

Three Essays on Household Finance, Entrepreneurship, and Corporate Finance

by

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Abstract

This dissertation consists of three essays. In the first essay, we examine how childhood gender socialization influences the gender gap in stock market participation. Using sibling fixed effects to exploit within-family variation, we find that individuals raised in more male-dominated households, where fathers have higher income or education than mothers, are more likely to invest in stocks. This relationship is stronger for men than for women, indicating that childhood socialization may constrain girls to traditionally feminine tasks, limiting their opportunities to learn about investing. We provide evidence that the primary mechanism driving this relationship is the internalization of masculine characteristics, rather than financial literacy or risk tolerance.

The second essay investigates how traditional household gender imbalances during childhood affect adult entrepreneurship. Analyzing data from the Panel Study of Income Dynamics (PSID), we find that individuals raised in more traditional gender-imbalanced households are more likely to own businesses and achieve better entrepreneurial performance in adulthood. This positive association is stronger for men than for women, thereby contributing to the gender gap in entrepreneurship.

In the third essay, we examine the relation between corporate pension liability and corporate social responsibility (CSR). On the one hand, firms that care about their employees tend to carry greater pension liabilities, and these firms are likely to be socially responsible firms, indicating a positive relationship between a firm's pension liability and CSR score. On the other hand, resource-competing relation implies achieving and maintaining a fully funded pension plan often requires significant financial outlays, therefore may crowd out funding for other socially responsible activities, especially those not directly tied to employee satisfaction. Our results show that a firm's pension liability positively affects its CSR score overall.

Furthermore, by decomposing the CSR score into its employee satisfaction and non-employee components, we find that this positive effect works through CSR's employee satisfaction component. Our results also show that pension funded status negatively moderates this positive effect: Funded status of pension competes with a firm's CSR investments, given its limited resources and this resource-competition pattern is largely driven by CSR's non-employee component. Granular analyses on CSR strengths and concerns present nuanced evidence for how pension liability and its funded status jointly affect CSR's employee satisfaction and non-employee components. Using baby boomer as an instrument, we mitigate the endogeneity concerns and confirm our main results. Our work has real-world implications for human resource management in a broader CSR setting.

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Chapter One: General Introduction

This dissertation is composed of five chapters: a general introduction, three individual essays, and a general conclusion. I focus on how social phenomena influence individual behavior in financial decision-making and ultimately affect financial outcomes. Traditional finance relies on assumptions of “rationality,” which include the idea that preferences remain constant and that utility is derived solely from wealth. However, these assumptions can lead to puzzling issues, such as lower stock market participation rates and female entrepreneurship.

To address these unexplained phenomena, the first chapter of my dissertation examines the effect of gender norm socialization on stock market participation. Traditional economic models often assume that financial decisions are based purely on rational calculations of risk and return. However, my research complements this view by showing that financial behaviors, such as stock market participation, are significantly influenced by social and cultural factors, particularly gender norms learned during childhood. In this study, we examine the impact of childhood gender socialization on the gender gap in stock market participation. We find that individuals raised in male-dominated households — where fathers have higher incomes or more education than mothers — are more likely to participate in the stock market and allocate more wealth to equities in adulthood. This relationship is stronger for men than women, indicating that childhood gender socialization within the household may constrain women to traditionally feminine tasks, thus limiting the opportunity for girls to learn about investing. We provide evidence that internalizing masculine characteristics is the primary mechanism driving this behavior.

The second chapter of my dissertation studies the effect of gender norms on entrepreneurship and finds that they influence both the likelihood of owning a business and entrepreneurial performance in adulthood. Our paper makes three key contributions: First, it

uniquely uses household gender imbalances as proxies for traditional gender norms, moving beyond previous studies that use self-employment as a proxy for gender norms. Second, it examines how childhood gender norms contribute to the gender gap in entrepreneurship, contrasting with other research emphasizing personality traits and risk factors. Third, it offers a detailed household-level perspective on gender norms, complementing broader country-level analyses of their impact on entrepreneurial activity.

The third chapter of my dissertation focuses on corporate finance, emphasizing corporate social responsibility (CSR). In today's business environment, where firms are increasingly evaluated on their social and environmental impact, understanding the drivers of CSR is crucial. My research in this area examines how a firm's pension liabilities, particularly those related to defined benefit (DB) plans, influence its CSR performance. We hypothesized that firms with substantial pension liabilities are more likely to demonstrate strong CSR performance. The underlying rationale is that firms committed to significant long-term obligations, such as pensions, may engage in socially responsible practices to maintain a positive reputation among stakeholders. By analyzing data from MSCI ESG Stats and Compustat, our paper indicates that pension liabilities positively affect CSR scores, even after addressing potential endogeneity. However, the funded status of the pension plans may moderate this positive effect.

Chapter Two: Gender Socialization and Stock Market Participation

2.1 Introduction

Gender disparities in economic behavior, particularly in stock market participation, persist despite advancements in gender equality (e.g., Halko, Kaustia, and Alanko, 2012; Almenberg and Dreber, 2015; Niessen-Ruenzi and Mueden, 2023). Traditional gender roles often limit women's exposure to financial decision-making and investment opportunities, perpetuating a cycle of economic inequality (e.g., Alesina, Giuliano, and Nunn, 2013; Bertrand, Kamenica, and Pan, 2015). While these differences may be attributed to varying financial literacy or risk tolerance between men and women (e.g., Croson and Gneezy, 2009; Van Rooij, Lusardi, and Alessie, 2011; Bucher-Koenen et al., 2021), we propose that they are deeply rooted in the gender norms and socialization processes experienced during childhood. Understanding the sources of these gender differences is crucial for addressing the persistent gender gap in investment behavior.

Research has shown that early life experiences significantly influence later economic decisions (e.g., Malmendier and Nagel, 2011; Malmendier, Tate, and Yan, 2011). Given the importance of a child's social environment in shaping their beliefs about gender roles (Bussey and Bandura, 1999), household environment is likely a significant determinant of gender differences and norms that influence their economic decision-making in adulthood (Duchin, Simutin, and Sosyura, 2021). Our study adds to the growing literature exploring the nuances of how childhood socialization within households and communities impacts financial behavior (Niessen-Ruenzi and Mueden, 2023; Itzkowitz, Itzkowitz, and Schwartz, 2024). It offers new insights into the persistent effects of childhood gender socialization on gender differences that contribute to the gender gap in stock market participation, as well as the mechanisms through which this effect occurs.

Gender socialization is the process through which individuals learn and internalize the values, behaviors, and norms expected of them based on their gender, starting from a young age. This socialization occurs through various agents, including family, peers, and social institutions (e.g., Handel, 2011; Bertrand, 2019), and can have long-term effects on important economic decisions and outcomes (Lawson, Crouter, and McHale, 2015). For example, women are often socialized into roles that prioritize caregiving and domestic responsibilities, which can limit their career advancement (Shelton and John, 1996) and contribute to the gender pay gap (Blau and Kahn, 2017). These findings suggest that gender socialization may be a key source of gender differences that drive economic inequalities, particularly by influencing women's financial behaviors and their participation in the stock market.

Parents are especially influential role models from whom children observe, learn, and imitate, thus shaping their gender socialization (Halpern and Perry-Jenkins, 2016). This parental influence is long-lasting and contributes to the formation of enduring gender views (Cunningham, 2001). Children internalize subtle messages about gender roles from their parents, who influence their gender role attitudes by modeling either traditional or egalitarian behaviors, such as through the division of domestic and paid labor (Cunningham, 2001). Parental income and education, which reflect societal norms and expectations related to gender and associated behaviors (Halpern and Perry-Jenkins, 2016), may determine each parent's social capital and relative bargaining power within the household. Children raised in households that prioritize the male parent's contributions and status relative to the female parent may become more familiar with and appreciate traditionally masculine roles and traits. Consequently, these children may be more likely to cultivate masculine tasks and behaviors (Martin and Ruble, 2010), including investing and finance, which are typically viewed as masculine functions (White et al., 1989). Therefore, we

hypothesize that growing up in more male-dominated households, where the father has a higher income or more education than the mother, is positively associated with equity participation and allocation in adulthood (Hypothesis 1).

Furthermore, there are gender differences in the socialization process, with society enforcing distinct roles for men and women (e.g., Bussey and Bandura, 1999; Hyde, 2014). Parents reinforce gender socialization by rewarding or discouraging behaviors that align with gender norms, teaching children that deviations from these norms are costly (e.g., Bussey and Bandura, 1999; Martin and Ruble, 2010). Rewards reinforce gender-appropriate behaviors, while punishments deter gender-nonconforming behaviors, thus creating pressure for boys to excel in traditionally masculine tasks and skills, such as science, math, engineering, and sports (e.g., Leaper and Friedman, 2007). Conversely, girls are limited to functions that are considered feminine, such as caregiving and nurturing roles, and face challenges in acquiring masculine skills (Leaper, 2005), thus impeding their opportunity to learn about finance and investing. Given these differences in gender socialization that constrain girls from acquiring masculine skills, we hypothesize that the positive effect of growing up in a male-dominated household on stock market participation and allocation is stronger for men than for women (Hypothesis 2).

To test the above two hypotheses, we use longitudinal survey data on U.S. households from the Panel Study of Income Dynamics (PSID). These data allow us to observe children and their parents from 1968 to 1997 to measure household gender imbalance (i.e., male dominance) and then track the children's stock market participation and portfolio allocation from 1999 to 2021 when they reach adulthood. To proxy for household gender imbalance during childhood, we use two measures: the difference in annual income between parents, scaled by their average income, and the difference in years of schooling between parents, scaled by their average years of schooling

(Duchin et al., 2021). A higher household gender imbalance value indicates a more male-dominated household. To address omitted variables bias concerns at the family level, we include sibling fixed effects in our analysis, accounting for unobservable family-level predictors of investment behavior, such as religion, cultural values, parental risk preferences, and socioeconomic background.¹In our analysis, the effect of childhood household gender imbalance on stock market participation that we capture relies on variation in parents' relative income and education levels among siblings born in different years.

Our results reveal that, consistent with our hypotheses, growing up in more male-dominated households is positively associated with stock market participation, and, conditional on participation, a higher allocation to stocks in adulthood. When controlling for race, gender, education, marital status, family size, income, and wealth, as well as state-by- year, age, birth cohort, and sibling fixed effects, we find that an increase of one standard deviation in parental income imbalance is associated with an increase of 3.71 percentage points in the probability of stock ownership, representing a 16.1% increase in the probability of equity participation relative to the sample average. Conditional on participation, an increase of one standard deviation in parental income imbalance is associated with an increase of 2.0 percentage points in equity allocation, and a 7.5% increase relative to average equity allocation in the sample. Furthermore, the effect of a one-standard-deviation increase in parental income imbalance on equity participation is 3.5 percentage points smaller for women than for men, indicating a 64.8% widening of the gender gap in equity allocation. Conditional on participation, a one standard deviation increase in parental income imbalance has an effect that is 2.06 percentage points smaller

¹In our main analysis, we include sibling fixed effects based on having a shared mother but ensure that our results remain robust to including fixed effects based on having a shared mother-father pair.

on equity allocation for women relative to men, representing a 39.0% increase in the gender gap in equity allocation.

We perform a series of tests to ensure the robustness of our results. First, we use a propensity score–matched sample to verify that our findings hold for individuals who grew up with similar parents. Second, we use sibling gender imbalance and having a stay-at-home mother as alternative proxies for childhood household gender imbalance and find similar results. Third, we rule out alternative explanations for our results, including trust, parental equity participation, inheritances, and current household gender imbalance. Lastly, we account for investments in IRAs, apply sample weights, and control for factors such as pensions, business majors, birth order, and mother-father pairs with similar results.

Next, we conduct a path analysis using structural equation modeling to examine the potential mechanisms through which growing up in male-dominated households affects investment behavior. Using a subsample for which we can measure financial literacy, risk tolerance, and masculine characteristics, we do not find evidence that childhood household gender imbalance affects risk tolerance or financial literacy in adulthood, suggesting these factors do not explain our findings. However, we do find that boys who grew up in more male-dominated households have stronger masculine characteristics, such as perceived competence and preferences for challenge and leadership, which in turn lead to higher rates of equity participation and allocation in adulthood. However, this mechanism does not apply to girls; while there is some evidence that women who grew up in male-dominated households tend to have stronger masculine characteristics, it does not result in higher equity participation or allocation for women.

Our paper relates to two strands of literature. First, we contribute to the literature examining how early-life experiences impact economic decisions later in life. Studies have shown that

experiences as early as in the womb can affect investment behavior in adulthood (Cronqvist et al., 2016). Additionally, past macroeconomic experiences can have long-lasting effects on household investments, including borrowing, lending, and home ownership (Malmendier and Nagel, 2011; Malmendier and Nagel, 2016; Malmendier and Shen, 2024).² In particular, one's social environment in early life is important in shaping economic and financial decision-making later on. The literature also finds that children's preschool environments and peer interactions significantly impact long-term outcomes such as health, college attendance, home ownership, and earnings in adulthood (Chetty et al., 2011; Anelli and Peri, 2015; Carrell, Hoekstra, and Kuka, 2018).

With respect to gender socialization, Fernández, Fogli, and Olivetti (2004) find that boys whose mothers worked are more likely to choose working wives in adulthood, which can improve women's labor force participation. Farré and Vella (2013) examine the transmission of gender role attitudes from mothers to children and find that daughters of women with more liberal attitudes toward gender roles have higher labor force participation rates. More recently, Bertrand (2019) shows that early exposure to nontraditional family roles and parental gender role attitudes significantly influences how children internalize gender norms. She finds that both boys and girls develop more liberal gender norms when raised by unmarried women or women who work and earn more than their spouses. Parental gender attitude also affects children's involvement in housework, occupational choice, and educational performance (Cordero-Coma and Esping-Andersen, 2018; Dhar, Jain, and Jayachandran, 2019; Cano and Hofmeister, 2023). We contribute to this strand of literature by demonstrating that gender socialization influences children's stock market participation later in life, highlighting the impact of family gender role attitudes on children's financial behaviors.

² Early-life experiences can also have long-lasting effects on corporate decision-making (Bernile, Bhagwat, and Rau, 2017; Duchin et al., 2021).

Second, we contribute to the growing literature on gender differences and stock market participation. Previous research has identified a disparity between men and women in stock market investment, with gender differences in financial literacy and risk tolerance partially accounting for this gap (e.g., Van Rooij et al., 2011; Halko et al., 2012; Bucher-Koenen et al., 2021). Recent studies have begun to reveal the impact of gender norms on investment behavior. Ke (2021) finds that traditional gender identity norms constrain women's influence over intra-household financial decision-making, leading to a significant gap in stock market participation between households with financially sophisticated husbands and those with financially sophisticated wives. Gu, Peng, and Zhang (2024) use a revealed-preference approach to quantify the bargaining power of each spouse in influencing household equity participation and allocation. They find evidence consistent with traditional gender norms constraining women's influence in household decisions. At the community level, Guiso and Zaccaria (2023) exploit variation in gender norms across cohorts and regions in Italy, and find that communities with more egalitarian gender norms have higher rates of household participation in financial markets. While these studies show that societal gender norms can influence household investment decision-making by constraining the influence of women, they do not examine the socialization processes through which these gender norms are learned.

Recent studies most closely related to ours have begun to examine whether socialization in childhood can help explain the gender investment gap. Consistent with the evidence that girls and boys are socialized and treated differently in ways that affect their investment behavior in adulthood, Niessen-Ruenzi and Mueden (2023) show that financial matters are discussed less frequently with daughters than sons in the household, and that insufficient financial education for girls in school can lead to lower financial literacy and confidence in women, thus reducing their

stock market participation. From a community perspective, Itzkowitz et al. (2024) show that women and girls receive less encouragement to participate in the stock market than men and boys via the receipt of stock gift cards. In our study, we focus on the role of parents and gender norms within the household in the gender socialization process, and examine how it affects girls and boys differently, contributing to the gender investment gap in adulthood. We provide evidence that growing up in a male-dominated household encourages masculine characteristics in men but not women. The development of masculine characteristics, rather than risk tolerance or financial literacy, is the key channel through which childhood household gender norms affect investment behavior in men but not in women.

2.2 Data and Methodology

2.2.1 Data and Variables

We use data from the Panel Study of Income Dynamics (PSID), a survey of representative U.S. households conducted by the University of Michigan's Institute for Social Research. The data are collected annually from 1968 to 1997 and biennially starting in 1999. This dataset is particularly well suited for studying the effect of gender socialization within households during childhood on investment behavior in adulthood due to its longitudinal and intergenerational nature. The PSID tracks families across generations, allowing us to observe parental characteristics during the sample individuals' childhoods and their subsequent characteristics in adulthood. Specifically, we observe and measure the education, income, and other demographic and socioeconomic characteristics of parents when the sample individuals were children, in order to quantify household gender imbalance. Once these children reach adulthood and form their own households, we are then able to observe their investment behaviors along with other demographic and socioeconomic characteristics.

Parental income and education, reflecting societal norms and gender-related expectations (Halpern and Perry-Jenkins, 2016), can affect each parent's status, social capital, and bargaining power within the household. For example, if the father has more education or a higher income than the mother, he is more likely to hold authority in the family (Eagly, 1983). Thornton, Alwin, and Camburn (1983) find that children raised in households where the mother has a lower education level than the father tend to adopt more traditional and less egalitarian gender attitudes. Children begin learning about gender norms through observation and imitation of their parents at an early age. Studies show that by age 3, most children understand gender, and by ages 5 and 6, they exhibit strong gender-stereotyped expectations (Leaper and Friedman, 2007).

Following the measures of household gender imbalance used by Duchin et al. (2021), we construct two measures of parental gender imbalance using data from 1968 to 1997, based on the differences in income and education between male and female parents when a child is between the ages of 3 and 18. Parental income imbalance is defined as the difference between the annual income of the father and the mother, divided by their average income. Since this difference varies by year, we measure parental income imbalance during childhood by averaging the annual parental income imbalance from ages 3 to 18. Similarly, we construct a measure of parental education imbalance using the difference in years of schooling between the father and mother, divided by their average years of schooling, and averaged over the same age range.³ Higher values of parental income and education imbalance indicate higher male dominance in the household.

For our outcome variables of interest, we use data on households' stock holdings and total wealth from 1999 to 2021 once the sample individuals, initially observed as children, reach

³We measure household gender imbalance using income and education data from heterosexual parents during the years they are married or permanently cohabiting, even if they become divorced later on

adulthood. Equity participation is a binary variable that equals 1 if an individual directly invests in stocks of publicly held corporations, mutual funds, or investment trusts (excluding stocks in employer-based pensions or IRAs) in a given year, and 0 otherwise.⁴ The equity-wealth ratio is defined as the value of directly held stocks and equity shares of mutual funds divided by total wealth, measured as the sum of cash-like assets, bonds, stocks, private business equity, vehicle equity, and home equity, minus other debts (Brunnermeier and Nagel, 2008).⁵ We exclude observations with an equity-wealth ratio greater than 1.

2.2.2 Summary Statistics

Table 2.1 presents summary statistics weighted using PSID sample weights to be representative of the underlying population. All income, wealth, and asset holdings are converted to December 2021 dollars using the consumer price index. Panel A of Table 1 reports parental characteristics from data collected during the 1968 to 1997 survey waves, corresponding to the sample individuals' childhood years. On average, the fathers (mothers) of sample individuals have 12.5 (12.3) years of education. Among these parents, 67.4% of fathers and 66.8% of mothers graduated from high school, while 24.6% of fathers and 14.6% of mothers hold a college degree. On average, fathers have an annual income of \$67,800, whereas mothers earn \$16,665 annually. The average parental income imbalance is 1.14, indicating that fathers' incomes were approximately 3.65 times those of mothers when individuals were children. The average parental education imbalance is 0.017, showing that fathers had only slightly more education than mothers.

⁴ We confirm the robustness of our results by including equity in IRAs in Table C1 on the Internet Appendix.

⁵ Cash-like assets include checking and savings accounts, money market funds, certificates of deposits, savings bonds, and Treasury bills. Bonds include bonds, bond funds, cash value in life insurance, valuable collections for investment purposes, and rights in a trust or estate. Stocks include shares in publicly held corporations, mutual funds, and investment trusts. Other debts include credit card debt, student loans, medical or legal bills, and loans from relatives.

This is consistent with the similar proportions of high school graduates among mothers and fathers, and the fact that 24.6% of fathers, compared to 14.6% of mothers, hold a college degree. These statistics suggest that the majority of individuals in our sample grew up in male-dominated households, where the father significantly out-earned the mother but had only a slight educational advantage.⁶

Panel B of Table 2.1 reports summary statistics from 1999 to 2021 for 7,628 unique sample individuals once they reach adulthood. The average age of individuals in our sample is 41.9 years. Of the sample individuals, 86% are White, 6.1% are Black, 55.0% are female, 91.1% graduated from high school, 33.0% hold a college degree, and 52.5% are married. The average annual income is \$55,253, and the average family size is 2.4 persons.

Panel C of Table 2.1 presents summary statistics for asset holdings of sample individuals. On average, 23.0% of individuals participate in the stock market. Specifically, 24.1% of men in our sample participate in the stock market, compared to 20.6% of women, resulting in an unconditional gender gap of 3.5 percentage points in stock market participation. Conditional on participation, sample individuals allocate an average of 26.7% of their wealth to equity. Men have an equity-wealth ratio of 28.4%, while women have an equity-wealth ratio of 25.2%, leading to a 3.2 percentage point gender gap in equity allocation among those who participate in the stock market. All variables are described in detail in Table 2A.1.

[Insert Table 2.1 here]

⁶ Figure C1 illustrates a left-skewed distribution, with approximately 70% of parental income imbalance observations concentrated above 1. In contrast, Figure C2 shows a much less skewed distribution of parental education imbalance, which is primarily centered around 0.

2.2.3 Methodology

We use the following regression to test our first hypothesis that growing up in more male-dominated households is positively associated with equity participation and allocation in adulthood:

$$Y_{it} = \beta \text{ChildImbali} + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it}, \quad (1)$$

where Y_{it} represents either equity participation or equity-wealth ratio for individual i in year t . ChildImbali denotes childhood household gender imbalance for individual i . We include controls that are important determinants of stock market participation, including race, gender, education, marital status, family size, income, and wealth (e.g., Campbell, 2006; Blau and Kahn, 2017). All continuous independent variables and controls are standardized. ζ_{st} are state-by-year fixed effects that control for time-varying state-level unobservables that may affect equity participation and allocation. δ_b are birth-cohort fixed effects, which account for cross-generational variation in investment behavior. The birth cohorts are grouped into five-year bins, with the earliest cohort consisting of individuals born between 1948 and 1952 (Duchin et al., 2021). η_a denotes age fixed effects to control for life-cycle factors that can affect investment behavior. θ_s represents sibling fixed effects, which indicate whether individuals share the same mother and account for unobservable family and background characteristics, including both genetic and nongenetic factors that can vary by household (Cronqvist and Siegel, 2014).

To test our second hypothesis that the impact of childhood household gender imbalance on investment behavior differs for men and women, we estimate the following equation:

$$Y_{it} = \beta_1 \text{ChildImbali} + \beta_2 \text{Female}_i + \beta_3 (\text{Female}_i \times \text{ChildImbali}) + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it}, \quad (2)$$

where Female_i equals 1 if individual i is female, and 0 if individual i is male. We include all other controls and fixed effects in equation (1). β_1 estimates the effect of childhood household gender imbalance on investment behavior for males. β_3 estimates the difference in investment behavior

between females and males, for a given level of childhood household gender imbalance. Thus, $\beta_1 + \beta_3$ captures the net effect of childhood household gender imbalance on investment behavior for women.

We estimate our models using ordinary least squares (OLS) regression and cluster standard errors by sibling group. We opt for linear probability models when estimating models with equity participation — a binary variable — as the dependent variable. This choice is due to the large number of fixed effects included in the regressions, which can lead to the incidental parameters problem in nonlinear models such as logit and probit (Neyman and Scott, 1948; Greene, 2004). Additionally, interaction terms, which are necessary to test hypothesis 2, are more difficult to interpret in nonlinear models (Ai and Norton, 2003).

2.3 Empirical Analysis

2.3.1 Main Results

We report our baseline results in Table 2.2. For comparison, we first estimate our models without sibling fixed effects in Panel A. As hypothesized, columns (1) and (2) show a positive relationship between growing up in a male-dominated household and equity participation in adulthood. In column (1) of Panel A, we find that a one standard deviation increase in parental income imbalance (i.e., higher household male dominance) during childhood is associated with a 0.85 percentage point increase in the probability of equity ownership. Relative to the mean equity participation rate of 23% (see Table 1), this represents a 3.7% increase in the overall probability of equity participation. We find similar statistical and economic significance for parental education imbalance in column (2). The results in columns (3) and (4) support our second hypothesis that women who grew up in more male-dominated households experience a smaller increase in the likelihood of equity participation relative to men. Economically, the estimate on the interaction

between childhood parental income imbalance and the female indicator in column (3) indicates that a one standard deviation increase in parental income imbalance widens the equity participation gap by 3.92 percentage points, a 67.4% increase relative to the mean. Column (4) shows similar statistical and economic significance for parental education imbalance.

[Insert Table 2.2 here]

Conditional on equity participation, we also find a positive relationship between growing up in a male-dominated household and the proportion of wealth allocated to equity in adulthood. The results in column (5) indicate that a one standard deviation increase in parental income imbalance is associated with a 0.52 percentage point increase in equity allocation, representing a 1.9% increase relative to the average equity allocation of 26.7% in the sample (see Table 2.1). The results for parental education imbalance in column (6) are comparable. However, the effect of growing up in a male-dominated household on equity allocation does not differ significantly between women and men.

The relationship between household male dominance during childhood and adult investment behavior may be confounded by unobservable household-level factors, including shared family environment and genetics (Cronqvist and Siegel, 2014). To account for these unobserved family-level characteristics and to alleviate concerns about omitted variable bias, we leverage the fact that many individuals in our sample have siblings and in Panel B of Table 2.2 include sibling fixed effects for those who share a mother and all subsequent regressions.⁷ The results in column (1) (column (2)) of Panel B indicate that a one standard deviation increase in parental income (education) imbalance during childhood is associated with a 3.71 (3.90)

⁷ Among the 7,628 individuals in the sample, 5,848 have siblings in 2,789 unique sibling groups. We verify that our baseline results are similar when using mother-father pair fixed effects in Table A1 of the Internet Appendix.

percentage point increase in the probability of equity participation, representing a 16.1% (17.0%) increase relative to the mean rate of equity participation of 23% (see Table 2.1). The magnitude of this effect on equity participation is economically significant and comparable to that of having a college degree. Moreover, we find in column (3) (column (4)) that a one standard deviation increase in parental income (education) imbalance widens the gender gap in equity participation by 3.50 (1.82) percentage points, representing a 64.8% (150%) increase relative to the mean gender gap in equity participation.⁸

For equity allocation, column (5) shows that a one standard deviation increase in parental income imbalance is associated with a 2.0 percentage point increase in equity allocation, representing a 7.5% increase relative to the mean equity allocation in the sample. In column (7), we find that a one standard deviation increase in parental income imbalance widens the equity allocation gap by 2.06 percentage points, a 39% increase relative to the mean participation gap. We find results with similar economic and statistical significance for parental education imbalance in columns (6) and (8).

Overall, in models with sibling fixed effects, which restrict the source of variation in childhood household gender imbalance to differences across siblings, we find a strong positive relationship between growing up in a male-dominated household and equity participation and allocation. Notably, this positive relationship is stronger for men than for women. In general, these results are statistically and economically as strong as, or stronger than, those without sibling fixed effects. This suggests that shared family background and support do not confound the relationship

⁸ For the average childhood parental income imbalance of 1.139 (see Table 2.1), the conditional gender gap in equity participation is 5.40% ($= (1.139 \times (-0.0350)) + (-0.0141)$), where -0.0350 is the coefficient estimate of the interaction term, and -0.0141 is the coefficient estimate of the female indicator. Similarly, for the average parental education imbalance of 0.017, the conditional gender gap in equity participation is 1.21% ($= (0.017 \times (-0.0182)) + (-0.0118)$), where -0.0182 is the coefficient estimate of the interaction term, and -0.0118 is the coefficient estimate of the female indicator.

between childhood household gender imbalance and investment behavior, but rather introduce noise into it.

2.3.2 Propensity Score Matching

Although we include sibling fixed effects in our models, it is possible that additional family-level factors drive the relationship between childhood household gender imbalance and adult investment behavior. To mitigate this concern, we use propensity score matching (PSM) to match individuals who grew up in households with high male dominance to those who did not. Given the continuous nature of parental income and education imbalance measures, we assign individuals from households with above-median male dominance to the treatment group and those from households with below-median male dominance to the control group (Mallick and Yang, 2011; Stolper and Walter, 2019).⁹ To estimate propensity scores, we estimate a logit regression with a dependent variable that equals 1 if an individual is in the treatment group and 0 if they are in the control group. We include covariates that may influence both the level of male dominance in a child's household and the child's investment behavior in adulthood. These covariates are based on the characteristics and upbringings of the parents, and include each parent's race, age at first marriage, industry, occupation, state of upbringing, and the mother's employment status. Based on the propensity scores for each individual, we use nearest neighbor matching with replacement to form matched pairs such that the treatment and control groups differ in parental gender imbalance but are otherwise similar. We find similar results using kernel and caliper matching with a radius of 0.05.

⁹ Since our treatment variables are continuous, we also use generalized propensity score matching (GPSM) and find similar results. A detailed discussion of GPSM can be found in the Appendix.

Table 2.3 reports the differences in the mean value of covariates between the treatment and control groups before and after matching.¹⁰ Panels A and B of Table 3 show that, for the full sample, the mean values of all covariates in the treatment and control groups are significantly different before matching, but these differences are significantly reduced after matching for both parental income imbalance and parental education imbalance. Our findings are similar for parental income and education imbalance in Panels C and D of Table 2.3 when using a subsample conditional on equity participation, indicating high matching quality. Next, we estimate our baseline regressions using the matched sample and report the results in Panel E of Table 3. The coefficient estimates and significance levels are similar to our baseline results, alleviating the concern that differences in the households in which children were raised may affect stock market participation and allocation in adulthood.¹¹

2.3.3 Alternative Proxies for Childhood Household Gender Imbalance

To alleviate concerns that parental income and education imbalance may be imperfect proxies for male-dominated childhood gender imbalance, we provide two additional proxies: sibling gender imbalance and having a stay-at-home mother. First, siblings can be social partners and role models, significantly influencing an individual's gender attitudes (McHale, Updegraff, and Whiteman, 2012). Boys with brothers are more likely to accept traditional gender roles and behaviors compared to boys with sisters (Stoneman, Brody, and MacKinnon, 1986). This effect is

¹⁰In addition to the reported covariates, we include dummy variables for each parent's occupation, industry, and state of upbringing when estimating propensity scores. Given the large number of dummy variables, we do not report their balance quality in Table 3. However, we acknowledge that the differences between these dummy variables are also reduced after matching.

¹¹We also calculate the average effect of growing up in a male-dominated household on investment behavior in the matched samples, known as the average treatment on treated effects (ATT) (Mallick and Yang, 2011). Table 2A2 in the Appendix presents the average equity participation and allocation differences between individuals with high and low household male dominance during childhood. A detailed discussion of the methodology and results can be found in Appendix.

not limited to boys; it also occurs for girls. Rust et al. (2000) find that the presence of an older brother is related to increased masculine behavior and decreased feminine behavior in both boys and girls. Furthermore, Okudaira et al. (2015) find that girls with a brother exhibit more masculine characteristics than those with a sister and show a stronger preference for competition. To quantify this influence, we construct a measure of childhood sibling imbalance, defined as the difference between the number of brothers and sisters, divided by the total number of siblings. We average this value from age 3 to 18, setting it to 0 if the child has no siblings.

Panel A of Table 2.4 reports the relationships between sibling gender imbalance and equity participation and allocation. The results in column (1) show that a one standard deviation increase in sibling gender imbalance is associated with a 1.56 percentage point increase in equity participation, a 6.8% increase relative to the mean. In column (2), we find that a one standard deviation increase in sibling gender imbalance widens the equity participation gap by 2.51 percentage points, a 61.5% increase relative to the mean. However, we do not find that childhood sibling gender imbalance affects equity allocation. These results are less strong, both statistically and economically, compared to our baseline regressions using parental income and education imbalance, which is consistent with the evidence that parents are the primary role models from whom children learn (Bandura and Walters, 1977).

Second, studies show that a mother's employment status can also affect children's gender attitudes. Fernández et al. (2004) find that boys raised in families with a working mother are more likely to have wives who also work. Similarly, Farré and Vella (2013) show that children who grew up in families where the mother was unemployed are more likely to develop traditional gender attitudes. To measure the impact of a mother's employment status, we construct a dummy variable that equals 1 if an individual had a stay-at-home mother during childhood and 0 otherwise.

Since this variable can change by year, we take an average when the child is between the ages of 3 and 18. In column (1) of Panel B in Table 2.4, we find that having a full-time stay-at-home mother throughout childhood is associated with a 2.38 percentage point increase in equity participation (or a 10.3% increase relative to the mean) compared to having a full-time working mother throughout childhood. In column (2), we find that having a full-time stay-at-home mother widens the gender gap in equity participation by 2.14 percentage points, a 155% increase relative to the mean. However, we do not find evidence that having a stay-at-home mother in childhood affects equity allocation.

[Insert Table 2.4 here]

2.3.4 The Effect of Trust

Literature has shown that trust can influence stock market participation. Less trusting individuals are less likely to buy stock, and, conditional on stock ownership, allocate less wealth to stocks (Guiso, Sapienza, and Zingales, 2008). In exploring the role of trust, Giannetti and Wang (2016) find that corporate fraud significantly reduces household stock market participation through a loss of trust in the market. Similarly, Gurun, Stoffman, and Yonker (2018) reveal that the Madoff Ponzi scheme caused victims to withdraw assets from investment advisers and increase their bank deposits due to a significant erosion of trust. To measure trust, we use a subsample of individuals who responded to the 2016 PSID Well-Being Supplement and indicate whether they trust (1) most people, (2) some people, or (3) very few people. We follow Guiso et al. (2008) and create a dummy variable that equals 1 if an individual trusts most people and 0 otherwise.

Panel A of Table 2.5 presents the results of our baseline regressions with the addition of the trust variable. These results are comparable in statistical and economic significance to our

baseline results in Panel B of Table 2.2, suggesting that our results are unlikely to be driven by trust. Notably, we do not find a significant relationship between trust and equity participation. It is possible that since we can only measure trust in one survey wave, it does not capture enough variation once we include our control variables and state-year, age, birth cohort, and sibling fixed effects.

[Insert Table 2.5 here]

2.3.5 The Effect of Parental Equity Participation

As children tend to exhibit similar behavior and attitudes to their parents, parental equity participation may affect the investment behavior of children. Black et al. (2017) find that investment behavior is highly correlated between parents and their children, due to environmental influences and, to a lesser extent, genetic influences. Li (2014) finds that the likelihood of stock market participation increases if one's parents or children have recently invested in the stock market, highlighting the importance of within-family information sharing.

Though we include sibling fixed effects, there may be within-family variation in equity participation over time. To examine whether parental equity participation during one's childhood may explain our results, we create a dummy variable equal to 1 if an individual's parents participated in the stock market at any time during the individual's childhood between the ages of 3 and 18, and 0 otherwise. Since data on stock market participation is available only in the 1984, 1989, and 1994 survey waves between 1968 and 1997 when parental characteristics are measured, including this variable in our tests reduces our sample by roughly half. Once we include parental equity participation in our regressions, our results in Panel B of Table 2.5 are remarkably similar to our baseline results. We do not find a significant relationship between parental equity

participation and investment behavior in our sample, likely because sibling fixed effects already account for much of this effect. Thus, our results are unlikely to be driven by parental equity participation.

2.3.6 The Effect of Inheritance

Andersen and Nielsen (2011) find that windfalls from unexpected inheritances increase stock market entry. To ensure that previously unaccounted-for inheritances are not driving our results, we construct a measure of inheritance scaled by income for sample individuals in each survey wave. Scaling inheritance by income accounts for the varying significance of a given inheritance amount for individuals with different income levels (Brunnermeier and Nagel, 2008). In Panel C of Table 2.5, we additionally control for inheritances and find that our results remain the same, indicating that inheritances are unlikely to drive our findings.

2.3.7 The Effect of Current Household Gender Imbalance

We verify that household male dominance during childhood, rather than male dominance in individuals' current households, is driving our findings. For each survey wave, we construct proxies for male dominance in the individual's current household by calculating the difference between the male and female household members' income, scaled by their average income, and do the same for the number of years of education. Our findings remain unchanged when we include current income and education imbalance as control variables in the baseline regressions, as shown in Panel D of Table 2.5.

2.3.8 Additional Robustness Tests

To ensure the robustness of our results, we perform several additional robustness tests. First, we include IRA holdings when constructing equity participation and allocation measures and find similar results in Table 2C.1. Second, although it can be inefficient to include sample weights in regression analysis (Deaton, 1997), in Table 2C.2 we use sample weights to estimate our results to ensure they are not biased toward specific populations. Third, we include additional control variables, such as participation in pension plans, having a business major in college, birth order, and mother-father pair fixed effects, to address any remaining omitted variable concerns in Table 2C.3, and find results similar to our main findings. Further details on these tests are discussed in the Appendix of Chapter Two.

2.4 Mechanisms

In this section, we examine several potential mechanisms that may underlie the effect of growing up in a male-dominated household on adult investment behavior. Prior studies show that financial literacy and risk tolerance can partially explain the gender gap in stock market participation (Van Rooij et al., 2011; Halko et al., 2012; Almenberg and Dreber, 2015). In addition, we test whether learned masculine characteristics may drive our findings.

To underline the importance of these mechanisms in explaining our findings, we use path analysis, an application of structural equation modeling (SEM), which has become increasingly common in finance (e.g., Pevzner, Xie, and Xin, 2015; Malceniiece, Malceniieks, and Putnin, š, 2019; Di Giuli and Laux, 2022). In path analysis, a starting variable (i.e., childhood household gender imbalance) can affect final outcomes (i.e., equity participation and allocation) either directly or indirectly through mediating variables (i.e., mechanisms) such as financial literacy, risk tolerance, and masculine characteristics. This approach enables us to differentiate between the

direct effects of childhood household gender imbalance on investment behavior and its indirect effects through these mechanisms, which subsequently affect investment behavior.

