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Growing up with the one-child policy: CEO early-life experiences and corporate investment in China

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ABSTRACT

We examine corporate investment behaviour of Chinese CEOs whose formative years (5–15 years old) overlapped with China's one-child policy period. We construct alternative measures of CEO early-life experience of gender inequality based on the information on the cities where CEOs lived in their formative years during the one-child policy period. We find that a sample CEO, who experienced greater gender inequality induced by the one-child policy, intends to increase investment, and they invest more than their peers. Moreover, experiencing greater gender inequality, women CEOs are more conservative and risk-averse in investment, and they invest less than their peers. In contrast, men CEOs experiencing greater gender inequality are overconfident and risk-taking in investment, and they invest more than their peers. These results remain robust across a set of tests, including the Generalized Method of Moments (GMM), Difference-In-Difference (DID), and Propensity Score Matching (PSM). We contribute to the debate surrounding China's one-child policy by providing new evidence on how the one-child policy affects the Chinese economy through its corporate sector.

1. Introduction

China implemented its controversial one-child policy during 1979–2015. Although the overall impact of the one-child policy on China's economic growth has been debated, there is a consensus that the one-child policy has resulted in the distortion of China's population structure, i.e., rapid aging population and gender imbalance. Zhang (2017) reviews the impact of the one-child policy on households, including fertility rate, human capital, and other family outcomes, such as women's labour participation. Wei and Zhang (2011) explain China's high savings rates by the sex ratio (the number of men per woman in the premarital cohort) and document that Chinese parents with a son raise their savings in order to improve their son's competitiveness in the marriage market. Edlund et al. (2013) document that China's high sex ratio imbalance contributes to the rise in crime. They document the connection between male behaviour, such as risk-taking, dominance, male-to-male aggression, with competition in the marriage market. Both Wei and Zhang (2011) and Edlund et al. (2013) acknowledge that the key determinant of the high sex ratio imbalance is China's one-child policy. Although the one-child policy has been examined concerning the above-mentioned social issues and household decisions, little is known whether or how the one-child policy impacts the Chinese economy through its corporate sector. The one-child policy period covered three decades of China's most crucial transition from a planning system to a market economy. Chinese stock markets were established at the beginning of the 1990 s, after which Chinese listed firms emerged; hence the Chinese corporate sector grew up within

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the one-child policy period. Correspondingly, Chinese professional managers were transformed from managers of Township and Village Enterprises (TVEs) to top managers of Privately-Owned Enterprises (POEs) in the 1990 s. During the same period, many Chinese State-Owned Enterprises (SOEs) were listed and became modern corporations, albeit with a partial privatisation until 2005. In sum, many professional managers in the Chinese corporate sector have experienced the one-child policy. This raises an interesting research question: Does China's one-child policy affect corporate decisions via these CEOs who grew up with the one-child policy?

An important consequence induced by China's one-child policy is gender inequality. The one-child policy created an unusual social environment in which boys are favoured and girls are discriminated against. This reinforced the conventional perception in the Chinese culture that boys are more important than girls. Hence, the one-child policy affects Chinese CEOs who grew up during that period in two ways. First, social norms and perceptions of girls as compared to boys have profound psychological influence in shaping their self-confidence and risk attitudes, which has lifelong consequences. Second, in general, girls have fewer opportunities in terms of education and jobs, which affects their human capital. We believe that early-life experiences of such intensified gender inequality affect CEOs' corporate decisions in their later careers because these experiences influence the formation of CEOs' risk attitudes and management styles.

A growing literature in corporate finance documents the importance of CEO past experiences in corporate decisions. The literature agrees that CEO past experiences shape CEO risk-attitudes and contribute to the formation of CEO management styles (Malmendier et al., 2011; Bucciol and Zarri, 2013; Bernile et al., 2017). This literature documents the impacts of CEO past experiences that are either idiosyncratic (Dittmar and Duchin, 2016; Cain and McKeon, 2016) or that are out of personal control, i.e., experiences of social and economic events (Schoar and Zuo, 2017).

In this paper, we argue that growing up with the one-child policy, Chinese CEOs' experience of gender inequality induced by the one-child policy influences CEOs risk attitudes and management styles, which then impacts corporate investment decisions made by these CEOs. Our argument is in line with theoretical predictions from psychological and medical studies (e.g., Holman and Silver, 1998) and the imprinting theory in organisational studies (Marquis and Tilcsik, 2013). Following the recent literature, we pay attention to CEO formative years (5–15 years old).[1] We identify Chinese CEOs whose formative years (5–15 years old) overlapped with the one-child policy period. We then construct a gender inequality indicator of the city in which CEOs lived in their formative years during the one-child policy period. This indicator is then used as a proxy for CEO early-life experience of gender inequality. Next, we match sample CEOs with the firms they served during their tenure. We find that CEOs who experienced greater gender inequality in their formative years during the one-child policy period are on average more confident and risk-taking in investment, and they invest more than their peers. In addition, subsample results show that early-life experiences of greater gender inequality make women CEOs more conservative and risk-averse in investment, and they invest less than their peers. In contrast, men CEOs are more confident in investment, and they invest more than their peers. These results remain robust across a set of tests, including the Generalized Method of Moments (GMM), Difference-In-Difference (DID), and Propensity Score Matching (PSM).

We contribute to the literature from the following aspects. First, we extend the debate surrounding China's one-child policy by examining how the one-child policy affects the Chinese economy through its corporate sector. We are not aware of any prior research which links China's one-child policy with Chinese CEOs and their corporate investment decisions. We believe that this contribution is important because it provides new insights on understanding China's investment/overinvestment-driven economic transition process in which our sample CEOs were active corporate decision-makers. Moreover, the debate on China's one-child policy is beyond China, and it is relevant to China's current and future economic performance, which has significant policy implications for the rest of the world.

Second, we contribute to the literature on CEO past experiences and corporate decisions in two ways. (1) We differ from existing studies in that we use gender inequality induced by China's one-child policy as a proxy for CEO early-life experiences, whereas most studies on CEO past experiences use a nominal or categorical indicator, i.e., whether CEOs had a particular experience in their early lives, as a proxy for CEO past experiences. We believe that quantifying the indicator of CEO past experiences enables us to reveal the social-cultural environment in which CEOs grew up. Specifically, we quantify CEO early-life experiences of gender inequality by utilising information on the cities in which CEOs lived in their formative years during the one-child policy period. Constructing gender inequality indicators, we consider city-level features, including the registered birth rate, GDP per capita, rural area of the city, and local monetary penalties for violating the one-child-policy. Hence, our gender inequality indicators reveal rich insights on the importance of the social-cultural environment for corporate decisions. (2) We extend the sub-literature on Chinese CEO early-life experiences and corporate decisions. A few existing studies on Chinese CEO early-life experiences document that Chinese CEOs who experienced China's great famine are more conservative in corporate decisions (see Section 2.2). The implication of CEOs early-life experiences of China's one-child policy on corporate decisions has not been formally examined yet. Hence, our research is an important addition to this sub-literature because China's one-child policy has more propound economic and societal impacts for a much longer time in the Chinese history.

Third, our evidence is an addition to the literature of gender diversity of corporate boards. We document that gender inequality resulting from China's one-child policy has opposite effects on women and men CEOs. Although social-cultural factors are examined in studies of gender diversity in corporate decisions (Belaounia et al., 2020; Mohsni et al., 2021), existing studies on women directors mainly treat social-cultural influence as a moderating factor. We use China's one-child policy as a special social experiment to examine how the social-cultural environment, in which women CEOs grew up, impacts their corporate investment decisions through shaping

[1] It is documented that imprints of early-life experiences are more profound for adolescence (Tulving, 2002; Benmelech and Frydman, 2015; Cui et al., 2022). Bernile et al. (2017) define CEOs' formative years to be 5–15 years old.

women CEOs' risk attitudes and management styles. This has important implications for policymakers to design gender inclusive social and economic policies.

In Section 2 we review related literatures, discuss underlying theories, and develop hypotheses. Section 3 describes data and empirical models. Section 4 discusses empirical results. Section 5 provides robustness tests. Section 6 concludes.

2. Literature review and hypotheses

2.1. Managerial traits and corporate decisions

Recent literature in corporate finance documents that managerial traits are important in explaining corporate decisions (Graham et al., 2013). Chevalier and Ellison (1999) provide evidence that mutual fund performance depends on managerial characteristics, including age and academic record. Bertrand and Schoar (2003) find that elder people are more conservative than younger ones, and an MBA degree is associated with more aggressive management strategies. Bamber et al. (2010) link managers' personal background to their disclosure styles. Graham et al. (2013) document that personal traits have significant impact on corporate decisions through managers' risk tolerance. They find that CEOs with higher risk tolerance conduct more mergers and acquisitions, and more optimistic CEOs prefer short-term debt. They also find that younger and taller CEOs are more risk-tolerant and more likely to serve high growth firms.

2.2. CEO past experiences and corporate decisions

The literature covers various managerial traits, including individual personalities, demographic characteristics, family background, education level, and manager past experiences. Among different types of managerial traits, the importance of managers' past experiences in explaining corporate decisions has attracted a lot of attention (Malmendier et al., 2011; Bernile et al., 2017). Past experiences affect people's subsequent perceptions and beliefs. The literature on CEO past experiences consists of two sub-streams: individual experiences and experiences of uncontrollable social or natural events. The former is more family or individual-related, whereas the latter is related to social and economic environments, and they are caused by external forces that are out of an individual's control.

If an individual experienced an idiosyncratic risky event in the past, the imprint of this experience on the individual is also risk-taking. For example, Cain and McKeon (2016) use the possession of a pilot license as a proxy for CEO past experiences and document that pilot CEOs are overconfident and risk-taking, hence acquisitions led by pilot CEOs increase the firm's risk exposure, i.e. higher volatility of the firm's equity. Malmendier et al. (2011) find that CEOs who served the army in World War II are more risk-taking, and they tend to raise leverage and implement more aggressive corporate policies.[2] Duchin et al. (2020) examine how a CEO's decision on capital allocation is influenced by the degree to which the CEO was exposed to gender inequality during his/her formative years. The authors document that CEOs would allocate more investment capital to men departmental managers than their women counterparts if these CEOs experienced gender inequality during their formative years. These CEOs include CEOs whose families are father-dominated in finance and education; who went to all-male high school; and who lived in communities with gender inequality. The finding in Duchin et al. (2020) can be explained by the imprinting theory. Moreover, if an individual perceives a past experience as positive, then the imprint of such an event is also positive, which makes the individual more optimistic and risk-taking. For example, Malmendier and Nagel (2011) document that individuals who experienced higher stock returns in the past are more confident about the expected future returns, and they tend to allocate more capital to stocks or bonds.

Many studies in this literature document how negative past experiences affect individuals' risk preferences. These studies document that overall if an individual experienced adverse events in the past, they become more risk averse. For example, Dittmar and Duchin (2016) document that if a manager has served a company that once encountered difficulties, such as bankruptcy or shocks to cash flow, credit ratings, and stock returns, then the manager is likely to make more conservative decisions, and he/she tends to save more cash and hold less debt. The literature also documents that past uncontrollable high-risk experiences weaken people's ability to bear financial risks and make them more conservative (Cassar et al., 2017). Bucciol and Zarri (2013) find that negative uncontrollable experiences, such as natural disasters or child death, discourage people to take up risky investments. Schoar and Zuo (2017) document that CEOs who began their first job in recessions have a more conservative style. For example, they cut costs and reduce leverage. This is because managers learn from the macroeconomic condition under which they worked, hence past macroeconomic environments shape CEOs' managerial styles. Apart from the literature that studies firms in mature market economies, some studies examine how Chinese CEO past experiences affect corporate decisions. These studies link Chinese CEO past experience of great famine (1959–1961) with various corporate decisions, covering capital structure, cash holding, and M&A decisions (Zhang, 2017); earnings management and financial fraud (Feng and Johansson, 2018); corporate information disclosure and financial reporting (Yao et al., 2020; Cui et al., 2022). These studies conclude that Chinese CEOs who experienced China's great famine become more risk-averse in corporate decisions.

