Fertility Trends in Rural China in the 1980s: Cohort Effect versus Period Effect

The concepts behind "later, longer, fewer" and the relationships between the period and cohort effects of fertility need to be restudied

By Baochang Gu and Shuzhang Yang*

While the dramatic decline in fertility in China in the 1970s has been acknowledged worldwide and is very well documented in the demographic literature both at home and abroad (China Population Information Center, 1984; Coale, 1984, among others), China's fertility and related population trends in the 1980s have evoked much concern and discussion in recent

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years (Hardee-Cleveland and Banister, 1988; Zeng, 1989; Kaufman *et al.*, 1989; Greenhalgh, 1989, 1990; Tien, 1990a; Aird, 1990; Poston, 1991, among others).1/

Although fertility in urban China had already declined to far below the replacement level before the beginning of the 1980s (Coale and Chen, 1987), fertility in rural areas continued to have a very strong effect on the fertility trends of the whole country. Thus, rural fertility has been the major focus of China's population control and family planning programmes, remaining the centre of concern during the 1980s.

Several recent studies (Feeney *et al.,* 1989; Luther *et al.,* 1990; Coale *et al.,* 1991) have addressed the issue of fertility trends in China during the 1980s and generated many insights which were very valuable to the present study. However, mainly owing to limitations in the available data, their studies had to resort either to indirect estimation procedures in reconstructing the birth history of women, or work with a subsample of the data set, which would allow only an analysis of the fertility trends in a general sense and at the national level rather than a disaggregation of overall fertility data to observe the fertility variations among the subregions (provinces, autonomous regions and municipalities) of the country.2/

The data from the 1988 Two-Per-Thousand Fertility Sampling Survey of China provide an excellent opportunity for conducting an overall assessment of fertility trends, particularly in rural areas during the 1980s, and provide a basis for predicting population and fertility trends in both rural areas and China as a whole in the 1990s.

In this article, we shall first examine the fertility trends over the decade of the 1980s for rural China, paying particular attention to the relationship between the cohort effect and period effect of fertility. Second, we shall examine the variations in fertility among the subregions of rural China by the end of the decade. The analyses will demonstrate in detail that, in the decade of the 1980s, fertility in rural China in terms of the number of children per woman had been further controlled, while the timing of both marriage and child-bearing had moved downward. As a result, "birth-bunching" became a nationwide and decade-long phenomenon characterizing the fertility trends in rural China in the 1980s. Third, we shall discuss the important implications of rural China's fertility trends in the 1980s to the fertility trends and family planning programmes in the years leading to the beginning of the twenty-first century.

1988 Two-Per-Thousand Fertility Sampling Survey

The Two-Per-Thousand Fertility Sampling Survey, i.e. the National Sample Survey on Fertility and Contraception, was carried out by the State Family Planning Commission of China on 1 July 1988 in 30 provinces (excluding Taiwan province), autonomous regions and municipalities of China. The survey, the major theme of which was fertility and birth control, employed stratified, systematic, cluster and random sampling methods. A total of 13,466 sample units were finally selected from throughout the country. The basic units for sampling were resident committees in urban areas and village committees in rural areas. Altogether 485,235 households accounting for 2,151,212 individuals were actually enumerated. This number of people, comprising 2 per thousand of the total population of mainland China, were actually enumerated. Of the total number sampled and interviewed, 459,269 were married women ranging in age from 15 to 57 years. The quality of the data derived from the survey is highly regarded (Wang *et al.,* 1990).

The data gathered on fertility by subregion, year, age and parity supply adequate and detailed information for analyzing fertility trends in China in the decade of the 1980s until 1987, the year prior to the survey. Thus, data on the rural population referred to in this article are derived from the responses of the sample units in the aforementioned village committees.

Total fertility rate and total parity progression rate

Any demographic measure as an indicator of population trends sets certain assumptions as prerequisites, and has both merits and demerits. Only when population trends can be assessed with multi-measures from various dimensions will the understanding of those trends be more comprehensive and less biased. So it is in demographic studies on fertility.

Though the fertility trends may be studied with different approaches, in this article we employ the total fertility rate (TFR) and total parity progression rate (TPPR)[3/] as analytical indicators for assessing the fertility trends in rural China during the 1980s. A detailed discussion of the calculation procedures for these measures is beyond the scope of this article (see Henry, 1980; Feeney, 1983; Feeney and Ross, 1984; Feeney, 1985; Ma, Wang and Yang, 1986; Feeney and Yu, 1987; Feeney, Wang and others, 1989; Luther *et al.,* 1990). However, a brief mention of the reasons for using these measures is in order.

The TFR, the fertility indicator most widely used by demographers, is regarded as a standardized indicator because it controls the effects of age-sex structure of a population, making it comparable between populations or one population over time. Furthermore, under the assumption that all women entering the child-bearing age group, i.e. at age 15, will go through that period until reaching the age of 49 according to the age-specific fertility rates observed in a given year, the average number of children ever born per woman during her reproductive life-time would be exactly the same as the TFR observed in the given year. In this sense and only with the above assumption as a prerequisite may the TFR be regarded as a reflection of the expected completed fertility for any particular group of women. Thus, it may be called the "expected" completed fertility rate. In other words, the "period indicator" of TFR may be viewed as a surrogate for the "cohort indicator" of the completed fertility rate.

It is important to note, however, that similar TFRs may be composed of children with different birth orders, "identical mean numbers of children may result from quite different parity distribution" (Feeney and Lutz, 1991, p. 177). The concept of "parity" of women is of crucial significance in the analysis of fertility trends in China since either the Government's population policy is formulated or the family planning programme is implemented on the basis of "parity" of women (Tien, 1989b; Poston, 1989). It is increasingly understood that any study of fertility trends in China that does not take into account the order/parity composition of fertility will make it difficult to obtain reasonable results. To include the concept of parity in the analysis, TFRs by birth order, i.e. the sum of age-order specific fertility rates, need to be examined. Here the denominator in the calculation is the same as in calculation of TFR, i.e. the number of women at a given age, but the numerator includes only the number of births of a given order born to the women at a given age. For example, the fertility rate of second births of women aged 25 is the result of the total number of second births born to women at age 25 divided by the total number of women aged 25. And the sum of the TFRs of all birth orders is the conventional TFR for a given population.

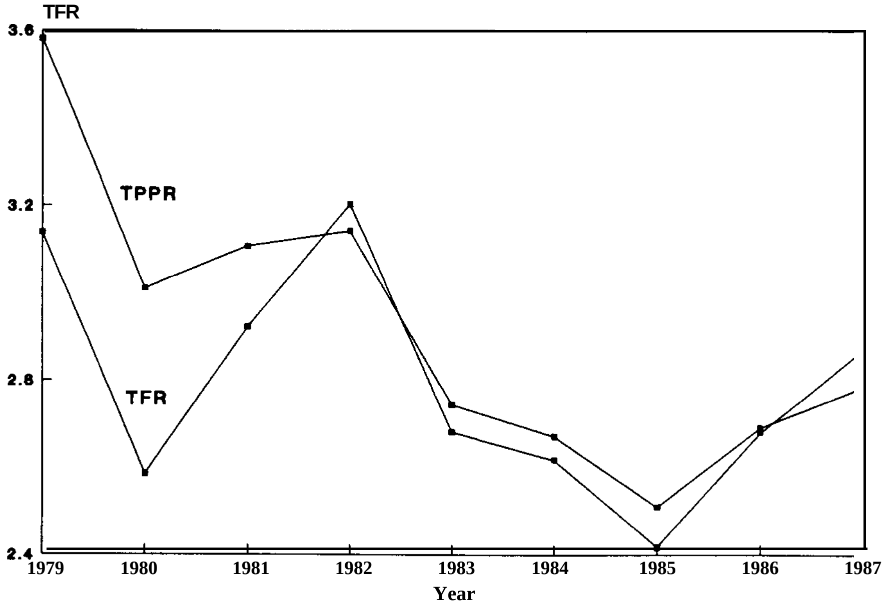
It is worth noting that parity fertility based on the age-order specific fertility rates may also be a biased evaluation of underlying fertility behaviour, since the base for the computation of the age-order specific fertility rates is the total number of women at a given age. In other words, it distinguishes the births by order in the numerator, but does not distinguish the women by parity in the denominator. In fact, only those women who have given n-th birth at the beginning of a given year are exposed to the risk of having (n+1)th baby during the year. Two populations, for example, may have the same parity fertility rates, but the real fertility levels may differ owing to the difference in the parity composition of the women. The differentiation in fertility due to the difference in the parity composition of women cannot be detected by the parity fertility rate simply because it does "not properly control for exposure to risk" (Feeney *et al.,* 1989, p. 307). To measure fertility by parity, not only do we need to distinguish birth composition by order, but also the parity composition of child-bearing women and take into consideration both of them in the examination of the fertility of the population. That is where the concept of "parity progression" develops.

The fertility level reflected in the concept of parity progression will not only answer how women at various ages are having babies of various orders, but also further answer how women of various parities at various ages are having babies of the next order. Particularly "for populations characterized by low and fluctuating fertility, parity-progression based measures provide the better representation of the level of fertility" (Feeney and Yu, 1987, p. 78) and in "this situation, the chances that a woman will give birth in any period are more heavily conditioned by the number of children already born than by the age of the woman" (Feeney and Lutz, 1991, p. 173).

Comparing TPPR with TFR, the similarity between the two is that both of them are period measures, i.e. the fertility level is measured with data observed and gathered for a given period (e.g. one year). As in the case of TFR, only when the observed parity progression scheme of fertility is maintained for quite a long period (e.g. 35 years) can the TPPR observed for a given period be regarded as "expected" completed fertility and completed parity distribution. In other words, only with the above assumption as a prerequisite can the "period indicator" of TPPR be viewed as a surrogate for the,"cohort indicator" of completed fertility rate. In this sense, the value of a TPPR may indicate the percentage of all the child-bearing women of a given population having at least n-th birth (or n-th and more births) in a life-time should the observed fertility be conformed to.

The advantage of TPPR relative to TFR is that TPPR takes into account, standardizes and controls the effects of both the age structure of child-bearing women and their parity structure. As a result, TPPR offers enhanced comparability with regard to "parity structure," and measures better the fertility level of a population. The drawback of TPPR relative to TFR is that it requires much more detailed data on fertility for analysis. When large volumes of data from a survey such as the Two-Per-Thousand

Figure 1: TFRs and TPPRs in rural China, 1979-1987

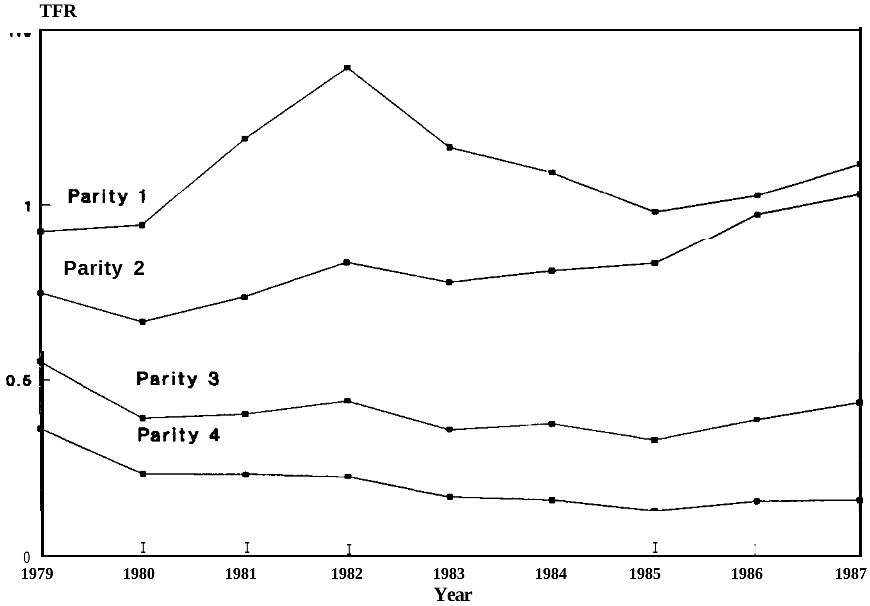


Source: **1988 Two-Per-Thousand Fertility Sampling Survey**

Fertility Sampling Survey and highly efficient computers are available for demographic study, however, this drawback no longer poses a problem.

Moreover, the advantage of TPPR as a measurement of fertility does not at all mean that the TFR will therefore lose its position in the analysis of fertility. It should be noted that, while TPPR may be a better indicator of completed cohort fertility, TFR may be more revealing with regard to the period shifting of fertility resulting from the change in the timing of marriage and child-bearing (Luther *et al.,* 1990, p. 350). We shall show in the analysis below that the issue of timing of marriage and child-bearing is of great significance in analyzing the fertility trends of China in the 1980s within the context of an explicit "period" population target (1.2 billion by the year 2000) and a very rigorous "cohort" requirement (advocating one child per couple). We thus decided in the present study to analyze China's rural fertility trends in the 1980s by comparing the results based on both of these indicators.

