 4: Pairwise differences and birth order position effects

This table presents the pairwise differences between birth order ranks and relates birth order rank dummies to fund's total risk, idiosyncratic risk, and active risk. Panel A presents pairwise differences between birth order ranks in monthly estimates of total risk, idiosyncratic risk, and active risk. Panel B presents results of risk regressions that include birth order dummy variables representing second child, third child, fourth child, with the final dummy variable equaling one if the child is the fifth child or greater and zero otherwise. In specifications with family size dummies, we include variables representing two-child, three-child, four-child families and families with five or more children. The dependent variables are total risk, idiosyncratic risk, and active risk. Dependent variables are annualized. Regressions include segment and year fixed effects, and standard errors are double-clustered by fund and year. Panel C reports difference in coefficients. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

Panel A: Pairwise differences by birth order

Birth order	First	Second	Third	Fourth
			Total risk	
Second	0.078			
Third	0.179**	0.101		
Fourth	0.382***	0.304**	0.203*	
Fifth/older	1.361***	1.283***	1.182***	0.979***
			Idiosyncratic risk	
Second	0.025			
Third	0.036*	0.01		
Fourth	0.119***	0.094**	0.083**	
Fifth/older	0.340***	0.315***	0.304***	0.221***
			Active risk	
Second	0.170**			
Third	0.217**	0.047		
Fourth	0.413***	0.244*	0.197	
Fifth/older	1.495***	1.325***	1.278***	1.082***

Panel B: Regressions with birth order dummies

	Total risk		*Idiosyncratic risk*		*Active risk*	
Second	0.247	0.288	0.080	0.079	0.440*	0.481*
	(0.89)	(0.95)	(1.26)	(1.23)	(1.72)	(1.90)
Third	0.977**	0.885**	0.229***	0.200**	0.902**	0.856**
	(2.46)	(2.11)	(2.69)	(2.22)	(2.51)	(2.25)
Fourth	1.856***	1.749***	0.547***	0.443***	2.102**	1.879**
	(3.29)	(2.79)	(4.74)	(3.45)	(2.49)	(2.16)
Fifth/older	3.549***	3.531***	0.824***	0.648***	3.650***	3.787***
	(3.80)	(3.44)	(4.55)	(3.25)	(3.96)	(3.62)
Family size dummies	No	Yes	No	Yes	No	Yes
Segment FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.53	0.53	0.24	0.24	0.56	0.57
Observations	7,112	7,108	7,112	7,108	6,860	6,856

Panel C: Differences in birth order dummies coefficients

	Total risk		*Idiosyncratic risk*		*Active risk*	
	diff.	t. stat/prob > F	diff.	t. stat/prob > F	diff.	t. stat/prob > F
Third–Second	0.729**	1.98	0.149*	1.72	0.462**	2.10
Fourth–Second	1.609***	2.99	0.467***	4.01	1.662***	5.69
Fifth/older–Second	3.301***	3.68	0.744***	4.09	3.210***	6.88
Fourth–Third	0.879	1.55	0.318**	2.47	1.200***	3.71
Fifth/older–Third	2.572***	2.82	0.595***	3.13	2.748***	5.64
Fifth/older–Fourth	1.693*	1.78	0.277	1.35	1.548***	2.96
Joint test (prob > F)		0.001		0.000		0.000

Table 5: Robustness tests: alternative explanations and placebo test

This table reports results of robustness tests. Panel A and B report the results of Fama and MacBeth (1973) risk regressions. Dependent variables are estimated using rolling window of 24 months (minimum 20 observations) and 36 months (minimum 30 observations). Newey and West (1987) standard errors are adjusted for 24- and 36-month lags, respectively. The sample is restricted to observations where rolling windows match single management period of a corresponding manager. Panel C through F show estimates of birth order for total risk, idiosyncratic risk, and active risk regressions, but, depending on the robustness test, regressions include additional control variables. Additional control variables for managerial attributes include bereavement periods, manager's marital status, relative age, and economic downturn experiences. Panel G reports results of regression with additional controls for educational degree, average admission SAT score, university size (ln) and undergraduate acceptance rate. In Panel H, birth order is defined using full set of families, including single-child families and results for the placebo experiment with the sample of index funds. All regressions include family size, fund, and manager controls along with segment and year fixed effects. Dependent variables are annualized. All fund control variables are lagged. Segment is defined by the Morningstar fund category. Standard errors are double-clustered by fund and year. The corresponding *t*-statistics are reported in parentheses. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

