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Effects of the One-Child Policy on the Second and the Third Birth in Three Provinces in China

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Ⅰ. Introduction

The Chinese population has experienced a rapid decline in its fertility rate over the last two decades (see, for example, Birdsall and Jamison (1983) for the cross-country comparative figures). The total fertility rate has dropped from 5.7 in 1970 to 2.3 in 1980 (Coale and Chen 1987). It is well noted that the government family planning programs have made considerable contributions to the fertility decline. Even one-child family policy which is implemented since 1979 seems to have succeeded to some extent (Luther et al. 1990). This is suprising considering the strong son preferences prevalent among the Chinese population.

Traditionally, Chinese parents have shown strong son preferences due to many reasons, such as, old-age support, provision of farm labor, carrying on the family line, and the practice of ancestor worship. Since the gender of children is not controllable, a problem facing parents at each parity is to decide whether or not to try to have another child without knowing the sex. Parents with gender preference are more likely to have another child when they did not achieve the de

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sired sex comosition of children than otherwise. Recognizing the potnential obstacle posed by son preference in accomplishing fertility decline, the government has introduced many financial incentives as well as educating people about the virtue of small family.[1]

Many studies have documented evidence of son preferences in China. For example, Arnold and Liu (1986) show that couples without a son are less likely to use contraception than those with a son. Larsen (1989) finds that the relative risks to second and third birth are much higher, especially in rural areas, among couples without a son. In a similar study, Choe et al. (1991) find mortality of previous children and the lack of son to be among the most important factors determining the progression to the second and third birth. Some of other important determinants of fertility in China are found to be women's education, income, urban/rural residence, ethnicity, and government family planning policy (Birdsall and Jamison 1983, Greenhalgh 1988, Freedman et al. 1988, Larsen 1989, Luther et al. 1990, Choe et al. 1991).

While many previous studies examind the fertility pattern in China both before and after the one-child family policy, there is no study to my knowledge which assesses the direct impact of the one-child policy. This paper examines the effect of the one-child family poclicy on second and third birth, and its differential effect by the sex composition of prior births. The estimation uses a multivariate hazard model of waiting time to birth. An important feature of the model is to include a time-varying variable denoting whether the time of analysis is before or after the one-child family, and its interaction terms with urban/rural and sex composition of previous children. Mortality of previous children and the sex of children who died are also included as time-varying variables.

Ⅱ. Data and sample characteristics

The data used for the analysis are from the In-Depth Fertility Survey-Phase I which is carried out in Hebei, Shaanxi, and Shanghai in 1985. The sample includes 5,080 women from Hebei, 4,084 from Shaanxi, and 4,143 from Shanghai of ages 16 to 49. The survey contains a complete pregnancy and birth history, which makes it appropriate for the study of the hazard model of conception or birth.

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1) For example, couples with one child with who sign a pledge stating that they will have no more children receive the single-child certificate entitling them to economic benefits. The economic benefits include a monthly cash payment, preference in housing allocation and job assignments, free medical care for the child, priority for kindergarten and school enrollment, and free schooling for the child. On the other hand, the penalties to the families who violate government policies, especially couples bearing a child of third or higher order, include reduced salary (or work points in rural areas), no additional housing space for the family, and charge of the full fees for the child's birth, medical care, and schooling, in addition to the public criticism. See Banister (1987) for more details.

The first and the birth intervals are studied separately. The interval from marriage to the first birth is excluded from the analysis since almost all women (over 95 percent) had a first child in relatively short duration, and the timing of the birth did not show much difference by any socioeconomic characteristics. The progressions to the fourth or higher order births are also excluded from the analysis of this paper due to relatively few births, especially after the one-child policy. The sample sizes and characteristics are reported in table 1 by province and parity. The sample studied here includes women who are currently and only once married.

(Table 1)

The three provinces covered in the survey differ from one another in many respects. The most pronounced difference is that Shanghai is much more urbanized than the other two provinces. The proportions of the sample drawn from the urban areas are 20%, 16% and 54% in Hebei, Shaanxi, and Shanghai, respectively among those with at least one child. Among the parity two sample in Shanghai the urban proportion is much smaller than in the case of parity one, a reflection of a lower progression rate to parity two in urban areas. Women's education level also shows a marked difference. About 61% among the parity one Shanghai sample have some secondary education while the corresponding figures 23% in Hebei and 26% in Shaanxi.

