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

[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]According to Suning Finance (https://www.sohu.com/a/152925294_371463), 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.

policy change to investigate the possible impact of negative labor market implications by 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 become reluctant to apply for loans since they worry about their job opportunities and, consequently, their repayment abilities if borrowing. We explore 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 more severe for applications for long-term and large-amount loans or loans for human capital investment purposes, suggesting that female college students are concerned with their employment-related prospects in the future and, therefore, are more worried about their ability to repay large-amount or long-term loans. The result also suggests that the lower human capital investment made by female college students is part of the reason that they reduce borrowing.[3] Interestingly, the effect is stronger for female students who major in STEM (science,

[3]Using the education statistics data from the Ministry of Education, we examine the proportion of female students in masters' and undergraduate programs. As shown in Figure 1, while the proportion of female master and undergraduate students has increased gradually since 2002, the trend has slowed down in recent

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.

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 compete away their 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 liter-

years and there was a sharp drop in the female ratio of master students in 2017, consistent with the argument that young women invest less in human capital after the universal two-child policy was introduced.

ature 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)).[4]

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 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.

[4]Kuziemko, Pan, Shen, and Washington (2020) also examine young women's anticipation about the motherhood effect on future employability. Using surveys, they show evidence that U.S. and U.K. women underestimate the effects of motherhood on their employment. This underestimate in recent years is a sharp reversal from a previous overestimate in the 1960s. By observing their borrowing behaviors in a P2P platform, our paper suggests that Chinese female college students do anticipate the increased childbearing and caring costs due to a policy change in 2016.

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 gender 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.[5] The new law was passed by the National People's Congress Standing Committee on December 27, 2015, and effective 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 question on the universal two-child policy by stating that the relevant regulations were being

[5]While the universal two-child policy directly affects siblinged but not only-child adults, China's Inter-Census Population Survey (2005) suggests that 75.5% of men and 81.5% of women had at least a sibling in the nation's 20–40 age group in 2015 (these 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 large number of siblinged children could 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 places where the proportion of (non-Han) minorities is larger and where the proportion of residents with agricultural household registration ("hukou") is larger, suggesting that minority women and women in rural areas are affected less by the universal two-child policy.

worked on. As shown in Figure 2, searches on "the universal two-child policy" or other related keywords first spiked in July 2015 on Baidu, the predominant search engine in China. Apparently, the highest search volume peaked at the end of October 2015 when Xinhua, the central government media in China, reported the change in the existing law 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. P2P lending platforms in China have played a major role in the development of consumer finance, which was spurred by the initial issuance of company licenses in pilot cities in 2009. The Chinese government granted more market access in 2013 and encouraged cooperation between banks, private capital, and internet companies, leading to rapid expansions of the industry. Major P2P lending platforms (e.g., MingXiaoDai, RenRenDai, etc.), along with products of consumption loans and installments (e.g., JD Baitiao, Ant Credit Pay, etc.) entered the market during this period and quickly gained popularity. However, after regulatory issues 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,[6] which provides detailed news,

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

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 was 9.81%, the average loan term was 12.65 months, the total number of lenders was around 13.3 million, and the total number of borrowers was 19.9 million. Individual lending was the major business type with a share of 84.5%, while company lending only accounted for 10%.

Given the rapid growth of the credit market for consumption in China, the credit market for university students was also expanding. 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 played 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 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.

The previous success of P2P lending among college students is partly due to the historical vacuum of alternative credit products for this group. State loans are only provided to students who have financial difficulties in paying tuition fees and daily living expenses. Contrary to the case in Western countries, credit cards are hardly accessible to students in China. Apart from forbidding banks from issuing credit cards to students under 18, the government has also set strict conditions for eligible students. They can only apply for credit cards with written consent from the second source of repayment, usually their par-

ents. Therefore, with convenient online access, easy approval, and large promotions, P2P lending platforms quickly took over the market of college students in China.

This paper focuses on MingXiaoDai, a leading P2P platform in China that targeted college students and issued short-term and long-term loans. The interest rate was fixed at 0.99% per month. It was founded in December 2013 and had grown rapidly since then. By the end of 2015, its market share for P2P loans to college students had reached 63%. In our data, the total amount of loan applications in MingXiaoDai was 13.5 billion RMB and that of approved loans was 8 billion RMB.

3 Data

3.1 Loan Data

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

Each application record contains both the borrower and loan information. We obtain borrowers' information, including their identification number in the platform, gender, age, annual family income, place of residence (province and city), university name, university location (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 is the basic unit of observation in our empirical tests. Starting from the collapsed sample of loan applications, we further apply two filtering conditions to get the final sample for later analysis. First, we require non-missing observations on key variables, which are the school and gender of applicants. Second, we require non-missing observations for every university-gender group every 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) from 579 universities. While there are on average 32.3 loan applications per month for all students in a college, male students file significantly more applications than their female schoolmates. This pattern is also found in terms of the total loan amount, reflecting a relatively stronger willingness to borrow from male college students. Besides, 14% of total applications are from students of STEM majors. Among them, male students account for a significantly larger portion.

We further summarize statistics regarding loan characteristics and the gender gap at the university-month level. For borrowing purposes, we find that male applicants are more likely to borrow for consumption, while female applicants have stronger demands for human capital investment. Male applicants are also more eager to apply for loans with smaller amounts and shorter terms, which is consistent with the fact that they are more likely to borrow for the purpose of consumption. Lastly, loan applications from female students are more likely to be approved on average.