	Total risk		*Idiosyncratic risk*		*Active risk*	
Panel A: Fama-MacBeth, 24m window, N-W 24m lags						
Birth order	0.090***	0.087***	0.091***	0.088***	0.069**	0.080***
	(3.52)	(3.34)	(3.66)	(3.46)	(2.40)	(3.02)
Family size		0.004		0.003		–0.020**
		(0.89)		(0.84)		(–2.00)
Observations	48,295	48,266	48,295	48,266	48,131	48,102
Panel B: Fama-MacBeth, 36m window, N-W 36m lags						
Birth order	0.074***	0.075**	0.074***	0.076***	0.059*	0.071**
	(2.72)	(2.56)	(2.82)	(2.65)	(1.74)	(2.22)
Family size		–0.004		–0.004		–0.023**
		(–0.66)		(–0.75)		(–2.31)
Observations	39,595	39,578	39,595	39,578	39,218	39,201
Panel C: Controlling for Bereavement						
Birth order	0.371***	0.294**	0.155***	0.110*	0.654***	0.635***
	(2.99)	(2.12)	(3.10)	(1.85)	(3.01)	(2.70)
Family size		–0.123**		0.075		0.030
		(–0.50)		(1.34)		(0.29)
Panel D: Controlling for Marital status						
Birth order	0.360***	0.369***	0.158**	0.137*	0.716***	0.750***
	(3.22)	(2.76)	(2.46)	(1.83)	(2.68)	(2.76)
Family size		–0.013		0.030		–0.050
		(–0.18)		(0.49)		(–0.51)
fixed age						
Birth order	0.371***	0.489**	0.154***	0.278***	0.650***	0.756**
	(2.99)	(2.49)	(3.05)	(3.13)	(3.02)	(2.49)
Family size		0.005		–0.035		–0.006
		(0.03)		(–0.30)		(–0.04)
Panel F: Controlling for Depression babies						
Birth order	0.402***	0.300*	0.169***	0.122**	0.566***	0.515**
	(3.09)	(2.07)	(3.32)	(1.96)	(2.82)	(2.30)
Family size		0.174*		0.080		0.086
		(1.72)		(1.42)		(0.83)
Panel G: Controlling for educational degree and university selectiveness						
Birth order	0.481***	0.399***	0.167***	0.117*	0.776***	0.734***
	(3.56)	(2.69)	(2.96)	(1.73)	(3.41)	(3.01)
Family size		0.134		0.082		0.067
		(1.39)		(1.47)		(0.65)
Panel H: Alternative Birth order specification and Placebo test						
	Specification with single-child families				Placebo test: Index funds	
	Total risk	Idio. risk	Active risk		Total risk	
Birth order	0.445***	0.150***	0.652***		–0.027	
	(3.65)	(3.12)	(3.38)		(–0.95)	
Observations	7,376	7,376	7,376		569	

Table 6: Parental household wealth and birth order effects

This table relates parental household wealth characteristics and birth order. Parents' income is based on 1940 census records (median split). Parent's employment information is from obituaries. Dependent variables are annualized. All regressions include family size, fund, and manager controls along with segment and year fixed effects. Fund and manager control variables are lagged. Standard errors are double-clustered by fund and year. Individual estimates by birth order rank in Panel A are all uniformly significant at the 1% level (star-indications are not reported for brevity). The corresponding *t*-statistics are reported in parentheses. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