Ⅲ. A simple analysis of parity progression rate

As a simple descriptive analysis, I first compare the sample progression rate at each parity (PPR) between the provinces, urban and rural areas, and by the sex composition of existing chirdren. The PPR from parity j at duration t is defined as the proportion of the sample who progress to parity j+1 by time t since the previous birth. This is estimated as the complement of the Karplan-Meier survival rate estimate (see, for example, Lawless 1982). In a discrete time framework, we can consider the sample hazard rate at period t at the origin parity j, $h_j(t)$, as the proportion of the sample who progress to the parity j+1 at t^{th} period of the interval among those who had not progressed during the first t-1 periods. The sample survival rate to period t, $s_j(t)$, then is the product of one minus hazard rate up to the period t. The parity progression rate is just the comlement of the sample survival rate, that is,

$$PPR_j(t) = 1 - S_j(t) = 1 - \prod_{k=1}^{t} [1 - h_j(k)] \qquad (1)$$

Table 2 presents the PPRs by the end of the 7th year since the previous birth.[2]

(Table 2)

The progression rate to the second birth by the 7th year is 59 percent in Shanghai while it

2) Most of women who progress to next parity do so within 7 years since the last birth. When the duration is increased to 10 years, the PPRs increased by less than three percent in all three provinces at all parities.

Table 1. Sample means (and standard deviations)

	Hebei		Shaanxi		Shanghai	
	Parity one[a]	Parity two[b]	Parity one	Parity two	Parity one	Parity two
Age at survey	34.48 (7.20)	39.70 (5.78)	34.51 (7.67)	39.28 (6.06)	35.28 (6.90)	44.07 (4.40)
Age at first birth	23.17 (2.93)	24.58 (2.84)	21.86 (2.78)	23.42 (2.70)	25.02 (3.25)	24.00 (2.63)
Sex of first child : -Girl	0.49 (0.50)	—	0.47 (0.50)	—	0.48 (0.50)	—
First two childern : -Two girls	—	0.24 (0.43)	—	0.25 (0.43)	—	0.26 (0.44)
-One boy one girl	—	0.48 (0.50)		0.51 (0.50)	—	0.44 (0.50)
-Two boys	—	0.28 (0.45)	—	0.24 (0.43)	—	0.30 (0.46)
Urban=1	0.20 (0.39)	0.16 (0.36)	0.22 (0.41)	0.18 (0.38)	0.54 (0.50)	0.36 (0.48)
Wife's education :						
No education	0.41 (0.49)	0.49 (0.50)	0.42 (0.49)	0.51 (0.50)	0.10 (0.30)	0.38 (0.49)
-Primary	0.37 (0.48)	0.41 (0.49)	0.32 (0.47)	0.37 (0.48)	0.28 (0.45)	0.46 (0.50)
-Secondary	0.16 (0.36)	0.09 (0.29)	0.17 (0.37)	0.09 (0.29)	0.41 (0.49)	0.12 (0.32)
-Above Secondary	0.07 (0.26)	0.01 (0.12)	0.09 (0.29)	0.03 (0.16)	0.20 (0.40)	0.04 (0.19)
Husband's education :						
-No education	0.11 (0.31)	0.17 (0.37)	0.15 (0.36)	0.22 (0.41)	0.02 (0.15)	0.11 (0.32)
-Primary	0.41 (0.49)	0.49 (0.50)	0.35 (0.48)	0.42 (0.49)	0.27 (0.44)	0.53 (0.50)
-Secondary	0.32 (0.46)	0.26 (0.44)	0.32 (0.46)	0.26 (0.44)	0.43 (0.49)	0.24 (0.43)
-Above secondary	0.16 (0.37)	0.08 (0.28)	0.18 (0.47)	0.11 (0.31)	0.28 (0.45)	0.12 (0.32)
N	4.595	3.449	3.532	2.773	3.695	1.616

Source : In-Depth Fertility Survey of China-Phase I.

