

Levels, Trends and Determinants of Fertility in China: 1973-1987

*There is room for further fertility decline, but
a more realistic goal might be to strive
for replacement level fertility*

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With the development of its family planning programme, China has achieved great success since the 1970s in slowing the growth of its population. This is evident in the rapid decline in fertility: the total fertility rate (TFR) declined from the 1960s average of 5.68 to 4.0 in the 1970s and to only 2.46 for the first eight years of the 1980s.

However, while the overall development picture is characterized by such advances, there are very large regional differences in China's socio-economic

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development. Because the implementation of the family planning programme is not uniform, changes in the fertility rates of different regions of the country are complex.

This article attempts to give a comprehensive description of changes in the fertility rates of China's 28 provinces, autonomous regions and municipalities (not including Hainan, Xizhang [Tibet] and Taiwan provinces) during the 15-year period from 1973 to 1987 using data from the 1982 One-per-Thousand Fertility Sampling Survey and the 1988 Two-per-Thousand Fertility and Birth Control Sampling Survey. Also, it summarizes some characteristics of fertility changes in these areas, all of which are referred to as "regions" in this article for the sake of convenience.

Changes in fertility are influenced by many factors; in China's case, the current family planning policy has played a decisive role. Nevertheless, no policy exists in isolation since it is conditioned by various aspects of development. This is seen in the changes in fertility in different regions of the country. When the family planning work in these regions is evaluated, it is necessary to consider the fertility rate in light of major factors related to family planning policy, and social, economic and cultural development. Thus, this article establishes a multivariate regression formula for fertility levels and per capita national income, rates of female illiteracy and the proportion of national minorities in the population. This regression equation is useful for comparing actual and expected fertility rates and for evaluating the implementation of the family planning programme in different regions of the country.

Based on changes in the fertility rate in different regions of China from 1973 to 1987, it may be possible for the country to achieve a further decline in fertility, but the magnitude of that decline will be limited in the near future. The reasons for this are quite clear. Family planning work in China is currently faced with a tremendous challenge because a third "baby boom" has already taken place in the country. At present it is perhaps more difficult to make the TFR decline by 0.1 than it was to make it decrease by 1.0 in the early 1970s.

As for policy decisions, it is important to keep the current family planning policy stable. Strict requirements are necessary in order to control population growth. Nevertheless, this does not mean "the stricter the better".

On the other hand, if difficulties are over-emphasized and family planning work slackens, then a "re-rise" in the fertility rate may again take place. Furthermore, in order to maintain more effective control over China's population growth, it is necessary to strengthen family planning legislation. This is not to replace publicity and education, but there is evidence that it is difficult

to achieve continuous fertility decline using only publicity and education as the means to do so.

With regard to the short-term goal of fertility control, we hold that to strive to make fertility decline as soon as possible to a level which is below the replacement level is both necessary and possible. Only in this way can the current continuous growth of China's population be stopped.

Data sources

The fertility rates for the period from 1973 to 1980 are from the 1982 One-per-Thousand Fertility Sampling Survey¹ and those from the period 1981 to 1987 are from the 1988 Two-per-Thousand Fertility and Birth Control Sampling Survey.² The 1988 Survey includes data on the Xizhang Autonomous Region, but the 1982 Survey does not. Moreover, at the time the 1982 Survey was taken, what is currently Hainan province was a part of Guangdong province; they were made into two separate provinces in 1988. Consequently, in analysing fertility changes during the period from 1973 to 1987, comparisons are unavailable for Hainan province and Xizhang Autonomous Region, and the data on Guangdong province for the periods 1973-1980 and 1981-1987 have different coverage.

The proportions of national minorities in the population used in this article are from the Third National Population Census.³ Statistical data on per capita national income are from the State Statistical Bureau⁴ and the women's illiteracy rates are from the One-per-Cent Population Changes Sampling Survey³ conducted by the State Statistical Bureau in 1987.

Findings and analysis

In 1963, TFR reached the highest level since the founding of the People's Republic 14 years previously. In the same year a gradual transition from high to low fertility began.