There are also some studies that document a mixed picture about how past experiences affect people's risk preference. For example, Malmendier et al. (2011) find that CEOs born during the Great Depression believe that their firms are undervalued. These CEOs are

[2] On the other side, Benmelech and Frydman (2015) provide evidence that CEOs who have military experiences are more conservative, and their companies are less likely to conduct fraud. This can be explained by that military training implies hardship and discipline.

more optimistic about the firm's future cash flow and regard external financing as a burden. Hence, they prefer internal funds and avoid using debt. This finding is in the opposite of the conclusion drawn from the above-mentioned other studies (e.g., Bucciol and Zarri, 2013; Schoar and Zuo, 2017). In addition, Bernile et al. (2017) document a nonmonotonic relation between the intensity of CEOs' early-life exposure to fatal disasters and corporate risk-taking. The authors find that different levels of severity of natural disasters lead to different impacts of such experiences on CEO decision-making. More specifically, CEOs who experience fatal disasters without extreme negative consequences behave more aggressively, whereas CEOs who suffer from the extreme downside of disasters behave more conservatively.

In sum, the literature on CEO past experiences documents that individuals respond to their past experiences differently depending on the nature of the events, whether it is perceived as a positive or negative experience, and even if it is a negative one, some individuals become more risk-averse and others become more risk-taking depending on the extent to which they suffer from the adverse event.

2.3. Why do CEO past experiences matter?

Psychological studies explain why past experiences shape people's risk attitude. For example, Holman and Silver (1998) document that people are affected by past traumatic experiences for an extended period. In addition, medical studies have identified mechanisms through which past experiences influence how the brain functions. For example, Lyoo et al. (2011) argue that exposure to traumatic experiences develops post-traumatic stress disorder (PTSD) symptoms. Moreover, Labonte′ et al. (2012) state that adverse experiences in childhood will alter brain neurons. Mehta et al. (2013) also point out that maltreatment during childhood alters the biological process and negatively influences people's adult lives. Bernile et al. (2017) argue that the brain can remember the feelings of non-economic traumatic events it has experienced and transfer such experiences into responses to economic risks. In sum, the above-mentioned studies show that past experiences do affect people's psychology, brain functions and hence their risk attitude towards economic decisions at a later stage.

The predictions from the above-mentioned psychology and medical studies have been already applied to economic research. For example, Marquis and Tilcsik (2013) review the literature in organizational studies. They discuss the applications of the imprinting theory developed from the bioecological literature to explain why the observed behaviours of industries, organisations, and individuals carry the patterns reflecting economic conditions either at the founding time of these entities or experienced by individuals in a sensitive period, and these patterns persist over time. For example, imprints of an employee's early career experiences are observed for the same employee in different organisations they served. The above-mentioned studies justify our argument that investment decisions made by Chinese CEOs who grew up during the one-child policy period should reveal consequences of the one-child policy in shaping these CEOs' risk preferences and management styles.

Although past experiences matter for people's later decision-making in general, they may affect men and women differently. For example, Croson and Gneezy (2009) summarise psychological studies and economic surveys and find that men are more risk-taking than women in nature, and that men are in general overconfident and more responsive to competition as compared to women. However, according to Croson and Gneezy (2009), generic differences between men and women, although true in the general population, do not explain differences in risk preference between managers and financial professionals. Evidence shows that environment and social-cultural factors are critically related to the observed differences in risk preference between men and women managers in corporate decisions. Moreover, other studies also argue that social gender norms explain more of the observed differences in corporate behaviour between men and women managers (Klenke, 2003; Gustafson, 1998). These studies justify our argument that the one-child policy, which created special social gender norms in China, should explain the observed differences in investment decisions between man and women CEOs who grew up during the one-child policy period.

2.4. Hypotheses

In this paper, we treat gender inequality induced by China's one-child policy as an element of the community and social environment experienced by CEOs during their formative years (5–15 years old). According to the above-discussed literature, such early-life experiences should play an important role in shaping CEO risk attitudes and management styles, and influence CEOs' corporate decisions. From the literature review, we also see that existing studies provide mixed evidence on how early-life experiences of unfavourable and uncontrollable external environment change CEOs' risk attitudes and management styles. For example, according to Malmendier et al. (2011), CEOs born during the Great Depression are overconfident about future prospects of their firms, whereas Schoar and Zuo (2017) find that CEOs who began their first job in recessions have a more conservative management style. Moreover, according to Bernile et al. (2017) the relationship between CEO past experiences of natural disasters and their risk attitudes is nonlinear depending on the extent to which the CEO suffered a loss from natural disasters. Specifically, CEOs who suffered extreme losses from natural disasters tend to be more conservative when making decisions, whereas those who experienced disasters without extreme losses are relatively more aggressive. China's one-child policy is widely seen as a repressive social policy because it was the most stringent family planning scheme in the globe, and it was compulsorily implemented, hence we believe that the one-child policy was overall an uncontrollable and negative experience for many Chinese families. However, this negative social policy may affect Chinese CEOs differently depending on their individual experiences of gender inequality resulting from the one-child policy. Hence, we set up the following hypotheses:

Hypothesis 1a. *: Chinese CEOs' experiences of gender inequality during the one-child policy period positively affect corporate investment.*

Hypothesis 1b. *: Chinese CEOs' experiences of gender inequality during the one-child policy period negatively affect corporate investment.*

Some studies on China's one-child policy document that the one-child policy has created different impacts on boys and girls due to the high sex ratio imbalance (Wei and Zhang, 2011; Edlund et al., 2013). Because of the one-child policy, boys grew up in an environment surrounded by many more boys than girls. This male-heavy environment affects boys' behaviour. Evidence shows that China's high sex ratio imbalance resulting from the one-child policy had created an environment in which boys behave aggressively in order to compete in the marriage market (Wei and Zhang, 2011; Edlund et al., 2013). This evidence is consistent with other studies. For example, Gneezy et al. (2003) show that men's performance is more incentivized by the competitiveness of the environment than women's performance. Gneezy et al. (2009) document that societal structure is linked to the observed gender differences in competitiveness. Moreover, boys on average are given more opportunities in education and jobs than girls in Chinese families (Wang et al., 2020). We expect that the one-child policy intensified the boy-preference social gender norm and generated different impacts on men and women CEOs. Our argument is consistent with Bernile et al. (2017) who document a nonlinear relationship between CEO early-life experiences of natural disasters and their risk attitudes. CEOs who suffered extreme losses from natural disasters tend to be more conservative, whereas those who experienced disasters without extreme losses are relatively more aggressive. In the context of China's one-child policy, it is women CEOs who were mostly affected adversely due to greater gender discrimination against girls. According to the literature discussed in Section 2.3, it is adverse past experiences that make people more risk-averse and conservative in their later lives. In addition, social-cultural elements are crucial in explaining the observed differences in risk preferences between men and women managers (Klenke, 2003; Gustafson, 1998; Croson and Gneezy, 2009). The literature agrees that social and cultural elements can explain why women directors take more risks in some cases and they are risk averse in other cases. For example, Adams and Funk (2012) find that in Sweden, a more gender equality country, women directors are more risk-taking than their men counterparts, whereas Belaounia et al. (2020) document that women directors are more risk-averse in countries where gender inequality is higher. Taking together, we believe that Chinese men CEOs who grew up with the one-child policy are more likely to be overconfident and risk-taking, whereas women CEOs who grew up with the one-child policy are more likely to be conservative and risk-averse. Therefore, we set up the following hypotheses:

Hypothesis 2. *Chinese men CEOs' experiences of gender inequality during the one-child policy period affect corporate investment positively.*

Hypothesis 3. *Chinese women CEOs' experiences of gender inequality during the one-child policy period affect corporate investment negatively.*

3. Empirical issues

3.1. Data collection

We collect CEO names and birthplaces from *China Stock Market and Accounting Research Database* (*CSMAR)*. For CEOs whose information is incomplete in the database, we manually collect information on these CEOs from *Baidu* or *Google*. We exclude CEOs without birthplace information. Based on the information on CEO age and birthplace, we identify cities in which these CEOs lived in their formative years (5–15 years old) during the one-child policy period (1979–2015). Some CEOs are further excluded because their birth cities do not have official records of the birth rate during the one-child policy period. City-level information is taken from *China Statistical Yearbooks* and *City Statistical Yearbooks*. After obtaining sample CEOs, we match nonfinancial firms those CEOs served during their tenue. These firms are listed on either the Shanghai Stock Exchange or the Shenzhen Stock Exchange. We further exclude CEOs with less than 3-year tenure in a firm to ensure that we have at least three-year observations for the firm included, which allows us to apply the Generalized Method of Moments (GMM) procedure in the empirical analysis. The earliest year in which our sample CEOs served their firms is 2003. The sample period stops in 2019 before COVID-19. Firm-level data is taken from *CSMAR*. All firm-level variables are winsorized by trimming 1 % of the top and the bottom extreme values. The whole sample consists of an unbalanced panel of 87 firms during 2003–2019, which provides us with a total of 520 firm-year observations.

3.2. Proxy for CEO early-life experiences of gender inequality

The purpose of our empirical analysis is to examine how sample CEOs' early-life experiences of gender inequality resulting from the one-child policy affect investment decisions of the firms these CEOs served. Hence, we first need to construct a proxy for CEO early-life experiences of gender inequality. For this we use the information on the cities in which CEOs lived in their formative years (5–15 years old) during the one-child policy period. Under the one-child policy, China restricted hospitals from revealing the information on the sex of the fetus during pregnancy. Consequently, if the firstborn child is a girl, some families would continue to have more children until they have a son even if they face a financial fine and the punishment of losing jobs in SOEs or government organisations. This suggests that Chinese families' desire to have more than one child, if the firstborn is a girl, would be stronger if their preference for boys is stronger. On the city level, the within-policy birth rate was officially registered. We construct our first indicator of gender inequality by using the city's out-of-policy birth rate, i.e., one minus the within-policy birth rate, to measure this city's degree of gender inequality in a year.

More specifically, we match a city to a CEO based on the CEO's birthplace. We assume that CEO birthplace is where the CEO lived during his/her formative years (5–15 years old). We recognise that CEOs may move to another city when they attend universities. However, most people in China go to universities after 16 years old, and we do not consider the CEO's age beyond 16. Thus, CEOs'

early-life experiences of gender inequality during the one-child policy is less likely to be affected by CEO migration. Therefore, we use the information on the CEO's birthplace to identify the city in which the CEO lived in his/her formative years. Because the one-child policy was implemented between 1979 and 2015, based on the information of CEO age, we select CEOs whose formative years (5–15 years old) overlapped with the period from 1979 to 2015. For example, if a CEO was 15 years old in 1979, we collect the information on the out-of-policy birth rate of the city in which the CEO lived in 1979. If a CEO lived in a city for multiple years during his/her formative years since 1979, we use the average of out-of-policy birth rates across all relevant years to proxy for gender inequality experienced by the CEO in this city. This gender inequality indicator is then matched with the CEO who lived in this city in their formative years during the one-child policy period. We denote this gender inequality indicator as *GII*. In the robustness tests (Sections 5.1&5.2), we construct alternative gender inequality measures considering other city level factors.

3.3. Empirical models and measurement of variables

To examine how CEO early-life experiences of gender inequality (*GII*) impact investment decisions, we use the following benchmark empirical model:

$$I_{it} = f_i + f_t + \beta_1 GII_i + \beta_2 I_{i,t-1} + \beta_3 Sales_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 NewEquity_{i,t-1} + \beta_8 Cash_{i,t-1} + \beta_9 State_{i,t-1} + \beta_{10} PE_{i,t-1} + \beta_{11} Duality_{i,t-1} + \beta_{12} CEOage_{i,t-1} + \beta_{13} CEOedu_i + \beta_{14} CEOoverseas_i + \beta_{15} CEOgender_i + \varepsilon_{i,t} \quad (1)$$

In the empirical model (1), the dependent variable is the ratio of fixed investment for firm i in year t (I_{it}). It is the sum of net fixed investment and depreciation in year t divided by the firm's total assets in year (t-1), where net fixed investment is the changes in the firm's fixed assets between year t and (t-1). The key explanatory variable is the gender inequality indicator (GII_i). It is the average out-of-policy birth rate in a city across relevant years corresponding to CEOs' formative years during the one child policy period. We use an accelerator investment model in which sales ($Sales_{i,t-1}$) is the fundamental variable of fixed investment (Jorgenson, 1971). Sales ($Sales_{i,t-1}$) is the change in sales for firm i between years (t-1) and (t-2) scaled by the firm's total assets in year (t-1). Other control variables include: (a) Firm size ($Size_{i,t-1}$), which is the natural logarithm of the firm's total assets in year (t-1). (b) Firm age ($FirmAge_{i,t-1}$), which is the natural logarithm of the number of listing years of the firm in year (t-1). (c) Leverage ($Leverage_{i,t-1}$), which is the ratio of total debt to total assets for firm i in year (t-1). (d) New equity ($NewEquity_{i,t-1}$), which is a dummy variable taking the value of one if the firm issued new equities before year (t-1), and zero otherwise. External sources of financing (e.g., new equity) are important for firm investment. (e) Cash flow ($Cash_{i,t-1}$), which is the firm's cash flow in year (t-1) scaled by total assets of the firm in year (t-1). Cash flow is an important factor for fixed investment decisions (Fazzari et al., 1988). (f) State Ownership ($State_{i,t-1}$), which is the ratio of state shares to total shares for firm i in year (t-1). State ownership explains investment behaviour of Chinese listed firms (Firth et al., 2012). (g) P/E ratio ($PE_{i,t-1}$), which is the ratio of stock price to the ratio of net income to capital for firm i in year (t-1). We use the firm's PE ratio to control the impact of growth potential of the firm. Growth firms experience higher fixed investment as

Table 1
Summary statistics.