Following Pevzner et al. (2015), we estimate both direct and mediated paths to better understand which mechanisms drive the effect of childhood household gender imbalance on adult investment behavior (Hypothesis 1). To estimate the direct path, we regress investment behavior on childhood household gender imbalance and a mediating variable, either financial literacy, risk tolerance, or masculine characteristics, as follows:

$$Y_{it} = \beta_4 \text{ChildImbali} + \beta_5 \text{MV}_i + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it}, \quad (3)$$

where Y_{it} is either equity participation or the equity-wealth ratio for individual i in year t . MV_i denotes the mediating variable for individual i . All other variables are as defined in our baseline regression shown in equation (1). If we continue to find a significant and positive effect of childhood household gender imbalance on investment behavior after controlling for a mediating variable, this implies that the direct path still holds.

To estimate the mediated path, we first regress each mediating variable on childhood gender imbalance, as shown in equation (4), and then regress equity participation and allocation on each mediating variable, as shown in equation (5):

$$\text{MV}_i = \beta_6 \text{ChildImbali} + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it}, \quad (4)$$

$$Y_{it} = \beta_7 \text{MV}_i + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it} \quad (5)$$

The total indirect effect of childhood household gender imbalance on investment behavior is calculated as the product of the effect of childhood household gender imbalance on the mediating variable (β_6) and the effect of the mediating variable on investment behavior (β_7). We use the Sobel (1982) test statistics to estimate the statistical significance of the total indirect effect.

Next, we perform path analysis to examine whether these potential mechanisms drive the differential effect of childhood household gender imbalance on investment behavior for men relative to women (Hypothesis 2). To estimate the direct path, we use the following model:

$$Y_{it} = \beta_8 \text{ChildImbali} + \beta_9 \text{Female}_{it} + \beta_{10} (\text{Female}_{it} \times \text{ChildImbali}) + \beta_{11} \text{MV}_{it} + \beta_{12} \text{Female}_{it} + \beta_{13} (\text{Female}_{it} \times \text{MV}_{it}) + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it}. \quad (6)$$

If we still find that the effect of childhood household gender imbalance on stock market participation and allocation is stronger for men than for women (i.e., β_{10} is negative), this suggests that the direct path persists independently of the mediation pathways. To estimate the mediated path and indirect effects, we use the following models:

$$\text{MV}_{it} = \beta_{14} \text{ChildImbali} + \beta_{15} \text{Female}_{it} + \beta_{16} (\text{Female}_{it} \times \text{ChildImbali}) + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it}, \quad (7)$$

$$Y_{it} = \beta_{17} \text{MV}_{it} + \beta_{18} \text{Female}_{it} + \beta_{19} (\text{Female}_{it} \times \text{MV}_{it}) + \gamma \text{Controls}_{it} + \zeta_{st} + \delta_b + \eta_a + \theta_s + \epsilon_{it}. \quad (8)$$

Given these estimates, we evaluate the total indirect effect of childhood household gender imbalance on investment behavior for men versus women. For men, the total indirect effect is calculated as the product of the effect of childhood household gender imbalance on the mediating variable for men (β_{14}) and the effect of the mediating variable on investment behavior for men (β_{17}). For women, we estimate the total indirect effect by taking the product of the effect of childhood gender imbalance on the mediating variable for women ($\beta_{14} + \beta_{16}$), and the effect of the mediating variable on investment behavior for women ($\beta_{17} + \beta_{19}$).

2.4.1 Financial Literacy

Parents are financial role models for their children, with fathers playing the primary role (Niessen-Ruenzi and Mueden, 2023). Parental social status, such as income and education,

influences children's financial literacy through the socialization process (Bottazzi and Lusardi, 2021). Children raised in male-dominated families may be more inclined to acquire financial knowledge, thereby developing higher financial literacy, which may lead to increased equity participation and allocation. Additionally, parents tend to treat boys and girls differently (Lytton and Romney, 1991), discussing financial matters less frequently with daughters than with sons, which contributes to lower financial literacy and equity participation among women (Niessen-Ruenzi and Mueden, 2023). Thus, financial literacy is a potential mechanism that may explain our findings.

To measure financial literacy for each sample individual, we use six questions from the 2016 PSID Well-Being Supplement to evaluate financial numeracy skills in daily life (Banks, o'Dea, and Oldfield, 2010). The six questions are as follows. First, "If you buy a drink for 85 cents and pay with one dollar, how much change should you get back?" Second, "A shop is having a half-price (50% off) sale. Before the sale, a sofa cost \$300. How much will it cost on sale?" Third, "If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?" Fourth, "A used car dealer is selling a car for \$6,000. This is two-thirds of what it cost new. How much did the car cost new?" Fifth, "If 5 people all have the winning numbers in the lottery and the prize is \$2 million, how much will each of them get?" Lastly, "Suppose you have \$200 in a savings account. The account earns 10 percent interest each year. How much would you have in the account at the end of two years?" Each individual is assigned a financial literacy score ranging from 0 to 6 based on the number of correct responses.

Using financial literacy as the mediating variable, we report the results of the path analysis in Panel A of Table 2.6. After controlling for financial literacy, we still find a positive and significant direct relationship between both parental income and education imbalance and equity

participation and allocation, as shown in columns (1) and (4) of the first two rows. The magnitudes of these estimates are comparable to our baseline results in Panel B of Table 2.2. However, the estimates from the mediated path results in columns (1) and (4) show that childhood household gender imbalance is not related to financial literacy in adulthood. We also find an insignificant relationship between financial literacy and equity participation and allocation. This may be due to the inclusion of sibling fixed effects in our model, which likely reduces the impact of family-level unobservables that could otherwise absorb the effects of financial literacy if it is correlated among siblings.

Next, we examine whether financial literacy is a mechanism through which childhood household gender imbalance affects investment behavior differently for men and women. The first two rows of columns (2) and (5) show a significantly positive direct path between both parental income and education imbalance and equity participation and equity allocation for men. However, these relationships do not hold for women, as shown in the first two rows of columns (3) and (6). The analysis of the mediated path shows no effect of childhood gender imbalance on financial literacy and no effect of financial literacy on investment behavior for either men or women, likely due to the inclusion of sibling fixed effects. These findings suggest that financial literacy is not a mechanism through which childhood household gender imbalance affects investment behavior.

[Insert Table 2.6 here]

2.4.2 Risk Tolerance

Parents play a significant role in shaping children's risk attitudes through the socialization process. For example, parents' risk-taking behaviors, such as stock market investments, can influence their children's investment decisions (Dohmen et al., 2012). In male-dominated

households where fathers typically make financial decisions (Burgoyne and Kirchler, 20098), children may be more exposed to risk-taking, potentially resulting in higher risk tolerance. Therefore, we expect a positive relationship between childhood household gender imbalance and risk tolerance. Boys raised in male-dominated households are encouraged to exhibit masculine traits (Adams and Coltrane, 2005), while girls are often constrained by traditional gender roles (Leaper, 2005). Research also suggests that risk-taking is typically viewed as a masculine trait (Bem, 1974). These gendered expectations influence children's attitudes toward risk, leading boys to develop higher risk tolerance (Dohmen et al., 2012). As a result, the impact of childhood household gender imbalance on risk tolerance is likely stronger in boys than in girls, making risk tolerance a potential factor in explaining our findings.

We construct risk tolerance parameters using the 1996 PSID data, which assesses individuals' risk tolerance based on respondents' answers to five questions about hypothetical income gambles (Kimball et al., 2009). The five questions are as follows: whether the respondent would take a job (1) with an equal probability of doubling income or cutting it by a third; (2) with equal probability of doubling income or cutting it in half; (3) with an equal probability of doubling income or cutting it by 20%; (4) with an equal probability of doubling income or cutting it by 75%; (5) with an equal probability of doubling income or cutting it by 10%. There are six response categories and then six individual-level preference parameter estimates. The higher the number, the higher the individual's risk tolerance level. Using risk tolerance as the mediating variable, the direct path in Panel B of Table 2.6 shows a significant positive relationship between growing up in a male-dominated household and equity participation and allocation after controlling for risk tolerance. The magnitudes of the effects are similar to those estimated in our baseline results. However, in the mediated path, we find no significant relationship between growing up in a male-

dominated household and risk tolerance, suggesting that a more male-dominated household does not lead to higher risk tolerance. We also observe no significant relationship between risk tolerance and equity participation or allocation.

Furthermore, we test whether risk tolerance is a mechanism for our second hypothesis. We find no significant differential effect between men and women in the mediated path. The insignificant coefficients in the mediated path result in an insignificant total indirect effect, as shown in Panel B of Table 2.6. These results suggest that while childhood household gender imbalance directly affects adult investment behavior, risk tolerance is not the mechanism explaining this relationship.

2.4.3 Masculine Characteristics

In this section, we examine whether learned masculine characteristics can explain our baseline results. Gendered characteristics, which affect individuals' behavior (Marianne, 2011; Mader and Schneebaum, 2013), are considered masculine if they are more culturally desirable for men than for women. Children raised in male-dominated households, where the father has a higher income or education level than the mother, may place greater value on masculine characteristics and are more likely to adopt masculine behaviors. Thus, we expect a positive relationship between childhood household gender imbalance and masculine characteristics.

Since the development of masculine characteristics is influenced by the dynamics within male-dominated households (Lamb and Tamis-LeMonda, 2004), and girls are generally discouraged from developing these characteristics, we expect that the effect of childhood household gender imbalance on masculine characteristics is stronger in boys than in girls. Therefore, masculine characteristics could also be a factor that explains our baseline results.

We measure the above three masculine characteristics using survey responses from the 2016 PSID Well-Being Supplement. The literature shows that men are more likely to take on challenges (Niederle and Yestrumskas, 2008; De Pater et al., 2009), prefer leadership in children (Fitzgerald et al., 2020), and perceive themselves as more competent than women (Wood and Karten, 1986; Eagly and Mladinic, 1994). To assess the preference for challenge, respondents were asked to choose between two statements: “I might quit a job if it turned out to be too difficult” or “I might quit if the job was no longer challenging.” We assign one point if respondents selected the second response. To measure the preference for leadership in their child, participants were asked whether they “would rather have a child who is a leader” or one “who does the work the teacher expects,” with a point given to those who favored leadership. Lastly, perceived competence is evaluated by asking respondents how strongly they agreed with the statement “I am competent and capable in the activities that are important to me.” Those who answered “strongly agree” or “somewhat agree” earn a point. These three qualities are combined to form a score ranging from 0 to 3 for masculine characteristics.

In Panel C of Table 2.6, the direct path continues to show significant positive relationships between both parental income and education imbalances with equity participation and allocation, even when controlling for masculine characteristics as the mediating variable. The effect sizes are comparable to, though slightly larger than, those in our baseline estimates. In the mediated path, we find a strong positive relationship between both parental income and education imbalances with masculine characteristics. In addition, there is a significant positive relationship between masculine characteristics and equity participation, resulting in a significant total indirect effect of parental income imbalance on equity participation, with masculine characteristics as the mediating variable. For equity allocation, we continue to find a strong positive relationship between both

parental income and education imbalances with masculine characteristics. However, the positive relationship between masculine characteristics and equity allocation is only marginally significant, resulting in an insignificant total direct effect. These findings suggest that growing up in a male-dominated household results in stronger masculine characteristics, which can subsequently affect their investment behavior in adulthood. Thus, we confirm that masculine characteristics are a mechanism through which childhood household gender imbalance affects equity participation, but find less support for its effect on equity allocation.

With respect to the differential effect of childhood household gender imbalance on investment behavior between men and women, we find that the direct path shows a positive relationship between parental income and education imbalances with both equity participation and allocation for men. However, these relationships do not hold for women. We also find that both parental income and education imbalances have positive and significant total indirect effects on equity participation through masculine characteristics for men, but not for women. The mediating effect of masculine characteristics for the relationship between childhood household gender imbalance and equity allocation is positive but insignificant due to a weak relationship between masculine characteristics and equity allocation. These results suggest that growing up in a male-dominated household leads boys to acquire masculine characteristics, which significantly influence their likelihood of participating in equity markets, but this effect does not hold for women. These findings are weaker and statistically insignificant for the equity-wealth ratio. This supports the idea that boys in male-dominated households develop masculine traits that shape their investment behavior in adulthood, while girls may encounter conflicts with traditional gender roles, limiting the effect of these traits on their investment decisions.

2.5 Conclusion

This paper provides new evidence on how household gender norms in childhood influence gender socialization, leading to long-term effects on investment behavior. We show that growing up in a male-dominated household is associated with a higher likelihood of equity participation and a greater portfolio allocation to equity. This relationship is notably stronger for men than for women, thus exacerbating the gender gap in stock market participation. Risk tolerance and financial literacy do not appear to be mechanisms through which childhood household gender norms affect investment behavior. Instead, growing up in male-dominated households encourages the acquisition of masculine characteristics, which is a key mechanism driving increased equity participation and, to a lesser extent, equity allocation in adulthood for men but not for women. We note that these findings depend on societal-level gender norms and are observed primarily in more traditional societies that enforce distinct roles for men and women, where the development of masculine characteristics and skills in boys may be more pronounced, while girls are excluded from acquiring these characteristics and skills.

2.5 Practical Implications

The study underscores the need for practical interventions to close the gender gap in investing. Educational systems should incorporate financial literacy programs that actively engage girls and young women, countering early socialization patterns that steer them away from traditionally "masculine" financial activities. Parents and caregivers play a crucial role by modeling equitable financial decision-making and discussing investments openly with all children, regardless of gender. Workplace initiatives—such as employer-sponsored financial workshops tailored for women—could address gaps in confidence and knowledge, while policymakers might introduce incentives to boost female participation in stock markets. Community-based efforts,

including investment clubs and mentorship programs, could foster supportive environments for women to develop financial skills. Media representation also matters; showcasing women as confident investors helps shift societal perceptions. Ultimately, narrowing the investment gap requires systemic changes—from early education to workplace policies—that challenge traditional gender norms and advance financial empowerment for women.

2.6 Future Research

An important direction for further research would be to examine whether these relationships persist in more egalitarian societies. In societies where gender norms are less restrictive and girls have equal opportunities to learn about finance and investments, we would expect the differential effect of growing up in male-dominated households on investment behavior to weaken for men relative to women. Guiso and Zaccaria (2023) show that in communities with more egalitarian norms, participation in financial markets and equity holdings are higher, suggesting a more optimal selection of household decision makers. In such societies, the gender socialization process may differ significantly, with household gender norms playing a reduced role. Thus, both boys and girls could receive equal financial exposure, potentially reducing the gender gap in investment behavior. Understanding how household and community-level norms interact to shape investment behavior has important policy implications, particularly for promoting gender equality in market participation to help close the gender gap in financial outcomes.

Chapter 2: Appendix

2A: Propensity Score Matching

We assign a value of 1 for individuals from households with above-median male dominance (treatment group) and a value of 0 for individuals from households with below-median male dominance (control group). Following the method of Mallick and Yang (2011), we calculate the average effect of childhood household gender imbalance on investment behavior in the matched samples, known as the average treatment on treated effects (ATT). The magnitude of the difference in equity participation and equity-wealth ratios between treatment and control groups can be obtained by using the following equation:

$$\tau \text{ ATT} = E[Y_{it} | \rho, D = 1] - E[Y_{it} | \rho, D = 0] \quad (9)$$

where $\tau \text{ ATT}$ represents the average propensity and allocation difference between the matched treatment and control groups. Y_i denotes the equity participation and equity-wealth ratio. D is a dummy variable that equals 1 if the childhood household gender imbalance is higher than the median and equals 0 otherwise. The propensity score of each individual can be calculated using the following equation:

$$\rho = \Pr(D = 1 | X) \quad (10)$$

where ρ is the probability that an individual is from a household with above-median male dominance, conditional on the individual characteristic X . This probability ranges from 0 to 1. The propensity score ρ is calculated using parental characteristics, such as the parents' race, age at the time of first marriage, industry, occupation, state of upbringing, and the employment status of the mother.

Our paper uses three different matching methods: nearest neighbor matching with replacement, kernel matching, and caliper matching using a radius of 0.05 (e.g., Drucker and Puri,

2005; Baghdadi, Safiullah, and Heyden, 2023; Chang, Ljungqvist, and Tseng, 2023). To ensure covariate balance, we implement a common support condition. We chose the nearest neighbor matching approach with replacement to ensure comparability between both groups and to prevent significant differences between them (Baghdadi, Safiullah, and Heyden, 2023). For caliper matching, we require that the absolute difference in predicted propensity scores does not exceed 0.05 (e.g., Drucker and Puri, 2005; Koetter and Popov, 2021; Chang et al., 2023).

Table 2A.1 presents the average propensity and allocation difference between individuals raised in households with above-median male dominance compared to those with below-median male dominance. Panel A (B) shows the average parental income (education) imbalance treatment effect on equity participation. Panel C (D) shows the average parental income (education) imbalance treatment effect on the equity-wealth ratio, conditional on participation. Using the nearest neighbor matching method in Panel A, we find that individuals from households with high parental income imbalance are 9.67% more likely to invest in the stock market, with this average treatment effect being statistically significant. When using other matching methods, the estimates are about 7%. In Panel B, individuals with high parental education imbalance show a 2.34% to 2.58% higher likelihood of investing in the stock market. We find similar results for equity allocation in Panels C and D of Table 2A.1.

Next, Table 2A.1. presents the covariate balance test results using nearest neighbor, kernel, and caliper matching methods. The last three columns of Table 2A.3 show that the pseudo R2 (PS R2), likelihood ratio of chi-square test (LR χ^2), and mean bias are significantly reduced when using different matching methods. Figures 2A.1 to 2A.4 further illustrate that the covariate differences diminish when using the nearest neighbor matching method, confirming that the balance quality is satisfactory.

2B: Generalized Propensity Score Matching

In this section, we present the results of generalized propensity score matching (GPSM) estimation following the method of Rosenbaum and Rubin (1983). Given that our gender imbalance proxies are continuous variables, we incorporate the generalized propensity score into our analysis to evaluate the average likelihood of stock market participation and wealth allocation into stocks at varying levels of the continuous “dose,” which in this case represents the degree of male-dominated childhood gender imbalance. GPSM, like traditional propensity score matching, satisfies the balancing property, thereby mitigating bias associated with differences in covariates.

Following Hirano and Imbens (2004), we first estimate the generalized propensity score.

Let $r(t, x)$ be the conditional density of the treatment given the covariates:

$$r(t, x) = fT | X(t | x) \quad (11)$$

in which X represents a vector of covariates, and T denotes a treatment variable. The generalized propensity score is $R = r(T, X)$.

Second, we estimate the conditional expectation of the outcome as a function of two scalar variables, the treatment level T and the GPS R . Then, the conditional expectation of Y given T and X is

$$E[Y | T = t, X = x] = E[Y(t) | X = x] \quad (12)$$

In particular, the above equation can be written as:

$$E[Y_t | T_t, R_t] = \alpha_0 + \alpha_1 T_t + \alpha_2 T_t^2 + \alpha_3 R_t + \alpha_4 R_t^2 + \alpha_5 T_t R_t \quad (13)$$

We use ordinary least squares to estimate parameters in the above equation.

Next, we estimate the average potential outcome at treatment level t , based on the parameter estimates obtained in the second step:

$$[\widehat{E[Y(t)}] = 1/N \sum_{t=1}^N (\widehat{\alpha}_0 + \widehat{\alpha}_1 t + \widehat{\alpha}_2 t^2 + \widehat{\alpha}_3 \widehat{r}(t, X_t) + \widehat{\alpha}_4 \widehat{r}(t, X_t)^2 + \widehat{\alpha}_5 t \widehat{r}(t, X_t)) \quad (14)$$

In this way, we obtain an estimate of the entire dose-response function for each level of the treatment variables. Table B1 presents the results of the generalized propensity score. Then, we test the balancing propensity of covariates. Following the method of Giannetti (2019), we divide the sample into three groups and five blocks. Within each block, the mean differences of each covariate are compared between individuals with a GPSM in that block and individuals in the same block but with different actual treatment intensities (i.e., groups). If the GPSM successfully balances the covariates, these differences should not be statistically significant. Table B2 reports the t-stat mean for each group across all covariates. Although some t-stats exceed the critical value of 1.96 after controlling for GPSM, we still conclude that the estimated generalized propensity score performs reasonably well, effectively reducing potential treatment bias. Table B3 shows the result of equation (13). While the estimated coefficients do not have a direct causal interpretation, the significant difference of the GPSM terms from 0 suggests that they are indeed relevant and contribute significantly to reducing the bias in the estimated response of stock market participation and allocation. This response is linked to changes in the level of male-dominated gender imbalance during childhood.

Since the GPSM is evaluated for each individual at every treatment level, a number of propensity scores correspond to each treatment level. The average response for each treatment level is calculated by taking the mean of all individual responses. Bootstrap methods are used to calculate the standard errors, accounting for the estimation of both GPSM and α .

Figures 2B.1–2B.4 illustrate the result of the dose-response function. The figures show that the average levels of stock market participation and allocation increase with the intensity of treatment, which is also consistent with our baseline results.

2C: Additional Robustness Tests

In this section, we conduct several additional robustness tests to confirm the validity of our baseline results.

2C.1 IRAs

An individual retirement account (IRA) is a personal financial strategy in which contributions are tax deductible. However, investment decisions within an IRA are influenced by default options, such as contribution rates, asset allocation, and fund distribution, among other factors (Beshears et al., 2009). Furthermore, individuals with substantial wealth tend to allocate funds toward IRAs due to the tax advantage they offer. To potential concerns about the effect of default choices in IRAs and the impact of wealth differences on stock holdings, we examine whether our results still hold when IRAs are included in the asset- holding measures. Since 1984, the PSID survey waves have collected data on stock market participation, including stocks in pension accounts and IRAs.¹² Since 1999, the PSID has also collected data on the investment amounts in IRAs.¹³ We use a dummy variable, equity participation (IRA), which consistently

¹² The question is: “Do you (or anyone in your family living there) have any shares of stock in publicly held corporations, mutual funds, or investment trusts, including stocks in IRAs?”

¹³ In the PSID, there is a question that asks: “Do you (or anyone in your family) have any money in private annuities or individual retirement accounts (IRAs)?” The following question is: “How much would they be worth?.” In addition, a question asks: “Are they mostly in stocks, mostly in interest-earning assets, split between the two, or what?” The answers are: (1) mostly stocks; (2) mostly interest-earning; and (3) split. Following the method used in Brunnermeier and Nagel (2008), we create an allocation variable that equals 1 if respondents choose (1), 0 if respondents choose (2), and 0.5 if respondents choose (3). We calculate the equity value, including IRAs, using this method: The allocation

includes stock holdings in IRAs across all survey rounds (Giannetti and Wang, 2016). Furthermore, IRA values are incorporated into the equity value to calculate a new equity-wealth ratio. The results are presented in Table 2C.1. We find that the coefficients of parental income and education imbalance are similar to the baseline results of Table 2, and that the gender gap persists in this analysis.

2C.2 Sample Weights

In this subsection, we apply sample weights to our baseline results. Since the PSID is a probability sample, not all families have an equal probability of selection. By using sample weights, we mitigate potential biases, ensuring that the results are representative of the broader population.

We employ longitudinal weights in our analysis to adjust the sample so that each individual contributes to sample estimates in proportion to their representation in the population from which they are drawn. Therefore, the weighted regression results are more representative of the population. Weight adjustments can also compensate for differential non-response bias and differential attrition issues. However, we do not include these weights in our main regression analyses because it is efficient to do so (Deaton, 1997). The results of the regression estimated using sample weights are shown in Table 2C.2. The results are similar in both significance and magnitude to our baseline regression results.

2C.3 Other Omitted Variables

In this section, we examine whether other omitted variables confound the relationship between childhood household gender imbalance and stock market participation and allocation in adulthood.

variable multiplied by the value of IRA investment plus the value of stock directly invested in publicly held corporations, mutual funds, or investment trusts — not including stocks in employer-based pensions or IRAs.

2C.3.1 Pension Plans

Our baseline results show that women are less likely to participate directly in the stock market. One possible explanation could be that women are more likely to work in fields that offer pension plans, which may affect their investment decisions. To account for this issue, we add two additional variables, defined contribution plan (DC) and defined benefit plan (DB) (Sunden and Surette, 1998; Agnew, Balduzzi, and Sunden, 2003), to our baseline regression to examine whether our conclusions still hold. Panel A of Table 2C.3 shows very similar results as our baseline regression, implying that pension plans do not drive our baseline results.

2C.3.2 Business Major

Financial knowledge is a key determinant of wealth inequality (Lusardi, Michaud, and Mitchell, 2017). The gap in stock market participation between men and women may be partially driven by differences in business knowledge. Dong, Eugster, and Nilsson (2023) show that a business school education enables students to value stocks, conduct fundamental analysis of firms, and increase the likelihood of stock market participation. Thus, we add a business major in college as a covariate in our baseline regression. We find that a business major does affect equity participation, which is consistent with the literature. However, the magnitude and significance of the coefficients for parental income and education imbalance of Panel B of Table 2C.3 are similar to those in our baseline regression, suggesting that business major does not drive our baseline results.

2C.3.3 Birth order

The birth order of an individual can affect their characteristics (Black, Grönqvist, and Öckert, 2018), which in turn may influence their financial decisions. For example, the first-born

child may be more risk-averse and thus less likely to participate in the stock market. To account for this issue, we include birth order as an additional covariate in our analysis. Panel C of Table 2C.3 shows very similar results to our baseline regression, suggesting that birth order does not significantly change our findings.

2C.3.4 Mother-Father Pair Fixed Effect

Although we include sibling fixed effects in our model, we have not yet controlled for genetic and environmental factors associated with fathers, which could also affect our results. Therefore, we add a mother-father pair fixed effect to our baseline model. Panel D of Table 2C.3 shows that our baseline results are still valid after controlling for genetic and family-level observables related to fathers and mothers.

Chapter Three: Gender Imbalance during Childhood and Entrepreneurship

3.1 Introduction

Entrepreneurial activity is important for economic development and female participation is an indispensable part of it (Gupta and Fernandez, 2009; Sarfaraz, Faghih, and Majd, 2014). In 2019, 12.3 million businesses in the US were owned by women. Despite the remarkable growth in female entrepreneurship, the total entrepreneurial activity (TEA) rate for women worldwide in 2019 was 10.2%, which is only three-quarters that of male entrepreneurship (Elam et al., 2019). In addition, only 1.3% of female entrepreneurs own medium to large businesses, while the percentage for men is 3.3%. With respect to business financing, women asked for 35,000 dollars less on average for business loans than men in 2019.¹⁴ Women are more likely to use personal savings to fund their businesses and provide more collateral and pay higher interest rates than men (Coleman, 2000). As a result, female entrepreneurial activities are usually concentrated in slower-growing and less profitable industries (Carter, Gartner, Shaver, and Gatewood, 2003).

Prior work provides explanations, including risk attitude, education, and financial constraints, for this entrepreneurial gap (Arenius and Clercq, 2005; Bönnte and Piegeler, 2013). We posit that learned gender norms during childhood may also be able to explain this gap. Given that successful entrepreneurship is typically portrayed through male stereotypes, while women tend to be underrepresented and are expected to balance family expectations and business, it is possible that gender norms in the household during one's formative childhood years may influence the likelihood and success of entrepreneurship later in life. To examine whether traditional gender

¹⁴ <https://writersblocklive.com/blog/women-entrepreneurs-statistics/>

norms during childhood affect entrepreneurial activity later in life, we put forward four hypotheses. First, a more traditional (less egalitarian) household gender imbalance during childhood is positively associated with business ownership in adulthood. Second, the positive relationship between traditional childhood gender imbalance and business ownership is driven by men and is insignificant for women. Third, a more traditional household gender imbalance during childhood is positively associated with entrepreneurial performance in adulthood. Fourth, a more traditional household gender imbalance during childhood constrains the entrepreneurial performance of female entrepreneurs. To test those hypotheses, we use data from the Panel Study of Income Dynamics (PSID), a longitudinal survey that has been ongoing for over 50 years. This data allows us to observe gender imbalance within the family during one's childhood as well as their entrepreneurial activities and performance once they reach adulthood.

Following Duchin, Simutin, and Sosyura (2021), we construct three measures of traditional childhood gender imbalance, which are intended to proxy for gender norms: parental income imbalance, parental education imbalance, and siblings' gender imbalance. First, parental income imbalance is the difference between the annual income of the father and the mother, divided by their average income. Second, parental educational imbalance is the difference between the number of years of education for the father and the mother, divided by their average years of education. Lastly, siblings' gender imbalance is the difference in the number of brothers and sisters an individual has during childhood, divided by the total number of siblings during childhood. To examine entrepreneurial activity and performance in adulthood, we use two proxies. First, we create a dummy variable that equals one if an individual owns and works in a business, and zero otherwise. Second, conditional on business ownership, we measure entrepreneurial performance by using business income.

Consistent with our first two hypotheses, we find a positive relationship between gender imbalance during childhood and business ownership in adulthood. A one-unit increase in parental income imbalance during childhood is associated with a 2.18 percentage point increase in the probability of owning and working in a business; however, this effect is primarily driven by men, and the net effect for women is not significant. We find similar results using parental education imbalance and siblings' gender imbalance as proxies for traditional household gender imbalance during childhood. With respect to entrepreneurial performance, we find that a one-unit increase in parental income imbalance during childhood is associated with approximately 4,000 dollars more annual unincorporated business income on average. For women, a one-unit increase in parental income imbalance during childhood is associated with 2,000 dollars less in unincorporated business income relative to men. We find that higher day-to-day housework duties and motherhood are channels that can cause this lower performance for female entrepreneurs.

For robustness, since non-entrepreneurs dominate our sample, we use the Propensity Score Matching method to create two comparison groups and find that our results remain basically the same. We also use the Heckman (1979) selection model to ensure our results are not driven by selection bias. Risk preference is a factor that can partially explain the gender gap, so we add an additional control variable, risk tolerance, to see if our baseline results are still valid. We also use an alternative proxy for traditional childhood gender imbalance, which is parental work imbalance, and find our conclusions still hold. Lastly, we measure entrepreneurship using self-employment instead of business ownership and find similar results.

Our paper makes four contributions. Literature has studied the inter-generational influence of parents on the entrepreneurial activities of children (Carr and Sequeira, 2007; Mungai and Velamuri, 2011; Criaco, Sieger, Wennberg, Chirico, and Minola, 2017). Most of them agree that

the entrepreneurial performance of parents affects the entrepreneurial intention or performance of children. Staniewski and Awruk (2021) found that parental attitude influences the entrepreneurial success of children through role modeling and communication. Criaco et al. (2017) showed that offspring are more likely to start a business if they are exposed to successful entrepreneurial parents, rather than less successful parents. Greene, Han, and Marlow (2013) believe that self-employed mothers hold counter-stereotypical gender attitudes, and this attitude positively influences daughters to become self-employed. This paper contributes to this strand of literature in that we disentangle the gender norms of self-employed parents. Compared with the literature that usually uses self-employed parents to represent gender norms, this paper provides a new and comprehensive way to represent them.

Second, researchers have studied the gender gap in entrepreneurship. Some researchers think personality difference contributes to it (Caliendo et al., 2015). A proactive personality positively relates to entrepreneurship intention (Crant, 1996). Extroversion and neuroticism are important characteristics found in female entrepreneurs (Zhang et al., 2009). Other characteristics, such as the willingness to compete, fear of failure, locus of control, and degree of trust can explain the difference in entrepreneurial activity (Wagner, 2007; Bönnte and Piegeler, 2013; Koellinger, Minniti, and Schade, 2013; Caliendo et al., 2015). Self-confidence also plays a role in entrepreneurship. If women believe they can overcome difficulties and have successful outcomes, then they have a higher probability of starting a business (Langowitz and Minniti, 2007). Risk preference is another explanation. A higher risk tolerance positively relates to starting a self-employed business (Kan and Tsai, 2006; Caliendo, Fossen, and Kritikos, 2009). Education has been regarded as an important factor that contributes to the gap. A person with greater knowledge can more easily perceive market opportunities and is more likely to start a self-employed business

(Acs, Arenius, Hay, and Minniti, 2004). Compared with other literature that tries to explain the gender gap, this paper puts forward a novel channel that explains the gap.

Third, researchers think gender norms can explain the gap shown in entrepreneurial activity. Traditional gender norms present women's primary roles as taking care of the home and following the expectations of society, which restricts their ability to access work opportunities and the resources required to engage in entrepreneurship (Fernández Cornejo et al., 2018; Chen, Huang, and Ye, 2020). For their professional role, women need to consistently negotiate with their husbands and have greater concerns about balancing family expectations and business (Bastian, Metcalfe, and Zali, 2019). As a result, traditional gender norms have a negative impact on female entrepreneurship (Marlow and Patton, 2005; Gupta, Turban, and Bhawe, 2008; Laguía, García-Ael, Wach, and Moriano, 2019). Also, women usually shy away from entrepreneurship because it has been traditionally characterized as a man's job (Goktan and Gupta, 2015). Women are also less likely to perceive themselves as having the ability to be entrepreneurs (Fernández Cornejo et al., 2018). This paper contributes to this aspect of the literature in that we demonstrate that gender norms women form during childhood affect their entrepreneurial activity later in life.

Fourth, researchers think gender norms are a part of wider social norms and those norms relate to a country's support for entrepreneurship (Welter et al., 2003; García-Cabrera and García-Soto, 2008; Bullough, Renko, and Abdelzaher, 2017; Bastian, Metcalfe, and Zali, 2019). Baughn, Chua, and Neupert (2006) use the GEM survey data of twenty-one countries and find that in those countries with more egalitarian gender norms, these norms contribute to more female entrepreneurial activities. From this aspect, we provide a household-level measure of gender norms instead of country-level measures.

The remainder of this paper is organized as follows. In Section 3.3, we describe our hypotheses. Section 3.4 describes the data for our empirical analysis. Our baseline results are presented in Section 3.5. Section 3.6 provides a robustness test for our baseline results. Section 7 concludes.

3.2 Theoretical Overview

This study draws on Social Learning Theory (SLT) to examine how traditional gender norms within households during childhood influence entrepreneurial behavior in adulthood. Social Learning Theory, rooted in the work of Bandura and Walters (1977), emphasizes the role of observational learning and modeling in shaping individual behavior. According to this theory, individuals acquire attitudes, skills, and behaviors by observing and imitating significant role models in their environment, particularly during formative years.

Within the family context, parents and siblings serve as primary role models from whom children learn gender-appropriate behaviors. In traditional households, where gender roles are sharply differentiated, children observe distinct patterns of behavior between mothers and fathers. Fathers typically embody traits associated with economic provision and leadership, while mothers often model caregiving and domestic responsibilities. These observed behaviors are reinforced through social rewards and punishments, leading children to internalize gendered expectations. For example, boys who witness their fathers as primary earners may associate masculinity with financial independence and risk-taking, traits commonly linked to entrepreneurship. Conversely, girls raised in such environments may learn to prioritize familial duties over professional ambitions, perceiving entrepreneurship as a domain less compatible with their prescribed roles.

The application of Social Learning Theory to entrepreneurship highlights how early exposure to gendered role models shapes career choices and outcomes. Entrepreneurship, often characterized by traits such as autonomy, risk-taking, and competitiveness, aligns with traditionally masculine stereotypes. As a result, individuals raised in gender-imbalanced households—where such traits are modeled and rewarded—may be more likely to pursue entrepreneurial ventures. However, this

effect is likely gendered: men benefit from the reinforcement of agentic behaviors, while women may encounter conflicting expectations that deter entrepreneurial engagement.

3.3 Hypothesis Development

Gender development is a phenomenon of early childhood rather than last throughout the life course. Around age three, children become aware of their gender. For example, they can sort pictures of males and females and refuse to dress their same-sex toys in unsuitable clothing (Weinraub et al., 1984). After awareness of their own gender, children develop the ability to label themselves as boys or girls or label surrounding children as boys or girls. At about age five or six, children learn gender norms (Durkin and Nugent, 1998), which are the binary principles that guide behaviors based on their gender, from their surroundings. Social learning theory argues that children learn gender norms from their surroundings, such as family, community, and school.

Parents are important role models for children to observe, learn from, and imitate. In a two-parent family, children learn gender norms by observing the differential performance of male and female models (Bussey and Bandura, 1999). In a traditional family, the father is the person who shows masculine characteristics and makes more money to support the family; the mother is the person who spends more time taking care of children and household work. An individual who was born into a family that has a nonworking mother may develop conservative gender attitudes and an individual who grew up in a family where the mother has less education than the father may develop less egalitarian attitudes (Thornton, Alwin, and Camburn, 1983; Farré and Vella, 2013). Therefore, in a traditional dual-parent family, there exists a gender imbalance skewed toward masculinity.

Siblings are also role models from whom children learn (McHale, Updegraff, and White-man, 2012). Brothers and sisters influence each other. Males with brothers adopt more conservative and masculine gender norms than males with sisters. An older girl with a younger

brother has more masculine traits than girls with sisters because brothers can influence girls towards male topics (Hartup, 1980; Stoneman, Brody, and MacKinnon, 1986). Therefore, it is easier for children to learn traditional gender norms when they are surrounded by more brothers than sisters.

Researchers believe that early-life experience predicts behavior later in life (Roberts and DelVecchio, 2000). Duchin, Simutin, and Sosyura (2021) find early-life exposure to a traditional household gender imbalance and masculine gender norms is associated with more active and competitive economic behaviors. Therefore, traditional gender norms formed during childhood may affect behavior in adulthood.

Over the years, entrepreneurship has been considered a male domain, and successful entrepreneurship is typically portrayed by male characteristics (García and Welter, 2013; Hancock, Pérez-Quintana, and Hormiga, 2014; Laguía et al., 2019). There is a gender imbalance towards masculinity in a traditional family during childhood and childhood experience predicts adulthood behavior. Therefore, we put forward our first hypothesis:

H1: A more traditional household gender imbalance during childhood is positively associated with business ownership in adulthood.

Historically, people who follow gender identity and beliefs are generally better off (D'Acunto, 2019). For children, if they follow gender norms that meet the expectations of society, then they would get rewards, such as approval and praise; if they violate these beliefs, they would get punished (Bussey and Bandura, 1984). Traditional gender norms tend to motivate boys to develop male-linked behaviors, such as being aggressive, independent, enterprising, and venturesome. Traditional gender norms tend to constrain the behaviors of women to traditionally feminine functions. Therefore, following these traditional gender norms, the learning behavior

of girls is constrained and impedes the opportunity for them to learn about entrepreneurship, which is traditionally cast as a masculine function. Therefore, we have our second hypothesis:

H2: The positive relationship between traditional childhood gender imbalance and business ownership is driven by men and is insignificant for women.