[a] : The parity one sample includes women who have at least one child.

[b] : The parity two sample includes women who have at least two children.

is 91 and 92 percent respectively in Hebei and Shaanxi. A similar difference is shown in the progression to the third birth. By the 7th year the progression rate from second to third child are 69, 77 and 36 percent in Hebei, Shaanxi and Shanghai respectively.

The second panel of Table 2 shows parity progression rates by the urban and rural areas. Since the differences are relatively small between the Hebei and Shaanxi, they are combined together. In Hebei and Shaanxi the progression rates show about 10 percent higher in rural areas than in urban areas at the parities both one and two. Shanghai shows much larger differences between rural and urban areas. At parity one the progression rate in rural areas is more than 30 percent higher than in urban areas. The difference at parity two is about 20 percent composition of existing chirdren.

The bottom panel of the Table 2 shows the progression rates by the sex composition of existing children. At parity one the progression rate does not show much differences by the sex of the first child; the largest difference is about 10 percent in rural areas of Shanghai. On the other hand, at parity two the progression rate is much higer among the

Table 2. Sample cumulative parity progression rate by the end of 7th year of the interval

Progression	Strata				X^2-Stat.[a]
	Hebei	Shaanxi	Shanghai		
From 0 to 1	0.971	0.967	0.975		182.89
From 1 to 2	0.912	0.924	0.585		890.51
From 2 to 3	0.691	0.773	0.363		598.46
	--Hebei.&.Shaanxi--		--Shanghai--		
	Urban	Rural	Urban	Rural	
From 1 to 2	0.834	0.937	0.460	0.714	1151.78
From 2 to 3	0.662	0.744	0.312	0.400	584.53
	By Sex.Composition of Existing Children				
	--Hebei & Shaanxi--		--Shanghai--		
From 1 to 2	Urban	Rural	Urban	Rural	
Boy	0.818	0.918	0.450	0.681	
Girl	0.852	0.957	0.471	0.752	1185.21
From 2 to 3					
Two boys	0.635	0.703	0.271	0.386	
A girl & a boy	0.635	0.701	0.296	0.365	734.32
Two girls	0.764	0.896	0.386	0.480	

Source : In-Depth Fertility Survey of China -Phase I.

[a] : This is obtained by likelihood ratios and can be used as tests of equality over strata. In all cases the null hypotheses (equality over strata) is rejected at the significance level of 0.0001.

couples with only daughters than among those with a son. The differences range between 15 percent and 25 percent.

Although Table 2 provides useful comparison by the strata used, it does not provide any direct implications of the effect of the policy changes or time trend. In the next section, using a multivariate hazard analysis I answer a few important questions: What is the effect of the sudden policy changes, such as one-child family policy, on fertility after the control of the time trend? Are the effects of the policy change different according to some individual or social environment, such as urban / rural residence and the sex of existing chirden? What are the effects of the mortality of existing children on subsequent fertility? Do they vary by the sex of the child who died?

Ⅳ. Multivariate hazards analysis

The estimation uses the method discussed in Prentice and Gloeckler (1978),[3] which is similar to the proportional hazard regression model (Cox 1972). Baseline hazards of discrete time intervals are estimated nonparametrically in order to reduce potential bias that can aries if a functional form is imposed on them.

To implement this method, time period of the analysis is reconstructed as four-month discrete intervals since the time of previous birth.[4] Let T_i be the period when the woman i give a live birth to a child. The hazard function at time t is assumed to take a proportional hazard from

$$\lambda_i(t, z_i(t)) = \lambda_0(t)\exp(z_i(t)'\beta) \qquad (2)$$

where $\lambda_0(t)$ is an unknown baseline hazard at time t, $z_i(t)$ is a vector of time-varying explanatory variables and β is the corresponding parameter vector which is unknown. Let C_i denote the terminal time period of analysis. Then the logarithm of the likelihood function for person i is

$$L_i = \delta_i \log \{ 1-\exp[-\exp(\gamma(k_i)+z_i(k_i)\beta)]\} - \sum_{t=1}^{k_i-1}\exp[\gamma(t)+z_i(t)'\beta] \qquad (3)$$

where δ_i the censoring indicator, is 0 if $T_i > C_i$, and 1 otherwise, $k_i = \min(T_i, C_i)$, and $\gamma(t) = \ln(\lambda_0(t))$.[5]

If a woman is observed to have a childbirth at period $k_i (< C_i)$, then her contribution to the likelihood is the hazard of birth at k_i (the first term in equation 2), plus the probability of not having a birth by the beginning of k_i (the last term in equation 2). If a woman did not have a birth by the time of survey, c_i, then her contribution is just the probability of not having a birth by the beginning of period C_i. The sam-

3) See also Meyer (1986) for the detailed discussions about the applications of this method.