During the 25 years from 1963 to 1987, the changes in fertility can be divided into three periods. During the first period (1963-1972), the fertility rate fluctuated at a high level, but showed an overall remarkable decline. In the second period (1973-1977), the TFR showed a stable, continuous decline, and in the third period (1978-1987), it fluctuated at a low level, showing only a slight decline.

This article covers only the second and third periods (1973-1987), but in order to enable more comprehensive comparisons and analyses, these periods are divided into phases, with 1973-1977 forming the first phase, 1978-1982, the second phase and 1983-1987, the third phase.

Changes in fertility rates

Changes in the total fertility rates of the 28 regions from 1973 to 1987 are shown in [table 1](#) (the TFRs are given in thousands of children per thousand women). The changes in TFR were compared by three methods. First, the TFR

Table 1.1: Total fertility rates (TFRs) per thousand in 28 provinces, autonomous regions and municipalities of China

Year	1973	1974	1975	1976	1977	1978	1979	1980
National	4 526	4 160	3 578	3 240	2 846	2 726	2 753	2 260
Beijing	2 601	1 722	1 395	1 452	1 482	1 374	1 461	1 547
Tianjing	2 296	2 066	1 997	2 070	1 718	1 659	1 543	1 413
Hebei	3 848	2 945	2 569	2 518	2 276	2 351	2 266	2 315
Shanxi	4 659	4 168	3 417	3 267	2 702	2 279	2 227	2 249
Inner Mongolia	4 257	4 273	3 048	2 879	2 703	2 550	2 472	2 435
Liaoning	3 413	2 874	2 135	1 953	1 880	2 243	2 092	1 705
Jilin	4 185	3 357	2 501	2 527	2 333	2 458	2 699	1 837
Heilongjiang	4 951	4 105	3 263	2 681	2 458	2 112	2 805	2 194
Shanghai	1 545	1 253	1 120	1 265	1 152	1 197	1 203	824
Jiangsu	2 701	2 524	2 224	2 184	1 989	1 900	1 855	1 381
Zhejiang	3 269	2 907	2 666	2 591	2 356	2 180	2 280	1 776
Anhui	4 862	4 001	3 644	3 399	3 001	3 349	3 403	2 709
Fujian	5 338	4 596	4 216	4 451	4 035	3 499	2 859	2 050
Jiangxi	6 781	6 422	5 825	5 905	5 261	4 771	4 030	3 049
Shandong	3 725	3 309	3 041	2 737	2 343	2 129	2 430	1 737
Henan	4 972	4 883	3 547	3 214	2 985	3 158	3 143	2 327
Hubei	4 015	3 726	3 247	3 051	2 712	2 534	2 930	2 159
Hunan	4 564	4 572	3 970	3 132	2 709	2 455	2 519	2 267
Guangdong	4 848	4 481	3 847	3 796	3 337	3 607	3 765	3 485
Guangxi	5 664	5 586	5 112	4 358	3 987	3 653	3 981	3 841
Sichuan	5 456	5 112	4 438	3 412	2 502	1 879	1 938	1 518
Guizhou	6 662	6 926	6 315	5 120	4 678	3 849	4 116	3 663
Yunnan	5 522	5 351	5 322	5 242	4 995	4 549	3 986	3 198
Shaanxi	4 438	4 168	3 288	3 209	2 617	2 690	2 871	2 158
Gansu	5 804	4 936	3 485	3 027	2 789	3 092	3 499	2 529
Qinghai	5 865	6 096	4 948	5 025	5 110	4 871	5 002	4 156
Ningxia	5 844	5 771	6 190	4 585	4 133	4 347	4 794	4 319
Xinjing	5 496	6 001	4 932	5 263	4 268	4 050	3 788	3 426

Source: 1982 One-per-Thousand Fertility Sampling Survey.