In a dual-parent family, children observe outcomes achieved by their parents. Outcomes convey information about gender norms and gender-linked behavior (Bussey and Bandura, 1999). People usually behave in a way that brings them valued outcomes and shy away from reversal outcomes (Bandura, 1989b). When children see valued outcomes, such as higher social status, and higher income achieved by their parents, they believe that they can also achieve comparable performances if they have similar beliefs and behaviors (Halpern and Perry-Jenkins, 2016). Therefore, the gender imbalance of family members incentivizes children to learn from an aggressive model in the family. This characteristic learned during childhood makes them overcome difficulties and want to have better performance. Because children learn traditional gender norms from the aggressive model, when they own businesses in adulthood, they may have a tendency to perform better. Therefore, we put forward our third hypothesis:

H3: A more traditional household gender imbalance during childhood is positively associated with entrepreneurial performance in adulthood.

Since society recognizes women as the primary caretakers of the home (Gupta et al., 2009), female entrepreneurs are still affected by gender norms and handicaps to their entrepreneurial performance (Marlow, 2002). First, the day-to-day responsibilities of a family restrict the time that women spend on their businesses, which negatively affects the entrepreneurial performance of female entrepreneurs (Eagly and Karau, 2002; Calás, Smircich, and Bourne, 2009). In our sample, women spend an average of 15 hours on housework per week, while men usually spend nine

hours.¹⁵ Therefore, it is possible that male entrepreneurs have better performance than female entrepreneurs because they have more free time to devote to business.

Second, society believes women should spend time with children and support them, leading them to be healthier and better educated (Coleman, 2004; Ahl, 2006; Calás, Smircich, and Bourne, 2009). In this way, motherhood distracts female entrepreneurs from their businesses. Even though women choose to become entrepreneurs because they want to balance work and life, they still face this "double burden" (Allen, Langowitz, and Minniti, 2007). Therefore, female entrepreneurs may perform worse than male entrepreneurs.

Third, the gender imbalance learned during childhood also limits growth opportunities for female entrepreneurs. Female entrepreneurs need to consistently negotiate their roles with family members and cooperate with them (Shinnar, Giacomini, and Janssen, 2012; Goktan and Gupta, 2015). For female entrepreneurs, when there is a conflict between family and business, the gender norms learned during childhood pressure them to forgo opportunities for career development to take care of their family (Arenius and Clercq, 2005). Based on the reasons above, we have our fourth hypothesis:

H4: A more traditional household gender imbalance during childhood constrains the entrepreneurial performance of female entrepreneurs.

3.4 Data and Methodology

3.4.1 Sample Formation

The data we used to test our hypotheses is the Panel Study of Income Dynamics (PSID), a longitudinal panel survey conducted by the University of Michigan. In 1968, about 4,800 U.S. households across 40 states were interviewed, and this number increased to 9,570 in 2019. The

¹⁵ This results from the question: How much time does the head/wife spend on housework in an average week?

data has two important features: 1) households are tracked over generations; 2) individuals are followed over long periods of time.

We restrict our sample to observations of individuals, including parents and children. We are able to observe the education, income, and other socioeconomic characteristics of parents to measure household gender imbalance when sample respondents are children. Once these children become adults, we can then observe their business ownership and entrepreneurial performance, along with other demographic and socioeconomic characteristics from 1999 to 2019. The final sample is composed of 7,119 unique individuals, and each individual participates in an average of 6.96 survey waves, resulting in a total sample of 49,968 individual-year observations. Our sample is unbalanced data.

3.4.2 Dependent Variables

Business ownership: Following the outcome variable used in Greidanus and Liao (2021), we construct a business ownership variable that equals one if an individual owns and works in that business in a specific year and zero otherwise.¹⁶ As shown in Table A1, 7% of our sample owns and works in a business.

Entrepreneurial performance: We use total business income to represent entrepreneurial performance. There are two types of business income in the PSID data: incorporated and unincorporated. Since incorporated individuals are not asked about their business income in the survey, we use reported labor income (Hamilton, 2000; Greidanus and Liao, 2021). For unincorporated individuals, income corresponds to the sum of labor and asset portions of income.¹⁷

¹⁶ We construct an indicator variable from three questions of the PSID: "Did you own a business at any time in 1968, or have a financial interest in any business enterprise?" "Who in the family owned that?" "Did (you/he/she/they) put in any work time for this business?"

¹⁷ We also only use labor income of unincorporated business income as a robustness check and find similar results.

We adjust business income to 2019 dollars using the CPI index. For the subsample of individuals who own and work in a business, the average annual unincorporated business income (no asset income) is 19,437 dollars.

3.4.3 Independent Variables

Parental income imbalance: The difference between the annual income of the father and the mother, divided by their average income. Since this difference varies by year, to measure the parental income imbalance during one's childhood, we take the average parental income imbalance when a child is between the ages of three and 18.

Parental education imbalance: The difference between the number of years of education for the father and the mother, divided by their average years of education. To construct the parental education imbalance during one's childhood, we take the average parental education imbalance when a child is between the ages of three and 18.

Siblings' gender imbalance: The number of brothers minus sisters, divided by a child's total siblings. We take the average when a child is between the ages of three and 18.

3.4.4 Control Variables

To account for differences in individual-year demographic and socioeconomic characteristics, we include control variables that are standard in the entrepreneurship literature. In particular, we control for human capital, such as high school dummy, college dummy, work experience, occupation, unemployment status, and hourly wage (Caliendo et al., 2015; Brush et al., 2018; Greidanus and Liao, 2021). In addition, we control for financial constraints because female entrepreneurs face difficulties in obtaining capital, which may affect their decisions to own

a business and their entrepreneurial performance. Family wealth and cash holdings are common proxies that are used for financial constraints. However, since family wealth data is only available every five years in the PSID survey until 2007, we use home ownership to represent financial constraints. People who have a home tend to much easier to access external financial resources than people without a home (Kroeger and Wright, 2021). Moreover, when parents are self-employed, children are more likely to be entrepreneurs. If parents are successful entrepreneurs, then children are more likely to have better entrepreneurial performance (Bosma et al., 2012; Criaco et al., 2017; Staniewski and Awruk, 2021). Therefore, this paper constructs a dummy for whether fathers own businesses and another dummy for whether mothers own businesses as our control variables. This paper also controls the demographic characteristics of our sample in adulthood, such as marital status, ethnic origin, gender, and health status (Kan and Tsai, 2006; Camelo-Ordaz, Diáñez-González, and Ruiz-Navarro, 2016). Since the presence of preschool children has a large and positive effect on the odds that a woman will be self-employed (Parker, 2008; Krichevskiy, 2014), this paper also controls for the number of children in our analysis.

3.4.5 Univariate Test

Table 3.1 shows univariate t-tests for entrepreneurs and non-entrepreneurs, which allows us to compare business owners with non-business owners based on a variety of characteristics. There are 49,968 individual-year observations: 46,476 non-entrepreneurs and 3,492 entrepreneurs. There are 7,119 unique individuals for whom we can both track parental gender imbalance and siblings' gender imbalance during childhood and follow up on whether they become entrepreneurs and their entrepreneurial performance in adulthood. In our sample, each individual participates in

an average of 6.96 survey waves. We can see that entrepreneurs have a higher mean parental income imbalance, parental education imbalance, and siblings' gender imbalance compared with non-entrepreneurs. The higher value means that entrepreneurs in our sample are more likely to grow up in male-dominated families, which exposes them to traditional gender imbalance during childhood. We can also see that entrepreneurs are more likely to be white, own homes, be white-collar, and have more children compared with non-entrepreneurs. We also find that women are less likely to be entrepreneurs.

Table 3A.2 provides detailed summary statistics of our sample. Panel A shows characteristics of the household in which the children live. The average number of years of education of those parents is about 10 years. Additionally, 61% of fathers graduated from high school, and 16% of them have a college degree, while only 10% of mothers have a college degree. The father's income is significantly higher than that of the mother, which shows that fathers typically have a higher economic status than mothers.

Panel B shows the siblings' gender imbalance in our sample during childhood. We can see this is smaller than the parental gender imbalance. Panel C shows sample characteristics during adulthood, wherein 55% of our sample is female and 39 years old on average. Furthermore, 66% of them are white and 52% are married, 90% of our sample graduated from high school and 30% have a college degree. Their average hourly wage is about 18 dollars. Panel D shows entrepreneurship in adulthood. On average, 6.9% of our sample is entrepreneurs. Male entrepreneurs make up 9.94%, and female entrepreneurs are 4.60%, which shows there is a gender gap in our sample. In our sample, the incorporated business income is higher than the unincorporated business income. According to the last year's unemployment status (Deli, 2011),

we divide our sample into necessity entrepreneurs and opportunity entrepreneurs and find that opportunity entrepreneurs dominate our sample. Table 4A.2 shows the correlations in our sample.

3.4.6 Methodology

We use the following equation to test our first and third hypotheses.

$$Y_{itkj} = \beta_1 \text{ChildImbali} + \gamma \text{Controls}_{it} + \delta_k + \eta_t + \theta_j + \epsilon_{it} \quad (14)$$

Where Y_{itkj} represents business ownership and entrepreneurial performance for individual i , who works in industry j , and is k years old in year t . β_1 estimates the effect of traditional childhood gender imbalance on business ownership and entrepreneurial performance in adulthood. ChildImbal is short for traditional household gender imbalance during childhood. We control variables that are important in entrepreneurship, including indicators for completing high school and college education, marital status, race, gender, health status, work experience, occupation, parental entrepreneurial status, unemployment status, and home ownership. δ_k represents age fixed effects, which account for unobservable effects of age on the dependent variables of interest since young individuals are more likely to own their businesses. η_t represents year fixed effects that account for macroeconomics that may affect business ownership and performance. θ_j represents industry fixed effects to account for unobservable, time-invariant, industry-level characteristics that affect business ownership and performance. Since our specifications include fixed effects, we estimate the equation using ordinary least squares regression. We cluster standard errors at the individual level.

We use the following equation to test our second and fourth hypotheses.

$$Y_{itkj} = \beta_1 \text{ChildImbali} + \beta_2 \text{female}_{it} + \beta_3 \text{female}_{it} \times \text{ChildImbali} + \gamma \text{Controls}_{it} + \delta_k + \eta_t + \theta_j + \epsilon_{it} \quad (15)$$

Where β_1 estimates the effect of traditional childhood gender imbalance on entrepreneurship. $\beta_1 + \beta_3$ gives the net effect of traditional childhood gender imbalance on entrepreneurship for women. On its own, β_3 estimates the difference in entrepreneurship between women and men, for a given level of traditional childhood gender imbalance.

3.5 Empirical Results

3.5.1 Traditional Childhood Gender Imbalance and Business Ownership

In Table 3.2, we report coefficient estimates for the relationship between traditional childhood gender imbalance and business ownership in adulthood. We can see that a significant relationship still exists after including control variables. In column (1) of Table 3.2, we show the relationship between parental income imbalance and business ownership in adulthood. A one-unit increase in parental income imbalance during childhood is associated with a 2.18 percentage point increase in the probability of owning a business. These effects are economically significant, relative to those of other variables. For example, based on our coefficients, having a college degree is associated with a 1.37 percentage point increase in owning a business. Thus, a one-unit increase in parental income imbalance has a better explanatory power on the probability of owning a business than having a college degree. In column (2), a one-unit increase in parental education imbalance during childhood is associated with a 2.50 percentage point increase in the probability of owning a business. Relative to the average frequency of responses in our sample, this implies a 35% increase in owning businesses. These effects are economically significant relative to those of other variables.

[Insert Table 3.2 Here]

In column (3), we show the relationship between siblings' gender imbalance and owning a business in adulthood. A one-unit increase in gender imbalance amongst one's siblings during childhood is associated with a 0.70 percentage points increase in owning a business. Relative to the average frequency of responses in our sample, this implies a 10.5% increase in owning a business. A one-unit increase in siblings' gender imbalance has approximately 27% of the magnitude of the effect of high school on owning a business and approximately 4 % of the magnitude of the effect of a college degree on owning a business. In column (4), after we include all gender imbalance proxies in the same regression, we can still see a positive and significant relationship between gender imbalance proxies and owning a business. In columns (5) through (8) of Table 3.2, we use the probit model to estimate the relationship between traditional gender imbalance proxies and the probability of owning a business, and we still find a positive and significant relationship.

3.5.2 The Differential Effects for Women versus Men

Table 3.3 presents the differential effect of traditional childhood gender imbalance and business ownership in adulthood for women versus men. The variable of interest is the interaction term of gender imbalance and the indicator of females. All regressions include the same controls and the same fixed effects as described before. The coefficients on the interaction terms between these measures and the indicator female are negative across all specifications in columns (1) to (6). In column (1) of Table 3.3, the point estimate on the interaction term (coefficient=-0.030) indicates that women whose parents' income had a gender imbalance during childhood have a 3 percentage points lower probability of owning a business than men with the same level of household parental income imbalance. This also shows that women whose parents' income had a gender imbalance

during childhood increase the probability of owning a business by 0.86 percentage points, compared with 3.86 percentage points for men with the same level of parental income imbalance, which contributes to the gender gap of owning a business.

[Insert Table 3.3 Here]

In column (2), women whose parents had an education gender imbalance during childhood have a 4.03 percentage points lower probability of owning a business relative to men with the same parental education imbalance. This estimate amounts to an increase of 0.73 percentage points of probability of owning a business in adulthood. For men, a one-unit increase in parental education imbalance is associated with 4.76 percentage points increase in the probability of owning a business. In column (3), a one-unit increase in siblings' gender imbalance is associated with a 0.05 percentage points increase in the probability of owning a business. From the p-value of joint significance in this table, we can see that the effect of traditional childhood gender imbalance on women is insignificant (p-value is larger than 0.1). Therefore, we can conclude that the positive relationship between traditional childhood gender imbalance and owning a business is driven by men and is insignificant for women.

3.5.3 Traditional Childhood Gender Imbalance and Entrepreneurial Performance

Table 3.4 reports coefficient estimates for the relationship between traditional gender imbalance during childhood and entrepreneurial performance in adulthood. After including control variables and fixed effects, our gender imbalance proxies have a positive and significant relationship with entrepreneurial performance.

In columns (1) to (4) of Table 3.4, we present results estimated using OLS regressions with standard errors clustered at the individual level using unincorporated business income as the

dependent variable. Individuals who do not own a business will have missing values for business income. Therefore, these regressions are based on the sub-sample of individual-year observations in which an individual owns and operates a business. The coefficient of column (1) shows that as one unit increase in parental income imbalance, an individual will earn 10,000 dollars more per year. The coefficient of column (2) shows that as parental education imbalance increases by one unit, an individual will earn 9,989 more dollars per year. The coefficient of column (3) shows that as siblings' gender imbalance increases by one unit, an individual earns 9,940 more dollars per year. In column (4), after putting all gender imbalance proxies in one regression, our results still hold.

[Insert Table 3.4 Here]

One concern is that fluctuations in asset income may drive our results. Therefore, we use unincorporated business income without asset income as the dependent variable to reduce those fluctuations. In columns (5) to (8) of Table 3.4, we can still see that our results are significant and positive. Column (5) tells us that an individual will earn 4,000 dollars more per year for each one-unit increase in parental income imbalance.

In columns (9) to (12) of Table 3.4, we use incorporated business income as the dependent variable. From the coefficient in column (9), we can see that per one-unit increase in parental income imbalance, an individual earns 34,152 more dollars on incorporated business income. For parental education imbalance and siblings' gender imbalance, we get similar results to unincorporated business income without asset income.

3.5.4 The Differential Effects of Gender Imbalance and Entrepreneurial Performance for Women versus Men

Next, we test our fourth hypothesis, and the result can be seen in Table 3.5. The coefficient of column (1) shows that a one-unit increase in parental income imbalance is associated with a 10,000-dollar increase in unincorporated business income for men. However, a one-unit increase in parental income imbalance for women is associated with a 17,624-dollar decrease in unincorporated business income per year, which shows that a woman with a parental income imbalance during childhood earns 7,000 less per year on unincorporated business income than men.

In column (2), we show the relationship between parental education imbalance and unincorporated income. A woman with a parental education imbalance earns 2,689 dollars less than a man with the same level of parental education imbalance. Column (3) shows the relationship between siblings' gender imbalance and entrepreneurial performance for women versus men. A one-unit increase in siblings' gender imbalance is associated with a 3,155 dollars increase in unincorporated business income. Women with a siblings' gender imbalance earn 4,994 dollars less than men with the same level of siblings' gender imbalance. The net effect for women is that they earn 1,739 dollars less on unincorporated business income. In column (4), we put all gender imbalance proxies into one regression, and we get a similar result.

[Insert Table 3.5 Here]

In columns (5) to (8), we use unincorporated business income without asset income as the dependent variable. We found that the net effect of women with a parental income imbalance is that they earn 2,064 dollars less per year. Women with a parental education imbalance earn 1,000 dollars less per year. And women with siblings' gender imbalance earn 1,087 dollars less per year. In columns (9) to (12), we test the relationship between gender imbalance proxies and corporation business income, another proxy for entrepreneurial performance. Since our sample for

incorporated business income with gender imbalance is less than the other two samples, the result shows similarities but little difference.

3.6 Robustness Check

In this section, we check the robustness of our baseline results above. First, we create a comparable sample of non-entrepreneurs and entrepreneurs using Propensity Score Matching. Then we use the Heckman Correction Model Heckman (1979) to deal with the self-selection issue. Third, researchers have shown that risk preference also affects the gender gap in entrepreneurship, therefore, we include it as an additional control variable to see whether our baseline results still hold. Next, we use the alternative proxy-parental work imbalance to see if our baseline results are still valid. Last but not least, we use self-employed as another dependent variable to check our baseline results. Overall, the results are consistent with the main results.

3.6.1 Matching Entrepreneurs and Non-entrepreneurs Using Propensity Score Matching

Since our sample is dominated by non-entrepreneurs, we use the Propensity Score Matching method to construct comparable groups. In this approach, the propensity score is used to select a control group and a treatment group. A notable feature of the method is that once the samples are matched, the remaining unmatched comparison sample is discarded, and is not directly used in estimating the treatment impact. There are six steps in propensity score matching as specified in Harris and Horst (2016).

The first step is to select covariates. Key covariates include variables that are related to self-selection into the intervention and to the outcome of interest Stuart (2010), and using a large set of covariates is recommended. In our sample, since parental income imbalance, parental

education imbalance, and siblings' gender imbalance are continuous variables, we create a discrete variable — gender imbalance — as a treatment variable. If an individual has any imbalance, then the new variable equals one; otherwise, this new variable equals zero. Since marital status, race, gender, education, health, work experience, the number of child, unemployment, home ownership, and hourly wage are all related to entrepreneurship, we include those variables as covariates.

The second step is to select a model to create propensity scores. The most frequently used model for creating propensity scores is logistic regression (Stuart, 2010; Austin, 2011). This step estimates a logistic or probit regression predicting whether a person has a gender imbalance or not. The dependent variable is equal to one if an individual has a gender imbalance and zero otherwise. Our model uses the Probit model.

The third and fourth steps are to select a matching method and create matches. Researchers usually use one-to-one or one-to-many matching. There are several matching methods, such as nearest neighbor matching, radius matching, and kernel matching, and we match the two groups based on the common range of propensity score.

Step 5 is to compare the quality of matches to make sure that the two groups have a similar distribution of propensity scores. One way of balance testing is to compare the standardized differences of group propensity score means and the ratio of variances between the two groups. After performing the balance test, we find the variance ratio of our sample close to 1, which suggests that we have a good match.

Step 6 is to estimate the effects of an intervention. After getting two balanced comparison groups, we then run the regression again and find that we get a similar result as our baseline result.

3.6.2 Adjusting for Self-Selection Using the Heckman Correction

The purpose of matching non-entrepreneurs and entrepreneurs on some dimensions is to ensure a closely matched sample, which also controls for the selection process associated with entrepreneurs with gender imbalance. As an alternative approach, we use the Heckman (1979) correction procedure to generate consistent model estimates after adjusting for selection bias. In the first step, we estimate the likelihood of entrepreneurs with gender imbalance using probit regression. In the second step, we include the inverse mills' ratio, lambda, obtained from the 1st-step estimation as an additional regressor in our earlier model.

1st step(Probit): $\text{Prob}(\text{gen_imbal}) = \alpha_0 + \alpha_1 \text{Control variables} + \epsilon$

2nd step: $\text{En_per} = \beta_0 + \beta_1 \text{gen_imbal} + \beta_2 \text{Control Variables} + \beta_3 \lambda + \eta$

In the first step of the Heckman (1979) procedure, we estimate a predictive model for entrepreneurs with gender imbalance. The result shows that the significant instruments in the 1st stage are not significant in the 2nd-stage model, making them valid instruments for the Heckman (1979) model. The inverse Mills ratio derived from the 1st-step estimation is not statistically significant (in the 2nd-stage model), indicating that selection bias does not significantly affect our 2nd-stage estimates. In summary, our results do not appear to be caused by selection bias. The Heckman (1979) model also calculates the probability of variables in the selection model, and we also see that a woman with gender imbalance has a lower probability of getting higher business income.

3.6.3 Risk Tolerance

Risk attitude explains the gap in entrepreneurship. Researchers have found that higher risk tolerance usually relates to higher-level entrepreneurial activities (Kan and Tsai, 2006; Koudstaal,

Sloof, and Van Praag, 2016). Risk preferences are based on individuals' answers to a hypothetical income gamble question (Barsky et al., 1997), specifically, whether the respondent would take a job (1) with an equal probability of doubling income or cutting it in half; (2) with an equal probability of doubling income or cutting it by a third; (3) with equal probability of doubling income or cutting it by 20%; (4) none of the above. Our risk tolerance measurement follows (Barsky et al., 1997; Kimball, Sahm, and Shapiro, 2009).

Comparing panel A of Table 3.6 with Table 3.2, we can see that our results remain almost the same. After we added risk tolerance as a control variable, our results still remained significant. Column (1) of panel A of Table 3.6 tells us that with a one-unit increase in risk tolerance, the probability of owning a business increases by 2.96 percentage points. By comparison, a one-unit increase in parental income imbalance increases the probability of being an entrepreneur by 2.50 percentage points. The result shows that the magnitude of parental income imbalance equals 64% of risk tolerance on the probability of owning a business.

In column (2) of panel A, we show that a one-unit increase in parental education imbalance is associated with a 3.7 percentage point increase in the probability of owning a business. The result shows that parental education imbalance positively and significantly affects entrepreneurship in adulthood. Column (3) of panel A shows that a one-unit increase in childhood siblings' gender imbalance increases the probability of owning a business by 0.59 percentage points. The result shows that a one-unit increase in childhood siblings' gender imbalance has approximately 17% of the magnitude of the effect of risk tolerance on owning a business. Column (4) shows results similar to Table 3.2.

In columns (5) to (8), we show the relationship between gender imbalance on unincorporated business income after controlling for risk tolerance. Although we control for risk

tolerance, we can still see a positive and significant relationship between our gender imbalance proxies and unincorporated business income. In columns (9) to (12), we show the relationship between our gender imbalance proxies and incorporated business income, and we also get a similar result to Table 3.4. The above result shows that our baseline results are not driven by risk tolerance.

3.6.4 Self-Employed

We use another proxy as our dependent variable: Self-employed (Mishkin, 2017). We construct the variable as a dummy at the household level. The relationship between parental gender imbalance and self-employment can be seen in Table 3A.3. The magnitudes of parental income imbalance, parental education imbalance, and siblings' gender imbalance are similar to Tables 3.2 and 3.3.

3.6.5 Parental Work Imbalance

The work experience of parents also contributes to forming children's understanding of gender norms (Halpern and Perry-Jenkins, 2016). To test whether children learn gender norms from their parents' working status, we construct a work gender imbalance of parents, another proxy for gender imbalance formed during childhood.

Parental work imbalance is an indicator variable. If both parents work in a specific year, the indicator equals 0; if the father works while the mother does not work in the specific year, the indicator equals 1; if the mother works while the father does not work, the indicator equals -1. After using the alternative proxy for traditional childhood gender imbalance, we find that our baseline results still hold.

3.7 Conclusion and Future Research

3.7.1 Conclusion

This paper answers the question of why there is a gender gap in entrepreneurship. We find that the formative experience of gender norms contributes to the gender gap in entrepreneurship in adulthood. During childhood, children learn gender norms from their family members. The inequality performance of family members has an effect on how children form gender norms. Four hypotheses are examined in this paper. Our results confirmed our hypotheses and show that gender imbalance contributes to the gap in entrepreneurship. We also use propensity score matching and the Heckman selection model to reduce selection bias. We find that parental education imbalance has the strongest effect on entrepreneurship. Our results are not driven by risk tolerance.

3.7.2 Practical Implications

This study reveals how traditional gender imbalances in childhood shape entrepreneurial outcomes, offering valuable insights for creating a more inclusive business landscape. To address these disparities, a multi-faceted approach is needed—one that begins in the home, extends through education, and is reinforced by policy and community support.

A critical starting point is fostering gender equality within families, where early exposure to traditional roles influences career aspirations. Parents should be encouraged to model egalitarian behaviors, such as sharing financial and caregiving responsibilities, while policymakers can support this shift through public awareness campaigns and family-oriented programs that challenge rigid gender norms. By reshaping childhood experiences, we can lay the foundation for more balanced entrepreneurial participation in adulthood.

For women who do pursue entrepreneurship, systemic barriers—including unequal domestic burdens and limited access to networks—must be addressed. Affordable childcare, flexible work policies, and targeted mentorship programs led by successful female founders can

help level the playing field. Such initiatives not only empower women to launch and grow businesses but also ensure they have the resources to thrive without sacrificing personal or family well-being.

Schools and universities also have a transformative role to play. By embedding entrepreneurship education into curricula and actively debunking stereotypes, educators can inspire students of all genders to view business ownership as an attainable goal. Showcasing diverse role models—particularly women and non-traditional entrepreneurs—can further normalize gender diversity in the field and broaden students' perceptions of who can succeed.

At the societal level, governments and institutions must dismantle structural inequities. Policies like grants for women-led startups, tax incentives for gender-balanced ventures, and subsidized professional development programs can help bridge gaps in funding and opportunity. Meanwhile, businesses and local organizations should champion inclusivity by hosting skill-building workshops, amplifying underrepresented voices, and creating collaborative spaces where aspiring entrepreneurs from all backgrounds feel welcomed and supported.

Ultimately, closing the entrepreneurship gender gap requires collective action across all sectors. By addressing childhood influences, systemic barriers, and cultural norms, we can cultivate an ecosystem where talent and ambition—not gender—determine success. The result would be a more dynamic, innovative, and equitable economy for future generations.

3.7.3 Future Research

Based on the above analysis, we identify three key directions for future research.

First, as the nature of entrepreneurship continues to evolve in the digital age, new research questions emerge about whether and how childhood gender imbalances affect participation in the gig economy, digital startups, or other non-traditional entrepreneurial ventures. Studies could

examine whether online platforms reduce traditional barriers for women or introduce new forms of bias, and how childhood socialization influences adaptation to these new entrepreneurial contexts. Similarly, future research could explore alternative measures of entrepreneurial success beyond business ownership and income, such as innovation metrics or social impact, to understand how childhood gender norms affect different dimensions of entrepreneurial achievement.

In addition, more detailed investigation into sibling dynamics and peer influence could enrich our understanding of how family gender composition interacts with broader social networks to shape entrepreneurial tendencies. Research could examine how birth order, age gaps between siblings, and peer networks moderate the effects of family gender norms on entrepreneurial development. By pursuing these diverse research directions, scholars can build a more comprehensive and nuanced understanding of how early-life gender socialization shapes entrepreneurial ecosystems, ultimately informing more effective strategies for fostering equitable opportunities in entrepreneurship.

Chapter Four: Corporate Pension Liability and Corporate Social Responsibility

4.1 Introduction

Corporate social responsibility (CSR) is a business's commitment to fulfilling obligations across economic, legal, ethical, and philanthropic levels. Beyond generating profits for shareholders, an organization should comply with laws, protect moral rights, meet the expectations of consumers and employees, and promote welfare and goodwill at the philanthropic level (Carroll, 1991). Given the substantial financial stakes and the growing importance of CSR in business operations, understanding the factors driving CSR has become a key area of research in accounting, management, and finance. Recently, scholars have begun to focus on the role of employees in CSR (Collier and Esteban, 2007; Kim et al., 2010; De Roeck and Maon, 2018); however, little research has examined the relationship between pension liability and CSR.

A firm's pension liability is an employee benefit that commits the employer to make regular contributions to a pool of money set aside to fund payments for eligible employees after they retire. Accordingly, corporate pensions have a profound social impact as they serve as retirement income insurance (Gustman, Mitchell, and Steinmeier, 1994). However, access to workplace pensions is shrinking: Less than 40% of workers in Canada have access to a pension plan, only 25% of workers in the private sector have a workplace pension, and the number plunges to 13% for young workers under the age of 29. The situation is even worse in the U.S., where the generous pension plans prevalent in the past have largely disappeared as companies sought to cut costs. A Bloomberg news article reports that more than half of Americans report having not enough

savings to retire.¹⁸ In this situation, firms with pension liabilities signal workplace quality and demonstrate social responsibility, which may be reflected in their stronger CSR performance.

Pension liability represents the financial commitments made under a pension plan, and in North America, there are two main types: defined benefit (DB) and defined contribution (DC) pension plans. The primary difference between these plans lies in who bears the investment risk. Under a DB plan, employees are guaranteed specific benefits upon retirement, with the employer shouldering the risk associated with future cash payouts. For pensioners, having a DB plan means less uncertainty about their retirement income and a more stable living standard during retirement (Broadbent et al., 2006; Goldhaber et al., 2017). In contrast, a DC plan specifies the contributions that are to be made by both the employer and the employee throughout the employee's career. DC plans allow employees to invest in various assets, but the investment risk falls on the employees. In recent days, DB plans have become increasingly rare as companies shift to DC plans, driven by factors such as workforce mobility, early retirements, and longer life expectancy, which make DB plans more costly to maintain (Aaronson and Coronado, 2005; Begley et al., 2015). Given these dynamics, this paper focuses on DB plans because they provide a unique context for examining firms' commitments to employees through responsible pension policies.

The objective features of pension plans, such as time horizon and funded status, can significantly influence employees' subjective satisfaction and economic well-being at work (Harjoto and Laksmana, 2021). Short-term pension liabilities are more pressing because they are close to being paid out and may compete for resources that could otherwise be allocated to CSR activities. Consequently, short-term pension liabilities might be negatively related to CSR performance. On the other hand, long-term pension liabilities represent a lasting commitment to

¹⁸ <https://www.bloomberg.com/news/articles/2022-08-16/do-i-have-enough-money-to-retire-americans-face-massive-retirement-shorfall?leadSource=verify%20wall>

employees and embody an altruistic promise, which is perceived positively by stakeholders and may positively impact CSR performance.

The relationship between a pension plan's funded status and CSR performance is inherently complex. On one hand, underfunded pensions can impose financial strain on firms, as they must allocate additional resources to meet their pension obligations—potentially crowding out investments in CSR and leading to weaker CSR performance (Rauh, 2006). On the other hand, a fully funded pension plan signals that a company has met its employee-related commitments, reinforcing its image as a socially responsible employer. However, achieving full funding may also consume resources that could otherwise be directed toward CSR initiatives. As such, the degree to which a pension plan is funded plays a critical role in shaping the relationship between pension liabilities and CSR performance.

To test the relationship between pension liabilities and CSR, we utilize data from the 2007-2019 MSCI ESG Stats (formerly the Kinder, Lydenberg, and Domini (KLD) database) and the Compustat annual pension database. Our findings show that total and long-term pension liabilities positively influence CSR performance, while we do not find a significant relationship between short-term pension liability and CSR performance. In addition to the aggregate CSR score, we also decompose CSR scores into employee and non-employee components and find that total pension liability has a significantly positive relationship with the employee relation component of the CSR score. This is likely because pension obligations reflect employee benefits, signaling the firm's long-term commitment to workforce welfare. Such commitments can enhance employee satisfaction and trust, which are key elements captured in the employee relations dimension of CSR.

We also examine the moderating effects of pension liabilities' funded status on CSR scores and find that the funded status negatively moderates the positive relationship between pension liabilities and CSR. This suggests that while firms with higher pension liabilities tend to engage more in CSR, those that actively fulfill (i.e., fund) these obligations may face resource constraints that limit their ability to invest further in CSR initiatives. After decomposing the CSR score, we find that this moderating effect is particularly evident in the non-employee relation component of CSR. This implies that the competition for limited resources is more pronounced in CSR activities that are externally focused. This trade-off highlights the complex balancing act firms face between internal financial commitments and external social engagement.

To mitigate endogeneity concerns, we perform a two-stage least squares (2SLS) analysis with an instrumental variable of baby boomers' retirement years. This analysis confirms that pension liabilities contribute to better CSR scores.

Next, we examine the relationship between pension liabilities and both CSR strengths and concerns. We find that total and long-term pension liabilities are positively associated with employee relations CSR strengths. Additionally, total, short-term, and long-term pension liabilities are negatively associated with overall CSR concerns and non-employee CSR concerns. Furthermore, total and long-term pension liabilities reduce employee relations concerns. These findings suggest that pension liabilities play a key role in employee relations and that firms with pension liabilities tend to reduce concerns related to irresponsible CSR activities. We then explore whether these effects are more pronounced in firms facing high financial distress. Our findings indicate that the moderating effect of pension funding is stronger in high-distress firms compared to those with low financial distress. This result likely reflects the fact that financially distressed firms operate under tighter resource constraints. Intuitively, allocating funds to meet pension

obligations may leave even fewer resources available for discretionary CSR activities. This intensifies the trade-off between fulfilling pension commitments and engaging in socially responsible activities.

Furthermore, we decompose CSR into six dimensions to assess how pension liabilities influence specific areas of social responsibility. The results show that pension liabilities positively affect CSR in environmental, product, diversity, and employee relations, but higher pension funding weakens this relationship in environmental and community dimensions, highlighting a resource trade-off between fulfilling internal obligations and investing in externally oriented CSR initiatives. Next, we examine the long-term effect of pension liabilities on corporate social performance, and we find that pension liabilities are positively associated with CSR performance three years later, affecting both employee- and non-employee-related dimensions. Lastly, to address concerns that unobserved industry-specific characteristics may influence our baseline results, we include industry dummies based on two-digit SIC codes. The results remain consistent with our baseline findings, suggesting that the observed relationships are not driven by industry-level factors.

Our research contributes to the literature in five important ways. First, we enhance the understanding of the drivers behind CSR. Previous studies have mainly explored the links between CSR and financial performance (Edmans, 2011; Servaes and Tamayo, 2013; Buchanan, Cao and Chen, 2018; Miller, Eden and Li, 2020; and the relationship between CSR and key financial decisions (Goss and Roberts, 2011; Deng, Kang and Low, 2013; Cheung, 2016). There is a growing but still limited body of research on the motivations behind CSR, including a belief in its inherent value (Carroll, 1979), personal preferences of CEOs or other stakeholders (Di Giuli and Kostovetsky, 2014; Davidson, Dey and Smith, 2019; Yuan et al., 2019), or concerns about

reputation damage (Anantharaman, Gao and Manchiraju, 2022). Our study contributes to this literature by providing evidence of a specific motivation for CSR—pension liabilities. We find that the objective features of pension plans, such as total value, time horizon, and funded status, significantly impact CSR performance.

Second, we contribute to the literature on the effects of pension plans on employee well-being. Previous studies have explored how pension plans influence employee hiring and turnover (Ippolito, 1985b; Williams and Dreher, 1992; Even and Macpherson, 1996; Chalmers, Johnson and Reuter, 2014; Goldhaber et al., 2024), employee performance (Ippolito, 1997; Gustman and Steinmeier, 2005; Thomas and Spataro, 2016), and lifetime wealth (Attanasio and Rohwedder, 2003; Bottazzi, Jappelli and Padula, 2006; Gustman et al., 2010; Engelhardt and Kumar, 2011; Lachowska and Myck, 2018; Kim, 2020). We extend this strand of research by broadening the scope from traditional employee well-being to encompass the wider realm of social responsibility.

Third, we contribute to the literature on the relationship between corporate social responsibility and pension policies. Harjoto and Laksmana (2021) explore the relationship between corporate social responsibility (CSR) performance and firms' pension policies, finding that companies with higher CSR scores tend to have better-funded pension plans, more conservative pension accounting practices, and are less likely to freeze pension plans, particularly in the industrial and materials sectors. Similarly, Jang (2022) examines how corporate social responsibility (CSR) mitigates agency issues in defined benefit (DB) pension plan management and finds that firms with strong CSR are less likely to manipulate pension discount rates in response to funding gaps. Recent studies most closely related to ours examine the effect of pension policy on CSR performance. Anantharaman et al. (2022) investigate how companies increase corporate social responsibility (CSR) activities after freezing defined-benefit pension plans,

indicating that this is aimed at repairing reputational damage and maintaining their image as responsible employers. We contribute to this strand of literature by studying the effect of pension liabilities on CSR and showing that the features of pension liability, namely, size, time horizon, and funded status, all affect CSR.

Fourth, we address the puzzle of why firms underfund pensions despite substantial tax incentives. Research has identified various factors influencing a firm's funding strategy, including managerial incentives, financial conditions, and decisions related to investing and financing (Logue, 1979; Bodie et al., 1985; Bodie, Light and Morck, 1987; Ballester, Fried and Livnat, 2002; Rauh, 2006; Cole and Sommer, 2010). In addition to these reasons, Ippolito (1985b) offers another explanation: by underfunding its pension plan, a firm effectively turns its employees into long-term bondholders. When workers contribute to their pensions through wages, they are essentially lending money to the firm if their contributions are not fully allocated to a pension plan. This arrangement means that employees, rather than outside investors, provide the firm with long-term financial support, creating a unique bond of human capital. We contribute to this literature by demonstrating that firms may underfund their pensions to sustain a certain level of corporate social responsibility performance.

Finally, we identify a new valid instrumental variable (IV) for researchers in this domain. A key challenge in this study and similar research is the endogeneity issue, as both pension liability and CSR can be endogenously determined. For instance, financial performance, a major driver of CSR activities (Hong, Kubik and Scheinkman, 2012), can influence both CSR and pension benefits simultaneously, potentially leading to a spurious positive correlation. To address this, our study uses a baby boomer dummy as the instrumental variable for pension liability. The logic is that the

inevitable retirement of baby boomers leads to a substantial increase in pension liability for firms, which is largely exogenous to CSR.

