Scared Away: Credit Demand Response to Expected Motherhood Penalty in the Labor Market*

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Abstract

We exploit a policy reform that exogenously deteriorates mothers' job prospects. China switched from a one-child policy to two-child in 2016, which increased female workers' childbearing and caring responsibilities. Using a leading peer-to-peer lending platform targeting college students in China, we find that loan applications from female college students decrease by 15.6% relative to male students after the reform. The drop suggests that female students can anticipate the poorer future job prospects; they reduce their borrowing and invest less in human capital accordingly. Applications for long-term and large-amount loans and loans for human capital investment purposes experience the largest decline. We also find that loan applications decrease after provincial governments' staggered extension of maternity leaves and that the decrease is more prominent when the expected motherhood penalty is greater. The results are unlikely driven by credit supply channels.

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1 Introduction

One of the contributing factors to the gender salary gap is the wage penalty for motherhood (see, e.g., Fuchs (1989); Waldfogel (1998); Blau and Kahn (2000); Blau and Kahn (2017)). The burdens of motherhood make some women choose to receive lower education, stay out of the labor force, choose more family-friendly jobs and occupations, or give up promotion opportunities (Baum (2002); Anderson, Binder, and Krause (2003); Aisenbrey, Evertsson, and Grunow (2009)). Budig and England (2001) and Correll, Benard, and Paik (2007) show that mothers may also face disadvantages in the job market because employers think that mothers are less competent or less committed to their jobs. A large body of literature compares the wages and career choices of mothers and childless women and examines whether employers tighten their labor policy for women based on current or future family constraints.

Although the motherhood penalty has been well documented in the literature, few have examined whether women *anticipate* the employment effect of childbearing and caring costs. In this paper, we study young women's financial and investment decisions before entering the labor market and before having any children. Do they reduce borrowing and debt burden in anticipation of poorer job prospects? Do they invest less in human capital? The answers to these questions help us understand how the motherhood penalty affects pre-labor-market choices and beliefs. We can infer from these real-life decisions whether young women lower their expectations of future income, while subjective income expectations are usually captured by survey responses in other studies (e.g., Dominitz and Manski (1997); Zafar (2011, 2013); Patnaik, Venator, Wiswall, and Zafar (2022)).

We focus on female college students—the vast majority of them have not given birth to children and have not entered the full-time job market yet. College students reach the age of adulthood and start making life decisions on their own. At the same time, college education is one of the most important human capital investments (Becker (1964, 1994)). College students are accumulating skills for their future careers. Their decisions are likely to be influenced by their anticipated future labor income and to have a long-term impact.

We examine college students' responses to a policy change that exogenously deteriorates mothers' job prospects. In 2016, China introduced a universal two-child policy, which relaxed the previous one-child policy that restricted many families to a single child between 1979 and 2015. To the extent that future employers anticipate some of the college graduates will become mothers of two children, the extra costs of childbearing and childrearing affect the balance between hiring male and female students (Agarwal, Li, Qin, and Wu (2022)). According to several surveys conducted around 2016, many respondents believe that the universal two-child policy negatively influences women's career development.[1]

Using comprehensive data from MingXiaoDai, a leading peer-to-peer (P2P) lending platform targeting college students in China,[2] we examine the gender difference in loan applications after the introduction of the universal two-child policy. We exploit this unexpected policy change to investigate the possible impact of negative labor market implications by

[1]The China Youth Daily conducted a survey in November 2015, shortly after the government announcement of the universal two-child policy. 71.4% of the respondents believe that having a second child would have a negative impact on female workers. A 2016 report from Beijing Normal University shows that 51% of young mothers in urban areas with two children are willing to give up personal development opportunities for the sake of their families. In a 2017 survey conducted by Peking University and Zhaopin.com, a large recruitment website, 22% of women believe that gender discrimination in employment is serious, 8% higher than the percentage of men who share the same view. Among the single women, 25% of them think that gender discrimination in promotion is serious.

[2]The market share of MingXiaoDai had reached 63% by the end of 2015 and become the largest P2P lending platform targeting college students in China.

employing a difference-in-differences strategy of comparing the borrowing behaviors of female college students with their male schoolmates before and after the policy shock. We find a both economically and statistically significant decrease in loan applications—female students in a college on average reduce their borrowing by 15.6% relative to male students in the same college after July 2015, when the universal two-child policy started to arouse public attention, as reflected by the Internet search volume. The insignificant pre-trend distinctions between female and male loan applications support the parallel trend assumption for our difference-in-differences strategy. We also estimate the effect at the individual level. Around 60% of the female students reduce their borrowing propensity relative to male students after the shock.

Is this result driven by the shrinking in credit demand from female college students or the tightening in credit supply to female applicants by the P2P platform? To differentiate between the demand and supply channels, we examine the detailed loan approval and performance information. We find that compared with their male schoolmates, the approval rate for female college students significantly increases by 3.4%, suggesting that loan screening does not become stricter for female applicants. Although it cannot completely rule out the supply channel as credit tightening on female students may have deterred low-quality borrowers in the first place, we track payment performance before and after the event to further mitigate this concern. If more stringent screening applies to female applicants, we expect to see a lower delinquency rate as a result. However, we find that the delinquency rate remains almost unchanged after the shock, again supporting that the shrinking in female applications more likely comes from the demand side.

To strengthen our identification, we use another setting by applying a staggered difference-

in-differences strategy based on the variation in provincial reforms on maternity leaves. Following the nationwide universal two-child policy, provincial governments further extended maternity leaves successively in 2016 to support relaxing birth control. As extended maternity leaves directly incur additional costs for employers, we expect even worse future employability of female college students. Our results support this view: extending maternity leaves leads to a significant decrease in local applications for female students in the next three months, relative to their male schoolmates. Furthermore, we repeat the test using only male loan applications and confirm that the observed results are not driven by the increase in their applications.

When female college students anticipate negative outcomes in the job markets, they may hesitate to apply for loans due to concerns about their job opportunities and, consequently, their ability to repay their borrowings. We examine this potential mechanism from various angles. First, we exploit the heterogeneity in loan and applicant characteristics. The discouraging effect of the two-child policy on female students' borrowing is particularly pronounced for long-term and large-amount loans. This suggests that female college students are concerned with their future employment prospects, leading them to be more worried about their ability to repay large-amount or long-term loans. Notably, the impact is greater for loans intended for human capital investment, indicating that the lower propensity for human capital investment among female college students contributes to their reduced borrowing. Interestingly, the effect is even stronger for female students majoring in STEM (science, technology, engineering, and math) as they may face a more competitive job environment in these male-dominated fields (Adams and Kirchmaier (2016); on Equal Opportunities in Science and Engineering (2015)), further corroborating our hypothesis.

We also use education statistics from the Ministry of Education to examine the gender gap in pursuing postgraduate studies, which is crucial for college students in China seeking to enhance their human capital. Our findings reveal a sharp decrease in the enrollment ratio of female master students in 2017. More importantly, the extent of the decrease in female enrollment is significantly and positively correlated with the identified policy effects on female loan applications across provinces. This geographical pattern further supports our argument that young women invest less in human capital following the introduction of the universal two-child policy.

Second, we explore variations in the local economic environment and structures across regions. Our results show that female college students become more conservative about borrowing after the introduction of a universal two-child policy if their universities are located in more developed areas. Relatedly, if an area is more market-oriented indicated by a lower share of the state-owned sector, the effect on female loan applications is stronger. As firms and employers may prioritize production efficiency in more developed and market-oriented regions, they are more likely to tighten their labor policy for women due to the higher manpower cost induced by the two-child policy. As a result, female college students face stronger labor market challenges in these regions and consequently become more reluctant to use debt to fund their expenditures.

Third, we analyze the characteristics of students' hometowns. We find that female students whose hometown has a stronger preference for sons reduce their borrowing more after the shock. The son preference may have shaped these students' beliefs so that they are more aware of gender discrimination. On the other hand, an alternative channel that female students' parents may have a second child to redistribute family resources does not

seem to explain our findings, as female students whose hometown has a higher fertility rate increase after the shock do not exhibit stronger results.

Our paper contributes to several strands of literature. We contribute to a large literature on the gender gap in the labor market (see Altonji and Blank (1999) and Blau and Kahn (2017) for comprehensive reviews), in particular, on gender differences in hiring (e.g., Neumark, Bank, and Van Nort (1996); Goldin and Rouse (2000); Booth and Leigh (2010)). Since the two-child policy is likely to increase female workers' childbearing and caring responsibilities, our paper is related to studies on female workers' disadvantages due to their fertility and motherhood (e.g., Waldfogel (1998); Anderson, Binder, and Krause (2002); Bertrand, Goldin, and Katz (2010); Becker, Fernandes, and Weichselbaumer (2019); Barber, Jiang, Morse, Puri, Tookes, and Werner (2021); Huang, Lei, and Sun (2021)).[3] Notably, Kleven, Landais, and Leite-Mariante (2024) estimate child penalties in employment across 134 countries and confirm the presence of such penalties in China. While the situation in China is less severe than in other countries in Asia, Europe, and North America, the strong responses we observed among female students to the two-child policy and its implications for employment suggest that the potential impacts of motherhood on women's job prospects could be substantial worldwide.

Our paper also closely relates to the recent literature on the negative female labor market outcomes of the two-child policy in China (e.g., Agarwal, Li, Qin, and Wu (2022) and He, Li, and Han (2022)). While these studies focus on the declines in labor demand for females

[3] Kuziemko, Pan, Shen, and Washington (2020) also examine young women's anticipation about the motherhood effect on future employability. Through surveys, they provide evidence that U.S. and U.K. women tend to underestimate the effects of motherhood on their employment, a notable shift from the overestimations observed in the 1960s. By analyzing their borrowing behaviors on a P2P platform, our paper suggests that Chinese female college students do anticipate increased childbearing and caring costs due to a policy change in 2016.

due to fertility relaxation, we highlight the endogenous response from prospective female job seekers, especially their human capital investment response, which will exacerbate the gender gap in labor markets.

We add to the research on gender differences in financial markets and industries. For example, Egan, Matvos, and Seru (2022) disclose gender differences in punishment of misconduct in the financial advisory industry. Atkinson, Baird, and Frye (2003) and Niessen-Ruenzi and Ruenzi (2019) document differences in inflows in male- and female-managed funds, albeit without gender differences in fund performance. Sunden and Surette (1998) find gender and marital differences in allocating their assets in retirement savings plans. Barber and Odean (2001) document that men trade more aggressively than women but perform worse in stock markets. Goldsmith-Pinkham and Shue (2020) study the gender gap in housing markets and find that single women earn significantly lower returns than single men. Adams and Funk (2012) examine gender differences in the boardroom. Related to our paper, Adams and Kirchmaier (2016) investigate the gender ratios of boards across industries and find that women are more underrepresented on the boards for the STEM and Finance firms. Our paper explores gender differences in borrowing from a P2P platform in the presence of aggravated future employability in the labor market.

Furthermore, our work is related to emerging research on P2P lending, especially disparities in P2P lending across different borrower characteristics, including appearance (e.g., Duarte, Siegel, and Young (2012)), race (e.g., Pope and Sydnor (2011)), location (e.g., Lin and Viswanathan (2016)), culture (e.g., D'Acunto, Ghosh, Jain, and Rossi (2021)) and social network (e.g., Lin, Prabhala, and Viswanathan (2013)). Previous studies such as Barasinska and Schäfer (2014) and Chen, Huang, and Ye (2020) also investigate the gen-

der gap in P2P lending. However, they mainly focus on gender differences from the lending platform, while our research emphasizes the change in female students' borrowing behaviors in anticipation of difficulties in the labor market.

Our paper also has important policy implications. To lower the gender pay gap and gender inequality, complementary policies can be designed to help employers recover their losses in productivity due to maternity leaves and childbearing. These will help improve female workers' employability and their likelihood to have two children, as well as encourage female students to invest more in their human capital and reduce the gender gap in the labor market.

The rest of the paper is organized as follows. Section 2 discusses the institutional backgrounds of the universal two-child policy in China and the P2P markets. Section 3 describes the data. Section 4 develops hypotheses and introduces empirical methodology. Section 5 presents empirical results. Section 6 concludes.

2 Background

2.1 The Universal Two-Child Policy

China enacted the one-child policy in 1979 to control its birth rate and population growth. To address the aging population issue, since 2009, provinces in China have gradually relaxed the one-child policy to allow two children of one couple if both parents are the only children from each family. In 2014, China further amended the policy by allowing two children if at least one parent was the only child. On October 29, 2015, the Chinese government announced a shift to a universal two-child policy, covering all families.[4] The

[4]While the universal two-child policy only directly affects adults with siblings, China's Inter-Census Population Survey (2005) suggests that 75.5% of men and 81.5% of women aged 20 to 40 had at least one sibling

new law was passed by the National People's Congress Standing Committee on December 27, 2015, and took effect on January 1, 2016.