Panel A: Sorting on birth rank

	Total risk				*Idiosyncratic risk*				*Active risk*			
	High income family	Low-income family	Parent's executive job	Parent's low-paid job	High income family	Low-income family	Parent's executive job	Parent's low-paid job	High income family	Low-income family	Parent's executive job	Parent's low-paid job
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	4.92	4.35	4.81	4.29	1.27	1.16	1.24	1.16	5.14	4.97	5.48	4.71
2	4.53	5.13	4.63	5.27	1.25	1.50	1.11	1.60	4.85	5.23	5.29	5.71
3	5.13	5.28	5.13	5.15	1.31	1.37	1.26	1.34	4.84	5.38	5.83	4.78
4	4.99	5.32	4.63	5.36	1.40	1.56	1.24	1.59	4.73	8.11	5.31	7.46
5+	5.50	9.97	5.55	5.89	1.27	2.86	1.50	1.84	5.74	12.16	5.12	9.07
5+ vs 1	0.58	5.62***	0.74**	1.60***	0.00	1.69***	0.26*	0.68***	0.60	7.19***	–0.36	4.35***

Panel B: Pooled regression analysis

	Total risk				*Idiosyncratic risk*				*Active risk*			
Variable	High income family	Low-income family	Parent's executive job	Parent's low-paid job	High income family	Low-income family	Parent's executive job	Parent's low-paid job	High income family	Low-income family	Parent's executive job	Parent's low-paid job
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Birth order	0.267	1.494***	–0.233	0.920***	0.065	0.499***	–0.091	0 .205**	0.671**	2.660***	–0.109	1.589***
	(1.43)	(4.45)	(–0.72)	(3.01)	(0.73)	(2.64)	(–0.94)	(2.23)	(2.24)	(3.88)	(–0.39)	(2.62)
diff. Low/Low-paid–High/Executive		1.227***		1.153**		0.434**		0.296**		1.989***		1.698***
		(3.22)		(2.53)		(2.00)		(2.22)		(2.72)		(2.64)

Panel C: Interactions

	Total risk		*Idiosyncratic risk*		*Active risk*	
	(1)	(2)	(3)	(4)	(5)	(6)
Birth order	0.156	0.192	0.238***	0.081**	0.441	0.357
	(0.71)	(1.30)	(3.01)	(2.43)	(1.52)	(1.63)
Birth order x Low income	1.201***		0.404***		1.957***	
	(3.01)		(3.60)		(2.84)	
Birth order x Low-paid parents		0.798**		0.250***		1.442**
		(2.09)		(3.62)		(2.33)
Low income	–1.968***		–0.470*		-2.928**	
	(–2.52)		(–1.89)		(-2.45)	
Low-paid father		–0.649		0.245		–1.586
		(–0.84)		(1.54)		(–1.57)
Family size	Yes	Yes	Yes	Yes	Yes	Yes
Man. and Fund controls	Yes	Yes	Yes	Yes	Yes	Yes
Segment and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.60	0.60	0.35	0.33	0.53	0.59
Observations	1,578	5,564	1,578	5,564	1,435	5,357

Table 7: Limited parental attention and birth order effects

This table relates limited parental attention and birth order. Parent's employment information is from obituaries. Father's military service records are from Department of Veteran Affairs and US military registries. Dependent variables are annualized. Fund and manager controls is comprised of variables described in the Appendix. Regressions include family size control, segment and year fixed effects, and standard errors are double-clustered by fund and year. Individual estimates by birth order rank in Panel A are all uniformly significant at the 1% level (star-indications are not reported for brevity). The corresponding *t*-statistics are reported in parentheses. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

Panel A: Sorting on birth rank

	Total risk				*Idiosyncratic risk*				*Active risk*			
	One parent works	Both parents work	Father no war conflict	Father war conflict	One parent works	Both parents work	Father no war conflict	Father war conflict	One parent works	Both parents work	Father no war conflict	Father war conflict
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	4.56	4.61	4.81	4.36	1.11	1.16	1.22	1.06	5.26	4.8	5.21	4.21
2	4.78	4.85	4.73	4.43	1.25	1.26	1.20	1.02	5.03	5.63	5.13	4.68
3	4.83	5.46	4.88	5.37	1.18	1.52	1.24	1.43	5.41	5.75	5.20	7.89
4	4.65	5.92	5.07	5.26	1.27	1.60	1.28	1.54	5.68	6.48	5.24	7.91
5+	4.81	6.87	5.84	7.59	1.12	1.86	1.35	1.99	5.28	7.65	6.41	8.34
5+ vs 1	0.25	2.26***	1.03***	3.23***	0.01	0.70***	0.12	0.94***	0.02	2.89***	1.20***	4.13***