Figure 2: TFRs by parity in rural China, 1979-1987



Source: **1988 Two-Per-Thousand Fertility Sampling Survey**

Fertility trends in rural China in the 1980s

Figure 1 shows the fertility trends by both TFR and TPPR for the rural population of China during the period 1979-1987. The TFRs and TPPRs in the figure suggest that (a) rural fertility during the period experienced three peaks (in 1979, 1982 and 1987) and two troughs (in 1980 and 1985); (b) although it experienced ups and downs, rural fertility declined to a level below 3.0 in the 1980s from a level above 3.0 in the 1970s (Coale and Chen, 1987); and (c) rural fertility fluctuated around the level of 2.7-2.8 over the decade.

What then does the difference between TFR and TPPR in figure 1 suggest? As noted previously, the distinction between the two fertility measures is that TPPR takes into account the parity structure of child-bearing women whereas TFR does not. For a closer look, both the TFRs and TPPRs need to be examined by parity. Table 1 shows the TFRs and TPPRs by parity for rural China between 1979 and 1987, and the difference between the two values. Figures 2 and 3 show TFR and TPPR data, respectively.

Table 1: Comparison of TFR and TPPR: Rural China: 1979-1987

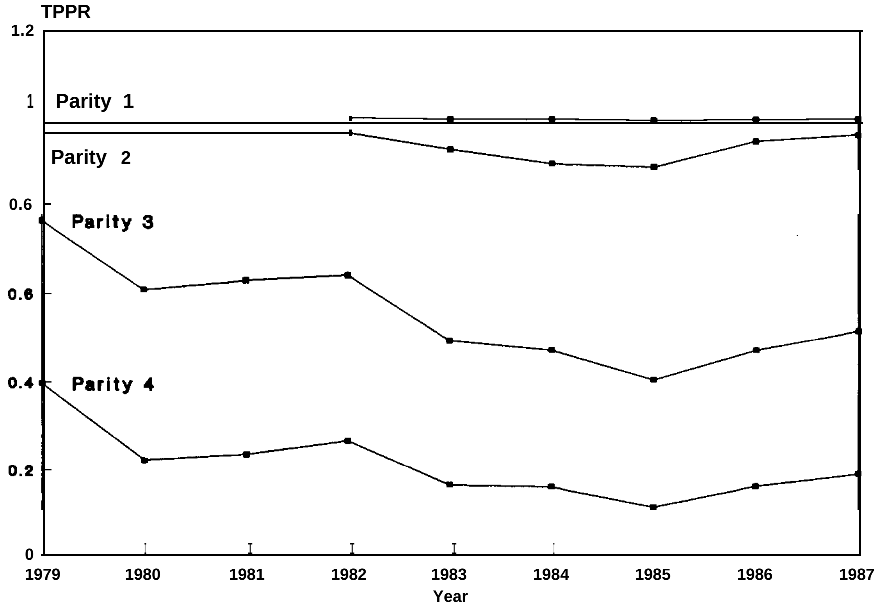
Parity	1979			1980			1981		
	TFR	TPPR	Diff.	TFR	TPPR	Diff.	TFR	TPPR	Diff.
Total	3.138	3.580	0.442	2.584	3.010	0.426	2.922	3.106	0.184
1	0.927	0.982	0.055	0.945	0.984	0.039	1.188	0.992	-0.196
2	0.743	0.962	0.219	0.664	0.942	0.278	0.732	0.960	0.228
3	0.552	0.763	0.211	0.393	0.609	0.216	0.404	0.630	0.226
4	0.364	0.397	-0.033	0.237	0.222	0.015	0.234	0.236	-0.002

Parity	1982			1983			1984		
	TFR	TPPR	Diff.	TFR	TPPR	Diff.	TFR	TPPR	Diff.
Total	3.201	3.141	-0.060	2.681	2.745	0.064	2.617	2.671	0.054
1	1.388	0.997	-0.391	1.164	0.994	-0.170	1.092	0.994	-0.098
2	0.833	0.963	0.130	0.774	0.927	0.153	0.807	0.895	0.088
3	0.441	0.642	0.201	0.361	0.494	0.133	0.376	0.473	0.097
4	0.228	0.266	-0.038	0.171	0.166	0.005	0.162	0.162	0.000

Parity	1985			1986			1987		
	TFR	TPPR	Diff.	TFR	TPPR	Diff.	TFR	TPPR	Diff.
Total	2.417	2.509	0.092	2.679	2.691	0.012	2.870	2.787	-0.083
1	0.981	0.991	0.010	1.026	0.992	-0.034	1.115	0.994	-0.121
2	0.829	0.887	0.058	0.972	0.944	-0.028	1.029	0.958	-0.071
3	0.331	0.406	0.075	0.388	0.473	0.085	0.435	0.516	0.081
4	0.132	0.116	0.016	0.158	0.163	-0.005	0.160	0.191	-0.031

Note: Diff. = TPPR minus TFR.

Figure 3: TPPRs by parity in rural China, 1979-1987



Source: **1988 Two-Per-Thousand Fertility Sampling Survey**

Table 1[4/] provides a tremendous amount of information on the fertility trends of rural China. Taking 1979 as an example, the value of TFR was 3.14 while that of TPPR was 3.58; thus, the TPPR is much higher (by 0.44) than that of TFR. A close look at fertility by parity indicates that much of the difference was at parities 2 and 3. Although the TFRs for parities 2 and 3 were 0.74 and 0.55, respectively, to those women with one child who were exposed to the risk of having a second child and those with two children exposed to the risk of having a third child, the year 1979 witnessed a higher parity progression of fertility. This implies that, according to this fertility scheme, almost 96 per cent of women in rural China would have at least two children in their life-time, and more than three quarters of women would have at least three children in their life-time. The data may thus indicate that the "cohort effect" of 1979 fertility was much higher than the "period effect" of 1979 fertility. The relatively low TFRs for parities 2 and 3 were due mainly to the relatively advantageous parity structure of the child-bearing women.

However, the “advantage” was gradually diminishing over the decade. Taking parity 2 as an example, over the decade the case of TFR being relatively lower than TPPR at the end of the 1970s gradually shifted to both being equivalent to each other in the mid-1980s, with TFR becoming relatively higher than TPPR by the end of the 1980s. It may be seen from figures 2 and 3, that while the TPPR for parity 2 changed little, the TFR for parity 2 increased from 0.74 in 1979 to 1.03 in 1987. Thus, fertility in 1987 was virtually the opposite of what it had been in 1979.

Comparing the TPPR by parity in 1987 with counterpart data in 1979 shows that the values for parities 1 and 2 were almost equal to each other (both about 0.99 and 0.96, respectively). Fertility for parity 3 displayed a sizable reduction, which implies the proportion of women having three or more children in their life-time dropped from 76 per cent in 1979 to 52 per cent in 1987. In the case of fertility for parity 4, the reduction in fertility was also apparent, dropping from 0.40 in 1979 to 0.19 in 1987. Thii means that, while 40 per cent of rural women would have at least four children in their life-time according to the rural fertility rates at the end of the 1970s, fewer than one out of five rural women would do so by the end of the 1980s.

Much of the difference between the TFR and TPPR in 1987 could be attributed to parities 1 and 2, with the TFRs being higher than the TPPRs, and even above 1 (1.12 and 1.03, respectively). However, if TFRs were viewed as the expected completed fertility rates, the TFR for a given parity should never be a value above 1. In this sense, the fertility level indicated by such a parity-specific TFR should be viewed as very much artificially inflated, since the “cohort effect” of the reflected fertility level is actually smaller than the “period effect”. If the TFR for parities 2 and 3 both have their maximum level set at 1, the TFR in 1987 would be around 2.75 rather than 2.87, a value even lower than the TPPR value of 2.79, although the difference appears marginal.

TFRs for a given parity with a value above 1, however, were not exceptional in rural China during the 1980s, particularly in the case of first births. It can be observed in table 1 that, except for 1985, the TFRs for parity 1 were all above 1,[5/] and even as high as 1.39 in 1982. In 1987, even the TFR for parity 2 rose to above 1. This phenomenon reflects the so-called “bunching” of births (Luther *et al.,* 1990, Banister, 1991; among others). The appearance of the “birth bunching” results from a sudden increase in births of a given order by women at different ages. The TFR for parity 1 exceeding 1 occurs “because the occurrence of first births for younger and older women, which would have occurred sequentially with constant mean age, overlap”

(Feeney *et al.,* 1989, footnote 19, p.319).[6/] The bunching of first births occurred because the women marrying late and bearing children late in previous years started to have first births and those getting married at a relative younger age began having their first births at the same time. It is evident that the "bunching of first births from different cohorts during the same period . . . resulted from a sudden decline in age at marriage following the 1980 marriage law" (Luther *et al.,* 1990, p. 352). In other words, part of the first births were "postponed" and part "advanced". The phenomenon was a result of "making-up" fertility that had been delayed by late marriage and late child-bearing in the 1970s because of the response to the "later, longer, fewer' campaign or the interruption caused the "Cultural Revolution". It was also a result of the "adding-up" fertility which resulted from a decline in the age of women at first marriage and first birth in the 1980s, because of the newly promulgated marriage law or the return to normal life after the end of the Cultural Revolution. Feeney *et al.* (1989, p. 306) concluded therefore that "the level of fertility indicated by total fertility rates during this period (1981-1986) has been inflated by declining age at first marriage". Moreover, as also indicated in table 1, birth bunching had swung from the first birth to the second birth over the decade, and in turn, pushed the parity 2 TFR up to above 1 in the late 1980s.

The fertility trends by parity in rural China in the 1980s, based on figures 2 and 3, may be summarized as follows. In terms of first births, the TFR was rising over the decade and remained above 1 for most years, but birth bunching was not reflected sensitively by the TPPR, which was at a level of about 0.99. However, the bunching phenomenon, which signified a change in the timing of marriage and child-bearing, deserves more attention and discussion, which will be pursued in a later section of this article. The TFR for second births was also increasing and even rose to above 1 in the later part of the 1980s, whereas the TPPR for second births was fluctuating around 0.90-0.95. In other words, when the fertility trends are examined, with the effect of the parity structure of child-bearing women controlled for, the fertility levels for first and second births do not show an upward trend as indicated by the TFRs. The curves for third births indicate that the TFR had stagnated at 0.40, whereas the TPPR displayed a tendency towards consistent decline from 0.76 in 1979 to 0.52 in 1987. Therefore, it may be concluded that, although rural fertility in China in the 1980s did not decline much in terms of TFR, if it is examined by parity, some progress in fertility decline had been made. Figures 2 and 3 show that fertility for parities 3 and 4 turned from being relatively close to the fertility for parities 1 and 2 at the end of the 1970s to diverge by the end of the 1980s, which signifies a steady reduction in high-parity fertility.

Table 2a: Total fertility rate by parity and subregion: rural China, 1985-1987

Region/subregion	Total fertility rate				
	Parity 1	Parity 2	Parity 3	Parity 4	Total
China	**1.041**	**0.943**	**0.385**	**0.150**	**2.656**
Beijing	1.155	0.582	0.093	0.027	1.861
Tianjin	1.133	0.757	0.105	0.017	2.017
Hebei	1.098	1.120	0.360	0.104	2.720
Shanxi	0.967	0.973	0.491	0.159	2.686
Inner Mongolia	0.969	0.797	0.306	0.114	2.322
Liaoning	1.111	0.656	0.052	0.005	1.828
Jilin	1.032	0.653	0.111	0.030	1.841
Heilongjiang	1.004	0.766	0.245	0.094	2.162
Shanghai	1.116	0.115	0.007	0.002	1.239
Jiangsu	1.100	0.578	0.161	0.004	1.895
Zhejiang	0.905	0.538	0.110	0.024	1.592
Anhui	0.981	0.918	0.449	0.172	2.622
Fujian	0.922	0.920	0.444	0.167	2.572
Jiangxi	0.96l	0.958	0.581	0.265	3.008
Shandong	1.162	0.919	0.281	0.091	2.496
Henan	1.086	1.077	0.378	0.118	2.714
Hubei	1.063	1.211	0.441	0.174	3.026
Hunan	0.991	1.011	0.433	0.146	2.682
Guangdong	0.935	1.079	0.576	0.226	3.008
Guangxi	1.003	1.129	0.859	0.441	3.850
Hainan	0.932	1.002	0.816	0.461	3.688
Sichuan	1.046	1.014	0.251	0.075	2.450
Guizhou	1.014	1.023	0.766	0.450	3.802
Yunnan	0.877	0.977	0.557	0.325	3.360
Shaanxi	1.093	1.204	0.572	0.198	3.191
Gansu	0.923	1.081	0581	0.173	2.888
Qinghai	0.844	0.694	0.618	0.373	3.134
Ningxia	0.937	0.971	0.768	0.391	3.402
Xinjiang	0.890	0.800	0.603	0.505	4.446

Table 2b: Total parity progression rate by parity and subregion: rural China, 1985-1987