	Whole (N = 520)		Men (N = 410)		Women (N = 110)		
Variables	Mean	Std dev.	Mean	Std dev.	Mean	Std dev.	t-test statistic
I	0.0347	0.0566	0.0363	0.0571	0.0290	0.0525	-1.2331
$(I - I_{peer})$	-0.0037	0.0542	-0.0035	0.0546	-0.0036	0.0510	-0.0922
GII	0.1244	0.0973	0.1292	0.1014	0.1065	0.0784	-2.1828**
GIIFINE	0.0950	0.0695	0.0973	0.0675	0.0880	0.0815	-1.4295*
GIICITY	0.0023	0.0064	0.0013	0.0015	0.0050	0.0115	3.8430***
Sales	0.0989	0.1949	0.0967	0.1835	0.1075	0.2202	0.6551
Size	21.7686	1.2280	21.7780	1.1886	21.7495	1.3387	-0.1745
Firm Age	9.1865	6.4907	8.7975	6.0301	10.6000	7.7911	2.5020**
Leverage	0.3740	0.5241	0.3580	0.5073	0.4330	0.5777	1.3477*
NewEquity	0.1442	0.3517	0.1415	0.3489	0.1545	0.3631	0.3462
Cash	0.0525	0.0552	0.0551	0.0502	0.0433	0.0679	-1.9532**
State	0.0407	0.1262	0.0515	0.1402	0.0003	0.0018	-3.8117***
PE	0.0943	0.1797	0.0931	0.1601	0.0924	0.2129	-0.1586
Duality	0.3096	0.4628	0.3639	0.4756	0.1818	0.3874	-3.2925***
CEOage	41.9808	5.4860	42.2049	5.2963	41.1455	6.0953	-1.8023**
CEOedu	3.2962	0.8606	3.1780	0.8593	3.7364	0.7126	6.2601***
CEOoverseas	0.0769	0.2667	0.0439	0.2051	0.2000	0.4018	5.6079***
CEOtenure	7.7558	3.8941	8.0487	3.9535	6.4545	3.3142	-3.8786***
CEOgender	0.7885	0.4088	1	0	0	0	

Notes to the table:
(1) The definitions of variables are presented in the Appendix.
(2)*FirmAge* and *CEOage* are not logarithms.
(3)T-test refers to the test of the difference in the mean between women CEO and men CEO subsamples.
(4)The number of observations concerning the estimation using *GIICITY* differs.
(5)***Significance at the 1 % level. **Significance at the 5 % level.*Significance at the 10 % level.
(6)Data Sources: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

Table 2
Correlation matrix.

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)	*I*	1.000																
(2)	$I - I_{peer}$	0.964 * **	1.000															
(3)	*GII*	0.104 * *	0.032	1.000														
(4)	*GIIFINE*	0.030	-0.029	0.682 * **	1.000													
(5)	*Sales*	0.082 *	0.100 * *	0.043	-0.008	1.000												
(6)	*Size*	0.001	0.102 * *	-0.184 * **	-0.191 * **	0.051	1.000											
(7)	*FirmAge*	-0.156 * **	-0.129 * **	-0.251 * **	-0.204 * **	-0.037	0.291 * **	1.000										
(8)	*Leverage*	-0.067	-0.051	-0.077 *	-0.110 * *	-0.002	0.210 * **	0.287 * **	1.000									
(9)	*NewEquity*	0.039	0.073 *	-0.090 * *	-0.096 * *	0.168 * **	0.204 * **	0.108 * *	-0.048	1.000								
(10)	*Cash*	0.224 * **	0.221 * **	0.011	-0.038	0.264 * **	-0.007	-0.334 * **	-0.366 * **	0.027	1.000							
(11)	*State*	-0.064	-0.099 * *	0.014	-0.005	0.102 * *	-0.141 * **	0.132 * **	0.137 * **	-0.039	-0.139 * **	1.000						
(12)	*PE*	-0.040	-0.041	0.056	0.140 * **	-0.127 * **	-0.188 * **	0.118 * **	-0.009	-0.042	-0.108 * *	0.013	1.000					
(13)	*Duality*	-0.022	-0.015	0.107 * *	0.126 * **	0.039	-0.170 * **	-0.182 * **	-0.085 * *	-0.003	0.042	-0.072	0.092 * *	1.000				
(14)	*CEOage*	-0.021	0.027	0.257 * **	-0.035	0.030	0.306 * **	0.048	0.007	0.043	-0.007	-0.158 * **	-0.121 * **	0.149 * **	1.000			
(15)	*CEOedu*	-0.084 *	-0.050	-0.236 * **	-0.046	-0.043	0.011	0.152 * **	-0.049	0.050	0.061	-0.039	0.004	-0.018	0.004	1.000		
(16)	*CEOoverseas*	-0.099 * *	-0.075 *	-0.028	0.283 * **	-0.047	-0.123 * **	0.080 *	-0.041	-0.057	-0.022	-0.093 * *	0.061	0.103 * *	-0.259 * **	0.211 * **	1.000	
(17)	*CEOgender*	-0.0990	0.004	0.095 * *	0.063	-0.029	0.008	-0.055	-0.059	-0.015	0.086 *	0.165 * **	0.007	0.143 * **	0.085 *	-0.265 * **	-0.239 * **	1.000

The definitions of variables are presented in the Appendix. ***Significance at the 1 % level. **Significance at the 5 % level. *Significance at the 10 % level.

compared to value firms. (h) CEO Duality ($Duality_{i,t-1}$), which is a dummy variable taking the value of one if the CEO and the chairman of the board are the same person for firm i in year (t-1), and zero otherwise. (i) CEO age ($CEOage_{i,t-1}$), which is the natural logarithm of the CEO's age in year (t-1). (j) CEO overseas experience ($CEOoverseas_i$), which is a dummy variable taking the value of one if the CEO has overseas work/academic experience before year t, and zero otherwise. (k) CEO education ($CEOedu_i$), which is a categorical variable. It takes the value of one if the CEO graduated from a secondary school, two if the CEO graduated from a college, three for a bachelor's degree, four for a master's degree, and five for a PhD degree. (l) CEO gender ($CEOgender_i$). It is a dummy variable which takes the value of one for a men CEO and zero for a women CEO. We add the lagged-one dependent variable in the investment model to consider investment persistence. Industry dummies are also included. We take the lagged-one observations of the Right-Hand-Side

Table 3
CEO early-life experience of gender inequality and firm investment.

	Whole	Men	Women
	(1)	(2)	(3)
GII_i	0.2855 * *	0.3913 * **	-0.6257 *
	(2.4933)	(3.5938)	(−1.8048)
	[0.4906]	[0.6947]	[− 0.9343]
$I_{i,t-1}$	-0.3542 * *	-0.2993 *	0.4554 * *
	(−2.5839)	(−1.6777)	(2.7806)
$Sales_{i,t-1}$	0.0025	-0.0338	0.0713 * *
	(0.0897)	(−1.3204)	(2.3101)
$Size_{i,t-1}$	-0.0120 *	-0.0146 * *	0.0042
	(−1.7297)	(−2.3625)	(0.2864)
$FirmAge_{i,t-1}$	-0.0280 * **	-0.0145	-0.0390 *
	(−2.6917)	(−1.4869)	(−1.9798)
$Leverage_{i,t-1}$	0.0100	0.0089	-0.0073
	(0.8137)	(0.6436)	(−0.5863)
$NewEquity_{i,t-1}$	-0.00002	-0.0114	0.0116
	(−0.0024)	(−1.2654)	(0.3125)
$Cash_{i,t-1}$	-0.0053	-0.0025	-0.1696
	(−0.0427)	(−0.0203)	(−1.2297)
$State_{i,t-1}$	0.1596 * *	0.1198 * *	10.8227
	(2.6213)	(1.8937)	(0.6080)
$PE_{i,t-1}$	-0.0131	-0.0058	-0.0095
	(−0.4947)	(−0.1980)	(−0.2940)
$Duality_{i,t-1}$	-0.0051	0.0146	0.0748
	(−0.3889)	(1.0699)	(0.9110)
$CEOage_{i,t-1}$	0.0767	-0.1279	-0.0282
	(0.6599)	(−1.3037)	(−0.2216)
$CEOedu_i$	0.0421 * **	0.0420 * **	0.0363 * *
	(2.9817)	(3.7054)	(2.3031)
$CEOoverseas_{i,t}$	-0.0625 *	-0.1181 * **	0.0132
	(−1.7201)	(−3.1587)	(0.2596)
$CEOgender_i$	0.0367		
	1.5154		
Obs.	520	410	110
m_1	-2.57	-2.61	-1.97
(p-value)	0.010	0.009	0.049
m_2	-0.66	0.37	0.05
(p-value)	0.512	0.710	0.957
Sargan	115.42	121.29	13.84
(p-value)	0.343	0.350	0.975

Notes to the table:
(1) The one-step system GMM estimators are reported.
(2) Heteroskedasticity consistent asymptotic t-statistics are reported in (); standardised coefficients are reported in []; the standardised coefficient = the original estimated coefficients* (the standard deviation of the corresponding explanatory variable/the standard deviation of the dependent variable).
(3) m1 and m2 are tests for first- and second-order serial correlation in the first-differenced residuals, asymptotically distributed as a standard normal under the null of no serial correlation. If the differenced residuals display significantly negative first-order serial correlation (m1 is significantly negative) and no second order serial correlation (m2 is not significant), then one can conclude that there is no serial correlation on the residuals of the original equation.
(4) Sargan: test of the overidentifying restrictions, asymptotically distributed as chi-square(k) under the null. The insignificant test statistics confirms the validities of the instruments. The set of instruments used varies across the estimated equations. In principle, they are the lagged observations of the right-hand-side variables starting from (t-2). The details of the instruments used in the estimation are available upon request.
(5) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(6) We control for time effects and industry effects by using time dummies and industry dummies as regressors and additional instruments.
(7) The definitions of variables are presented in the Appendix.
(8) Data Source: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

(RHS) variables to explain the current-year dependent variable. f_i and f_t are the firm fixed effect and the time effect, respectively.

3.4. Descriptive statistics

Table 1 summarises variables used in the empirical analysis. Based on the whole sample, the mean of the fixed investment ratio is 3.47 %. The average firm size (logarithm of total assets) is 21.77. The sample firms experienced a positive change in sales, and the average ratio of changes in sales to total assets is 9.89 %. The average number of listing years of the sample firms is 9.19 years. The average leverage ratio is 37.40 %. On average, state-owned shares account for 4.07 % of total shares of the sample firms, which is low. This suggests that our sample firms are mainly private listed nonfinancial firms. Moreover, state ownership in listed firms has declined significantly since the split shares reform in 2005 when non-tradable shares were abolished. The mean value of the average out-of-policy birth rate (*GII*) is 12.44 %, which indicates that for the cities corresponding to our sample CEOs there were on average 12 newborns per every 100 who were out of the one-child policy. The average age of sample CEOs is 41.98 years old. The average education level is above 3, which means that an average sample CEO obtained a bachelor's degree. The average CEO tenure is 7.76 years. Finally, Table 1 shows that only 21.15 % of our sample CEOs are women.

To understand the differences in these variables between women and men CEOs, in Table 1 we carry out a two-sample t-test. The results show that the mean of cash flow, state-ownership, CEO duality, and CEO age for men CEOs are significantly larger than that for women CEOs. However, women CEOs received higher education and they are more likely to have overseas working or academic background than men CEOs. Table 2 presents the correlation matrix. In general, the correlation coefficients between variables are low.

4. Empirical results

We apply the one-step system GMM procedure to estimate investment models. We use forward orthogonal-deviations transform rather than first differences by adding 'orthogonal' to the Stata command, which helps maximise the sample size (Roodman, 2009).