Panel B: Pooled regression analysis

	Total risk				*Idiosyncratic risk*				*Active risk*			
Variable	One parent works	Both parents work	Father no war conflict	Father war conflict	One parent works	Both parents work	Father no war conflict	Father war conflict	One parent works	Both parents work	Father no war conflict	Father war conflict
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Birth order	0.190*	0.886***	0.353**	0.712***	0.158***	0.327***	0.085	0.301***	0.673**	1.320***	0.759***	1.552***
	(1.66)	(4.68)	(2.41)	(3.35)	(2.92)	(3.65)	(1.22)	(2.98)	(2.22)	(2.62)	(3.79)	(5.36)
diff. Both work/War–		0.696***		0.359*		0.168		0.216*		0.646**		0.793**
One works/No war		(3.15)		(1.90)		(1.60)		(1.74)		(2.22)		(2.23)

Panel C: Interactions

	Total risk		*Idiosyncratic risk*		*Active risk*	
	(1)	(2)	(3)	(4)	(5)	(6)
Birth order	0.169	0.110	0.154*	0.062	0.660**	0.438
	(0.95)	(0.56)	(1.75)	(0.76)	(2.21)	(1.39)
Birth order x Both work	1.109***		0.309**		0.905**	
	(3.57)		(2.06)		(1.98)	
Birth order x Father war		0.776**		0.346***		1.573**
		(2.34)		(2.25)		(2.00)
Both work	-1.807***		–0.445		–1.609*	
	(–2.65)		(–1.30)		(–1.79)	
Father war		–2.132***		–1.117***		–3.001**
		(–3.05)		(–3.44)		(–2.40)
Family size	Yes	Yes	Yes	Yes	Yes	Yes
Man..and Fund controls	Yes	Yes	Yes	Yes	Yes	Yes
Segment and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.62	0.59	0.35	0.31	0.59	0.55
Observations	3,067	4,164	3,067	4,164	2,885	3,972

Table 8: Age spacing and parental planning

This table relates limited parental attention and birth order. Panel A shows the estimates of birth order for total risk, idiosyncratic risk, and active risk regressions, which include an interaction term of birth order with age gap between children. Age gap is measured as the number of years between the focal manager and manager's closest sibling. Regressions include family size, fund, and manager controls along with segment and year fixed effects. All variables are described in Appendix. Standard errors are double-clustered by fund and year. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

	Total risk	*Idiosyncratic risk*	*Active risk*
Birth order	0.694***	0.278***	1.183***
	(2.88)	(3.02)	(2.66)
Birth order x Age gap	–0.132**	–0.042**	–0.221***
	(–2.31)	(–1.96)	(–2.70)
Age gap	–0.334**	–0.205***	–0.156
	(–2.47)	(–3.90)	(–1.09)
Family size	Yes	Yes	Yes
Manager and Fund controls	Yes	Yes	Yes
Segment and Year FE	Yes	Yes	Yes
Adj. R-squared	0.60	0.36	0.59
Observations	4,844	4,844	4,663

Table 9: Trading behavior and birth order

This table relates a manager's birth order to trading behavior metrics. Panel A report results for style extremity measures. Style extremity is computed as the normalized absolute difference between a fund's style, as determined by the four loadings on the style factors from Carhart (1997) and the average style of all funds in the same segment and year. Panel B report results for *Distinctiveness*, *NRsquared*, *Turnover*, and *Active share* metrics. *Distinctiveness* is the Sun, Wang, and Zheng (2012) strategy distinctiveness index measure, defined as one minus the correlation of a fund's return with the average return of all funds belonging to the same investment style. *NRsquared* is one minus the R-squared from the regression of fund excess returns on four style factors from Carhart (1997). *Turnover* is from the CRSP MF database. *Active share* is defined as in Cremers and Petajisto (2009) and represents the fraction of fund's portfolio holdings that differ from the fund-specific benchmark index. The trading behavior metrics of Panel B are defined such that an increase in any one of them represents a more active or unconventional portfolio. All regressions include fund and manager controls along with segment and year fixed effects. Standard errors are double-clustered by fund and year. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