The rest of this paper proceeds as follows. Section 4.2 describes the literature and develops hypotheses for empirical tests. Section 4.3 describes the data and methodology to employ in empirical analyses. Section 4.4 presents our main findings, Section 4.5 conducts additional analyses, and Section 4.6 concludes the paper.

4.2 Literature Review and Hypothesis Development

4.2.1 Literature Review

Defined Benefit Pensions as a Human Resource Management (HRM) Tool

Defined Benefit (DB) pension plans as a significant organizational commitment mechanism that signals long-term investment in employee welfare. Scholars have established that these plans foster relational employment contracts characterized by mutual trust and commitment (Luchak & Pohler, 2010; Westerman & Sundali, 2005). As strategic human resource management instruments, DB pensions yield multiple organizational benefits, with their most empirically validated effect being the reduction of employee turnover and extension of employment tenure. The plans' structural design creates powerful retention incentives through deferred compensation. Gustman and Steinmeier (1993) demonstrates that employees leaving prior to retirement forfeit pension benefits equivalent to more than half a year's salary. Beyond retention, DB pensions serve additional strategic HRM functions including retirement timing regulation, workforce quality optimization through self-selection effects, and minimization of shirking behavior (Allen, 1996). These characteristics position DB pensions as foundational elements in building stable, productive employment relationships.

HRM's Strategic Role in CSR Implementation

The human resource management function emerges as a natural partner in CSR execution, given its existing competencies in workforce management and organizational development. HRM's established expertise across the employee lifecycle - encompassing recruitment, training, performance management, and compensation systems (Mello, 2011) - provides the necessary infrastructure for embedding CSR principles into organizational culture and daily operations. This alignment suggests that HR professionals are uniquely positioned to operationalize CSR strategies by leveraging their traditional HR tools while adapting them to sustainability objectives. The combination of DB pensions' stability-enhancing properties with strategic CSR implementation represents an integrated approach to building resilient, values-driven organizations that balance employee welfare with broader stakeholder considerations.

4.2.2 Pension Liability and Corporate Social Responsibility

Stakeholder Theory (Freeman, 1984) emphasizes that firms have obligations to multiple stakeholders, including employees, shareholders, and communities. Pension liabilities—particularly in defined benefit (DB) plans—reflect a long-term commitment to employees, aligning with the stakeholder view that firms should balance diverse interests. As an employee benefit, pension liabilities obligate employers to make consistent contributions to funds designated for retirement payments to eligible employees. The decision to maintain these liabilities and their funding levels is voluntary. Organizations offering exceptional benefits packages demonstrate commitment to employee growth and well-being, signaling workplace quality. Research shows that companies with high-quality benefit programs are perceived as attractive employers and achieve greater market value (Ballou, Godwin, & Shortridge, 2003; Edmans, 2011; Servaes & Tamayo, 2013; Flammer, 2015).

From a Human Resource Management (HRM) perspective, robust benefits like pensions correlate with higher job satisfaction and organizational commitment (Edmans, 2011). Firms investing in employee welfare through pensions often engage more broadly in CSR initiatives, reflecting comprehensive stakeholder management. Socially responsible firms are also viewed as attractive employers (Turban & Greening, 1997; Albinger & Freeman, 2000; Ferrell, Liang, & Renneboog, 2016). Arguably, firms that care about their employees tend to carry greater pension liabilities, and these firms are likely to be socially responsible firms at the same time. Therefore, we hypothesize:

H1: Pension liability positively affects CSR performance and in particular, the CSR's employee satisfaction component.

4.2.3 The Moderating Effects of Pension Funded Status

The relationship between pension liabilities and CSR performance is shaped by competing resource demands, as explained through multiple theoretical lenses. Resource Dependence Theory (Pfeffer & Salancik, 1978) suggests that fully funding pensions may divert limited resources from non-employee CSR initiatives (e.g., environmental or community projects), potentially weakening the positive pension-CSR relationship.

Researchers have explored the factors that can affect a firm's funding strategy. Financial condition is a significant factor that can affect funding strategy. Firms under distress have incentives to underfund their DB plans and use pensions to store or withdraw internal funds as needed (Bodie et al., 1985; Bodie et al., 1987). Ballester et al. (2002) argue that a firm is more likely to use the pension plan to store financial slack for a tax benefit when the firm's earnings performance is high. Corporate core financing and investing decisions also affect a firm's pension

funding decisions. Cheng and Michalski (2010) find that profitability, cash flow from operations, and a marginal tax rate are positively associated with pension funding. If a firm has enough assets to cover all promised liabilities, the pension plan is deemed “fully funded”. Conversely, a plan is “underfunded” if its assets fall short of these obligations (Ippolito, 1985a). For a pension plan to be fully funded, its assets must at least match the accumulated benefit obligations.

The relationship between a pension plan’s funded status and corporate social responsibility (CSR) is multifaceted and nuanced. On one hand, anything else equal, when pension plans are underfunded, firms may retain greater financial flexibility and allocate more resources toward CSR initiatives, potentially enhancing their CSR performance. On the other hand, a fully funded pension plan—where assets sufficiently cover liabilities—signals financial prudence and long-term stability. This can build stakeholders’ trust and enhance the firm’s reputation for responsibility and reliability, creating a favorable environment for pursuing CSR initiatives.

Nonetheless, achieving and maintaining a fully funded pension plan often requires significant financial outlays. These resource demands may crowd out funding for other socially responsible activities, especially those not directly tied to employee satisfaction. Accordingly, firms with better-funded pension plans might exhibit lower CSR performance than otherwise identical firms with less funded pension plans. This conjecture is consistent with (Rauh, 2006), where this crowding-out effect is not due to a lack of commitment to social responsibility but due to constrained resources. That is, there is likely a resource-competing relation between pension funded status and CSR performance, in particular CSR’s non-employee component.

Overall, though pension funded status may reflect internal responsibility, it can simultaneously limit a firm’s ability to engage in broader CSR efforts, highlighting a resource-competing relation between fulfilling internal obligations and supporting external social initiatives. Therefore, we conjecture that the degree to which a pension plan is funded is crucial in determining

how pension liabilities affect a firm's engagement and performance in corporate social responsibility. Hence, we hypothesize:

H2: A pension's funded status moderates its positive effects on CSR performance, and in particular, the CSR's non-employee component.

4.3 Data and Methodology

4.3.1 Sample Formation

We utilize two primary data sources: Compustat annual pension data and MSCI ESG Stats (formerly KLD Stats). Compustat annual pension data have been used in recent pension studies (Yu, 2013; Bauman and Shaw, 2014), and MSCI ESG Stats is widely used in CSR research (Di Giuli and Kostovetsky, 2014; Cheung, 2016; Cronqvist and Yu, 2017; Dyck et al., 2019). Our financial and accounting data come from the Compustat fundamental annual database. After merging these datasets, our sample spans 2007 to 2019 with a total of 7,088 firm-year observations.

4.3.2 Measures of Pension Liability

We collect pension data from the Compustat annual pension database, consistent with previous studies (e.g., Bauman and Shaw, 2014). We focus on pension liabilities under DB plans. Total pension liabilities represent a firm's entire financial obligation. Pension liabilities are classified as short-term if they are due within one year and long-term if they are due after more than one year. Technically, total pension liability is the sum of short-term and long-term liabilities. Instead of using the original dollar values, we take the natural log of pension liabilities as the variable in our model.

4.3.3 Measures of Corporate Social Responsibility

We construct CSR performance measures using data from MSCI ESG STATS ratings (formerly the Kinder, Lydenberg, and Domini (KLD) database). The data of environmental, social, and governance (ESG) factors are collected from various sources such as surveys, financial statements, sustainability reports, media reports, and regulatory filings. MSCI ESG Stats evaluates firms' CSR performance across seven qualitative areas: corporate governance, community, diversity, employee relations, environment, human rights, and product. Each area receives ratings for “strengths” (positive CSR policies) and “concerns” (negative policies). For example, in the employee relations category, a firm receives a score of one for “Health and safety” if it has strong health and safety programs. We construct the CSR score by aggregating the six categories. That is, the CSR score equals the number of strengths minus the number of concerns. As a result, a higher CSR score corresponds to more socially responsible corporate decision-making.

We measure a firm's CSR performance as its total CSR strength scores minus its total CSR concern scores across six categories: community, diversity, employee relations, environment, human rights, and product (Cheung, 2016; Cronqvist and Yu, 2017; Dyck et al., 2019).¹⁹ Specifically, we calculate the CSR rating as follows: $\text{CSR score} = (\text{community strengths} - \text{community concerns}) + (\text{diversity strengths} - \text{diversity concerns}) + (\text{employee strengths} - \text{employee concerns}) + (\text{environmental strengths} - \text{environmental concerns}) + (\text{human rights strengths} - \text{human rights concerns}) + (\text{product strengths} - \text{product concerns})$.

In addition, we decompose the total CSR score into two components: the employee satisfaction component (EMPS), which only includes the employee relations factor, and the non-employee satisfaction component (CSR—EMPS), which excludes the employee relations factor

¹⁹ The corporate governance category is excluded to avoid potential bias, as investors may prefer firms with good governance for reasons unrelated to CSR (Cahan, Chen, and Chen, 2017)

from the overall CSR score. These components serve as additional dependent variables. We analyze the relationship between pension liability and the employee satisfaction component of CSR because pension liability is part of employee benefits, and we expect a positive correlation between the two. We also examine the non-employee satisfaction component to determine whether pension liability influences the overall CSR rating or other specific components.

4.3.4 Control Variables

Following the literature, we control for several firm characteristics that are known to influence CSR. Firm size is controlled by the log of total assets (AT), since larger firms typically face greater scrutiny and are more likely to engage in CSR activities (Jiraporn et al., 2014). Financial leverage is controlled using the debt-to-total assets ratio (Leverage). To account for corporate investments, we include the ratio of capital expenditures to total assets (CAPX), since firms that make significant capital expenditures may have fewer resources for CSR. The market-to-book ratio (MB) is included to control for future growth opportunities. We also control for return on assets (ROA). Dividend payments (DVT) are included since dividend-paying firms often have stronger CSR performance (Di Giuli and Kostovetsky, 2014; Yuan et al., 2019). We also control for the number of employees (Employee) due to its connection with pension liabilities. We also account for the funded ratio, which is defined as pension plan assets divided by accumulated plan benefits (Francis and Reiter, 1987). Finally, to capture firm-specific factors, we include firm-fixed effects in our model.

4.3.5 Summary Statistics

Table 4.1 presents summary statistics for the variables employed in our empirical analyses. The average CSR score is 1.447, indicating that an average firm in our sample has more CSR strengths than concerns. The average employee satisfaction component of CSR (EMPS) is 0.500, while the non-employee satisfaction component (CSR-EMPS) is 0.947. The log of short-term pension liability is 1.123, the log of long-term pension liability is 4.020, and the log of total pension liability stands at 4.073. The mean funded ratio is 0.272, suggesting that many pensions in our sample are substantially underfunded. The log of the number of employees is 2.426. Detailed definitions of all variables can be found in Table 4A.1.

[Insert Table 4.1 Here]

4.3.6 Model Specifications

We use the following model specification to test hypotheses:

$$Y_{i,t} = \beta_0 + \beta_1 \text{Pension}_{i,t-1} + \beta_2 \text{FundedRatio}_{i,t-1} + \beta_3 \text{AT}_{i,t-1} + \beta_4 \text{ROA}_{i,t-1} + \beta_5 \text{LEV}_{i,t-1} + \beta_6 \text{CAPX}_{i,t-1} + \beta_7 \text{Employee}_{i,t-1} + \beta_8 \text{MB}_{i,t-1} + \beta_9 \text{DVT}_{i,t-1} + \beta_{10} \text{ROE}_{i,t-1} + \epsilon_{i,t} \quad (16)$$

where $Y_{i,t}$ represents firm i 's CSR score, CSR's employee satisfaction component, or non-employee component in year t . "Pension" represents the natural log applied to each of the short-term, long-term, and total pension liabilities. Funded Ratio $i,t-1$ is the value of pension assets divided by total pension liabilities, and it reflects the cumulative amounts of pension fund assets and accrued benefits (Francis and Reiter, 1987). AT is the natural log of total assets; ROA is the natural log of return on assets; LEV is the natural log of the financial leverage ratio; CAPX is the natural log of capital expenditures to total assets; Employee represents the number of employees of a firm; MB is the natural log of the market-to-book ratio; DVT is the natural log of dividends; ROE is the

natural log of return on equity. All independent variables are lagged by 1 year. We estimate our models using ordinary least squares regression and cluster standard errors at the firm level.

To test our third hypothesis, we estimate the following regression:

$$Y_{i,t} = \beta_0 + \beta_1 \text{Pension}_{i,t-1} + \beta_2 \text{Pension}_{i,t-1} \times \text{FundedRatio}_{i,t-1} + \beta_3 \text{FundedRatio}_{i,t-1} + \beta_4 \text{AT}_{i,t-1} + \beta_5 \text{ROA}_{i,t-1} + \beta_6 \text{LEV}_{i,t-1} + \beta_7 \text{CAPX}_{i,t-1} + \beta_8 \text{Employee}_{i,t-1} + \beta_9 \text{MB}_{i,t-1} + \beta_{10} \text{DVT}_{i,t-1} + \beta_{11} \text{ROE}_{i,t-1} + \epsilon_{i,t} \quad (17)$$

where the same controls and fixed effects are included as with equation (1). β_2 estimates the interaction effect of the funded ratio on CSR performance.

4.4 Empirical Analysis

4.4.1 Corporate Pension Liability and CSR Performance

Table 4.2 reports the regression results using equation (1). The dependent variable is CSR in columns (1) to (3), the employee relation component of CSR in columns (4) to (6), and the non-employee relation component of CSR in columns (7) to (9). We cluster standard errors at the firm level and report t-statistics in parentheses. Specifically, column (1) supports our first hypothesis, and we find that total pension liability is positively and significantly related to CSR score (0.1822, $p < 0.01$). This result confirms a strong positive association between a firm's pension liability and its CSR performance. In column (4), we also find that total pension liability positively affects CSR's employee relation score, while this positive effect turns statistically insignificant in column (7).

[Insert Table 4.2 Here]

Column (2) examines the relationship between short-term pension liability and CSR score, though we do not find a statistically significant effect of short-term pension liability on CSR score.

Column (3) reports the results for long-term pension liability and CSR score. Consistent with our hypothesis, we find that long-term pension liability positively affects the CSR score. Intuitively, long-term pension liability represents a crucial long-term commitment and contribution to CSR performance. Nonetheless, these patterns in the data are absent in columns (5) and (6) for CSR's employee satisfaction component and in columns (8) and (9) for CSR's non-employee component. Overall, our findings show that total pension liability positively and significantly affects CSR performance and its employee relation component.

4.4.2 Two-Stage Least Squares (2SLS) Analysis

Endogeneity issues are a crucial challenge in the empirical literature on corporate finance in general, but on CSR in particular, which hinders researchers from making causal inferences. For example, in our empirical setup, one may be concerned that both pension liability and CSR can be jointly determined by another factor. Specifically, financial performance, a significant driver of CSR activities (Hong, Kubik, and Scheinkman, 2012), can simultaneously affect both CSR and pension benefits, resulting in a spurious positive correlation between CSR and pension liability in our empirical setup.

We employ the instrumental variable (IV) approach to mitigate endogeneity concerns. This method involves identifying a variable that is strongly correlated with pension liability but does not directly influence the CSR score. We employ the baby boomer dummy as our instrumental variable.²⁰ This variable is a valid instrument for two reasons. First, it is mechanically related to pension liability: as baby boomers (people who were born between 1946 and 1964) retire, pension liabilities for firms increase because this generation constitutes a significant portion of the U.S.

²⁰ A baby boomer dummy variable that equals 1 if the retirement year is after 2011 and 0 before 2011.

population. Figure 1 illustrates that birth rates from 1946 to 1964 were higher than in other periods. With a typical retirement age of 65, baby boomers began retiring around 2011, so we expect a substantial rise in pension liabilities starting in that year. Figure 2 confirms this expectation, showing a noticeable increase in average pension liability in 2011, highlighting a clear distinction between pre-2011 and post-2011 periods. Thus, the baby boomer dummy meets the relevance requirement for an instrumental variable. Regarding the exclusion condition, first of all, there is no evidence that baby boomers are correlated with CSR performance. Furthermore, it is difficult to find an economically intuitive mechanism through which baby boomers may directly affect CSR performance. Arguably, the baby boomer dummy variable may affect CSR scores via its effect on pension liabilities.

[Insert Figures 4.1 and 4.2 Here]

Table 4.3 presents the two-stage least squares (2SLS) results. Column (1) of Panel A in Table 4.3 shows the first stage regression where we estimate the relationship between total pension liability and the baby boomer dummy. Consistent with the relevance condition, we find a positive and statistically significant association between total pension liability and the baby boomer dummy. We conduct similar analyses with short-term and long-term pension liabilities for illustrative purposes. The results suggest that the baby boomer dummy tends to be a stronger instrument for long-term pension liability than for short-term pension liability.

[Insert Table 4.3 Here]

Panel B of Table 4.3 presents the results of the second-stage regression, where we use the instrumented values of pension liability and its short-term and long-term counterparts from the first-stage regressions as independent variables. Columns (1), (4), and (7) jointly suggest that a unit increase in total pension liability leads to 5.13 units of increase in CSR score, which

corresponds to 3.18 units of increase in CSR's employee satisfaction component and 1.96 units of increase in CSR's non-employee component. We find similar patterns in columns (2), (5), and (8) for short-term pension liability and in columns (3), (6), and (9) for long-term pension liability. Overall, the regression results across all columns in Panel B suggest a strong positive relationship between pension liability and CSR performance.

4.4.3 The Moderating Effects of Funded Status on CSR Performance

Table 4.4 presents the results of regressions estimating equation (2), and we keep the same dependent and independent variables as in our previous analysis. Again, standard errors are clustered at the firm level, and t-statistics are reported in parentheses. To quantify a pension's funded status, we construct the funded ratio calculated as pension assets divided by pension liabilities. In columns (1) and (4), again, we find that total pension liability is positively and statistically significantly associated with CSR score and CSR's employee relation component. The coefficient for the interaction term between total pension liability and "FR", the funded ratio, is negative and statistically significant at the 1% level, suggesting a weakened effect of pension liability on CSR score as the value of the funded ratio increases. In columns (4) and (7), we find that the coefficient for this interaction term is negative for both columns but statistically significant only in column (7), suggesting the moderating effect in column (1) is largely driven by its impact on CSR's non-employee component. Put differently, as the value of the pension funded ratio increases, more resources are being crowded out of CSR's non-employee component.

[Insert Table 4.4 Here]

Columns (2), (5), and (8) focus on the interaction term between short-term pension liability and the funded ratio. We find that the coefficient for this interaction term in column (2) is negative

and statistically significant at the 1% level, suggesting a resource-competing effect on CSR. Columns (5) and (8) confirm that this resource-competing effect is largely driven by the effect on CSR's non-employee component. We document similar patterns in the data for the interaction term between long-term pension liability and the funded ratio in columns (3), (6), and (9).

To sum up, though total pension liability is documented as positively associated with CSR score and its employee relation component, we also find that this positive relation is weakened as pension funded ratio increases and that this weakened relation is primarily driven by its effect on CSR's non-employee relation component. This nuanced pattern in the data applies to short-term and long-term pension liabilities as well, suggesting a resource-competing relation between CSR score (and in particular its non-employee relation component) and the funded status of pension liability.

4.4.4 CSR Strengths and CSR Concerns

Prior research shows that firms make CSR investment decisions based on a cost-benefit analysis (Nofsinger et al., 2019). When the resource-competing effect is prevailing, firms may reduce their responsible behavior (CSR strengths) rather than increase irresponsible behavior (CSR concerns). Arguably, irresponsible CSR actions (CSR concerns) can result in significant costs, including lawsuits, consumer boycotts, and production disruptions (Bénabou and Tirole, 2010). In contrast, positive CSR activities (CSR strengths) can provide economic benefits, such as higher firm valuations or reduced risk in certain situations (Servaes and Tamayo, 2013; Lins et al., 2017). Rather than focusing on an aggregate CSR score, in this section, we further look into the two components of the CSR score: CSR strengths and CSR concerns. Specifically, we calculate CSR strengths by summing all the strength scores, and then calculate CSR concerns by summing all the

concern scores across six dimensions. Additionally, we break down CSR strengths and concerns into employee-related and non-employee-related components to examine whether there are differences between these two categories.

[Insert Table 4.5 Here]

Panel A in Table 4.5 examines the relationship between pension liabilities and strength scores. The dependent variable is the total CSR strength score in columns (1)-(3), the employee satisfaction component's strength score in columns (4)-(6), and the non-employee component's strength score in columns (7)-(9). We observe a significant positive relationship between total pension liability and employee satisfaction's strength, and we find similar results for long-term pension liabilities. This positive relationship demonstrates that pension liabilities represent a long-term commitment and are important for employee satisfaction.

In Panel B, we examine the relationship between pension liabilities and concern scores. Similarly, the dependent variable is the total CSR strength score in columns (1)-(3), the employee satisfaction component's strength score in columns (4)-(6), and the non-employee component's strength score in columns (7) to (9). We find that total, short-term, and long-term pension liabilities are all negatively and statistically significantly associated with CSR concerns, indicating that firms with more pension liabilities are less likely to engage in irresponsible CSR activities. Similar results are observed for the non-employee components of CSR. We also find that total and long-term pension liabilities are significantly negatively related to employee relations concerns, suggesting that as firms carry more and longer-term pension liabilities, employee relations improve.

In Panel C, we interact the funded ratio with total, short-term, and long-term pension liabilities to examine the interaction effect on CSR strength. We find that the funded ratio moderates the positive relationship between total pension liability and total CSR strength in

column (1). Results in Columns (3) and (6) also present the moderating effects of funded ratio between long-term pension liability and total CSR strength and the strength of CSR's employee satisfaction component. These findings further confirm that resource competition exists between better-funded pension liabilities and improved CSR strengths.

In Panel D, we similarly interact the funded ratio with total, short-term, and long-term pension liabilities to examine the interaction effect on CSR concerns. We find that the coefficients for the interaction term across the first three columns are all positive and statistically significant. These results suggest that resource competition exists between better-funded pensions and worsened CSR concerns. The absence of statistical significance for the interaction terms in columns (4)-(6) and the presence of statistical significance for the interaction terms in columns (7)-(9) jointly suggest that this resource-competing effect is primarily driven by its effect on concerns of CSR's non-employee component. To sum up, our findings in this section confirm the resource-competition patterns in the data by decomposing a firm's total CSR score into its CSR strengths and CSR concerns. Specifically, there is some evidence on the resource-competing relation between a firm's long-term pension liability and its total CSR strength and the strength of employee satisfaction. We also find that this resource-competing effect is primarily driven by its effect on worsened concerns of CSR's non-employee component.

4.4.5 The Role of Financial Distress

The literature has shown that financial constraints influence firms' investment preferences (e.g., Waddock and Graves, 1997; Sun and Gunia, 2018). Accordingly, we look into whether the resource-competition patterns are more pronounced among firms experiencing financial distress. Following Chen and Wang (2012), we use Altman's Z-score (Altman, 1968) as a proxy to estimate

a firm's level of financial distress risk. According to Chen and Wang (2012), firms with a Z-score below 1.81 are classified as having higher financial distress risk. Based on this threshold, we construct a financial distress dummy variable, which equals 1 if a firm's Z-score is less than 1.81 (indicating high financial distress risk), and 0 otherwise.

Columns (1)-(3) of Panel A in Table 4.6 examine the effects of pension liability on CSR score in firms with high financial distress, while Columns (1)-(3) of Panel B in firms with low financial distress. After comparing the coefficients and significance levels in these two panels, we find that the positive relationship is much stronger in firms with high financial distress. This demonstrates that pension liability is an important driver of CSR performance, especially for financially distressed firms. We also find that total and long-term pension liabilities positively affect the employee satisfaction score (as shown in columns (4) to (6) of both panels). These results confirm that pension liability is positively related to employee satisfaction. Additionally, we find that total and long-term pension liabilities positively affect the CSR's non-employee component among financially distressed firms. These patterns are absent among firms with low financial distress.

[Insert Table 4.6 Here]

Panels C and D again examine the moderating effects of pension-funded status. Specifically, we interact the pension funded ratio with pension liabilities and find that the funded ratio moderates the positive relationship between total, short-term, and long-term pension liabilities and CSR performance in both high- and low-financial distress firms. The coefficient for the interaction term between pension funded ratio and pension liabilities is negative and statistically significant across all columns in Panel C, including columns (4)-(6) for CSR's employee satisfaction component. The first three columns and the last three columns in Panel D

present similar patterns in the coefficient of the interaction term. When comparing columns (4)-(6) between Panels C and D, we find that there even exists a resource-competing effect between pension liabilities and CSR's employee satisfaction component among financially distressed firms while this resource-competing effect turns absent in a statistical sense among low-financial distress firms.

4.5 Additional Tests

In this section, we conduct several additional tests to confirm the validity of our baseline results.

4.5.1 More Granular Components of Corporate Social Responsibility

In the previous section, we decomposed corporate social responsibility (CSR) into two broad components: employee-related and non-employee-related CSR. To gain a more granular understanding of how pension liabilities influence different aspects of CSR, we now further disaggregate CSR into six distinct dimensions as defined in the MSCI ESG STATS (formerly KLD) framework: environment, community, human rights, product, diversity, and employee relations dimensions.

Each dimension captures a unique facet of a firm's social responsibility. The environment category reflects a firm's commitment to sustainable practices, pollution control, and resource conservation. The community dimension includes corporate philanthropy, support for local development, and engagement with community stakeholders. Human rights assess a company's policies and practices regarding labor rights and operations in countries with questionable human rights records. The product dimension evaluates product safety, innovation, and quality control, as

well as ethical marketing and transparency. Diversity focuses on a firm's efforts to promote an inclusive workplace through equal opportunity, representation of minority groups, and support for women and marginalized communities. Lastly, the employee relations dimension captures a firm's labor practices, health and safety programs, employee satisfaction, and benefits, closely aligning with our focus on pension liabilities.

By examining the effect of pension liabilities on each of these six dimensions individually, we aim to uncover which specific areas of CSR are most sensitive to a firm's long-term financial commitments to employees. This finer decomposition allows us to assess whether pension obligations influence CSR broadly or whether the effects are concentrated in areas most closely tied to internal workforce policies, such as employee relations and diversity. The detailed results of this analysis are presented in Table 4A.2. In this table, we find that the positive relationship between pension liability and corporate social performance persists in the environmental, product, diversity, and employee relations components. This suggests that firms with greater pension obligations tend to demonstrate stronger commitments not only to internal workforce issues but also to broader stakeholder concerns. The positive association with the environmental and product dimensions indicates that such firms may adopt more sustainable practices and prioritize product responsibility, possibly strengthening their public image and legitimacy. Meanwhile, the significant effects in diversity and employee relations reflect a deeper investment in fostering inclusive and supportive workplace environments—an expected outcome given that pension liabilities are directly related to employee welfare. Collectively, these findings imply that pension obligations are associated with a more comprehensive approach to social responsibility, extending beyond employees to encompass external stakeholders and long-term corporate reputation.

In Table 4A.3, we find that the moderating effect of pension funding continues to be significant in the environmental and community dimensions of CSR. Specifically, as firms allocate more resources to fulfill their pension obligations—reflected in higher funded ratios—the positive relationship between pension liabilities and CSR performance weakens in these two areas. This suggests that resource competition is particularly pronounced when it comes to externally oriented CSR activities.

Environmental and community initiatives often require substantial financial investment, such as implementing green technologies, reducing carbon footprints, engaging in local development projects, or supporting nonprofit partnerships. These activities, while beneficial for long-term reputation and stakeholder engagement, are not directly tied to internal operations or employee expectations in the same way as employee relations or diversity initiatives. As a result, when financial resources are strained due to pension funding requirements, firms may prioritize fulfilling contractual employee obligations over voluntary external CSR efforts.

The persistence of the moderating effect in these two dimensions highlights a trade-off that firms face when managing limited resources: while long-term pension commitments reflect responsible corporate behavior, fully funding these obligations may constrain a firm's ability to invest in broader sustainability or community-focused programs. These findings underscore the importance of understanding how financial commitments to internal stakeholders can indirectly shape a firm's engagement with external stakeholders through resource allocation decisions.

4.5.2 Long-term Effects on Corporate Social Responsibility

Corporate pension liabilities represent a firm's long-term commitment to employee welfare and post-retirement financial security. This enduring obligation not only reflects responsible

corporate behavior but also aligns with stakeholder expectations for social responsibility. To explore this relationship, we examine the long-term impact of pension liabilities on CSR, focusing on firm-level CSR outcomes three years after the liabilities are reported in financial statements. The detailed results are presented in Table 3A.4. Panel A shows that both total and long-term pension liabilities are significantly and positively associated with CSR performance three years later. This suggests that firms making long-term commitments to employee benefits are more likely to engage in broader socially responsible practices over time. Columns (4) through (9) further reveal that this positive effect holds across both employee-related and non-employee-related components of CSR.

Panel B of Table 4A.4 investigates the moderating role of pension funding. We find that the funded status continues to moderate the relationship between pension liabilities and the employee-related component of CSR: as firms allocate more resources to fulfill their pension obligations, their performance in employee-related CSR slightly declines. This may be due to resource constraints—companies prioritizing pension funding may have fewer remaining resources for additional employee-focused CSR initiatives, such as wellness programs or diversity training. Interestingly, the non-employee component of CSR shows the opposite pattern: as pension obligations are fulfilled, performance in non-employee CSR activities improves. One possible explanation is that firms, having met their long-term commitments to employees, redirect attention and remaining resources toward external stakeholders, such as environmental initiatives, community engagement, or product responsibility, to enhance their broader CSR reputation.

4.5.3 Industry Dummy

To mitigate potential endogeneity concerns—particularly those arising from unobserved industry-specific characteristics that may jointly influence both pension liabilities and CSR performance—we incorporate industry-fixed effects into our regression models. Specifically, we construct industry dummy variables based on the first two digits of the Standard Industrial Classification (SIC) codes, which allow us to control for variation across broad industry groups. This approach helps isolate the effect of pension liabilities on CSR from industry-level trends, norms, or regulatory environments that could otherwise confound our estimates. The results, reported in Table 4A.5, remain consistent with our baseline findings. Both total and long-term pension liabilities continue to exhibit a significant positive association with CSR performance, suggesting that the observed relationships are not artifacts of industry-specific factors. This robustness check reinforces the validity of our main results and provides additional support for our hypotheses.

4.6 Conclusion

This study explores the relationship between a firm's pension liability and its CSR scores. Our findings indicate that long-term and total pension liabilities positively and statistically significantly affect a firm's CSR score. We then decompose CSR scores into employee and non-employee satisfaction components and find that the positive effects remain evident in the employee relation component. We also observe that the funded ratio moderates these positive effects; that is, as firms allocate more resources to pension plans, they limit the funds available for CSR activities, resulting in lower CSR performance.

To mitigate endogeneity concerns, we employ the instrumental-variable approach as our empirical identification strategy. The identified results confirm that firms with substantial pension

liabilities achieve higher CSR scores, greater employee satisfaction, and higher CSR scores adjusted for employee satisfaction components. We also find firms with pension liability are less likely to conduct irresponsible CSR activities. Furthermore, our evidence indicates that resource competition exists in both high- and low-financial distress firms, and there are nuanced differences in the moderating effects of funded ratio between high- and low-financial distress firms. As the funded ratio increases, high-financial distress firms are more likely to have a lower employee satisfaction score; this effect is statistically insignificant for low-financial distress firms.

4.7 Practical Implications

Our findings have important policy implications for corporate governance and pension regulation. Essentially, our evidence indicates that corporations face the trade-offs between fully funding pension plans and supporting CSR activities. Ensuring pension security is essential; nonetheless, it is equally important to recognize that allocating extensive resources to pension funding may limit a firm's capacity to invest in CSR, leading to broader social consequences. Accordingly, a feasible regulatory framework should seek to balance pension funding requirements with the incentives to sustain CSR efforts. This issue is crucial in industries where social responsibility is the core to business operations. Our research underscores the importance for firms with limited resources to optimize CSR efforts and meet the needs of their employee.

Our empirical findings also demonstrate that pension liabilities function as a signal of organizational commitment to employee welfare, aligning with the broader HRM objective of fostering high-involvement employment systems. The trade-off between pension funding and CSR investment suggests that firms manage an internal HRM portfolio balancing employee-centered and externally focused responsibilities (Dulebohn et al., 2009; Goergen et al., 2017). Thus, rather

than viewing pensions purely through a financial lens, we reframe them as embedded HRM strategies with significant consequences for industrial relations and CSR performance.

To further ground our work in HRM theory, we incorporate the Resource-Based View (RBV) of the firm, which posits that human capital is a key source of sustained competitive advantage (Barney, 1991). CSR activities focused on employees, such as pension provision, represent strategic investments in firm-specific human capital that enhance organizational commitment, reduce turnover, and improve firm reputation.

4.8 Future Research

In the future, we aim to expand the intersection between pensions, HRM, and CSR, particularly in light of shifting employment contracts, labor market expectations, and demographic pressures. Integrating industrial relations and HRM perspectives will offer a more nuanced account of how firms manage stakeholder relationships through both internal compensation design and external social engagement.

Chapter Five: General Conclusion

This dissertation takes an interdisciplinary approach to examine how social and psychological factors influence financial decision-making, aiming to broaden traditional finance by incorporating behavioral and social insights. Additionally, I hope my research fosters a more inclusive and socially responsible perspective on financial decisions. In the long term, I aspire for my work to contribute to the finance discipline by emphasizing not only profit maximization but also sustainability, diversity, and ethical considerations.

The first essay finds that gender socialization during childhood influences investment behavior in adulthood. The second essay investigates the impact of childhood gender imbalance on business ownership and entrepreneurial performance. The third essay provides evidence that firms with higher pension liabilities tend to exhibit stronger corporate social responsibility (CSR), and that the funded status of pensions moderates this positive relationship. The concluding chapter

Overall, I believe this thesis contributes to the literature in several meaningful ways, though further research is needed to deepen our understanding of financial behavior.

Contribution of Authors

In the first essay, Yang Liu's contribution: Conceptualization, Methodology, Data Curation, Formal Analysis, Investigation, Writing – Original Draft, Review & Editing, and Visualization.

Dr. Lei Lu: Supervision, Review, and Editing

Dr. Chi Liao: Supervision, Review, and Editing

In the second essay, Yang Liu's contribution: Conceptualization, Methodology, Data Curation, Formal Analysis, Investigation, Writing – Original Draft, Review & Editing, and Visualization.

Dr. Lei Lu: Supervision

Dr. Chi Liao: Supervision

In the third essay, Yang Liu's contribution: Conceptualization, Methodology, Data Curation, Formal Analysis, Investigation, Writing – Original Draft, Review & Editing, and Visualization.

Dr. Jun Wang: Supervision

Dr. Frank Zhang: Supervision

Dr. Jingyu Zhang: Data Curation, Resources

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Figure List

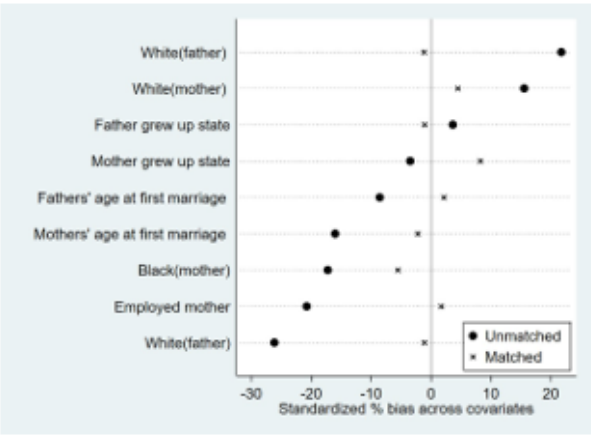


Figure 2A.1: Balancing Properties of Covariates after Propensity Score Matching

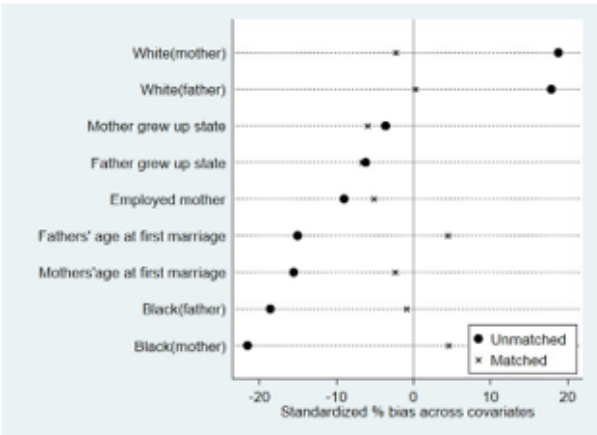


Figure 2A.2: Balancing Properties of Covariates after Propensity Score Matching

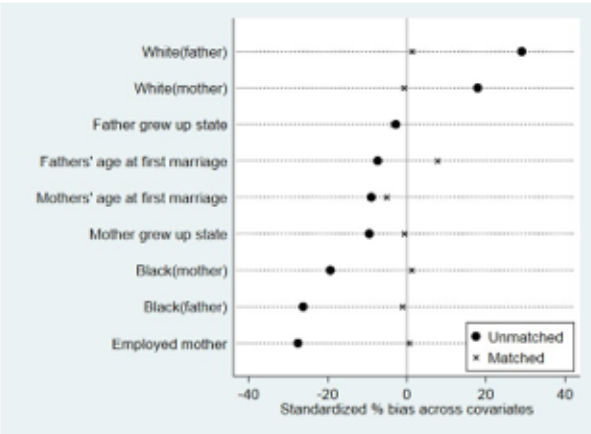


Figure 2A.3: Balancing Properties of Covariates after Propensity Score Matching

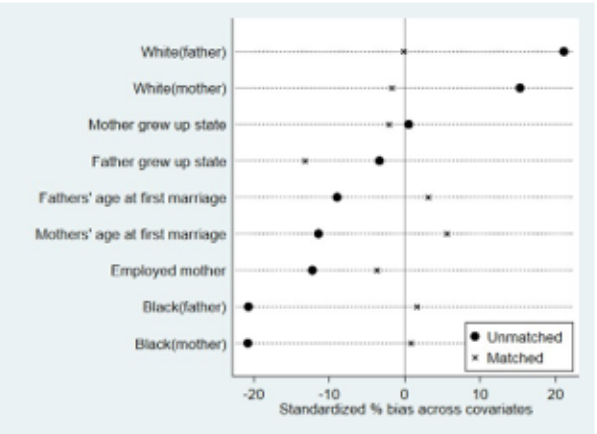


Figure 2A.4: Balancing Properties of Covariates after Propensity Score Matching

Figure 2A.1 illustrates covariate balance for childhood household male dominance, as measured by parental income imbalance. Figure 2A.2 shows covariate balance for childhood household male dominance, as measured by parental education imbalance. Figure 2A.3 presents covariate balance for childhood household male dominance, measured by parental income imbalance, using the sample conditional on participation. Figure 2A.4 displays covariate balance for childhood household male dominance measured using parental education imbalance using the sample conditional on participation.