4.1. CEO early-life experiences of gender inequality and firm investment

We first estimate the empirical model (1) for the whole sample and report the results in column (1) of Table 3. Column (1) shows that the estimated coefficient for gender inequality (*GII*) is significant with a positive sign. This result supports Hypothesis 1a. It suggests that sample CEOs' early-life experiences of gender inequality during the one-child policy period make them more risk-taking on average, and they increase firm investment. The standardised coefficient for *GII* is 0.4906, indicating that a one standard deviation increase in gender inequality indicator results in 49.06 % standard deviation increase in fixed investment, holding other variables constant.

Regarding control variables, column (1) of Table 3 shows that the estimated coefficient for both firm size (*Size*) and firm age (*FirmAge*) is significant with a negative sign, suggesting that larger and elder firms invest less in fixed assets than smaller and younger ones. The estimated coefficient for state ownership (*State*) is positively significant, which suggests that state ownership helps the firm invest more. The estimated coefficient for CEO education (*CEOedu*) is also positively significant, implying that CEOs who received higher academic degree invest more in fixed assets. The estimated coefficient for CEO overseas background (*CEOoverseas*) is negatively significant, suggesting that CEOs with overseas experience are likely to invest less.

In columns (2) and (3) of Table 3 we estimate the empirical model (1) for men and women CEO subsamples, respectively. In these estimations we took the variable CEO gender (*CEOgender)* out of the empirical model (1). As we can see from column (2) of Table 3, the estimated coefficient for gender inequality (*GII*) is positively significant, which suggests that greater gender inequality experienced by men CEOs during their formative years is positively associated with firm investment. Hypothesis 2 is confirmed. This result is in line with the evidence that China's very high sex ratio imbalance resulted from the one-child policy created an environment in which boys behave aggressively in order to be more competitive in the marriage market (Wei and Zhang, 2011; Edlund et al., 2013). The one child policy reinforced the Chinese boy-preference tradition. On average boys are favoured in Chinese traditional families and they are provided with more opportunities than girls (Wang et al., 2020), which boosts their confidence.

Column (3) of Table 3 presents the results for women CEOs. It turns out that the estimated coefficient for gender inequality (*GII*) is significant with a negative sign, which supports Hypothesis 3. This result is interesting because it suggests that gender inequality experienced by women CEOs affects their investment decisions differently from men CEOs. Early-life experiences of gender inequality resulting from the one-child policy make women CEOs more conservative and risk-averse in investment. This result is in line with some previous studies. For example, Belaounia et al. (2020) document that women directors are more risk averse in countries where gender inequality is higher. Bucciol and Zarri (2013) document that past traumatic experiences make people more risk-averse. Psychological research also shows that trauma lead to high-stress status, and victims may 'get stuck' in the past (Holman and Silver, 1998). We believe that it is women CEOs who were mostly adversely affected due to greater gender discrimination against girls during China's one-child policy period.

Apart from the key independent variable gender inequality (*GII*), columns (2) and (3) show that the estimated results regarding control variables are consistent with that in column (1) of Table 3 when significant. Moreover, in Table 3 the test statistics for the absence of first-order serial correlation in the first-differenced residuals (m1) are significant with a negative sign; the second-order serial correlation test statistics (m2) are insignificant. They suggest that there is no serial correlation in the error term. The Sargan test confirms the validity of the instruments used.

4.2. CEO early-life experiences of gender inequality and the deviation of the firm's investment from its peers

In Table 3 we test whether CEO early-life experiences of gender inequality during the one-child policy period impact corporate investment of the firms they served. There the dependent variable is their own firms' fixed investment. The whole sample result (column (1) of Table 3) shows that greater gender inequality is associated with more investment, which suggests that an average sample CEO who grew up with the one-child policy is overconfident and risk-taking in making investment decisions. However, subsample results (columns (2) and (3) of Table 3) show that men and women CEOs react to their early-life experiences of gender inequality differently. Although men CEOs are overconfident and risk-taking in investment, early-life experiences of greater gender

Table 4
CEO early-life experience of gender inequality and the deviation of the firm's investment from its peers.

	Whole	Men	Women
	(1)	(2)	(3)
GII_i	0.1936 * *	0.2864 * *	-0.6284 *
	(2.3028)	(2.4312)	(−1.8518)
	[0.3478]	[0.5315]	[− 0.9657]
$(I_{i,t-1} - I_{peer,t-1})$	-0.1561	-0.3644 * *	0.4171 * *
	(−0.9358)	(−2.3210)	(2.7039)
$Sales_{i,t-1}$	0.0210	-0.0167	0.0671 * *
	(0.6671)	(−0.5013)	(2.2329)
$Size_{i,t-1}$	-0.0082	-0.0168 * *	0.0037
	(−1.2420)	(−2.2511)	(0.2563)
$FirmAge_{i,t-1}$	-0.0153 *	-0.0264 * *	-0.0377 *
	(−1.9351)	(−2.1612)	(−1.9119)
$Leverage_{i,t-1}$	-0.0017	0.0120	-0.0060
	(−0.2006)	(0.7241)	(−0.4991)
$NewEquity_{i,t-1}$	0.0144	-0.0076	0.0092
	(0.7422)	(−0.5973)	(0.2562)
$Cash_{i,t-1}$	0.0481	-0.0101	-0.1685
	(0.4656)	(−0.0784)	(−1.2318)
$State_{i,t-1}$	0.0302	0.1191 *	10.3107
	(0.4826)	(1.6745)	(0.5821)
$PE_{i,t-1}$	0.0512 *	0.0003	-0.0083
	(1.7971)	(0.0089)	(−0.2547)
$Duality_{i,t-1}$	-0.0061	0.0016	0.0686
	(−0.4837)	(0.1286)	(0.8409)
$CEOage_{i,t-1}$	0.0091	-0.1042	-0.0221
	(0.1629)	(−1.0558)	(−0.1756)
$CEOedu_i$	0.0271 * **	0.0506 * **	0.0350 * *
	(2.9829)	(3.6879)	(2.3684)
$CEOoverseas_{i,t}$	-0.0327	-0.1335 * **	0.0076
	(−1.6071)	(−3.4124)	(0.1530)
$CEOgender_i$	0.0343		
	(1.4661)		
Obs.	520	410	110
m_1	-3.63	-2.93	-1.98
(p-value)	0.000	0.003	0.048
m_2	-1.06	0.01	0.07
(p-value)	0.291	0.993	0.944
Sargan	218.19	125.24	14.79
(p-value)	0.180	0.263	0.961

Notes to the table:
(1) The one-step system GMM estimators are reported.
(2) Heteroskedasticity consistent asymptotic t-statistics are reported in (); standardised coefficients are reported in []; the standardised coefficient = the original estimated coefficients* (the standard deviation of the corresponding explanatory variable/the standard deviation of the dependent variable).
(3) m1 and m2 are tests for first- and second-order serial correlation in the first-differenced residuals, asymptotically distributed as a standard normal under the null of no serial correlation. If the differenced residuals display significantly negative first-order serial correlation (m1 is significantly negative) and no second order serial correlation (m2 is not significant), then one can conclude that there is no serial correlation on the residuals of the original equation.
(4) Sargan: test of the overidentifying restrictions, asymptotically distributed as chi-square(k) under the null. The insignificant test statistics confirms the validities of the instruments. The set of instruments used varies across the estimated equations. In principle, they are the lagged observations of the right-hand-side variables starting from (t-2). The details of the instruments used in the estimation are available upon request.
(5) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(6) We control for time effects and industry effects by using time dummies and industry dummies as regressors and additional instruments.
(7) The definitions of variables are presented in the Appendix.
(8) Data Source: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

inequality resulting from the one-child policy make women CEOs more conservative in investment. However, based on the results shown in Table 3, we can only judge the impact of gender inequality by looking at the investment decision of CEOs' own firms. The conclusions of overconfident men CEOs and conservative women CEOs are derived without comparing the firm's investment with a benchmark; hence we still do not have direct evidence regarding whether the firm's investment deviates from the benchmark. In this section, we compare the firm's investment with the average investment of its peers.

We are interested in examining how the firm's investment deviates from the investment of its peers in response to CEO early-life experiences of gender inequality. By the firm's peers, we mean other firms in the same industry (Bo et al., 2016). We construct a new dependent variable, i.e., the gap between the firm's investment and the average investment of its peers ($I_{it} - I_{peer,t}$). More specifically, we go back to the *CSMAR* database and identify Chinese listed nonfinancial firms that are operating in the same industry as the firm (firm i) in year t. We then calculate the average fixed investment of these firms in year t (firm i excluded) ($I_{peer,t}$). Next, we subtract the average investment of the firm's peers from the firm's investment in the same year ($I_{it} - I_{peer,t}$). We replace the dependent variable in model (1) by the new dependent variable ($I_{it} - I_{peer,t}$):

$$\begin{aligned}\left(I_{it} - I_{peer,t}\right) = {} & f_i + f_t + \beta_1 GII_i + \beta_2 (I_{i,t-1} - I_{peer,t-1}) + \beta_3 Sales_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 NewEquity_{i,t-1} \\ & + \beta_8 Cash_{i,t-1} + \beta_9 State_{i,t-1} + \beta_{10} PE_{i,t-1} + \beta_{11} Duality_{i,t-1} + + \beta_{12} CEOage_{i,t-1} + \beta_{13} CEOedu_i \\ & + \beta_{14} CEOoverseas_i + \beta_{15} CEOgender_i + \varepsilon_{it}\end{aligned} \tag{2}$$

We estimate model (2) for the whole sample, the men and women CEOs subsamples, respectively. The results are reported in Table 4.

Column (1) of Table 4 shows that the estimated coefficient for gender inequality (*GII*) is significant with a positive sign. This result does not only confirm the result in column (1) of Table 3, but also lends further support to the notion that sample CEOs who experienced greater gender inequality during the one-child policy period are on average more risk-taking, and they invest more than their peers. Column (2) of Table 4 shows that the estimated coefficient for gender inequality (*GII*) is positively significant for men CEOs, which confirms that men CEOs who experienced gender imbalance resulting from the one-child policy are overconfident and risk-taking in making investment decisions, and they invest more than their peers. In contrast, column (3) of Table 4 shows the opposite result for women CEOs. The estimated coefficient for gender inequality (*GII*) is negatively significant. This result suggests that sample women CEOs who experienced more server gender inequality in their formative years during the one-child policy period are more conservative and risk-averse, and they invest less than their peers. Table 4 shows that the estimated results regarding control variables, such as *Firm age*, *State ownership*, *CEOedu,* and *CEOoverseas* are consistent with that in Table 3 when they are statistically significant. Apart from these results, column (1) of Table 4 also shows that the estimated coefficient for the PE ratio is also positively significant, which suggests that growth firms are likely to experience higher investment than their peers.

5. Robustness tests

5.1. An alternative gender inequality indicator considering monetary penalties for violating the one-child policy

In both Tables 3 and 4 we use a simple gender inequality indicator (*GII*) as a proxy for CEO early-life experiences of gender inequality resulting from the one-child policy. *GII* is the average out-of-policy birth rate of the city over the years corresponding CEOs formative years during the one-child policy period. This indicator is simply the realised out-of-policy birth rate and it is derived based on the officially registered birth rate in the city's statistical yearbooks. The realised out-of-policy birth rate captures both the family's preference for having more children if the firstborn is a girl and the implementation enforcement of the one-child policy imposed by local governments. A potential caveat of using *GII* is that it may not reveal the family's true preference for giving out-of-policy birth. The existing literature on China's one-child policy agrees that local implementation of the one-child policy is often measured by monetary penalties for violating the one-child policy *(FINE)* (Wei and Zhang, 2011; Edlund et al., 2013). The policy instrument *FINE* was issued by local governments considering the region's income level. *FINE* was defined as a proportion of households' annual income in the region. Hence, *FINE* varies from region to region. High monetary penalties *(FINE)* reduce the unauthorised birth rate, and the region with higher *FINE* would have a lower realised out-of-policy birth rate. Hence, we have: the realised out-of-policy birth rate = family preference for more children */FINE*. This means that the average out-of-policy birth rate (*GII*) at the city level contains the information of both the family's preference for having out-of-policy children and the local government's implementation of the one-child policy. Therefore, *GII* does not fully reflect the family's preference for having out-of-policy children. We believe that gender inequality in the social/community environment in which CEOs experienced in their formative years can be more closely captured by Chinese families' preferences for having out-of-policy children before considering monetary penalties *(FINE)*.