Figure 3 depicts the monthly average number of loan applications at each university

for female (red line) and male (blue line) students, respectively, during the sample period between January 2015 and May 2017. We set August 2015 at the event time 0 after the universal two-child policy started to arouse public attention, as reflected by the Baidu Search Volume Index in Figure 2.

Figure 3 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 plot the amount of short-term consumption loans to households in China, calculated using statistics published by the People's Bank of China. Consumption loans are also expanding in the sample period.[7]

Several dips in the number of university P2P loan applications 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). More interestingly, the gap between male and female applicants was relatively stable before July 2015. Since then, the gap rapidly enlarged from August 2015 (event time 0) to January 2016 (event time 5) and never reverted till the end of our sample. Furthermore, the borrowing trend of male students is more consistent with the overall development of short-term consumption loans, while female loan applications have been gradually diverging 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 and identify the impact of the two-child

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

policy on the gender difference in loan applications.

The loan amount displays a similar pattern over our sample period. Figure 4 shows the gender comparison of the loan amount on average across universities between January 2015 and May 2017. Despite the overall upward trend for both genders, the difference in the total loan amount applied by male and female students also jumped 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 will likely stay and work in the local city or province after graduation. This assumption is supported by graduate employment reports published by universities and colleges across provinces.[8] We collect economic data at different levels and match them with the locations of loan applicants' universities and colleges in our loan data.

First, we collect regional data on economic development measures, including GDP, GDP per capita, urban disposable income, and urban consumption expenditure. While GDP-related variables are measured at both province and prefecture levels, income and consumption measures for urban populations are measured at the province level only. All data on economic development are collected from China Statistical Yearbook and Statistical Yearbooks for provinces. We use regional economic data to identify developed regions.

We use property price as another proxy for regional development by following the clas-

[8] According to a report on employment of college graduates by Shanghai Ranking Consultancy, a renowned organization focusing on 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.

sification used in the Residential Property Price Index published by the National Bureau of Statistics of China. Specifically, the Bureau groups Beijing, Shanghai, Guangzhou, and Shenzhen into the four "Tier-1 Cities" and the remaining capital cities and sub-provincial cities of all provinces and autonomous regions into the 31 "Tier-2 Cities" for tracking their housing markets.

We also collect regional data on local employment markets by tracking the number of employees in different urban units. Information about urban employment is from China Labour Statistical Yearbooks. Among different units, we are particularly interested in the ones with state involvement in order to measure how state-oriented local job markets are. Therefore, we focus on three subcategories available in the yearbook, which are state-owned units, state jointly-run enterprises, and sole state-owned companies.[9] We sum up the number of employees in these subcategories to calculate the ratio of the state-owned sector to the total urban employment of units.[10]

Lastly, we collect regional data on population and fertility to examine heterogeneous policy effects from a social perspective. We are interested in reflecting fertility-related concerns in three aspects: the restrictiveness of the historical one-child policy, the responsive-

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

[10]Total urban employment of units, or "Danwei," refer to all the persons who have their population records in urban areas while working in government agencies of various levels, political and party organizations, social organizations, enterprises, and institutions, and receiving wages or other forms of payment. Note that in the yearbook, employment in urban private enterprises and individual units are included in another category for total urban employment. Since we find adding employment in urban private enterprises and individual units to our calculation of ratios produces similar results in unreported regressions for later tests, we follow the dichotomous categorization by the yearbook.

ness 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 relaxed the decades-long limit of one child allowed per family. The new policy was designed to mitigate social and economic issues such as low fertility rates and population aging. According to the National Bureau of Statistics census data, the birth rate in 2016 was higher than 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 responsibilities (He, Li, and Han (2022)).

As current or future job candidates with expected motherhood responsibilities, female college students are directly confronted with this issue after the universal two-child policy. In the presence of ongoing or in expectation of future difficulties in the labor market, female college students may become reluctant to borrow as they worry about their job prospects and repayment abilities. We provide additional evidence using provincial reforms of maternity leaves, which were implemented in a staggered manner in 2016 to further optimize birth control policies and boost population growth. The lengthier maternity leaves also in-

crease employers' costs in hiring young female workers and may worsen these workers' job prospects. Therefore, we examine the following hypothesis:

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

However, female college students may not become less likely to apply for loans. The credit supply rather than the demand may lead to a relative decline in applications from female students. For example, the lenders and the platform realize the negative impact of the universal two-child policy on female college students' job opportunities and are concerned with their creditworthiness. In response, the platform may employ stricter screening on female borrowers, which may deter potential applicants from borrowing on the platform.

To differentiate the supply and demand channels, we further investigate the approval and delinquency information on this platform.[11] If supply-side screening is the main driving force, we expect to observe a lower approval rate for female applicants after the shock. Nevertheless, even if the approval rate does not decrease, one may wonder whether the low-quality borrowers have already been deterred due to more stringent screening in the first place. Therefore, the approval rate for quality applicants does not decline. To address this concern, we can further examine their loan performance. If that is the case, we should see a decrease in delinquencies for those 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 subject to negative labor market outcomes would like to apply. How-

[11]Note that the interest rate on MingXiaoDai is fixed at 0.99% per month. Therefore, we cannot use the variation in interest rates to analyze the supply versus demand channel.