Panel A: Style Extremity

	Market		*Size*		*Value*		*Momentum*	
Birth order	0.043***	0.033*	0.039***	0.041**	0.044***	0.040**	0.038**	0.049**
	(2.94)	(1.88)	(2.59)	(2.02)	(3.16)	(2.37)	(2.10)	(2.06)
Family size		0.017		–0.002		0.006		–0.018
		(0.98)		(–0.14)		(0.31)		(–1.00)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Segment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.05	0.05	0.07	0.07	0.06	0.06	0.06	0.06
N of funds	1,009	1,009	1,009	1,009	1,009	1,009	1,009	1,009
Observations	6,312	6,309	6,312	6,309	6,312	6,309	6,312	6,309

Panel A: Measures of unconventional trading and activeness

	Distinctiveness		*NRSquared*		*Turnover*		*Active share*	
Birth order	0.011***	0.011***	0.009**	0.007*	0.140*	0.140**	0.013**	0.014*
	(3.12)	(2.98)	(2.42)	(1.65)	(1.85)	(1.97)	(2.47)	(1.87)
Family size		0.000		0.004*		0.001		–0.002
		(0.09)		(1.69)		(0.04)		(–0.29)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Segment FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.2	0.2	0.23	0.23	0.15	0.15	0.33	0.33
N of funds	1,009	1,009	1,009	1,009	1,009	1,009	510	510
Observations	6,316	6,312	6,316	6,312	6,315	6,311	3,273	3,273

Table 10: Managerial violations and birth order

This table reports coefficient estimates from multivariate cross-sectional logit regressions on fund manager total violations, regulatory violations, and customer disputes indicator variables, and multivariate cross-sectional OLS regressions on a number of violations per manager and total paid fines (compensations) by fund managers. Data on violations is from FINRA BrokerCheck, including these on civil (customer disputes), regulatory events, total fines paid, and disclosed investigations. Data covers individuals who single-managed funds at any time from 2008 until 2018. *Violations* is a dummy variable that equals one if manager is found liable in any violation case (civil, regulatory, or criminal), and zero otherwise. *Regulatory* is a dummy indicator that equals one of any regulatory disciplinary event(s) are disclosed, and zero otherwise. *Customer disputes* is a dummy indicator that equals one if a manager has a record of resolved customer disputes not in his/her favor, and zero otherwise. *Number of violations* is the total number of all violations that are reported in FINRA BrokerCheck. *Fines paid* is the USD dollar amount of total fines and compensations paid by the manager at fault. Regressions include manager-specific controls, namely manager gender, year of birth, father's age at manager birth, parental employment, and parental household wealth. Table also reports a number of managers. The corresponding *t*-statistics are reported in parentheses. 10%, 5%, and 1% significance levels are marked by *, **, and ***, respectively.

	Dependent Variable:				
	Violations	*Regulatory*	*Customer disputes*	*Number of violations*	*Fines paid (USD)*
Birth order	0.547***	0.174	0.791***	0.057**	14677.43***
	(2.89)	(0.68)	(3.44)	(2.49)	(3.51)
Manager controls	Yes	Yes	Yes	Yes	Yes
Pseudo/Adj. R-squared	0.12	0.09	0.15	0.03	0.03
Managers	303	303	303	303	303

Table 11: Performance metrics by birth order

This table reports managerial performance characteristics for our sample of fund managers by manager birth order. Birth order is a manager's rank by age among siblings. Sharpe ratio is the average monthly fund excess returns divided by standard deviation of monthly fund returns. Information ratio is the average monthly fund returns in excess to the market divided by the tracking error. Four-factor alpha is calculated as in Carhart (1997) using monthly returns over the twelve months, while to calculate gross-of-fee ("gross") alpha, we use gross monthly returns. Gross monthly returns are calculated by adding 1/12 of the fund's annual expense ratio to its monthly net-of-fee ("net") returns. All variables are annualized. The number of fund-year observations is reported along with the raw net returns. Superstar indicator is the percentage of managers awarded (and finalists) with Morningstar "Fund Manager of the Year" award among all finalists-managers by birth order. 5+ vs 1 is the percentage difference for 5+ versus 1 birth order group, which is reported with significance level indicators. 10%, 5%, and 1% significance levels are denoted by *, **, and ***, respectively.