In this section, we construct an alternative gender inequality indicator which reveals more of the family's preference. Specifically, we multiply the original city-level out-of-policy birth rate by the penalty ratio (*FINE)*. Scharping (2003) first collects Chinese provincial level *FINE* data. Ebenstein (2011) expands the data using an algorithm and constructs *FINE* data covering the period from 1979 to 2000. We use the provincial-level *FINE* data constructed by Ebenstein (2011). Because Ebenstein (2011) *FINE* data is only available up to 2000, we use *FINE* data in the year 2000 for the only two cases in our sample which are beyond the year 2000. This is justified by that *FINE* imposed by the local government does not change frequently in the region (Ebenstein, 2011). More specifically, we first calculate the city's out-of-policy birth rate for each year corresponding to sample CEOs' formative years during the one-child policy period. We then multiply the city's out-of-policy birth rate in that year by the corresponding provincial *FINE* ratio in the same year. Finally, we take the average of the product (out-of-policy birth rate x *FINE*) over the years corresponding to CEOs' formative years

during the one-child policy period. This way we obtain an alternative gender inequality indicator, which is denoted as *GIIFINE*.

Table 5 reports the results corresponding to the estimated equations in Table 3 by using the alternative gender inequality indicator (*GIIFINE*). Table 6 reports the results corresponding to the estimations in Table 4. Both Table 5 and Table 6 show that the estimated coefficient for the alternative gender inequality indicator (*GIIFINE*) is significant with a positive sign for the whole sample (column (1)) and for men CEOs (column (2)), but it is negatively significant for women CEOs (column (3)). This result is closely consistent with the results we obtained in both Table 3 and Table 4 when the first gender inequality indicator (*GII*) is used. The estimated results concerning other control variables are also consistent with that reported in Table 3 and Table 4.

Table 5
An alternative gender inequality indicator (*GIIFINE*)): CEO early-life experience of gender inequality and firm investment.

	Whole	Men	Women
	(1)	(2)	(3)
$GIIFINE_i$	0.2850 * *	0.5397 * **	-0.9708 *
	(2.4521)	(3.0093)	(−1.8375)
	[0.3499]	[0.6379]	[− 1.5068]
$I_{i,t-1}$	-0.2680 *	-0.2719 *	0.4245 * **
	(−1.9121)	(−1.7168)	(2.9297)
$Sales_{i,t-1}$	-0.0020	-0.0332	0.0678 * *
	(−0.0875)	(−1.2728)	(2.0837)
$Size_{i,t-1}$	-0.0088	-0.0150 * *	0.0097
	(−1.4372)	(−2.3600)	(0.6511)
$FirmAge_{i,t-1}$	-0.0227 * *	-0.0170 *	-0.0365 * *
	(−2.5728)	(−1.9273)	(−1.8874)
$Leverage_{i,t-1}$	0.0033	0.0059	-0.0044
	(0.3540)	(0.4447)	(−0.2934)
$NewEquity_{i,t-1}$	-0.0083	-0.0118	0.0174
	(−0.8659)	(−1.3110)	(0.5111)
$Cash_{i,t-1}$	-0.0054	-0.0347	-0.1292
	(−0.0589)	(−0.3138)	(−0.8689)
$State_{i,t-1}$	0.1278 * *	0.0640	11.5813
	(2.2211)	(1.1853)	(0.6076)
$PE_{i,t-1}$	-0.0060	-0.0066	-0.0122
	(−0.2798)	(−0.2645)	(−0.4156)
$Duality_{i,t-1}$	0.0003	0.0241 *	0.0840
	(0.0301)	(1.6956)	(1.0203)
$CEOage_{i,t-1}$	0.1413 *	0.0488	-0.3808 *
	(1.8216)	(0.5093)	(−1.7898)
$CEOedu_i$	0.0267 * **	0.0221 * *	0.0083
	(2.7865)	(2.5344)	(0.4235)
$CEOoverseas_{i,t}$	-0.0600 *	-0.1339 * **	-0.0039
	(−1.9765)	(−3.2053)	(−0.0645)
$CEOgender_i$	0.0111		
	(0.5456)		
Obs.	520	410	110
m_1	-3.01	-2.51	-1.98
(p-value)	0.003	0.012	0.048
m_2	0.28	0.37	0.01
(p-value)	0.780	0.709	0.993
Sargan	132.56	128.81	11.68
(p-value)	0.373	0.196	0.993

Notes to the table:
(1) The one-step system GMM estimators are reported.
(2) Heteroskedasticity consistent asymptotic t-statistics are reported in (); standardised coefficients are reported in []; the standardised coefficient = the original estimated coefficients* (the standard deviation of the corresponding explanatory variable/the standard deviation of the dependent variable).
(3) m1 and m2 are tests for first- and second-order serial correlation in the first-differenced residuals, asymptotically distributed as a standard normal under the null of no serial correlation. If the differenced residuals display significantly negative first-order serial correlation (m1 is significantly negative) and no second order serial correlation (m2 is not significant), then one can conclude that there is no serial correlation on the residuals of the original equation.
(4) Sargan: test of the overidentifying restrictions, asymptotically distributed as chi-square(k) under the null. The insignificant test statistics confirms the validities of the instruments. The set of instruments used varies across the estimated equations. In principle, they are the lagged observations of the right-hand-side variables starting from (t-2). The details of the instruments used in the estimation are available upon request.
(5) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(6) We control for time effects and industry effects by using time dummies and industry dummies as regressors and additional instruments.
(7) The definitions of variables are presented in the Appendix.
(8) Data Source: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

Table 6
An alternative gender inequality indicator (*GIIFINE*): CEO early-life experience of gender inequality and the deviation of the firm's investment from its peers.

	Whole	Men	Women
	(1)	(2)	(3)
$GIIFINE_i$	0.2467 *	0.3028 * *	-0.9695 *
	(1.8947)	(2.3405)	(−1.8516)
	[0.3165]	[0.3741]	[− 1.5488]
$(I_{i,t-1} - I_{peer,t-1})$	-0.2367 *	-0.3041 * *	0.3918 * **
	(−1.9489)	(−2.2844)	(3.0676)
$Sales_{i,t-1}$	0.0021	-0.0161	0.0638 *
	(0.0920)	(−0.5578)	(1.9938)
$Size_{i,t-1}$	-0.0127 * *	-0.0106 * *	0.0092
	(−2.0178)	(−2.1748)	(0.6552)
$FirmAge_{i,t-1}$	-0.0202 * *	-0.0273 * **	-0.0351 *
	(−2.1753)	(−2.8256)	(−1.8129)
$Leverage_{i,t-1}$	-0.0013	-0.0023	-0.0031
	(−0.1270)	(−0.1750)	(−0.2073)
$NewEquity_{i,t-1}$	-0.0047	-0.0129	0.0151
	(−0.5294)	(−1.4139)	(0.4559)
$Cash_{i,t-1}$	-0.0301	-0.0749	-0.1282
	(−0.3103)	(−0.7343)	(−0.8458)
$State_{i,t-1}$	0.1413 * **	0.1093 *	11.0452
	(2.8323)	(1.7744)	(0.5823)
$PE_{i,t-1}$	0.0059	0.0113	-0.0111
	(0.2795)	(0.3943)	(−0.3746)
$Duality_{i,t-1}$	0.0068	0.00956	0.0782
	(0.6119)	(0.7603)	(0.9496)
$CEOage_{i,t-1}$	0.1428 *	0.0194	-0.3754 *
	(1.9706)	(0.2580)	(−1.8023)
$CEOedu_i$	0.0202 * *	0.0316 * **	0.0070
	(2.0666)	(3.7139)	(0.3672)
$CEOoverseas_{i,t}$	-0.0634 * *	-0.0970 * **	-0.0093
	(−2.0225)	(−2.9469)	(−0.1557)
$CEOgender_i$	-0.0048		
	(−0.1850)		
Obs.	520	410	110
m_1	-2.48	-2.76	-2.01
(p-value)	0.013	0.006	0.045
m_2	0.05	0.15	0.03
(p-value)	0.962	0.881	0.974
Sargan	130.60	161.39	12.64
(p-value)	0.469	0.104	0.987

Notes to the table:
(1) The one-step system GMM estimators are reported.
(2) Heteroskedasticity consistent asymptotic t-statistics are reported in (); standardised coefficients are reported in []; the standardised coefficient = the original estimated coefficients* (the standard deviation of the corresponding explanatory variable/the standard deviation of the dependent variable).
(3) m1 and m2 are tests for first- and second-order serial correlation in the first-differenced residuals, asymptotically distributed as a standard normal under the null of no serial correlation. If the differenced residuals display significantly negative first-order serial correlation (m1 is significantly negative) and no second order serial correlation (m2 is not significant), then one can conclude that there is no serial correlation on the residuals of the original equation.
(4) Sargan: test of the overidentifying restrictions, asymptotically distributed as chi-square(k) under the null. The insignificant test statistics confirms the validities of the instruments. The set of instruments used varies across the estimated equations. In principle, they are the lagged observations of the right-hand-side variables starting from (t-2). The details of the instruments used in the estimation are available upon request.
(5) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(6) We control for time effects and industry effects by using time dummies and industry dummies as regressors and additional instruments.
(7) The definitions of variables are presented in the Appendix.
(8) Data Source: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

5.2. An alternative gender inequality indicator considering other city-level factors

Another potential criticism of our two gender inequality indicators (*GII* and *GIIFINE)* concerns that they may not accurately reflect gender inequality of the city in which sample CEOs lived in their formative years during the one-child policy period. This is because both *GII* and *GIIFINE* contain the impact of other city-level factors on the city's out-of-policy birth rate, such as the city's economic performance and its rural population. In this section, we carry out another robustness test in which we use a more restrictive measure of gender inequality which further excludes city characteristics that potentially affect the city's out-of-policy birth rate.

More specifically, we perform a regression analysis for each city in the sample based on the following model:

$$OutofPolicy\quad Birth\quad Rate_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 Rural_t + \alpha_3 FINE_t + \varepsilon_t \tag{3}$$

Where $OutofPolicy\ Birth\ rate_t$ refers to the birth rate outside of the one-child policy in year t for the city, which is defined as one minus the registered within policy birth rate in year t. GDP_t refers to GDP per capita in year t for the city. We use the natural logarithm of GDP per capita (*GDP*) in the estimation. $Rural_t$ stands for the ratio of rural area to the total area of the city in year t. If a city contains a large proportion of rural area, then it is likely that the impact of the traditional Chinese boy-preference culture is more important, hence gender inequality resulting for the one-child policy is more severe in rural areas. We also control the local implementation of the one-

Table 7
An alternative gender inequality indicator (*GIICITY*): CEO early-life experience of gender inequality and firm investment.

	Whole	Men
	(1)	(2)
$GIICITY_i$	34.0737 *	40.0218 * *
	(1.7303)	(2.4174)
	[3.9483]	[1.0629]
$I_{i,t-1}$	-0.3000 *	-0.4581 * *
	(−1.8289)	(−2.5613)
$Sales_{i,t-1}$	-0.1257	-0.0466
	(−1.4694)	(−1.2950)
$Size_{i,t-1}$	-0.0099	0.0045
	(−0.3666)	(0.1920)
$FirmAge_{i,t-1}$	-0.0607	-0.0514
	(−0.7493)	(−0.7399)
$Leverage_{i,t-1}$	-0.0682 *	-0.0415
	(−2.0161)	(−1.7067)
$NewEquity_{i,t-1}$	-0.0351	-0.0283
	(−1.5882)	(−1.6709)
$Cash_{i,t-1}$	0.1627	0.2022 *
	(1.4361)	(1.9938)
$State_{i,t-1}$	0.0281	-0.1485 * **
	(0.1054)	(−2.9760)
$PE_{i,t-1}$	0.0067	0.0507 *
	(0.3565)	(1.9756)
$Duality_{i,t-1}$	0.1562 * *	0.0945
	(2.3466)	(1.3472)
$CEOage_{i,t-1}$	0.6509	0.1035
	(0.5484)	(0.1473)
$CEOedu_i$	-0.1459	-0.0641
	(−0.5958)	(−0.3411)
$CEOoverseas_{i,t}$	-0.5350	
	(−0.5962)	
$CEOgender_i$	-0.0597	
	(−0.1420)	
Obs.	201	144
m_1	-1.78	-2.24
(p-value)	0.074	0.025
m_2	0.45	-1.21
(p-value)	0.656	0.225
Sargan	16.40	47.31
(p-value)	0.903	0.143

Notes to the table:
(1) The one-step system GMM estimators are reported.
(2) Heteroskedasticity consistent asymptotic t-statistics are reported in (); standardised coefficients are reported in []; the standardised coefficient = the original estimated coefficients* (the standard deviation of the corresponding explanatory variable/the standard deviation of the dependent variable).
(3) m1 and m2 are tests for first- and second-order serial correlation in the first-differenced residuals, asymptotically distributed as a standard normal under the null of no serial correlation. If the differenced residuals display significantly negative first-order serial correlation (m1 is significantly negative) and no second order serial correlation (m2 is not significant), then one can conclude that there is no serial correlation on the residuals of the original equation.
(4) Sargan: test of the overidentifying restrictions, asymptotically distributed as chi-square(k) under the null. The insignificant test statistics confirms the validities of the instruments. The set of instruments used varies across the estimated equations. In principle, they are the lagged observations of the right-hand-side variables starting from (t-2). The details of the instruments used in the estimation are available upon request.
(5) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(6) We control for time effects and industry effects by using time dummies and industry dummies as regressors and additional instruments.
(7) The definitions of variables are presented in the Appendix.
(8) Data Source: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

child policy by including monetary penalties for violating the one-child policy (*FINE*) in the regression. As in Section 5.1, we use the provincial-level *FINE* data constructed by Ebenstein (2011). Other city-level data are collected from *China City Statistic Yearbooks*.