Before October 2015, the universal two-child policy had already been widely discussed. In July 2015, the National Health and Family Planning Commission responded to the inquiries on the universal two-child policy by stating that the relevant regulations were under development. As shown in Figure 1, searches for "the universal two-child policy" or other related keywords first surged in July 2015 on Baidu, China's leading search engine. Notably, search volume peaked at the end of October 2015 when Xinhua, the central government media outlet in China, reported the transition to a universal two-child policy, a decision made by the Fifth Plenary Session of the 18th Central Committee of the Communist Party of China held in Beijing. We then observed several spikes in Baidu search volume in late December 2015, when the new law was officially passed, and at the beginning of January 2016, when the policy was effective.

2.2 P2P Platform in China

Peer-to-peer (P2P) lending, a financial innovation to lend money to individuals or businesses through online platforms that match lenders and borrowers, experienced rapid growth from 2007 to 2018 in China. This expansion was significantly influenced by the initial issuance of company licenses in pilot cities in 2009, which marked a pivotal moment for consumer finance. In 2013, the Chinese government granted more market access and pro-

in 2015 (these figures are calculated based on the 10–30 age group in the 2005 survey). As noted by He, Li, and Han (2022), the existence of a significant number of people with siblings can be attributed to various factors such as exemptions given to ethnic minorities, relaxed regulations that permitted a second child for eligible households, or difficulties in implementing the rules in rural areas. Consistent with these explanations, we show in Section 5.3.4 that our results are weaker in regions with a higher proportion of (non-Han) minorities and residents with agricultural household registration ("hukou"), suggesting that minority women and those in rural areas are less affected by the universal two-child policy.

moted collaboration among banks, private capital, and internet companies, leading to rapid expansions of the industry. During this period, major P2P lending platforms (e.g., MingXiaoDai, RenRenDai, etc.) emerged, alongside consumer loan products like JD Baitiao and Ant Credit Pay, which quickly gained popularity. However, due to regulatory challenges in recent years, the P2P lending business had been completely suspended in China by the end of 2020.

According to a 2018 report from the website WDZJ,[5] which provides comprehensive news, data, and reports on all the P2P lending platforms in China, the number of operational P2P platforms was 1,021 by the end of 2018. The total volume of all P2P platforms reached 1,795 billion RMB in 2018. The average annual return for P2P lending stood at 9.81%, with an average loan term of 12.65 months, the total number of lenders was approximately 13.3 million, and the total number of borrowers was 19.9 million. Individual lending constituted the primary business type with a share of 84.5%, whereas company lending represented only 10%.

Amid the rapid expansion of the credit market in China, the credit landscape for university students also saw significant growth. According to the 2016 report from iResearch, a major consulting firm in online marketing and the Internet finance sector in China, the size of the overall consumption market for college students was estimated to reach 452.4 billion RMB in 2016. And in this market, fintech companies play an important role by providing credit products. The transaction volume of fintech credit among college students exploded with a growth rate of 746.7% in 2015. It was further expected to reach 80.1 billion RMB in

[5]The website WDZJ (www.wdzj.com) was the first and largest portal for P2P lending in China. However, the website had been suspended following the collapse of the P2P lending industry in China.

2016 and 141.2 billion RMB in 2017. Specifically, P2P lending platforms themselves were popular among students while being a significant funding source for other credit products such as installment plans of online purchases.[6] Meanwhile, due to the high demand for vocational training and qualification certificates in China, college students also frequently turn to P2P loans to cover education-related expenses, such as off-campus tutoring and certificate exam registration.[7]

The previous success of P2P lending among college students can be attributed, in part, to the lack of alternative credit products catering to this group. State-provided loans are only available to students with financial difficulties in paying tuition fees and daily living expenses.[8] Unlike in many Western countries, credit cards are hardly accessible to students in China. In addition to prohibiting banks from issuing credit cards to those under 18, the government imposes strict criteria for eligible students. They must obtain written consent from a secondary source of repayment, typically their parents, in order to apply. Consequently, with their convenient online access, rapid approval processes, and attractive promotions, P2P lending platforms have swiftly captured the college student market in China.

This paper focuses on MingXiaoDai, a leading P2P platform in China that specifically targets college students by offering both short-term and long-term loans. The platform

[6]According to a 2017 report from Sina Finance (https://cj.sina.com.cn/article/detail/5617157631/326548), a major business news portal in China, the top three loan purposes among college students in China are education expenditures, entrepreneurship financing, and consumption.

[7]A 2020 report from iResearch and New Oriental (https://pdf.dfcfw.com/pdf/H3_AP202204151559406158_1.pdf), a leading provider of private education service in China, highlights that College English Tests (CET-4 and CET-6), the National Graduate Entrance Examination, and professional certification are three key areas of focuses for Chinese college students preparing for future job markets. As such, the off-campus tutoring market for these purposes has been steadily growing over the years.

[8]According to the guidelines published by the Ministry of Education (https://hudong.moe.gov.cn/jyb_xwfb/xw_zt/moe_357/jyzt_2015nztzl/2015_zt06/15zt06_gxzzzc/gxzz_bzks/201508/t20150810_199211.html), applications for these government loans undergo rigorous scrutiny by both the school and the financial institution designated by the local government. This process involves lengthy assessments and ongoing monitoring.

maintained a fixed interest rate of 0.99% per month. Established in December 2013, MingXiaoDai experienced rapid growth and, by the end of 2015, commanded a 63% market share in P2P loans for college students. In our data, the total volume of loan applications submitted through MingXiaoDai amounted to 13.5 billion RMB, with approved loans totaling 8 billion RMB.

3 Data

3.1 Loan Data

We obtain the loan information from the MingXiaoDai website, with our sample period spanning from January 2015 to May 2017. Our data sample encompasses the universe of the loan information available on the platform, including 2,097,809 loan applications from 908,627 student borrowers, consisting of 664,706 male and 243,927 female students. The platform has approved a total of 1,133,844 loan applications from 621,865 borrowers, which includes 456,775 male students and 165,090 female students.

Each application record contains both the borrower and loan information. We obtain borrower information, such as their identification number within the platform, gender, age, annual family income, place of residence (including province and city), university name and location (including province and city), major, enrollment time, and borrowing date. The loan information consists of the loan amount, interest rate, loan term, loan date, loan purpose, and repayment status.

Table 1 reports summary statistics of our dataset at the university-gender-month level, which serves as the basic unit of observation in our empirical tests. Starting from the aggregated sample of loan applications, we apply two filtering criteria to refine our final sample

for further analysis. First, we require non-missing observations for key variables, which are the school and gender of applicants. Second, we require non-missing observations for every university-gender group each month before the national implementation of the universal two-child policy in January 2016. This is crucial for a fair comparison between the circumstances of loan applications before and after the new policy. Finally, there are 21,605 observations at this level, including 15,950 for male groups (university-month) and 5,655 for female groups (university-month) across 579 universities. While there are on average 32.3 loan applications per month per college, male students file significantly more applications than their female counterparts. This pattern is also evident in the total loan amounts, indicating a relatively stronger willingness to borrow among male college students. Besides, 14% of total applications come from students in STEM majors, with male students representing a significantly larger portion within this group.

We further summarize statistics regarding loan characteristics and the gender gap at the university-month level. Our analysis reveals that male applicants are more inclined to borrow for consumption purposes, whereas female applicants demonstrate a stronger demand for loans aimed at human capital investment. Additionally, male applicants tend to apply for loans with smaller amounts and shorter terms, aligning with their higher likelihood of borrowing for the purpose of consumption. Lastly, loan applications from female students are, on average, more likely to be approved.

Figure 2 depicts the monthly average number of loan applications submitted by female (red line) and male (blue line) students at each university during the sample period from January 2015 and May 2017. We set August 2015 at event time 0, marking the point when the universal two-child policy started to capture public attention, as evidenced by the Baidu

Search Volume Index shown in Figure 1.

Figure 2 illustrates an increasing trend in the number of loan applications over time, implying a rapid expansion in the P2P business during our sample period. As a comparison, we also plot the amount of short-term consumption loans issued to households in China, based on statistics published by the People's Bank of China. Consumption loans have also been expanding during our sample period.[9]

Several dips in the number of P2P loan applications from students are expected due to winter breaks around the Lunar New Year, such as February 2015 and 2016 (event time -6 and 6) and January 2017 (event time 17), and the summer breaks, such as July and August in 2015 and 2016 (event time -1, 0, 11 and 12).[10] More interestingly, the gap between male and female applicants remained relatively stable until July 2015. Since then, the gap has rapidly widened from August 2015 (event time 0) to January 2016 (event time 5) and has not reverted by the end of our sample period. Furthermore, the borrowing trend of male students aligns more closely with the overall development of short-term consumption loans, while female loan applications have gradually diverged from the national trend since 2016. This implies that the gender difference in loan applications is more likely to be driven by a decline in female borrowing. In our following empirical analysis, we will exploit this pattern by adopting a difference-in-differences approach to identify the impact of the two-

[9]The data are obtained from the website of People's Bank of China, under the section "Sources and Uses of Credit Funds of Financial Institutions" (`http://www.pbc.gov.cn/en/3688247/3688975/3718249/4503802/index.html`).

[10]One possible explanation to these dips in loan applications is that students receive more financial support from families during these special periods. For instance, students often receive red packets from parents and relatives during the Lunar New Year in China. According to a survey conducted by China Daily in 2016 (`http://caijing.chinadaily.com.cn/finance/2016-02/29/content_23684369.htm`), more than 75% of respondents reported amounts between ¥100 and ¥800 for each red packet, which can help partially cover students' expenditures.

child policy on the gender difference in loan applications.

The loan amount displays a similar pattern over our sample period. Figure 3 shows a comparison of average loan amount by gender across universities between January 2015 and May 2017. Despite the overall upward trend and regular dips in school holidays for both genders, the disparity in the total loan amounts applied for by male and female students increased significantly after July 2015, when the policy started being discussed in the media and searched on the Internet.

3.2 Regional Economic and Population Data

We use regional economic data to exploit the time and geographic variation of local economic development for heterogeneity tests. The key assumption for this analysis is that college students are likely to remain in their local city or province for employment after graduation. This assumption is supported by graduate employment reports published by universities and colleges nationwide.[11] We collect economic data at different levels and match them with the locations of loan applicants' universities and colleges in our loan dataset.

First, we collect regional data on various economic development measures, including GDP, GDP per capita, urban disposable income, and urban consumption expenditure. While the GDP-related variables are available at both province and prefecture levels, income and consumption measures for urban populations are reported only at the province level. All data on economic development are sourced from the China Statistical Yearbook and the

[11] According to a report on employment of college graduates by Shanghai Ranking Consultancy, a renowned organization specializing in higher education intelligence and consultation, the national mean of local retention rate is 62.58% for the undergraduate Class of 2017. They collected data from employment reports of graduates from over 350 colleges and universities across provinces in China.

Statistical Yearbooks for the provinces. We utilize this regional economic data to identify developed regions.

We also use property price as another proxy for regional development by following the classification provided by the Residential Property Price Index published by the National Bureau of Statistics of China. Specifically, the Bureau categorizes Beijing, Shanghai, Guangzhou, and Shenzhen into the four "Tier-1 Cities," while the remaining capital and sub-provincial cities across all provinces and autonomous regions are classified as "Tier-2 Cities" for tracking their housing markets.

We also gather regional data on local employment markets by tracking the number of employees across various urban units. Information about urban employment is from China Labor Statistical Yearbooks. Among the different types of units, we are particularly interested in those with state involvement to assess how state-oriented local job markets are. Therefore, we focus on three subcategories available in the yearbook: state-owned units, state jointly-run enterprises, and sole state-owned companies.[12] We aggregate the number of employees in these subcategories to calculate the ratio of the state-owned sector to the total urban employment within these units.[13]

Lastly, we collect regional data on population and fertility to examine heterogeneous

[12]State-owned units refer to various enterprises, institutions, government administrative organizations at different levels, and social organizations that are state-owned or utilize state production means. Note that economic units classified as "companies" under the Company Law of China are not included in this subcategory. State jointly-run enterprises refer to economic units established through joint investment by two or more state-owned corporate enterprises or institutions. Sole state-owned companies are limited liability companies established solely by state-authorized investment institutions or departments.

[13]Total urban employment of units, or "Danwei," refers to all individuals registered in urban areas who work in government agencies at various levels, political and party organizations, social organizations, enterprises, and institutions, and receive wages or other forms of payment. Note that in the yearbook, employment in urban private enterprises and individual units is included in another category for total urban employment. We find that including employment from urban private enterprises and individual units in our calculation of ratios produces similar results in unreported regressions for subsequent tests, so we adhere to the dichotomous categorization used in the yearbook.

policy effects from a social perspective. Our focus is to address fertility-related concerns in three aspects: the restrictiveness of the historical one-child policy, the responsiveness to the current policy relaxation, and the prevalence of son preference as a social norm. For these purposes, we construct indicators based on measures like population structures, birth rates, and sex ratios. Such information is from the China Statistical Yearbooks and five national population censuses conducted from 1982 to 2020.