ever, the quality of approved loans remains similar if the screening criteria from the supply side have been maintained. 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 shock. 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 worried about the returns to human capital investment and become more cautious about borrowing for this purpose. In addition, they are more careful about long-term and large-amount loans, which can incur excessive burdens on themselves 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 applicants with STEM backgrounds.*

We also expect that female students facing more competitive job markets are less likely to borrow after the shock because their future employers are more concerned with their

commitment to childbearing and rearing and thus become more selective among female job seekers. In contrast, the effect would be weaker if the local economy is less market-oriented, proxied by the 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 the areas with a lower fraction of state-owned sectors.*

4.2 Empirical Methodology

Based on the hypotheses developed in the last 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 formal effective date of the universal two-child policy was January 1, 2016, as shown in Figure 2, the policy had been spotlighted on social media since late July 2015. Therefore, we use August 2015 as the cut-off month for our main 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. $\text{Post}_{t \geq t*}$ 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 $\text{Post}_{t \geq t*}$ 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 $\text{Z}_{s,t-1}$ denotes a dummy variable indicating different economic conditions of the region in the previous calendar year. We take 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 since 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 after the relaxation of the two-child policy. 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 schoolmates 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[12], we can see that this act of borrowing is a significant decision for college students. This is particularly true when the average monthly expense for Chinese college students is only less than ¥2,000.[13] Moreover, according to Zhaopin.com, a major recruitment website, the average expected (actual) monthly salary for the first job of college graduates was ¥4,985 (¥4,765) in 2016. This shows that college students are actually deciding over quite a large sum of money when borrowing. Therefore, our result suggests that female university students are strongly concerned by the poorer job prospects induced by the relaxation of the two-child policy such that they are significantly more reluctant to borrow before entering the job market.

A reasonable concern for this result is that there could be information leakage about potential reforms before 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. We do so by exploiting the Baidu Search Volume Index, which is built upon the

[12]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.

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

search volume of specific keywords on Baidu. Figure 2 displays the daily index from June 2015 to January 2016. We find that the first obvious spike in public discussions about the policy reform occurred in July 2015. This pattern is robust to the use of different keywords which are all the Chinese equivalents of "the two-child policy" and "the universal two-child policy." Together with the survey evidence mentioned in the Introduction, this implies that female college students may adjust their expectations of the future employment environment affected by the new birth control policy, and consequently change their borrowing behaviors before the national implementation in 2016.

Therefore, we further examine whether there were fewer loan applications from female students relative to their male counterparts during the period of information leakage in 2015. Column (2) presents the results of the effect on loan applications in two distinct periods: from August to December and after January 2016. It shows that apart from the implementation period since 2016, a significant reduction in female applications is also documented for the leakage period between August and December 2015.[14] The anticipation of a relaxed birth control policy, on average, leads to a relative decrease in loan applications of 6.18% ($=e^{0.060}$-1) for female college students. This is significantly different from the effect on female applicants after the materialization of reform in January 2016. The latter further grows into a 15.6% ($=e^{0.145}$-1) drop in female loan applications compared with the effect presented in Column (1). The difference between these two effects on female applicants in two distinct periods is also statistically significant. This finding suggests a long-term impact on female college students since they react gradually as the reform of the

[14]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 measure of the effect.

two-child policy develops. Therefore, we expand our definition of the treatment period to August 2015 in later tests in order to fully capture the policy effect.

5.1.2 Parallel trend assumption

While the above results show significant differences in loan applications between female and male college students after the new policy first aroused public attention in July 2015, it is crucial to examine if they have been behaving differently before. For this purpose, we test the gender difference between loan applicants in June 2015. Column (3) of Table 2 presents the result. The sign on the difference-in-differences term is statistically insignificant, suggesting that the parallel trend assumption is verified. There are no significant pre-trend differences between the treatment (female) and the control (male) group. Meanwhile, the point estimation result indicates no significant differences between effects on female college students before and during the leakage period.

5.1.3 Prevalence of the response

To better understand the scope and nature of the effect, we examine if the documented response by female students is driven by outliers. We study the distribution of the post-shock response within the treatment group. To do so, we follow Gu, He, Qian, and Ren (2021) and estimate their responses at the individual level. Specifically, we compute 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.[15]

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

We plot the distribution of the post-shock response in the propensity to apply for a P2P loan for each treated female student in Figure IA.1. About 60% of the treatment group displays a propensity decrease after the policy shock in July 2015.[16] This suggests the negative post-shock response among female students is prevalent and not driven by the dramatic responses of a few individuals. Therefore, Figure IA.1 helps sharpen the interpretation of the documented effect. While some female students could be more likely to borrow and invest in themselves in response to a worsened future job prospect, the majority of them still decide to stop borrowing and avoid the debt burden.[17]

5.1.4 Demand or Supply?

It might be possible that female college students reduce their willingness to borrow because they face gender bias from the loan platform. For example, capital providers' incentive to discriminate against female applicants could be driven by a higher likelihood of loan overdue by female students due to the negative impact of the universal two-child policy on their job opportunities. If female applicants believe that lenders in the P2P loan platform have a stronger preference for male applicants after the universal two-child policy, they may expect their loan applications to be less likely to be approved and become reluctant to apply in the first place. In this case, the relative decline of borrowings from female students could come from the supply rather than the demand side.

The above proposal is unlikely to explain the effect we document. Using the information

[16] In an unreported test, we further examine the distribution of post-shock propensity change 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.

