First and second births in China: Individual and contextual determinants

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Introduction and background

Fertility change is an important topic for the socioeconomic development of China, where the TFR (Total Fertility Rate) decreased from 5.8 in 1953 to 1.3 in 2020 (National Bureau of Statistics of China, 2021; Peng, 2011). To better understand fertility trends and patterns in China, it is important to study the transition to first and second births for two reasons. First, before the "three-child" policy was announced in 2021, most Chinese couples were encouraged and allowed to have one or two children since the early 1970s (Wang, 2012). Accordingly, women's ideal number of children is about 2 (Zhuang et al., 2020). Second, although the second-birth rate increased after the policy change from a "one-child" policy to a "two-child" policy, the first-birth rate decreased and the postponement of first births is regarded as a key reason for the fertility decline (Chen, 2019).

Although a large literature exists on the patterns and determinants of women's births, only a few previous studies have used a life course perspective to understand the transition to births and their timing. For example, Piotrowski and Tong (2016) investigated the role of education in the transition to first and second births among women born between 1945 and 1968. They found that education plays different roles in individuals' fertility behaviour in different birth cohorts. However, we know much less about the fertility patterns of younger generations, who have not yet reached the end of their reproductive lifespan. Qin et al. (2022) studied the impact of education and family planning policies on women's transition to second and third births between 1982 and 2006. They showed that the influence of family planning policies varied among women with different educational levels. The compositional hypothesis states that different individual characteristics can lead to variations in women's fertility while the contextual hypothesis argues that the local context has an impact on fertility behaviour through economic development and culture. However, the role of contextual factors and some compositional factors (e.g., Hukou status, migration) on women's transition to first and second births has not been analysed in previous studies in China.

To fill these gaps, we study the transition to first and second births among Chinese women who were born between 1960 and 1999. We ask: Does the timing and levels of women's first and second births vary by compositional, and contextual factors? How do compositional and contextual factors influence women's transition to first and second births? This research has the following contributions. First, we investigate the timing and patterns of first and second births, including among cohorts who are still in their reproductive years. Second, we apply longitudinal methods and focus on not only how compositional characteristics influence fertility behaviour but also the impact of the context, trying to understand the fertility patterns of women in China from both the perspective of time and space.

Data and methods

We use data from the China Family Panel Studies (CFPS) 2010-2020. The sample consists of 17,711 women who were born between 1960 and 1999 and participated in at least one wave of CFPS between 2010 and 2020. We obtain compositional, contextual, and family relationship information from their latest interview, and construct women's birth histories from age 16 to 50. We use piecewise constant exponential models to investigate the timing and levels of the transition to first and second births, as well as the compositional and contextual determinants of these transitions.

Compositional variables include birth cohort (*1960-1969,1970-1979,1980-1989,1990-1999*), ethnicity (*ethnic majority, ethnic minority*), educational level (*illiteracy, primary school, middle school, high school, higher than high school*), Hukou status (*agricultural Hukou, non-agricultural Hukou*), migration (*permanent resident in current province, in-migrants from other provinces*), and marriage status (*ever married, never married*). Compositional variables are whether women live in urban or rural areas, geographical regions with different local cultures (*North China, Northeast China, East China, Central*

China, South China, Southwest China, and Northwest China), and regions with different family planning policies (*regions with most strict, relatively strict, relatively relaxed, and most relaxed family planning policies*) showing local fertility culture shaped by family policies.

Preliminary results

Figures 1-4 show the variation in timing and levels of first and second births by birth cohort and regions with different family planning policies in China. Figure 1 shows that there is variation in the timing and level of first birth by birth cohorts. More than 90% of women had their first birth before age 36 among the three older cohorts, and more than half of the women had a first child by age 28 in the youngest cohort (1990-1999). Among the younger cohorts (1980s and 1990s), the transition to first birth is postponed. The variation in the timing and level of the first birth is small among regions (Figure 2), probably because first births are universal in China, and contextual factors have a limited impact. The timing of the second birth also varies by birth cohort (Figure 3). Women in the 1960-1969 birth cohort had a second birth more quickly (within 5 years after the first birth) whereas, for women born 1970-1979, the interval between first and second births was longer. Women born in the 1980s had a quicker transition to a second birth than women born in the 1970s and those born in the 1990s had an even quicker transition. The variation in the timing and level of second birth by regions with different family planning policies is large. Women who live in regions with the most strict family planning policies are less likely to have a second birth and have longer birth intervals between their first and second birth whereas those living in regions with relaxed policies are more likely to have a second birth and their birth intervals between first and second births are much shorter. Surprisingly, the trends in regions with relatively relaxed family planning policies are similar to the trends in regions with most relaxed family planning policies, which may be influenced by women's socio-economic characteristics and low fertility desire.

