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The impact of the two child policy on China's fertility rate

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Abstract

I investigate the impact of China's family policy reform on its birth rate. In 2016 the Chinese government relaxed its one-child policy into a two-children policy due concerns of a rapidly aging population, so all Chinese women were permitted to have two children from then onwards. Using the synthetic control method, I find that this reform increased the birth rate in 2016 and 2017 but declined back to previous levels after 2017. This implies that China's birth rate may not increase in the long run by mere relaxation of current anti-natalist family policy.

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1. Introduction

This paper investigates whether the recent relaxation of China's one-child policy achieved its goal – to increase the birth rate. This topic has important implications in understanding whether removing an anti-natalist policy can mitigate population aging, which can have substantial socio-economic effects such as increases in social welfare burdens to support the retired population.

China's "one-child policy" has been one of the most restrictive anti-natalist family policies in the world during the last 40 years, even though it permits some Chinese to have more than one child in some circumstances (e.g. minority ethnics, and when both parents are the only children of their parents (Hesketh, Lu, and Xing, 2005)). The one-child policy has been surmised to slow down population growth and increase human capital level (Qin, Zhuang and Yang, 2017; Rosenzweig and Zhang, 2009). However, this policy has been controversial due to side effects such as sex-ratio distortion as well as questions over the necessity of this restrictive policy given the rapid fertility decline in China (Ebenstein, 2010).

Recently, the one-child policy has been criticized as China's population is aging rapidly, so China may need more and not fewer births to promote economic development and support the rapidly increasing retired population (Zhang and Goza, 2006). Partially due to this demographic concern, in late 2015 the Chinese government relaxed the one-child policy so all Chinese women can have two children without any caveats from 2016 onwards (ABC News, 2015, December 27). The Chinese government expected that this measure would increase the birth rate significantly, but sceptics argued that many fertile Chinese women are already used to the one-child family norm and could face high opportunity costs due to China's rapid socioeconomic modernization (Li, Zhou, and Jia, 2019; Zeng and Hesketh, 2016).

In this paper, I investigate the causal impact of China's shift to the two-child policy on fertility. By using the synthetic control method, I find some evidence that this reform increased the birth rate in 2016 and 2017 but declined back to previous levels after 2017.

My result implies that China's birth rate may not increase in the long run by mere relaxation of the current anti-natalist family policy. But given the relatively short length of data observed post-reform, it remains to be seen whether the currently studied family policy reform will have a long term impact on the fertility rate. This is the first attempt to estimate the causal impact of this family policy reform on Chinese birth rates, which has important implications for population aging in China.

2. Data and Empirical Strategy

I use the synthetic control method (SCM) to investigate the impact of the recent relaxation of the one-child policy in China. The SCM was proposed by Abadie, Diamond and Hainmueller (2010) and is widely used to estimate causal impacts when the number of units receiving a "treatment" is one or similarly small. In short, this method combines control units to construct a "synthetic control unit" whose pre-treatment trends match with those of treatment unit in terms of dependent and control variables, and compares it to the treatment unit to estimate the treatment effect. Abadie, Diamond and Hainmueller (2010) also proposed a method for a falsification test, which provides a "pseudo p-value" by constructing the size distribution of counter-factual causal effects when randomly assigning the "treatment". The null hypothesis of the placebo test is that the true treatment effect is 0, and the estimated treatment effect arises by random chance

I collected birth rate data (from 1990 to 2018) across nations and macro-regions from the World Bank, which collects its information from statistics bureaus of each country. I also collected

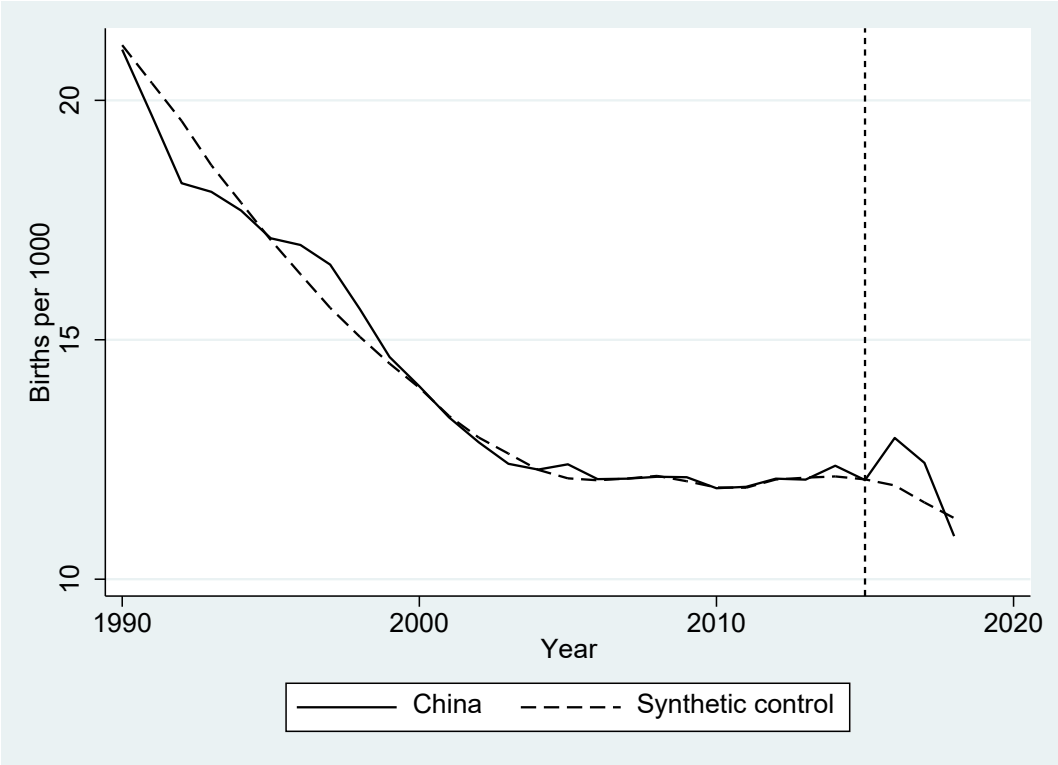
covariates related to birth rate such as GDP (PPP) per capita, urbanization rate, and ratio of female to male labor force participation rate (%) in 2016[1] from the World Bank.