[17] In another unreported test, we look at 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. The future job prospects of these elite female students might not be hurt by the policy, or they invest in themselves more to compensate for the poorer job prospects.

on loan approval, we examine whether there is a stronger gender bias from the platform after the policy. 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 wonder whether the low-quality female borrowers have already been deterred due to more stringent screening targeting female students in the first place. Therefore, the approval rate for quality applicants does not decline. To further address this concern, we compare the likelihood of loan delinquency. We test if loans to female applicants are more likely to be delinquent after the introduction of policy reform. Two seven-month observation windows are used for a clearer comparison. Panel B of Table 3 presents the result. After the introduction of a relaxed birth control policy, there is no significant difference between female and male applicants in terms of changes in their likelihood of loan delinquency. This is also the case when we use alternative lengths of observation windows for comparison as shown in Table IA.1 in the Internet Appendix. Lenders do not seem to apply more stringent screening to female applicants after the introduction of the policy.

5.2 Additional evidence from reforms of maternity leave

Here we link local policies on maternity leave with college students' borrowing choices. Following the nationwide universal two-child policy implemented by the central government, local governments across provinces launched reforms of extending maternity leaves

successively in 2016 to further optimize birth control policies and boost 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 implement staggered difference-in-differences tests by exploiting the different timings of reforms on maternity leaves across provinces.[18] In contrast with our baseline regressions with a universal cutoff for the national policy change, the variation in timing mitigates confounding effects from any time-series national shocks coinciding with the universal two-child policy.

Second, extending maternity leaves would directly lower the workload of pregnant employees and thus increase production costs for employers and firms in hiring female workers. This could in turn lead to more disadvantages for female job seekers. Anticipating this potential outcome of a more competitive job market, female college students would lower their loan burden and insolvency risks by reducing loan applications before entering the job market. Therefore, if female students indeed apply for fewer loans after local reforms on maternity leave, this would provide strong and consistent evidence for our channel.

Finally, in this set of tests, we can examine loan applications from male students separately. Our previous results focus on the relative comparison between female and male students. Here we can check whether the documented relative decrease in female students' credit demand is attributed to the increase in male students' borrowing.

Table 4 presents the results. Female college students are significantly more reluctant to borrow after the length of maternity leave is extended by provincial governments. For

[18]The conclusion remains unchanged if a stacked difference-in-differences approach is used, as shown in Table IA.2 .

example, the extension of maternity leave, on average, leads to a 2.96% decrease in loan applications for female students relative to their male schoolmates in the first month (30 days) afterward. The effect continues to grow up to 11.93% in the first two months after the reform, suggesting that female students take time to learn about the undesirable impact of the reform on their future employment environment. The effect diminishes but remains significant and stronger than the initial magnitude even in the third month after the reform.[19]

Moreover, the effect of maternity leave reforms is not driven by changes in the behaviors of male applicants. As shown in Table IA.3, 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 quickly learn about the fiercer competition in their future employment market brought by extended maternity leave and that they would then react by borrowing less. 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: concerned with job opportunities due to labor market difficulties after the relaxation of the birth control policy, female college students become less likely to borrow.

[19] 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. We drop them from the analysis because the $[t-90, t]$ window covers the Chinese New Year.

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 the defined type 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 the portion of loan applications for human capital investment purposes by 3.1% for female students relative to that of their male schoolmates, while there is no significant difference for loans that are applied for consumption purposes only.[20] This evidence implies that female students are less willing to prepare themselves for future competitions in job markets after the new birth control policy since they have already anticipated more difficulties which may not be worth more (leveraged) investment in human capital.

Meanwhile, regarding borrowers' backgrounds, we find that the discouraging effect on borrowing is relatively stronger for female loan applicants who are 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 the STEM major applications from female college students relative to their male schoolmates. Given 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 Opportuni-

[20] In an unreported test, we check the approval rates of loans that are applied for consumption and human capital investment purposes. We do not see a change after the policy reform. There is no incentive for applicants to switch from one purpose to another for easier approval.

ties 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 rate and employment opportunities. They would be more reluctant to borrow after introducing the universal two-child policy, which is expected to hinder 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.[21] These results corroborate the finding of a stronger impact on borrowings for human capital investment because expenditures on human capital investment, such as taking tutoring and exams for vocational certificates or language proficiency, are usually larger and more persistent than consumption spending.

A potential alternative mechanism is that the universal two-child policy may alter male and female students' attractiveness in the marriage market. While we cannot rule out this explanation, we believe that it is not the main driver of our results because: 1) there is no significant change in female loans that are applied for consumption purposes, which presumably are related to the competitiveness in the marriage market, and 2) we see further drops in female loan applications after the provincial maternity leave reforms in Table 4. The extension of maternity leaves is directly related to female workers' employability.

[21] Table IA.4 shows that the results are robust to different cutoffs for the loan term and loan amount.

5.3.2 Evidence from economic opportunities

We exploit variations in the local economic environment. After collecting the economic data of cities and provinces in which their universities and colleges are located, we test if the baseline effect on female borrowings is intensified by higher levels of regional economic development using various measures. The intuition is that more developed areas attract more job seekers and thus have more competitive job markets. Female college students in these regions would then expect more difficulties in future job-seeking 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 5 displays the results.[22] Two geographical patterns are found. 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 powerhouses 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 effect of regional economic development. We use city- and province-level GDP data to find the most developed regions sorted by regional economic outputs. Given a potential non-linear effect of

[22]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 every month during the sample period.