4) The construction of discrete time intervals of an arbitrary duration length is purely for computational convenience. However, the four month duration length is not likely to cause any specification problems.

5) This transformation is for a notational convenience. However, it is suggested that convergence is achieved faster with the transformation (Prentice and Gloeckler, 1978).

ple log-likelihood is just the summation of (3) over the individuals in the sample.

The covariates used in this study include the woman's and her husband's education, the calendar year at the previous birth, urban / rural residence at the time of survey, and the sex composition of existing children. To capture the impact of the one-child family policy, a time-varying variable, AFTER(t), is introduced. This variable denotes whether the time t is before (−0)or after (−1) the January 1979, the time when the one-child family policy started. While the continuous time trend of fertility is represented by the calendar year at the previous birth, the effect of a sudden policy change is expected to be captured by AFTER(t). Furthermore, since it is suspected that the effect of the policy may differ between the urban and rural areas, the interaction term of AFTER(t) with the urban / rural residence is included. Also, I include interaction terms of AFTER(t) with sex composition of existing children to find if the fertility differentials by sex of prior births change after the policy. Finally, the effect of mortality of previous children and the importance of the sex of children who died are estimated by including a time-varying variable which denotes whether the time of analysis is before or after the death of each previous child, and its interaction term with the sex of the child.

V. Results

Table 3 and 4 present the estimation results of the progression to the second and the third birth respectively. Each parity progression is estimated for each province separately.[6]

Progression To Second Birth

Parental Education :

The relative risk to the second birth with respect to woman's education shows a inverse U shape. While the primary educated mothers are more likely to have second birth than uneducated women by 9 percent in Shaanxi and 23 percent in Shanghai, the secondary edcated women have about 15 percent lower risks to second birth in Hebei and Shanghai. The women with more than secondary education shows 29, 18, and 44 percent lower risks respectively in Hebei, Shaanxi, and Shanghai. The inverse U-shape association between the education and progression to second birth needs further investigation (see also Zhang 1990).

The husband's education shows positive effects on risks to the second birth in general. The effect becomes small and insignificant at above secondary education. In Shanghai where the effect is strongest, the primary, secondary and above secondary ed-

6) The likelihood ratio tests reject the hypothesis that the parameters are same across provinces. The restricted regression is run over the total combined sample with province as an additional variable. Twice of the difference in loglikelihood ratios (which follows chi-square distributions asymptotically) are 1,154 and 928 in the regressions of progression to parity two and three respectively.

Table 3. Relative risk of second childbirth[a]

Covariates	Hebei	Shaanxi	Shabghai
Wife's education (no edtion=1.00)			
Primary	1.05 (1.44)	1.09 (2.12)	1.23 (2.97)
Secondary	0.85 (2.76)	1.00 (0.03)	0.84 (1.81)
Above Secondary	0.71 (3.61)	0.82 (1.97)	0.56 (4.60)
Husband's education (no education=1.00)			
Primary	1.13 (2.27)	1.08 (1.45)	1.43 (2.91)
Secondary	1.14 (2.24)	1.11 (1.68)	1.39 (2.47)
Above secondary	1.10 (1.43)	1.01 (0.13)	1.22 (1.38)
Urban/ rural residence (rural=1.00)			
Urban.(U)	0.91 (1.83)	0.95 (0.91)	0.88 (1.81)
Sex of the first child (boy=1.00)			
Girl(G)	1.13 (3.10)	1.09 (1.99)	1.16 (2.88)
Mortality of the first child[t] (alive=1.00)			
Dead (D)	2.37 (7.05)	1.91 (5.28)	2.53 (4.14)
One-child family policy[t] (before=1.00)			
After (A)	0.63 (7.15)	0.72 (4.39)	0.36 (8.46)
Interaction Terms[t]			
(A) * (U)	0.57 (5.54)	0.48 (6.52)	0.16 (9.29)
(A) * (G)	1.23 (2.98)	1.26 (2.89)	1.41 (2.55)
(D) * Boy	1.30 (1.69)	1.06 (0.36)	2.28 (3.00)
Calendar year at the first birth	0.99 (2.15)	1.00 (0.28)	0.94 (12.26)
Log-likelihood	-9850.52	-7835.08	-5104.58