3. Results and Discussion

Figure 1 shows synthetic control estimates for the impact of the relaxation of one-child policy on China's birth rate. At the implementation of the new policy in 2016, the birth rate per 1000 increased relative to China's synthetic control counterpart and remained high in 2017, but in 2018 the birth rate declined to a level very close to the synthetic control unit. The estimated impact is around one more birth per 1000 in 2016 and 0.8 more birth per 1000 in 2017, which means around 2,520,000 more births over two years (Table 2). The pseudo p-value (Abadie, Diamond and Hainmueller, 2010) is statistically significant in 2016 (5 percent level).

The match between China and its synthetic control in terms of birth rate and other covariates is very close indeed (Table 1), which supports the validity of this analysis. Also, China's synthetic control is heavily weighted towards post-communist countries (Albania, Belarus, Latvia and Ukraine) which tend to have high female labor force participation rates, relatively low incomes per capita and low birth rates, each of which characterize China also. These post-communist countries with large weights also experienced transitions from a centrally planned economy into a market economy, which again shows the socioeconomic and historical common factors between China and the countries constituting its synthetic control.

Figure 1: Birth Rate Comparison between China and Its Synthetic Control Unit, with Covariates Included



[1] Dividing female labor force participation rate by male labor force participation rate (multiplying by 100).

Table 1: Covariate Balance between China and Synthetic Control, Weight of Countries in Synthetic Control

	Treated	Synthetic	Country	Weight
Births per 1000 (average)	14.48	14.49	Albania	0.437
Births per 1000 (2015)	12.07	12.09	Belarus	0.068
Births per 1000 (2010)	11.90	11.92	Brazil	0.021
Births per 1000 (2008)	12.14	12.16	Latvia	0.133
Urbanization rate (2016)	56.74	56.78	Moldova	0.23
GDP (PPP) per capita (2016)	13573	13613	Nepal	0.048
Ratio of female to male labor (2016)	80.88	79.69	Ukraine	0.064

Table 2: Estimated Size of Impact of Treatment and Pseudo P-value for Figure 1

Year	Estimates	Pseudo P-value
2016	0.992	0.028
2017	0.827	0.116
2018	-0.378	0.433

It is possible that the birth rate observed in 2018 was an abnormal outlier. Unfortunately, while Chinese birth rate data is available for 2019, it is not available for all countries, which precludes constructing a synthetic control with 2019 data. I instead construct the 2019 birth rate of the synthetic control unit by taking a weighted sum of 2019 birth rates across just the seven countries that were selected for inclusion in the synthetic control unit using birth rate data up to 2018, using the weights from Table 1[2]. I calculate that the Chinese birth rate in 2019 (10.48) continued to be lower than the synthetic control's birth rate (11.25). Thus, it would be reasonable to interpret that the birth rate decline in China in 2018 was not an anomaly. However, given the relatively short post-treatment period, it is too early to conclude that the impact of the one-child policy reform is a short-lived one.

To check the robustness of this result, I perform an "in-time placebo test" for whether the impact of the relaxation of one-child policy preceded the policy itself in late 2015. By setting the "treatment" year as 2010 and repeating the synthetic control estimate, I test whether the birth rate of China diverged from its control before 2016. Figure 2 shows that the synthetic control unit constructed based on 2010 data has a birth rate trend almost identical to that of China until 2016, supporting the finding of Figure 1. Table 3 displays the covariate balance and composition of this synthetic control unit.

[2] Birth rates data in 2019 are from World Bank. The birth rate of the synthetic control in 2019 is calculated by $B_{2019} = \sum_1^n W_i B_{i,2019}$ where W_i is the weight of country i in the synthetic control and $B_{i,2019}$ is birth rate of country i in 2019.