GDP and ease of interpretation, we construct dummy variables that take one for regions with GDP levels above different thresholds.[23] 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, 9.97% (11.85%) stronger for 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, 9.75% stronger in the Top 5 provinces relative to others from a descending sorting of provincial GDP. Although the signs of these coefficients are consistent with our hypothesis of a larger effect for developed areas and the coefficient is economically 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 quite large. 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 10 cities and others is 25.61% now, 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 are sometimes noisy in reflecting overall development and levels of competition in 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, the sign of coefficients

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

is still consistent with the hypothesis and the significance level does increase.[24]

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 (53.73%) and significant when we compare all four Tier-1 cities with the remaining region. The inter-regional difference drops to 3.05% and becomes insignificant 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 to different 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 effect of economic structure. Specifically, we are interested in the degree of market orientation of the local economy. This is because economic development may not fully reflect the competitiveness of local employment markets since government intervention and state involvement can also boost short-term production. In the latter scenario, 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 assumption behind this is that production efficiency is more prioritized in market-oriented

[24]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, the signs of coefficients are all negative and consistent despite statistical insignificance.

economies in general. Therefore, it is important to describe the competition level of local employment markets and capture how the baseline policy effect varies.

To this end, we exploit variations in the size of the state-owned sector in local employment. We collect data from the China Labour Statistical Yearbook, which provides detailed numbers of urban employment at different dimensions. We then calculate the ratio of urban employment by 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. The full sample is used in Column (1). The average policy effect on female students is smaller by 17.59% in cities located in provinces with a large state-owned sector in terms of urban employment.[25] The magnitude is both economically and statistically significant. This finding suggests that female students indeed feel less restricted by the relaxed birth control policy 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, have strong state involvement

[25]Narrowing the definition of the state-owned sector to 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.

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 11.4% to 17.59% 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.

5.3.4 Expectations of policy effectiveness

Given that the one-child policy included several initial exemptions and has seen partial relaxations since 1984,[26] there could be variations in the effectiveness of the universal two-child policy in boosting fertility. The uneven implementation of the one-child policy could lead to differences in how the subsequent shift to a universal two-child policy impacts fertility in different regions. Both employers and employees may anticipate the potential outcomes of the policy change and the impact on female borrowing may depend on how binding the previous birth control measures were.

As such, we exploit regional variations in the binding power of the one-child policy. Specifically, we refer to the historical demographic composition of each province and construct proxies based on the proportion of two exempted population groups: ethnic minori-

[26]The one-child policy had originally exempted some people like ethnic minorities from birth control. There have been several notable reforms of the policy since then. 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, conditional on fulfilling the only-child requirement upon both parents' own families. This condition on the parents was further relaxed by the "selective two-child" policy in 2013.

ties and rural households. Provinces with a higher ratio of such people 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. We find a weaker policy effect on female loan applications in provinces that had a larger minority population from 1982 to 2010. This pattern is robust to different thresholds used to define the indicator and also to an alternative proxy based on agricultural household registration. Together, these results support the mechanism of pre-shock expectations of the policy effectiveness in shaping loan application patterns from 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 brought by 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 effect 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.[27] The assumption is that a common practice of son preference, implied by an abnormally high sex ratio at birth, would shape daughters' beliefs and make them more aware of gender discrim-

[27]Typically, the sex ratio at birth is around 106 boys per 100 girls. Distortions to this balanced sex ratio are usually caused by interventions such as sex-selective abortions and under-reports, leading to the problem of "missing women" first proposed by Sen (1992). Many studies have linked this phenomenon in China with the one-child policy (e.g., Ebenstein (2010); Chen, Li, and Meng (2013)).

ination. Hence, they would be more sensitive when interpreting the policy consequences on the gender income gap, regardless of returning to their hometowns or not after graduation.

In Table IA.8, 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 female borrowings. As shown in Panel A, our baseline effect is mostly driven by female students who come from high-sex-ratio provinces. The difference in effects on 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 by different birth orders to better 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 is 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, and thus choose to reduce their borrowing to avoid more debt burden. While the competition for limited family resources could impact both male and female students, this may be a more significant concern for female students. There is a common preference for sons in Chinese families, which could lead parents of female students to be more inclined 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 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.[28] We then examine the difference in the baseline effect between students who experience higher and lower fertility responses in their hometowns.

Table IA.9 displays the results. We find no significant differences in the baseline effect between female students who experienced large vs small jumps in birth rates at home. 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 focus our analysis on women aged between 35 and 49 since they are more representative of mothers of college students. We again find no significant difference in our baseline effect between regions. This suggests that the alternative story of internal resource competition is unlikely to account for the observed findings.

6 Conclusion

The salary gap between male and female is often used as a measure of gender inequality. China switched from a one-child policy to 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

[28] 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 often used to depict a population's reproductive patterns.

also drop after local provincial governments extended maternity leaves in a staggered manner. More developed and market-oriented regions, as well as students who 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