	Sharpe ratio	Information ratio	Gross 4-factor alpha	Net 4-factor alpha	Superstars	N of obs.
	Birth order (2+ children)					
	(1)	(2)	(3)	(4)	(5)	(6)
1	0.94***	–0.09***	0.86***	–0.19	0.50	2900
2	0.92***	–0.13***	0.27	–0.84***	0.33	2505
3	0.83***	–0.14***	0.06	–1.02***	0.11	1049
4	0.71***	–0.24***	–0.68	–1.87***	0.06	481
5+	0.48***	–0.31***	–1.62*	–2.77***	0	177
5+ vs 1	−0.46***	–0.22**	–2.48***	–2.58***	0.50***	

Table 12: The effect of birth order on performance

This table relates a manager's birth order to fund's risk-adjusted performance. The dependent variables in Panel A are Sharpe and Information ratios. Sharpe ratio is the average monthly fund excess returns divided by standard deviation of monthly fund returns. Information ratio is the average monthly fund returns in excess to the market divided by the tracking error. The set of fund control variables include: Fund size as natural logarithm of the fund's total net assets in million USD; Fund family size as natural logarithm of combined fund family total net assets; Fund age measured as the natural logarithm of fund age in years in a given year; Fund risk as time series standard deviation of the fund returns using the twelve months return observations; Turnover ratio; Expense ratio; Fund flows are the net percentage flows of the fund in a given year. All fund control variables are lagged and are described in the Appendix. The set of manager-specific controls is comprised of manager age, gender, fund tenure and industry tenure. Baseline regression specifications (1) and (4) include fund and manager controls and segment and year fixed effects. Segment is defined by the Morningstar fund category indicator. The dependent variable in Panel B are monthly gross alpha and net alpha from Carhart (1997) four-factor model. Panel B also reports the results of Fama and MacBeth (1973) performance regressions, where dependent variables are estimated using rolling window of 24 months (minimum 20 observations) and 36 months (minimum 30 observations). Newey and West (1987) standard errors are adjusted for 24- and 36-month lags, respectively. The sample is restricted to observations where rolling windows exactly match single management period of a corresponding manager. Standard errors are double-clustered by fund and year. The corresponding *t*-statistics are reported in parentheses. 10%, 5%, and 1% significance levels are marked by *, **, and ***, respectively.

Panel A: Sharpe ratio and Information ratio

Variable	*Sharpe ratio*			*Information ratio*		
	(1)	(2)	(3)	(4)	(5)	(6)
Birth order	–0.056***	–0.053***	–0.013	–0.068***	–0.058***	–0.040***
	(–3.88)	(–3.95)	(–0.53)	(–4.23)	(–3.88)	(–1.82)
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes
Manager controls	Yes	Yes	Yes	Yes	Yes	Yes
Segment FE	Yes	No	No	Yes	No	No
Year FE	Yes	No	No	Yes	No	No
Segment FE x Year FE	No	Yes	No	No	Yes	No
Fund firm FE x Year FE	No	No	Yes	No	No	Yes
Adj. R-squared	0.7	0.76	0.79	0.12	0.32	0.29
N of funds	1,009	1,009	775	1,009	1,009	775
Observations	6,316	6,264	4,038	6,316	6,264	4,038

Panel B: Gross and Net alphas

Variable	*Gross 4-factor alpha*			*Net 4-factor alpha*		
	Baseline	FMB(24), N-W(24)	FMB(36), N-W(36)	Baseline	FMB(24), N-W (24)	FMB(36), N-W (36)
	(1)	(2)	(3)	(4)	(5)	(6)
Birth order	–0.053***	–0.012*	–0.015***	–0.053***	–0.012*	–0.015***
	(–3.24)	(–1.91)	(–2.76)	(–3.21)	(–1.88)	(–2.69)
Observations	6,316	48,266	39,578	6,316	48,266	39,578

Appendix. Variable Description

Table A1: Descriptions of main variables

This table provides descriptions and sources of variable used in this paper. The following abbreviations are used: OBIT - Obituaries; CRSP: CRSP - CRSP Survivorship Bias Free Mutual Fund Database; MS - Morningstar Direct Database; BL - Bloomberg; MQ - Marquis Who's Who database; INT - Intelius database; ANC - Ancestry.com; LEG - Legacy.com; FW - Fund company websites; LN - LexisNexis; NP - Newspapers.com; AE - Authors' estimations; MC - manually collected.