4 Empirical Strategy

4.1 Hypothesis development

The universal two-child policy completely lifted the decades-long restriction of allowing only one child per family. The new policy aimed to address social and economic challenges such as declining fertility rates and an aging population. According to the census data from the National Bureau of Statistics, the birth rate in 2016 surpassed that in 2003 for the first time, reaching 12.95‰ (Liu and Liu (2020)). However, the policy also incurs considerable additional time costs of childbearing and rearing for parents, especially for women. As such, employers may discriminate against job candidates of childbearing age, most likely young women, in the labor markets, in anticipation of potential productivity reduction or even departure from the jobs due to their future commitment to family obligations (He, Li, and Han (2022)).

As current or prospective job candidates facing potential motherhood responsibilities, female college students are directly impacted by the universal two-child policy. In the presence of challenges in the labor market, both present and anticipated, female college students may hesitate to take on loans due to concerns about their job prospects and repayment

abilities. To support this, we provide additional evidence using provincial reforms of maternity leaves, which were implemented in a staggered manner in 2016 to further refine birth control policies and boost population growth. Extended maternity leaves can increase employers' costs in hiring young female workers, potentially diminishing these workers' job prospects. Therefore, we examine the following hypothesis:

Hypothesis 1: *The number of loan applications from female college students decreases following the implementation of the universal two-child policy and the extension of maternity leaves.*

However, female college students may not necessarily be less inclined to apply for loans. Instead, a decline in applications from female students could be driven by changes in credit supply rather than demand. For example, the lenders and the platform may recognize the negative impact of the universal two-child policy on female college students' job opportunities, raising concerns about their creditworthiness. In response, the platform may employ stricter screening processes on female borrowers, which could discourage potential applicants from seeking loans on the platform.

To differentiate the supply and demand channels, we further investigate the approval and delinquency information on this platform.[14] If supply-side screening is the main driving force, we expect to observe a lower approval rate for female applicants after the policy change. Nevertheless, even if the approval rate does not decrease, one may question whether low-quality borrowers have already been discouraged by the more stringent screening processes implemented initially. In such as scenario, the approval rate for high-quality

[14]Note that the interest rate on MingXiaoDai is fixed at 0.99% per month. Therefore, we cannot use the variation in interest rates to differentiate between supply and demand effects.

applicants might not decline. To address this concern, we can further examine the loan performance of these borrowers. If that is indeed the case, we should see a decrease in delinquencies among high-quality borrowers.

In contrast, if the demand channel dominates, the approval rate of the platform should remain unchanged or even increase because the quality of the application pool may improve, as only applicants less affected by negative labor market prospects would choose to apply. However, the quality of approved loans remains similar if the screening criteria from the supply side have remained consistent. As a result, the delinquency rate would not change significantly. We develop the following hypothesis to tease out the possible credit supply channel as the consequence of negative labor market outcomes due to the universal two-child policy.

Hypothesis 2: *The approval rate for loan applications does not decrease after the policy change. In addition, the delinquency rate would not change if the platform (the credit supply side) did not apply stricter screening to female college students.*

Furthermore, we study the underlying mechanism by exploring the heterogeneous effects of the universal two-child policy on loan applications from female college students. We first exploit variations in loan and applicant characteristics. When facing poorer labor market conditions, female college students might be concerned about the returns to human capital investment and become more cautious about borrowing for this purpose. In addition, they may be more hesitant to take on long-term and large-amount loans, which could impose excessive burdens in the future. As we can also observe the major of applicants, we explore the borrowing behaviors across the major backgrounds and expect the

effect to be stronger in male-dominated areas such as STEM. Following is the corresponding hypothesis:

Hypothesis 3: *The discouraging effect of the universal two-child policy on loan applications from female college students is stronger for long-term and large-amount loans, loans with human capital investment purposes, and among applicants with STEM backgrounds.*

We also expect that female students in more competitive job markets are less likely to borrow after the shock because their future employers are more concerned about their commitment to childbearing and rearing, leading to increased selectivity among female job seekers. In contrast, the effect would be weaker if the local economy is less market-oriented, indicated by a higher share of state-owned sectors. Our related hypothesis is the following:

Hypothesis 4: *The number of loan applications from female college students decreases more in more economically developed areas and in areas with a lower fraction of state-owned sectors.*

4.2 Empirical Methodology

Based on the hypotheses developed in the previous section, we employ difference-in-differences strategies to test the effect of the two-child policy on the borrowing behaviors of female college students compared to male students through the P2P platform.

Although the universal two-child policy officially took effect on January 1, 2016, as shown in Figure 1, the policy had been spotlighted on social media as early as late July 2015. Therefore, we use August 2015 as the cut-off month for our primary setting. Our main regression specifications are as follows:

$$y_{u,g,t} = \alpha + \beta \cdot \text{Post}_{t \geq t*} \times \text{Female}_i + \gamma_{s,t} + \psi_{u,g} + \epsilon_{u,g,t} \tag{1}$$

where the dependent variable $y_{u,g,t}$ is at the university(u)-gender(g)-month(t) level. Post$_{t\geq t*}$ is an indicator taking one since month t*. Female$_g$ is an indicator taking one for female applicants. We are interested in the interaction term between Post$_{t\geq t*}$ and Female$_g$ as it captures the difference-in-differences effect. We also consider strict fixed effects to control for possible confounding factors. Specifically, $\gamma_{s,t}$ denotes city-year-month fixed effects which will absorb any regional time-varying economic conditions that may affect students' borrowing activities. $\psi_{u,g}$ denotes university-gender fixed effects which consider the variations of gender composition across different universities.

When we explore the heterogeneity of the effect, we further introduce an additional interaction between a variable of economic opportunities or structures and the difference-in-difference term and examine whether the effect gets intensified or mitigated by varying in a specific economic dimension. The specification is as follows:

$$y_{u,g,t} = \alpha + \beta \cdot \text{Post}_{t\geq t*} \times \text{Female}_g \times \text{Z}_{s,t-1} + \gamma_{s,t} + \psi_{u,g} + \epsilon_{u,g,t} \tag{2}$$

where Z$_{s,t-1}$ denotes a dummy variable indicating different economic conditions of the region in the previous calendar year. We take a one-year lag on the economic variable to examine whether the impact of the reformed policy varies with the past economic environment.

5 Empirical Results

5.1 Baseline effect

5.1.1 Does the universal two-child policy affect loan applications?

We first examine whether female college students reduce their willingness to borrow after the introduction of the universal two-child policy. Table 2 presents the difference-in-differences regression results. The national implementation of this reformed policy began on January 1st, 2016. Therefore, we define the treatment period as all sample months from January 2016. Column (1) presents the result of its effect on the log of the number of loan applications after the policy implementation. It shows that female college students significantly reduce their applications following the shock. In terms of economic magnitude, the reform, on average, leads to a decrease in loan applications of 12.75% (=$e^{0.120}$-1) for female college students relative to their male counterparts in the same college.

To better illustrate the importance of this effect, it is worth mentioning that the average loan amount of an application is ¥7,878.5 (=254,474.8/32.3). Also, the average amount of a loan application from a female student (¥8,074.0) is higher than that from her male schoolmate (¥7,847.4). By comparing the average loan value with the college tuition fee, which varies from ¥4,000 to ¥7,000 per school year for most majors in public universities[15], we can see that borrowing represents a significant financial decision for college students. This is particularly true when the average monthly expense for Chinese college students is only less than ¥2,000.[16] Moreover, data from Zhaopin.com, a major recruitment website,

[15]College tuition fees for public schools are relatively stable over time as required by the central government. Provincial governments are only allowed to adjust their standards for schools slowly.

[16]According to a survey study done by MyCos and Tencent Education in 2020, college students spend on average ¥1,734 per month (excluding tuition fees and transportation expenses) with mostly of these expenses covered by their parents and relatives. MyCos is a leading higher education consulting firm in China.

indicates that the average expected (and actual) monthly salary for college graduates' first jobs was ¥4,985 (¥4,765) in 2016. This shows that college students are making decisions involving substantial amounts of money when borrowing. Therefore, our results suggest that female university students are strongly concerned about the poorer job prospects induced by the relaxation of the two-child policy, leading them to be noticeably more hesitant to borrow before entering the job market.

A valid concern regarding this result is the possibility of information leakage about potential reforms prior to the national implementation of the universal two-child policy. If this is the case, the policy impact on female incentives to borrow could be underestimated. To verify this concern, we track public attention toward the two-child policy in general and its reform by exploiting the Baidu Search Volume Index, which measures the search volume of specific keywords on Baidu. Figure 1 displays the daily index from June 2015 to January 2016. We find that the first significant spike in public discussions surrounding the policy reform occurred in July 2015. This pattern remains consistent across various keywords, including the Chinese equivalents of "the two-child policy" and "the universal two-child policy." Together with the survey evidence mentioned in the Introduction, these findings suggest that female college students may adjust their expectations regarding the future employment environment affected by the new birth control policy, and consequently alter their borrowing behaviors even before the national implementation in 2016.

Therefore, we further examine whether there was a decline in loan applications from female students relative to their male counterparts during the period of information leakage in 2015. Column (2) of Table 2 presents the results of the effect on loan applications in two distinct periods: from August to December 2015 and after January 2016. The findings indi-

cate that apart from the implementation period starting in 2016, a significant reduction in female applications is also documented during the leakage period between August and December 2015.[17] On average, the anticipation of a relaxed birth control policy corresponds to a relative decrease of 6.18% (=$e^{0.060}$-1) in loan applications from female college students. This effect is significantly different from the impact observed for female applicants following the formal implementation of the reform in January 2016, which results in a more substantial 15.6% (=$e^{0.145}$-1) drop in loan applications compared to the finding in Column (1). The difference between these two effects on female applicants in two distinct periods is also statistically significant, suggesting that female college students are responding gradually as the reform of the two-child policy unfolds. Therefore, we expand our definition of the treatment period to August 2015 in subsequent analyses to comprehensively capture the policy effect.

5.1.2 Parallel trend assumption

While the above results indicate significant differences in loan applications between female and male college students following the initial public attention to the new policy in July 2015, it is crucial to examine whether they have been behaving differently prior to this period. For this purpose, we test the gender difference between loan applicants in June 2015. Column (3) of Table 2 presents the result. The coefficient on the difference-in-differences term is statistically insignificant, supporting the validity of the parallel trend assumption. There are no significant pre-trend differences between the treatment (female) and the control (male) group. Meanwhile, the point estimates indicate no significant differences in the

[17] Since the earliest two obvious spikes of public attention took place in the middle of July 2015, we exclude this month from the leakage period for a clearer assessment of the effect.

effects on female college students before and during the leakage period.

5.1.3 Prevalence of the response

To gain a deeper understanding of the scope and nature of the effect, we examine whether the documented response by female students is driven by outliers. We study the distribution of the post-shock responses within the treatment group. Following the methodology of Gu, He, Qian, and Ren (2021), we estimate individual-level responses by calculating the change in the propensity to submit a loan application for each student. After accounting for time-invariant individual heterogeneity and common time trends, we compute the post-shock propensity change for each female student relative to male students.[18]

We plot the distribution of the post-shock response in the propensity to apply for a P2P loan among treated female students in Figure IA.1. Approximately 60% of this group displays a decrease in their propensity to apply following the policy shock in July 2015.[19] This finding suggests that the negative post-shock response among female students is prevalent and not solely driven by the extreme responses of a few individuals. Therefore, Figure IA.1 sharpens the interpretation of the documented effect. While some female students could be more likely to borrow and invest in their education in response to deteriorating job prospects, the majority still decide to stop borrowing to avoid the debt burden. [20]

[18] Specifically, we first regress the monthly loan application dummy on individual fixed effects and school-specific time trends. The propensity to apply for a loan is defined as the residuals of the treatment group minus the same-month average of the residuals of the control group. We then compare the average propensities between the pre-shock and post-shock periods for each treated individual and plot the changes in propensity.

[19] In an unreported analysis, we further examine the distribution of post-shock propensity changes among female students who are repeated borrowers. We find the majority (58.7%) of treated students show a decrease in the propensity of loan application.

[20] We also examine those treated female students who display an increase in borrowing propensity. Interestingly, we find that these students are more likely to come from elite universities in China. This pattern implies that either the future job prospects for these elite female students remain unaffected by the policy, or they perceive it as worthwhile to invest in their human capital to compensate for the diminished job prospects.

5.1.4 Demand or Supply?

It is possible that female college students reduce their willingness to borrow due to gender bias from the loan platform. For example, capital providers may have an incentive to discriminate against female applicants, stemming from a perceived higher likelihood of loan defaults among female students, due to the negative impact of the universal two-child policy on their job opportunities. If female applicants perceive that lenders on the P2P loan platform favor male applicants following the implementation of the universal two-child policy, they may anticipate lower approval rates for their loan applications, leading to their reluctance to apply in the first place. In this case, the relative decline in borrowings among female students could be attributed to the supply-side factors rather than a decrease in demand.

The above proposal is unlikely to explain the effect we document. Using the information on loan approval, we examine whether there is a stronger gender bias from the platform after the policy change. Panel A of Table 3 presents the result. Instead of being discriminated against by lenders, female applicants are, to some extent, favored after the introduction of the universal two-child policy. The reform, on average, leads to a 3.4% increase in loan approval rate for female applicants relative to that for male applicants from the same college. This evidence appears against the supply side story.