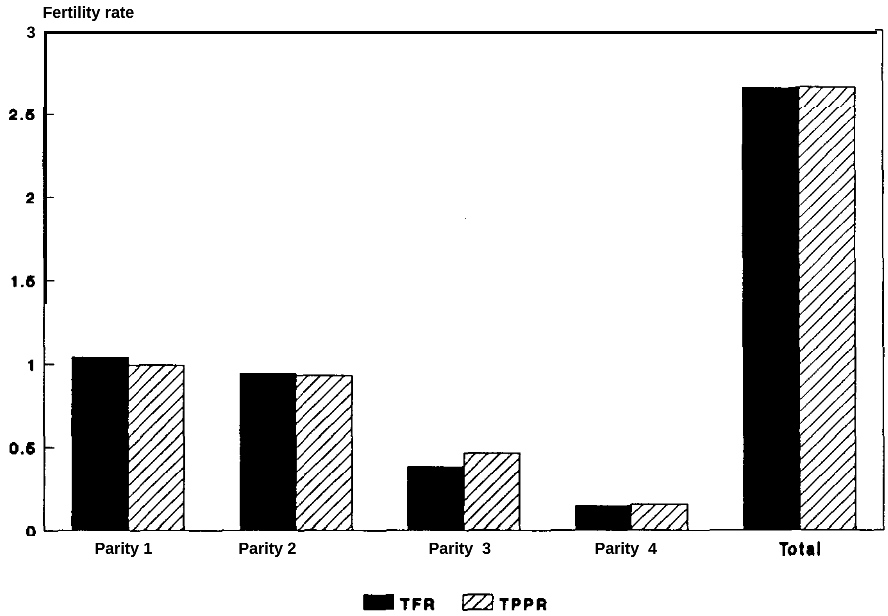
Region/subregion	Total parity progression rate				
	Parity 1	Parity 2	Parity 3	Parity 4	Total
China	0.992	0.930	0.465	0.157	2.662
Beijing	0.995	0.627	0.112	0.018	1.757
Tianjin	0.997	0.813	0.138	0.009	1.961
Hebei	0.994	0.959	0.456	0.118	2.558
Shanxi	0.989	0.942	0.544	0.170	2.728
Inner Mongolia	0.984	0.918	0.361	0.078	2.437
Liaoning	0.994	0.807	0.066	0.003	1.872
Jilin	0.991	0.837	0.139	0.015	1.987
Heilongjiang	0.987	0.894	0.361	0.062	2.338
Shanghai	0.993	0.145	0.003	0.001	1.142
Jiangsu	0.995	0.623	0.183	0.040	1.854
Zhejiang	0.981	0.772	0.100	0.008	1.820
Anhui	0.994	0.968	0.570	0.171	2.774
Fujian	0.989	0.963	0.536	0.146	2.713
Jiangxi	0.984	0.972	0.733	0.298	3.191
Shandong	0.997	0.904	0.337	0.106	2.382
Henan	0.991	0.964	0.555	0.145	2.705
Hubei	0.996	0.987	0.548	0.198	2.865
Hunan	0.989	0.962	0.489	0.149	2.669
Guangdong	0.990	0.979	0.666	0.252	3.040
Guangxi	0.993	0.986	0.913	0.571	3.893
Hainan	0.984	0.976	0.840	0.572	3.857
Sichuan	0.996	0.909	0.339	0.084	2.377
Guizhou	0.984	0.981	0.874	0.568	3.971
Yunnan	0.993	0.970	0.719	0.362	3.424
Shaanxi	0.994	0.971	0.652	0.264	3.022
Gansu	0.984	0.964	0.637	0.193	2.900
Qinghai	0.951	0.913	0.756	0.470	3.668
Ningxia	0.991	0.977	0.808	0.443	3.556
Xinjiang	0.964	0.883	0.680	0.466	4.540

Fertility variation by subregion in rural China: 1985-1987

To analyze further the fertility trends towards the end of the 1980s, we next examine the TFRs and TPPRs for rural China and individual subregions. In order to avoid the bias due to annual fluctuations, we have calculated the arithmetic mean of both TFRs and TPPRs by subregion (excluding Tibet) and for the period 1985-1987, i.e. the latest three years for which data are available from the survey (tables 2a and 2b).

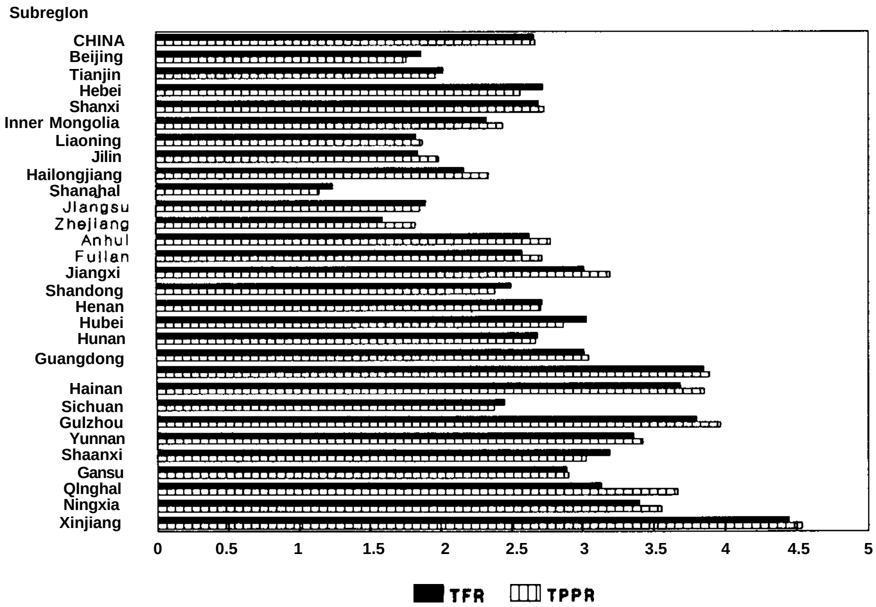
Figure 4 shows the average TFR and TPPR by parity for the period 1985-1987 for rural China as a whole. Both TFR and TPPR were at about 2.66, a fertility level much higher than what had been targeted under the Government's family planning programme. The parity 1 TPPR was close to 1 which means, following current fertility, that almost all women would have at least one child in their life-time. Parity 1 TFR was somewhat higher than 1, which suggests some bunching of births, but not to a serious degree. What is important to note is that parity 2 TPPR was above 0.90, which

Figure 4: TFR and TPPR by parity, rural China: 1985 - 1987



Source: 1988 Two-Per-Thousand Fertility Sampling Survey

Figure 5: TFR and TPPR by subregion, rural China: 1985 - 1987

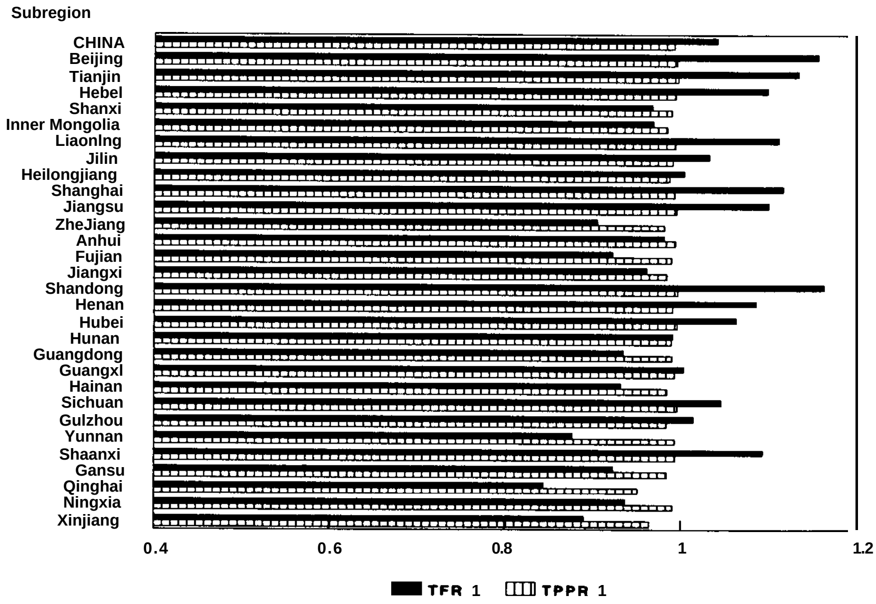


Source: **1988 Two-Per-Thousand Fertility Sampling Survey**

means having two children was a phenomenon quite widespread, occurring on a massive scale among women of child-bearing age in rural China in the late 1980s. Moreover, the TPPR also shows that about half of the women (0.47) would have at least three children, and about one sixth of them (0.16) would have at least four children. It indicates that not only were second births numerous, but also high-parity births were not rare at all in rural China during this time.

Figures 5 to 8 compare rural fertility among subregions (excluding Tibet), with the data presented in tables 2a and 2b. Figure 5 shows that, among the subregions, 22 of them had fertility higher than 2, with 10 of them higher than 3. At the beginning of the 1980s, there were seven areas (Hainan [retrospectively], Ningxia, Guizhou, Xinjiang, Qinghai, Guangxi and Yunnan) where fertility in rural areas was higher than 4 and even 5 (Coale and Chen, 1987). By the end of that decade, all the subregions except for Xinjiang had fertility levels below 4, although rural fertility nationwide had been fluctuating around 2.7-2.8 throughout the decade.

Figure 6: TFR 1 and TPPR 1 by subregion, rural China: 1985 - 1987

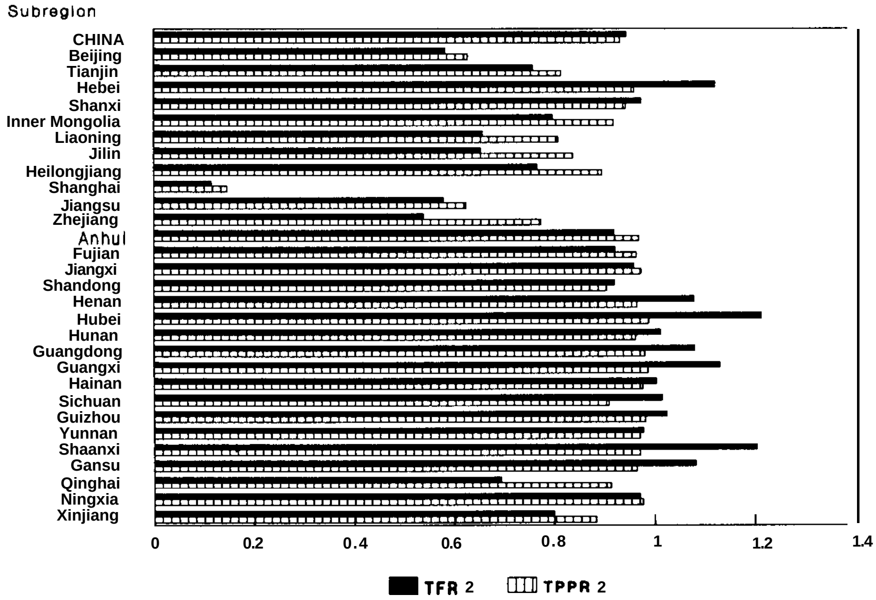


Source: **1988 Two-Per-Thousand Fertility Sampling Survey**

The shrinking of the disparity in rural fertility among the subregions should be viewed as one of the important advances China made in lowering its fertility during the 1980s. However, despite the enormous efforts that had been made in advocating one child per couple, the achievement of fertility close to or below the replacement level was still confined to Beijing, Tianjin, Shanghai, Jiangsu, Zhejiang and north-eastern China, i.e. the areas along the country's eastern coast. The pattern of variation in rural fertility among the subregions remained unchanged (Poston and Gu, 1987; Freedman *et al.,* 1988; Poston, 1988; Peng, 1989; Poston and Jia, 1990).

Figure 6 shows the parity 1 fertility of the rural population in the subregions. The parity 1 TPPRs were all about 1, which indicates that almost all women would have one or more children during their life-time according to the current fertility level. However, there were 15 subregions with a parity 1 TFR above 1, six of them having a TFR higher than 1.1. The question arises: Why did the birth-bunching phenomenon appear more serious in the relatively more developed rural areas such as Shandong (1.16), Beijing (1.16),

Figure 7: TFR 2 and TPPR 2 by subregion, rural China: 1985 - 1987



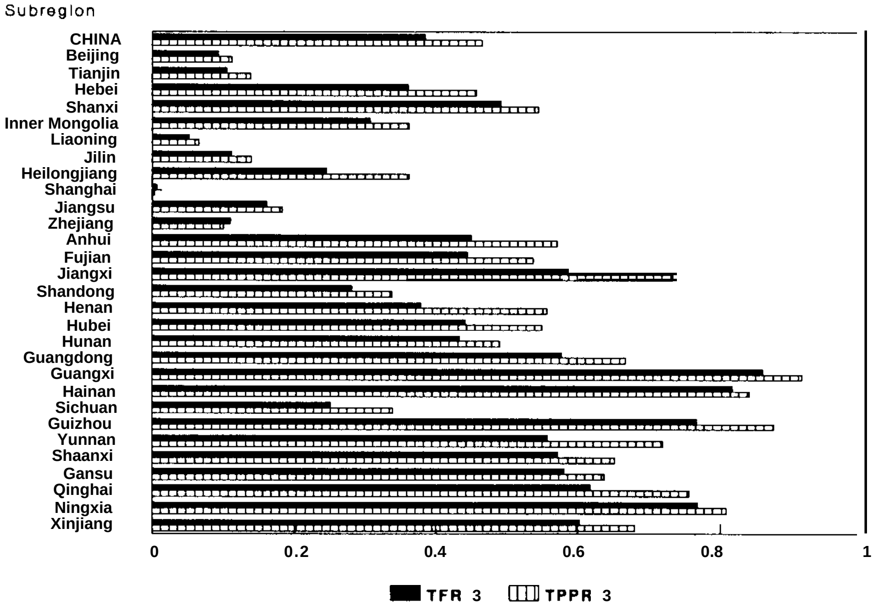
Source: **1988 Two-Per-Thousand Fertility Sampling Survey**

Tianjin (1.13), Shanghai (1.12), Liaoning (1.11) and Jiangsu (l.l0)? One explanation is that the areas with a better profile with regard to late marriage and late child-bearing previously owed more "debts" for child-bearing and therefore the bunching of first births appeared stronger when the ages of first marriage and first births moved downward.