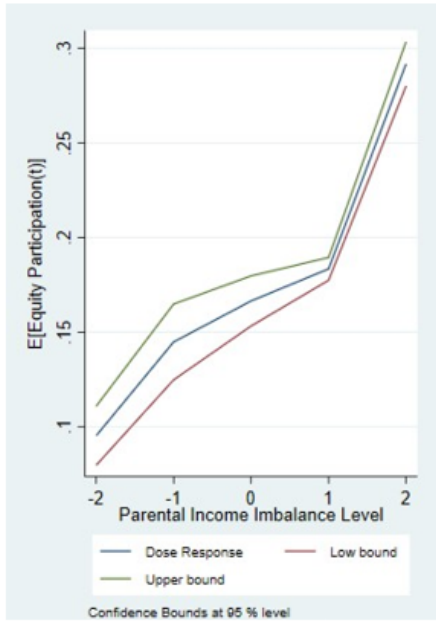


Figure 2B.1: Dose-response function of Parental Income Imbalance

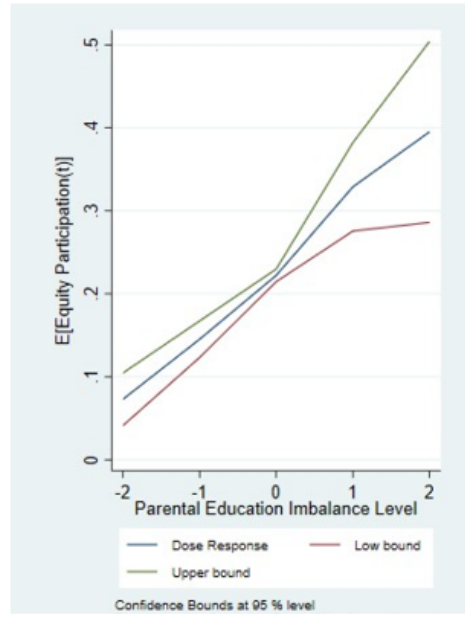


Figure 2B.2: Dose-response function of Parental Education Imbalance

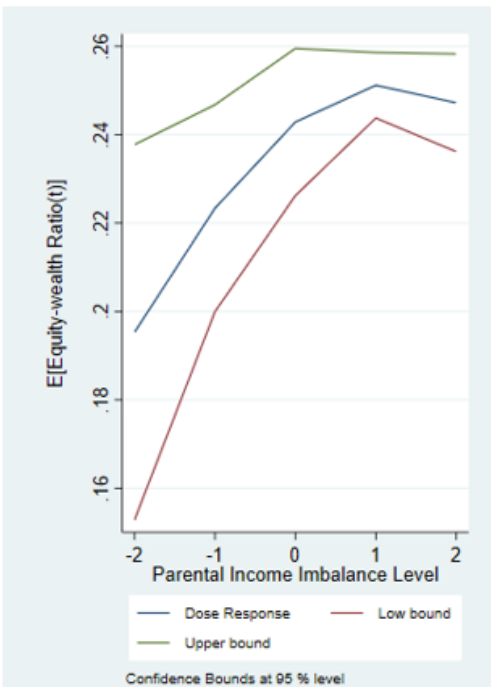


Figure 2B.3: Dose-response function of Parental Income Imbalance conditional on equity participation

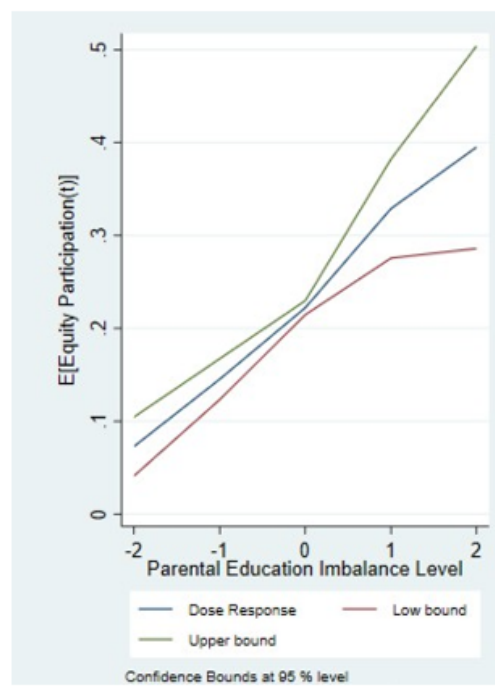
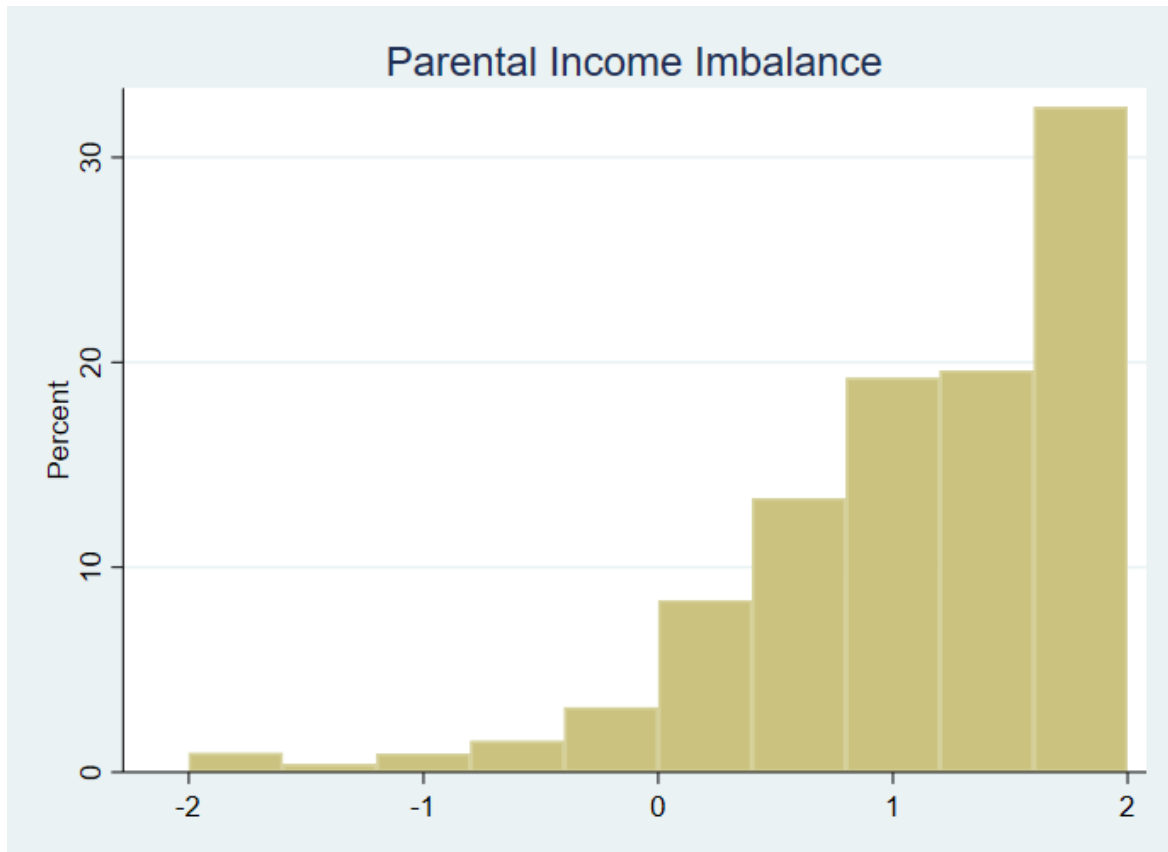


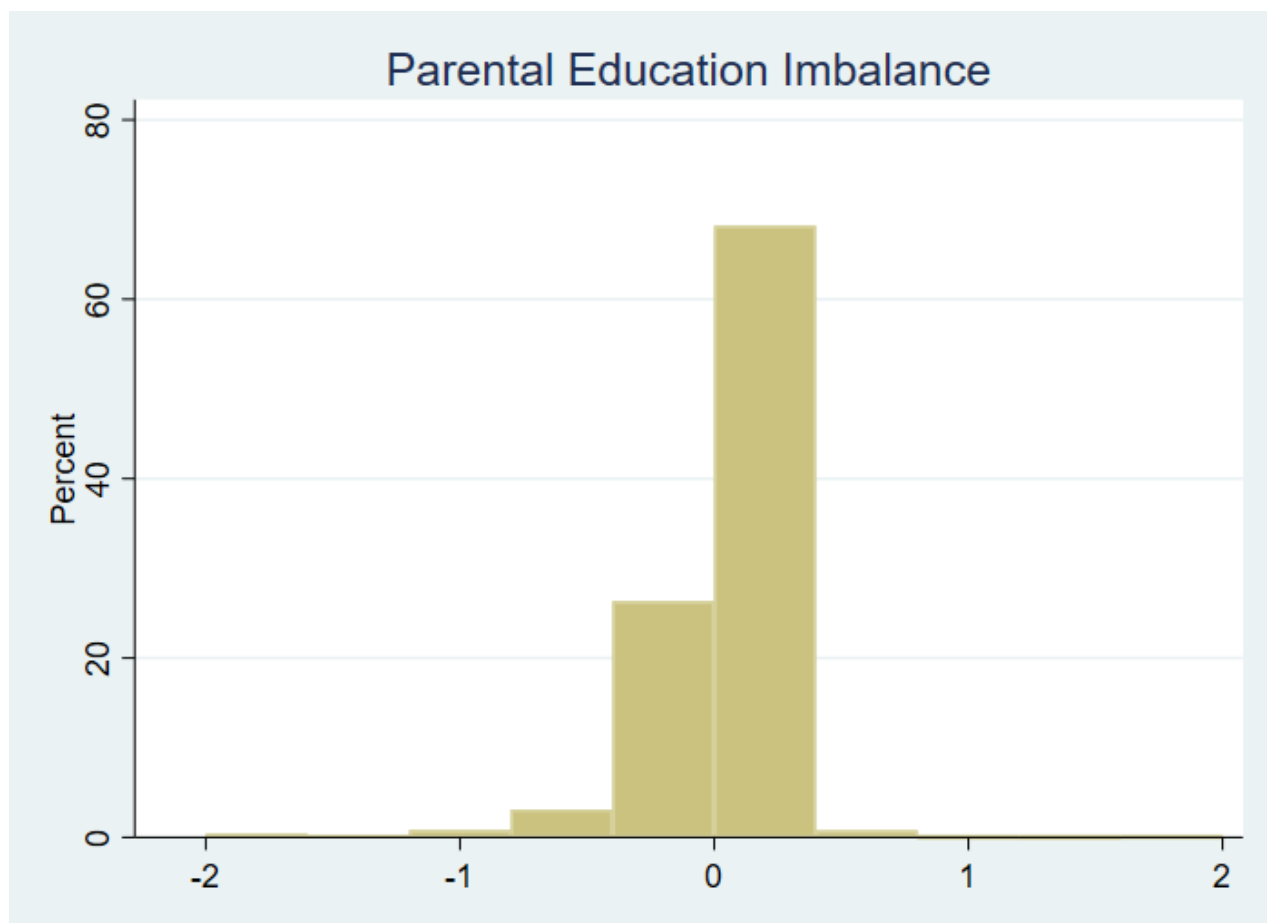
Figure 2B.4: Dose-response function of Parental Education Imbalance conditional on equity participation

Figure 2C.1: Parental Income Imbalance Distribution



This figure shows the distribution of parental income imbalance for individuals from 1999 to 2021. Data are obtained from the Panel Study of Income Dynamics (PSID).

Figure 2C.2: Parental Education Imbalance Distribution



This figure shows the distribution of parental education imbalance for individuals from 1999 to 2021. Data are obtained from the Panel Study of Income Dynamics (PSID).

Figure 3.1: Population Birth Rate in the USA

This figure shows the time trend of the U.S. population birth rate from 1909 to 2019. The orange bars represent the annual birth rate per 1,000 population during the “Baby Boomer” period, while the blue bars represent the birth rates for all other years.

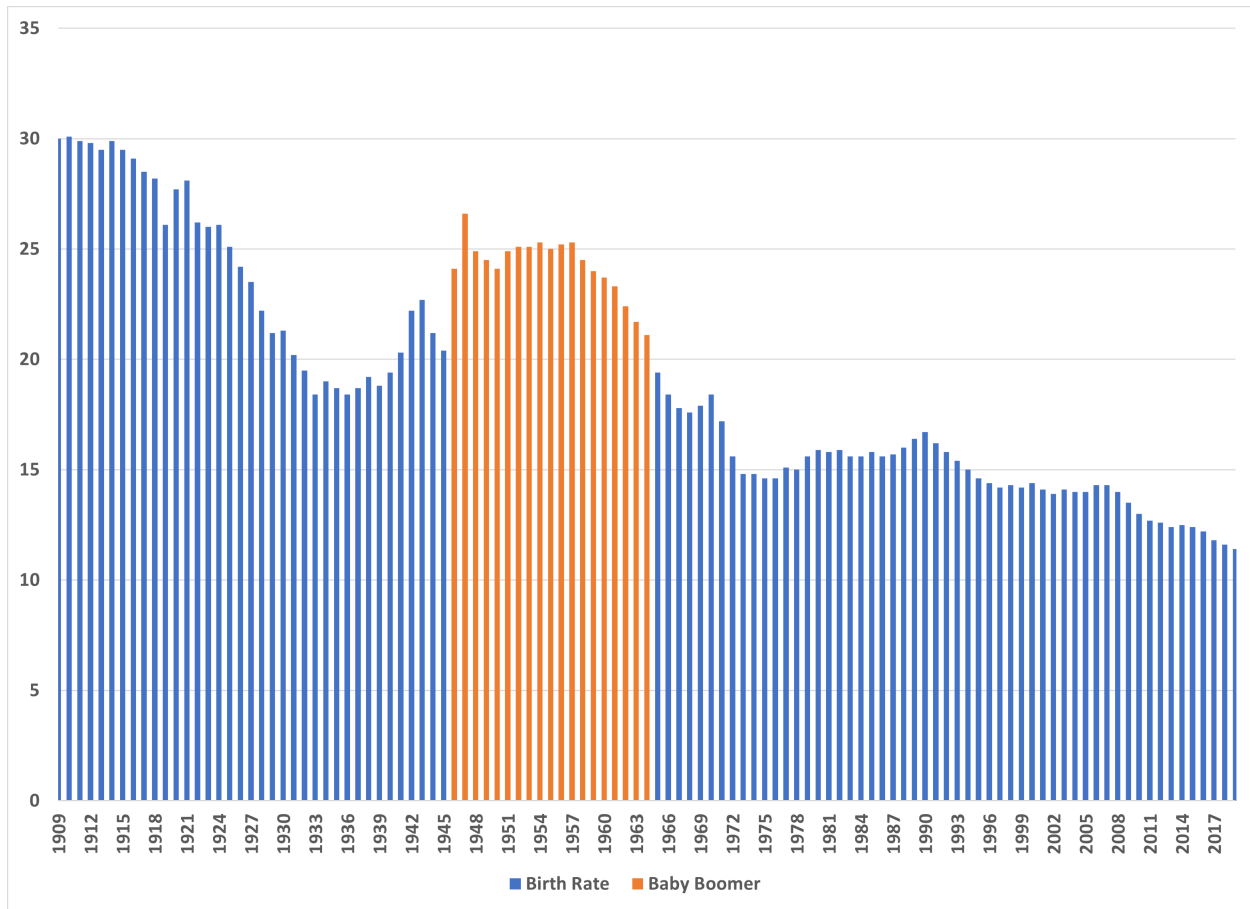


Figure 3.2: Pension Liability over Time

This figure shows the time trend of average pension liability for all firms in our sample on an annual basis. The orange bars represent the average pension liability during the “Baby Boomer” period starting from 2011, while the blue bars represent the liability for all years prior to 2011.

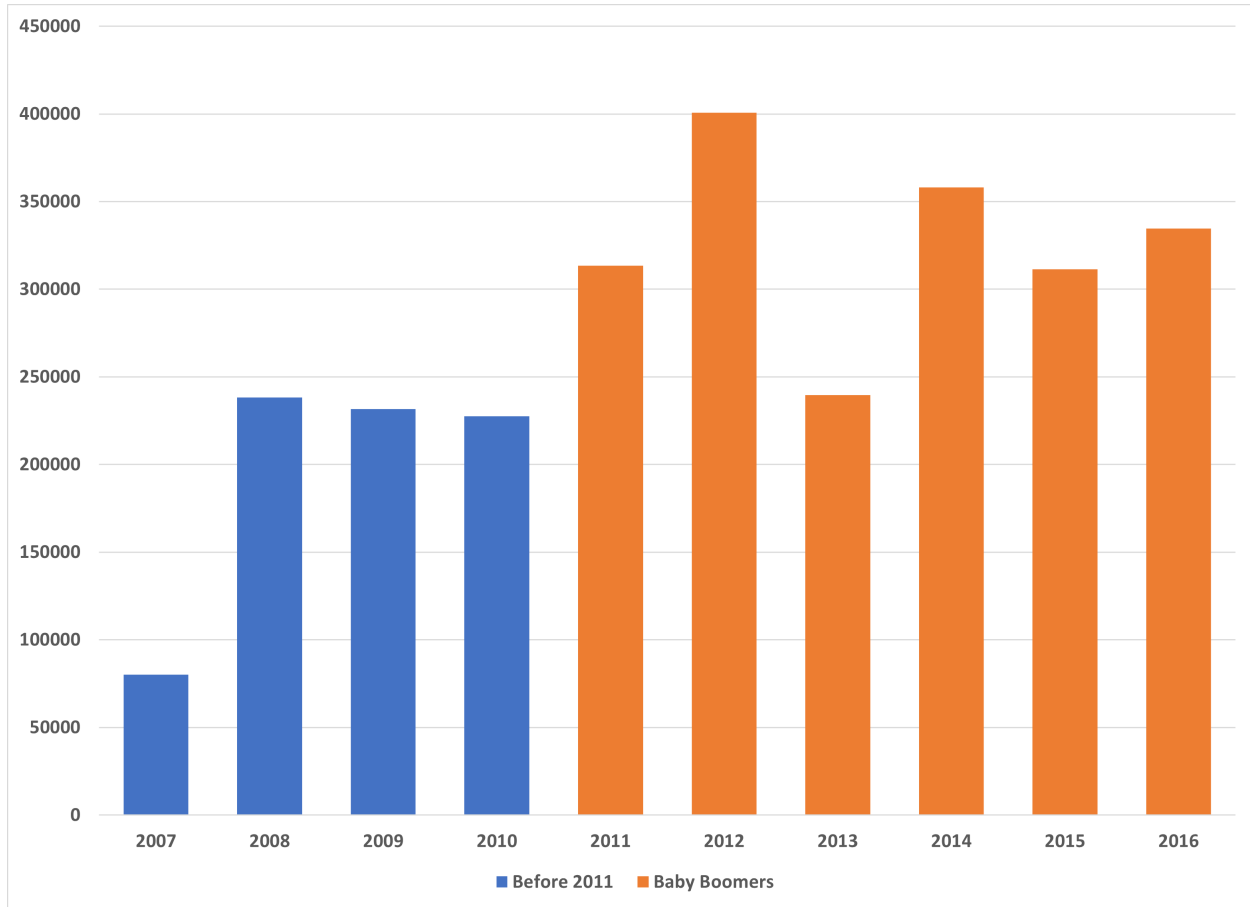


Table 2.1: Summary Statistics

This table reports summary statistics using the PSID survey waves from 1968 to 2021, which allow us to observe both individuals' childhood household gender imbalance and asset holdings in adulthood. All variables are defined in Table 4A.1. Panel A presents parental characteristics for individuals, constructed using data from the 1968 to 1997 survey waves when the individuals were children. Panel B shows the demographic and socioeconomic characteristics of individuals in adulthood. Panel C reports asset holdings for individuals in adulthood. All income, wealth, and asset holdings are converted to December 2021 dollars using the consumer price index. Summary statistics are weighted using PSID sample weights to be representative of the population.

	Mean	P1	P50	P99	Stdev	N
Panel A: Parental Characteristics in Childhood						
Father's education (in years)	12.507	3	12	17	3.039	41,413
Mother's education (in years)	12.339	6	12	17	2.365	41,309
Father's high school education	0.674	0	1	1	0.484	41,413
Mother's high school education	0.668	0	1	1	0.470	41,309
Father's college degree	0.246	0	0	1	0.418	41,413
Mother's college degree	0.146	0	0	1	0.353	41,309
Father's income	67,800	0	59,400	229,500	50,345	53,532
Mother's income	16,665	0	12,213	76,500	18,560	53,493
ChildImbal(Inc)	1.139	-2	1.291	2	0.823	52,498
ChildImbal(Edu)	0.017	-0.8	0	2	0.318	41,536
Sibling gender imbalance	0.049	-2	0	2	1.567	41,174
Stay-at-home mother	0.173	0	0	1	0.275	42,950
Panel B: Individuals' Characteristics in Adulthood						
Number of years in sample	7.018	1	7	13	3.322	7,628
Age	41.873	21	41	68	11.833	53,532
White	0.860	0	1	1	0.347	53,532
Black	0.061	0	0	1	0.240	53,532
Female	0.550	0	1	1	0.498	53,532
High school	0.911	0	1	1	0.285	53,532
College	0.330	0	0	1	0.470	53,532
Married	0.525	0	1	1	0.499	53,532
Family size	2.362	1	2	6	1.377	53,532
Income	55,253	0	39,702	328,566	93,326	51,475
Financial literacy	5.099	0	5	6	1.132	30,449
Risk tolerance	0.537	0.270	0.491	1.218	0.255	21,733
Trust	0.242	0	0	1	0.428	30,449
Masculine characteristics	2.036	0	2	3	0.821	30,449
Panel C: Individuals' Assets in Adulthood						
Equity participation	0.230	0	0	1	0.421	53,532
Male equity participation	0.241	0	0	1	0.428	23,678
Female equity participation	0.206	0	0	1	0.415	29,854
Equity-wealth ratio	0.267	0	0.179	0.958	0.257	11,073
Male equity-wealth ratio	0.284	0	0.192	0.956	0.268	5,203
Female equity-wealth ratio	0.252	0	0.167	0.961	0.247	5,870

Table 2.2: Effects of Learned Gender Norms on Investment Behavior

This table reports the relationship between learned gender norms during childhood and investment behavior in adulthood. Panel A reports the results without sibling fixed effects, while Panel B includes sibling fixed effects. The dependent variables are equity participation and the equity-wealth ratio, respectively. Equity Participation is a binary variable that equals 1 if the individual invests directly in stocks and 0 otherwise. Equity-Wealth Ratio is the combined value of direct stock holdings and the equity share of mutual funds divided by total wealth. ChildImbal(Inc) represents parental income imbalance during childhood, calculated as the difference in the annual income of the father and the mother, divided by their average income. ChildImbal(Edu) represents parental education imbalance during childhood, calculated as the difference in the number of years of schooling for the father and the mother, divided by their average schooling. We control for education, marital status, family size, gender, race, income, and wealth, as well as state-by-year, age, and cohort fixed effects in Panel A. In Panel B, we add sibling fixed effects. The sample period covers the biennial surveys from 1999 to 2021. All continuous variables are standardized. Robust standard errors are clustered by individuals in Panel A and by sibling groups in Panel B, with standard errors reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Equity Participation				Equity-Wealth ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Without Sibling Fixed Effects								
ChildImbal(Inc)	0.0085** (0.0034)		0.0396*** (0.0055)		0.0052* (0.0031)		0.0087* (0.0045)	
ChildImbal(Inc)*Female			-0.0392*** (0.0075)				-0.0082 (0.0060)	
ChildImbal(Edu)		0.0107*** (0.0034)		0.0204*** (0.0050)		0.0063* (0.0038)		0.0062 (0.0048)
ChildImbal(Edu)*Female				-0.0193*** (0.0060)				-0.0047 (0.0056)
High school	-0.0270*** (0.0091)	-0.0173 (0.0111)	-0.0269*** (0.0091)	-0.0165 (0.0111)	-0.0094 (0.0117)	-0.0172 (0.0153)	-0.0093 (0.0118)	-0.0174 (0.0154)
College	0.1036*** (0.0073)	0.1159*** (0.0080)	0.1024*** (0.0073)	0.1160*** (0.0080)	0.0266*** (0.0079)	0.0291*** (0.0087)	0.0265*** (0.0079)	0.0288*** (0.0087)
Married	0.0359*** (0.0062)	0.0345*** (0.0072)	0.0352*** (0.0062)	0.0351*** (0.0071)	-0.0569*** (0.0101)	-0.0506*** (0.0114)	-0.0574*** (0.0100)	-0.0507*** (0.0114)
Family size	-0.0222*** (0.0029)	-0.0172*** (0.0035)	-0.0225*** (0.0029)	-0.0174*** (0.0035)	-0.0258*** (0.0043)	-0.0253*** (0.0051)	-0.0256*** (0.0043)	-0.0254*** (0.0051)
Female	-0.0126** (0.0063)	-0.0183** (0.0074)	-0.0136** (0.0063)	-0.0180** (0.0073)	-0.0221*** (0.0075)	-0.0211** (0.0086)	-0.0220*** (0.0075)	-0.0213** (0.0086)
White	0.0497*** (0.0125)	0.0345** (0.0156)	0.0494*** (0.0125)	0.0346** (0.0156)	0.0187 (0.0166)	0.0373* (0.0196)	0.0185 (0.0166)	0.0371* (0.0196)
Black	-0.0336** (0.0134)	-0.0450*** (0.0166)	-0.0349*** (0.0134)	-0.0448*** (0.0166)	0.0225 (0.0229)	0.0567** (0.0283)	0.0217 (0.0229)	0.0564** (0.0282)
Log(Income)	0.0307*** (0.0030)	0.0316*** (0.0034)	0.0302*** (0.0030)	0.0312*** (0.0034)	-0.0024 (0.0037)	-0.0018 (0.0042)	-0.0026 (0.0037)	-0.0016 (0.0042)
Log(Wealth)	0.1143*** (0.0022)	0.1142*** (0.0026)	0.1142*** (0.0022)	0.1142*** (0.0026)				
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Observations	43,555	34,892	43,555	34,892	9,153	7,515	9,153	7,515
R^2	0.1868	0.1949	0.1892	0.1956	0.1378	0.1462	0.1382	0.1463

Panel B: With Sibling Fixed Effects								
ChildImbal(Inc)	0.0371*** (0.0086)		0.0513*** (0.0103)		0.0200*** (0.0065)		0.0276*** (0.0066)	
ChildImbal(Inc)*Female			-0.0350*** (0.0124)				-0.0206* (0.0109)	
ChildImbal(Edu)		0.0390*** (0.0151)		0.0409*** (0.0152)		0.0300** (0.0121)		0.0275** (0.0129)
ChildImbal(Edu)*Female				-0.0182** (0.0092)				-0.0202** (0.0101)
High school	-0.0350*** (0.0124)	-0.0179 (0.0143)	-0.0361*** (0.0124)	-0.0186 (0.0142)	0.0272 (0.0212)	0.0064 (0.0262)	0.0285 (0.0213)	0.0059 (0.0258)
College	0.0442*** (0.0105)	0.0489*** (0.0113)	0.0423*** (0.0104)	0.0489*** (0.0113)	-0.0037 (0.0156)	0.0074 (0.0173)	-0.0054 (0.0155)	0.0082 (0.0171)
Married	0.0474*** (0.0070)	0.0472*** (0.0078)	0.0470*** (0.0070)	0.0476*** (0.0078)	-0.0473*** (0.0148)	-0.0385*** (0.0158)	-0.0475*** (0.0148)	-0.0391** (0.0157)
Family size	-0.0171*** (0.0033)	-0.0132*** (0.0038)	-0.0171*** (0.0033)	-0.0134*** (0.0038)	-0.0134** (0.0062)	-0.0128* (0.0067)	-0.0132** (0.0062)	-0.0125* (0.0068)
Female	-0.0145 (0.0093)	-0.0125 (0.0105)	-0.0141 (0.0094)	-0.0118 (0.0105)	-0.0323** (0.0148)	-0.0226 (0.0139)	-0.0293** (0.0146)	-0.0217 (0.0136)
White	0.0574*** (0.0143)	0.0613*** (0.0174)	0.0582*** (0.0143)	0.0620*** (0.0174)	0.0484 (0.0352)	0.0893** (0.0444)	0.0496 (0.0354)	0.0901** (0.0445)
Black	-0.0440*** (0.0157)	-0.0430** (0.0192)	-0.0441*** (0.0156)	-0.0422** (0.0192)	0.0023 (0.0439)	0.0454 (0.0531)	0.0039 (0.0440)	0.0453 (0.0533)
Log(Income)	0.0250*** (0.0031)	0.0238*** (0.0035)	0.0247*** (0.0031)	0.0237*** (0.0035)	-0.0077 (0.0050)	-0.0065 (0.0051)	-0.0078 (0.0050)	-0.0071 (0.0051)
Log(Wealth)	0.0936*** (0.0026)	0.0918*** (0.0029)	0.0934*** (0.0026)	0.0917*** (0.0029)				
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,914	29,752	33,914	29,752	6,797	6,040	6,797	6,040
R ²	0.3831	0.3977	0.3846	0.3980	0.4691	0.4813	0.4697	0.4820

Table 2.3: Robustness: Propensity Score Matching Analysis

This table reports the results of propensity score matching (PSM). Panels A–D present differences in the mean values of parental covariates used in the PSM for treatment and control groups. Individuals raised in households with above-median male dominance are assigned to the treatment group, while those raised in households with below-median male dominance are assigned to the control group. We report the t -statistics for the difference in mean covariate values between the treatment and control groups. The first three columns show covariate balance for raw, unmatched data, and the last three columns show covariate balance after nearest neighbor matching. Panels A and B present covariate balance for childhood household gender imbalance measured using parental income imbalance and parental education imbalance, respectively, for the full sample. Panels C and D present covariate balance for childhood household gender imbalance measured using parental income imbalance and parental education imbalance, respectively, for the sample conditional on participation. Panel E presents the relationship between growing up in male-dominated households and investment behavior in adulthood after PSM. In Panel E, we control for education, marital status, family size, gender, race, income, and wealth, as well as state-by-year, age, cohort, and sibling fixed effects. The sample period spans biennial surveys from 1999 to 2021. All continuous variables are standardized. Standard errors are clustered by sibling groups and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Unmatched Data			Matched Data		
	Treatment (N=16,432)	Control (N=12,797)	t -stat	Treatment (N=16,432)	Control (N=12,797)	t -stat
Panel A: Covariate Balance for Parental Income Imbalance (Full Sample)						
White mother	0.918	0.857	18.680	0.918	0.915	1.090
White father	0.902	0.826	21.390	0.902	0.893	2.850
Black mother	0.053	0.109	-19.840	0.053	0.056	-1.460
Black father	0.071	0.150	-24.290	0.0716	0.078	-2.250
Mother's age at first marriage	20.046	20.742	-17.980	20.055	20.125	-1.890
Father's age at first marriage	22.594	22.935	-7.990	22.595	22.764	-3.980
Employed mother	0.930	0.977	-20.700	0.932	0.941	-3.350
Panel B: Covariate Balance for Parental Education Imbalance (Full Sample)						
White mother	0.925	0.869	15.660	0.925	0.921	1.500
White father	0.908	0.850	14.780	0.907	0.906	0.580
Black mother	0.049	0.106	-18.330	0.049	0.050	-0.330
Black father	0.0726	0.128	-15.510	0.073	0.075	-0.720
Mother's age at first marriage	19.680	20.206	-12.720	19.693	19.760	-2.050
Father's age at first marriage	22.223	22.821	-12.330	22.242	22.189	1.400
Employed mother	0.951	0.969	-6.900	0.951	0.950	0.660
	Treatment (N=3,929)	Control (N=2,732)	t -stat	Treatment (N=3,929)	Control (N=2,732)	t -stat
Panel C: Covariate Balance for Parental Income Imbalance (Sample Conditional on Participation)						
White mother	0.949	0.902	7.390	0.948	0.936	2.400
White father	0.958	0.878	12.180	0.958	0.943	3.080
Black mother	0.029	0.070	-8.070	0.029	0.038	-2.310
Black father	0.035	0.101	-11.000	0.036	0.046	-2.390
Mother's age at first marriage	20.184	20.481	-3.620	20.201	20.242	-0.560
Father's age at first marriage	22.747	23.038	-2.980	22.767	22.959	-1.180
Employed mother	0.924	0.982	-10.510	0.924	0.943	-3.320
Panel D: Covariate Balance for Parental Education Imbalance (Sample Conditional on Participation)						
White mother	0.941	0.900	5.930	0.942	0.930	2.370
White father	0.942	0.882	8.330	0.942	0.933	1.650
Black mother	0.032	0.080	-8.420	0.032	0.040	-2.150
Black father	0.047	0.101	-8.250	0.047	0.058	-2.370
Mother's age at first marriage	20.196	20.585	-4.340	20.189	20.017	2.570
Father's age at first marriage	22.765	23.125	-3.370	22.764	22.780	-0.200
Employed mother	0.941	0.966	-4.260	0.941	0.932	1.670

Panel E: Propensity Score Matching

	Equity Participation				Equity-Wealth Ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ChildImbal(Inc)	0.0373*** (0.0102)		0.0553*** (0.0111)		0.0200* (0.0066)		0.0219*** (0.0066)	
ChildImbal(Inc)*Female			-0.0498*** (0.0144)				-0.0169* (0.0102)	
ChildImbal(Edu)		0.0401** (0.0127)		0.0391** (0.0136)		0.0300** (0.0121)		0.0280** (0.0125)
ChildImbal(Edu)*Female				-0.0267** (0.0085)				-0.0177* (0.0107)
Female	-0.0190** (0.0097)	-0.0207** (0.0102)	-0.0150 (0.0097)	-0.0187* (0.0101)	-0.0323** (0.0130)	-0.0226* (0.0126)	-0.0302** (0.0127)	-0.0219* (0.0124)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,323	21,497	22,323	21,497	6,797	6,040	6,797	6,040
R ²	0.3982	0.4022	0.4000	0.4029	0.4691	0.4813	0.4694	0.4818

Table 2.4: Robustness: Alternative Proxies for Childhood Household Gender Imbalance

This table reports the relationship between learned gender norms and investment behavior in adulthood using alternative proxies for childhood household gender imbalance. ChildImbal(Sib) denotes sibling gender imbalance, calculated as the difference between the number of brothers and sisters, divided by the total number of siblings. Stay-at-home mother is a dummy variable that equals 1 if the individual had a stay-at-home mother during childhood, and 0 otherwise, averaged across the ages of 3 and 18. Panel A presents the relationship between sibling gender imbalance and investment behavior in adulthood, and Panel B presents the relationship between stay-at-home mothers and investment behavior in adulthood. In all regressions, we control for education, marital status, family size, gender, race, income, and wealth, as well as state-by-year, age, cohort, and sibling fixed effects. The sample period spans biennial surveys from 1999 to 2021. All continuous variables are standardized. Standard errors are clustered by sibling group and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Equity Participation		Equity-Wealth Ratio	
	(1)	(2)	(3)	(4)
Panel A: Sibling Gender Imbalance				
ChildImbal(Sib)	0.0156*	0.0272**	0.0061	0.0123
	(0.0094)	(0.0135)	(0.0142)	(0.0175)
ChildImbal(Sib)×Female		-0.0251*		-0.0135
		(0.0152)		(0.0238)
Female	-0.0399**	-0.0396**	-0.0374	-0.0364
	(0.0202)	(0.0202)	(0.0231)	(0.0234)
Control variables	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes
Observations	34,233	34,233	6,842	6,842
R ²	0.3820	0.3822	0.4678	0.4679
Panel B: Stay-at-Home Mother				
Stay-at-home mother	0.0238**	0.0344***	0.0057	0.0113
	(0.0107)	(0.0116)	(0.0145)	(0.0155)
Stay-at-home mother×Female		-0.0214**		-0.0106
		(0.0087)		(0.0125)
Female	-0.0103	-0.0101	-0.0334**	-0.0349**
	(0.0098)	(0.0099)	(0.0158)	(0.0153)
Control variables	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes
Observations	30,695	30,695	6,289	6,289
R ²	0.3894	0.3897	0.4685	0.4686