Table 1 shows the hazard ratios of first and second births in China. For first birth, women in their 20s have the highest risk of first birth. Women with higher educational levels are less likely to have a first birth. Fertility is highly related to marriage in East Asia including China, the first birth risk of women who have never married is negligible. Although there is variation in the impact of cohort, Hukou status, migration, and contexts, the variation is small. For second births, women are most likely to have a second birth 1-5 years after first birth. Women in the 1970 birth cohort have the lowest risk of a second birth while those who were born in the 1990s have the highest risk. This may be due to the timing of the implementation of the family planning policy: women who were born in the 1970s grew up and experienced most of their reproductive years in the "one-child" policy period, while the "one-child" policy has been relaxed to "two-child" and "three-child" policy when women in the 1990 birth cohort just entered their reproductive years. Women who are ethnic minority, with agricultural Hukou and whose first birth is a girl have a higher second birth risk. This might be because in some provinces, these women are allowed to have a second child. At the same time traditional norms such as "more children mean more happiness" and son preference in the traditional fertility and family culture in China, encourage these women to have more births. Women with a higher educational level have a lower risk of two births. In addition to the compositional factors, the risk of a second birth also varies among women who live in different contexts. Women who live in Northeast and East China have a lower risk of second birth while those who live in South China have the highest risk. This may be because of local culture and economic development. Women who live in urban areas and regions with the most strict family planning policies are less likely to have a second birth. Women who live in areas with relatively relaxed family planning policies are more likely to have a second birth compared to those who live in regions with the most relaxed family planning policies. There are two potential reasons for this. First, this may be due to culture and social interaction with the couples who are allowed to have a second birth. Second, in this dataset, the number of women who live in regions with the most relaxed family planning policies is much smaller than those who live in the other three regions, which may influence the results.

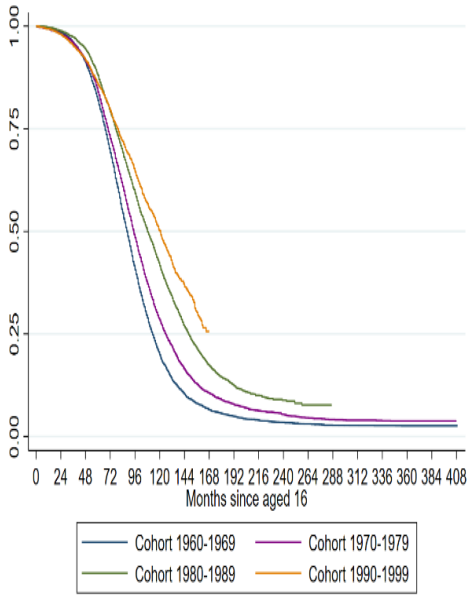

Figure 1 Kaplan-Meier survival curves of first birth by birth cohort in China

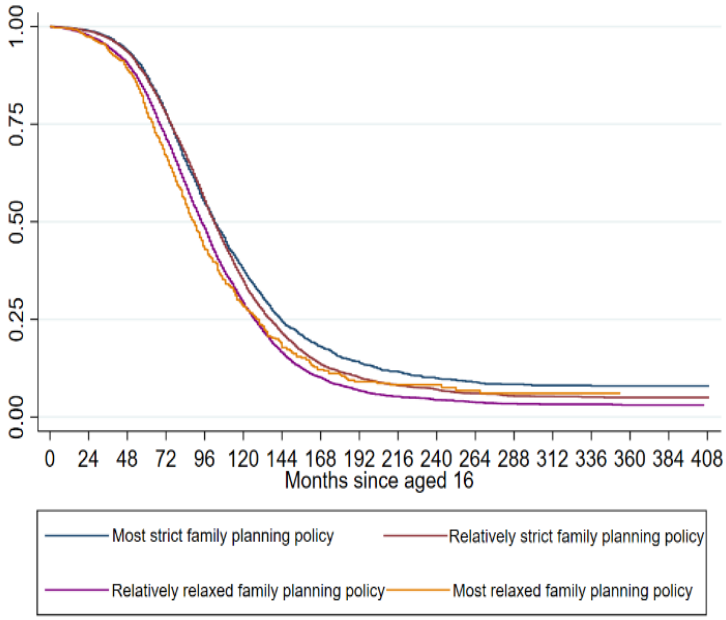

Figure 2 Kaplan-Meier survival curves of first birth by regions with different family planning policies in China