The empirical model (3) is estimated for each city which we can match a CEO who lived in that city for at least 5 years in their formative years during the one-child policy period. In this test, we were forced to further cut down the CEO sample to just include CEOs who lived in the city for at least 5 years in their formative years. This is because we need the minimum 5-year observations for the city-level variables in estimating model (3). In total we use 34 CEOs between 2003 and 2019, among which there are 22 men CEOs and 12 women CEOs. We use Ordinary Least Square (OLS) to estimate model (3) for each city included in this robustness test. We then use the

Table 8
An alternative gender inequality indicator (*GIICITY*): CEO early-life experience of gender inequality and the deviation of the firm's investment from its peers.

	Whole	Men
	(1)	(2)
$GIICITY_i$	33.6597 *	44.6119 * *
	(1.6975)	(2.7095)
	[3.9846]	[1.2159]
$(I_{i,t-1} - I_{peer,t-1})$	-0.2978 * *	-0.4689 * *
	(−2.0691)	(−2.5949)
$Sales_{i,t-1}$	-0.1346	-0.0470
	(−1.5937)	(−1.2592)
$Size_{i,t-1}$	-0.0122	0.0001
	(−0.4636)	(0.0062)
$FirmAge_{i,t-1}$	-0.0529	-0.0436
	(−0.6722)	(−0.6065)
$Leverage_{i,t-1}$	-0.0747 * *	-0.0473 *
	(−2.3601)	(−2.0229)
$NewEquity_{i,t-1}$	-0.0427	-0.0257
	(−1.5811)	(−1.6436)
$Cash_{i,t-1}$	0.1790	0.2150 * *
	(1.6487)	(2.1772)
$State_{i,t-1}$	0.0316	-0.1399 * *
	(0.1322)	(−2.7392)
$PE_{i,t-1}$	0.0072	0.0542 * *
	(0.4090)	(2.1168)
$Duality_{i,t-1}$	0.1586 * *	0.0941
	(2.2685)	(1.3137)
$CEOage_{i,t-1}$	0.7223	-0.0138
	(0.6208)	(−0.0198)
$CEOedu_i$	-0.1066	-0.0535
	(−0.4462)	(−0.2707)
$CEOoverseas_{i,t}$	-0.6463	
	(−0.6400)	
$CEOgender_i$	-0.0967	
	(−0.2323)	
Obs.	201	144
m_1	-1.86	-2.34
(p-value)	0.063	0.019
m_2	0.63	-1.17
(p-value)	0.526	0.242
Sargan	15.66	44.90
(p-value)	0.900	0.205

Notes to the table:
(1) The one-step system GMM estimators are reported.
(2) Heteroskedasticity consistent asymptotic t-statistics are reported in (); standardised coefficients are reported in []; the standardised coefficient = the original estimated coefficients* (the standard deviation of the corresponding explanatory variable/the standard deviation of the dependent variable).
(3) m1 and m2 are tests for first- and second-order serial correlation in the first-differenced residuals, asymptotically distributed as a standard normal under the null of no serial correlation. If the differenced residuals display significantly negative first-order serial correlation (m1 is significantly negative) and no second order serial correlation (m2 is not significant), then one can conclude that there is no serial correlation on the residuals of the original equation.
(4) Sargan: test of the overidentifying restrictions, asymptotically distributed as chi-square(k) under the null. The insignificant test statistics confirms the validities of the instruments. The set of instruments used varies across the estimated equations. In principle, they are the lagged observations of the right-hand-side variables starting from (t-2). The details of the instruments used in the estimation are available upon request.
(5) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(6) We control for time effects and industry effects by using time dummies and industry dummies as regressors and additional instruments.
(7) The definitions of variables are presented in the Appendix.
(8) Data Source: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

Sum of Squared Residuals of the regression (model (3)) as the new alternative gender inequality indictor for the city. We denote this new gender inequality indicator as *GIICITY*. The improvement of this new gender inequality indicator is that the potential impacts of the city's GDP, its rural area, and the local implementation of the one-child-policy have been excluded from the remaining unexplained out-of-policy birth rate, and this unexplained element should capture gender inequality related to the one-child policy.

After obtaining *GIICITY* for CEOs in this sample, we match the firm level information of the firms that are corresponding to this set of CEOs. We then estimate the empirical models (1) and (2), respectively. We use 34 firms (corresponding to 34 CEOs) over 2003–2019, which provides us a total of 201 observations, including 144 observations for the men CEO sample and 57 for the women CEO sample. When estimating the models for men CEOs, the variable CEO overseas background (*CEOoverseas)* is dropped from the estimation because it is the same for all men CEOs in this sample. Due to the small number of observations for the women CEOs subsample, we were not able to obtain the GMM results for women CEOs in this test. The results for the whole sample and the men CEOs subsample are reported in Table 7 and Table 8, respectively, for the empirical models (1) and (2). Although being restricted by a smaller sample CEOs/firms in this robustness test, we managed to provide additional evidence using a more accurate measure of gender inequality. As we can see from Tables 8 and 9 that these results clearly confirm the conclusions we derived based on the results reported in Tables 4–7.

5.3. Difference-in-difference (DID) analysis of CEO turnover

In Sections 5.1 and 5.2, our robustness tests focus on constructing alternative gender inequality indicators. In Sections 5.3 and 5.4, we further check the robustness by applying different estimation procedures which can reduce the endogenous problem. We start with a Difference-In-Difference (DID) estimation in this section, and in Section 5.4 we undertake a Propensity Score Matching (PSM) analysis. In the DID estimation, we compare the sample firms that have changed their CEOs from the one whose formative years (5–15 years old) do not overlap with the one-child policy period (non-one-child policy CEO hereafter) to a CEO whose formative years overlap with the one-child policy period (one-child policy CEO hereafter). To achieve this, we examine CEO turnovers before the sample one-child policy CEOs for each firm used in the main test (Section 4). More specifically, we first identify the year when a CEO turnover takes place in the firm before the current one-child policy CEO. If the firm experienced a CEO turnover, we then examine the information on the previous CEO and identify whether this CEO is a non-one-child policy CEO based on the CEO's age. If the CEO before the turnover is a non-one-child policy CEO, we then extend the sample years for this firm based on this CEO's tenure and match the CEO information with the firm level information. If the CEO before the turnover is also a one-child policy CEO,[3] we then trace back further to the next past CEO turnover to identify the year when the firm changed from a non-one-child policy CEO to a one-child policy CEO. In this case, we add the information on the above-mentioned two CEOs to the data and match it with the firm level information. In general, the number of sample years added to the data is determined jointly by the CEO's tenure with the firm and the availability of the firm level information in the *CSMAR* dataset. We identified 70 firms (80 % of the sample firms used in Section 4) that experienced the CEO turnover from a non-one-child policy CEO to a one-child-policy CEO, and there are 17 firms that have only one-child policy CEOs during the sample period. These firms are listed only recently, and their current CEOs are the one-child policy CEOs. In sum, this data extension process allows us to add additional 234 firm-year observations to the sample used in Section 4. In total we have 774 firm-year observations for 87 sample firms in the DID analysis.

The treatment dummy (Treat) is defined as one if the firm experienced a CEO turnover from a non-one-child-policy CEO to a one-child policy CEO, and it is zero for the firms that did not experience such CEO turnovers. For the treatment firms, the post dummy (Post) is defined as one for the years after the CEO turnover, and it is zero for the years before the CEO turnover. For the firms that did not experience such CEO turnovers, the post dummy is zero (Beck et al., 2010). Hence, we have a time-varying post dummy. Following the literature on DID with a time-varying post dummy (Goodman-Bacon, 2021; Beck et al., 2010), the interactive term between the treatment dummy and the post dummy is most relevant, hence we use the interactive term 'Treat*Post' in estimating the following model which is similar to our empirical model (1). The results are reported in Table 9.

$$I_{it} = f_i + f_t + \beta_1 Treat * Post_{i,t-1} + \beta_2 I_{i,t-1} + \beta_3 Sales_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 FirmAge_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 NewEquity_{i,t-1} + \beta_8 Cash_{i,t-1} + \beta_9 State_{i,t-1} + \beta_{10} PE_{i,t-1} + \beta_{11} Duality_{i,t-1} + \beta_{12} CEOage_{i,t-1} + \beta_{13} CEOedu_i + \beta_{14} CEOoverseas_i + \beta_{15} CEOgender_i + \varepsilon_{i,t} \quad (4)$$

Table 9 shows that the estimated coefficient for the interactive term 'Treat*Post' is positively significant for both the whole sample (column (1)) and the men CEO subsample (column (2)). These results suggest that firm investment increases after the CEO turnover from a non-one-child policy CEO to a one-child policy CEO. This result confirms our main result in Section 4 on the impact of gender inequality on firm investment. It supports our argument that sample CEOs' early-life experiences of gender inequality during the one-child policy period make them more risk-taking on average, and they increase firm investment. Moreover, the DID result also confirms that men CEOs who experienced gender imbalance resulting from the one-child policy are overconfident and risk-taking in making investment decisions. Column (3) of Table 9 shows that the estimated coefficient for the interactive term 'Treat*Post' is not significant for the women CEO subsample. This result needs to be interpreted with caution because the Stata DID output failed to generate the

[3] We were not able to use this CEO in our main test in Section 4 because the city level information for constructing the gender inequality index (GII) is missing. In the DID test, we can make use of this one-child policy CEO even if there is no corresponding city level data because we now use a dummy variable rather than the GII index.

Table 9
Difference-in-difference analysis of CEO turnover.

	Whole	Men	Women
	(1)	(2)	(3)
Treat ∗ *Post*	0.0143 * *	0.0160 *	-0.0003
	(2.0107)	(1.7828)	(−0.0374)
$I_{i,t-1}$	0.1087 *	0.1011 *	0.2095 * *
	(1.8198)	(1.6560)	(2.3445)
$Sales_{i,t-1}$	0.0279	0.0384	-0.0009
	(0.9684)	(1.0240)	(−0.0290)
$Size_{i,t-1}$	0.0025	0.0032	-0.0021
	(0.6156)	(0.6612)	(−0.7534)
$FirmAge_{i,t-1}$	-0.0159 * **	-0.0161 * **	-0.0188 * *
	(−0.0159)	(−4.1232)	(−2.2808)
$Leverage_{i,t-1}$	0.0062	0.0031	0.0028
	(0.7604)	(0.3008)	(0.3434)
$NewEquity_{i,t-1}$	-0.0045	-0.0059	-0.0023
	(−0.8104)	(−0.8244)	(−0.3679)
$Cash_{i,t-1}$	0.1125 * *	0.1147 *	-0.0403
	(2.0179)	(1.9332)	(−0.4206)
$State_{i,t-1}$	-0.0614 * *	-0.0597 * *	-0.0766 *
	(−2.2383)	(−2.0307)	(−1.7356)
$PE_{i,t-1}$	0.0058	0.0090	-0.0044
	(0.2405)	(0.2976)	(−0.1484)
$Duality_{i,t-1}$	0.0023	0.0066	-0.0278 * *
	(0.3270)	(0.8166)	(−2.1769)
$CEOage_{i,t-1}$	0.0233	0.0325	-0.0282
	(1.0376)	(1.2643)	(−0.5603)
$CEOedu_i$	-0.0033	-0.0038	0.0003
	(−0.6322)	(−0.5935)	(0.0226)
$CEOoverseas_{i,t}$	-0.0028	-0.0037	-0.0119
	(−0.2009)	(−0.2864)	(−1.0624)
$CEOgender_i$	-0.0040		
	(−0.5478)		
Obs.	754	634	120
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
R-squared	0.0921	0.0936	0.3977
F	3.62	3.13	na
(p-value)	(0.0000)	(0.0001)	na

Notes to the table:
(1) t-statistics are reported in brackets.
(2) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(3) Both time effects and industry effects are controlled by including time dummies and industry dummies.
(4) The definitions of variables are presented in the Appendix.
(5) Data Source: China Stock Market Accounting Research (CSMAR).

model performance indicator for this estimation, which is likely due to the small number of women CEO subsample firms.