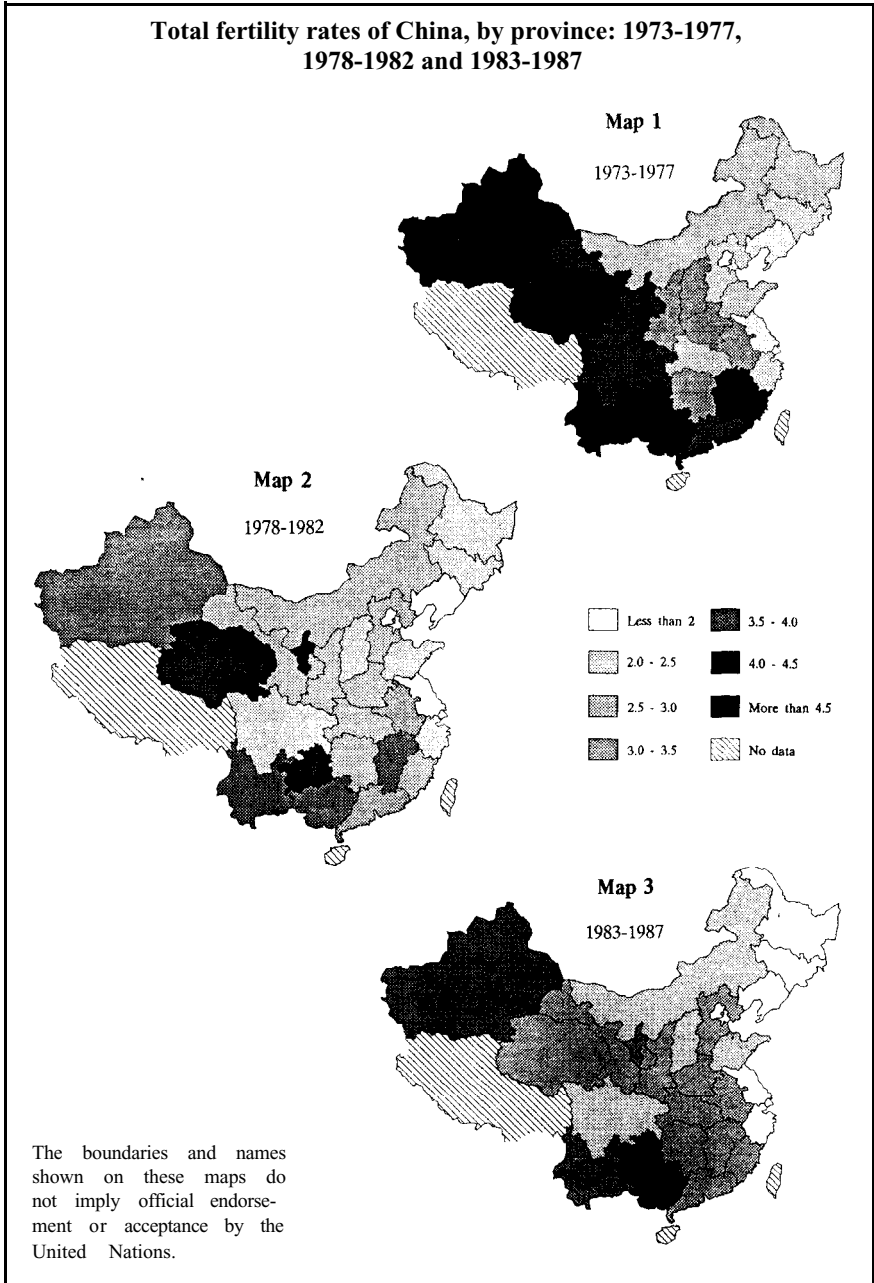
in the 28 regions during different periods of time was studied by comparing changes in the rank order. Second, the difference between the rank order during the previous period and that of the magnitude of TFR decline taking place from the previous to the more recent period was studied in order to determine the relationship between the magnitude of TFR decline and the original TFR level

Table 1.2: Total fertility rates (TFRs) per thousand in 28 provinces, autonomous regions and municipalities of China