However, even if the approval rate does not decrease, one may question whether lower-quality female borrowers have already been deterred by more stringent screening processes targeting female students in the first place. Therefore, the approval rate for high-quality applicants does not decline. To further address this concern, we assess whether loans to

female applicants are more likely to become delinquent after the policy reform. For a clearer comparison, we utilize two seven-month observation windows. Panel B of Table 3 presents the result. After the introduction of a relaxed birth control policy, we observe no significant differences in loan delinquency rates between female and male applicants. This is also the case when we use alternative observation windows for comparison, as shown in Table IA.1 in the Internet Appendix. Therefore, it appears that lenders are not implementing more stringent screening for female applicants after the introduction of the new policy.

5.2 Additional evidence from reforms of maternity leave

In this subsection, we link local maternity leave policies with college students' borrowing choices. Following the nationwide universal two-child policy implemented by the central government, provincial governments launched reforms of extending maternity leaves successively in 2016 to further refine birth control policies and encourage population growth. This provides another setting to test the impact of expected negative labor market outcomes on loan applications.

Using local reforms of maternity leaves provides three advantages. First, we can implement staggered difference-in-differences tests by exploiting the varying implementation dates of these reforms across provinces.[21] In contrast with our baseline regressions that use a universal cutoff for the national policy change, the variation in timing mitigates confounding effects from any national time-series shocks that may coincide with the universal two-child policy.

Second, extending maternity leaves would directly lower the workload of pregnant em-

[21]The conclusion remains unchanged when employing a stacked difference-in-differences approach, as shown in Table IA.2 in the Internet Appendix .

ployees and thus increase production costs for employers and firms hiring female workers. This could in turn lead to additional disadvantages for female job seekers. Anticipating this potential outcome of a more competitive job market, female college students might choose to reduce their loan burden and insolvency risks by decreasing their loan applications before entering the workforce. Therefore, if female students indeed apply for fewer loans following local maternity leave reforms, this would provide strong and consistent support for our proposed channel.

Finally, in this series of tests, we can examine loan applications from male students separately. While our previous results focus on the relative comparison between female and male students, this allows us to investigate whether the documented relative decrease in female students' credit demand is attributed to the increase in borrowing among male students.

Table 4 presents the results. Female college students are significantly more reluctant to borrow after the extension of maternity leave by provincial governments. For example, the extension of maternity leave, on average, leads to a 3% decrease in loan applications from female students relative to their male schoolmates in the first month (30 days) after the change. The effect continues to grow up to 12.7% in the first two months following the change, suggesting that female students take time to recognize the undesirable impact of the change on their future employment prospects. The effect diminishes but remains significant and stronger than the initial magnitude even in the third month after the reform.[22]

Moreover, the effect of maternity leave reforms is not driven by changes in the behaviors

[22]In each column, we examine the $[t-x, t+x]$ window. The number of observations in Column (3) is lower than that in Column (2) because a few provinces carried out the reforms in March 2016, which we exclude from the analysis because the $[t-90, t]$ window covers the Chinese New Year.

of male applicants. As shown in Table IA.3 of the Internet Appendix, there are no significant changes in loan applications among male college students after the extension of maternity leave. Therefore, the evidence above suggests that female university students indeed rapidly learn about the fiercer competition in their future employment market resulting from the extended maternity leave and respond by reducing their borrowing. This supports our proposed channel of negative labor market implications for female students.

5.3 Mechanism

In this subsection, we provide evidence from different aspects of the proposed mechanism: due to concerns about job opportunities arising from labor market challenges after the relaxation of the birth control policy, female college students become less inclined to borrow.

5.3.1 Evidence from loan characteristics

We exploit the heterogeneity in loan and loan applicant characteristics to examine the mechanism of negative labor market implications for female college students. To this end, we change the dependent variable from the logged number of applications to the ratio of the number of specific types of loans to the total number of loan applications. Table 5 presents the result. Panel A of the table focuses on different purposes of borrowings. For example, the new birth control policy leads to, on average, a significant reduction of 3.1% in the proportion of loan applications aimed at human capital investment purposes for female students compared to their male schoolmates, while there is no significant difference in loans sought solely for consumption purposes.[23] This evidence implies that female stu-

[23]In an unreported test, we assess the approval rates for loans intended for consumption versus human capital investment purposes. We do not see a change after the policy reform. This suggests that there is no

dents are less willing to prepare themselves for future competitions in job markets after the new birth control policy, as they anticipate the challenges may not justify further leveraged investments in their human capital.

Meanwhile, regarding borrowers' backgrounds, we find the discouraging effect on borrowing is relatively stronger for female loan applicants majoring in STEM (science, technology, engineering, and math) majors. As shown in Panel B of Table 5, the relaxation of the two-child policy is associated with a significant drop of 6.2% in the fraction of loan applications from female college students in STEM majors compared to their male schoolmates. Given the pervasive evidence of gender disparity in STEM industries in China and other countries (e.g., Rickne, 2010; Glass, Sassler, Levitte, and Michelmore, 2013; on Equal Opportunities in Science and Engineering, 2015; Adams and Kirchmaier, 2016; Zhang, Jin, Li, and Wang, 2021), female students in STEM majors could be more concerned about wage rates and employment opportunities. Consequently, they would be more reluctant to borrow after introducing the universal two-child policy, which is expected to impede their career development.

The results for tests about loan duration and loan amount displayed in Panels C and D are consistent with the above findings. The policy reform significantly lowers the average application ratio of long-term loans (defined as loans lasting for 24 months or more) by 3.0% and that of large loans (defined as loans with an amount above the mean value) by 4.1% for female students relative to their male counterparts.[24] These results corroborate the finding of a stronger impact on borrowings for human capital investment because expenditures

incentive for applicants to switch purposes to secure easier approval.

[24]Table IA.4 of the Internet Appendix shows that the results are robust to different cutoffs for the loan terms and loan amounts.

on human capital investment, such as tutorials and exams for vocational certificates or language proficiency, are usually larger and more sustained than consumption spending.

In addition, we explore the policy impact on college students' decisions regarding human capital investment, particularly their choices to attend graduate schools, a popular path for Chinese undergraduates. Using education statistics from the Ministry of Education, we observe a sudden drop in female postgraduate enrollment ratios in 2017 at both national and provincial levels. Moreover, we highlight two noteworthy facts about this post-policy reduction in enrollment. First, this gender gap in responses is primarily attributed to changes in enrollment in master's degree programs. Second, the magnitude of the decline in female postgraduate enrollment ratios is positively correlated (ρ=0.3641 and significant at 10%) with the policy effect on loan applications from female college students across provinces. Thus, this geographic pattern further corroborates our findings regarding the discouraging effect of the two-child policy on human capital investment for female college students.

5.3.2 Evidence from economic opportunities

We leverage variations in the local economic environment by collecting economic data of the cities and provinces where their universities and colleges are located, we then test whether the baseline effect on female borrowing is intensified by higher levels of regional economic development using various measures. The intuition is that more developed areas attract more job seekers, resulting in more competitive job markets. Consequently, female college students in these regions would expect more difficulties in their future job searches after the introduction of the universal two-child policy. Therefore, we expect female students in more developed regions to be more dissuaded from borrowing after the reform of

the birth control policy.

We first examine how the baseline effect of the universal two-child policy varies across provinces by interacting the difference-in-differences term with province dummies. Figure 4 displays the results.[25] Our analysis reveals two geographical patterns. The effect on female borrowings is much stronger in coastal regions, which are usually more developed than inland regions. Stronger effects are also recorded for provinces located in the Bohai Bay Economic Rim, the Yangtze River Delta Economic Zone, and the Pearl River Delta Economic Zone, the major economic hubs in China. These patterns of geographic distribution imply that female students in more developed regions are relatively more affected by the policy.

We continue to test the hypothesis by exploring the heterogeneous effects of regional economic development. We use city- and province-level GDP data to identify the most developed regions sorted by regional economic outputs. Given a potential non-linear effect of GDP and ease of interpretation, we construct dummy variables that take one for regions with GDP levels above different thresholds.[26] We then interact these dummy variables with the difference-in-differences term. Panel A of Table 6 reports the results for these tests. The baseline effect on female borrowings is, on average, 9.5% (11.2%) stronger in provinces (cities) in the top decile relative to other provinces (cities) after the introduction of the universal two-child policy. The effect is, on average, 9.3% stronger in the top five provinces relative to others when sorted GDP. Although the signs of these coefficients are consistent with our hypothesis of a larger effect for developed areas and the coefficient is economi-

[25]There are no observations from Taiwan in our raw sample. Jiangxi Province and Tibet Autonomous Region are excluded after we collapse the data to the university-month level as we require observations for each month during the sample period.

[26]We verify that explanatory variables used for mechanism analysis are not highly correlated. This implies that they reflect different aspects of the proposed mechanism.

cally significant, the difference is statistically insignificant. This could be due to the coarse grouping of developed regions as there are still many cities in the group. The noise of measuring economic development with regional GDP at the provincial level could be substantial. Therefore, we refine the grouping of regions for larger contrast by applying a descending sorting of GDP at the city level. As a result, we find that the differential effect between the top ten cities and others is 22.8%, and both the economic and statistical significance of the coefficient is enhanced.

While the above result supports our hypothesis of a stronger effect of the policy on students in more developed regions, it also implies the importance of using a clearer categorization of regional economic development. Since GDP measures can sometimes be noisy in reflecting overall development and the competitive landscape of job markets in the region, we use different classification methods. For example, we resort to the sample by GDP per capita at each level and repeat the above analysis. As shown in Table IA.5 of the Internet Appendix, the sign of coefficients is still consistent with the hypothesis and the significance level improves.[27]

Furthermore, we employ the official definition of "Tier-1" and "Tier-2" cities for a more precise representation of developed cities. Panel B of Table 6 shows the results. Beijing and Shanghai, the two most developed cities in China, have a much stronger average policy effect on female college students relative to other cities. The difference in average policy effect is still large (43%) and significant when we compare all four Tier-1 cities with the remaining region. The inter-regional difference drops to 0.3% and becomes insignificant

[27]We also rerun the test with indicator variables for other aspects of economic development, including the ratio of the tertiary sector, disposable income, and consumption level. As shown in Table IA.5 of the Internet Appendix, the signs of coefficients are all negative and consistent despite statistical insignificance.

when we add 31 Tier-2 cities to the developed group for comparison. Overall, the above evidence of heterogeneity analysis provides strong support for our hypothesis of a larger policy effect in more developed regions. The difference between developed areas and the remaining places is large and robust across various measures of economic development.

5.3.3 Evidence from economic structure

While the above analysis is based on a direct comparison of economic development, we take a step further to test the heterogeneous effects of economic structure. Specifically, we are interested in the degree of market orientation of the local economy. This is important because economic development may not fully reflect the competitiveness of local employment markets since government intervention and state involvement can also enhance short-term production. In such scenarios, female students in developed cities could still be less concerned about their future employment as competition is likely to be milder in a planned economy. The underlying assumption is that production efficiency is more prioritized in market-oriented economies in general. Therefore, it is crucial to describe the competition level of local employment markets and capture how the baseline policy effect varies accordingly.

To this end, we exploit variations in the size of the state-owned sector within local employment. We collect data from the China Labor Statistical Yearbook, which provides detailed numbers of urban employment at different dimensions. We then calculate the ratio of urban employment in the state-owned sector to total urban employment. We use all three available subcategories of state-involved units to form a comprehensive measure of the state-owned sector. Similarly, we then define an indicator variable taking one if the

provincial ratio is larger than the cross-sectional median and interact it with the difference-in-differences term.

The results are presented in Table 7. Column (1) uses the full sample. The average policy effect on female students is reduced by 16.2% in cities located in provinces with a large state-owned sector in terms of urban employment.[28] The magnitude is both economically and statistically significant. This finding suggests that female students indeed feel less pessimistic about their job prospects following the policy shock in regions that have less market-oriented competition in local urban employment. Therefore, they are less reluctant to borrow before entering the job market.

To ensure that this result is not spurious or essentially capturing the same heterogeneous effect of economic development, we rerun the test with different sub-samples. Since developed regions like Beijing and Shanghai also, to some extent, exhibit strong state involvement in the industrial sector, we gradually exclude observations from Tier-1 cities in the sample. As shown in Columns (2) to (4) in Table 7, the reduction in the average treatment effect for regions with the larger state-owned sector in local urban employment is robust across different sub-samples. The economic magnitude varies from 10.8% to 16.2% with robust statistical significance. Therefore, this rules out the possibility of capturing a "Beijing Effect" or "Top Cities Effect." More importantly, this finding strongly supports the hypothesis of a smaller treatment effect for less market-oriented regions, providing solid evidence for the negative labor market implication channel.