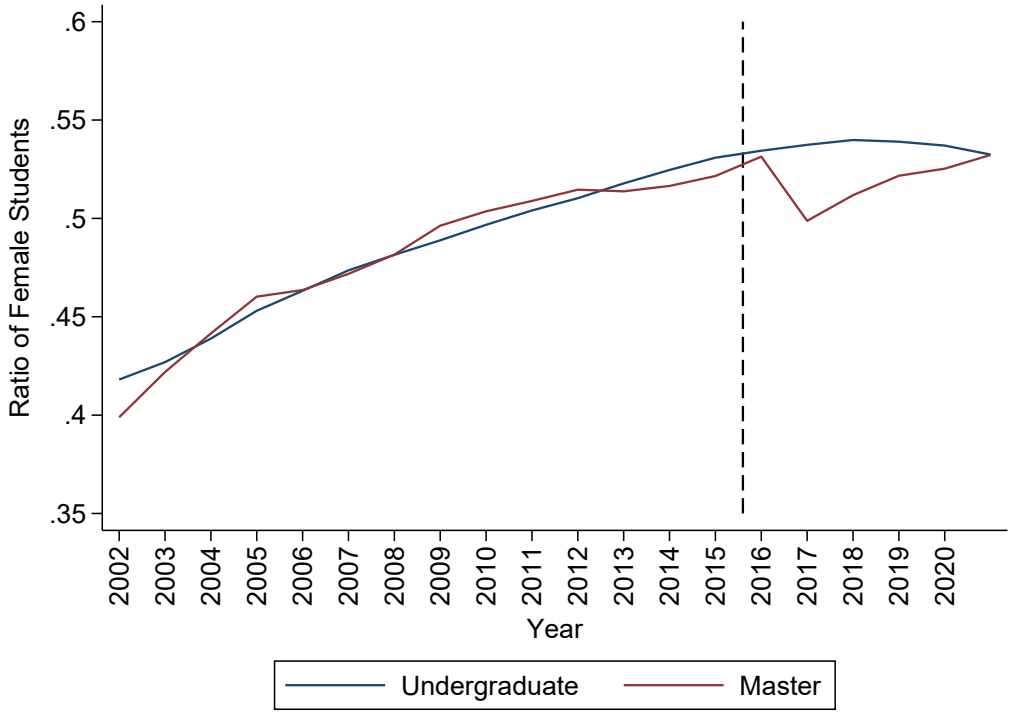


Figure 1. **Female Enrolment in Tertiary Education: 2002-2020**

This figure displays the trend of female enrolment in different levels of tertiary education between 2002 and 2020 in China. We capture the trend with ratios of female students to total students in each category of college education. We use the educational statistics data published by the Ministry of Education in China. We highlight August 2015 by the dashed line when the universal two-child policy started to arouse public attention.

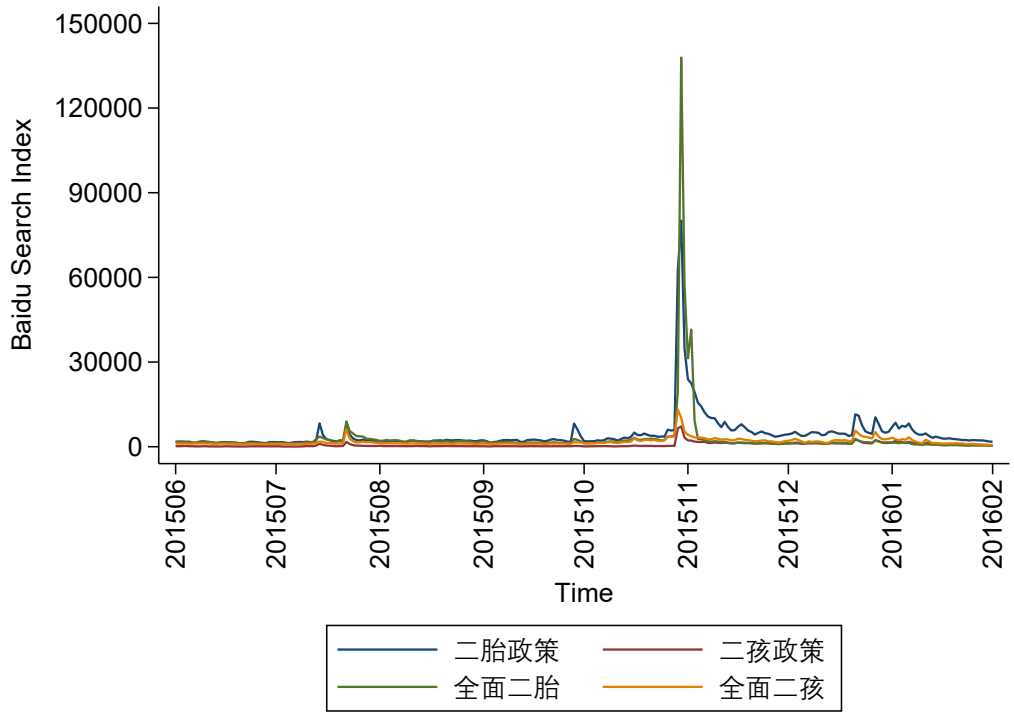


Figure 2. **Baidu Index: 2015.06-2016.01**

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.