Year	1981	1982	1983	1984	1985	1986	1987
National	2 610	2 860	2 420	2 350	2 200	2 420	2 590
Beijing	1 580	1 780	1 470	1 430	1 320	1 490	1 580
Tianjing	1 740	1 850	1 680	1 520	1 510	1 640	1 690
Hebei	2 730	2 960	2 470	2 450	2 360	2 480	2 810
Shanxi	2 370	2 920	2 390	2 630	2 400	2 400	2 460
Inner Mongolia	2 720	2 910	2 330	2 320	2 010	1 970	2 220
Liaoning	1 820	1 900	1 500	1 180	1 340	1 630	1 880
Jilin	1 850	2 100	1 620	1 520	1 520	1 710	1 830
Heilongjiang	2 110	2 390	1 850	1 690	1 620	1 830	1 940
Shanghai	1 280	1 540	1 230	1 100	1 000	1 360	1 480
Jiangsu	2 020	2 140	1 730	1 610	1 580	1 800	2 040
Zhejiang	1 940	2 370	1 880	1 580	1 400	1 550	1 690
Anhui	3 160	3 090	2 760	2 570	2 410	2 390	2 690
Fujian	2 830	3 400	2 960	2 820	2 440	2 320	2 350
Jiangxi	2 750	3 270	2 930	3 160	2 610	2 690	2 900
Shandong	2 200	2 370	2 090	2 100	1 910	2 560	2 680
Henan	2 720	3 050	2 600	2 320	2 110	2 630	3 060
Hubei	2 380	2 690	2 520	2 670	2 500	2 570	2 970
Hunan	2 910	3 500	2 860	2 540	2 360	2 440	2 730
Guangdong	3 170	3 090	2 980	2 890	2 560	2 700	2 760
Guangxi	4 040	3 880	3 550	4 080	3 680	3 480	3 590
Sichuan	2 350	2 850	2 070	1 760	1 940	2 650	2 260
Guizhou	4 250	4 390	3 550	3 870	3 320	3 360	3 690
Yunnan	3 860	4 200	3 440	3 400	3 040	2 970	3 200
Shaanxi	2 320	2 700	2 470	2 600	2 640	2 960	2 970
Gansu	2 750	2 940	2 630	2 760	2 550	2 530	2 610
Qinghai	3 970	4 000	3 040	2 830	2 520	2 610	2 720
Ningxia	3 950	4 420	3 160	3 410	2 770	2 850	3 120
Xinjing	4 180	4 210	4 070	4 200	3 660	3 840	3 750

Source: 1988 Two-per-Thousand Fertility and Birth Control Sampling Survey.

**Total fertility rates of China, by province: 1973-1977,
1978-1982 and 1983-1987**





during the previous period. Third, the magnitude of TFR decline taking place from the previous to the more recent period in those regions was compared so as to study the increase or decrease in TFR.

A comparison between the average TFRs of the first and thud phases ([maps 1](#) and [3](#)) shows that, while no change took place in the rank order in four regions (namely, Beijing, Shanghai, Anhui and Gansu), the rank order in 11 regions (namely, Hubei, Shaanxi, Hebei, Guangxi, Xinjiang, Jiangsu, Guangdong, Shandong, Tianjin, Hunan and Yunnan), rose with three of them showing a significant rise (9, 7 and 6 for Hubei, Shaanxi and Hebei, respectively). The remaining 13 regions showed a decline in rank order, with Sichuan province showing a remarkable decline (a decrease of 11).

Thus the mutual relationship between the fertility levels of the different

regions was by no means unchanged. Only a small number of them experienced no change in rank order between the first and third phases. In other words, some of them became relatively more “advanced”, while others became relatively more “backward”.

When the fertility rates of the different regions in the second phase are compared with those in the first phase, the following features of change can be found:

- a) Fertility rates declined in all 28 regions;
- b) The magnitude of the decline generally had an evident association with the previous fertility level, the correlation coefficient being 0.79;
- c) Individual comparison of the 28 regions, based on the difference between the rank order of the previous fertility rate and the rank order of the magnitudes of decline, revealed three types of relationship. First, 14 regions showed a negative value, indicating a relatively larger magnitude of decline compared with the previous level. Outstanding examples are Sichuan, Shanxi and Heilongjiang, with the difference between the two orders being -7, -8 and -9, respectively. Second, seven regions showed a positive value, indicating a relatively smaller magnitude of decline compared with the previous level. Examples are Guangdong, Ningxia, Qmghai and Anhui, with the difference between the two orders being 12, 11, 10 and 7, respectively. Third, another seven regions showed no value difference, indicating that the magnitude declined correspondingly compared with the previous level.