[a] : The relative risks are computed by taking exponents of the estimated β.
[t] : Time-varying variable. Unsigned t-statistics are reported in parenthesis.

ucation of husband show 43, 39, and 22 percent positive effects respectively relative to the uneducated husbands.

Effect of urban residence, before and after the one-child policy :

In general, a child's value to parents is considered to be lower in urban areas than in rural areas due to many reason (Croll 1983, Greenhalgh 1988). It is also well known that goverment controls have been enforced more strictly in urban areas (Banister 1987). Therefore, it is not surprising to see a negative effect of urban residence on the second birth. However, it is interesting that the negative effect is particularly strong in Shanghai than in Hebei or Shaanxi, and after the one-child policy than before the

Table 4. Relative risk of third childbirth[a]

Covariates	Hebei	Shaanxi	Shabghai
Wife's education (no education = 1.00)			
Primary	1.01 (0.18)	1.02 (0.44)	0.96 (0.42)
Secondary	0.90 (1.31)	0.94 (0.79)	0.58 (3.58)
Above Secondary	0.55 (3.09)	0.59 (3.40)	0.36 (4.21)
Husband's education (no education = 1.00)			
Primary	1.15 (2.31)	1.06 (0.95)	1.10 (0.68)
Secondary	1.09 (1.20)	1.16 (2.03)	1.23 (1.40)
Above secondary	1.07 (0.75)	1.07 (0.72)	0.87 (0.73)
Urban/ rural residence (rural = 1.00)			
Urban.(U)	0.85 (2.50)	0.84 (2.76)	0.70 (4.06)
Sex of the first two children (two boy = 1.00)			
boy & girl(BG)	1.08 (1.42)	1.01 (0.22)	0.91 (1.08)
Two girls (GG)	1.76 (8.40)	1.35 (4.15)	1.50 (4.07)
Mortality of previous children[t] (alive = 1.00)			
1st child (D1)	1.44 (4.22)	1.17 (1.89)	2.47 (5.99)
2nd child (D2)	2.95(11.74)	2.37 (9.70)	3.46 (8.11)
One-child family policy[t] (before = 1.00)			
After (A)	0.59 (4.48)	0.42 (6.65)	0.45 (2.56)
Interactive Terms[t]			
(A) * (U)	0.69 (2.27)	0.65 (2.25)	1.10 (0.18)
(A) * (BG)	1.13 (0.99)	0.94 (0.43)	1.25 (0.64)
(A) * (GG)	2.14 (5.44)	1.71 (3.49)	0.53 (1.67)
(D1) * Boy[d]	1.06 (1.41)	0.97 (1.03)	1.06 (0.86)
(D2) * Boy[d]	1.12 (2.73)	1.05 (1.03)	0.91 (1.26)
Calendar year at the second birth	0.93 (15.2)	0.96 (7.38)	0.87 (16.5)
*Log-likelihood	-6516.62	-5711.90	-2009.72

[a],[t] : see the footnote of Table 3.
[d] : interaction term between mortality and the sex of child.

policy. Before the policy urban residence shows a small and insignificant effect, but after the policy the risks of second birth in urban areas are about 50 percent lower in Hebei and Shaanxi and 86 percent lower in Shanghai. The extreme difference after the one-child policy between the urban and rural areas of Shanghai reflects almost no progression to parity two in urban Shanghai. This indicates that the value of children has decreased much more in urban areas or / and one-child family policy has been more

effective in urban areas.