Figure 7 shows the parity 2 fertility of the rural population among the subregions. In terms of TPPR, all the rural areas, except for rural Shanghai, had a value above 0.6 and, except for Shanghai, Beijing, Jiangsu and Zhejiang, all the rural areas had a value above 0.8, which suggests that having two children became quite widespread in rural areas.

In terms of TFR, there were 11 areas with a value above 1; in Hebei, Hubei, Guangxi and Shaanxi, they were even above 1.1, which suggests that the bunching of second births had appeared in not a few areas of rural China by the end of the 1980s. Once again, this demonstrates the phenomenon of "parity waving" from first birth to second birth.

Figure 8: TFR 3 and TPPR 3 by subregion, rural China: 1985 - 1987



Source: **1998 Two-Per-Thousand Fertility Sampling Survey**

Figure 8 shows data about third births. One feature in this case is that the differences in values between TFR and TPPR became apparent, the former being lower than the latter in general, and even much lower in some areas such as Heilongjiang, Anhui, Jiangxi, Henan, Guangxi and Yunnan. The lower TFRs indicate that, among all child-bearing women, only a small proportion had third births, while the relatively high TPPR signifies that the cohort effect of high-parity fertility was higher than the period effect among the rural women with two or more children. Another feature is that parity 3 fertility varied considerably among the subregions. Shanghai had the lowest TPPR value (close to zero, at 0.003), which means that almost no women in Shanghai had three or more children. However, Guangxi had the highest TPPR value (0.91), which means that almost all women in Guangxi were having three or more children. Among the 29 subregions, 18 of them had a TPPR higher than 0.4. In other words, in almost two thirds of the rural areas, 40 per cent of the women of child-bearing age would have at least three children in their life-time, if the current fertility pattern was followed. Among them, the percentages for Jiangxi, Guangxi, Hainan, Guizhou, Yunnan, Qinghai and Ningxia were even higher than 0.7, with the percentages for Guangxi, Hainan, Guizhou and Ningxia being even higher than 0.8. All these data indicate that, in many rural areas of China, not only was the practice of having two children considerably widespread, having three children was also quite common in the late 1980s.

Cohort effect versus period effect: "birth bunching"

In the preceding section, we reviewed rural China's fertility experience during the 1980s. Before going on to the concluding remarks, one issue which has to be discussed with regard to the assessment of fertility trends in rural China in the 1980s is the relationship between cohort fertility and period fertility. Although fertility remained at a low level -- if it did not decline to an even lower level during that decade -- population grew much larger in absolute number than ever before. Over the decade, the number of births had risen from about 20 million annually to about 23 million; the natural increase of the population is currently about 16 million annually (Gu, 1990). Consequently, China was entering the decade of the 1990s with a population of more than 1.1 billion. Although there are various factors responsible for the fertility trends in the 1980s, as it was, the achievements in fertility decline were apparently not proportional to the efforts China had made in implementing its family planning programme in the decades of the 1970s and the 1980s.

As the above analysis of fertility trends reveals, the cohort effect of fertility shown by high-parity fertility declined considerably over the decade, as indicated by the TPPRs in table 1 and figure 3, while the period effect of fertility, as indicated by the TFRs in figure 1 did not change much over the decade. To disentangle the puzzle, the birth-bunching phenomenon deserves more attention. The decade of the 1980s saw not only the bunching of first births, as indicated by parity 1 TFR above 1 over the entire decade (see figure 2), but also the bunching of second births, as indicated by the parity 2 TFR being above 1 by the end of the decade (see figure 2). Moreover, the above analysis also demonstrates that, at the end of the 1980s the bunching of first births existed in at least 15 of the 29 subregions of rural China with parity 1 TFR being above 1 (see table 2 and figure 6). Further, the bunching of second births existed in at least 11 of the 29 subregions of rural China with parity 2 TFR being above 1 (see table 2 and figure 7). It is no exaggeration to state that birth bunching should be viewed as a decade-long and nationwide phenomenon, characterizing the fertility trends in rural China in the 1970s and 1980s.

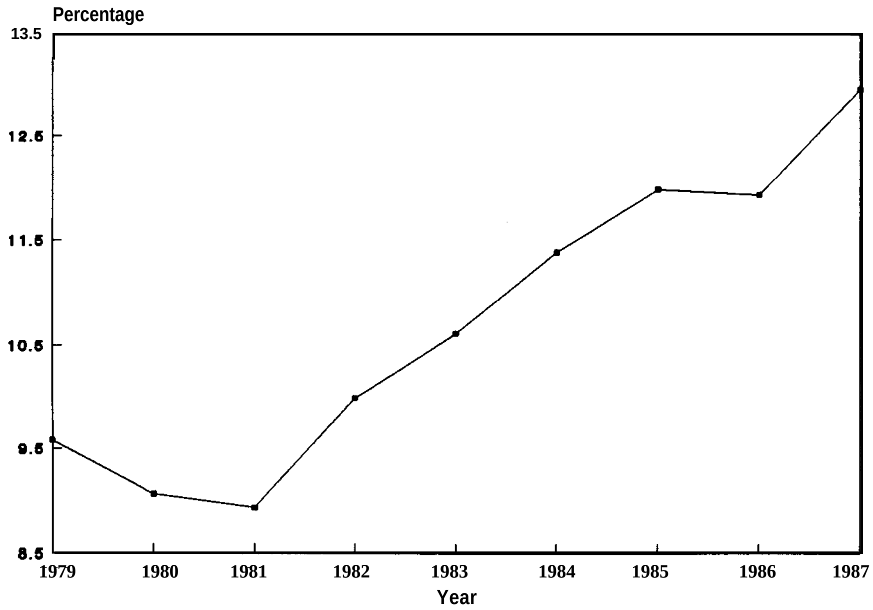
As noted in the previous analysis, the birth-bunching phenomenon is the result of the downward shift in the timing of marriage and child-bearing, which in turn pushed the period fertility upward even with reduced cohort fertility in terms of the number of births a woman may give in her life-time, as was the case in rural China during the 1980s. In other words, the inflated period fertility due to the downward shift in the timing of marriage and child-bearing had somewhat offset the decline in cohort fertility, consequently contributing to an increasing number of births annually (Yang and Gu, 1991).

Several recent studies on fertility trends in China have made similar observations. For example, Feeney *et al.* (1989, p. 306) conclude that the level of fertility indicated by TFRs during this period (1981-1986) has been inflated by declining age at first marriage: "[t]his effect results from a change in the timmg of childbearing, however, rather than from any change in completed family size". According to Luther *et al.* (1990, p. 356), "even after the rise in 1987, levels of progression to high-order births in China were very low -- lower, for example, than in the United States during the mid-1980s". Coale and his colleagues (1991, p. 393) have also observed that

> "the total marital fertility rate by duration since first marriage did continue to decline at least until 1985, and that for married women that rate of bearing second and third children diminished (except for an upturn in the total second birth rate in 1986 and 1987). A major element in the undiminished or rising fertility calculated by age (as the TAFR) or for the whole population (as the birth rate) is the marriage boom that began when the Government in 1980 relaxed the locally administered restrictions on marriage before an officially recommended age ." 7/

All these studies, along with the present study, provide explicit evidence that the population control and family planning programmes in China during the 1980s paid a great deal of attention to the number of children born per woman in her lie-time, i.e. the parity of the mother, but very much overlooked the timing of marriage and child-bearing, particularly the first marriage and the first birth. In the decade of the 1980s, compared with that of the 1970s, the occurrence of marriage before the age of 20 (the minimum age of marriage for women under the 1980 State Marriage Law) had increased. The proportion of later marriage (marriage at age 23 or later for females) declined, and the mean age at first marriage also dropped. Consequently, the timing of the first birth moved downward by the age of the mother. As shown in figure 9, the proportion of child-bearing women

Figure 9: Mothers among women aged 20, China: 1979 - 1987



Source: **1988 Two-Per-Thousand Fertility Sampling Survey**

aged 20 or less who had babies was consistently increasing over the decade. During the late 1980s, among the estimated 12 million women reaching age 20 each year, more than 10 per cent of them had already become mothers before or upon reaching the minimum legal age for marriage.[8/] Of course, most of these births occurred in rural areas. Thus, the orientation of China's population control and family planning programmes moved from the policy of "later, longer, fewer" in the 1970s (Tien, 1980) to advocacy of "one child per couple" in the 1980s (Croll *et al.,* 1985), and contributed to a period increase in the crude birth rate as well as in the absolute size of the population, among other factors.[9/] In sum, while so much effort had been focused on the cohort effects of child-bearing, ironically the period effects were relatively out of the sight of the programme. It is estimated that, had late marriage and late child-bearing been maintained during the 1980s at the higher level of the 1970s, at least 20 million births would have been averted in the last decade, and the total population of mainland China by mid-1990 would be at 1.13 billion rather than 1.15 billion, as reported by the 1990 census (Yang and Gu, 1991).

At the beginning of the 1980s, as part of China's holistic strategy to achieve modernization, the Government adopted the goal of 1.2 billion population for the year 2000, and a birth control policy advocating one child per couple. In demographic terms, it is apparent that the former goal aims at the period effect of fertility on population growth, which was indeed the overriding concern of the Govermnent, while the latter aims at the cohort effect of fertility on population growth, which was initially designated to serve as the means for achieving the overall goal. While it is true that the number of births an individual woman has in her life-time will affect population growth at the aggregate level (taking into account mortality and migration as well) for a given period, it is also true that the timing of marriage and the related timing of the first birth and subsequent births will all contribute to population growth for a given period. As Coale (1984, p. 49) stated: "In populations practicing effective contraception, changes in age at marriage alter the timing of births for each cohort of women without necessarily altering the final average size of family achieved".

Along this line, some population scholars have proposed alternatives to China's current birth control policy. For example, Greenhalgh and Bongaarts (1987, p. 235) propose, as one alternative, the "27-4 option", which involves establishing 27 years of age as "the minimum age at first child-bearing that, when combined with 4-year spacing, would keep the population from ever reaching 1.2 billion." Liang (In: Tien, 1986, p.7) proposes that "each woman be permitted to have two children, provided that the interval between births be extended to 8-10 years. That is, if a woman's age at first marriage is 20, the birth of the second child be delayed to age 30". Li (1989) proposed a policy of "a constant stream of births", and suggests that "in order to achieve the two goals of limiting population size (to about 1.2 billion in 2000 and 1.4 billion in the 2050s) and allowing more individual fertility choice (2.2 children per family), the annual stream of births should be around 20 million and the mean age of childbearing has to increase from 26 to 30 over the next 10-15 years".

These proposals later evoked a great deal of debate among population scholars, policy makers and the general public alike regarding whether the birth control policy of China should be changed to allow a couple to have two children instead of one. Although the specifics of their proposals were viewed by many as impractical in the context of the current situation in China, the principle embedded in these proposals, which is crucial to China's population control and family planning programme efforts, was unfortunately missed. The essence of their proposals is that, as far as the period growth of population is concerned, it matters not only how many children a couple has in their life-time, but also when the couple marries and when they have their children. In other words, not only can *shao* (fewer) contribute to the period effect of population growth, but *wan* (later) and *xi* (longer) can as well.

In general, for a country with a relatively low level of fertility, given that there is not much room left for further decline in terms of the number of children per couple, the timing of marriage and child-bearing will play a much more important role with regard to the further success of the family planning programme. As Bongaarts and Greenhalgh (1990, p. 600) have argued, along with several others (Hajnal, 1950; Ryder, 1956, 1983; Coale, 1984), about the link between cohort and period fertility: "an increase in the mean age at childbearing of cohorts temporarily depresses period fertility even if cohort fertility remains constant"; there is a "direct link between delayed childbearing and a reduced period total fertility" both theoretically and realistically.

It seems extremely important, at least to the authors of this article, to restudy the "three-character bible" of *wan, xi* and *shao,* and better understand the relationship between the period effect and cohort effect of fertility, if a more successful family planning programme is going to be achieved. These are the lessons that may have to be learned from China's experience regarding rural fertility trends of the 1980s. They certainly hold many weighty implications for the family planning and population control programmes that will be implemented in the 1990s.