5.4. Propensity score matching (PSM)

The empirical results in Section 4 show that the firms with one-child policy CEOs invest more. Although higher investment of these firms can be explained by the one-child policy CEO's early life experience of gender inequality, it might also be related to firm characteristics that normally affect investment decisions, such as firm size, sales, leverage, etc. In this section, we undertake another robustness test by applying the Propensity Score Matching (PSM) procedure which can further reduce the endogenous problem. In the PSM test, sample firms used in the main test (Section 4) are the treatment firms. We construct a control group which contains comparison firms that can be matched with the treatment firms. These comparison firms do not have one-child policy CEOs during the 2002–2020 period. We use the period 2002–2020 to cover the sample period 2003–2019 for the treatment firms. We obtain 1798 firms in the control group (total 10672 observations). We then collect the firm level information for these comparison firms. Next, we match treatment firms with comparison firms by using the logit model one-to-one PSM in Stata based on the following firm level characteristics: *Size, Sales, Leverage, PE ratio, State ownership,* and *Industry*. In addition to the whole sample, we also match firms with men CEOs in the treatment group with firms with men CEOs in the control group. Similarly, we match firms with women CEOs in the treatment group with firms with women CEOs in the control group.

We check the quality of the matching following the literature. Wonde et al. (2022) propose that the absolute standardised difference in the covariate for each variable between the treatment group and the control group can be used to evaluate the matching quality. Larger values of absolute standardised difference indicate greater imbalance in covariate values, and the absolute value of

Table 10
Propensity score matching - matching quality test.

		WholeSample					MenSample					WomenSample				
	Match	Mean Value Treatment	Control	%Bias	%Reduction Bias	t-Value	Mean Value Treatment	Control	%Bias	%Reduction Bias	t-Value	Mean Value Treatment	Control	%Bias	%Reduction Bias	t-Value
Size	Before	21.769	21.855	-6.8	54.8	-1.46	21.773	21.863	-7.1	21.9	-1.34	21.75	21.723	2.1	-850.3	0.21
	After	21.738	21.698	3.1		0.47	21.739	21.669	5.5		0.79	21.503	21.761	-20.4		-1.47
Sales	Before	0.099	0.064	5.3	58.9	0.87	0.096	0.063	4.8	65.0	0.70	0.110	0.066	22.2	78.5	2.48 * *
	After	0.097	0.111	-2.2		-0.72	0.093	0.104	-1.7		-0.64	0.100	0.109	-4.8		-0.29
Leverage	Before	0.374	0.177	50.0	97.9	20.07 * **	0.358	0.178	47.0	94.8	16.90 * **	0.433	0.159	62.8	96.0	8.77 * **
	After	0.321	0.317	1.1		0.14	0.297	0.288	2.4		0.32	0.168	0.180	-2.5		-0.28
PE	Before	0.094	0.080	5.0	-15.6	0.89	0.095	0.080	5.4	2.7	0.85	0.092	0.083	2.5	-155.3	0.20
	After	0.094	0.110	-5.7		-0.42	0.093	0.108	-5.2		-0.28	0.103	0.081	6.4		0.61
State	Before	0.041	0.144	-55.9	98.3	-10.23 * **	0.051	0.148	-50.4	97.6	-8.38 * **	0.000	0.083	-65.1	99.3	-4.82 * **
	After	0.041	0.043	-1.0		-0.23	0.051	0.049	1.2		0.24	0.001	0.001	-0.5		-0.73
Industry	Before	0.081	0.070	4.3	9.3	0.98	0.054	0.070	-6.7	100.0	-1.26	0.182	0.066	35.6	57.4	4.06 * **
	After	0.073	0.084	-3.9		-0.59	0.051	0.051	0.0		0.00	0.037	0.086	-15.2		-1.30

Notes to the table:
(1)Bias refers to the standardised difference in the covariate for each variable between the treatment group and the control group. If the absolute value of the standardised difference is less than 10 % after the matching, then it indicates that the matching is balanced.
(2)T-value refers to the t-statistics for testing the difference in the means between the treatment and the control groups.
(3)***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(4)Data Source: China Stock Market Accounting Research (CSMAR).

standardised differences in covariates should become smaller after the matching if the matching is balanced. A commonly used threshold is 10 %, i.e., if the absolute value of the standardised difference is less than 10 %, then it indicates that the matching is balanced (Morgan, 2018; Austin, 2011). Table 10 shows that absolute standardised differences in the covariates after the matching are less than 10 % for both the whole sample and the men CEO subsample, which suggests that the matching is balanced for both samples. Regarding the women CEO subsample, the absolute values of standardised differences for other variables, except for *Size* and *Industry*, are less than 10 %. Moreover, the t-test statistics show that there are no significant differences in *Size* and *Industry* between the two groups for the women CEO subsample after the matching. Therefore, our matching is overall balanced.

Table 11 reports the PSM results regarding average treatment effect on the treated (ATT). ATT is the PSM estimate of the differences in the outcome variable for the treated firms relative to the matched control firms, conditional on firm characteristics used in the matching (Campello et al., 2010). ATT suits our purpose well. This is because the aim of our PSM analysis is to compare the difference in firm investment between one-child policy CEO firms and non-one-child policy CEO firms after the matching. The last column of Table 11 shows that the difference in firm investment between the one-child policy CEO firms (treated) and their matched counterparts is positively significant for both the whole sample and the men CEO subsample, whereas it is negatively significant for the women CEO subsample. Once again, these results support our main argument that sample CEOs' early-life experiences of gender inequality during the one-child policy period make them more risk-taking on average, and they invest more than their non-one-child policy counterparts. Moreover, comparing the ATT result between men CEO and women CEO firms, we obtain further evidence that men CEOs who experienced gender imbalance resulting from the one-child policy are overconfident and risk-taking in making investment decisions, whereas women one-child policy CEOs are more conservative and risk-averse in investment, and they invest less than their non-one-child policy counterparts.

We can now make a summary of our empirical results. First, an average sample CEO whose formatives years (5–15 years) overlapped with the one-child policy period is overconfident and risk-taking in making investment decisions. These CEOs do not only increase firm investment, but also invest more than their peers. Second, gender inequality resulting from the one-child policy affects men CEOs and women CEOs differently. We find that men CEOs, if they experience greater gender inequality in their formative years during the one-child policy period, are more likely to increase firm investment and they invest more than their peers. However, early-life experiences of gender inequality during the one-child policy period make sample women CEOs more conservative and risk-averse in investment, and they invest less than their peers.

6. Conclusions

We examine whether China's one-child policy impacts corporate investment decisions of Chinese listed firms via their CEOs. We argue that Chinese CEOs whose formative years (5–15 years old) overlapped with the one-child policy period experienced intensified gender inequality resulting from the one-child policy, and such early-life experiences shape CEOs' risk attitudes and management styles in their later management careers. We identify the city in which the CEO lived in his/her formative years during the one-child policy period. We then utilise the city-level information during the one-child policy period to construct proxies for the degree of gender inequality in this city. Specifically, we consider the city's out-of-policy birth rate, the city's GDP per capita, the rural area of the city, and the local implementation of the one-child policy. The constructed gender inequality indicator is then matched with the CEO as a proxy for the CEO's early-life experiences of gender inequality resulting from the one-child policy. Next, we match the sample CEOs with Chinese listed nonfinancial firms they served. We test whether CEOs early-life experiences of gender inequality impact the firm's investment decision. The system GMM results show that sample CEOs, who experienced greater gender inequality in their formative years during the one-child policy period, are on average overconfident and risk-taking in investment, and they invest more than their peers. The subsample analysis shows that women CEOs respond to early-life experiences of gender inequality resulted from the one-child policy differently from men CEOs. Women CEOs are more conservative and risk-averse in investment, and they invest less than their peers. In contrast, experiencing greater gender inequality, men CEOs do not only increase their firm investment, but also invest more than their peers. In addition to the GMM estimation, we undertake additional robustness tests by applying both the Difference-In-Difference (DID) and the Propensity Score Matching (PSM) procedures. Overall, the results obtained from both DID and PSM provide further evidence in support of our main argument in the paper.

Our results are consistent with some existing studies documenting the impact of the one-child policy. China's one-child policy resulted in a high sex ratio imbalance. Consequently, boys grew up surrounding more boys and girls grew up as a minority group. In such a social/community environment, boys were not only more favoured and given more opportunities than girls, but also, they must learn how to be competitive in the marriage market (Wei and Zhang, 2011; Edlund et al., 2013). In general, men's performance is more incentivized by the competitiveness of the environment than women's performance (Gneezy et al., 2003). Therefore, on average boys grew up to be overconfident and risk-taking, which is reflected in their later investment decisions. In contrast, girls who grew up in the environment being treated unequally become more conservative and risk-averse, which explains why women CEOs invest less than their peers.

Our paper closely fits the literature on the importance of CEO past experiences in corporate decisions. We contribute to this literature by providing new insights on how the one-child policy affects Chinese corporate investment through its impacts on CEOs who grew up with the one-child policy. China's controversial one-child policy has been debated for a long time regarding its impacts on the Chinese population structure, labour market, and other household decisions (Zhang, 2017). To the best of our knowledge, there is

Table 11
Propensity score matching - average treatment effect on the treated (ATT).

Sample	Matching method	Mean value of the outcome variable (Investment)		
		One-child policy CEO firms	Non-one-child policy CEO firms	ATT
Whole	one-to-one	0.0350	0.0091	0.0260 * ** (3.73)
Men CEO firms	one-to-one	0.0366	0.0140	0.0226 * ** (2.87)
Women CEO firms	one-to-one	0.0342	0.0588	-0.0246 * * (−2.30)

Notes to the table:
(1) ATT stands for average treatment effect on the treated. ATT is the PSM estimate of the differences in the outcome variable for the treated firms relative to the matched control firms, conditional on firm characteristics used in the matching.
(2) t-statistics are reported in brackets.
(3) Caliper (0.01) is applied to one-to-one matching.
(4) ***Significance at the 1 % level; **Significance at the 5 % level; *Significance at the 10 % level.
(5) Data Source: China Stock Market Accounting Research (CSMAR).

no econometric evidence on how the one-child policy also affects corporate behaviour. We fill the gap in this aspect. Our results provide a new perspective in understanding China's investment/overinvestment-driven economic transition process in which our sample CEOs were active corporate decision-makers. Our research also contributes to the literature on the importance of social-cultural factors in explaining the function of board gender diversity. For example, Belaounia et al. (2020) document that women directors' efficacy is associated with a country's overall level of gender equality. We use China's one-child policy as a well-known special experiment to document that social-cultural elements indeed affect managerial decisions through impacting CEOs' risk attitudes and management styles, and this impact differs between men and women directors. Policymakers should be conscious that any social policies that create gender inequality will have profound impact on corporate behaviour through CEOs.

We are restricted by the limited data available to construct the city-level indicator of gender inequality resulting from the one-child policy. We are also restricted by the lack of information on sample CEOs' family background during the one-child policy period. Future research can explore Chinese CEOs who were themselves the only child in the family due to the one-child policy and examine how their traits are different from CEOs who were from multiple children families, and how such differences affect corporate decisions. This would reveal deeper insights on how the one-child policy has impacted the Chinese economy through its corporate sector.