Table 2.5: Robustness: Additional Omitted Variables

This table reports the relationship between learned gender norms and investment behavior in adulthood after controlling for additional omitted variables. ChildImbal(Inc) and ChildImbal(Edu) denote income and education imbalance, respectively. Panel A presents the relationship between learned gender norms and investment behavior in adulthood after including trust as a covariate. Trust is a dummy variable that equals 1 if an individual trusts most people and 0 otherwise. Panel B presents results when controlling for parental equity participation. Parental equity participation is a dummy variable that equals 1 if an individual's parents participated in the stock market at any time when an individual was between ages 3 and 18, and 0 otherwise. Panel C presents results when inheritance is incorporated as a covariate. Inheritance denotes the inheritance amount received, scaled by income. Panel D presents results when an individual's current household income and education imbalances are included as covariates. An individual's current household income (education) imbalance is calculated as the difference between the male and female household member's income (years of education), scaled by their average income (years of education). In all regressions, we control for education, marital status, family size, gender, race, income, and wealth, as well as state-by-year, age, cohort, and sibling fixed effects. The sample period spans biennial surveys from 1999 to 2021. All continuous variables are standardized. Standard errors are clustered by sibling groups and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Equity Participation				Equity-Wealth ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: The Effect of Trust								
ChildImbal(Inc)	0.0546*** (0.0123)		0.0770*** (0.0155)		0.0187** (0.0090)		0.0171* (0.0103)	
ChildImbal(Inc)×Female			-0.0543*** (0.0206)				-0.0264* (0.0160)	
ChildImbal(Edu)		0.0470** (0.0217)		0.0548** (0.0223)		0.0383*** (0.0096)		0.0374*** (0.0095)
ChildImbal(Edu)×Female				-0.0275** (0.0121)				-0.0348*** (0.0117)
Trust	-0.0093 (0.0182)	-0.0054 (0.0205)	-0.0320 (0.0287)	-0.0301 (0.0327)	-0.0167 (0.0272)	0.0075 (0.0243)	-0.0174 (0.0291)	-0.0001 (0.0276)
Trust×Female			0.0427 (0.0380)	0.0409 (0.0432)			-0.0027 (0.0365)	0.0187 (0.0369)
Female	-0.0245 (0.0158)	-0.0290* (0.0175)	-0.0318* (0.0188)	-0.0371* (0.0205)	-0.0404 (0.0250)	-0.0210 (0.0212)	-0.0331 (0.0242)	-0.0243 (0.0234)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20,046	17,985	20,046	17,985	4,415	4,040	4,415	4,040
R2	0.4338	0.4417	0.4357	0.4422	0.4945	0.5042	0.4955	0.5065
Panel B: The Effect of Parental Equity Participation								
ChildImbal(Inc)	0.0239* (0.0139)		0.0468*** (0.0137)		0.0261 (0.0160)		0.0312* (0.0164)	
ChildImbal(Inc)×Female			-0.0387*** (0.0139)				-0.0252* (0.0137)	
ChildImbal(Edu)		0.0361* (0.0217)		0.0311* (0.0188)		0.0333** (0.0140)		0.0328** (0.0142)
ChildImbal(Edu)×Female				-0.0225* (0.0135)				-0.0138* (0.0078)
Parental equity participation	0.0022 (0.0395)	0.0125 (0.0408)	0.0085 (0.0402)	0.0278 (0.0428)	-0.0211 (0.0419)	-0.0306 (0.0417)	-0.0348 (0.0433)	-0.0298 (0.0421)
Parental equity participation×Female			-0.0344	-0.0351			-0.0147	-0.0207

Female	-0.0025 (0.0132)	-0.0029 (0.0133)	(0.0327) -0.0002 (0.0142)	(0.0330) 0.0088 (0.0141)	-0.0452** (0.0199)	-0.0496** (0.0206)	(0.0424) -0.0491** (0.0203)	(0.0405) -0.0468** (0.0204)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,507	15,459	15,507	15,459	2,569	2,555	2,569	2,555
R2	0.4202	0.4217	0.4240	0.4222	0.5766	0.5774	0.5779	0.5778
Panel C: The Effect of Inheritance								
ChildImbal(Inc)	0.0374*** (0.0085)		0.0550*** (0.0092)		0.0194** (0.0065)		0.0208** (0.0064)	
ChildImbal(Inc)×Female			-0.0456*** (0.0121)				-0.0135 (0.0114)	
ChildImbal(Edu)		0.0365** (0.0115)		0.0365** (0.0119)		0.0301** (0.0121)		0.0453*** (0.0124)
ChildImbal(Edu)×Female				-0.0187** (0.0083)				-0.0333** (0.0143)
Inheritance	0.0068** (0.0024)	0.0058*** (0.0016)	0.0393*** (0.0105)	0.0411*** (0.0112)	-0.0017 (0.0015)	-0.0026* (0.0016)	0.0323 (0.0211)	0.0269 (0.0195)
Inheritance×Female			-0.0333** (0.0106)	-0.0361** (0.0112)			-0.0348* (0.0211)	-0.0302 (0.0195)
Female	-0.0151 (0.0092)	-0.0129 (0.0104)	-0.0148 (0.0093)	-0.0123 (0.0104)	-0.0307** (0.0149)	-0.0217 (0.0139)	-0.0286* (0.0146)	-0.0183 (0.0137)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,886	29,726	33,886	29,726	6,782	6,027	6,782	6,027
R2	0.3842	0.3985	0.3861	0.3991	0.4672	0.4813	0.4679	0.4827
Panel D: The Effect of Current Household Gender Imbalance								
ChildImbal(Inc)	0.0398*** (0.0095)		0.0569*** (0.0104)		0.0175*** (0.0059)		0.0185*** (0.0058)	
ChildImbal(Inc)×Female			-0.0475*** (0.0147)				-0.0146 (0.0131)	
ChildImbal(Edu)		0.0342*** (0.0123)		0.0318** (0.0128)		0.0332** (0.0138)		0.0321** (0.0144)
ChildImbal(Edu)×Female				-0.0335*** (0.0080)				-0.0047 (0.0129)
CurrentImbal(Inc)	-0.0009 (0.0044)	-0.0002 (0.0046)	-0.0140** (0.0060)	-0.0107* (0.0064)	0.0078 (0.0054)	0.0050 (0.0058)	0.0119 (0.0082)	0.0090 (0.0087)
CurrentImbal(Inc)×Female			0.0217*** (0.0074)	0.0184** (0.0078)			-0.0075 (0.0107)	-0.0070 (0.0112)
CurrentImbal(Edu)	0.0118* (0.0072)	0.0086 (0.0089)	-0.0008 (0.0091)	-0.0040 (0.0107)	-0.0257** (0.0100)	-0.0229 (0.0163)	-0.0202 (0.0124)	-0.0190 (0.0174)
CurrentImbal(Edu)×Female			0.0326*** (0.0110)	0.0378*** (0.0111)			-0.0106 (0.0169)	-0.0082 (0.0196)
Female	-0.0076 (0.0109)	-0.0064 (0.0117)	-0.0059 (0.0108)	-0.0058 (0.0115)	-0.0232* (0.0132)	-0.0217 (0.0144)	-0.0212 (0.0131)	-0.0213 (0.0144)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,447	25,115	27,447	25,115	5,526	5,083	5,526	5,083
R ²	0.3977	0.4082	0.4001	0.4095	0.5058	0.5040	0.5062	0.5042

Table 2.6: Mechanisms: Path Analysis of the Childhood Household Gender Imbalance on Investment Behavior

This table summarizes the path analysis estimates of the relationship between childhood household gender imbalance and equity participation and equity-wealth ratio in our subsample. Since questions related to financial literacy and masculine norms are only available in the 2016 PSID Well-Being Supplement, and questions about risk tolerance are only available in the 1996 survey wave, we use the subsample of individuals who responded to both in the subsequent analysis. Direct path reports the effect of childhood household gender imbalance on equity participation and allocation after controlling for mediated variables in our subsample. Mediated path reports the coefficient estimates of childhood household gender imbalance on mediating variables and the effect of mediating variables on equity participation and allocation. Equity refers to equity participation and the equity-wealth ratio. FinLit represents financial literacy, measured by the number of correct responses (ranging from 0 to 6) to questions in the 2016 Well Being PSID survey. RiskTol represents risk tolerance, a preference parameter based on five questions about hypothetical gambles from the 1996 survey data. Masc refers to masculine characteristics, measured by the sum of responses (ranging from 0 to 3) based on three questions in the 2016 WellBeing PSID survey. Panel A reports the relationship between childhood gender imbalance and investment behavior when the path is financial literacy. Panel B presents the relationship between childhood gender imbalance and investment behavior when the path is risk tolerance. Panel C reports the relationship between childhood gender imbalance and investment behavior when the path is masculine characteristics. We also report the total indirect effect of male-dominated childhood gender imbalance on investment behavior. In all regressions, we control for education, marital status, family size, gender, race, income, and wealth, as well as state-by-year, age, cohort, and sibling fixed effects. The sample period spans biennial surveys from 1999 to 2021. All continuous variables are standardized. Standard errors are clustered by sibling groups and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Panel A: Financial Literacy						
	Equity Participation			Equity-Wealth Ratio		
	Full Sample (1)	Men (2)	Women (3)	Full Sample (4)	Men (5)	Women (6)
<i>Direct Path:</i>						
Path(ChildImbal(Inc) → Equity)	0.0570*** (0.0185)	0.0729*** (0.0210)	0.0167 (0.0249)	0.0281*** (0.0095)	0.0336*** (0.0117)	0.0062 (0.0188)
Path(ChildImbal(Edu) → Equity)	0.0494** (0.0216)	0.0521** (0.0234)	0.0251 (0.0385)	0.0332** (0.0135)	0.0304** (0.0140)	-0.0026 (0.0260)
<i>Mediated Path:</i>						
Path(ChildImbal(Inc) → FinLit)	0.0599 (0.0597)	0.0434 (0.0664)	0.0100 (0.0582)	-0.0301 (0.0358)	-0.0322 (0.0362)	-0.0207 (0.0362)
Path(ChildImbal(Edu) → FinLit)	0.0321 (0.0544)	-0.0089 (0.0634)	0.0724 (0.0653)	0.0649 (0.0636)	0.0723 (0.0682)	0.1725* (0.0889)
Path(FinLit(Inc)→ Equity)	0.0003 (0.0111)	-0.0272 (0.0264)	-0.0438 (0.0294)	-0.0059 (0.0174)	-0.0036 (-0.0180)	-0.0081 (-0.0279)
Path(FinLit(Edu)→ Equity)	0.0022 (0.0130)	-0.0081 (0.0261)	0.0099 (0.0200)	-0.0194 (0.0185)	-0.0265 (0.0205)	0.0007 (0.035)
<i>Total Indirect Effect (x 10⁻⁴) :</i>						
Path(ChildImbal(Inc)→FinLit)× Path(FinLit→Equity)	0.1797 (6.6510)	1.7759 (2.2000)	4.3800 (25.6600)	1.8000 (5.5555)	1.2000 (6.0000)	1.7000 (7.0000)
Path(ChildImbal(Edu)→FinLit)× Path(FinLit→Equity)	0.7062 (4.341)	-0.6370 (-1.8500)	-7.1676 (-15.8600)	-12.5906 (17.7596)	-2.0000 (24.0000)	1.2000 (6.0000)

Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,832	8,832	8,832	2,398	2,398	2,398

Panel B: Risk Tolerance

	Full Sample (1)	Men (2)	Women (3)	Full Sample (4)	Men (5)	Women (6)
<i>Direct Path:</i>						
Path(ChildImbal(Inc) → Equity)	0.0570*** (0.0184)	0.0741*** (0.0232)	0.0170 (0.0270)	0.0269*** (0.0098)	0.0318*** (0.0104)	0.0104 (0.0176)
Path(ChildImbal(Edu) → Equity)	0.0489** (0.0244)	0.0599*** (0.0277)	0.0403* (0.0219)	0.0309** (0.0140)	0.0367*** (0.0139)	0.0019 (0.0238)
<i>Mediated Path:</i>						
Path(ChildImbal(Inc) → RiskTol)	0.0048 (0.0563)	-0.0212 (0.0629)	0.0679 (0.0591)	-0.0566 (0.0590)	-0.0846 (0.0572)	0.0690 (0.0750)
Path(ChildImbal(Edu) → RiskTol)	0.0496 (0.0530)	0.0108 (0.0777)	0.0876 (0.0743)	-0.0900* (0.0539)	-0.0828 (0.05483)	0.0148 (0.0779)
Path(RiskTol(Inc)→ Equity)	0.0105 (0.0123)	0.0229 (0.0165)	0.0014 (0.0174)	-0.0081 (-0.0791)	0.0045 (0.0250)	0.0105 (0.0178)
Path(RiskTol(Edu)→ Equity)	0.0131 (0.0133)	0.0201 (0.0177)	0.0053 (0.0180)	0.0007 (0.0261)	0.0144 (0.0300)	0.0019 (0.0238)
<i>Total Indirect Effect(x 10⁻⁴) :</i>						
Path(ChildImbal(Inc)→RiskTol)× Path(RiskTol→Equity)	0.5040 (5.9409)	-4.8548 (14.8228)	0.9506 (1.8435)	1.3400 (7.0000)	-3.8070 (21.0000)	7.0000 (14.0000)
Path(ChildImbal(Edu)→RiskTol)× Path(RiskTol→Equity)	6.4976 (9.5772)	2.1708 (15.7343)	4.6428 (16.2523)	1.10000 (16.2523)	1.1900 (26.0000)	3.0000 (4.000)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,832	8,832	8,832	2,398	2,398	2,398

Panel C: Masculine Characteristics

	Equity Participation			Equity-Wealth Ratio		
	Full Sample (1)	Men (2)	Women (3)	Full Sample (4)	Men (5)	Women (6)
<i>Direct Path:</i>						
Path(ChildImbal(Inc) → Equity)	0.0475*** (0.0174)	0.0652*** (0.0205)	0.0115 (0.0248)	0.0195* (0.0114)	0.0434*** (0.0161)	0.0126 (0.0175)
Path(ChildImbal(Edu) → Equity)	0.0557** (0.0226)	0.0559** (0.0256)	0.0214 (0.0259)	0.0382** (0.0150)	0.0324* (0.0170)	0.0053 (0.0265)
<i>Mediated Path:</i>						
Path(ChildImbal(Inc) → Masc)	0.2921*** (0.0734)	0.2933*** (0.0746)	0.2891*** (0.0881)	0.4578*** (0.1330)	0.4801*** (0.1376)	0.3584** (0.1493)
Path(ChildImbal(Edu) → Masc)	0.1936** (0.0950)	0.1966** (0.0953)	0.0944 (0.1210)	0.2479** (0.1087)	0.2749*** (0.0965)	-0.094*** (0.0194)
Path(Masc(Inc)→ Equity)	0.0324** (0.0137)	0.0539*** (0.0150)	0.0046 (0.0174)	0.0200* (0.0121)	0.0348* (0.0180)	-0.0224 (0.0243)
Path(Masc(Edu)→ Equity)	0.0451*** (0.0172)	0.0638*** (0.0236)	0.0209 (0.0170)	0.0252* (0.0142)	0.0264* (0.0160)	0.0114 (0.0237)
<i>Total Indirect Effect:</i>						
Path(ChildImbal(Inc)→Masc)× Path(Masc→Equity)	0.0095** (0.0046)	0.0158** (0.0078)	0.0013 (0.0050)	0.0092 (0.0069)	0.0167 (0.0099)	-0.0080 (0.0093)
Path(ChildImbal(Edu)→Masc)× Path(Masc→Equity)	0.0087* (0.0052)	0.0125* (0.0074)	0.0020 (0.0030)	0.0062 (0.0044)	0.0073 (0.0051)	-0.0010 (0.0017)
Controls and fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,832	8,832	8,832	2,398	2,398	2,398

Table 2A.1 Variable Definitions

Variable Names	Variable Definitions
Panel A: Parental Characteristics in Childhood	
Father's education (in years)	The number of years of education that the respondent's father completed.
Mother's education (in years)	The number of years of education that the respondent's mother completed.
Father's high school education	A dummy variable that equals 1 if the respondent's father completed at least 12 years of schooling and 0 otherwise.
Mother's high school education	A dummy variable that equals 1 if the respondent's mother completed at least 12 years of schooling and 0 otherwise.
Father's college degree	A dummy variable that equals 1 if the respondent's father completed at least 16 years of schooling and 0 otherwise.
Mother's college degree	A dummy variable that equals 1 if the respondent's mother completed at least 16 years of schooling and 0 otherwise.
Father's income	The father's labor income, including the labor portion of farm income and business income, wages, bonuses, overtime, commissions, income from professional practice or trade, market gardening, additional job income, and miscellaneous labor income.
Mother's income	The mother's labor income, including the labor portion of farm income and business income, wages, bonuses, overtime, commissions, income from professional practice or trade, market gardening, additional job income, and miscellaneous labor income.
ChildImbal(Inc)	Parental income imbalance, defined as the difference between the father's and mother's annual income, divided by their average income.
ChildImbal(Edu)	Parental education imbalance, defined as the difference between the father's and mother's years of education, divided by their average years of education.
ChildImbal(Sib)	Sibling gender imbalance, calculated as the difference between the number of brothers and sisters, divided by the total number of siblings.
Stay-at-home mother	A dummy variable that equals 1 if the mother is a stay-at-home mother in a given year and 0 otherwise.
Parental equity participation	A dummy variable that equals 1 if an individual's parents participated in the stock market when the individual was between the ages of 3 and 18, and 0 otherwise.
Panel B: Characteristics in Adulthood	
Number of years	The total number of years a respondent has participated in the sample.
Age	The age of an individual.
White	A dummy variable that equals 1 if the individual's race is White and 0 otherwise.
Black	A dummy variable that equals 1 if the individual's race is Black and 0 otherwise.
Female	A dummy variable that equals 1 if the individual is female and 0 if the individual is male.
High school	A dummy variable that equals 1 if the individual has completed at least 12 years of education and 0 otherwise.
College	A dummy variable that equals 1 if the individual has completed at least 16 years of education and 0 otherwise.
Married	A dummy variable that equals 1 if the individual has ever been married and 0 otherwise.
Income	The individual's reported labor income in survey years, including the labor portion of farm income and business income, wages, bonuses, overtime, commissions, income from professional practice or trade, market gardening, additional job income, and miscellaneous labor income.
Family size	The number of family members in a given year.
Trust	A dummy variable that equals 1 if the individual trusts most people in any given year and 0 otherwise. The question asks, "Generally speaking, how many people do you trust?"
Financial literacy	A score calculated as the sum of correct responses (ranging from 0 to 6) based on six questions in the PSID. The six questions are: (1) If you buy a drink for 85 cents and pay with one dollar, how much change should you get back? (2) A shop is having a half-price (50% off) sale. Before the sale, a sofa costs \$300. How much will it cost on sale? (3) If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease? (4) A used car dealer is selling a car for \$6,000. This is two thirds of what it cost new. How much did the car cost new? (5) If five people all have the winning numbers in the lottery and the prize is \$2 million, how much will each of them get? (6) Suppose you have \$200 in a savings account. The account earns 10 percent interest each year. How much would you have in the account at the end of two years?

Risk tolerance	Preference parameters measure the risk tolerance level based on the following five questions about hypothetical gambles in the PSID—specifically, whether the respondent would take a job (1) with an equal probability of doubling income or cutting it by a third; (2) with equal probability of doubling income or cutting it in half; (3) with an equal probability of doubling income or cutting it by 20%; (4) with an equal probability of doubling income or cutting it by 75%; (5) with an equal probability of doubling income or cutting it by 10%. There are six response categories and six individual-level preference parameter estimates. The higher the number, the higher the individual's risk tolerance level.
Masculine characteristics	A score calculated as the sum of responses (ranging from 0 to 3) based on the following three questions in the PSID. The first question asks: "Which statement describes you better? (1) I might quit a job if the job turned out to be too difficult; (2) I might quit if the job was no longer challenging." We assign one point if respondents choose (2). Leadership is another aspect of masculine characteristics. The second question asks: "Which statement describes you better: (1) I would rather have a child that was a leader; (2) I would rather have a child that does the work his or her teacher expects." We give respondents one point if they choose (1). We capture the competence aspect of masculinity using the third question: "How much do you agree or disagree with the following statement? I am competent and capable in the activities that are important to me." The answers are: (1) strongly agree, (2) somewhat agree, (3) neither agree nor disagree, (4) somewhat disagree, and (5) strongly disagree. Individuals receive an additional point if they answer "strongly agree" or "somewhat agree."
Panel C: Assets in Adulthood	
Equity participation	A dummy variable if the individual directly invests in stocks of publicly held corporations, mutual funds, or investment trusts (excluding stocks in employer-based pensions or IRAs) in a given year, and 0 otherwise
Male equity participation	A dummy variable that equals 1 if a male respondent directly invests in stocks of publicly held corporations, mutual funds, or investment trusts (excluding stocks in employer-based pensions or IRAs) in a given year and 0 otherwise.
Female equity participation	A dummy variable that equals 1 if a female respondent directly invests in stocks of publicly held corporations, mutual funds, or investment trusts (excluding stocks in employer-based pensions or IRAs) in a given year and 0 otherwise.
Equity-wealth ratio	The ratio of an individual's net equity value to their total wealth.
Male equity-wealth ratio	The ratio of a male respondent's net equity value to their total wealth.
Female equity-wealth ratio	The ratio of a female respondent's net equity value to their total wealth.

Table 2A.2: Average Treatment Effects on Investment Behavior

This table reports the average treatment effect for the treatment groups after using three different matching methods: nearest neighbor matching with replacement, kernel matching, and caliper matching with a radius of 0.05. ATT refers to the average treatment effect for the treatment group in terms of outcome variables, including equity participation and the equity-wealth ratio. *t*-ratio denotes the *t*-ratio of the average treatment effect. N (Treated) and N (Control) represent the number of individuals in the treatment group (individuals from households with above-median male dominance) and control group (individuals from households with below-median male dominance). Panel A (B) reports the average parental income(education) imbalance treatment effect on equity participation. Panel C (D) shows the average parental income (education) imbalance treatment effect on the sample conditional on participation.

	ATT	<i>t</i> -ratio	N (Treated)	N (Control)
Panel A: Average Parental Income Imbalance Treatment Effect on Equity Participation				
Nearest neighbor	0.0967	2.81	17,819	15,837
Kernel	0.0700	12.28	17,819	15,837
Radius (0.05)	0.0699	12.29	17,819	15,837
Panel B: Average Parental Education Imbalance Treatment Effect on Equity Participation				
Nearest neighbor	0.0258	3.25	22,755	10,901
Kernel	0.0234	3.99	22,755	10,901
Radius (0.05)	0.0237	4.03	22,755	10,901
Panel C: Average Parental Income Imbalance Treatment Effect on Equity-Wealth Ratio				
Nearest neighbor	0.0531	1.69	4,140	3,205
Kernel	0.0627	2.43	4,140	3,205
Radius (0.05)	0.0628	2.44	4,140	3,205
Panel D: Average Parental Education Imbalance Treatment Effect on Equity-Wealth Ratio				
Nearest neighbor	0.0322	2.82	5,257	2,088
Kernel	0.0209	2.35	5,257	2,088
Radius (0.05)	0.0203	2.30	5,257	2,088

Table 2A.3: Covariate Balance Test: Different Matching Methods

This table reports the covariate balance results across different matching methods. The first three columns show the covariate balance results for raw, unmatched data, and the last three columns show covariate balance results after using nearest neighbor matching, kernel matching, and caliper matching using a radius of 0.05. Panels A and B show covariate balance for childhood household male dominance, measured by parental income imbalance and parental education imbalance, respectively, using the full sample. Panels C and D show covariate balance for childhood household male dominance, measured by parental income imbalance and parental education imbalance, respectively, using the sample conditional on participation.

	Raw data			Matched data		
	Ps R^2	LR χ^2	MeanBias	Ps R^2	LR χ^2	MeanBias
Panel A: Covariate Balance for Parental Income Imbalance (Full Sample)						
Nearest neighbor	0.109	4374.25	12.5	0.040	308.73	1.9
Kernel	0.109	4374.25	12.5	0.009	386.01	2.3
Radius (0.05)	0.109	4374.25	12.5	0.008	379.48	2.3
Panel B: Covariate Balance for Parental Education Imbalance (Full Sample)						
Nearest neighbor	0.089	3239.14	8.7	0.052	1831.76	3.6
Kernel	0.089	3239.14	8.7	0.016	865.91	2.6
Radius (0.05)	0.089	3239.14	8.7	0.015	845.81	2.6
Panel C: Covariate Balance for Parental Income Imbalance (Sample Conditional on Participation)						
Nearest neighbor	0.136	1237.68	14.7	0.114	1129.35	9.4
Kernel	0.136	1229.35	14.7	0.029	310.14	4.5
Radius (0.05)	0.136	1229.35	14.7	0.029	309.94	4.5
Panel D: Covariate Balance for Parental Education Imbalance (Sample Conditional on Participation)						
Nearest neighbor	0.136	1078.23	11.4	0.099	810.18	8.9
Kernel	0.136	1078.23	11.4	0.041	541.31	4.5
Radius (0.05)	0.136	1078.23	11.4	0.041	537.04	4.5

Table 2B.1: Estimations of the Generalized Propensity Score

This table reports the generalized propensity score analysis. Panel A (B) shows the coefficients and standard errors for all individual characteristics, where the dependent variable is parental income (education) imbalance. Panel C (D) shows the coefficients and standard errors for all individual characteristics, where the dependent variable is parental income (education) imbalance, conditional on participation.

Variables	Coefficients	Standard Error
Panel A: Estimations of the Generalized Propensity Score on Parental Income Imbalance		
White mother	0.0925***	(0.0260)
White father	-0.1588***	(0.0333)
Black mother	-0.0137	(0.0310)
Black father	-0.3393***	(0.0368)
Mother's age at first marriage	-0.0179***	(0.0016)
Father's age at first marriage	-0.0018	(0.0013)
Employed mother	-0.2581***	(0.0236)
Observations	29,001	
Log-likelihood	-32634.132	
Panel B: Estimations of the Generalized Propensity Score on Parental Education Imbalance		
White mother	-0.0295***	(0.0083)
White father	0.0181*	(0.0105)
Black mother	-0.0908***	(0.0099)
Black father	0.0025	(0.0117)
Mother's age at first marriage	-0.0066***	(0.0005)
Father's age at first marriage	-0.0018	(0.0004)
Employed mother	-0.0161**	(0.0074)
Observations	27,847	
Log-likelihood	1343.2143	
Panel C: Estimations of the Generalized Propensity Score on Parental Income Imbalance (Sample Conditional on Participation)		
White mother	0.1483***	(0.0547)
White father	0.3671***	(0.0853)
Black mother	0.0691	(0.0683)
Black father	0.1642*	(0.0929)
Mother's age at first marriage	-0.0186***	(0.0033)
Father's age at first marriage	-0.0066**	(0.0027)
Employed mother	-0.1923***	(0.0433)
Observations	6,515	
Log-likelihood	-6863.9071	
Panel D: Estimations of the Generalized Propensity Score on Parental Education Imbalance (Sample Conditional on Participation)		
White mother	-0.1359***	(0.0189)
White father	0.0804 ***	(0.0279)
Black mother	-0.1920***	(0.0238)
Black father	0.0636**	(0.0307)
Mother's age at first marriage	-0.0088***	(0.0012)
Father's age at first marriage	-0.0002	(0.0009)
Employed mother	-0.0299**	(0.0150)
Observations	6,284	
Log-likelihood	229.19897	

Table 2B.2: Test of the Balancing Property

This table illustrates the results of the balancing properties test. We divide the full sample into three treatment groups according to the level of childhood household gender imbalance: [0- 0.300], (0.300-0.500], and (0.500,1]. Observations within each group are then divided into five blocks according to the estimated generalized propensity score matching (GPSM). For each variable, we test for covariate balance by comparing units within the same GPSM interval but belonging to different treatment levels of gender imbalance. The balancing properties are assessed using a standard two-sided t-test. Panel A reports the balancing test results when the dependent variable is parental income imbalance. Panel B reports the results when the dependent variable is parental education imbalance. Panel C (D) presents the balancing test results when the dependent variable is parental income (education) imbalance, conditional on equity participation.

	Group 1			Group 2			Group 3		
	Mean	Std	t-stat	Mean	Std	t-stat	Mean	Std	t-stat
Panel A: Balancing Property on Parental Income Imbalance									
White mother	0.0040	0.0022	1.8053	0.0043	0.0021	1.0650	-0.0056	0.0019	-2.9243
White father	0.0089	0.0023	3.8788	0.0042	0.0022	1.9214	-0.0137	0.0020	-6.7508
Black mother	-0.0067	0.0019	-3.6158	-0.0056	0.0018	-3.1765	0.0071	0.0016	4.3372
Black father	-0.0109	0.0020	-5.4942	-0.0048	0.0019	-2.5135	0.0147	0.0018	3.1266
Mother's age at first marriage	-0.0818	0.0262	-3.1247	0.0807	0.0239	3.3727	-0.0055	0.0215	-0.2563
Father's age at first marriage	-0.1394	0.0322	-4.3298	-0.0145	0.0291	-0.4976	0.0279	0.0259	1.0789
Employed mother	0.0078	0.0020	3.9709	-0.0251	0.0017	-5.0220	0.0102	0.0015	7.0412
Panel B: Balancing Property on Parental Education Imbalance									
White mother	0.0204	0.0021	9.5054	-0.0213	0.0018	-11.7030	0.0104	0.0019	5.4011
White father	0.0100	0.0022	4.4996	-0.0120	0.0020	-6.0589	0.0087	0.0021	4.2446
Black mother	-0.0073	0.0016	-4.4510	0.0133	0.0016	8.5259	-0.0090	0.0017	-5.4395
Black father	-0.0069	0.0020	-3.4636	0.0092	0.0018	5.0509	-0.0073	0.0019	-3.8820
Mother's age at first marriage	0.0989	0.0251	3.9469	-0.2177	0.0208	-5.4450	0.1208	0.0216	5.6052
Father's age at first marriage	0.1191	0.0296	4.0251	-0.0611	0.0244	-2.5010	-0.0507	0.0252	-2.0141
Employed mother	-0.0053	0.0017	-3.0939	0.0036	0.0013	2.8043	0.0024	0.0013	1.8279
Panel C: Balancing Property on Parental Income Imbalance in Equity-Wealth Sample									
White mother	-0.0005	0.0044	-0.1211	-0.0001	0.0036	-0.0394	-0.0052	0.0050	-1.0421
White father	0.0045	0.0035	1.3180	0.0045	0.0035	1.3180	-0.0321	0.0052	-6.2131
Black mother	-0.0039	0.0035	-1.1062	-0.0071	0.0030	-2.4040	0.0160	0.0041	3.8807
Black father	-0.0104	0.0036	-2.8755	0.0008	0.0032	0.2516	0.0274	0.0048	5.7174
Mother's age at first marriage	-0.0386	0.0642	-0.6020	0.2368	0.0464	5.1046	-0.1688	0.0596	-2.8341
Father's age at first marriage	-0.2114	0.0757	-2.7942	0.0985	0.0563	1.7503	-0.1139	0.0733	-1.5528
Employed mother	0.0019	0.0054	0.3574	-0.0528	0.0031	-7.2550	0.0460	0.0032	4.5100
Panel D: Balancing Property on Parental Education Imbalance in Equity-Wealth Sample									
White mother	2.2328	0.0047	3.0325	0.0020	0.0036	0.5468	-0.0150	0.0045	-3.3365
White father	0.0262	0.0044	5.9507	-0.0135	0.0038	-3.5609	-0.0004	0.0049	-0.0847
Black mother	-0.0107	0.0032	-3.3375	0.0056	0.0029	1.9462	0.0039	0.0039	1.0013
Black father	-0.0238	0.0039	-6.0587	0.0118	0.0035	3.3909	-0.0006	0.0046	-0.1275
Mother's age at first marriage	-0.0465	0.0578	-0.8052	-0.1457	0.0472	-3.0888	0.2590	0.0593	4.3682
Father's age at first marriage	0.1050	0.0704	1.4908	-0.0532	0.0563	-0.9440	0.0055	0.0717	0.0765
Employed mother	-0.0115	0.0045	-2.5564	0.0090	0.0031	2.8694	0.0022	0.0037	0.5846

Table 2B.3: Estimations of the Conditional Expectation of Outcome

This table reports the estimations of the conditional expectation of outcome. Panel A (B) shows the coefficients of the dose-response function at different levels of parental income (education) imbalance when the dependent variable is equity participation. Panel C (D) shows the coefficients of the dose-response function at different levels of parental income (education) imbalance when the dependent variable is equity-wealth ratio. Standard errors are calculated using block-bootstrapping with 100 replications.

Variables	Coefficients	Standard Error
Panel A: Dose-Response Function Based on Parental Income Imbalance		
ChildImbal(Inc)	0.4053***	(0.0500)
ChildImbal(Inc) ²	-0.0347	(0.0297)
GPS	-1.8826**	(0.7364)
GPS ²	0.7195	(0.7364)
ChildImbal(Inc)×GPS	0.3677*	(0.2020)
Observations	35,771	
Panel B: Dose-Response Function Based on Parental Education Imbalance		
ChildImbal(Edu)	0.5297***	(0.0659)
ChildImbal(Edu) ²	-0.0807	(0.0558)
GPS	-0.6882***	(0.1850)
GPS ²	0.3762***	(0.0790)
ChildImbal(Edu)×GPS	0.5174***	(0.1103)
Observations	34,100	
Panel C: Dose-Response Function Based on Parental Income Imbalance in Equity-Wealth Sample		
ChildImbal(Inc)	0.0124	(0.0109)
ChildImbal(Inc) ²	-0.0052	(0.0057)
GPS	0.0208	(0.1333)
GPS ²	-0.0239	(0.1928)
ChildImbal(Inc)×GPS	-0.0026	(0.0429)
Observations	7,629	
Panel D: Dose-Response Function Based on Parental Education Imbalance in Equity-Wealth Sample		
ChildImbal(Edu)	0.0231	(0.1445)
ChildImbal(Edu) ²	0.0086	(0.0116)
GPS	0.0196	(0.0413)
GPS ²	-0.0159	(0.0180)
ChildImbal(Edu)×GPS	-0.0092	(0.0212)
Observations	7,344	

Table 2C.1: Including IRA Accounts

This table reports the relationship between learned gender norms and investment behavior (including IRA accounts) in adulthood. Equity participation (IRA) is a dummy variable that equals 1 if a household invests in the stock market (including IRAs or annuities), and 0 otherwise. Equity-Wealth ratio (IRA) is defined as the combined value of directly and indirectly held stocks and the equity share of mutual funds, divided by total wealth. We control for education, marital status, family size, gender, race, income, and wealth, as well as state-by-year, age, cohort, and sibling fixed effects. The sample period spans from 1999 to 2021 biennially. All models are estimated using OLS, and all continuous variables are standardized. Standard errors are clustered by sibling group and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Equity Participation (IRA)				Equity-Wealth Ratio (IRA)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ChildImbal(Inc)	0.0203*** (0.0070)		0.0338*** (0.0078)		0.0190** (0.0086)		0.0270** (0.0088)	
ChildImbal(Inc)×Female			-0.0329*** (0.0085)				-0.0257** (0.0117)	
ChildImbal(Edu)		0.0269** (0.0107)		0.0270** (0.0105)		0.0416*** (0.0095)		0.0376*** (0.0105)
ChildImbal(Edu)×Female				-0.0151* (0.0081)				-0.0320** (0.0124)
Female	0.0032 (0.0104)	0.0072 (0.0117)	0.0037 (0.0104)	-0.0129 (0.0104)	-0.0234 (0.0152)	-0.0149 (0.0157)	-0.0196 (0.0149)	-0.0136 (0.0152)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,914	29,752	33,914	29,752	6,796	6,039	6,796	6,039
R ²	0.4192	0.4304	0.4198	0.4306	0.5039	0.5216	0.5048	0.5230

Table 2C.2: Controlling for Sample Weights

This table reports the relationship between learned gender norms and adulthood investment behavior after adjusting for sample weights. We use longitudinal weights to ensure that the sample is representative of the overall population. We control for education, marital status, family size, gender, race, income, and wealth, as well as state-by-year, age, cohort, and sibling fixed effects. The sample period spans from 1999 to 2021 biennially. All models are estimated using OLS, and all continuous variables are standardized. Standard errors are clustered by sibling group and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Equity Participation				Equity-Wealth Ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ChildImbal(Inc)	0.0352*** (0.0097)		0.0524*** (0.0113)		0.0215*** (0.0074)		0.0226*** (0.0074)	
ChildImbal(Inc)*Female			-0.0385*** (0.0131)				-0.0198* (0.0115)	
ChildImbal(Edu)		0.0453*** (0.0151)		0.0466*** (0.0153)		0.0329*** (0.0111)		0.0296** (0.0117)
ChildImbal(Edu)*Female				-0.0189** (0.0086)				-0.0245** (0.0105)
Female	-0.0151 (0.0092)	-0.0177* (0.0103)	-0.0118 (0.0092)	-0.0165 (0.0102)	-0.0350** (0.0154)	-0.0191 (0.0145)	-0.0313** (0.0151)	-0.0176 (0.0142)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,914	29,752	33,914	29,752	6,797	6,040	6,797	6,040
R ²	0.4075	0.4168	0.4085	0.4170	0.5345	0.5491	0.5350	0.5500

Table 2C.3: Other Omitted Variables

This table reports childhood household gender imbalance and investment behavior after controlling for additional variables. Defined benefit (DB) is a dummy variable that equals 1 if an individual has a defined benefit pension plan, and 0 otherwise. Defined contribution (DC) is a dummy variable that equals 1 if an individual has a defined contribution pension plan and 0 otherwise. Business is a dummy variable that equals 1 if an individual majored in business in college. We control controls for education, marital status, family size, gender, race, income, wealth, defined benefit plan, defined contribution plan, average parental education, average parental income, and birth order, as well as state-by-year, age, cohort, and sibling fixed effects. The sample period spans from 1999 to 2021 biennially. All models are estimated using OLS, and all continuous variables are standardized. Standard errors are clustered by sibling group and are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	Equity Participation			Equity-Wealth Ratio				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: The Effect of Pension Plans								
ChildImbal(Inc)	0.0367*** (0.0086)		0.0546*** (0.0093)		0.0199*** (0.0066)		0.0210*** (0.0070)	
ChildImbal(Inc)*Female			-0.0460*** (0.0122)				-0.0233** (0.0099)	
ChildImbal(Edu)		0.0360*** (0.0115)		0.0359*** (0.0119)		0.0299*** (0.0092)		0.0279*** (0.0097)
ChildImbal(Edu)*Female				-0.0184** (0.0083)				-0.0201** (0.0082)
Defined benefit (DB)	0.0004 (0.0071)	-0.0020 (0.0077)	0.0049 (0.0099)	0.0034 (0.0106)	-0.0003 (0.0090)	0.0051 (0.0099)	0.0053 (0.0125)	0.0110 (0.0134)
Defined benefit*Female			-0.0082 (0.0142)	-0.0106 (0.0154)			-0.0114 (0.0162)	-0.0110 (0.0175)
Defined contribution	0.0152** (0.0060)	0.0151** (0.0064)	0.0232*** (0.0087)	0.0260*** (0.0092)	0.0087 (0.0077)	0.0138* (0.0079)	0.0160 (0.0105)	0.0190* (0.0107)
Defined contribution *Female			-0.0160 (0.0122)	-0.0228* (0.0130)			-0.0152 (0.0149)	-0.0132 (0.0152)
Female	-0.0150 (0.0092)	-0.0128 (0.0104)	-0.0089 (0.0094)	-0.0042 (0.0104)	-0.0326** (0.0148)	-0.0240* (0.0137)	-0.0223 (0.0154)	-0.0155 (0.0148)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,914	29,752	33,914	29,752	6,797	6,040	6,797	6,040
R ²	0.3837	0.3981	0.3855	0.3985	0.4692	0.4820	0.4705	0.4830
Panel B: The Effect of Business Major								
ChildImbal(Inc)	0.0366*** (0.0086)		0.0547*** (0.0092)		0.0200*** (0.0065)		0.0211*** (0.0069)	
ChildImbal(Inc)*Female			-0.0465*** (0.0121)				-0.0234** (0.0098)	
ChildImbal(Edu)		0.0358*** (0.0115)		0.0358*** (0.0119)		0.0299*** (0.0094)		0.0280*** (0.0098)
ChildImbal(Edu)*Female				-0.0181** (0.0084)				-0.0205** (0.0080)
Business	0.0684*** (0.0180)	0.0642*** (0.0191)	0.0768*** (0.0252)	0.0718*** (0.0256)	-0.0261 (0.0228)	-0.0193 (0.0219)	-0.0027 (0.0266)	-0.0002 (0.0272)
Business*Female			-0.0165 (0.0352)	-0.0231 (0.0379)			-0.0600 (0.0436)	-0.0561 (0.0411)

Female	-0.0139 (0.0092)	-0.0116 (0.0104)	-0.0131 (0.0093)	-0.0105 (0.0104)	-0.0327** (0.0149)	-0.0238* (0.0138)	-0.0290** (0.0145)	-0.0213 (0.0136)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,914	29,752	33,914	29,752	6,797	6,040	6,797	6,040
R ²	0.3840	0.3983	0.3858	0.3986	0.4692	0.4817	0.4705	0.4828

Panel C: The Effect of Birth Order

ChildImbal(Inc)	0.0368*** (0.0086)		0.0544*** (0.0091)		0.0210*** (0.0067)		0.0221*** (0.0070)	
ChildImbal(Inc)*Female			-0.0458*** (0.0123)				-0.0222** (0.0097)	
ChildImbal(Edu)		0.0361*** (0.0115)		0.0360*** (0.0121)		0.0302*** (0.0095)		0.0295*** (0.0103)
ChildImbal(Edu)*Female				-0.0180** (0.0084)				-0.0198** (0.0080)
Female	-0.0146 (0.0093)	-0.0123 (0.0105)	-0.0152 (0.0120)	-0.0034 (0.0132)	-0.0318** (0.0147)	-0.0232* (0.0139)	-0.0097 (0.0174)	-0.0026 (0.0188)
Second child	-0.0104 (0.0143)	-0.0068 (0.0161)	0.0030 (0.0220)	0.0219 (0.0247)	-0.0066 (0.0172)	0.0054 (0.0186)	0.0052 (0.0255)	0.0069 (0.0272)
Second child *Female			-0.0277 (0.0288)	-0.0561* (0.0321)			-0.0264 (0.0387)	-0.0122 (0.0371)
Third child	-0.0174 (0.0152)	-0.0172 (0.0176)	-0.0279 (0.0215)	-0.0287 (0.0247)	0.0110 (0.0193)	-0.0076 (0.0196)	0.0446 (0.0303)	0.0182 (0.0271)
Third child *Female			0.0234 (0.0285)	0.0247 (0.0318)			-0.0710* (0.0373)	-0.0546 (0.0350)
Fourth child	-0.0155 (0.0161)	-0.0118 (0.0187)	-0.0197 (0.0229)	-0.0055 (0.0263)	-0.0072 (0.0217)	-0.0275 (0.0246)	-0.0060 (0.0270)	-0.0114 (0.0297)
Fourth child *Female			0.0091 (0.0296)	-0.0116 (0.0333)			-0.0069 (0.0406)	-0.0398 (0.0462)
	(0.0174)	(0.0201)	(0.0261)	(0.0298)	(0.0213)	(0.0228)	(0.0329)	(0.0358)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,914	29,752	33,914	29,752	6,797	6,040	6,797	6,040
R ²	0.3836	0.3979	0.3855	0.3987	0.4694	0.4820	0.4713	0.4836

Panel D: The Effect of Mother-Father Pair Fixed Effect

ChildImbal(Inc)	0.0365*** (0.0090)		0.0548*** (0.0096)		0.0202** (0.0063)		0.0216*** (0.0062)	
ChildImbal(Inc)*Female			-0.0477*** (0.0128)				-0.0165 (0.0120)	
ChildImbal(Edu)		0.0360** (0.0118)		0.0363** (0.0120)		0.0299** (0.0122)		0.0449*** (0.0126)
ChildImbal(Edu)*Female				-0.0149* (0.0082)				-0.0335** (0.0143)
Female	-0.0131 (0.0096)	-0.0158 (0.0103)	-0.0114 (0.0097)	-0.0156 (0.0104)	-0.0343** (0.0154)	-0.0218 (0.0139)	-0.0319** (0.0151)	-0.0188 (0.0137)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent pair fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,914	29,752	33,914	29,752	6,796	6,039	6,796	6,039
R ²	0.3931	0.4016	0.3947	0.4018	0.4697	0.4815	0.4701	0.4825

Table 2C. 4: Mechanism Analyses Subsample: Summary Statistics

This table reports summary statistics using the PSID survey waves from 1999 to 2021, with which we can observe both an individual's childhood household gender imbalance and asset holdings in adulthood. All variables are defined in Table A1. Panel A shows parental characteristics for individuals, constructed using data from the 1968 to 1997 survey waves when the individuals were children. Panel B shows the demographic and socioeconomic characteristics of individuals in adulthood. Panel C reports investment holdings for individuals in adulthood. All income, wealth, and asset holdings are converted to December 2021 dollars using the consumer price index. Summary statistics are weighted using PSID sample weights to ensure they are representative of the population.