Effects of sex of previous children, before and after the one-child policy :

The sex of previous children are an important determinant in subsequent childbearing if parents have gender preferences for their children. However, the effect of sex of previous children varies according to desired family size and the type of preference. For example, when the desired total numder of children is large, the preference for at least a son would not matter much since most of families would have at least a son within the desired number of children. On the other hand, if the desired number of children is one or two, the sex of each child becomes an important factor in the decision of subsequent childbearing for parents with preference for a son.

Before the one-child policy the risks of second birth among the couples with a female first child are about 9 to 16 percent higer than among those with a male first child. The difference increases after the one-child policy to about 38 percent in Hebei and Shaanxi, and 64 percent in Shanghai. The results indicate that although the one-child policy has been very effective to bring down the general fertility rate, the strong son preferences have helped to keep much higher subsequent childbearing rate among the women without a son than those with a son. It is important to notice that the policy has led the gender of the first child to be a more decisive factor in subsequent childbearing decision.

Effects of mortality of the first child

It is well documented that child mortality is positively related to the birth rates, mainly due to pure biological factors and replacement effect. The sample used here also shows large positive effects of mortality on fertility. The death of first child increases the risk of second birth by about 2. 5 times in Hebei and Shanghai, and 1.9 times in Shaanxi.

The mortality effect differs by the sex of the child who died. If the child who died is a boy, the subsequent increase in the risk of second birth is 3.1 times in Hebei and 5.8 times in Shanghai. This differential effect of child mortality by the sex of child indicates that there are strong replacement effort by parents who lost a child, especially when it is a boy. The fact that the parents in Shanghai respond most strongly to the death of a male child suggests the persistent strong son preferences even in Shanghai.

Progression To Third birth Parental Education :

In the progression to third child, woman's education shows persistent negative effect above the primary edcation. In particular, women with above secondary education have about 43 percent lower risks of the third birth than uneducated women in Hebei and Shaanxi, and 64 percent in Shanghai. On the other hand, husband's education shows in most cases insignificant effect.

Effect of urban residence, before and after the one-child policy :

Urban residence shows a negative effect on progression to the third chird, and the effect is larger than in the case of progression to the second child. It is interesting that while the urban-rural differential has increased after the one-child policy in Hebei and Shaanxi, it has declined in Shanghai. After the one-child policy, the risk to the third birth in urban areas of Hebei and Shaanxi is only the half of that in rural areas. On the other hand, in both urban and rural areas of Shanghai few couples progress to the third parity.

Effects of sex composition, before and after the one-child policy :

The results show that the one-child policy has reduced the progression rate to parity three as well. Women without a son show much greater risks to the third birth than those with at least a son. Only a small difference in subsequent childbearing between the families with a son and a daughter and those with two sons indicates parental preferences for a son. The difference in progression rate by the existence of a son among existing children has increased substantially after the one-child family policy in Hebei and Shaanxi, but it has declined in Shanghai. First, in Shanghai before the one-child policy couples with two girl children have a 50 percent higer hazard of progression to the third parity than those with two boys. This difference has disappeared after the one-child policy. However, only few couples even among women with two girls are observed to progress to the thrid child after the policy. On the other hand, in Hebei and Shaanxi the couples with two girls show 3.5 and 2.5 times higher risks of third birth than those with two boys after the policy. These differences are much greater than before the one-child policy, when they were 1.76 in Hebei and 1.35 in Shaanxi. It seems that in a less urbanized and less tightly controlled areas son preferences are still strong enough for parents without a boy to go on to have the third child. On the other hand, in areas like Shanghai the high costs of an additional child or strict government controls seem to suppress the son preferences.

Effect of child mortality

The death of previous children increases the risk of the birth substantially. The mortality effect on the third birth is particularly strong when the second child has died. While the death of the first child increases the risk of the third birth by 44, 17 and 147 percent in Hebei, Shaanxi and Shanghai, the increases due to the death of the second child are 295, 237 and 346 percent correspondingly. Again this might be due to the combination of both biological and behavioral factors. In the case of the progression to third birth the sex of the child who has died does not play much roles.