[28]Narrowing the definition of the state-owned sector to include only state-owned units produces similar results as shown in Table IA.6 of the Internet Appendix. Furthermore, we rerun the test with indicator variables for the state-owned sector of urban female employment. Similar policy effects are found as shown in Table IA.6, implying the stability of state involvement in both female employment and total employment in urban job markets.

5.3.4 Expectations of policy effectiveness

Given that the one-child policy included several initial exemptions and has seen partial relaxations since 1984,[29] there could be variations in the effectiveness of the universal two-child policy in promoting fertility. The uneven implementation of the one-child policy could result in differing impacts across regions from the subsequent shift to a universal two-child policy. Both employers and employees may anticipate the potential outcomes of the policy change and the impact on female borrowing may depend on the stringency of the previous birth control measures.

As such, we exploit regional variations in the binding effect of the one-child policy. Specifically, we analyze the historical demographic composition of each province and construct proxies based on the proportions of two exempted population groups: ethnic minorities and rural households. Provinces with a higher ratio of these groups are then classified as less restricted regions, where we would expect a smaller increase in fertility rates after the universal two-child policy. We then explore the heterogeneity of the baseline effect from this perspective.

Results are reported in Table IA.7 of the Internet Appendix. We find a weaker policy effect on female loan applications in provinces with a larger minority population from 1982 to 2010. This pattern is robust across different thresholds used to define the indicator, as well as when employing an alternative proxy based on agricultural household registration.

[29]The one-child policy had originally exempted some people like ethnic minorities from its restrictions. Several notable reforms of the policy have occurred over the years. For example, rural households with only one daughter were allowed to have two children under the "one-and-a-half-child" policy in 1984. The increased birth quota was also applied to urban couples under the "two only-child two children" policy in 2002, provided both parents met the only-child requirement within their own families. This condition on the parents was further relaxed by the "selective two-child" policy in 2013.

Together, these results support the mechanism wherein pre-shock expectations regarding the policy's effectiveness shape loan application patterns of female college students across different regions.

5.3.5 The role of social norms

We offer insights into how social norms may have influenced the borrowing decisions of female college students. Their responses to potential changes in future job prospects resulting from the new policy should depend on their perceptions of gender discrimination, which are intuitively shaped by their background and beliefs on gender inequality. Based on this hypothesis, we study the heterogeneous effects of son preference, a deeply entrenched social norm in many Chinese families. Specifically, we use sex ratios at birth in students' hometowns to measure the prevalence of this social norm in their background.[30] The assumption is that a common practice of son preference, indicated by an abnormally high sex ratio at birth, would shape daughters' beliefs and make them more aware of gender discrimination. Hence, they would be more sensitive when interpreting the policy consequences on the gender income gap, regardless of whether they are returning to their hometowns or not after graduation.

In Table IA.8 of the Internet Appendix, we classify the current sample based on sex ratios at birth in students' residence provinces. Mean sex ratios are computed between 1982 and 2010 to capture the long-standing social norm among the local population. We then re-run the baseline regression in each sub-sample to decompose the policy effect on

[30]The sex ratio at birth is approximately 106 boys for every 100 girls in China. Distortions to this balanced sex ratio often arise from interventions such as sex-selective abortions and under-reporting, leading to the problem of "missing women," first proposed by Sen (1992). Numerous studies have linked this phenomenon in China with the one-child policy (e.g., Ebenstein (2010); Chen, Li, and Meng (2013)).

female borrowings. As shown in Panel A, our baseline effect is mostly driven by female students from high-sex-ratio provinces. The difference in effects between students from low-sex-ratio and high-sex-ratio provinces is strongly significant. Furthermore, results in Panels B and C, where we use sex ratios based on different birth orders to more accurately capture the degree of son preference, highlight the robustness of this pattern. Together, our findings imply a crucial role of social norms in shaping female college students' choice of loan applications.

5.3.6 Alternative mechanism: internal resource competition

An alternative potential mechanism involves female students' concerns about increased competition for internal family resources. Specifically, anticipating the arrival of a second child in the parents' family, female students may worry about receiving less financial support from parents, leading them to reduce their borrowing to avoid accumulating debt burden. While the competition for limited family resources could impact both male and female students, this concern may be more pronounced for female students, as there is a common preference for sons in Chinese families, which could encourage parents of female students to have a second child, potentially diverting resources away from their daughters.

To address this concern, we explore the heterogeneity of the baseline effect based on actual fertility responses to the policy change in students' residence provinces. If female students are concerned about internal resources instead of future job prospects, we should observe a stronger policy effect for those whose hometown provinces experience larger increases in childbearing. We sort students' residence provinces by the change in two major

measures of fertility before and after the policy shock.[31] We then examine the difference in the baseline effect between students from home provinces with higher and those from home provinces with lower fertility responses.

Table IA.9 displays the results. We find no significant differences in the baseline effect between female students from home provinces with large versus small increases in birth rates. This result is robust across different observation windows. Similarly, we document insignificant differences between these regions when using total fertility rates as alternative measures of fertility responses. We also narrow our analysis to women aged between 35 and 49 since they are more representative of mothers of college students. Again, we find no significant difference in our baseline effect across these regions. This suggests that the alternative explanation of internal resource competition is unlikely to account for the observed findings.

6 Conclusion

The salary gap between males and females is often used as a measure of gender inequality. China switched from a one-child policy to a two-child policy in 2016, which increased working mothers' burden and employability difficulties for female job seekers. We show evidence that female university students, under the new policy, react to labor market conditions and borrow less, relative to their male counterparts. Loan applications from female students also drop after local provincial governments extended maternity leaves in a staggered manner. More developed and market-oriented regions, as well as students who

[31] Birth rate is a direct measure of the number of live births per 1,000 population. The total fertility rate is a more comprehensive measure as it represents the average number of children a woman would have over her lifetime if she were to experience the current age-specific fertility rates throughout her childbearing years. Both measures are commonly used to depict a population's reproductive patterns.

originate from provinces that display a stronger son preference, exhibit stronger results.

We find that women borrow less after the introduction of the two-child policy is at least partly attributable to their reduced investment in human capital. Therefore, the gender pay gap may be widened after the reform due to young women's self-initiated response to the anticipated drop in future employability. As China further removed all family size limits in 2021, policies that make work environment more family-friendly and reduce the gender gap in the job market are desirable. These policies should lower the motherhood wage penalty and encourage women to invest in human capital.

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Table 1. **Descriptive Statistics**

This table provides descriptive statistics for student applicants from all university-gender groups and male groups versus female groups. Student applicants are separated based on their gender. *Total Number of Applications* is the sum of the number of applications received from students in the same university-gender group. *Total Loan Amount* is the sum of nominal values of loan amount applied by students in the same group. *Fraction: Purpose = Human Capital Investment* is the ratio of loans applied for human capital investment purposes to total loan applications. *Fraction: Purpose = Consumption* is the ratio of loans applied for consumption purposes to total loan applications. *Fraction: STEM Majors* is the ratio of loans applied by students with STEM majors to total loan applications. *Fraction: Repayment Period* ≥ 24 *Months* is the ratio of loan applications which have a repayment period of 24 or 36 months to total loan applications. *Fraction: Loan Amount* > 6440 is the ratio of loan applications which have a loan amount larger than 6,440 (mean) to total loan applications. *Fraction: Application Approved* is the ratio of approved loan applications to total loan applications. p1, p10, p50, p90, and p99 denote the value of 1-, 10-, 50-, 90-, and 99-th percentile.

	Total		Male		Female		Differences		p1	p10	p50	p90	p99
	N	Mean	N	Mean	N	Mean	Mean	t-statistics					
Total Number of Applications	21,605	32.3	15,950	36.3	5,655	20.9	15.4	36.7***	1	4	23	71	161
Total Loan Amount	21,602	254474.8	15,949	284860.2	5,653	168747.2	116113	32.4***	2500	24400	175200	567200	1323800
Fraction: Purpose = Human Capital Investment	21,602	0.490	15,949	0.481	5,653	0.514	-0.033	-9.9***	0	0.273	0.479	0.75	1
Fraction: Purpose = Consumption	21,602	0.222	15,949	0.232	5,653	0.193	0.038	14.0***	0	0	0.2	0.4	1
Fraction: STEM Majors	21,602	0.140	15,949	0.170	5,653	0.055	0.115	59.3***	0	0	0.089	0.375	0.667
Fraction: Repayment Period $\geq$ 24 Months	21,602	0.515	15,949	0.506	5,653	0.539	-0.033	-9.3***	0	0.271	0.5	0.8	1
Fraction: Loan Amount $>$ 6440	21,602	0.487	15,949	0.483	5,653	0.498	-0.015	-4.4***	0	0.255	0.481	0.734	1
Fraction: Application Approved	21,602	0.588	15,949	0.583	5,653	0.603	-0.020	-6.9***	0	0.406	0.574	0.8	1

Table 2. **The Effect of the Universal Two-child Policy on Loan Applications**

This table shows the effect of the universal two-child policy on loan applications from university students. *Log(Number of Applications)* is log of the total number of loan applications. *Post*$_{t\geq 201601}$ is an indicator taking one for months since the national implementation of the universal two-child policy on 1 January 2016. *Period*$_{t=201508\text{-}12}$ is an indicator taking one for the period between August 2015 and December 2015. *Period*$_{t=201506}$ is an indicator taking one for June 2015. *Female* is an indicator taking one for female applicants. Standard errors are clustered by city. β_1, β_2, and β_3 are OLS regression coefficients of three interaction terms respectively. Point estimates of differences between these coefficients are shown in the table. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Dep. Var	Log(Number of Applications)		
Post$_{t\geq 201601}$ × Female	-0.120***	-0.145***	-0.152***
	(0.028)	(0.036)	(0.039)
Period$_{t=201508\text{-}12}$ × Female		-0.060**	-0.067**
		(0.030)	(0.032)
Period$_{t=201506}$ × Female			-0.051
			(0.033)
$\beta_1 - \beta_2$		*-0.085****	*-0.085****
		(0.022)	*(-0.022)*
$\beta_2 - \beta_3$			*-0.017*
			(0.033)
Adj. R^2	0.895	0.895	0.895
Observations	21,605	21,605	21,605
University × Gender Fixed effects	Yes	Yes	Yes
City × Year-month Fixed effects	Yes	Yes	Yes
Clustered	City	City	City

Table 3. **The Effect of the Universal Two-child Policy on Loan Approval and Delinquency**

This table shows the effect of the universal two-child policy on loan approval (Panel A) and loan delinquency (Panel B). In Panel A, we use the full sample period to test the policy effect on loan approval. In Panel B, we use observations in two 7-month windows around August 2015 to test the policy effect on loan delinquency. Specifically, We compare loans approved and ended between January and July 2015 with those between August 2015 and February 2016. *Fraction of Total Applications* is the ratio of the number of approved loan applications to the number of total loan applications. *Delinquency* is an indicator taking one for loans with records of default. *Post*$_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. Loan controls are dummy variables for loan purposes, loan terms, and loan amounts. Borrower controls are dummy variables for age, grades, majors, and family income levels of loan applicants. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Loan Approval	
Dep. Var	Fraction of Total Applications
Post$_{t\geq 201508}$ × Female	0.034***
	(0.010)
Adj. R^2	0.209
Observations	21,602
University × Gender Fixed effects	Yes
City × Year-month Fixed effects	Yes
Clustered	City
Panel B: Loan Delinquency	
Dep. Var	Delinquency
Post$_{t\geq 201508}$ × Female	0.002
	(0.042)
Adj. R^2	-0.032
Observations	4,079
Loan Controls	Yes
Borrower Controls	Yes
University × Gender Fixed effects	Yes
City × Year-month Fixed effects	Yes
Clustered	City

Table 4. **The Effect of Provincial Reforms of Maternity Leave on Loan Applications**

This table shows the effect of provincial reforms of maternity leave on loan applications. Since 2016, provinces across China have passed amendments of regulations on population and family planning to extend the length of maternity leave. We thus test the effect by comparing situations of loan applications before and after provincial reforms of maternity leave. Three observation windows of 30, 60, or 90 days are used for both periods before and after the passage of provincial amendments respectively. We exclude observations in 2015 to capture the pure effect of extended maternity leave. *Log(Number of Applications)* is log of the total number of loan applications. $Post_{t,t+29}$, $Post_{t,t+59}$, and $Post_{t,t+89}$ are indicators taking one for 30, 60, and 90 days since the passage of provincial amendments respectively. *Female* is an indicator taking one for female applicants. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Dep. Var	Log(Number of Applications)		
$Post_{t,t+29} \times$ Female	-0.030***		
	(0.009)		
$Post_{t,t+59} \times$ Female		-0.127***	
		(0.015)	
$Post_{t,t+89} \times$ Female			-0.086***
			(0.022)
Adj. R^2	0.581	0.560	0.548
Observations	47,103	88,994	68,162
University $\times$ Gender Fixed effects	Yes	Yes	Yes
Year-month-day Fixed effects	Yes	Yes	Yes
Clustered	City	City	City

Table 5. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Loan Characteristics**