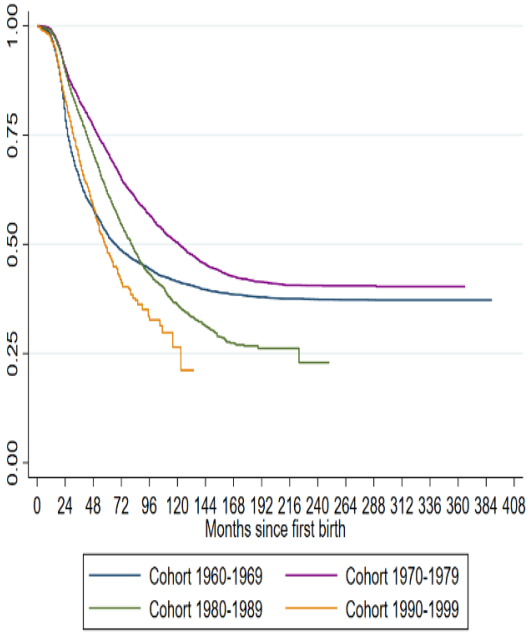

Figure 3 Kaplan-Meier survival curves of second birth by birth cohort in China

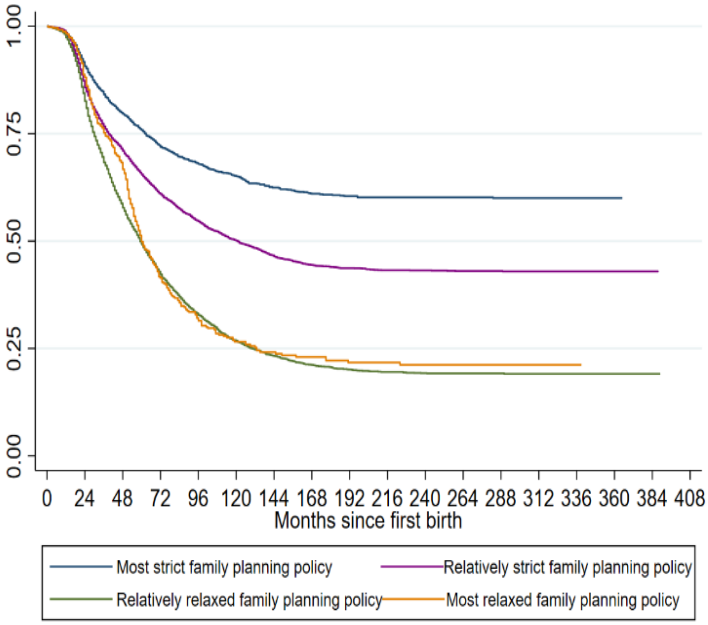

Figure 4 Kaplan-Meier survival curves of second birth by regions with different family planning policies in China

Table 1 Hazard ratio for first and second births in China

Model 1 (First birth)				Model 2 (Second birth)			
	Variables	**Hazard Ratio**			**Variables**	**Hazard Ratio**	
Age	16-19 years old	0.13	*	**Time**	Within 1 year since first birth	0.14	*
	20-24 years old	1.00			1-3 years since first birth	1.00	
	25-29 years old	1.84	*		3-5 years since first birth	0.91	*
	30-34 years old	0.96			5-10 years since first birth	0.76	*
	35-39 years old	0.46	*		More than 10 years since first birth	0.20	*
	40-44 years old	0.07	*	**Birth cohort**	Cohort 1960-1969	1.00	
	45-50 years old	0.03	*		Cohort 1970-1979	0.75	*
Birth cohort	Cohort 1960-1969	1.00			Cohort 1980-1989	1.01	
	Cohort 1970-1979	0.91	*		Cohort 1990-1999	1.19	*
	Cohort 1980-1989	0.86	*	**Ethnicity**	Ethnic majority	0.89	*
	Cohort 1990-1999	0.97			Ethnic minority	1.00	
Ethnicity	Ethnic majority	1.04		**Educational level**	Illiteracy	1.00	
	Ethnic minority	1.00			Primary school	0.82	*
Educational level	Illiteracy	1.00			Middle school	0.68	*
	Primary school	1.02			High school	0.56	*
	Middle school	0.90	*		Higher than high school	0.46	*
	High school	0.70	*	**Hukou status**	Agricultural Hukou	1.00	
	Higher than high school	0.47	*		Non-agricultural Hukou	0.46	*
Hukou status	Agricultural Hukou	1.00		**Migration**	Resident in the same province	1.00	
	Non-agricultural Hukou	0.83	*		In-migrant from other provinces	1.00	
Migration	Resident in the same province	1.00		**Gender of first birth**	Girl	1.61	*
	In-migrant from other provinces	0.92	*		Boy	1.00	
Marriage status	Ever married	1.00		**Marriage status**	Ever married	1.00	
	Never married	0.05	*		Never married	0.76	
Region	North China	1.00		**Region**	North China	1.00	
	Northeast China	0.85	*		Northeast China	0.23	*
	East China	0.94			East China	0.61	*
	Central China	0.90	*		Central China	0.97	
	South China	0.80	*		South China	1.53	*
	Southwest China	0.93			Southwest China	0.98	
	Northwest China	1.04			Northwest China	1.04	
Policy region	Most strict family planning policy	0.89	*	**Policy region**	Most strict family planning policy	0.62	*
	Relatively strict family planning policy	0.92			Relatively strict family planning policy	1.08	
	Relatively relaxed family planning policy	0.95			Relatively relaxed family planning policy	1.16	*
	Most relaxed family planning policy	1.00			Most relaxed family planning policy	1.00	
Residential area	Rural area	1.00		**Residential area**	Rural area	1.00	
	Urban area	0.96			Urban area	0.83	*
No. of subjects		17711		No. of subjects		13795	
No. of failures		13795		No. of failures		7499	
Time at risk		1767385		Time at risk		1408674	

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