V. Conclusions

The changing values of children to parents along with the changing government family planning policies and overall development have played important roles in reducing the general fertility rate in China. However, the pattern of fertility changes over time shows substantial variations across province, between urban and rural areas, and by the sex composition of previous children. This research examines the impact of the one-child policy on the progression to the second and third birth in Hebei, Shaanxi, and Shanghai provinces of China. It highlights the differential effect of the policy, by the sex of previous childern and urban / rural residence.

First, the negative effect of urban residence on the progression to the second and third birth has increased significantly after the one-child family policy. This suggests that the value of childern has declined more rapidly in urban areas or the government controls are enforced more strictly in urban areas. Second, much higher parity progression rates among families without a son realtive to families with a son in Hebei and Shaanxi speaks clearly for the persistent strong son preferences among Chinese parents. In fact the son preference has manifested itself more clearly after the one-child policy is enforced. On the other hand, evidence from Shanghai suggests that the parental son preferences could be suppressed even at low parities if the costs of an additional child become unbearable or / and government controls are strictly enforced. Yet even in Shanghai considerably higher risks to the second birth after the death of male child than after the death of female child indicate persistent son preferences.

In terms of fertility decline, Shanghai seems to be far ahead of other provinces, and similarly urban areas ahead of rural areas. It remains to be seen whether Hebei and Shaanxi will follow the same fertility transition pattern which Shanghai has already experienced, and likewise whether the rural areas will follow the urban areas. Also, the time will tell us whether the relaxation of the government restriction or other cultural and socio-economic change which increases the value of children will reverse the transition pattern. Evidence so far suggests positive answers to these questions (Luther et al. 1990, Choe et al. 1991, Si et al. 1991).

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(國文抄錄)

中國의 한子女政策이 出産力에 미친 效果分析

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本 硏究는 中國의 3개지역 (Hebei, Shaanxi, Shanghai)에서 한 子女家族政策이 둘째 및 셋째 아이의 出産에 미치는 영향을 헤져드(Hazard) 모델을 이용하여 分析하고 있다. 特히, 그 정책효과의 도시와 농촌간의 격차, 現在子女의 性構造에 따른 격차의 연구에 중점을 두고 있다. 연구자료는 1985년에 완료된 제 1단계 중국의 출산력 심층조사 (In-Depth Fertility Survey in China)를 이용하였다.

이 分析은 헤져드 모델에서 各 時点이 한 자녀정책 前인지 後인지를 나타내는 時間에 따른 변동변수(time-varying variable)를 설명변수중의 하나로 포함시키고 그와 더불어 그 변수와 도시/농촌 주거여부를 나타내는 변수와의 혼합변수 (Interactive term) 및 현존자녀의 性구조와의 혼합변수를 포함하므로써 가능하게 된다. 또한, 자녀의 死亡力이 차후 출산력에 미치는 영향을 비슷한 방법으로 분석하였다.

연구결과로는 첫째, 둘째 및 셋째 아이를 출산할 확률에 있어서 도시와 농촌격차가 한 자녀정책 실시 이후 더욱 커졌다는 사실이다. 이러한 결과는 부모가 생각하는 자녀의 가치가 도시에서 더 많이 저하했음을 제시하거나 정부의 한 자녀정책이 도시에서 더욱더 엄격히 집행되고 있음을 시사하고 있다.

둘째, Hebei와 Shanghai에서는 男兒가 없는 부부가 남아를 가진 부부보다 둘째 또는 셋째아이를 가질 확률이 훨씬 높게 나타났다. 한편, Shanghai에서는 한 자녀정책 이후 둘째아이의 출산률이 첫째아이의 性에 관계없이 매우 낮았다. 이는 전통적으로 내려오는 남아선호 성향이 아직 농촌지역에서는 강하게 영향을 미치고 있지만 도시지역에서는 강력한 정책집행이 이를 억누르고 있음을 시사하고 있다. 하지만 Shanghai에서도 첫째아이가 사망한 경우 그 아이가 男兒였으면 죽은아이가 女兒이였을 경우보다 둘째아이의 출산이 훨씬 더 빠르게 나타나고 있음을 볼때 도시에서도 여전히 남아선호 성향이 잠재하고 있음을 간접적으로 보여주고 있다.

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