Variable	Description	Source
Panel A: Dependent variables		
Total risk	The time-series standard deviation of monthly mutual fund return observations in a given year. Alternatively, we calculate it using rolling window of 24 and 36 months.	CRSP, AE
Idiosyncratic risk	The standard deviation of the monthly residuals from the four-factor model. Calculated with monthly observations in a given year or using rolling window of 24 and 36 months.	CRSP, AE
Active risk	The standard deviation of monthly mutual fund returns in excess of the fund-specific benchmark. Calculated with monthly observations in a given year or using rolling window of 24 and 36 months.	CRSP, AE
	We follow Petajisto (2013) and use the official benchmark index of each fund as stated in its prospectus. The benchmarks are 5 indices from S&P, 12 indices from Russell, and 2 indices from Dow Jones / Wilshire.	
Panel B: Main Independent variables		
Birth order	Manager's rank by age among siblings.	OBIT, MQ, LN, NP, MC
Family size	Number of children born to a manager's parents.	OBIT, MQ, LN, NP, MC
Panel C: Fund variables		
Fund size	Natural logarithm of a fund's total net assets in million USD.	CRSP, AE
Fund family size	Natural logarithm of combined fund family total net assets.	CRSP, AE
Fund age	Natural logarithm of fund age in years in a given year.	CRSP, AE
Turnover	A fund's turnover ratio.	CRSP
Expense ratio	A fund's expense ratio in %.	CRSP
Fund Flows	Net percentage mutual fund flows, computed as $(TNA_t^i - TNA_{t-1}^i(1 + r_t^i))/TNA_{t-1}^i$ where TNA_t^i is the fund *i*'s total net assets in year *t* and r_t^i stands for the net return in year *t*.	CRSP, AE
Panel D: Manager-specific variables		
Age	Biological age of a manager in years in a given month.	MS, BL, INT, FW, NP, MC
Female	Dummy variable equal to 1 if a manager is a female and 0 if male.	MS, BL, INT, FW, NP, MC
Fund tenure	Tenure of a manager in years, computed as difference between a current date and the date when the manager started managing the fund.	MS, AE
Industry tenure	Tenure of a manager in years, computed as difference between a current date and the date when the manager joined the fund management industry.	MS, AE

Table A1 - continued		
Panel E: Demographic controls		
Mother's/Father's age	Mother's/Father's age at manager's birth.	MQ, ANC, LN, NP, MC
Parents' college degree (0/1)	Dummy variable equal to 1 if manager's parents (father and/or mother) have a college degree as the highest degree earned and 0 otherwise	OBIT, MQ, ANC, LEG, LN, NP, MC
Parents' fund manager (0/1)	Dummy variable equal to 1 if manager's parents (father and/or mother) have worked in the asset management industry and 0 otherwise.	OBIT, MQ, ANC, LEG, LN, NP, MC
Father's military service (0/1)	Dummy variable equal to 1 if a manager's father has served in the military and 0 otherwise.	OBIT, MQ, ANC, LEG, LN, NP, MC
Father at war during childhood (0/1)	Dummy variable equal to 1 if a manager's father has served has done a prolonged military service overseas during a manager's childhood and 0 otherwise. Father's military service dates are from Department of Veteran Affairs and US military registries available on ancestry.com.	OBIT, MQ, ANC, LEG, LN, NP, MC
Parents executive job (0/1)	Dummy variable equal to 1 if a manager's father or mother had an executive position in a publicly traded company and 0 otherwise.	OBIT, MQ, ANC, LEG, LN, NP, MC
Parents low paid job (0/1)	Dummy variable equal to 1 if a manager's parents were either unemployed, worked in a relatively low paid jobs, or otherwise are reported to have low income and 0 otherwise.	OBIT, MQ, ANC, LEG, LN, NP, MC
Parents' monthly income (USD)	Parental income reported in U.S. censuses.	ANC, MC