This table shows the heterogeneous effect of the universal two-child policy on loan applications, depending on loan characteristics. Specifically, we test for the heterogeneous effect of the policy depending on purposes of borrowing (Panel A), majors of applicants (Panel B), loan term (Panel C), and loan amount (Panel D). *Fraction of Total Applications* is the ratio of the number of the specific type of loan applications to the number of total loan applications. $Post_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var	Fraction of Total Applications
Panel A.1: Purpose = Human Capital Investment	
$Post_{t\geq 201508} \times$ Female	-0.031***
	(0.011)
Adj. R^2	0.242
Panel A.2: Purpose = Consumption	
$Post_{t\geq 201508} \times$ Female	0.001
	(0.009)
Adj. R^2	0.185
Panel B: STEM Majors	
$Post_{t\geq 201508} \times$ Female	-0.062***
	(0.006)
Adj. R^2	0.592
Panel C: Long Term	
$Post_{t\geq 201508} \times$ Female	-0.030***
	(0.011)
Adj. R^2	0.361
Panel D: Large Amount	
$Post_{t\geq 201508} \times$ Female	-0.041***
	(0.012)
Adj. R^2	0.247
Observations	21,602
University $\times$ Gender Fixed effects	Yes
City $\times$ Year-month Fixed effects	Yes
Clustered	City

Table 6. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Economic Opportunities**

This table shows the heterogeneous effect of the universal two-child policy on loan applications, depending on economic opportunities. Specifically, we interact the difference-in-difference term with different proxies of regional economic development. In Panel A, we construct dummy variables based on annual GDP values of provinces and cities in the previous calendar year of loan application. $GDP_{province,top\,decile}$ is an indicator taking one if the provincial GDP falls into the 10th decile in the cross section. $GDP_{city,top\,decile}$ is an indicator taking one if the city GDP falls into the 10th decile in the cross section. $GDP_{province,top\,5}$ is an indicator taking one if the province is ranked in the top 5 from a descending sorting of GDP in the cross section. $GDP_{city,top\,10}$ is an indicator taking one if the city is ranked in the top 10 from a descending sorting of GDP in the cross section. Data on regional GDP are from China Statistical Yearbooks and Provincial Statistical Yearbooks. In Panel B, we construct dummy variables to indicate major cities in China. *Beijing* is an indicator taking one if the applicant's university is located in Beijing. *Beijing&Shanghai* is an indicator taking one if the applicant's university is located in Beijing or Shanghai. *Tier-1 Cities* is an indicator taking one if the applicant's university is located in Tier-1 cities. *Tier-1&2 Cities* is an indicator taking one if the applicant's university is located in Tier-1 cities or Tier-2 cities. The classification of major cities follows the definition used in the Residential Property Price Index published by the National Bureau of Statistics of China. Tier-1 cities refer to Beijing, Shanghai, Guangzhou, and Shenzhen. Tier-2 cities refer to a total of 31 cities including capital cities and sub-provincial cities of all provinces and autonomous regions, except the first-tier cities. *Log(Number of Applications)* is log of the total number of loan applications. $Post_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: GDP				
	(1)	(2)	(3)	(4)
Dep. Var	Log(Number of Applications)			
$Post_{t\geq 201508} \times$ Female	-0.117***	-0.087***	-0.112***	-0.085***
	(0.036)	(0.027)	(0.038)	(0.023)
$Post_{t\geq 201508} \times$ Female $\times GDP_{province,top\,decile}$	-0.095			
	(0.081)			
$Post_{t\geq 201508} \times$ Female $\times GDP_{city,top\,decile}$		-0.112		
		(0.077)		
$Post_{t\geq 201508} \times$ Female $\times GDP_{province,top\,5}$			-0.093	
			(0.060)	
$Post_{t\geq 201508} \times$ Female $\times GDP_{city,top\,10}$				-0.228*
				(0.123)
Adj. R^2	0.894	0.895	0.894	0.895
Observations	21,605	21,605	21,605	21,605
Panel B: Major Cities				
	(1)	(2)	(3)	(4)
Dep. Var	Log(Number of Applications)			
$Post_{t\geq 201508} \times$ Female	-0.124***	-0.097***	-0.097***	-0.123***
	(0.034)	(0.022)	(0.022)	(0.036)
$Post_{t\geq 201508} \times$ Female $\times$ Beijing	-0.089**			
	(0.034)			
$Post_{t\geq 201508} \times$ Female $\times$ Beijing&Shanghai		-0.536**		
		(0.222)		
$Post_{t\geq 201508} \times$ Female $\times$ Tier-1 Cities			-0.430*	
			(0.22)	
$Post_{t\geq 201508} \times$ Female $\times$ Tier-1&2 Cities				-0.003
				(0.058)
Adj. R^2	0.894	0.895	0.895	0.894
Observations	21,605	21,605	21,605	21,605
University $\times$ Gender Fixed effects	Yes	Yes	Yes	Yes
City $\times$ Year-month Fixed effects	Yes	Yes	Yes	Yes
Clustered	City	City	City	City

Table 7. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Economic Structure**

This table shows the heterogeneous effect of the universal two-child policy on loan applications, depending on economic structure. Specifically, we interact the difference-in-difference term with a proxy of regional economic structure in terms of urban employment. *Log(Number of Applications)* is log of the total number of loan applications. $Post_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. We compute the dummy variable for economic structure using provincial annual values in the previous calendar year of loan application. *Large State-owned Sector* is an indicator taking one if the ratio of urban employment in state-owned units, state jointly-run enterprises, and sole state-owned companies to total urban unit employment is higher than the median across provinces. Data on urban employment is from China Labour Statistical Yearbooks. Column (1) shows test results using the full sample, while Column (2) to Column (4) shows test results using sub-samples in which observations from major cities are excluded. The classification of major cities follows the definition used in the Residential Property Price Index published by the National Bureau of Statistics of China. First-tier cities refer to Beijing, Shanghai, Guangzhou and Shenzhen. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dep. Var	Log(Number of Applications)			
	Full Sample	Beijing Excluded	Beijing & Shanghai Excluded	First-tier Cities Excluded
$Post_{t\geq 201508} \times$ Female	-0.211***	-0.211***	-0.156***	-0.160***
	(0.054)	(0.057)	(0.026)	(0.026)
$Post_{t\geq 201508} \times$ Female $\times$ Large State-owned Sector	0.162***	0.162**	0.108***	0.111***
	(0.061)	(0.063)	(0.038)	(0.039)
Adj. R^2	0.895	0.895	0.897	0.898
Observations	21,605	21,054	20,445	19,894
University $\times$ Gender Fixed effects	Yes	Yes	Yes	Yes
City $\times$ Year-month Fixed effects	Yes	Yes	Yes	Yes
Clustered	City	City	City	City

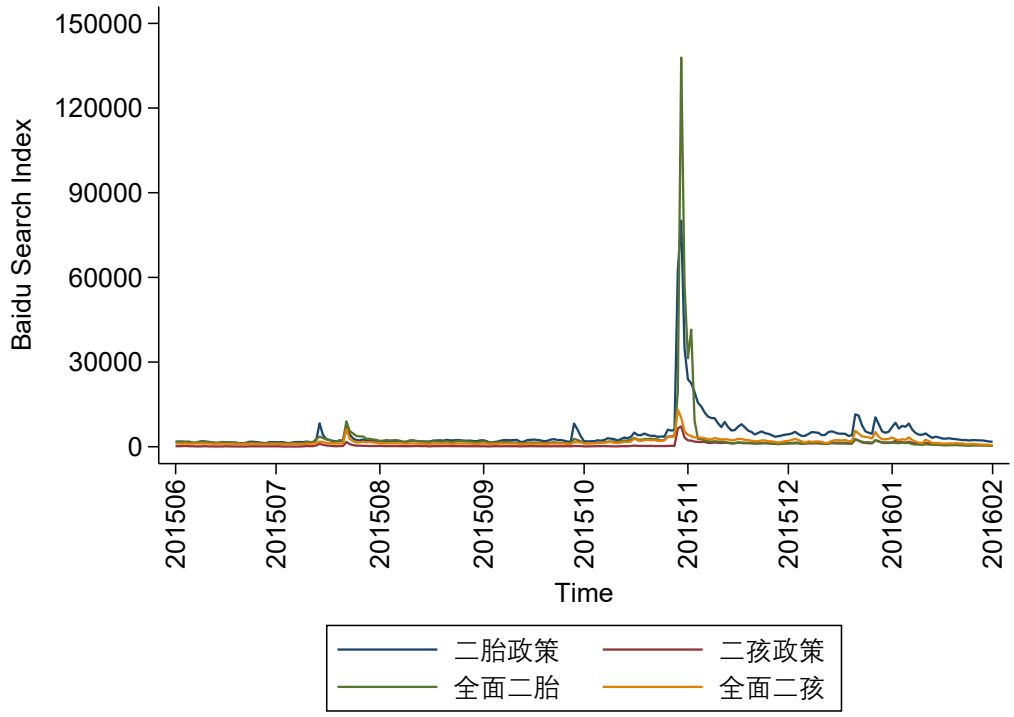


Figure 1. **Baidu Index: 2015.06-2016.01**

This figure displays the trend of online search volume for different keywords related to the universal two-child policy between June 2015 and January 2016. The search volume is captured by the Baidu Index offered by Baidu which is the predominant search engine in China.

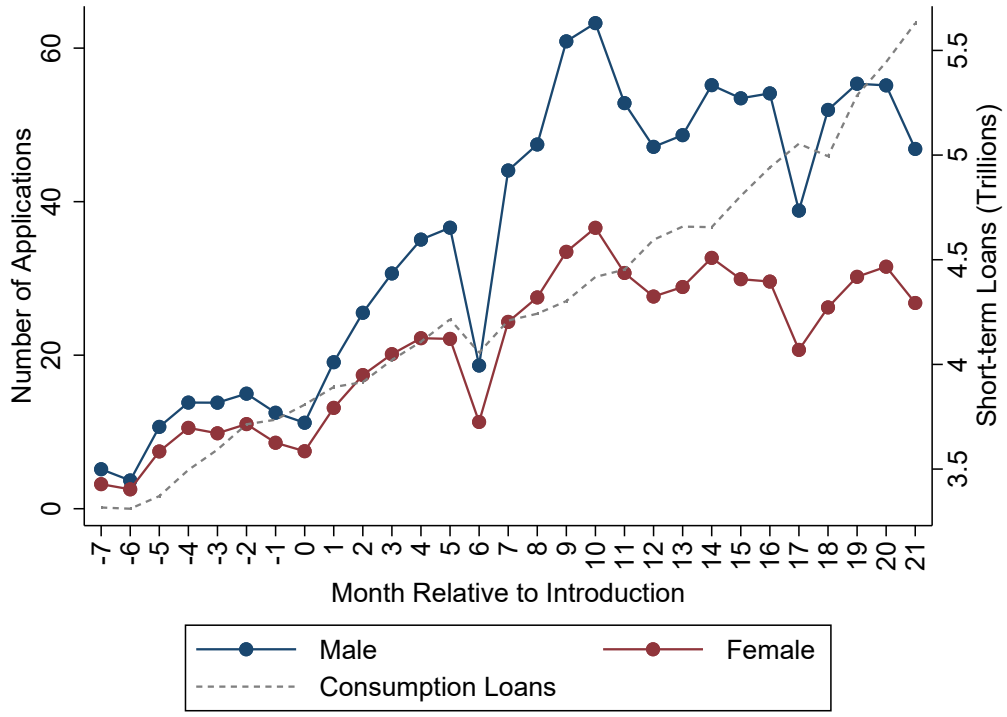


Figure 2. **Average Number of Loan Applications: Gender Comparison**

This figure displays the gender comparison for the monthly average number of loan applications across universities between January 2015 and May 2017. We set August 2015 at the event time 0 when the universal two-child policy started to arouse public attention. The dotted line shows the amount of short-term consumption loans to households in China using statistics published by the People's Bank of China.