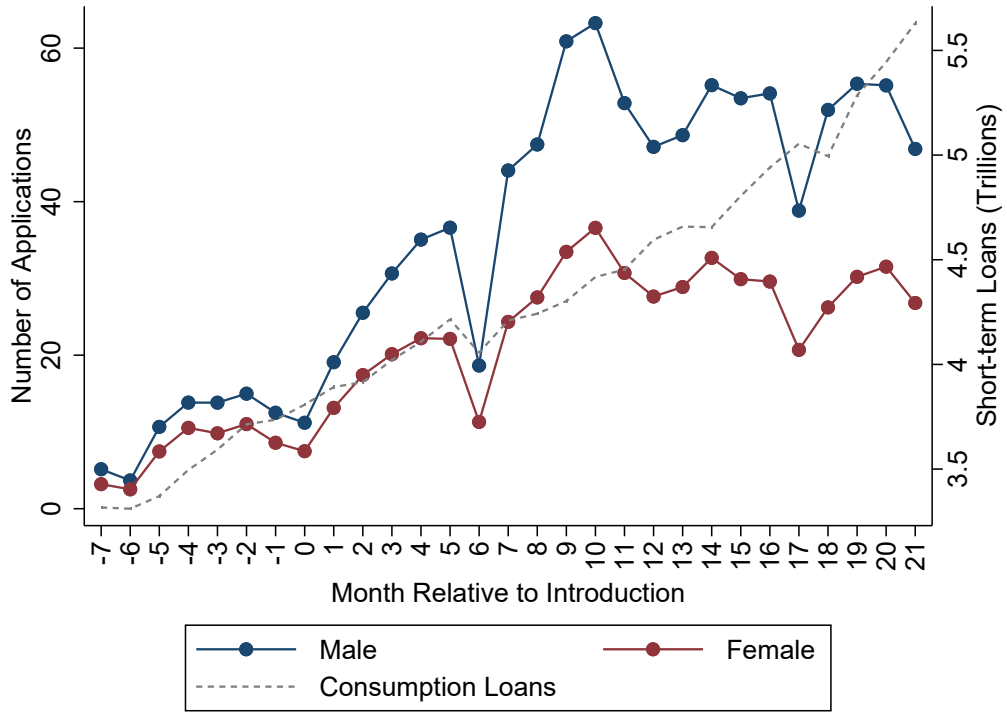


Figure 3. **Average Number of Loan Applications: Gender Comparison**

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.

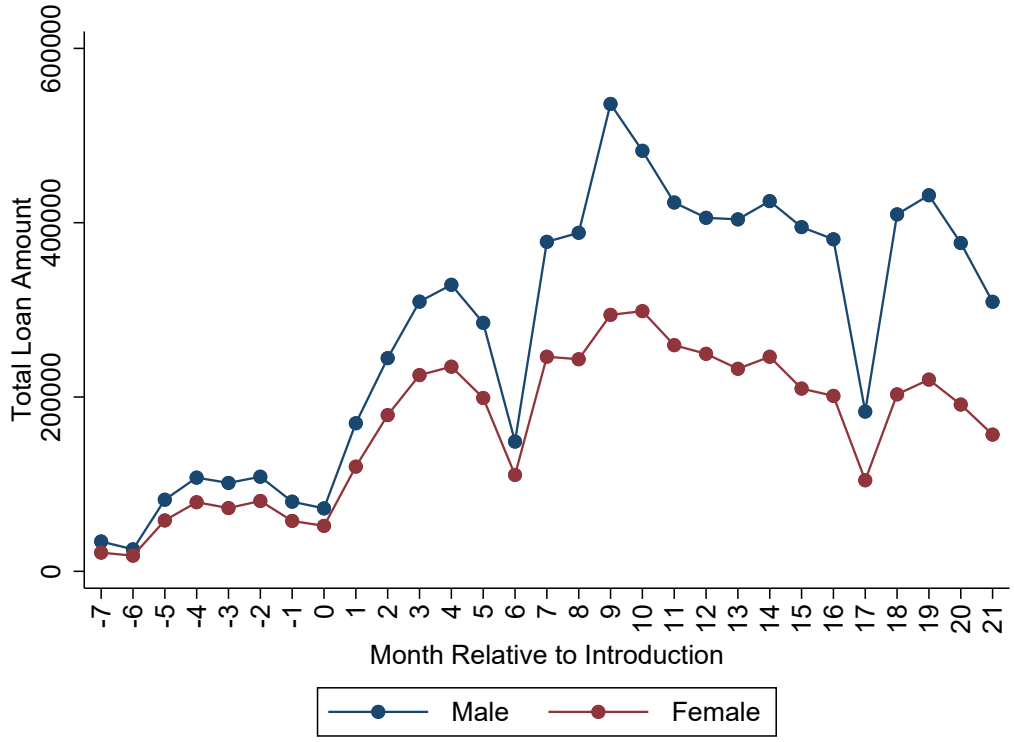


Figure 4. **Average Loan Amount: Gender Comparison**

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.