	Mean	P1	P50	P99	SD	N
Panel A: Parental Characteristics in Childhood						
Father's education (in years)	12.276	3	12	17	3.031	11,854
Mother's education (in years)	12.126	5	12	17	2.233	11,854
Father's high school education	0.718	0	1	1	0.450	11,854
Mother's high school education	0.773	0	1	1	0.419	11,854
Father's college degree	0.226	0	0	1	0.418	11,854
Mother's college degree	0.104	0	0	1	0.306	11,854
Father's income	75,995	6,990	68,576	203,294	45,679	11,854
Mother's income	12,770	0	8,290	58,479	14,608	11,854
ChildImbal(Inc)	1.326	-2	1.561	2	0.815	11,854
ChildImbal(Edu)	0.013	-1.170	0	1.600	0.288	11,854
Panel B: Characteristics in Adulthood						
Number of years in sample	10.230	3	11	12	2.253	1,158
Age	49.660	27	50	69	9.990	11,854
White	0.9364	0	1	1	0.244	11,854
Black	0.034	0	0	1	0.182	11,854
Female	0.536	0	1	1	0.498	11,854
High school	0.952	0	1	1	0.213	11,854
College	0.395	0	0	1	0.489	11,854
Married	0.611	0	1	1	0.488	11,854
Family size	2.412	1	2	6	1.320	11,854
Income	64,098	0	46,293	371,250	106,990	11,854
Financial literacy	4.765	0	5	6	1.700	11,854
Risk tolerance	0.544	0.270	0.491	1.218	0.251	11,854
Trust	0.264	0	0	1	0.441	11,854
Masculine characteristics	2.029	0	2	3	0.833	11,854
Panel C: Assets in Adulthood						
Equity participation	0.277	0	0	1	0.448	11,854
Male equity participation	0.320	0	0	1	0.467	5,595
Female equity participation	0.240	0	0	1	0.427	6,259
Equity-wealth ratio	0.255	0	0.173	0.912	0.241	3,284
Male equity-wealth ratio	0.258	0	0.174	0.909	0.240	1,500
Female equity-wealth ratio	0.252	0	0.173	0.961	0.247	1,784

Table 3.1: Descriptive Statistics of Entrepreneurs and Non-Entrepreneurs

This table shows descriptive statistics for entrepreneurs and non-entrepreneurs. There are 49,968 individual-year observations, 46,476 non-entrepreneurs (non-Enter), and 3,492 entrepreneurs (enter). There are 7,119 unique individuals, and each individual participates in an average of 6.96 survey waves. Entrepreneurs have a higher mean parental income imbalance, parental education imbalance, and siblings' gender imbalance compared with non-entrepreneurs. The higher value means that entrepreneurs in our sample are more likely to grow up in male-dominated families, which exposes them to traditional gender imbalance during childhood. Women are less likely to be entrepreneurs.

	Non-Entrepreneurs	Entrepreneurs	Difference	P-value	T-statistics	N (Non-Enter)	N (Enter)
Parental income imbalance	0.560	0.634	-0.074***	0.000	-10.493	45,355	3,451
Parental education imbalance	0.031	0.081	-0.049***	0.000	-5.307	40,214	2,872
Siblings' gender imbalance	0.017	0.039	-0.022*	0.012	-3.548	40,783	3,133
High school	0.896	0.953	-0.057***	0.000	-10.818	46,476	3,492
College	0.294	0.401	-0.107***	0.000	-13.278	46,476	3,492
Married	0.512	0.662	-0.150***	0.000	-17.219	46,476	3,492
White	0.648	0.819	-0.171***	0.000	-20.669	46,476	3,492
Black	0.313	0.151	0.162***	0.000	20.182	46,476	3,492
Health	0.572	0.692	-0.120***	0.000	-13.848	46,476	3,492
Experience	9.023	9.865	-0.842***	0.000	-6.547	40,748	3,382
Unemployment (last year)	0.105	0.035	0.070***	0.000	13.380	46,476	3,492
Homeowner	0.489	0.729	-0.240***	0.000	-27.532	46,476	3,492
Hourly wage	17.604	21.348	-3.744***	0.000	-13.136	43,024	3,255
Blue Collar	0.369	0.389	-0.020*	0.018	-2.360	46,476	3,492
White Collar	0.424	0.563	-0.139***	0.000	-16.066	4,6476	3,492
Female	0.567	0.363	0.203***	0.000	23.426	46,476	3,492
Children	0.884	0.934	-0.049*	0.017	-2.379	43,409	3,492
Father_own	0.017	0.023	-0.006*	0.030	2.166	46,476	3,492
Mother_own	0.007	0.005	0.002	0.203	1.273	45,559	3,445

Table 3.2: Traditional Childhood Gender Imbalance and Business Ownership

This table reports the relationship between traditional household gender imbalance during childhood and business ownership in adulthood. The dependent variable is business ownership, which equals one if an individual owns and works in a business. *ChildImbal (Inc)* represents parental income imbalance during childhood, which is the difference between the annual income of the father and the mother, divided by their average income. *ChildImbal (Edu)* represents parental education imbalance during childhood, which is the difference between the number of years of education for the father and the mother, divided by their average education. *ChildImbal (Sib)* represents siblings' gender imbalance, which is the number of brothers minus sisters, divided by a child's total siblings. We take the average when a child is between the ages of three and 18. We include controls for race, gender, education, marital status, health status, working experience, unemployment status, homeowner, hourly rate, occupation, and the number of children, as well as age, year, and industry fixed effects. All models are estimated using OLS. Coefficient estimates and standard errors are reported. All standard errors are clustered at the individual level. +, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1%.

	OLS				Probit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ChildImbal (Inc)	0.0218*** (0.0061)			0.0148* (0.0075)	0.1821** (0.0559)			0.1263+ (0.0676)
ChildImbal (Edu)		0.0250** (0.0080)		0.0316** (0.0101)		0.1811*** (0.0536)		0.2282*** (0.0639)
ChildImbal (Sib)			0.0070+ (0.0039)	0.0066 (0.0040)			0.0478+ (0.0277)	0.0476 (0.0299)
High school	0.0234*** (0.0058)	0.0221*** (0.0061)	0.0255*** (0.0060)	0.0246*** (0.0065)	0.2491*** (0.0685)	0.2556*** (0.0762)	0.2818*** (0.0737)	0.2821*** (0.0839)
College	0.0137* (0.0064)	0.0103 (0.0066)	0.0145* (0.0069)	0.0114 (0.0073)	0.0924* (0.0425)	0.0682 (0.0455)	0.0947* (0.0455)	0.0725 (0.0490)
Married	0.0112* (0.0054)	0.0106+ (0.0057)	0.0112+ (0.0058)	0.0103 (0.0062)	0.0709+ (0.0405)	0.0713 (0.0441)	0.0706 (0.0432)	0.0646 (0.0473)
White	0.0007 (0.0156)	-0.0047 (0.0163)	0.0046 (0.0154)	-0.0118 (0.0192)	0.0022 (0.1259)	-0.0367 (0.1316)	0.0347 (0.1333)	-0.0792 (0.1505)
Black	-0.0333* (0.0154)	-0.0363* (0.0160)	-0.0332* (0.0153)	-0.0404* (0.0189)	-0.3006* (0.1288)	-0.3276* (0.1345)	-0.2986* (0.1373)	-0.3411* (0.1535)
Health	0.0229*** (0.0040)	0.0241*** (0.0040)	0.0256*** (0.0043)	0.0269*** (0.0045)	0.1770*** (0.0308)	0.1922*** (0.0325)	0.1972*** (0.0331)	0.2138*** (0.0353)
Experience	-0.0001 (0.0004)	0.0000 (0.0004)	0.0000 (0.0005)	0.0001 (0.0005)	0.0010 (0.0030)	0.0022 (0.0032)	0.0023 (0.0032)	0.0028 (0.0034)
Unemployment(last year)	-0.0327*** (0.0032)	-0.0310*** (0.0033)	-0.0314*** (0.0036)	-0.0300*** (0.0038)	-0.4223*** (0.0484)	-0.4251*** (0.0515)	-0.3883*** (0.0514)	-0.3824*** (0.0549)
Home owner	0.0201*** (0.0048)	0.0174*** (0.0050)	0.0215*** (0.0052)	0.0182** (0.0056)	0.1589*** (0.0378)	0.1459*** (0.0410)	0.1713*** (0.0408)	0.1532*** (0.0448)
Hourly rate	-0.0005* (0.0002)	-0.0004+ (0.0002)	-0.0005* (0.0002)	-0.0005* (0.0002)	-0.0029* (0.0012)	-0.0025+ (0.0014)	-0.0033* (0.0013)	-0.0032* (0.0014)
Blue collar	0.0089+ (0.0052)	0.0053 (0.0054)	0.0058 (0.0055)	0.0024 (0.0058)	0.0859* (0.0372)	0.0642 (0.0398)	0.0583 (0.0386)	0.0395 (0.0414)
White collar	0.0332*** (0.0049)	0.0348*** (0.0051)	0.0344*** (0.0052)	0.0363*** (0.0056)	0.2116*** (0.0347)	0.2332*** (0.0374)	0.2108*** (0.0370)	0.2361*** (0.0402)
Female	-0.0376*** (0.0053)	-0.0339*** (0.0054)	-0.0417*** (0.0057)	-0.0375*** (0.0059)	-0.2745*** (0.0419)	-0.2574*** (0.0444)	-0.3062*** (0.0450)	-0.2855*** (0.0477)
Children	0.0035+ (0.0020)	0.0031 (0.0021)	0.0037+ (0.0022)	0.0029 (0.0022)	0.0124 (0.0155)	0.0099 (0.0167)	0.0124 (0.0166)	0.0083 (0.0176)
Father_own	0.0013 (0.0120)	0.0025 (0.0121)	-0.0065 (0.0129)	-0.0044 (0.0136)	0.0599 (0.1128)	0.0601 (0.1122)	-0.0285 (0.1298)	-0.0033 (0.1323)
Mother_own	0.0109 (0.0188)	0.0174 (0.0198)	0.0115 (0.0204)	0.0186 (0.0226)	0.1158 (0.1699)	0.1755 (0.1718)	0.1314 (0.1805)	0.1940 (0.1851)
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42,339	37,071	36,814	31,637	42,298	37,031	36,739	31,565
R-squared	0.0403	0.0391	0.0415	0.0417	0.0821	0.0813	0.0826	0.0840

Table 3.3: The Differential Effects for Women versus Men

This table reports the differential effect of traditional childhood gender imbalance on business ownership. The dependent variable and independent variables are defined as in Table 3A.1. All models are estimated using OLS. Coefficient estimates and standard errors are reported. All standard errors are clustered at the individual level. +, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1%.

	OLS				Probit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ChildImbal (Inc)	0.0386*** (0.0108)			0.0262* (0.0126)	0.1992** (0.0725)			0.1218 (0.0855)
ChildImbal (Edu)		0.0476*** (0.0135)		0.0584*** (0.0172)		0.2739*** (0.0733)		0.3130*** (0.0883)
ChildImbal (Sib)			0.0139* (0.0068)	0.0151* (0.0070)			0.0749* (0.0380)	0.0850* (0.0413)
ChildImbal (Inc)×female	-0.0300* (0.0124)			-0.0217 (0.0146)	-0.0393 (0.1063)			-0.0021 (0.1290)
ChildImbal (Edu)×female		-0.0403* (0.0160)		-0.0454* (0.0201)		-0.1985+ (0.1091)		-0.1742 (0.1278)
ChildImbal (Sib)×female			-0.0134+ (0.0079)	-0.0144+ (0.0082)			-0.0680 (0.0549)	-0.0909 (0.0595)
High school	0.0233*** (0.0059)	0.0220*** (0.0061)	0.0258*** (0.0060)	0.0243*** (0.0065)	0.2487*** (0.0684)	0.2542*** (0.0763)	0.2832*** (0.0738)	0.2807*** (0.0840)
College	0.0134* (0.0064)	0.0103 (0.0066)	0.0145* (0.0069)	0.0110 (0.0072)	0.0919* (0.0426)	0.0678 (0.0455)	0.0947* (0.0455)	0.0709 (0.0491)
Married	0.0109* (0.0054)	0.0107+ (0.0057)	0.0110+ (0.0058)	0.0101 (0.0062)	0.0706+ (0.0405)	0.0723 (0.0442)	0.0695 (0.0432)	0.0647 (0.0474)
White	0.0006 (0.0156)	-0.0048 (0.0163)	0.0045 (0.0154)	-0.0116 (0.0193)	0.0022 (0.1260)	-0.0373 (0.1317)	0.0333 (0.1335)	-0.0808 (0.1511)
Black	-0.0338* (0.0154)	-0.0368* (0.0160)	-0.0333* (0.0153)	-0.0408* (0.0189)	-0.3013* (0.1287)	-0.3283* (0.1347)	-0.2998* (0.1375)	-0.3437* (0.1539)
Health	0.0230*** (0.0040)	0.0244*** (0.0040)	0.0256*** (0.0043)	0.0274*** (0.0045)	0.1773*** (0.0308)	0.1937*** (0.0326)	0.1967*** (0.0332)	0.2145*** (0.0353)
Experience	-0.0001 (0.0004)	0.0000 (0.0004)	0.0000 (0.0005)	0.0001 (0.0005)	0.0010 (0.0030)	0.0021 (0.0032)	0.0025 (0.0032)	0.0030 (0.0034)
Unemployment(last year)	-0.0327*** (0.0032)	-0.0311*** (0.0033)	-0.0314*** (0.0036)	-0.0299*** (0.0038)	-0.4225*** (0.0484)	-0.4249*** (0.0517)	-0.3883*** (0.0514)	-0.3819*** (0.0550)
Home owner	0.0206*** (0.0048)	0.0172*** (0.0050)	0.0216*** (0.0052)	0.0188*** (0.0056)	0.1593*** (0.0379)	0.1440*** (0.0411)	0.1721*** (0.0408)	0.1533*** (0.0450)
Hourly rate	-0.0005* (0.0002)	-0.0004+ (0.0002)	-0.0006* (0.0002)	-0.0005* (0.0002)	-0.0029* (0.0012)	-0.0025+ (0.0014)	-0.0033* (0.0013)	-0.0032* (0.0014)
Blue collar	0.0090+ (0.0052)	0.0055 (0.0054)	0.0058 (0.0055)	0.0026 (0.0057)	0.0859* (0.0372)	0.0642 (0.0398)	0.0587 (0.0386)	0.0397 (0.0414)
White collar	0.0327*** (0.0048)	0.0344*** (0.0051)	0.0342*** (0.0052)	0.0355*** (0.0056)	0.2110*** (0.0347)	0.2311*** (0.0374)	0.2100*** (0.0370)	0.2335*** (0.0404)
Female	-0.0210** (0.0074)	-0.0340*** (0.0055)	-0.0414*** (0.0056)	-0.0255** (0.0090)	-0.2500*** (0.0758)	-0.2517*** (0.0445)	-0.3029*** (0.0451)	-0.2780** (0.0917)
Children	0.0034+ (0.0020)	0.0031 (0.0021)	0.0037+ (0.0022)	0.0029 (0.0022)	0.0124 (0.0155)	0.0098 (0.0167)	0.0126 (0.0166)	0.0085 (0.0176)
Father_own	0.0010 (0.0120)	0.0028 (0.0121)	-0.0067 (0.0129)	-0.0039 (0.0137)	0.0601 (0.1128)	0.0614 (0.1120)	-0.0298 (0.1298)	-0.0012 (0.1323)
Mother_own	0.0101 (0.0189)	0.0172 (0.0198)	0.0123 (0.0205)	0.0194 (0.0228)	0.1153 (0.1702)	0.1762 (0.1721)	0.1362 (0.1811)	0.2025 (0.1862)
P-value of joint significance	0.195 (0.0066)	0.427 (0.0091)	0.725 (0.0039)	0.741 (0.0137)				
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	42,339	37,071	36,814	31,637	42,298	37,031	36,739	31,565
R-squared and Pseudo R-squared	0.0407	0.0400	0.0423	0.0449	0.0810	0.0820	0.0821	0.0868

Table 3.4: Gender Imbalance and Entrepreneurial Performance

This table reports the relationship between traditional childhood gender imbalance on entrepreneurial performance. Unincorporated business income is labor and asset income for the incorporated business type. Incorporated business is the labor portion of annual income. All independent variables, controls, and fixed effects are defined as in Table 3A.1. All models are estimated using OLS. Coefficient estimates and standard errors are reported. All standard errors are clustered at the individual level. +, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1%.

	Unincorporated business income(000's) income(000's)				Unincorporated business income without asset income(000's)				Incorporated business			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ChildImbal (Inc)	10.0051*** (0.0030)			7.0509*** (0.4883)	4.7242*** (0.1485)			3.4896*** (0.5687)	34.1522* (15.3139)			31.6539+ (16.9301)
ChildImbal (Edu)		9.9888*** (0.0057)		2.7537*** (0.4967)		4.8365*** (0.0725)		1.1227* (0.5512)		6.6429 (13.3151)		2.7421 (14.5574)
ChildImbal (Sib)			9.9400*** (0.0314)	0.1964** (0.0608)			4.6810*** (0.1560)	0.2210 (0.2678)			5.4046 (7.4839)	6.6337 (7.1543)
Female	-18.2249*** (0.1374)	-19.4054*** (0.2471)	-13.7190*** (0.8262)	-18.4511*** (0.1304)	-7.7277*** (0.5699)	-9.0030*** (0.4559)	-5.2491*** (0.7790)	-8.2805*** (0.5120)	-52.3266*** (15.0436)	-48.7721** (17.0203)	-58.4550*** (16.5026)	-52.4942**
Controls and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,015	1,650	1,796	1,454	2,015	1,650	1,796	1,454	1,301	1,167	1,291	1,072
R-squared	0.9998	0.9994	0.9946	0.9998	0.9303	0.9735	0.9219	0.9718	0.1537	0.1425	0.1445	0.1508

Table 3.5: The Differential Effects of Gender Imbalance and Entrepreneurial Performance for Women versus Men

This table reports the differential effect of traditional childhood gender imbalance on entrepreneurial performance for women versus men. All dependent variables, independent variables, and controls are defined in Table 3A.1. All models are estimated using OLS. Coefficient estimates and standard errors are reported. All standard errors are clustered at the individual level. +, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1%.

	Unincorporated business income(000's) income(000's)				Unincorporated business income without asset income(000's)				Incorporated business			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ChildImbal (Inc)	10.0035*** (0.0026)			6.1858*** (0.7904)	2.7229*** (0.1488)			3.1719*** (0.7654)	48.3355* (21.3982)			31.6659 (28.0410)
ChildImbal (Edu)		6.2406*** (0.0044)		2.3605*** (0.8051)		3.7639*** (0.0721)		1.4312+ (0.7795)		4.3827 (19.6664)		4.1492 (24.3062)
ChildImbal (Sib)			3.1551*** (0.0283)	0.0560* (0.0501)			3.6788*** (0.1571)	0.2312 (0.2833)			4.7005 (7.6882)	4.6991 (7.5646)
ChildImbal (Inc)×female	-17.6241*** (0.0895)			-12.1968*** (0.2831)	-4.7867*** (0.8161)			-3.3838*** (0.9661)	-53.3431+ (26.6491)			-42.0593 (33.1682)
ChildImbal (Edu)×female		-9.9935*** (0.0876)		-4.8394*** (0.4892)		-4.7639*** (0.4095)		-1.9180** (0.7251)		-15.3605 (21.4538)		-26.0127 (25.6687)
ChildImbal (Sib)×female			-4.9935*** (0.8520)	-0.1201 (0.0386)			-4.7658*** (0.1571)	-0.3212 (0.2833)			-14.8458 (9.9772)	-17.9182+ (10.7100)
Female	-20.4238*** (0.1066)	-18.8384*** (0.1259)	-13.6905*** (0.7605)	-19.7261*** (0.1487)	-19.7261*** (0.1487)	-9.4353*** (0.7060)	-8.6610*** (0.4393)	-5.2372*** (0.7545)	-20.4107 (17.9313)	-47.6082** (16.7281)	-58.3284*** (16.4383)	-25.9045 (23.0436)
Controls and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,015	1,650	1,796	1,454	2,015	1,650	1,796	1,454	1,301	1,167	1,291	1,072
R-squared	0.9999	0.9997	0.9948	0.9999	0.9999	0.9304	0.9740	0.9223	0.9722	0.6491	0.7091	0.6813

Table 3.6: Traditional Childhood Gender Imbalance and Business Ownership after Controlling Risk Tolerance

This table reports the differential effect of traditional childhood gender imbalance and business ownership after controlling for risk tolerance. All models are estimated using OLS. Coefficient estimates and standard errors are reported. All standard errors are clustered at the individual level. +, *, **, and *** indicate significance at the 10%, 5%, 1%, and 0.1%.

	Entrepreneur				Unincorporated business income(000's)				Corporation business income(000's)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Traditional childhood gender imbalance and entrepreneurship when controlling risk tolerance												
ChildImbal (Inc)	0.0250** (0.0084)			0.0162 (0.0101)	10.0049*** (0.0033)			7.0509*** (0.4883)		28.6225 (18.3883)		28.4728 (20.7647)
ChildImbal (Edu)		0.0371** (0.0115)		0.0426** (0.0139)		9.9897*** (0.0061)		2.4392*** (0.4940)		1.7372 (14.9442)		3.9917 (16.5040)
ChildImbal (Sib)			0.0059 (0.0047)	0.0056 (0.0048)			9.9552*** (0.0331)	0.2473*** (0.0707)			3.4242 (7.9105)	6.6206 (7.4261)
Female	-0.0395*** (0.0066)	-0.0353*** (0.0068)	-0.0424*** (0.0070)	-0.0372*** (0.0073)	-18.2568*** (0.1619)	-19.5023*** (0.3232)	-13.7190*** (0.8262)	-18.4511*** (0.1304)	-52.8405*** (15.6139)	-48.1709** (17.6946)	-56.1326** (17.0476)	-48.9223** (18.0855)
Risk tolerance	0.0296* (0.0134)	0.0336* (0.0142)	0.0338* (0.0144)	0.0365* (0.0154)	0.3611 (0.2583)	-0.0402 (0.3196)	-0.1445 (1.4978)	0.1649 (0.2221)	20.5976 (22.5372)	32.2794 (25.6142)	21.8867 (22.9353)	33.9994 (25.3593)
Controls and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,893	26,789	26,992	23,313	1,580	1,280	1,796	1,454	1,146	9,45	1,059	8,72
R-squared	0.0417	0.0422	0.0421	0.0445	0.9998	0.9993	0.9946	0.9998	0.1673	0.1757	0.1619	0.1845
Panel B: Traditional childhood gender imbalance, female, and entrepreneurship when control risk tolerance												
ChildImbal (Inc)	0.0341** (0.0141)			0.0199 (0.0164)	10.0032*** (0.0028)			6.4462*** (0.8590)	29.8474 (25.6422)			31.6659 (28.0410)
ChildImbal (Edu)		0.0460*** (0.0180)		0.0427** (0.0217)		6.2455*** (0.0044)		3.3991*** (0.8835)		1.0340 (21.4534)		4.1492 (24.3062)
ChildImbal (Sib)			0.0129 (0.0079)	0.0138+ (0.0082)			1.4838** (0.0288)	29.6115 (0.0612)			2.5462 (8.1069)	4.6991 (7.5646)
ChildImbal (Inc)×female	-0.0440* (0.0161)			-0.0267 (0.0187)	-13.6063*** (0.0931)			2.2455*** (0.3036)	-38.7895 (30.5971)			-42.0593 (33.1682)
ChildImbal (Edu)×female		-0.0613* (0.0224)		-0.0658 (0.0266)		-9.9942*** (0.1016)		-2.1545*** (0.5385)		-5.7432 (27.9846)		-41.4375 (91.8832)
ChildImbal (Sib)×female			-0.0140 (0.0093)	-0.0164+ (0.0098)			-9.9489*** (0.0288)	0.1552* (0.0612)			-14.7832 (11.3816)	-17.9182+ (10.7100)
Female	-0.0206* (0.0095)	-0.0355*** (0.0068)	-0.0422*** (0.0070)	-0.0258* (0.0113)	-20.4978*** (0.1076)	-18.7981*** (0.1586)	-13.9550*** (0.8984)	-19.7532*** (0.1674)	-20.8001 (37.4983)	-56.3216 (64.1569)	-42.4855 (35.3084)	-2.3632 (98.3376)
Risk tolerance	0.0294* (0.0133)	0.0335* (0.0142)	0.0338* (0.0144)	0.0373* (0.0154)	0.2549 (0.2316)	0.1538 (0.2305)	0.3883 (1.5066)	0.1971 (0.1865)	-16.0850 (36.1751)	-26.5890 (60.7745)	-19.0441 (39.2398)	-37.7544 (72.9969)
Controls and Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,893	26,789	26,992	23,313	1,580	1,280	1,394	1,125	143	107	129	95
R-squared	0.0423	0.0432	0.0425	0.0460	0.9999	0.9997	0.9958	0.9999	0.6491	0.7091	0.6813	0.7604

Table 3A.1: Variable Definition

Variable Names	Variable Definitions
Business ownership	An indicator variable that equals one if an individual owns and works in a business in a given year and zero otherwise
Unincorporated business income	Labor and asset income for the incorporated business type
Incorporated business income	Labor portion of annual income
Male entrepreneurs	Entrepreneurs whose gender is male
Female entrepreneurs	Entrepreneurs whose gender is female
Parental Income Imbalance	The difference between the annual income of the father and the mother, divided by their average income. We take the average parental income imbalance when the child is between the ages of three and 18
Parental Education Imbalance	The difference between the number of years of education for the father and the mother, divided by their average years of education. We take the average parental education imbalance when the child is between the ages of three and 18
Siblings' gender imbalance	The number of brothers minus sisters, divided by a child's total siblings. We take the average when a child is between ages three and 18
Income, Wealth, and Other Demographic Controls	
High School	An indicator variable that equals one if an individual has at least 12 years of education
College	An indicator variable that equals one if an individual has at least 16 years of education
Married	An indicator variable that equals one if an individual has been married
White	An indicator variable that is one if the race of an individual is white and zero otherwise
Black	An indicator variable that is one if the race of an individual is black and zero otherwise
Health	An indicator variable that is one if the health condition of an individual is excellent, very good and good
Experience	The work length of an individual
Unemployment (last year)	An indicator variable that is one if an individual was unemployed last year
Home owner	An indicator variable that is one if an individual owns a home
Hourly rate (2019)	The hourly wage deflated CPI to 2019 dollars
Children	The number of children in a household
Female	An indicator variable that is one if the gender of an individual is female and zero otherwise
Risk Tolerance	Risk preference parameter. The higher the number, the higher the tolerance
Father ownership	An indicator variable that is one if an individual's father owns a business
Mother ownership	An indicator variable that is one if an individual's mother owns a business

Table 3A.2: Summary statistics

This table reports summary statistics for 6,770 unique individuals that we have their parents' data and follow up them from 1969 and track their financial decisions from 1999 to 2019. All dollar values are inflation-adjusted to 2019. Panel A shows household characteristics. Panel B shows sample characteristics during childhood. Panel C shows sample characteristics during adulthood.

	Mean	P1	P50	P99	SD	N
Panel A: Household Characteristics during Childhood						
Father education,years	10.625	0	12	17	4.78	47,971
Mother education,years	10.062	0	12	17	4.988	49,968
High school, father	0.611	0	1	1	0.488	49,968
High school, mother	0.602	0	1	1	0.490	49,968
College degree, father	0.157	0	0	1	0.364	49,968
College degree, mother	0.108	0	0	1	0.311	49,968
Father income (2019 dollars)	59,863	0	51,286	225,251	53,765	49,704
Mother income (2019 dollars)	14,934	0	9,634	75,498	18,904	49,058
Parental income imbalance	0.565	-.940	0.644	1	0.401	48,806
Parental education imbalance	0.035	-1.111	0	2	0.479	43,086
Panel B: Sample Characteristics During Childhood						
Brothers	0.639	0	0.500	3	0.635	43,916
Sisters	0.612	0	0.500	3	0.582	43,916
Siblings gender imbalance	0.018	-1	0	1	0.777	43,916
Panel C: Sample Characteristics During Adulthood						
Number of years in sample	6.96	1	7	11	3.448	7,179
Age	38.656	15	37	70	11.639	49,968
White	0.660	0	1	1	0.474	49,968
Black	0.292	0	0	1	0.459	49,968
Female	0.552	0	1	1	0.497	49,968
High school	0.900	0	1	1	0.300	49,968
College	0.302	0	0	1	0.459	49,968
Married	0.522	0	1	1	0.500	49,968
Single	0.307	0	0	1	0.461	49,968
Widowed	0.014	0	0	1	0.118	49,968
Divorced	0.120	0	0	1	0.325	49,968
Separated	0.036	0	0	1	0.187	49,968
Number of Children	0.888	0	0	11	1.179	46,901
Risk Tolerance	0.526	0.270	0.491	1.218	0.252	35,730
Health	0.581	0	1	1	0.493	49,968
Work experience	9.088	1	7	57	7.189	44,130
Unemployment(last year)	0.100	0	0	1	0.301	49,968
Blue collar	0.371	0	0	1	0.483	49,968
White collar	0.433	0	0	1	0.496	49,968
Hourly rate (2019 dollars)	17.867	0	14.740	98.930	15.707	46,279
Homeowner	0.506	0	1	1	0.500	49,968
Father_ own	0.022		0 0.000		1 0.148	49,968
Mother_ own	0.007		0 0.000		0 0.081	49,004
Panel D: Entrepreneurship						

Entrepreneurs	0.0699	0	0	1	0.255	49,968
Opportunity entrepreneurs	0.0683	0	0	1	0.252	49,968
Necessity entrepreneurs	0.0016	0	0	1	0.395	49,968
Male entrepreneurs	0.0994	0	0	1	0.299	22,362
Female entrepreneurs	0.0460	0	0	1	0.209	27,606
Unincorporated business income	37,570	-38,225	12,136	437,540	95,192	2,136
Unincorporated business income (no asset income)	19,437	0	43,320	208,600	46,775	2,136
Incorporated business income	105,554	0	70,000	616,500	117,488	1,311

Table 3A.3: Traditional Childhood Gender Imbalance and Self-employed

This table reports traditional childhood gender imbalance and self-employed. Self-employed is an indicator variable that equals one that is self-employed in a given year and zero otherwise. All independent variables and controls are defined as in Table 3A.1. The sample period is also from 1999 to 2019 biennially. All models are estimated using OLS. Coefficient estimates and standard errors are reported. All standard errors are clustered at the individual level. +, *, **, and *** indicate significance at the 10% , 5% , 1%, and 0.1%.

	(1)	(2)	(3)	(4)
Panel A: Individual Gender Imbalance and Self-Employed				
ChildImbal(Inc)	0.0243*** (0.0073)			0.0143 (0.0088)
ChildImbal(Edu)		0.0420*** (0.0095)		0.0449*** (0.0108)
ChildImbal(Sib)			0.0091+ (0.0047)	0.0083+ (0.0050)
Female	-0.0182** (0.0061)	-0.0152* (0.0063)	-0.0220*** (0.0066)	-0.0171* (0.0069)
Controls and fixed effects	Yes	Yes	Yes	Yes
Observations	42,339	37,071	36,814	31,637
R-squared	0.0497	0.0504	0.0517	0.0526
Panel B: Individual Gender Imbalance, Female and Self-employed				
ChildImbal(Inc)	0.0392*** (0.0117)			0.0273* (0.0134)
ChildImbal(Edu)		0.0592*** (0.0151)		0.0661*** (0.0180)
ChildImbal(Sib)			0.0152* (0.0074)	0.0177* (0.0077)
ChildImbal(Inc)×female	-0.0266+ (0.0147)			-0.0252 (0.0171)
ChildImbal(Edu)×female		-0.0307 (0.0188)		-0.0353 (0.0215)
ChildImbal(Sib)×female			-0.0117 (0.0095)	-0.0184+ (0.0100)
Female	-0.0034 (0.0087)	-0.0152* (0.0063)	-0.0218*** (0.0066)	-0.0030 (0.0105)
P-value of joint significance	0.173 (0.0092)	0.116 (0.0141)	0.565 (0.0060)	0.169 (0.0199)
Controls and fixed effects	Yes	Yes	Yes	Yes
Observations	42,339	37,071	36,814	31,637
R-squared	0.0500	0.0507	0.0519	0.0537

Table 3A.4: Parental Work Imbalance and Entrepreneurship in Adulthood

This table reports the relationship between traditional household gender imbalance during childhood and entrepreneurship in adulthood. ChildImbal(Work) represents parental work imbalance during childhood. Parental work imbalance is an indicator variable. If both parents work in a specific year, the indicator equals 0; if the father work, while the mother does not work in the specific year, the indicator equals 1; if the mother work, while the father does not work, the indicator equals -1. All independent variables and controls are defined as in Table 3A.1. The sample period is also from 1999 to 2019 biennially. All models are estimated using OLS. Coefficient estimates and standard errors are reported. All standard errors are clustered at the individual level. +, *, **, and *** indicate significance at the 10%, 5% , 1%, and 0.1%.