Ethics approval statement

This article does not contain any studies with human participants or animals performed by any of the authors.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix: Definitions of Variables

Denotation	Variable	Measurement of variables
I	Fixed investment	The net fixed investments plus depreciation scaled by total assets of firm i in year t, where the net fixed investment is measured by the changes in the firm's fixed assets between the current year and last year.
$I - I_{peer}$	The gap between the firm's fixed investment and the average investment of its peers	$(I_{it} - I_{peer,t})$ = (the fixed investment made by firm i in year t) - (the fixed investment made by other firms in the same industry of firm i in year t).
Sales	Total sales revenue	The change in sales for firm i from year (t-1) to year t scaled by total assets in year t.
Size	Firm size	The natural logarithm of total assets of firm i in year t.
FirmAge	Firm age	The natural log of the number of listing years of firm i in year t.
Leverage	Leverage	The ratio of total debts to total assets for firm i in year t.
NewEquity	New equity	A dummy variable taking the value of one if firm i issued new equities in year t, and zero otherwise.
Cash	Cash flow	The cash flow of firm i in year t scaled by total assets of the firm in year t, where cash flow = net income + depreciation.
State	State ownership	The ratio of state shares to total shares for firm i in year t.
Duality	CEO Duality	A dummy variable taking the value of one if the CEO and the chairman of the board are the same person for firm i in year t, and zero otherwise.
PE	P/E ratio	The ratio of stock price to the ratio of net income to capital for firm i in year t.
GII	Gender inequality indicator	The average of the city level out-of-policy birth rates across all relevant years when the CEO lived in the city in his/her formative years during the one-child policy period.
CEOedu	The level of education	A categorical variable, which takes the value of 1 if the CEO is graduated from secondary school, 2 if the CEO is graduated from a college, 3 if the CEO holds a bachelor's degree, 4 if the CEO holds a master's degree, 5 if the CEO is Ph.D.
CEOage	Age of CEO	The natural log of the CEO' age for firm i in year t.
CEOoverseas	Oversea background of CEO	A dummy variable taking the value of one if the CEO has a foreign work or academic experience before year t, and zero otherwise.
CEOgender	CEO gender	A dummy variable taking the value of one if the CEO is recorded as a men, and zero if the CEO is recorded as a women.
GIIFINE	An alternative gender inequality indicator	See the construction of this variable in Section 5.1.
GIICITY	An alternative gender inequality indicator	See the construction of this variable in Section 5.2.

Data Source: China Stock Market Accounting Research (CSMAR); China City Statistic Yearbooks.

References

Adams, R.B., Funk, P., 2012. Beyond the glass ceiling: does gender matter? Manag. Sci. 58 (2), 219–235. https://doi.org/10.2139/ssrn.1475152.

Austin, P.C., 2011. An introduction to propensity score methods for reducing the effects of confounding in observational studies. Multivar. Behav. Res. 46 (3), 399–424. https://doi.org/10.1080/00273171.2011.568786.

Bamber, L.S., Jiang, J.X., Wang, I.Y., 2010. What's my style? the influence of top managers on voluntary corporate financial disclosure. Account. Rev. 85 (4), 1131–1162. https://doi.org/10.2308/accr.2010.85.4.1131.

Beck, T., Levine, R., Levkov, A., 2010. Big bad banks? The winners and losers from bank deregulation in the United States. J. Financ. 65 (5), 1637–1667. https://doi.org/10.1111/j.1540-6261.2010.01589.x.

Belaounia, S., Tao, R., Zhao, H., 2020. Gender equality's impact on female directors' efficacy: a multi-country study. Int. Bus. Rev. 29 (5), 101737 https://doi.org/10.1016/j.ibusrev.2020.101737.

Benmelech, E., Frydman, C., 2015. Military CEOs. J. Financ. Econ. 117 (1), 43–59. https://doi.org/10.1016/j.jfineco.2014.04.009.

Bernile, G., Bhagwat, V., Rau, P.R., 2017. What doesn't kill you will only make you more risk-loving: earlylife disasters and CEO behavior. J. Financ. 72 (1), 167–206. https://doi.org/10.1111/jofi.12432.

Bertrand, M., Schoar, A., 2003. Managing with style: the effect of managers on firm politics. Q. J. Econ. 118 (4), 1169–1208. https://doi.org/10.1162/003355303322552775.

Bo, H., Li, T., Sun, Y., 2016. Board attributes and herding in corporate investment: evidence from Chinese-listed firms. Eur. J. Financ. 22 (4), 432–462. https://doi.org/10.1080/1351847X.2013.788536.

Bucciol, A., Zarri, L., 2013. Financial Risk Aversion and Personal Life History. https://doi.org/10.2139/ssrn.2356202.

Cain, M.D., McKeon, S.B., 2016. CEO personal risk-taking and corporate policies. J. Financ. Q. Anal. 51 (1), 139–164. https://doi.org/10.1017/S0022109016000041.

Campello, M., Graham, J.R., Harvey, C.R., 2010. The real effects of financial constraints: evidence from a financial crisis. J. Financ. Econ. 97 (3), 470–487. https://doi.org/10.1016/j.jfineco.2010.02.009.

Cassar, A., Healy, A., Von Kessler, C., 2017. Trust, risk, and time preferences after a natural disaster: experimental evidence from Thailand. World Dev. 94, 90–105. https://doi.org/10.1016/j.worlddev.2016.12.042.

Chevalier, J., Ellison, G., 1999. Are some mutual fund managers better than others? cross-sectional patterns in behavior and performance. J. Financ. 54 (3), 875–899. https://doi.org/10.1111/0022-1082.00130.

Croson, R., Gneezy, U., 2009. Gender differences in preferences. J. Econ. Lit. 47 (2), 448–474. https://doi.org/10.1257/jel.47.2.448.

Cui, X., Sun, M., Sensoy, A., Wang, P., Wang, Y., 2022. Top executives' great famine experience and stock price crash risk. Res. Int. Bus. Financ. 59, 101564 https://doi.org/10.1016/j.ribaf.2021.101564.

Dittmar, A., Duchin, R., 2016. Looking in the rearview mirror: the effect of managers' professional experience on corporate financial policy. Rev. Financ. Stud. 29 (3), 565–602. https://doi.org/10.1093/rfs/hhv051.

Duchin, R., Simutin, M., Sosyura, D., 2020. The origins and real effects of the gender gap: evidence from CEOs' formative years. Rev. Financ. Stud. 34 (2), 700–762. https://doi.org/10.1093/rfs/hhaa068.

Ebenstein, A., 2011. Estimating a dynamic model of sex selection in China. Demography 48 (2), 783–811. https://doi.org/10.1007/s13524-011-0030-7.

Edlund, L., Li, H., Yi, J., Zhang, J., 2013. Sex ratios and crime: evidence from China. Rev. Econ. Stat. 95 (5), 1520–1534. https://doi.org/10.1162/REST_a_00356.

Fazzari, S.M., Hubbard, R.G., Petersen, B.C., Blinder, A.S., Poterba, J.M., 1988. Financing constraints and corporate investment. Brook. Pap. Econ. Act. 1988 (1), 141–206. https://doi.org/10.2307/2534426.

Feng, X., Johansson, A.C., 2018. Living through the Great Chinese famine: early-life experiences and managerial decisions. J. Corp. Financ. 48, 638–657. https://doi.org/10.1016/j.jcorpfin.2017.11.012.
Firth, M., Malatesta, P.H., Xin, Q., Xu, L., 2012. Corporate investment, government control, and financing channels: evidence from China's listed companies. J. Corp. Financ. 18 (3), 433–450. https://doi.org/10.1016/j.jcorpfin.2012.01.004.
Gneezy, U., Leonard, K.L., List, J.A., 2009. Gender differences in competition: evidence from a matrilineal and a patriarchal society. Econometrica 77 (5), 1637–1664. https://doi.org/10.3982/ECTA6690.
Gneezy, U., Niederle, M., Rustichini, A., 2003. Performance in competitive environments: gender differences. Q. J. Econ. 118 (3), 1049–1074. https://doi.org/10.1162/00335530360698496.
Goodman-Bacon, A., 2021. Difference-in-differences with variation in treatment timing. J. Econom. 225 (2), 254–277. https://doi.org/10.1016/j.jeconom.2021.03.014.
Graham, J.R., Harvey, C.R., Puri, M., 2013. Managerial attitudes and corporate actions. J. Financ. Econ. 109 (1), 103–121. https://doi.org/10.1016/j.jfineco.2013.01.010.
Gustafson, P.E., 1998. Gender Differences in risk perception: theoretical and methodological erspectives. Risk Anal. 18 (6), 805–811. https://doi.org/10.1111/j.1539-6924.1998.tb01123.x.
Holman, E.A., Silver, R.C., 1998. Getting "stuck" in the past: temporal orientation and coping with trauma. J. Pers. Soc. Psychol. 74 (5), 1146–1163. https://doi.org/10.1037/0022-3514.74.5.1146.
Jorgenson, D.W., 1971. Econometric studies of investment behavior: a survey. J. Econ. Lit. 9 (4), 1111–1147. ⟨http://www.jstor.org/stable/2721137⟩.
Klenke, K., 2003. Gender influences in decision-making processes in top management teams. Manag. Decis. 41 (10), 1024–1034. https://doi.org/10.1108/00251740310509553.
Labonte′, B., Suderman, M., Maussion, G., Navaro, L., Yerko, V., 2012. Genome-wide epigenetic regulation by early-life trauma. Arch. Gen. Psychiatry 69 (7), 722–731. https://doi.org/10.1001/archgenpsychiatry.2011.2287.
Lyoo, I.K., Kim, J.E., Yoon, S.J., Hwang, J., Bae, S., Kim, D.J., 2011. The neurobiological role of the dorsolateral prefrontal cortex in recovery from trauma: longitudinal brain imaging study among survivors of the south Korean subway disaster. Arch. Gen. Psychiatry 68 (7), 701–713. https://doi.org/10.1001/archgenpsychiatry.2011.70.
Malmendier, U., Nagel, S., 2011. Depression babies: do macroeconomic experiences affect risk taking?*. Q. J. Econ. 126 (1), 373–416. https://doi.org/10.1093/qje/qjq004.
Malmendier, U., Tate, G., Yan, J., 2011. Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies. J. Financ. 66 (5), 1687–1733. https://doi.org/10.1111/j.1540-6261.2011.01685.x.
Marquis, C., Tilcsik, A., 2013. Imprinting: toward a multilevel theory. Acad. Manag. Ann. 7 (1), 195–245. https://doi.org/10.5465/19416520.2013.766076.
Mehta, D., Klengel, T., Conneely, K.N., Smith, A.K., Altmann, A., Pace, T.W., Rex-Haffner, M., Loeschner, A., Gonik, M., Mercer, K.B., Binder, E.B., 2013. Childhood maltreatment is associated with distinct genomic and epigenetic profiles in posttraumatic stress disorder. Proc. Natl. Acad. Sci. USA 110 (20), 8302–8307. https://doi.org/10.1073/pnas.1217750110.
Mohsni, S., Otchere, I., Shahriar, S., 2021. Board gender diversity, firm performance and risk-taking in developing countries: the moderating effect of culture. J. Int. Financ. Mark. Inst. Money 73, 101360. https://doi.org/10.1016/j.intfin.2021.101360.
Morgan, C.J., 2018. Reducing bias using propensity score matching. J. Nucl. Cardiol. 25, 404–406. https://doi.org/10.1007/s12350-017-1012-y.
Roodman, D., 2009. How to do xtabond2: an introduction to difference and system GMM in Stata. Stata J. 9 (1), 86–136. https://doi.org/10.1177/1536867×0900900106.
Scharping, T., 2003. Birth Control in China. Routledge Curzon, New York, pp. 1949–2000.
Schoar, A., Zuo, L., 2017. Shaped by booms and busts: how the economy impacts CEO careers and management styles. Rev. Financ. Stud. 30 (5), 1425–1456. https://doi.org/10.1093/rfs/hhw111.
Tulving, E., 2002. Episodic memory: from mind to brain. Annu. Rev. Psychol. 53 (1), 1–25. https://doi.org/10.1146/annurev.psych.53.100901.135114.
Wang, W., Liu, X., Dong, Y., Bai, Y., Wang, S., Zhang, L., 2020. Son preference, eldest son preference, and educational attainment: evidence from Chinese families. J. Fam. Issues 41 (5), 636–666. https://doi.org/10.1177/0192513×19874091.
Wei, S.J., Zhang, X., 2011. The competitive saving motive: evidence from rising sex ratios and savings rates in China. J. Political Econ. 119 (3), 511–564. https://doi.org/10.1086/660887.
Wonde, K.M., Tsehay, A.S., Lemma, S.E., 2022. Training at farmers training centers and its impact on crop productivity and households' income in Ethiopia: a propensity score matching (PSM) analysis. Heliyon 8 (7), e09837. https://doi.org/10.1016/j.heliyon.2022.e09837.
Yao, S., Wang, Z., Sun, M., Liao, J., Cheng, F., 2020. Top executives' early-life experience and financial disclosure quality: impact from the Great Chinese Famine. Account. Financ. 60 (5), 4757–4793. https://doi.org/10.1111/acfi.12659.
Zhang, J., 2017. The evolution of China's one-child policy and its effects on family outcomes. J. Econ. Perspect. 31 (1), 141–160. https://doi.org/10.1257/jep.31.1.141.