When the fertility rates of the various regions in the third phase are compared with those in the second phase, more complicated changes can be found:

- a) Of the 28 regions, there was a continuous decline in 22 of them, while the other six, namely, Shaanxi, Hubei, Shandong, Shanxi, Sichuan and Shanghai, showed a rise in fertility; the TFR for Shaanxi, Hubei and Shandong increased by 180.2, 107.4 and 94.8, respectively;
- b) The magnitude of fertility decline retained an association with the previous fertility level, the correlation coefficient being 0.64; however, the association was weak compared with that during the previous two phases; and
- c) When individual comparisons were made of the 28 regions, the above-mentioned 22 (not including the six regions with a rise in the fertility rate) can be divided into three types based on the difference between the order of precedence of the previous fertility level and the order

of precedence in the magnitude of decline. First, 12 regions showed negative values, the difference between the two orders being - 13, -12, -12, -11, -8, -7 and -6 in Jilin, Zhejiang, Liaoning, Heilongjiang, Beijing, Jiangsu and Tianjin, respectively. Second, eight regions showed positive values, the difference between the two orders being 16, 10 and 6 in Xinjiang, Guangxi and Guizhou, respectively. Third, two regions, i.e. Qinghai and Ningxia, showed no difference, the values being zero.

A comprehensive examination of the data listed in [table 1](#) shows that the spatial distribution of fertility fluctuations had no regularity while their time distribution had a tendency to concentrate.

For the sake of convenience, when the time distribution of fertility fluctuations are examined in terms of their tendency to concentrate, they are compared by phases, with the phase from 1978 to 1982 being further divided into two subphases, namely, from 1978 to 1980 and from 1981 to 1982, and the phase from 1983 to 1987 similarly divided into two subphases, from 1983 to 1985 and from 1986 to 1987.

When the two subphases of the 1978-1982 phase are studied, 17 regions show a rise in TFR while 11 of them show a continuous decline. Of the 17 regions, Sichuan, Hunan and Hebei show marked rises in their mean TFR, the increases being 822, 791 and 534, respectively, whereas Henan, Zhejiang and Yunnan show less marked rises in their mean TFR, with the increases being 9, 76 and 119, respectively.

As for the two subphases in the 1983-1987 phase, fertility rose in 13 regions, declined in 14 regions and did not change in one region, i.e. Zhejiang. Out of the 13 regions showing a rise in fertility, the rises in mean TFR were more marked in Shandong and Sichuan, with the increases being 587 and 532, respectively, while in Tianjin and Beijing the rises were less marked, being 95 and 128, respectively.

In summarising the fertility fluctuations taking place in the 28 regions during the second and third phases, it is found that the rise in fertility during both phases took place in eight regions, namely, Beijing, Tianjin, Hebei, Jiangsu, Shanghai, Shandong, Henan and Sichuan, whereas the decline in fertility during both phases took place in six regions, namely, Anhui, Jiangxi, Guangdong, Gansu, Qinghai and Ningxia. As for the 14 other regions, a decline in fertility took place during one phase while a rise in fertility, or maintenance of the previous level of fertility, took place during the other phase.

When the previous fertility levels of the regions where a rise in fertility took place in both phases are compared with those of the regions where a

decline in fertility took place during those phases, it is found that the previous fertility levels in the former regions were all relatively low (with the exception of Henan where the order of precedence was 18 during 1978-1980, the other seven regions' orders being equal to or below 10; and their orders of precedence during 1983-1985 being equal to or below 13). By contrast, the previous fertility levels of the regions where the decline in fertility took place during both phases were all relatively high (their orders of precedence during 1978-1980 being equal to or above 20, and during 1983-1985 being equal to or above 17).

However, the previous fertility level was not necessarily associated with the rise or decline in later fertility. In other words, the rise in fertility did not take place in all the regions with a previously low fertility level, nor did a further fertility decline take place in all the regions with a previously high fertility level. This is because during a certain period of time, a rise or decline in the fertility rate is influenced by other factors in addition to the previous fertility level, particularly by the family planning work being conducted in the region at that time.