Concluding remarks

Based on the foregoing analysis, several concluding remarks may be made regarding the fertility trends in rural China in the 1980s. First, in comparison with the 1970s, mainland China continued to make progress in furthering the fertility decline in rural areas in two regards: except for Xinjiang (and Tibet, although it is not included in the present study), there was no longer any subregion with a TFR above 4.0 in the 1980s, and the fertility of third and higher parity women had dropped consistently over the decade. Consequently, the TFR for the whole country reached approximately 2.3. The TFR of developing countries around the world (excluding China) remained at 4.6 during the same period (PRB, 1990). On the other hand, as a result of the policy advocating one child per couple, rural fertility below or close to the replacement level remained confined to subregions along the country's eastern coast. There was no fundamental change in the pattern of variation in fertility among the subregions in the 1980s compared with the

1970s (see also Li, 1990 for TFRs during the period 1973-1987). Although fertility in rural China declined somewhat in the 1980s, it was fluctuating around 2.7-2.8 over the decade, which was much higher than the Government had expected.[10/]

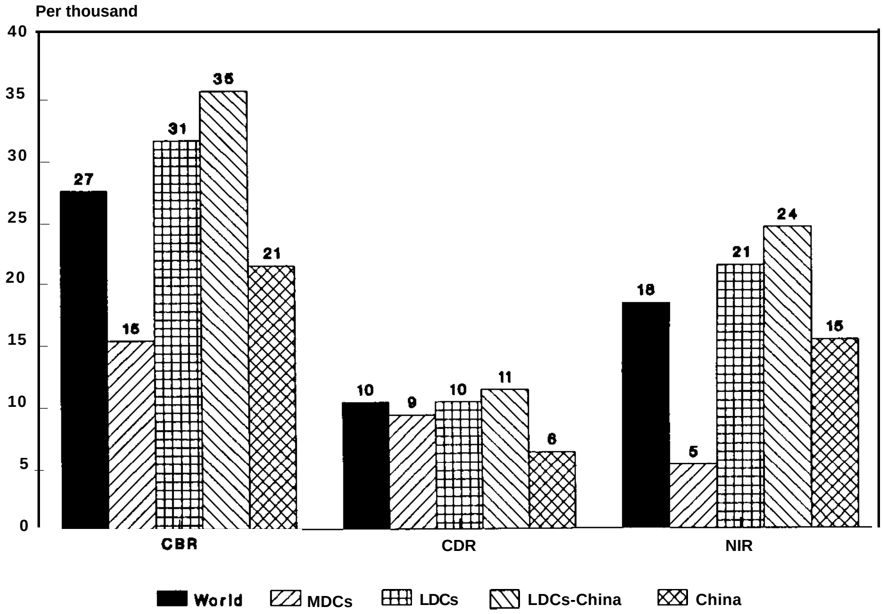
Second, based on our study, the fertility trends of rural China in the 1980s may be depicted as follows: at the beginning of the decade, owing mainly to the shift in emphasis of the fertility policy from "later, longer and fewer" to "advocating one child per couple' and the promulgation of the new marriage law, the relatively older women who conformed to the requirements for later marriage and child-bearing in the 1970s as well as the relatively younger women who desired to marry early and begin chid-bearing, all rushed to have their first children, which resulted in the "bunching" of first births. At the middle of the decade, owing mainly to the process of "perfection of family planning policy' (Li, 1985; Greenhalgh, 1986) and the new situation resulting from rural economic reform (Gu, 1987 and 1990),[11/] those who had their first children at the beginning of the 1980s and so were rightly eligible in terms of either the existing policy or parity progression, all began having their second children, which resulted in the "bunching" of second births. By the end of the 1980s, a large number of rural Chinese women had already given birth to two children, and were exposed to the risk of having yet a third child. These phenomena characterized the fertility of rural China nationwide throughout the decade.

Third, the slow-down in the pace of fertility decline in rural China in the 1980s was not at all a coincidence; rather, it was due to (a) an increase in the number of women in the child-bearing age group, which was an echo of the previous baby boom, (b) the "ceiling-effect" of low-level fertility, and (c) one of the ramifications of having reached the take-off stage of socio-economic development (Gu, 1990).

Fourth, it should be remembered that rural China may have been facing two different kinds of fertility situation (Gu, 1991). One was the decline from high fertility to low fertility, as in the 1970s; the other was the decline from low fertility to replacement-level fertility, and even below the replacement level as anticipated by the Government in the 1980s. The two kinds of fertility decline cannot be considered different only in the numerical sense. Rather, understanding them requires greater knowledge of the social, economic and cultural implications of "having fewer children" and "having fewer than two children or even one child" (see Tien, 1989a) as well as greater knowledge about China's new phase of fertility decline.

Fifth, following the adoption of policies related to opening China to the world and instituting economic reforms, China entered into the

Figure 10: Population growth comparison, 1990



Source: **CPIRC, 1991; PRB, 1990.**

so-called "take-off stage" of socio-economic development towards the end of the 1970s. Although fertility in general and in rural China in particular had changed little during the 1980s, the country and its people changed dramatically indeed, socially, economically and culturally, as any observer can perceive. The manner and extent of those changes and their effect on the people's fertility desires and fertility behaviour are of prime importance for demographic research in order to improve the so-far quite fragmented knowledge we have in this regard.

Sixth, overall population change in China has remained at a relatively low level in terms of crude birth rate (CBR), crude death rate (CDR) and the rate of natural increase (NIR), compared with the rest of the developing countries of the world (see figure 10). According to the 1990 population census, the current level of CBR, CDR and rate of natural increase are 21, 6 and 15 per thousand, respectively (CPIRC, 1991), while those of developing countries of the world (excluding China) are 35, 11 and 24 per thousand, respectively, for the same period, with the world average being 27,10 and 18 per thousand, respectively (PRB, 1990). Thus, what is considered high fertility in China differs greatly from 'high-fertility" in the classical sense.

Seventh, it would be quite premature -- even naive -- to conclude therefore that China’s population problems have been solved. Rather, they will become even more severe in the 1990s since the population of mainland China has already reached 1.134 billion, according to the 1990 census. From no perspective -- whether for social, economic, cultural, political, or military considerations, whether for short-term or long-term interests -- does China need to have a population in excess of 1.1 billion. Although serious attention should be paid to the new demographic issues which may arise during the process of fertility decline, such as rapid population ageing, abnormal sex ratio and education of single-children, no one would argue rationally against the continuation of China’s family planning and population control programmes (Gu, 1991).

Eighth, to further curb the pace of population growth, the Government has recently decided to keep the annual growth rate within 12.5 per thousand on average over the decade of the 1990s. This implies a reduction of TFR to 2.1 by 1995, and 2.0 by 2000. It is apparent from the above analysis, that to achieve this goal, both a reduction in high-order births and a postponement in the timing of marriage and child-bearing should be the major highlights of the family planning programme in the 1990s.

Ninth, looking towards the remainder of the 1990s, China’s socio-economic development and family planning programmes will surely continue to advance in varying degrees nationwide and population trends will become more favourable, which will help the country to achieve its long-term goal of modernization. However, given the bulge in the female population in the child-bearing age groups and the already low level of fertility and mortality achieved so far, the population of China will continue to grow at a pace relatively not much different from what is observed today. It is very likely, therefore, that China’s population will surpass 1.2 billion sometime in the mid-1990s, approaching close to 1.3 billion by the turn of the century, eight years from now.

Tenth, in terms of the population dynamics of China in the second half of the twentieth century, it may be stated in summary that if the 1950s were characterized by a decline in mortality and the 1970s by a decline in fertility, it can be predicted with confidence that the 1990s will be a decade characterized by migration and population movements, or in other words by the process of urbanization and labour transformation from agricultural to non-agricultural pursuits. All these factors will present a formidable challenge to population scholars in improving demographic understanding and to policy makers in formulating more effective integrated development strategies.

Footnotes

1. This article is based on a paper that was initially prepared to assist in the formulation of China's "Eighth Five"-Year (1991-1995) Population Plan. Earlier versions of it were presented at the National Symposium on Rural Population Problems, 11-15 November 1990, Wuxi, China; at the XVII Pacific Science Congress "Towards the Pacific Century. The Challenge of Change", 27 May to 2 June 1991, Honolulu, Hawaii, USA; and the International Symposium on Fertility and Contraception in China, 26-29 August 1991, Beijing. It has benefitted from the useful comments of a number of Chinese and foreign scholars. Particular thanks are extended to Griffith Feeney for his encouragement and advice. The paper was substantially revised while the first author was a visiting fellow at the East-West Population Institute, Honolulu, during June 1991. However, the views expressed in the article are those of the authors and not necessarily those of either China's State Family Planning Commission or the China Population Information and Research Center (CPIRC).

2. Feeney *et al.,* (1988) and Luther *et al.,* (1990) both used the data from the One-Per-Cent Survey conducted by China's State Statistical Bureau in 1987, which resembles more a mini-census than a survey, but does not contain birth history data. Fertility trends, therefore, were indirectly estimated with the application of the "own-children" method (Cho, Retherford and Choe, 1986, Luther and Cho, 1988). Coale *et al.,* (1991) used the data from the 1988 Two-Per-Thousand Fertility Sampling Survey -- as does the present study -- but only a 10 per cent subsample of the survey data was available to them for their study.

3. We have taken the same life-table approach as Feeney *et al.,* (1989) to calculate the total parity progression rate, but the terms for parity progression measures which we used in the paper differ somewhat from the terms used in the studies by Feeney and his colleagues (Feeney *et al.,* 1989). The order-specific total parity progression fertility rate is equivalent to what is called the "birth order component" by Feeney *et al.,* 1989, table 6, p. 310; also see table 4 in Luther *et al.,* 1990, p. 350. What we call TPPR is equivalent to what Feeney *et al.,* referred to as "the period total fertility rate calculated from the age/parity-specific birth probabilities" (1989, p. 308) or the "TFR calculated from period parity progression ratios" (Luther *et al.,* 1990, p. 350, or table 5, p. 353). We prefer not to consider fertility based on the parity progression measure as an alternative calculation of TFR, since TFR already has its own definition established among demographers based solely on age-specific standardization with no consideration of "parity progression schedules" (Feeney, 1983, p. 76). The parity progression ratio (PPR) in Feeney *et al.,* (1989) and Luther *et al.,* (1990) and the order-specific total parity progression rate (TPPR) in our study (i.e. birth order component) are virtually mutually convertible as illustrated in table 6 of Feeney *et al.,* (1989, p. 310). The interpretations of the two parity progression indicators differ somewhat, however. While the PPR indicates the percentage of women of (n-1)th parity progressing to n-th parity in their life-time, the TPPR indicates the percentage of all women having at least n-th order births (in other words, n or more births) in their life-time if they go through their child-bearing period according to the parity progression schedule observed in a given period (e.g. one year). In this sense, we assert that the total parity progression rate (TPPR) is more directly comparable to the total fertility rate (TFR) than the parity progression ratio (PPR).

4. There are slight differences in results between the present study and the studies by Feeney *et el.,* (1989, see tables 3, 4, 6, 7) and Luther *et el.,* (1990, see tables 1, 4, 5). Readers are reminded that: a) the present article is focused on rural China only rather than China as a whole, which is covered in their studies; b) the results of this study are based on direct calculations with birth history data, whereas their studies were based on reconstructed birth history with an indirect method; and c) important differences exist with regard to the content and interpretation of TPPR and PPR.

5. It is interesting to note the recent observation by Ryder (1990, p. 439) in a review of American fertility "for 11 of the years since World War II" the total fertility rate for first-order births "exceeds 100 percent -- an impossible assignment for any real group of women". Ryder points out: "the time pattern of first births may change from one cohort to the next . . . and sometimes systematically as cohort reproduction is shifted toward the earlier ages, as occurred during the postwar baby boom". As a result, it made the period total first-order fertility rate "obviously distorted" (1990, pp. 439-410).

6. Parallel to the "birth bunching", one may observe the bunching of marriages. In the words of Coale (1984, pp. 40-41): "(w)hen the mean age at marriage of a cohort falls, the total marriage rate rises above 1.0 because the marriages of older and younger women, which would have occurred sequentially with constant mean age, overlap".

7. In the article by Coale *et al.,* (1991, p. 389; also refers to Coale and Chen, 1987), TAFR stands for the total age-specific fertility rate, "commonly called simply the total fertility rate or TFR"; and the total duration-specific rate (TDFR) refers to "the total number of births that would occur per ever-married woman in a hypothetical group of newly married women subject at each duration since first marriage to the duration-specific rate of a given calendar year".

8. Similarly, Coale *et al.,* (1991, p. 390) suggest that "the proportion of marriage before 20 actually increased from 12.5% for women reaching 20 in 1980 to 17.9% for women reaching 20 in 1983". They argue, therefore, that "(t)he increase in the number of marriages is the major cause of the upturn in the TFR in 1981 and 1982".