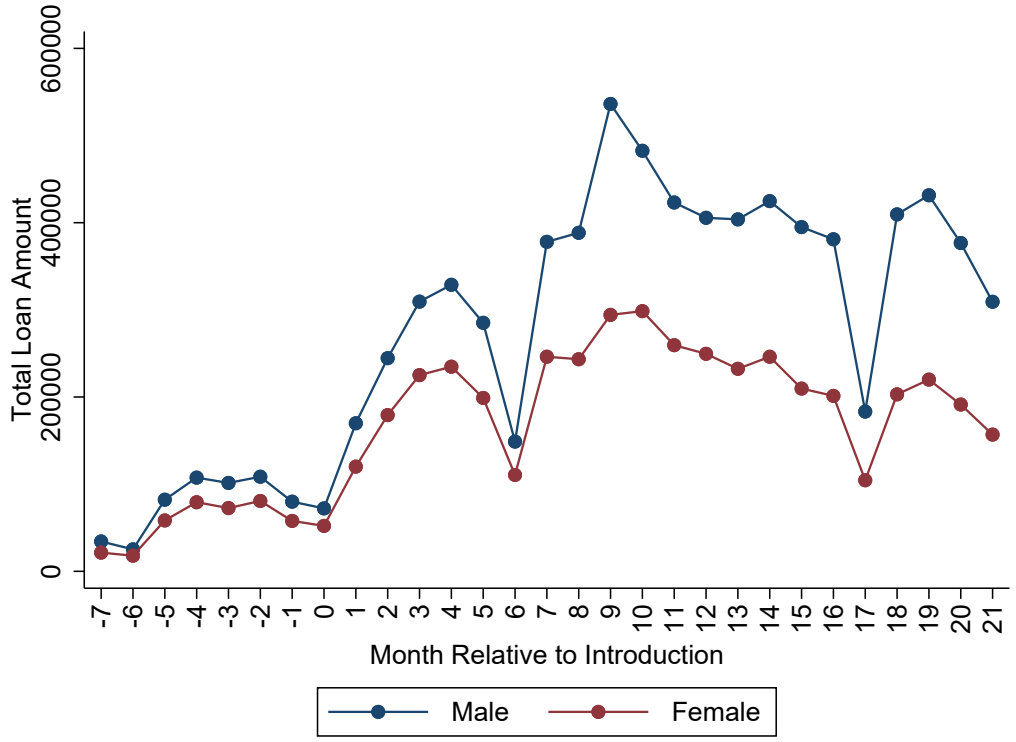


Figure 3. **Average Loan Amount: Gender Comparison**

This figure displays the gender comparison for the monthly average of loan amount across universities between January 2015 and May 2017. We set August 2015 at the event time 0 when the universal two-child policy started to arouse public attention.

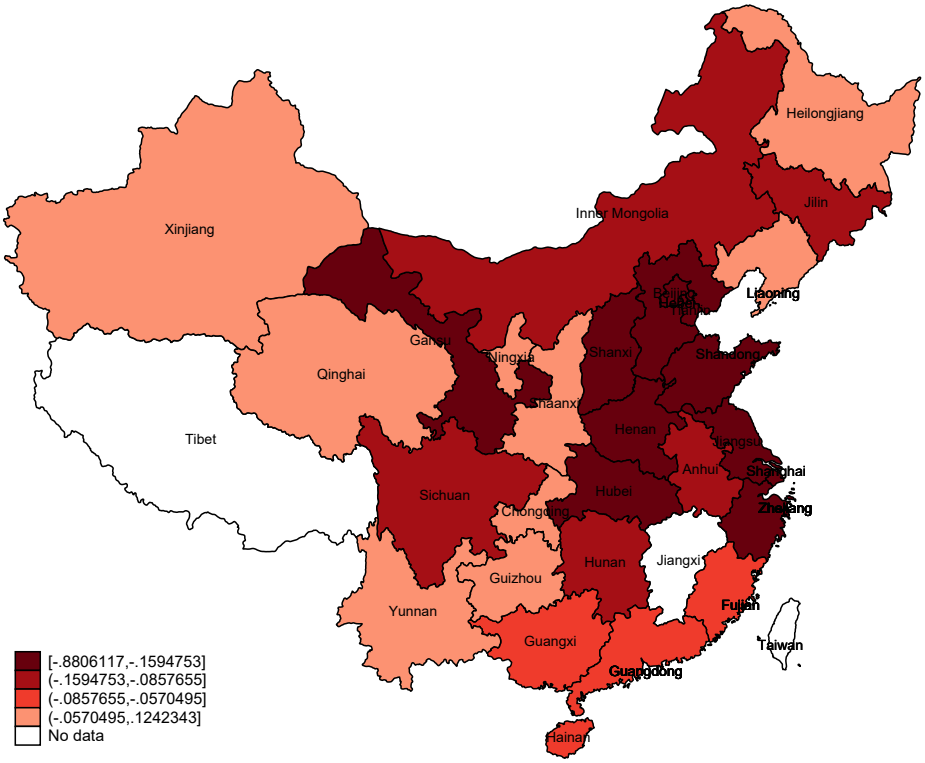


Figure 4. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Geographical Distribution**

This heatmap displays the effect of the universal two-child policy on loan applications across provinces. Policy effects for provinces are estimated by interacting the difference-in-difference term in Equation 1 with province dummies. Absolute effects for each province are then computed by adding the effect for the baseline province. Jiangxi Province and Tibet Autonomous Region are excluded after we collapse the raw data to the university-month level as we require observations every month during the sample period. There are no observations from Taiwan in our raw sample.

Internet Appendix to "Scared Away: Credit Demand Response to Expected Motherhood Penalty in the Labor Market"

Table IA.1. **The Effect of the Universal Two-child Policy on Loan Delinquency (Robustness)**

This table shows robustness checks of the effect of the universal two-child policy on loan delinquency. Specifically, we use alternative time lengths for the two observation windows around August 2015 in each column. We then rerun the test for the policy effect on loan delinquency. *Delinquency* is an indicator taking one for loans with records of default. $Post_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. Loan controls are dummy variables for loan purposes, loan terms, and loan amounts. Borrower controls are dummy variables for age, grades, majors, and family income levels of loan applicants. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dep. Var	Delinquency		
	windows=±6 months	windows=±5 months	windows=±4 months
$Post_{t\geq 201508} \times$ Female	0.037	0.047	0.037
	(0.050)	(0.052)	(0.080)
Adj. R^2	-0.039	-0.049	-0.109
Observations	3,269	2,450	1,547
Loan Controls	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes
University × Gender Fixed effects	Yes	Yes	Yes
City × Year-month Fixed effects	Yes	Yes	Yes
Clustered	City	City	City

Table IA.2. **The Effect of Provincial Reforms of Maternity Leave on Loan Applications, Using Stacked DiD**

This table shows the effect of provincial maternity leave reforms on loan applications using the stacked difference-in-difference approach for a robustness check. Since 2016, provinces across China have passed amendments to regulations on population and family planning to extend the length of maternity leave. We thus test the effect by comparing situations of loan applications before and after provincial reforms of maternity leave. Three observation windows of 30, 60, or 90 days are used for both periods before and after the passage of provincial amendments respectively. We exclude observations in 2015 to capture the pure effect of extended maternity leave. *Log(Number of Applications)* is log of the total number of loan applications. *Post*$_{t,t+29}$, *Post*$_{t,t+59}$, and *Post*$_{t,t+89}$ are indicators taking one for 30, 60, and 90 days since the passage of provincial amendments respectively. *Female* is an indicator taking one for female applicants. Standard errors are clustered by event-city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Dep. Var	Log(Number of Applications)		
Post$_{t,t+29}$ × Female	-0.023***		
	(0.009)		
Post$_{t,t+59}$ × Female		-0.059***	
		(0.010)	
Post$_{t,t+89}$ × Female			-0.046***
			(0.014)
Adj. R^2	0.556	0.545	0.555
Observations	349,656	443,515	273,968
University × Gender × Event Fixed effects	Yes	Yes	Yes
Year-month-day × Event Fixed effects	Yes	Yes	Yes
Clustered	Event-City	Event-City	Event-City

Table IA.3. **The Effect of Provincial Reforms of Maternity Leave on Loan Applications of Male Students**

This table shows the effect of provincial reforms of maternity leave on loan applications of male students only. Since 2016, provinces across China have passed amendments to regulations on population and family planning to extend the length of maternity leave. We thus test the effect by comparing situations of loan applications before and after provincial reforms of maternity leave. Three observation windows of 30, 60, or 90 days are used for both periods before and after the passage of provincial amendments respectively. We exclude observations in 2015 to capture the pure effect of extended maternity leave. *Log(Number of Applications)* is log of the total number of loan applications. *Post*$_{t,t+29}$, *Post*$_{t,t+59}$, and *Post*$_{t,t+89}$ are indicators taking one for 30, 60, and 90 days since the passage of provincial amendments respectively. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Dep. Var	Log(Number of Applications)		
Post$_{t,t+29}$	0.004		
	(0.022)		
Post$_{t,t+59}$		-0.014	
		(0.015)	
Post$_{t,t+89}$			-0.020
			(0.012)
Adj. R^2	0.441	0.446	0.381
Observations	23,520	44,817	34,160
University Fixed effects	Yes	Yes	Yes
Year-month-day Fixed effects	Yes	Yes	Yes
Clustered	City	City	City

Table IA.4. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Loan Characteristics (Robustness)**

This table shows robustness checks of the effect of the universal two-child policy on loan applications, depending on loan characteristics. Specifically, we use alternative definitions for long loan term (Panel A) and large loan amount (Panel B). In Panel A, we redefine "long term loans" as loans which have a loan term of 12 months or more. In Panel B, we use different cutoffs of loan amounts to redefine "large loans" in each column. We then rerun previous tests for the heterogeneous effect of the policy depending on loan term and loan amount. *Fraction of Total Applications* is the ratio of the number of the specific type of loan applications to the number of total loan applications. $Post_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Long Term			
Dep. Var	Fraction of Total Applications loan term $\geq$ 12 months		
$Post_{t\geq 201508} \times$ Female	-0.039***		
	(0.008)		
Adj. R^2	0.323		
Observations	21,602		
Panel B: Large Amount			
Dep. Var	Fraction of Total Applications		
	loan amount>5000	loan amount>6000	loan amount>8000
$Post_{t\geq 201508} \times$ Female	-0.035***	-0.039***	-0.037***
	(0.010)	(0.011)	(0.011)
Adj. R^2	0.288	0.283	0.239
Observations	21,602	21,602	21,602
University $\times$ Gender Fixed effects	Yes	Yes	Yes
City $\times$ Year-month Fixed effects	Yes	Yes	Yes
Clustered	City	City	City

Table IA.5. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Economic Opportunities (Robustness)**

This table shows robustness checks of the heterogeneous effect of the universal two-child policy on loan applications, depending on economic opportunities. In Panel A, we construct proxies of regional economic development based on annual GDP per capita values of provinces and cities in the previous calendar year of loan application. *GDPPC*$_{province,top\,decile}$ is an indicator taking one if the provincial GDP per capita falls into the 10th decile in the cross section. *GDPPC*$_{city,top\,decile}$ is an indicator taking one if the city GDP per capita falls into the 10th decile in the cross section. *GDPPC*$_{province,top\,5}$ is an indicator taking one if the province is ranked in the top 5 from a descending sorting of GDP per capita in the cross section. *GDPPC*$_{city,top\,10}$ is an indicator taking one if the city is ranked in the top 10 from a descending sorting of GDP per capita in the cross section. In Panel B, we construct other proxies which reflect different dimensions of regional economic development. *Large Tertiary Sector* is an indicator taking one if the ratio of GDP of the tertiary sector to total provincial GDP is higher than the median across provinces. *High Urban Disposable Income* is an indicator taking one if the provincial value of urban disposable income is higher than the median across provinces. *High Urban Disposable Income: Wages & Salaries* is an indicator taking one if the provincial value of wages and salaries (a component of urban disposable income) is higher than the median across provinces. *High Urban Consumption Expenditure* is an indicator taking one if the provincial value of urban consumption expenditure is higher than the median across provinces. *Log(Number of Applications)* is log of the total number of loan applications. *Post*$_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. We compute the dummy variable for economic opportunities using regional annual values in the previous calendar year of loan application. Data on regional GDP per capita, GDP of tertiary sector, urban disposable income and urban consumption expenditure are all from China Statistical Yearbooks and Provincial Statistical Yearbooks. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: GDP Per Capita				
	(1)	(2)	(3)	(4)
Dep. Var	Log(Number of Applications)			
Post$_{t\geq 201508}$ × Female	-0.094***	-0.091***	-0.085***	-0.119***
	(0.022)	(0.024)	(0.022)	(0.036)
Post$_{t\geq 201508}$ × Female × GDPPC$_{province,top\,decile}$	-0.405*			
	(0.204)			
Post$_{t\geq 201508}$ × Female × GDPPC$_{city,top\,decile}$		-0.142		
		(0.089)		
Post$_{t\geq 201508}$ × Female × GDPPC$_{province,top5}$			-0.298**	
			(0.141)	
Post$_{t\geq 201508}$ × Female × GDPPC$_{city,top10}$				-0.062*
				(0.037)
Adj. R^2	0.894	0.895	0.895	0.894
Observations	21,605	21,605	21,605	21,605
Panel B: Other Economic Dimensions				
	(1)	(2)	(3)	(4)
Dep. Var	Log(Number of Applications)			
Post$_{t\geq 201508}$ × Female	-0.103***	-0.078**	-0.084***	-0.090***
	(0.025)	(0.032)	(0.027)	(0.031)
Post$_{t\geq 201508}$ × Female × Large Tertiary Sector	-0.052			
	(0.046)			
Post$_{t\geq 201508}$ × Female × High Urban Disposable Income		-0.093		
		(0.059)		
Post$_{t\geq 201508}$ × Female × High Urban Disposable Income: Wages & Salaries			-0.110	
			(0.069)	
Post$_{t\geq 201508}$ × Female × High Urban Consumption Expenditure				-0.068
				(0.055)
Adj. R^2	0.894	0.895	0.895	0.895
Observations	21,605	21,605	21,605	21,605
University × Gender Fixed effects	Yes	Yes	Yes	Yes
City × Year-month Fixed effects	Yes	Yes	Yes	Yes
Clustered	City	City	City	City