	(1)	(2)
Panel A: Parental Work Gender Imbalance and Entrepreneurship		
ChildImbal(Work)	0.0179** (0.0065)	0.0132+ (0.0077)
ChildImbal(Edu)		0.0305** (0.0097)
ChildImbal(Sib)		0.0069+ (0.0040)
Female	-0.0374*** (0.0052)	-0.0373*** (0.0059)
Controls and fixed effects	Yes	Yes
Observations	42,757	31,917
R-squared	0.0400	0.0414
Panel B: Parental Work Gender Imbalance, Female and Entrepreneurship		
ChildImbal(Work)	0.0321** (0.0116)	0.0240+ (0.0133)
ChildImbal(Edu)		0.0540*** (0.0160)
ChildImbal(Sib)		0.0149* (0.0070)
ChildImbal(Work)×fem	-0.276** (0.0210)	-0.0240** (0.0211)
ChildImbal(Edu)×female		-0.0413* (0.0190)
ChildImbal(Sib)×female		-0.0155+ (0.0082)
Female	-0.0281*** (0.0062)	-0.0299*** (0.0073)
P-value of joint significance	0.316 (0.0068)	0.267 (0.0144)
Controls and fixed effects	Yes	Yes
Observations	42,757	31,917
R-squared	0.0404	0.0430

Table 4.1: Summary Statistics

This table provides summary statistics for all variables employed in our empirical analyses. CSR refers to the CSR score derived from KLD ratings, which reflects the total strengths minus concerns across six dimensions. EMPS represents the employee satisfaction component of the CSR score. CSR-EMPS indicates the CSR score excluding the employee satisfaction component. EMPS Strength indicates the strength score in the employee relation factor. EMPS Concern indicates the concern score in the employee relation factor. CSR-EMPS Strength indicates the strength score in the non-employee relation factor. CSR-EMPS Concern indicates the concern score in the non-employee relation factor. St Pension stands for short-term pension liability, while Lt Pension denotes long-term pension liability, and Total Pension represents total pension liability. Funded ratio refers to the pension assets divided by pension liabilities. Employee represents the number of employees in a firm. DVT refers to dividend payments, AT signifies total assets. ROA denotes return on assets, CAPX refers to capital expenditure divided by total assets, and MB is the market-to-book ratio. Leverage indicates the financial leverage ratio. Baby Dummy denotes a dummy variable that equals 1 if an individual was born between 1946 and 1964. All variables are defined in Table 4A.1.

	N Obs	Mean	SD	P25	Median	P75
CSR	7,088	1.447	2.892	0	1	3
EMPS	7,088	0.500	1.333	0	0	1
CSR-EMPS	7,088	0.947	2.160	0	1	2
Strength	7,088	2.564	2.975	0	1	4
Concern	7,088	1.117	1.699	0	0	2
EMPS Strength	7,088	0.802	1.241	0	0	1
EMPS Concern	7,088	0.299	0.640	0	0	0
CSR-EMPS Strength	7,088	1.762	2.207	0	1	3
CSR-EMPS Concern	70,88	0.818	1.319	0	0	1
Total Pension	7,088	4.073	2.235	2.660	4.259	5.559
St Pension	7,088	1.123	1.298	0.000	0.693	1.946
Lt Pension	7,088	4.020	2.259	2.581	4.217	5.531
Funded_ratio	7,088	0.272	1.172	0	0	0.038
AT	7,088	8.518	1.585	7.396	8.372	9.575
ROA	7,088	0.039	0.070	0.013	0.038	0.069
Leverage	7,088	0.222	0.126	0.134	0.225	0.306
CAPX	7,088	0.041	0.036	0.018	0.032	0.056
Employee	7,088	2.426	1.259	1.482	2.300	3.296
MB	7,088	1.299	0.632	0.926	1.184	1.538
DVT	7,088	3.533	2.509	1.323	3.743	5.450
ROE	7,088	0.132	0.316	0.067	0.116	0.186
Baby Dummy	7,088	0.785	0.411	1	1	1

Table 4.2: Pension Liability and Corporate Social Responsibility

This table reports the baseline results for the relationship between pension liability and corporate social responsibility. CSR stands for corporate social responsibility score. EMPS denotes employee relation score, and CSR-EMPS represents CSR component, excluding employee relation. St Pension stands for short-term pension liability, Lt Pension denotes long-term pension liability, and Total Pension represents total pension liability. FR represents the funded ratio. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	CSR			EMPS		CSR-EMPS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.1822*** (2.9961)	0.1709*** (2.7927)	-0.0406 (-0.3180)	0.1502*** (4.7274)	0.1454*** (4.4969)	0.0809 (0.8633)	0.0320 (0.7340)	0.0254 (0.5672)	-0.1215 (-0.9830)
St Pension		0.0788 (0.9161)			0.0331 (0.6460)			0.0457 (0.6333)	
Lt Pension			0.2207* (1.9429)			0.0686 (0.7702)			0.1521 (1.3166)
FR	-0.0575 (-1.1354)	-0.0578 (-1.1412)	-0.0552 (-1.0885)	0.0025 (0.1000)	0.0024 (0.0958)	0.0033 (0.1273)	-0.0601 (-1.3920)	-0.0602 (-1.3917)	-0.0585 (-1.3592)
AT	1.9351*** (8.8744)	1.9168*** (8.7850)	1.9286*** (8.8400)	0.8434*** (6.6099)	0.8357*** (6.5510)	0.8414*** (6.5897)	1.0917*** (6.3614)	1.0811*** (6.3179)	1.0872*** (6.3273)
ROA	0.0328 (0.0429)	0.0389 (0.0507)	-0.0052 (-0.0069)	0.4916 (1.2110)	0.4942 (1.2141)	0.4798 (1.1831)	-0.4589 (-0.8333)	-0.4553 (-0.8240)	-0.4850 (-0.8849)
Leverage	-0.2526 (-0.3335)	-0.2475 (-0.3274)	-0.2545 (-0.3363)	-0.3032 (-0.7510)	-0.3011 (-0.7467)	-0.3038 (-0.7524)	0.0507 (0.0775)	0.0536 (0.0820)	0.0493 (0.0755)
CAPX	-0.6911 (-0.3658)	-0.6529 (-0.3455)	-0.7110 (-0.3768)	0.4890 (0.4923)	0.5051 (0.5093)	0.4828 (0.4867)	-1.1801 (-0.7837)	-1.1579 (-0.7687)	-1.1938 (-0.7932)
Employee	-1.2310*** (-3.7433)	-1.2194*** (-3.7201)	-1.2298*** (-3.7414)	-0.5358*** (-3.0463)	-0.5310*** (-3.0064)	-0.5355*** (-3.0506)	-0.6952** (-2.4992)	-0.6884** (-2.4924)	-0.6943** (-2.4925)
MB	0.4452*** (3.8555)	0.4405*** (3.8137)	0.4451*** (3.8564)	0.2080*** (3.1403)	0.2060*** (3.1129)	0.2080*** (3.1398)	0.2372*** (2.6684)	0.2345*** (2.6400)	0.2371*** (2.6687)
DVT	0.1559*** (2.6053)	0.1561*** (2.6090)	0.1547*** (2.5849)	0.1154*** (3.8447)	0.1155*** (3.8495)	0.1150*** (3.8288)	0.0405 (0.8681)	0.0406 (0.8701)	0.0397 (0.8504)
ROE	-0.2254 (-1.2380)	-0.2216 (-1.2164)	-0.2239 (-1.2306)	-0.0303 (-0.3645)	-0.0287 (-0.3450)	-0.0299 (-0.3591)	-0.1950 (-1.4056)	-0.1928 (-1.3875)	-0.1940 (-1.3986)
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.6043	0.6044	0.6044	0.4378	0.4378	0.4378	0.6356	0.6357	0.6357

Table 4.3: 2SLS results

This table reports the first stage of 2SLS results using the baby-boomer dummy as the instrument. St Pension stands for short-term pension liability, while Lt Pension denotes long-term pension liability, and Total Pension represents total pension liability. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

Panel A: First Stage									
	Total Pension			St Pension		Lt Pension			
babyboomer_dummy	0.2807*** (7.9315)			0.0971*** (3.2471)			0.2908*** (7.3124)		
FR	-0.2047*** (-7.2422)			-0.0235** (-1.9624)			-0.2167*** (-7.0817)		
AT	0.2556*** (3.2672)			0.2219*** (2.9666)			0.2814*** (2.8928)		
ROA	-1.2391*** (-5.1498)			-0.2776 (-1.2324)			-1.0816*** (-3.6912)		
Leverage	0.0015 (0.0063)			-0.0413 (-0.2177)			0.0132 (0.0551)		
CAPX	0.2744 (0.4547)			-0.3954 (-0.9848)			0.3739 (0.6160)		
Employee	0.2412** (2.5730)			-0.0836 (-0.6343)			0.2418** (2.2926)		
MB	-0.0895** (-2.2237)			0.0351 (1.3631)			-0.0913** (-2.1184)		
DVT	-0.0539*** (-3.5362)			-0.0137 (-1.1628)			-0.0494*** (-3.0799)		
ROE	0.1568*** (2.7614)			-0.0205 (-0.5807)			0.1523*** (2.5874)		
Observations	7,088			7,088			7,088		
Adj R2	0.9352			0.8843			0.9289		
Panel B: Second Stage									
	CSR Score			EMPS		CSR-EMPS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	5.1338*** (7.1851)			3.1750*** (7.6353)			1.9588*** (4.9059)		
St Pension		14.8332*** (3.5510)			9.1736*** (3.5652)			5.6596*** (3.1796)	
Lt Pension			4.9545*** (6.7600)			3.0641*** (7.2120)			1.8904*** (4.7258)
FR	1.0118*** (4.5161)	0.3087 (1.5123)	1.0343*** (4.3269)	0.6558*** (4.8999)	0.2209* (1.8715)	0.6697*** (4.6626)	0.3561*** (3.2628)	0.0878 (0.9485)	0.3646*** (3.1973)
AT	-0.4899 (-0.9488)	-2.4687 (-1.5314)	-0.5720 (-0.9601)	-0.6380** (-2.0626)	-1.8618* (-1.8695)	-0.6888* (-1.9545)	0.1481 (0.5625)	-0.6069 (-0.9174)	0.1167 (0.3973)
ROA	5.6389*** (3.8462)	3.3959 (0.9891)	4.6367*** (2.9787)	3.9163*** (4.5006)	2.5291 (1.2230)	3.2964*** (3.4935)	1.7226** (2.2857)	0.8668 (0.6088)	1.3402* (1.7817)
Leverage	0.3098 (0.2527)	0.9295 (0.3599)	0.2517 (0.2072)	0.0403 (0.0532)	0.4236 (0.2648)	0.0044 (0.0058)	0.2695 (0.3912)	0.5059 (0.4565)	0.2473 (0.3624)
CAPX	-0.8292 (-0.2522)	6.4443 (1.0317)	-1.2727 (-0.3985)	0.4046 (0.2111)	4.9029 (1.3041)	0.1304 (0.0701)	-1.2338 (-0.7018)	1.5414 (0.5644)	-1.4031 (-0.8110)
Employee	-1.7152*** (-3.2522)	0.7626 (0.4199)	-1.6749*** (-3.0830)	-0.8316*** (-2.7434)	0.7008 (0.6001)	-0.8067*** (-2.6097)	-0.8836*** (-2.8275)	0.0618 (0.0910)	-0.8682*** (-2.7244)
MB	0.6222*** (2.9030)	-0.3577 (-0.8387)	0.6148*** (2.8318)	0.3161** (2.3706)	-0.2899 (-1.1390)	0.3115** (2.3012)	0.3061*** (2.8900)	-0.0678 (-0.3614)	0.3032*** (2.8495)
DVT	0.3353*** (3.3648)	0.2616 (1.4947)	0.3037*** (3.0842)	0.2250*** (4.1822)	0.1794* (1.7066)	0.2054*** (3.8224)	0.1103* (1.9208)	0.0822 (1.0549)	0.0982* (1.7454)
ROE	-0.8667*** (-2.8264)	0.2431 (0.4646)	-0.8163*** (-2.6627)	-0.4221** (-2.2863)	0.2643 (0.8562)	-0.3909** (-2.1116)	-0.4446*** (-2.8170)	-0.0211 (-0.0902)	-0.4253*** (-2.7124)
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088

Table 4.4: The Moderating Effect of Funded Ratio of Pension Liabilities on CSR Score

This table reports the moderating effect of the funded ratio of pension liabilities on CSR scores. The outcome variable is CSR scores. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	CSR			EMPS			CSR-EMPS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.1719*** (2.8674)	0.1570*** (2.5835)	-0.0899 (-0.7009)	0.1484*** (4.6882)	0.1426*** (4.4352)	0.0691 (0.7909)	0.0235 (0.5442)	0.0143 (0.3218)	-0.1591 (-1.1615)
Total Pension×FR	-0.0932*** (-3.6771)			-0.0161 (-1.1371)			-0.0770*** (-3.1829)		
St Pension		0.1136 (1.2715)			0.0401 (0.7731)			0.0735 (0.9978)	
St Pension×FR		-0.1160*** (-2.5801)			-0.0233 (-0.8771)			-0.0928** (-2.2997)	
Lt Pension			0.2601** (2.2763)			0.0780 (0.9474)			0.1821 (1.4050)
Lt Pension×FR			-0.0909*** (-3.6430)			-0.0217 (-1.6264)			-0.0692*** (-2.8345)
FR	0.1734*** (2.6645)	0.0256 (0.4001)	0.1584*** (2.6281)	0.0425 (1.0397)	0.0192 (0.6343)	0.0543 (1.3760)	0.1309** (2.5333)	0.0065 (0.1190)	0.1041** (2.0572)
AT	1.9113*** (8.8337)	1.9104*** (8.7871)	1.9005*** (8.7930)	0.8393*** (6.5855)	0.8344*** (6.5416)	0.8347*** (6.5625)	1.0720*** (6.2861)	1.0760*** (6.3074)	1.0659*** (6.2385)
ROA	0.0852 (0.1112)	0.0842 (0.1091)	0.0436 (0.0573)	0.5007 (1.2305)	0.5033 (1.2318)	0.4915 (1.2090)	-0.4155 (-0.7531)	-0.4191 (-0.7552)	-0.4479 (-0.8154)
Leverage	-0.2617 (-0.3458)	-0.2203 (-0.2917)	-0.2666 (-0.3526)	-0.3048 (-0.7551)	-0.2956 (-0.7328)	-0.3067 (-0.7597)	0.0431 (0.0660)	0.0754 (0.1152)	0.0401 (0.0615)
CAPX	-0.6880 (-0.3665)	-0.6280 (-0.3334)	-0.6845 (-0.3648)	0.4895 (0.4932)	0.5100 (0.5139)	0.4891 (0.4939)	-1.1776 (-0.7871)	-1.1380 (-0.7594)	-1.1737 (-0.7834)
Employee	-1.1817*** (-3.5761)	-1.2129*** (-3.6970)	-1.1779*** (-3.5634)	-0.5273*** (-2.9945)	-0.5297*** (-3.0036)	-0.5231*** (-2.9728)	-0.6544** (-2.3637)	-0.6832** (-2.4677)	-0.6549** (-2.3585)
MB	0.4398*** (3.7535)	0.4369*** (3.7285)	0.4394*** (3.7521)	0.2071*** (3.1226)	0.2053*** (3.0951)	0.2066*** (3.1139)	0.2328*** (2.5808)	0.2316** (2.5704)	0.2328*** (2.5868)
DVT	0.1560*** (2.5934)	0.1575*** (2.6286)	0.1544** (2.5656)	0.1154*** (3.8412)	0.1158*** (3.8555)	0.1150*** (3.8206)	0.0406 (0.8658)	0.0417 (0.8933)	0.0395 (0.8416)
ROE	-0.2369 (-1.2940)	-0.2301 (-1.2566)	-0.2349 (-1.2836)	-0.0323 (-0.3868)	-0.0304 (-0.3639)	-0.0325 (-0.3886)	-0.2046 (-1.4716)	-0.1996 (-1.4340)	-0.2024 (-1.4561)
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.6066	0.6058	0.6066	0.4380	0.4380	0.4383	0.5538	0.5527	0.5534

Table 4.5: CSR Strength Vs. CSR Concern

This table compares the relationship between pension liability and CSR strength and CSR concern. CSR Strength stands for the total strength score over six CSR categories. EMPS Strength is the strength score in employee relation. CSR-EMPS Strength is the total strength score, excluding the employee relation strength score. CSR Concern stands for the total concern score over six CSR categories. EMPS Concern is the concern score in employee relation. CSR-EMPS Concern is the total concern score, excluding the employee relation concern score. Panel A reports the relationship between pension liability and CSR strength. Panel B shows the the relationship between pension liability and CSR concern. Panel C reports the interaction effect of pension liability and funded ratio in CSR strength. Panel D reports the interaction effect of pension liability and funded ratio in CSR strength. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	CSR Strength			EMPS Strength			CSR-EMPS Strength		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Pension Liability and CSR Strength									
Total Pension	0.0414 (0.9057)			0.0795*** (3.1685)			-0.0381 (-1.0881)		
St Pension		-0.0207 (-0.2708)			0.0373 (0.9227)			-0.0581 (-0.8726)	
Lt Pension			0.0431 (0.9653)			0.0761*** (3.1619)			-0.0330 (-0.9634)
FR	-0.0295 (-0.8962)	-0.0390 (-1.1779)	-0.0286 (-0.8665)	-0.0006 (-0.0276)	-0.0167 (-0.8182)	-0.0004 (-0.0184)	-0.0289 (-1.1116)	-0.0223 (-0.8549)	-0.0282 (-1.0714)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.7206	0.7206	0.7206	0.5160	0.5148	0.5160	0.6536	0.6536	0.6536
	CSR Concern			EMPS Concern			CSR-EMPS Concern		
Panel B: Pension Liability and CSR Concern									
Total Pension	-0.1408*** (-3.2567)			-0.0763*** (-4.3895)			-0.0645** (-1.9898)		
St Pension		-0.1412* (-1.6882)			-0.0402 (-1.2838)			-0.1010 (-1.6377)	
Lt Pension			-0.1409*** (-3.4141)			-0.0705*** (-4.2763)			-0.0704** (-2.2856)
FR	0.0280 (0.8286)	0.0546 (1.5806)	0.0263 (0.7775)	-0.0058 (-0.4551)	0.0096 (0.7676)	-0.0054 (-0.4224)	0.0338 (1.1709)	0.0450 (1.5420)	0.0317 (1.1002)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.5690	0.5681	0.5693	0.4212	0.4173	0.4210	0.5541	0.5544	0.5543

Panel C: The Interaction Effect of Pension Liability on CSR Strength									
Total Pension	0.0367			0.0778***			-0.0411		
	(0.8085)			(3.1044)			(-1.1773)		
Total Pension×FR	-0.0421*			-0.0153			-0.0268		
	(-1.8032)			(-1.2677)			(-1.2350)		
St Pension		-0.0093			0.0435			-0.0528	
		(-0.1190)			(1.0847)			(-0.7737)	
St Pension×FR		-0.0422			-0.0228			-0.0194	
		(-0.9046)			(-0.9010)			(-0.5131)	
Lt Pension			0.0405			0.0749***			-0.0344
			(0.9184)			(3.1417)			(-1.0132)
Lt Pension×FR			-0.0476**			-0.0213*			-0.0263
			(-2.0531)			(-1.8357)			(-1.2342)
FR	0.0749	-0.0076	0.0835	0.0373	0.0002	0.0497	0.0375	-0.0078	0.0337
	(1.4035)	(-0.1959)	(1.6213)	(1.1089)	(0.0092)	(1.4620)	(0.7957)	(-0.2363)	(0.7742)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.7210	0.7207	0.7212	0.5162	0.5150	0.5166	0.6539	0.6536	0.6538
Panel D: The Interaction Effect of Pension Liability on CSR Concern									
Total Pension	-0.1351***			-0.0762***			-0.0589*		
	(-3.1781)			(-4.4031)			(-1.8427)		
Total Pension×FR	0.0511**			0.0003			0.0507***		
	(2.4927)			(0.0425)			(3.1351)		
St Pension		-0.1630*			-0.0420			-0.1210*	
		(-1.8943)			(-1.3240)			(-1.9088)	
St Pension×FR		0.0803**			0.0066			0.0737***	
		(2.3162)			(0.5366)			(2.7359)	
Lt Pension			-0.1385***			-0.0705***			-0.0681**
			(-3.3653)			(-4.2851)			(-2.1992)
Lt Pension×FR			0.0427**			0.0004			0.0423**
			(1.9669)			(0.0560)			(2.4022)
FR	-0.0986**	-0.0052	-0.0743	-0.0066	0.0047	-0.0064	-0.0920**	-0.0099	-0.0679*
	(-2.0958)	(-0.1252)	(-1.5368)	(-0.3303)	(0.3118)	(-0.3468)	(-2.5204)	(-0.2742)	(-1.7257)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.5709	0.5701	0.5707	0.4211	0.4173	0.4209	0.5573	0.5573	0.5566

Table 4.6: High Financial Distress vs. Low Financial Distress

This table compares the relationship between pension liability and CSR in firms with high financial distress and low financial distress. Panel A reports the relationship between pension liability and CSR in firms with high financial constraints. Panel B shows the relationship between pension liability and CSR in firms with low financial constraints. Panel C reports the interaction effect of pension liability and funded ratio in high financial constraints companies. Panel D reports the interaction effect of pension liability and funded ratio in low financial constraints companies. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	CSR			EMPS			CSR-EMPS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Pension Liability and CSR in Firms with High Financial Distress									
Total Pension	0.2596*** (2.8738)			0.1248** (2.4185)			0.1349** (2.2005)		
St Pension		0.1438 (0.8164)			0.0726 (0.8026)			0.0701 (0.6272)	
Lt Pension			0.2659*** (2.9339)			0.1167** (2.1542)			0.1492** (2.4869)
FR	-0.1615 (-1.4679)	-0.2024* (-1.7294)	-0.1529 (-1.3821)	0.0028 (0.0599)	-0.0169 (-0.3479)	0.0048 (0.1032)	-0.1642* (-1.7864)	-0.1866** (-1.9714)	-0.1577* (-1.7168)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318
Adj R2	0.4942	0.4909	0.4946	0.3673	0.3689	0.3670	0.4724	0.4698	0.4730
Panel B: Pension Liability and CSR in Firms with Low Financial Distress									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.1421* (1.9324)			0.1680*** (4.0101)			-0.0258 (-0.4932)		
St Pension		0.1053 (1.0788)			0.0766 (1.2232)			0.0364 (0.4060)	
Lt Pension			0.1446** (2.2017)			0.1578*** (4.2736)			-0.0132 (-0.2787)
FR	-0.0274 (-0.5825)	-0.0566 (-1.2152)	-0.0261 (-0.5566)	-0.0053 (-0.1927)	-0.0415* (-1.7376)	-0.0068 (-0.2520)	-0.0221 (-0.5682)	-0.0132 (-0.3428)	-0.0193 (-0.4952)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344
Adj R2	0.6205	0.6201	0.6206	0.4372	0.4355	0.4373	0.5660	0.5657	0.5660

Panel C: The Interaction Effect of Pension Liability and CSR in Firms with High Financial Distress

	CSR			EMPS			CSR-EMPS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.2857*** (2.6405)			0.1661*** (3.9736)			-0.0432 (-0.8416)		
Total Pension×FR	-0.0961*** (-2.9671)			-0.0192* (-0.0641)			-0.0869*** (-2.8011)		
St Pension		0.1134 (1.1000)			0.0846 (1.3549)			0.0545 (0.5950)	
St Pension×FR		-0.1498** (-2.4796)			-0.0446* (-1.8510)			-0.1122* (-1.8145)	
Lt Pension			0.1285** (1.9999)			0.1562*** (4.2402)			-0.0277 (-0.5951)
Lt Pension×FR			-0.0937*** (-2.9030)			-0.1191* (-0.0626)			-0.0846*** (-2.7202)
FR	0.1672** (2.2461)	0.0465 (0.8820)	0.1571** (2.2112)	0.0133 (0.3677)	-0.0182 (-0.6632)	0.0109 (0.3158)	0.1539** (2.5543)	0.0443 (0.9903)	0.1462** (2.5198)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318	2,318
Adj R2	0.4946	0.4909	0.4952	0.3650	0.3638	0.3661	0.4706	0.4708	0.4727

Panel D: The Interaction Effect of Pension Liability and CSR in Firms with Low Financial Distress

Total Pension	0.1449** (2.0453)			0.1623*** (4.1353)			-0.0174 (-0.3278)		
Total Pension×FR	-0.0873*** (-2.9890)			-0.0050 (-0.3558)			-0.0823*** (-2.8384)		
St Pension		0.1368 (1.3687)			0.0721 (1.1168)			0.0648 (0.7387)	
St Pension×FR		-0.1446*** (-2.6829)			-0.0379 (-1.5718)			-0.1066* (-1.8483)	
Lt Pension			0.1483** (2.3471)			0.1533*** (4.4305)			-0.0050 (-0.1036)
Lt Pension×FR			-0.0851*** (-2.9285)			-0.0049 (-0.3494)			-0.0803*** (-2.7599)
FR	0.1660** (2.3478)	0.0313 (0.6178)	0.1567** (2.3209)	0.0099 (0.2742)	-0.0160 (-0.5755)	0.0079 (0.2297)	0.1561*** (2.7289)	0.0473 (1.0721)	0.1488*** (2.6989)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344
Adj R2	0.6223	0.6222	0.6224	0.4371	0.4339	0.4372	0.5687	0.5676	0.5685

Table 4A.1: Variable Definitions

Variable Names	Variable Definitions
CSR	The net score (strengths minus concerns) of community, diversity, employee relations, environment, human rights, and product dimensions.
EMPS	Employee satisfaction component of CSR scores.
CSR-EMPS	CSR score excludes the employee satisfaction component.
EMPS Strength	The strength score of employee relation factor of CSR.
EMPS Concern	The concern score of employee relation Factor of CSR.
CSR-EMPS Strength	The strength score of non-employee relation factor of CSR.
CSR-EMPS Concern	The concern score of non-employee relation factor of CSR.
St Pension	Pension liability of a firm due to be paid out within one year.
Lt Pension	The pension liability of a firm has more than one year remaining until it is due.
Total pension	The total pension liability of a firm, the sum of short-term and long-term pension liabilities.
Funded Ratio	Fair value of pension assets dividend by pension liabilities.
Employee	Natural log of firm's number of employees.
DVT	Natural log of the total dividend paying amount.
AT	Natural log of the total assets of a firm at the end of the fiscal year.
ROA	Return on assets, calculated as income before extraordinary items less pension and retirement expense divided by beginning total assets.
CAPX	Natural log of capital expenditure to book assets.
MB	Natural log of the market value of equity divided by book value of equity.
Leverage	Long-term debt plus debt in current liabilities, divided by beginning total assets.
Baby Dummy	A dummy variable that equals 1 if the retirement year is after 2011 and 0 before 2011.

Table 4A.2: Pension Liability and Corporate Social Responsibility in Different Components

This table reports the results for the relationship between pension liability and corporate social responsibility in different components. CSR stands for corporate social responsibility score. EMPS denotes employee relation score, and CSR-EMPS represents CSR component excluding employee relation. St Pension stands for short-term pension liability, while Lt Pension denotes long-term pension liability, and Total Pension represents total pension liability. FR represents the funded ratio. Environmental stands for the environmental dimension of corporate social responsibility. Community stands for the community dimension of corporate social responsibility. Human rights stand for the human rights dimension of corporate social responsibility. Product stands for the product dimension of corporate social responsibility. Diversity stands for the diversity dimension of corporate social responsibility. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	Environmental			Community			Human Rights		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.1049*** (3.5392)	0.0963*** (3.1824)	0.0343 (0.6409)	0.0168 (1.1601)	0.0179 (1.2039)	0.0132 (0.5441)	0.0134 (1.3128)	0.0104 (1.0254)	0.0176 (0.5840)
St Pension		0.0602 (1.4421)			-0.0078 (-0.3677)			0.0207 (1.3218)	
Lt Pension			0.0699 (1.4825)			0.0036 (0.1899)			-0.0042 (-0.1525)
FR	-0.0411** (-1.9773)	-0.0413** (-1.9818)	-0.0403* (-1.9383) (2.0480)	-0.0254** (-2.1477)	-0.0253** (-2.1446)	-0.0253** (-2.1439) (0.7487)	-0.0177** (-2.2395)	-0.0178** (-2.2459)	-0.0178** (-2.2406) (1.4123)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.6079	0.6081	0.6081	0.4406	0.4407	0.4406	0.5498	0.5499	0.5499
	Product			Diversity			Employee Relation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.0420** (2.5447)	0.0372** (2.2472)	-0.0076 (-0.1107)	-0.1223*** (-4.4023)	-0.1157*** (-3.9493)	-0.1808*** (-2.7553)	0.1502*** (4.7274)	0.1454*** (4.4969)	0.0809 (0.8633)
St Pension		0.0336 (1.3316)			-0.0461 (-1.0630)			0.0331 (0.6460)	
Lt Pension			0.0492 (0.7352)			0.0579 (0.9559)			0.0686 (0.7702)
FR	-0.0028 (-0.2159)	-0.0030 (-0.2250)	-0.0023 (-0.1799)	0.0172 (0.7673)	0.0174 (0.7816)	0.0178 (0.7952)	0.0025 (0.1000)	0.0024 (0.0958)	0.0033 (0.1273)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.4555	0.4559	0.4556	0.4353	0.4355	0.4352	0.4378	0.4378	0.4378

Table 4A.3: The Moderating Effect of Funded Status on Corporate Social Responsibility in Different Components

This table reports the moderating effect of funded status on corporate social responsibility in different components. CSR stands for corporate social responsibility score. EMPS denotes employee relation score, and CSR-EMPS represents CSR component, excluding employee relations. St Pension stands for short-term pension liability, while Lt Pension denotes long-term pension liability, and Total Pension represents total pension liability. FR represents the funded ratio. Environmental stands for the environmental dimension of corporate social responsibility. Community stands for the community dimension of corporate social responsibility. Human rights stand for the human rights dimension of corporate social responsibility. Product stands for the product dimension of corporate social responsibility. Diversity stands for the diversity dimension of corporate social responsibility. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	Environmental			Community		Human Rights			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.0987*** (3.4153)	0.0881*** (3.0021)	0.0028 (0.0621)	0.0147 (1.0095)	0.0154 (1.0127)	0.0036 (0.1240)	0.0131 (1.2830)	0.0104 (1.0245)	0.0159 (0.5246)
Total Pension×FR	-0.0564*** (-3.8243)			-0.0193*** (-2.9664)			-0.0029 (-0.6863)		
St Pension		0.0806* (1.8769)			-0.0014 (-0.0635)			0.0207 (1.2925)	
St Pension×FR		-0.0680** (-2.2893)			-0.0213** (-2.0525)			-0.0002 (-0.0359)	
Lt Pension			0.0951*** (2.6498)			0.0113 (0.4602)			-0.0028 (-0.1005)
Lt Pension×FR			-0.0580*** (-4.1115)			-0.0177*** (-2.8458)			-0.0033 (-0.8003)
FR	0.0988*** (3.0164)	0.0076 (0.3130)	0.0961*** (3.2253)	0.0224 (1.5283)	-0.0100 (-0.8089)	0.0163 (1.1847)	-0.0106 (-0.8584)	-0.0177* (-1.7878)	-0.0100 (-0.8773)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.5028	0.5012	0.5033	0.2568	0.2550	0.2562	0.2693	0.2697	0.2693
	Product			Diversity		Employee Relation			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Pension	0.0408** (2.4910)	0.0351** (2.1440)	-0.0108 (-0.1559)	-0.1212*** (-4.3444)	-0.1138*** (-3.8305)	-0.1740*** (-2.6717)	0.1484*** (4.6882)	0.1426*** (4.4352)	0.0691 (0.7909)
Total Pension×FR	-0.0112 (-1.4712)			0.0100 (0.5694)			-0.0161 (-1.1371)		
St Pension		0.0388 (1.5212)			-0.0510 (-1.1347)			0.0401 (0.7731)	
St Pension×FR		-0.0171 (-1.1890)			0.0161 (0.6259)			-0.0233 (-0.8771)	
Lt Pension			0.0517 (0.7613)			0.0524 (0.8799)			0.0780 (0.9474)
Lt Pension×FR			-0.0059 (-0.7458)			0.0125 (0.7372)			-0.0217 (-1.6264)
FR	0.0250* (1.6967)	0.0093 (0.6109)	0.0116 (0.6762)	-0.0075 (-0.1710)	0.0058 (0.2185)	-0.0116 (-0.2856)	0.0425 (1.0397)	0.0192 (0.6343)	0.0543 (1.3760)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
Adj R2	0.4561	0.4564	0.4557	0.4353	0.4355	0.4354	0.4380	0.4380	0.4383

Table 4A.4: The Long-term Effect of Pension Liability and Corporate Social Responsibility

This table reports the long-term effect of pension liability on corporate social responsibility. CSR_t+3 stands for corporate social responsibility performance for the next three years. EMPS_t+3 denotes the employee relation score for the next three years, and CSR-EMPS_t+3 represents the CSR component, which excludes employee relations for the next three years. St Pension stands for short-term pension liability, while Lt Pension denotes long-term pension liability, and Total Pension represents total pension liability. FR represents the funded ratio. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	CSR_t+3			EMPS_t+3		CSR-EMPS_t+3			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: The Long-term Effect of Pension Liability on CSR									
Total Pension	0.1759*	0.1802*		0.3229***	0.3219***		0.3229***		
	(1.8259)	(1.8436)		(6.1082)	(6.0627)		(6.1082)		
St Pension		-0.0426			0.0098			0.0581	
		(-0.4420)			(0.1613)			(0.9413)	
Lt Pension			0.1559*			0.2886***			0.2886***
			(1.8269)			(5.7717)			(5.7717)
FR	-0.0141	-0.0148	-0.0168	-0.0553	-0.0551	-0.0596*	-0.0553	-0.1357***	-0.0596*
	(-0.2863)	(-0.3008)	(-0.3437)	(-1.5394)	(-1.5381)	(-1.6746)	(-1.5394)	(-3.9242)	(-1.6746)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,453	3,453	3,453	3,453	3,453	3,453	3,453	3,453	3,453
Adj R2	0.6309	0.6309	0.6309	0.4774	0.4772	0.4763	0.4774	0.4615	0.4763
Panel B: The Long-term Moderating Effect of Pension Liability on CSR									
Total Pension	0.1809*	0.1896*	0.1760	0.3024***	0.3068***	0.1832	-0.1216	-0.1172	-0.0072
	(1.8614)	(1.9175)	(0.6468)	(6.0183)	(5.9639)	(1.0991)	(-1.3977)	(-1.3111)	(-0.0357)
Total Pension×FR	0.0207			-0.0857***			0.1065***		
	(0.6188)			(-4.6598)			(2.7824)		
St Pension		-0.0527			0.0260			-0.0787	
		(-0.5350)			(0.4127)			(-0.8704)	
St Pension×FR		0.0430			-0.0689*			0.1119**	
		(0.8895)			(-1.6721)			(2.0182)	
Lt Pension			0.0031			0.1165			-0.1134
			(0.0128)			(0.7436)			(-0.6608)
Lt Pension×FR			0.0148			-0.0938***			0.1086***
			(0.4521)			(-5.4650)			(2.9829)
FR	-0.0708	-0.0483	-0.0524	0.1789***	-0.0014	0.1883***	-0.2497**	-0.0469	-0.2407***
	(-0.9166)	(-0.8656)	(-0.7407)	(3.1862)	(-0.0367)	(3.5221)	(-2.5085)	(-0.8182)	(-2.6956)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,453	3,453	3,453	3,453	3,453	3,453	3,453	3,453	3,453
Adj R2	0.6309	0.6310	0.6308	0.4870	0.4801	0.4894	0.5705	0.5677	0.5710

Table 4A.5: Industry Dummy

This table reports the relationship between pension liability and corporate social responsibility when including industry dummies. The sample period is from 2007 to 2019. All models are estimated using OLS. Robust standard errors are clustered at the firm level, and t-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Table 4A.1.

	CSR				EMPS		CSR-EMPS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: The Effect of Pension Liability on CSR									
Total Pension	0.1822*** (2.9961)			0.1502*** (4.7274)			0.0320 (0.7340)		
St Pension		0.1205 (1.4124)			0.0686 (1.3398)			0.0519 (0.7370)	
Lt Pension			0.1840*** (3.2875)			0.1416*** (4.7372)			0.0424 (1.0450)
FR	-0.0575 (-1.1354)	-0.0936* (-1.8092)	-0.0548 (-1.0785)	0.0025 (0.1000)	-0.0280 (-1.1447)	0.0025 (0.0959)	-0.0601 (-1.3920)	-0.0656 (-1.4996)	-0.0573 (-1.3255)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088	7,088
R-squared	0.6789	0.6781	0.6790	0.5437	0.5407	0.5437	0.6356	0.6356	0.6357
Panel B: The Moderating Effect of Funded Ratio of Pension Liability on CSR									
Total Pension	0.1719*** (2.8674)			0.1484*** (4.6882)			0.0235 (0.5442)		
Total Pension×FR	-0.0932*** (-3.6771)			-0.0161 (-1.1371)			-0.0770*** (-3.1829)		
St Pension		0.1536* (1.7327)			0.0765 (1.4779)			0.0772 (1.0730)	
St Pension×FR		-0.1225*** (-2.7108)			-0.0291 (-1.1111)			-0.0934** (-2.3152)	
Lt Pension			0.1790*** (3.2560)			0.1404*** (4.7397)			0.0386 (0.9563)
Lt Pension×FR			-0.0903*** (-3.6125)			-0.0222* (-1.6525)			-0.0681*** (-2.7607)
FR	0.1734*** (2.6645)	-0.0024 (-0.0381)	0.1578*** (2.6119)	0.0425 (1.0397)	-0.0064 (-0.2209)	0.0548 (1.3707)	0.1309** (2.5333)	0.0039 (0.0713)	0.1030** (1.9878)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES	1960
Firm fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,088	7,088	7,088	7088	7,088	7,088	7,088	7,088	7,088
R-squared	0.6807	0.6794	0.6808	0.5440	0.5411	0.5442	0.6379	0.6371	0.6375