9. Some scholars point out that some other factors may also be responsible for the trend towards early marriage for women in the 1980s, for example, the "marriage squeeze". Banister (1987, p. 164) states: "During 1981 women aged 20-23 in rural areas suddenly became legally eligible for marriage, but because they were born during the years 1958-61 they were members of deficit cohorts. Men about four years older than these women were members of huge cohorts born during 1954-57. Therefore, many rural men may have been well over the minimum marriage age in 1981 but could not many, both because of high bride prices and because of a dearth of women in the customary age range. These men will search for spouses among the bigger cohorts of women younger than 20". Tien (1990b) suggests that because men in China tend customarily to marry a woman two or three years younger, the fluctuation in birth rates in the 1960s may have forced men to look for potential spouses among the women from a much younger age group which may cause early female age at marriage, i.e. at ages below 20.

10. Several recent studies also show that couples in China, particularly in rural areas, tend to consider two children as the "desirable family size" (Whyte and Gu, 1987; Wang, 1989; Choe and Tsuya, 1991). With that evidence, they argue that the "Chinese government seems to have achieved considerable success in promoting the ideal of a small family size but its success in achieving acceptance of one child as a desirable family size seems to be rather limited" (Cho and Tsuya, 1991, p. 50).

11. In 1987 and 1988, following Professor Fei Shaotong, a prominent Chinese sociologist and anthropologist, the first author of the present article had visited some of the so-called "ten-thousand-yuan households" in rural Henan, Gansu and Qinghai provinces. It was found that all the "early birds" who had attained prosperity in these rural areas had two characteristics in common, i.e. diversified household income and a relatively large household size (Gu, 1987). It is not difficult to understand in light of the sociology of families and households. The adoption and implementation of the household "responsibility system" in rural China since the beginning of the 1980s signalled the re-establishment and even reinforcement of the production function of the family and households, which once was taken away under the system of people's communes during the 1960s and 1970s. The family once again functions as the basic economic unit in China in terms of either the division of labour or income distribution. It is apparent that the division of labour required by a diversified family economy, which leads to a quicker proliferation and accumulation of family wealth, is possible only when the family size is relatively large, which will very likely stimulate people's demand and desire for early marriage and more children, particularly more sons in rural areas.

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An Analysis of the Effects of Fertility on Women's Spatial Mobility in the Philippines

The spatial mobility of women is beneficial not only to individual females but also to their kin

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Although numerous studies have been conducted on the interaction between fertility and migration in the context of rapid population growth in developing countries, little has been said about the impact of fertility on

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migration. Instead attention has been focused disproportionately on the effects of migration on fertility (Myers, 1966; Macisco *et al.*, 1970; Zarate and Zarate, 1975; Magnani, 1980; Goldstein and Goldstein, 1981, 1983; Weller and Bouvier, 1981; Findley, 1982; Berry, 1983; Lee and Farber, 1984).

In the Philippines, a few studies have documented the effects of migration on fertility (Hendershot, 1976; Cabegin, 1986, Bacal, 1989). Until recently, the equally important question of how fertility affects the spatial mobility of women has not been addressed. Examination of this relationship in a systematic manner is sparse (Corgeau, 1985; White, Moreno and Guo, 1991). Corgeau (1985) in a study of the interaction between spatial mobility, family and career life-cycle in France showed that women who marry at a younger age undertake migration related to increases in family size more frequently than women who marry at a later age. White *et al.* (1991) used data from the 1986 Peru Demographic Health Survey and found that marriage and fertility have inhibitive effects on spatial mobility.

The question of how fertility might affect the probability of migration seemed simple while at the same time the answer is complex. This article focuses on this question. It is an attempt to uncover in a systematic manner the temporal and spatial linkages between fertility and migration at the individual level. Further, the applicability of some theoretical perspectives commonly referred to in the literature on the migration effects on fertility will be tested.

Theoretical perspective: fertility effects on migration

The theoretical importance of the fertility impacts on migration lies in the fact that fertility can have a two-pronged effect on spatial mobility. One is that parity can increase the probability of moving. An increase in migration is plausible when it is viewed by couples as a coping strategy to meet additional expenses of a larger family with more children. For instance, Findley (1987) reports that large family size stimulates migration in the Philippines because of demographic pressure within the family and because of labour supply. More adults within the family mean that there are enough adults within the family to carry out economic activities even if some family members, e.g. the mother, migrates.

The other is that parity can reduce the likelihood of migration. It may be that when couples adapt to the needs of children, they may be resistant to any relocation so as not to disrupt their socialization and schooling. Besides, the greater costs of moving with more children can significantly decrease the likelihood of moving. The latter implies that the migration of married women may be tempered not only by the number of children but also by the ages of the children. A study by Long (1972) on residential mobility in the United States of America underscores the importance of the age of children. Among couples with children, families with children under six years old were the most mobile both within and between countries. This corroborates the earlier findings of Speare (1970) that "the presence of school-age children increases one's ties to a particular neighborhood and thus reduce mobility."

In both cases, migration can be viewed as an adaptive response to changing circumstances triggered by transitions to higher parity. Thus, one can test for the adaptation effects of fertility on mobility.

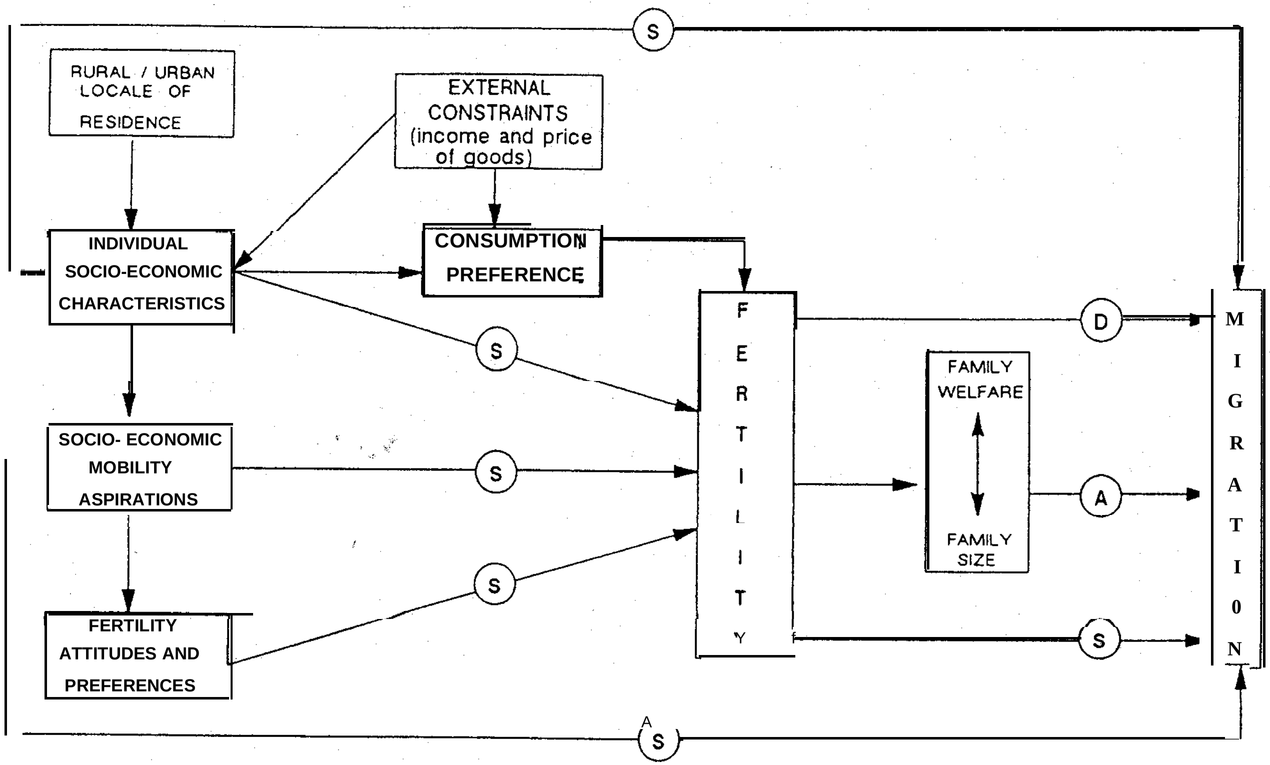
Another perspective is offered by the independent effects of the occurrence of a birth on a women's abiity to move. This suggests some disruption effects of fertility on migration. The argument is that the demands of motherhood during the early stages of infant care, while the mother is still in the process of post-parturition recuperation, can present major obstacles to mobility. Post-partum recovery and early infant care can tie down women to home-based activities and effectively make relocation the least important item on the family agenda. In addition, one can argue that the demands of a breast-feeding infant during the first 12 to 18 months can poste constraints to spatial mobility. One can, therefore, test for the disruption effects of fertility on migration.

Still another theoretical grounding for examining the interrelationship between fertility and migration is the notion that even after controlling for background characteristics, migrants continue to have different fertility attitudes and behaviour from non-migrants. The problem with testing the selectivity theory is that there are hardly any data on selectivity at origin on fertility preference and attitudes.

Conceptual framework

Critical to the study of the causal interaction between fertility and migration is the existence and persistence of fertility and migration differentials among different subgroups of women. Attempts to explain fertility and migration differentials revert to the underlying determinants of fertility and migration decisions. The hallmark of fertility and migration differentials research has been to approach fertility and migration as a matter of rational choice. A basic assumption is that both births and movements are in some large measure the outcome of deliberate decisions made by couples.

Figure: Conceptual framework fertility effects on migration



Note: S denotes selectivity effects; D denotes disruption effects; and A denotes adaptation effects.

The figure (opposite) represents an analytically useful guiding framework for conceptualizing the effects of fertility on migration. The conceptual framework for this analysis borrows extensively from the household maximization theory in which resource allocation decisions are made under constraint. It should be noted, however, that the framework makes explicit the manner in which non-economic factors influence fertility and migration within the consumer theory. There is ample reason to believe that couples' preference for children versus other consumption activities vary systematically with membership in specific socio-demographic groups.

Household maximization theory holds that couples in the reproductive ages are confronted with a set of constraints (see figure) that affect the price of goods, "price" of children, costs of migration and household consumption decisions. These constraints jointly determine the set of goods and the investments in migration from which the household will select the most preferred combinations. The influence of basic socio-economic variables that differentiate the women prior to migration will be discussed within the context of this theory.

It cannot be disputed that age is simply the single most important source of variation in social and demographic processes in general, and in vital rates in particular. Sten within the purview of the household utility maximization framework, younger women who are presumably better-educated that older women are more likely to migrate in search of paid non-child-related activities. It should also be borne in mind that the potential income streams for younger women are relatively greater than those for older women. Consequently, they may be more prone to migrate than older women.

Education

Of all social indicators, education appears to approximate best women's social position in the household and in the larger society. Education unleashes women out of seclusion from access to modem knowledge and modes of action that fortify barriers to mobility such as high fertility and high information costs of migration. The broader horizon of knowledge and interests gained from formal schooling puts the better educated women at an advantageous position in terms of ability to transcend the uncertainties and risks involved in migration. In the context of the household utility maximization theory, the better educated would be more likely to migrate. The assumption is that by doing so, they would minimize the opportunity costs of children while maximizing utility from non-child related goods and services for the household's overall welfare.

Rural-urban residence

Some researchers have postulated that development promotes both socio-economic and geographic mobility. The "modern" life in urban places has often been viewed as effectively raising individual social aspirations alongside the increased awareness of the greater opportunities for upward socio-economic mobility. The overall effect of development, in particular, urbanization, is to place population within an environment where goods become relatively less expensive than children and, other things being equal, more attractive. Exposure to this "material" culture may introduce greater socio-economic aspirations. Thus, women in urban areas may be expected to be more spatially mobile.

Parity

The presence of a larger number of children can result in relatively lower feasibility of migration owing to the higher costs of moving. In cases where the higher cost of moving with more children is met, an impeding factor could be the non-monetary cost of breaking away from established community ties and other needs of the children. Viewed from the perspective of household utility maximization, women at high parity who face high costs of moving, both monetary and non-monetary, are more likely to defer migration plans.

Timing of birth

The biological requirements of the mother and child immediately after birth may especially inhibit spatial mobility. Mothers who would want to maximize the outcome of their pregnancies, i.e. have healthy babies, would avoid the physical strains of migration for both themselves and their infants. Thus, the occurrence of a birth is expected to exert some negative effect on the women's predisposition to migrate. Moreover, a birth can have a lagged effect on mobility. For instance, the demands of child care during the first 12 to 18 months can constrain women's spatial mobility.

Since the principal concern of this analysis is the determinants of migration, focusing on the impacts of fertility, the main contention in this analysis is as follows. In the Philippine setting, a negative relationship between fertility and migration will prevail mainly owing to cost considerations innate in the long-distance movements that permeate the country's internal migration system. Reinforcing this argument are the following: (a) the pervasiveness of the extended kin network and support that cushions the increased sustenance pressures on a growing family and (b) the subservience of the Filipino wife whose socialization has been mainly to be mother and housekeeper once married and with children.

Data and methods

Data from a nationally representative survey of 10,843 ever-married women aged 15-49 at the time of survey (in 1983) were employed to test the aforementioned assertion. The survey respondents were asked detailed birth and residence histories. Information on other socio-economic and demographic variables was also gathered. Primarily a fertility survey, only about half (49 per cent) or a total of 5,364 women were asked their detailed residence history from age 15 until the survey date.