Table IA.6. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Economic Structure (Robustness)**

This table shows robustness checks of the heterogeneous effect of the universal two-child policy on loan applications, depending on economic structure. In Panel A, we use a new proxy of regional economic structure in terms of urban female employment. *Large State-owned Sector for Female* is an indicator taking one if the ratio of urban female employment in state-owned units, state jointly-run enterprises, and sole state-owned companies to total urban unit female employment is higher than the median across provinces. Column (1) shows test results using the full sample, while Column (2) to Column (4) show test results using sub-samples in which observations from major cities are excluded. The classification of major cities follows the definition used in the Residential Property Price Index published by the National Bureau of Statistics of China. First-tier cities refer to Beijing, Shanghai, Guangzhou and Shenzhen. In Panel B, we use an alternative definition of state-owned sector in urban employment by narrowing down the scope to state-owned units only. *Large State-owned Sector*$_{SOU}$ is an indicator taking one if the ratio of urban employment in state-owned units to total urban employment in units is higher than the median across provinces. *State-owned Sector*$_{SOU}$ is the ratio of urban employment in state-owned units to total urban employment in units of the province. *Large State-owned Sector for Female*$_{SOU}$ is an indicator taking one if the ratio of urban female employment in state-owned units to total urban female employment in units is higher than the median across provinces. *State-owned Sector for Female*$_{SOU}$ is the ratio of urban female employment in state-owned units to total urban female employment in units of the province. We use the full sample for all tests shown in Panel B. *Log(Number of Applications)* is log of the total number of loan applications. *Post*$_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. We compute the dummy variable for economic structure using provincial annual values in the previous calendar year of loan application. Data on urban employment and urban female employment is from China Labour Statistical Yearbooks. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Urban Unit Female Employment				
	(1)	(2)	(3)	(4)
Dep. Var	Log(Number of Applications)			
	Full Sample	Beijing Excluded	Beijing&Shanghai Excluded	First-tier Cities Excluded
Post$_{t\geq 201508}$ × Female	-0.211***	-0.211***	-0.156***	-0.160***
	(0.054)	(0.057)	(0.026)	(0.026)
Post$_{t\geq 201508}$ × Female × Large State-owned Sector for Female	0.162***	0.162**	0.108***	0.111***
	(0.061)	(0.063)	(0.038)	(0.039)
Adj. R^2	0.895	0.895	0.897	0.898
Observations	21,605	21,054	20,445	19,894
Panel B: Urban Unit Employment				
	(1)	(2)	(3)	(4)
Dep. Var	Log(Number of Applications)			
Post$_{t\geq 201508}$ × Female	-0.211***	-0.442***	-0.211***	-0.449**
	(0.054)	(0.163)	(0.054)	(0.171)
Post$_{t\geq 201508}$ × Female × Large State-owned Sector$_{SOU}$	0.162***			
	(0.061)			
Post$_{t\geq 201508}$ × Female × State-owned Sector$_{SOU}$		0.754**		
		(0.349)		
Post$_{t\geq 201508}$ × Female × Large State-owned Sector for Female$_{SOU}$			0.162***	
			(0.061)	
Post$_{t\geq 201508}$ × Female × State-owned Sector for Female$_{SOU}$				0.682**
				(0.326)
Adj. R^2	0.895	0.895	0.895	0.895
Observations	21,605	21,605	21,605	21,605
University × Gender Fixed effects	Yes	Yes	Yes	Yes
City × Year-month Fixed effects	Yes	Yes	Yes	Yes
Clustered	City	City	City	City

Table IA.7. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Binding Power of the One-child Policy**

This table shows the heterogeneous effect of the universal two-child policy on loan applications, depending on binding power of the one-child policy. In Panel A, we construct proxies of regional effects of the one-child policy based on ratio of ethnic minorities to local population because non-Han ethnic groups are not subject to the historical birth control policy. *Large Minority Group*$_{top\ quartile}$ is an indicator taking one if the ratio of non-Han ethnic groups to local population falls into the upper quartile in the cross section. *Large Minority Group*$_{top\ decile}$ is an indicator taking one if the ratio of non-Han ethnic groups to local population falls into the 10th decile in the cross section. In Panel B, we construct other proxies which reflect the binding power of the one-child policy. Specifically, we use the ratio of residents with agricultural household registration ("hukou") to the local population because the birth restriction is relaxed for them. *Large Agricultural Group*$_{top\ quartile}$ is an indicator taking one if the ratio of agricultural hukou holders to local population falls into the upper quartile in the cross section. *Large Agricultural Group*$_{top\ decile}$ is an indicator taking one if the ratio of agricultural hukou holders to local population falls into the 10th decile in the cross section. *Log(Number of Applications)* is log of the total number of loan applications. *Post*$_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. We compute dummy variables for the binding power of the one-child policy using provincial mean values computed from four censuses during 1982-2010. Data on population composition are from the third (1982), fourth (1990), fifth (2000), and sixth (2010) national population census of China. Standard errors are clustered by city. Standard errors are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Ethnic Minorities		
	(1)	(2)
Dep. Var	Log(Number of Applications)	
Post$_{t\geq 201508}$ × Female	-0.152***	-0.128***
	(0.038)	(0.034)
Post$_{t\geq 201508}$ × Female × Large Minority Group$_{top\ quartile}$	0.156***	
	(0.049)	
Post$_{t\geq 201508}$ × Female × Large Minority Group$_{top\ decile}$		0.143***
		(0.039)
Adj. R^2	0.895	0.894
Observations	21,605	21,605
Panel B: Agricultural Household Registration		
	(1)	(2)
Dep. Var	Log(Number of Applications)	
Post$_{t\geq 201508}$ × Female	-0.140***	-0.140***
	(0.044)	(0.036)
Post$_{t\geq 201508}$ × Female × Large Agricultural Group$_{top\ quartile}$	0.051	
	(0.057)	
Post$_{t\geq 201508}$ × Female × Large Agricultural Group$_{top\ decile}$		0.163***
		(0.053)
Adj. R^2	0.894	0.895
Observations	21,605	21,605
University × Gender Fixed effects	Yes	Yes
City × Year-month Fixed effects	Yes	Yes
Clustered	City	City

Table IA.8. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Son Preference**

This table shows robustness checks of the heterogeneous effect of the universal two-child policy on loan applications, depending on the extent of son preference in students' hometowns. We use sex ratios at birth to capture the degree of son preference in students' residence provinces which are then sorted and divided into two groups by the median. We run the baseline regression in each group and compare their results. In Panel A, we compute the mean sex ratio at birth for all newborns. We further compute the ratios for urban newborns by different birth orders: first born in Panel B, and second or later born in Panel C. *Log(Number of Applications)* is log of the total number of loan applications. $Post_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. Data on birth rates are from China Statistical Yearbooks. We follow Wei and Zhang (2011) to estimate annual sex ratios at birth from the data of four national censuses during 1982-2010. For sex ratios by order, we use the fifth (2000) and sixth (2010) censuses due to data availability. Standard errors are clustered by city. Standard errors are in parentheses. P-values are in parentheses for the difference between coefficient estimates. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: All Birth			
Dep. Var	Log(Number of Applications)		
	(1)	(2)	
	Low	High	Low - High
$Post_{t\geq 201508} \times$ Female	-0.043	-0.154***	0.111***
	(0.035)	(0.041)	(0.000)
Adj. R^2	0.892	0.885	
Observations	8,613	11,455	
Panel B: Urban First Born			
Dep. Var	Log(Number of Applications)		
	(1)	(2)	
	Low	High	Low - High
$Post_{t\geq 201508} \times$ Female	-0.003	-0.133***	0.130***
	(0.036)	(0.030)	(0.000)
Adj. R^2	0.904	0.875	
Observations	7,482	12,035	
Panel C: Urban Second or Later Born			
Dep. Var	Log(Number of Applications)		
	(1)	(2)	
	Low	High	Low - High
$Post_{t\geq 201508} \times$ Female	-0.055*	-0.187***	0.133***
	(0.029)	(0.057)	(0.000)
Adj. R^2	0.894	0.880	
Observations	9,280	10,904	
University $\times$ Gender Fixed effects	Yes	Yes	
City $\times$ Year-month Fixed effects	Yes	Yes	
Clustered	City	City	

Table IA.9. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Fertility Responses**

This table shows robustness checks of the heterogeneous effect of the universal two-child policy on loan applications, depending on regional fertility responses to the policy in students' hometowns. We capture fertility responses by changes in birth rates and total fertility rates at the provincial level. Students' hometown provinces are then sorted into two groups by the median. We run the baseline regression in each group and compare their results. In Panel A, we compute the changes in birth rates by comparing two-year averages before and after the policy. In Panel B, we compare the three-year mean rates. In Panel C, we capture fertility responses in terms of total fertility rates. In Panel D, we focus on the change in total fertility rates for women aged from 35 to 49. *Log(Number of Applications)* is log of the total number of loan applications. $Post_{t\geq 201508}$ is an indicator taking one for months since August 2015. *Female* is an indicator taking one for female applicants. Data on birth rates are from China Statistical Yearbooks. Data on annual birth rates are from the National Bureau of Statistics of China. Data on total fertility rates are from the sixth (2010) and the seventh (2020) national population census of China. Standard errors are clustered by city. Standard errors are in parentheses. P-values are in parentheses for the difference between coefficient estimates. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Changes in Birth Rates ($\pm$ 2 Years)			
Dep. Var	Log(Number of Applications)		
	(1)	(2)	
	Low	High	Low - High
$Post_{t\geq 201508}$ × Female	-0.099***	-0.112*	0.013
	(0.033)	(0.066)	(0.430)
Adj. R^2	0.876	0.900	
Observations	9,512	10,092	
Panel B: Changes in Birth Rates ($\pm$ 3 Years)			
Dep. Var	Log(Number of Applications)		
	(1)	(2)	
	Low	High	Low - High
$Post_{t\geq 201508}$ × Female	-0.115***	-0.065*	-0.051
	(0.038)	(0.033)	(0.195)
Adj. R^2	0.874	0.898	
Observations	7,598	11,948	
Panel C: Changes in Total Fertility Rates			
Dep. Var	Log(Number of Applications)		
	(1)	(2)	
	Low	High	Low - High
$Post_{t\geq 201508}$ × Female	-0.152***	-0.089***	-0.063
	(0.042)	(0.031)	(0.105)
Adj. R^2	0.891	0.888	
Observations	10,295	9,193	
Panel D: Changes in Total Fertility Rates (Age 35-49)			
Dep. Var	Log(Number of Applications)		
	(1)	(2)	
	Low	High	Low - High
$Post_{t\geq 201508}$ × Female	-0.081**	-0.141**	0.061
	(0.031)	(0.064)	(0.105)
Adj. R^2	0.891	0.883	
Observations	11,600	7,714	
University × Gender Fixed effects	Yes	Yes	
City × Year-month Fixed effects	Yes	Yes	
Clustered	City	City	

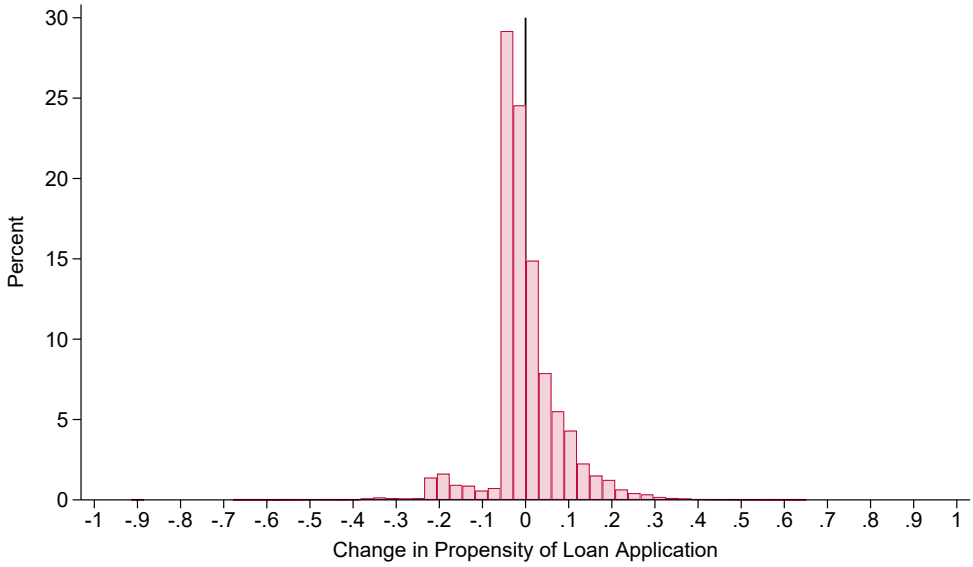


Figure IA.1. **Distribution of Change in Loan Applications**

This figure plots the distribution of the post-shock change in the propensity of P2P loan applications among female students. The x-axis shows the change in the propensity of loan applications. We follow Gu, He, Qian, and Ren (2021) to compute the post-shock change in propensity.