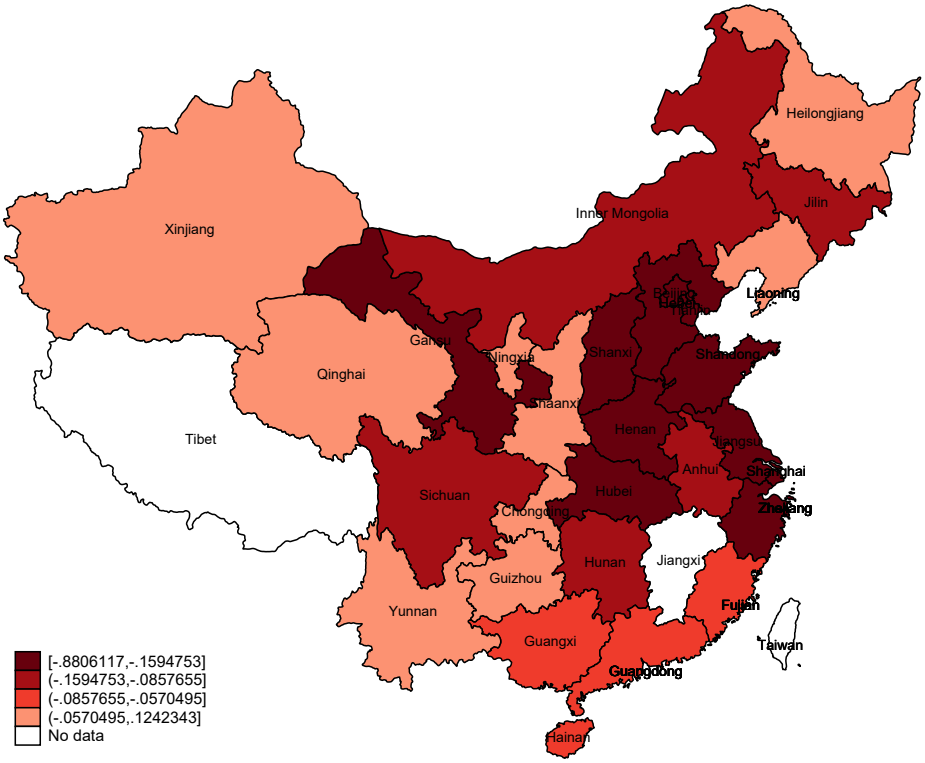


Figure 5. **Heterogeneous Effect of the Universal Two-child Policy on Loan Applications: Geographical Distribution**

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 amount. 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 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 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	-0.024***		
	(0.008)		
Post$_{t,t+59}$ × Female		-0.062***	
		(0.010)	
Post$_{t,t+89}$ × Female			-0.049***
			(0.011)
Adj. R^2	0.566	0.551	0.563
Observations	1,436,562	2,691,972	1,907,424
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 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. 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)			
$Post_{t\geq 201508} \times$ Female	-0.094***	-0.091***	-0.085***	-0.119***
	(0.022)	(0.024)	(0.022)	(0.036)
$Post_{t\geq 201508} \times$ Female $\times$ $GDPPC_{province,top\,decile}$	-0.405*			
	(0.204)			
$Post_{t\geq 201508} \times$ Female $\times$ $GDPPC_{city,top\,decile}$		-0.142		
		(0.089)		
$Post_{t\geq 201508} \times$ Female $\times$ $GDPPC_{province,top5}$			-0.298**	
			(0.141)	
$Post_{t\geq 201508} \times$ Female $\times$ $GDPPC_{city,top10}$				-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)			
$Post_{t\geq 201508} \times$ Female	-0.103***	-0.078**	-0.084***	-0.090***
	(0.025)	(0.032)	(0.027)	(0.031)
$Post_{t\geq 201508} \times$ Female $\times$ Large Tertiary Sector	-0.052			
	(0.046)			
$Post_{t\geq 201508} \times$ Female $\times$ High Urban Disposable Income		-0.093		
		(0.059)		
$Post_{t\geq 201508} \times$ Female $\times$ High Urban Disposable Income: Wages & Salaries			-0.110	
			(0.069)	
$Post_{t\geq 201508} \times$ Female $\times$ 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 $\times$ Gender Fixed effects	Yes	Yes	Yes	Yes
City $\times$ 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 born or more 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 More 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
$Post_{t\geq 201508} \times$ 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
$Post_{t\geq 201508} \times$ 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
$Post_{t\geq 201508} \times$ 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
$Post_{t\geq 201508} \times$ 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 $\times$ Gender Fixed effects	Yes	Yes	
City $\times$ Year-month Fixed effects	Yes	Yes	
Clustered	City	City	

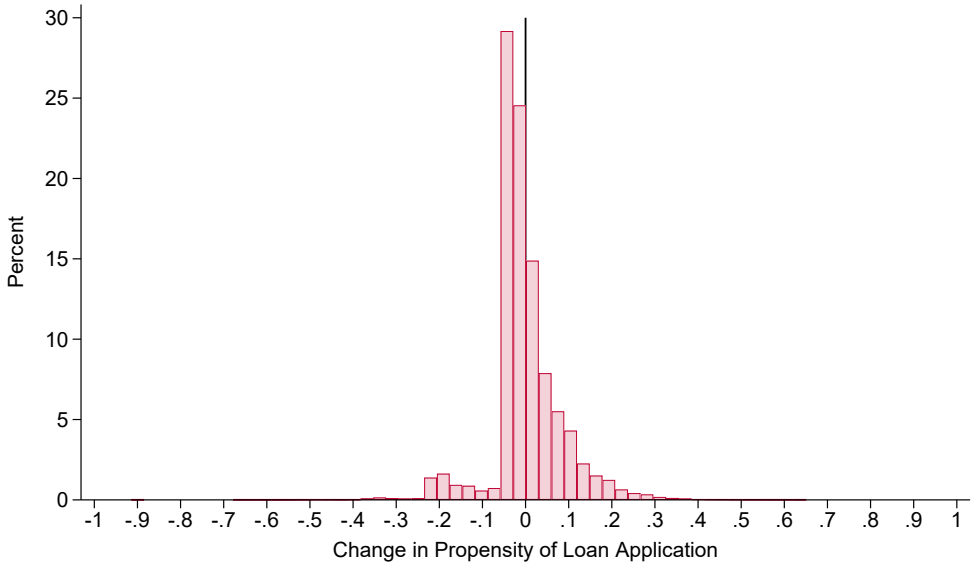


Figure IA.1. **Distribution of Change in Loan Applications**

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.