Each respondent was asked if she ever changed residence since age 15; this question was designed to obtain information on her migration status as of the survey date. The change of residence was defined on a six-month temporal criterion and a change in municipality of residence on a spatial criterion.[1/] An ever-married woman was considered a migrant if her residence at age 15 was different from her residence at the time of the survey. Once migration status was ascertained, a detailed residence history was obtained for the migrants using the same temporal and spatial criteria. The residence history yielded information on migration streams, since the survey covered both rural and urban areas, and the frequency of movement of each respondent. Of particular interest in this analysis is the verification of the differential effects of fertility on migration, if any exists, between the more permanent one-time movers and the less permanent repeat movers. Moreover, the residence history data allow for the measurement of characteristics of the women prior to migration, an appreciable improvement over many census-based analyses of migration.

Two data files were created, one for modelling the odds of a first migration occurring and the other for modelling the odds of a second migration occurring. The structure of the data file involved the transformation of all dates into century months and all durations in months. In both data files, the three basic indicators are (a) the duration from start of interval to the survey (b) the duration from start of interval to the event and (c) the event indicator. The event of interest here is migration.

The migration interval is the basic unit of analysis. Each period of residence in a particular place defines an interval. Thus, the event (i.e. the migration) defines the end of one interval and the beginning of another. For this analysis, all intervals which began since the respondent was age 15 are included. Intervals which remain incomplete (e.g. open migration interval) as of the date of the survey are censored and are treated as such by the estimation technique employed. Each interval is characterized by its duration, the presence of censoring and covariates, some of which are invariant throughout the interval, while others may vary over the interval.

Logit regressions [2/] for six 24-month discrete time segments were used to estimate the conditional probability of making a migration in each time segment. This set of time segments, also referred to as age segments, provided a sufficiently long time to allow an examination of trends in the chances of migration across age segments with samples (risk sets) large enough to permit stable estimates. The purpose here is to show that the relations involved can vary and that the size of the effects of the same covariate (ii not their direction) may vary in different age segments. In addition, the use of discrete time segments allows for the incorporation of time-varying covariates, at least to the extent that one can introduce a new value of the covariate for each discrete segment, in the estimation procedure. The age segments, as defined in the data files, reflect the duration to the occurrence of the event, e.g. the length of time (in months) from age 15 to a first migration or the length of time (in months) from a first migration to a second migration. The choice of six 24-month age segments is based on data on age at move, which ranged from 20.6 years to age on the first move to 26.3 years on the fourth move. Further, the majority of the moves (95.7 per cent) were of order four or more.

Since the data are partitioned into discrete time segments, estimates are of the probability of migration occurring, conditional on no migration occurring in a prior segment and survival to the segment. Two models are estimated, one for the first migration and the other for the second or repeat migration. The underlying premise is that the factors surrounding the decision-making process for a first migration can differ from those operating on a subsequent migration decision-making process.

Variable definition and measurement

The choice of the variables for the multivariate analysis of the probability of moving was guided by the principle of keeping to a minimum the number of parameters to be estimated in modelling migration. It should be noted that the stationary covariates are defined at the start of the time segment. The time-varying covariates, on the other hand, are defined to vary within the segment. The variables are presented in tabular form in table 1.

Table 1: Definition of variables used in logit analysis

Variable	Category	Description
A. Stationary variables		
Education [a/]	0 (r) [d/]	No schooling
	1	Primary through secondary
	2	College (university)
Residence	0 (r)	Rural
	1	Town
	2	City
Age [b/]	Continuous, range 15 to 49	Age at prior move
B. Time-varying variables		
Birth [c/]	0 (r)	No birth
	1	Birth within two years from start of time interval
	2	Birth two or more years from start of time interval
Parity	0 (r)	Zero live birth
	1	One live birth
	2	Two to three live births
	3	Four or more live births

Notes: a. In the model for a first migration, schooling assigned for all women was as of the survey date; b. Applicable only for second migration model; c. Not applicable for first two time intervals; and d. Category marked (r) is reference category.

Stationary covariates

Education

The significance of schooling in influencing migration propensity at the individual level has been well documented. The education of the women at the beginning of each migration interval was gathered during the survey. This is a continuous variable with valid values ranging from 0 to 20 years of schooling. For the regression equations, the following categories were used: no schooling (the reference category), primary through secondary, and college education, the latter two being indicated by dummy variables in the equation. A positive relationship between education and migration was hypothesized.

A brief note on the measurement of education is in order. Owing to the lack of information on education among those who, from the age of 15, never moved, the educational attainment assigned for women at risk of making the first move (i.e. those at risk of ever migrating) at the start of the interval is as of the survey date. In other words, what has been used as a measure of schooling at the start of the interval closed by a first move is a subsequent educational attainment rather than the actual schooling attained at age 15. Measured in this way, some association between education and migration may be due to the mobility of the respondent in search of an education. This may be particularly true for the younger women who had not yet finished their schooling. This raises the issue of the joint determination of education and migration particular to the first migration. However, for the interval closed by a second migration, education attainment assigned to women at risk of making a second move was as of the start of the migration interval for all women. The only inaccuracy in the estimates of the effects of schooling on migration is due to changes in education within the interval. Without retrospective education history where dates of changes in educational attainment are recorded, this inaccuracy cannot be corrected.

Rural-urban residence

The notion that areal disparities in opportunity structure determined by the level of development influence the individual migration decision-making process is widely accepted. If it is true that development promotes spatial mobility, it is postulated that women in urban areas would be more likely to migrate than women in rural areas. Information on the type of residence at the beginning of each migration interval was likewise collected during the survey. The following categories were used: rural (reference category), towns and cities, with the latter two being expressed as dummy variables. It is important to note that respondents classified each place of residence as rural, town or city. Unlike educational attainment at age 15 (or at the start of the interval closed by a first move), which was not recorded for those who never moved since age 15, the classification of residence at age 15 for all women, whether migrant or non-migrant, was gathered.

Age at prior move

Estimates of repeat migration include the age at prior migration or age at first migration. The assumption here is that relative to late comers to the migration path, those who made their first migration at younger ages, or the early comers, will be more prone to migrate subsequently. A negative effect on the odds of moving again is therefore expected. This is treated as a continuous variable in the regression equation with value ranging from 15 to 49.

Time-varying covariates

Timing of birth

The availability of the dates of terminations of live pregnancies allows for the classification of each month under examination by the timing of the occurrence of a live birth. This is currently viewed as an indicator that could adequately measure the effects of recent fertility, as opposed to the effects of cumulative fertility. The reference category is non-occurrence of a birth prior to the start of the segment in contrast with two dummy variables: the occurrence of a birth within two years from the start of the segment and the occurrence of a birth two or more years away from the start of the segment. The first reflects the more recent births while the second reflects the earlier births. The intention is to capture the effects of both the coming and the ageing of children on the women's propensity to migrate. The cut-off points were based on the premise that two years is sufficient time for a change of residence and that whatever negative effects a live birth may have on women's spatial mobility can vary for the first two years of child care on one hand and for the years from the "terrible twos" stage of child care and thereafter on the other. Further, the effects of a more recent birth should be stronger than the effects of a birth occurring farther away from the start of the segment. Overall, births should have negative effects on the odds of migration.

Parity

Each month in the sub-interval is examined in relation to the reported date of a live birth in the women's pregnancy history. Thus, each month is classified by the number of live births which can change during any segment. It is intended to measure the effects of cumulative fertility indexed by the previous live birth at the beginning of the segment. The dynamics of family building and the circumstances surrounding the growth of the family as the intended number of children are realized -- here captured by cumulative fertility -- can have distinct effects on migration from those associated with maternal depletion and recuperation after birth. The argument here is that more children will impede women's spatial mobility. The following categories are used: parity zero (reference category), parity one, parity two through three, and parity four.

At the juncture, it can be argued that a more refined analysis of the effects of fertility on migration should consider the interaction between births and parity. There is reason to believe that the strains of a first birth and maternal recuperation as well as care for the first child is different from that associated with a second and higher parity birth. Greater negative effects of a first-order birth on migration appear justifiable. However, the present data set does not permit the teasing of the close interaction between the two variables.

Discussion of results

Of particular interest in this analysis are the effects of the fertility indicators indexed by parity and timing of birth on the odds of migration. That migration is selective of some types of individuals is a widely accepted notion in the migration literature. For this reason, the independent effects of locale of residence, education and age at prior move which are used as control variables are discussed first.

The dependent variable in the logistic regressions is the odds of migration occurring in each of the age segments for both models estimated, i.e. first migration and second migration. In an effort to make the presentation of results simple, estimates for the full regression equations are shown in the appendix tables on pp. 48-51. The discussion will dwell mainly on the effects on the odds of migration associated with each of the covariates, based on the exponentiated values of the logit coefficients which are presented in tables 2a through 5b.

Locale of residence

Data in tables 2a and 2b show mostly positive and highly significant effects of being a town dweller at the start of the age segment on the odds of migration. This holds for all age segments in both first and second migrations. At the youngest age segment, living in a town increases the chances of moving a first and a second time by 65 per cent and 8 per cent, respectively, over the chances of moving for those living in a rural village. The increased chances of moving the first time is even greater for city residents, underscoring the higher propensities for a first move among women living in cities in the Philippines. This pattern is observed for all age segments. Note, however, the negative effects on the odds of moving that living in a city has for a second migration. For instance, the chance of moving again among city residents is four-fifths (87 per cent and 86 per cent) of the chance of those living in the countryside at age segments 0-24 and 24-48, respectively. Overall, the picture one gets is that women living in towns and cities are more likely to make a first move than those in rural villages but that women in towns and rural areas are more prone to migrate a second time than their counterparts in cities. This trend supports the notion of stage migration

Table 2a: Locale of residence by age segments for first migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
	Segment 0-24 (N=5,306)		Segment 24-43 (N=4,540)	
Residence: City	0.4357*** (0.0730)	1.5460	0.4239*** (0.0794)	1.5279
Town	0.5020*** (0.0659)	1.6520	0.4515*** (0.0719)	1.5707
	Segment 48-72 (N=3,769)		Segment 72-96 (N=3,227)	
Residence: City	0.4026*** (0.0905)	1.4957	0.4030*** (0.1026)	1.4963
Town	0.4539*** (0.0814)	1.5744	0.4159*** (0.0925)	1.5157
	Segment 96-120 (N= 2,713)		Segment 120-144 (N=2,286)	
Residence: City	0.4753*** (0.1198)	1.6085	0.4715*** (0.1401)	1.6024
Town	0.4194*** (0.1075)	1.5210	0.4209*** (0.1252)	1.5233

Notes: * Significant at .05 level;
** significant at .01 level; and
*** significant at .001 level.

where cities are apparently chosen as final destinations. Those who migrate to cities appear not to migrate again in comparison with those migrating to either towns or rural areas.

Perhaps the greater chances of ever migrating for women in the urban areas than for women in the rural areas is unusual for a developing country like the Philippines. However, over the years, the saturation of the frontier settlement and the changes in the structure of opportunities that allowed for greater participation of women in internal migration in the Philippines have

Appendix table A: Estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients for predictors by age segments for first migration

	Coeff (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
	Segment 0-24		Segment 24-48		Segment 48-72		Segment 72-96		Segment 96-120		Segment 120-144	
No. of cases	5,306		4,540		3,679		3,227		2,713		2,286	
% movers	50.8		44.2		36.6		30.0		24.6		20.6	
Intercept:	-0.8645		-0.9611		-1.1118		-1.2130		- 1.2155		- 1.406	
Residence:												
City	0.4357***	1.5460	0.4239***	1.5279	0.4026***	1.4957	0.4030***	1.4963	0.4753***	1.6085	0.4715***	1.6024
	(0.0730)		(0.0794)		(0.0905)		(0.1026)		(0.1198)		(0.1401)	
Town	0.5020***	1.6520	0.4.515***	1.5707	0.4539***	1.5744	0.4159***	1.5157	0.4194***	1.5210	0.4209***	1.5233
	(0.0659)		(0.0719)		(0.0814)		(0.0925)		(0.1075)		(0.1252)	
Education												
Primary to secondary	0.5892***	1.8025	0.4556**	1.5771	0.3648	1.4402	0.2605	1.2976	0.1499	1.1617	0.0540	1.0555
	(0.1687)		(0.1873)		(0.2059)		(0.2226)		(0.2358)		(0.2563)	
College	0.7870***	2.1968	0.6675***	1.9494	0.5913***	1.8063	0.4862*	1.6261	0.2685	1.3080	0.1362	1.1459
	(0.1699)		(0.1891)		(0.2079)		(0.2252)		(0.2404)		(0.2636)	

Appendix table A (continued)

	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
Parity												
1	-0.9093***	0.4028	-0.5877***	0.5556	-0.5050	0.6035	-0.5664*	0.5676	-0.5583**	0.5722	-0.8490***	0.4278
	(0.3284)		(0.1535)		(0.3545)		(0.2289)		(0.1953)		(0.2177)	
2-3	-1.4638	0.2314	-1.0459***	0.3514	-0.5222	0.5932	-0.3333	0.7166	-0.4385	0.6450	-0.7453***	0.4746
	(1.1082)		(0.3419)		(0.5349)		(0.3169)		(0.2505)		(0.2355)	
4 or more	- -	--	--	--	-0.8169	0.4418	-0.3752	0.6872	-0.2682	0.7648	-0.2412*	0.7857
					(0.9884)		(0.4568)		(0.3180)		(0.2776)	
Births:												
Within 2 yrs	--	--	–	--	-0.1977	0.8206	-0.0721	0.930	-0.2669	0.7657	-0.0879	0.9159
					(0.3573)		(0.2227)		(0.1725)			(0.1746)
Over 2yrs	--	--	--	--	0.1057	1.1115	-0.1704	0.8433	0.0010	1.0010	-0.2090	0.8114
					(0.3141)		(0.2018)		(0.1784)			(0.1737)
-2Log -L	7,217.10		6,102.27		4,815.63		3,829.78		2,933.12		2,234.21	
d.f.	5,299		4,532		3,759		3,217		2,703		2,276	

*Notes
* Significant at the .05 level;
** significant at the .01 level; and
*** significant at the .001 level.