Figure 2: "In-time placebo test"

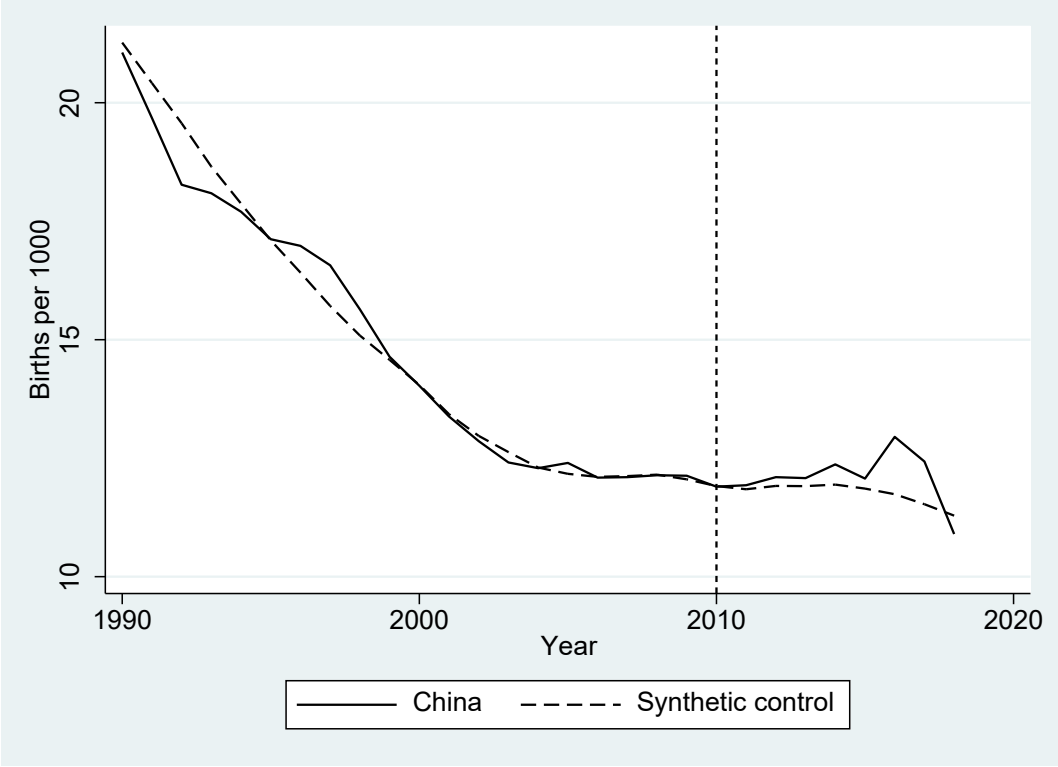


Table 3: Balance between China and Synthetic Control, Weight of Countries in Synthetic Control for Figure 2

	Treated	Synthetic
Births per 1000 (average)	15.08	15.13
Births per 1000 (2010)	11.90	11.91
Births per 1000 (2008)	12.14	12.15
Births per 1000 (2000)	14.03	14.05
Urbanization rate (2010)	49.23	49.26
GDP (PPP) per capita (2010)	9254	9283
Ratio of female to male labor (2010)	81.73	80.60

Country	Weight
Albania	0.363
Bulgaria	0.047
Latvia	0.133
Moldova	0.387
Nepal	0.066
Portugal	0.005

Finally, I propose a possible explanation for this limited effect. The one-child policy had granted some exceptions, and the policy was less binding on populations which were relatively more inclined to have multiple children. For instance, the one-child policy allowed women in in rural areas to have two children in some cases, such as when the first-born child was a girl (Hesketh et al, 2005). Also, ethnic minority populations for whom education and income levels are low (so more likely to prefer to have a larger family) were allowed to have more than one child (Hesketh et al, 2005). Thus the relaxation of the one-child policy was meaningful only for urban populations who were previously under strict application of the one-child policy. But Chinese urban total fertility rate was already 0.88, according to the 2010 China Census (Wang and Fu, 2013); Beijing had a total fertility rate of 0.71, Shanghai 0.74, and Heilongjiang 0.75, implying that many do not even have one child due to female empowerment, female career pursuit, and financial constraints

from high education costs and housing prices (Fang, Eggleston, Rizzo and Zeckhauser, 2013; Liu, 2005). Also, Chinese on average express a smaller "ideal number" of children - less than 2 - compared even to other low-fertility countries, which usually report more than 2 (Basten and Jiang, 2015). Therefore, the mere relaxation of the one-child policy had no reason to have significant positive impact on birth rates, especially in the long run.

4. Conclusion

I estimated the causal impact of the reform of China's family policy, which has permitted all Chinese women to have two children from 2016 onwards. By using the synthetic control method, I find some evidence that this reform increased the birth rate in 2016 and 2017, but the birth rate declined back to previous levels after 2017. This implies that China's birth rate may not increase in the long run by mere relaxation of current anti-natalist family policy. However, because of the short length of data available since the reform at this point, it is still an open question whether the current family policy reform will have a long term impact on the fertility rate.

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