Generally, the regions with a previously relatively high fertility level were more sensitive to family planning work so that their fertility rates were more likely to show a tendency to decline. Nevertheless, if the role of family planning has not been brought into full play in a particular region, the fertility rate may show a rise. By contrast, in regions with a previously relatively low fertility rate, family planning work will usually be found to have played a considerable role, and any slight slackening of those factors which promote fertility decline will result in a rise in fertility under such conditions. However, if family planning is brought into full play, there subsequently may be a continuous decline in the fertility rate. For example, in Guangxi, Guizhou and Yunnan during 1978-1980, their mean TFRs were 3,825, 3,876 and 3,911, respectively; during 1981-1982, the mean TFR of these three regions rose to some extent. During 1983-1985, the mean TFR of these regions dropped to 3,770, 3,580 and 3,293, respectively; however during 1986-1987, the mean TFR of the same regions still showed a tendency to decline.

It is evident that the former rise in fertility was due to a lack of full implementation of the family planning programme, while the later decline in fertility was a result of improved family planning work.

Actual and expected mean TFR

The per capita national income (1986), women's illiteracy rate (1987) and the proportion of national minority population (1982) of the 28 regions are listed in [table 2](#).

Taking the mean TFR of the 28 regions during 1986-1987 as the dependent variable (y) and the figures listed in table 2 as the independent variables, i.e. per capita national income (x_1), women's illiteracy rate (x_2) and proportion of national minorities in the population (x_3), the following regression formula can be derived:

Table 2: Population and socioeconomic indicators for 28 provinces, autonomous regions and municipalities

	Per capita income (yuan) (1986)	Women's illiteracy rate (%) (1987)	Proportion of national minorities in the population (%) (1982)
Beijing	2 130	10.8	3.5
Tianjing	2 040	23.1	2.1
Hebei	673	35.3	1.6
Shanxi	682	27.8	0.3
Inner Mongolia	630	31.1	15.5
Liaoning	1 299	18.9	8.1
Jilin	823	23.4	8.1
Heilongjiang	997	25.4	4.9
Shanghai	3 471	22.6	0.4
Jiangsu	1 064	40.9	0.2
Zhejiang	1 042	35.0	0.4
Anhui	599	54.1	0.5
Fujian	672	49.0	1.0
Jiangxi	543	45.7	0.1
Shandong	770	42.1	0.5
Henan	540	42.6	1.1
Hubei	805	36.1	3.7
Hunan	603	29.7	4.1
Guangdong	897	32.1	1.8
Guangxi	450	35.2	38.3
Sichuan	515	36.4	3.7
Guizhou	406	56.8	26.0
Yunnan	453	57.4	31.7
Shaanxi	531	39.2	0.5
Gansu	570	59.4	7.9
Qinghai	698	66.7	39.4
Ningxia	616	47.3	31.9
Xinjing	740	25.1	59.6

$$y = 2505.4 - 0.469939x_1 + 5.42744x_2 + 18.5786x_3$$

The F test value of the regression formula was significant at the 0.001 level and the compound correlation coefficient was $R = 0.83$. The high correlation is striking because the fertility rate had already declined to a low level. A strong relationship of fertility to economic, cultural and other factors would be expected if fertility were high, but not necessarily so if fertility were low.

The values of the standardized coefficients of x_1 , x_2 and x_3 were 0.49, 0.11 and 0.47, respectively. Per capita national income had the largest impact on fertility, about the same as the proportion of national minority population. Women's illiteracy had the smallest impact.

Using the above regression formula, the expected mean TFR of the 28 regions during 1986-1987 can be calculated (table 3). The expected TFR is the TFR which a province would have if fertility were completely determined by the above three socioeconomic variables.

Out of the 28 regions, during 1986-1987, nine regions, namely Beijing, Tianjin, Inner Mongolia, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu and Zhejiang, had an actual mean TFR which was below the replacement level. Six regions, namely Fujian, Sichuan, Yunnan, Gansu, Qinghai and Ningxia, had an actual mean TFR which was above the replacement level but lower than the expected mean TFR. Six other regions, namely Hebei, Shanxi, Anhui, Jiangxi, Shandong and Hunan, had an actual mean TFR which was above the replacement level and higher than the expected mean TFR, with the difference between the two mean TFRs being less than 300. The remaining seven regions, namely Henan, Hubei, Guangdong, Guangxi, Guizhou, Shaanxi and Xinjiang, had an actual mean TFR which was above the replacement level, but higher than the expected mean TFR, with the difference between the actual and expected mean TFRs of more than 300.

Conclusions

It may be concluded that the regions in the above-described first and second categories developed their family planning work successfully; while those regions in the third category have enjoyed moderate success, the regions in the fourth category were not very successful.

By comparing the mean fertility rates during 1983-1987 with those during 1973-1977, it is found that the change in fertility of the different regions was neither "parallel" nor "proportional". When compared with the past, some regions became more "advanced" whereas others became more "back-

Table 3: Actual mean total fertility rate (TFR) and expected mean TFR in 28 provinces, autonomous regions and municipalities of China (1986-1987)

	Actual mean TFR	Expected mean TFR
Beijing	1 535	1 676.7
Tianjing	1 665	1 711.3
Hebei	2 645	2 410.8
Shanxi	2 430	2 340.5
Inner Mongolia	2 095	2 667.1
Liaoning	1 755	2 148.8
Jilin	1 770	2 396.5
Heilongjiang	1 885	2 266.7
Shanghai	1 420	1 004.7
Jiangsu	1 920	2 230.9
Zhejiang	1 620	2 213.2
Anhui	2 540	2 527.1
Fujian	2 335	2 473.8
Jiangxi	2 795	2 499.7
Shandong	2 620	2 382.2
Henan	2 845	2 502.6
Hubei	2 770	2 391.9
Hunan	2 585	2 458.8
Guangdong	2 730	2 290.7
Guangxi	3 535	3 196.0
Sichuan	2 455	2 529.1
Guizhou	3 525	3 106.0
Yunnan	3 085	3 193.3
Shaanxi	2 965	2 477.1
Gansu	2 570	2 707.4
Qinghai	2 665	3 271.9
Ningxia	2 985	3 065.8
Xinjing	3 795	3 400.8

ward". Sichuan province serves as a representative of the former while Hubei, Shaanxi and Hebei are examples of the latter.

Comparisons of the magnitude of fertility decline between the different phases show that in seven regions, namely, Heilongjiang, Jilin, Zhejiang, Liaoning, Jiangsu, Tianjin and Inner Mongolia, the magnitude of fertility decline

during the two periods was relatively significant compared with their previous fertility rates, while three regions, Guangxi, Hebei and Guizhou, showed a relatively insignificant magnitude of fertility decline during the two periods compared with their previous fertility rates.

During 1973-1987, the fertility decline in all regions showed fluctuations. It is understandable that when the fertility rate is relatively high, the probability of a declining trend continuing is greater, but if the fertility rate is already relatively low, there is a greater probability that it will rise again rather than continue to decline. However, population policy factors and successful family planning work can obviously make an impact on fertility rates.

As shown by the findings of this study, there are 13 regions with a fertility rate above the replacement level and higher actual than expected fertility levels. Thus, although there is potential for a further decline in fertility in those regions, China's family planning programme faces very difficult challenges in realizing that potential.

Out of the 28 regions, the expected mean TFRs during 1986-1987 were higher in five of them, namely Jiangxi, Guangdong, Guangxi, Guizhou and Xinjiang, than the lowest actual fertility levels during 1973-1987. Hence, there exists a probability of further decline in fertility in China. Historically, however, although China's fertility was close to the replacement level in 1980 and 1985, the decline in fertility was not constant, and a rise subsequently took place. Moreover, with regard to the four categories of regions classified in this article, despite the possibility of a further decline in fertility in the first two categories of regions, the magnitude of decline will not be very remarkable, although there is a considerable "potential" for fertility decline in the last two categories. However, owing to the relatively backward family planning work in those regions, the fertility there probably will not show a rapid and significant decline.

Based on a comprehensive consideration of the above-mentioned findings, a realistic goal for China might be to strive to reach the replacement level of fertility as soon as possible and maintain it at that level.

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