Appendix table B: Estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients for predictors by age segments for second migration

	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
	Segment 0-24		Segment 24-48		Segment 48-72		Segment 72-96		Segment 96-120		Segment 120-144	
No. of cases	2,551		1,815		1,336		1,027		794		616	
% movers	55.5		45.8		36.1		27.9		24.3		19.5	
Intercept:	-0.7826		0.4726		0.3499		-0.3240		-0.2718		-0.2259	
Residence:												
City	-0.1340 (0.1081)	0.8746	-0.1504 (0.1319)	0.8604	-0.0581 (0.1593)	0.9436	0.0131 (0.1919)	1.0132	0.0696 (0.2319)	1.0721	-0.0481 (0.2898)	0.9530
Town	-0.0778 (0.0992)	1.0809	-0.0162 (0.1190)	1.0163	-0.0858 (0.1441)	1.0896	-0.1826 (0.1705)	1.2003	0.3156 (0.2031)	1.3711	0.4439 (0.2444)	1.5588
Education												
Primary to secondary	0.1795 (0.3159)	1.1966	0.2518 (0.4121)	1.2863	0.0840 (0.4708)	1.0876	0.2783 (0.5796)	1.3209	-0.0828 (0.5939)	0.9205	-0.6141 (0.6044)	0.5411
College	0.2507 (0.3172)	1.2849	0.4326 (0.4136)	1.5413	0.3059 (0.4729)	1.3578	0.5481 (0.5817)	1.7300	0.4330 (0.5972)	1.5419	-0.3522 (0.6120)	0.7031
Age: prior to move	-0.0110 (0.0010)	0.9891	-0.0083*** (0.0012)	0.9917	-0.0078** (0.0015)	0.9922	-0.0064*** (0.0017)	0.9936	-0.0075*** (0.0021)	0.9925	-0.0077** (0.0029)	0.9923

Appendix table B *(continued)*

	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
Parity												
1	-0.6288***	0.5332	-1.1576***	0.3142	-1.1141***	0.3282	-0.6240*	0.5358	-0.3496	0.7050	-0.5750	0.5627
	(0.1777)		(0.1313)		(0.2460)		(0.2624)		(0.3299)		(0.4522)	
2-3	-0.0017	0.9983	-0.9919***	0.3709	-0.9406**	0.3904	-1.1204***	0.3261	-1.2839***	0.2770	-1.3466***	0.2601
	(0.1822)		(0.1744)		(0.3288)		(0.3192)		(0.3418)		(0.3921)	
4 or more	-0.0212	0.9790	-0.4824	0.6173	-0.5920	0.5532	-0.7831*	0.4570	-0.8843*	0.4130	-1.3094*	0.2700
	(0.2378)		(0.2514)		(0.3805)		(0.3837)		(0.4020)		(0.4310)	
Births												
Within 2yrs	--	--	--	--	-0.0913	0.9127	-0.0116	0.9885	0.1611	1.1748	-0.0354	0.9652
					(0.2165)		(0.2124)		(0.2360)		(0.2549)	
Over 2yrs	--	--	--	--	-0.1555	0.8560	-0.0736	0.9290	-0.0422	0.9587	0.3543	1.4252
					(0.2056)		(0.2258)		(0.2396)		(0.2847)	
-2 Log -L	3,232.93		2,235.71		1,563.97		1,120.50		806.85		561.43	
d.f.	2,542		1,806		1,325		1,016		783		605	

* Notes
* Significant at .05 level;
** significant at .01 level; and
*** significant at .001 level.

Table 2b: Locale of residence by age segments for second migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

		Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
		Segment 0-24 (N= 2,551)		Segment 24-48 (N= 1,815)	
Residence:	City	-0.1340 (0.1081)	0.8746	-0.1504 (0.1319)	0.8604
	Town	0.0778 (0.0992)	1.0809	0.0162 (0.1190)	1.0163
		Segment 48-72 (N = 1,336)		Segment 72-96 (N= 1,027)	
Residence:	City	– 0.0581 (0.1593)	0.9436	0.0131 (0.1919)	1.0132
	Town	0.0858 (0.1441)	1.0896	0.1826 (0.1705)	1.2003
		segment 96-120 (N=794)		segment 120-144 (N= 616)	
Residence:	City	0.0696 (0.2319)	1.0721	– 0.0481 (0.2898)	0.9530
	Town	0.3156 (0.2031)	1.3711	0.4439 (0.2444)	1.5588

triggered a system of geographic mobility dominated by intra-urban migration (Eviota and Smith, 1983; Engracia and Herrin, 1984, Perez, 1985). Thus, the observed greater chances for spatial mobility of women in urban places appropriately reflects the changing configuration of the country's population redistribution concomitant with socio-economic development. Of significance to increased intra-urban mobility is the improved transportation system and road development that linked areas. This physical integration made travel easier. As is commonly true with other development programmes, road and transportation development was biased towards urban areas. This may have played a key role in the greater mobility of women in urban areas.

Table 3a: Educational by age segments for first migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

	Coeff. (SE)	Exp. coeff	Coeff. (SE)	Exp. coeff.
	Segment 0-24 (N= 5,306)		Segment 24-48 (N=4,540)	
Education:				
Primary to secondary	0.5892***	1.8025	0.4556***	1.5771
	(0.1687)		(0.1873)	
College	0.7870***	2.1968	0.6675***	1.9494
	(0.1699)		(0.1891)	
	Segment 48-72 (N = 3,760)		Segment 72-96 (N=3,227)	
Education:				
Primary to secondary	0.3648	1.4402	0.2605	1.2976
	(0.2059)		(0.2226)	
College	0.5913***	1.8063	0.4862*	1.6261
	(0.2079)		(0.2252)	
	Segment 96-120 (N = 2,713)		Segment 120-144 (N = 2,286)	
Education:				
Primary to secondary	0.1499	1.1617	0.0540	1.0555
	(0.2358)		(0.2563)	
College	0.2685	1.3080	0.1362	1.1459
	(0.2404)		(0.2636)	

Notes: * Significant at .05 level;
** significant at .0l level;
*** significant at .001 level.

Education

One of the most striking features of Filipino society is women's relatively easy access to educational opportunities. The migrant women in this study reported an average education of 10 years of formal schooling, which is equivalent to secondary education.

Table 3b: Education by age segments for second migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

	Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
	Segment 0-24 (N= 2,551)		Segment 24-48 (N=1,815)	
Education:				
Primary to secondary	0.1795	1.1966	0.2518	1.2863
	(0.3159)		(0.4121)	
College	0.2507	1.2849	0.4326	1.5413
	(0.3172)		(0.4136)	
	Segment 48-72 (N= 1,336)		Segment 72-96 (N=1,027)	
Education:				
Primaly to secondary	0.0840	1.0876	0.2783	1.3209
	(0.4708)		(0.5796)	
College	0.3059	1.3578	0.5481	1.7300
	(0.4729)		(0.5817)	
	Segment 96-120 (N=794)		Segment 120-144 (N=616)	
Education:				
Primaly to secondary	-0.0828	0.9205	- 0.6141	0.5411
	(0.5939)		(0.6044)	
College	0.4330	1.5419	-0.3522	0.7031
	(0.5972)		(0.6120)	

Data in tables 3a and 3b suggest a relatively strong positive and significant effect of education on the odds of moving a first time. This is particularly true among the younger women, i.e. those at age segments 0-24 and 24-48. For both segments, the chances of college-(or university-)educated women migrating were twice as high as those among women without schooling. Similarly, but to a lesser degree, the odds of moving for those with primary and secondary education was 80 per cent and 58 per cent greater, respectively, than those for uneducated women.

This finding, however, should be interpreted with caution. Recalling that the educational attainment assigned to women at risk of making the first move was as of the survey date, what is reflected at the start of the migration interval is a subsequent educational attainment rather than the actual schooling obtained, which is, on average, six to seven years in the Philippines. Therefore, one can make inferences with regard to the education obtained as of age 15, or at the onset of the risk of migrating the first time. Those captured as having a college education in age segment 0-24 would have gained about eight to nine years of schooling while those captured as having a primary and secondary education are those with six to seven years of schooling. These inferences about education still suggest a positive effect of education on the odds of a first migration.

For the second migration, it is worth noting that the distinctly strong positive effect of a college education at the youngest age segment was reduced. This may be attributed to the fact that the educational attainment assigned at the start of the migration interval closed by a second move is as of the start of the spell. Additionally, the effect of primary and secondary education on the odds of migrating again is not nearly as strong as its effect on the odds of a first migration. In fact, at the older ages, i.e. age segments 96-120 and 120-144, the chances for a repeat migration among those with primary and secondary education are lower by 8 per cent and 46 per cent, respectively, than the chances for a second migration by those without schooling. The same observation holds for the college-educated women at the oldest age segment who exhibit odds of migrating 30 per cent less than those without education.

Given the reversal of the effect of education for the last two age segments where educational attainment at the start of the segment is more accurate, one can argue that the positive selection associated with a first move may not be applicable for repeat migration. This is particularly true for the older women who have presumably ended their schooling.

This finding is consistent with the earlier findings on the greater odds for repeat migration among those in rural areas and towns than those in cities. This implies educational differentials across groups of women defined by type of residence. In a country where institutions for better education are heavily concentrated in cities, such differentials are expected. It is no wonder then that the better-educated, especially among the older women, are less likely to be engaged in repeat migration. This suggests that the subsequent moves are undertaken by the less educated who may not have achieved their migration goals. Presumably, the relatively better-informed migration decisions of the better-educated account for their less frequent but probably more successful and satisfactory migrations as against the rela-

Table 4a: Education by age segments for first migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

		Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
		Segment 0-24 (N=5,306)		Segment 24-48 (N=4,540)	
Births:	Within 2yrs				
	Over 2yrs	--	--	--	--
		Segment 48-72 (N=3,769)		Segment 72-96 (N = 3,227)	
Births:	Within 2yrs	- 0.1977 (0.3573)	0.8206	- 0.0721 (0.2227)	0.9304
	Over 2yrs	0.1057 (0.3141)	1.1115	-0.1704 (0.2018)	0.8433
		Segment 96-120 (N=2,713)		Segment 120-144 (N= 2,286)	
Births:	Within 2yrs	- 0.2669 (0.1725)	0.7657	- 0.0879 (0.1746)	0.9159
	Over 2yrs	0.0010 (0.1784)	1.0010	- 0.2090 (0.1737)	0.8114

tively more frequent, perhaps less successful and unsatisfactory migrations by the less educated.

Age at prior move

It is widely accepted that age has a clear differentiating effect on the likelihood of moving. In terms of exposure to the risk of moving again, those who made their first migration at earlier ages are expected to have longer durations of exposure to the next migration. Since spatial mobility peaks around the younger ages, it is expected that the younger women who made their first moves at earlier ages are more likely to make a second move than the older women. This is similar to the notion that the mother's age at birth of her first child determines, to a large extent, the age at which her child-bearing will cease.

Table 4b: Age at prior move and timing of births by age segments for second migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

		Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
		Segment 0-24 (N=2,551)		**Segment 24-48 (N = 1,815)**	
Age: prior move		- 0.0110 (0.0010)	0.9891	- 0.0083*** (0.0012)	0.9917
Birth:	**Within 2yrs**	--	--	--	--
	Over 2yrs	--	--	--	--
		Segment 48-72 (N = 1,336)		**Segment 72-96 (N = 1,027)**	
Age: prior move		-0.0078*** (0.0015)	0.9922	- 0.0064*** (0.0017)	0.9936
Birth:	**Within 2 yrs**	– 0.0913 (0.2165)	0.9127	- 0.0116 (0.2124)	0.9885
	Over 2yrs	–0.1555 (0.2056)	0.8560	-0.0736 (0.2258)	0.9290
		Segment 96-120 (N=794)		**Segment 120-144 (N = 616)**	
Age: prior move		-0.0075*** (0.0021)	0.9925	-0.0077*** (0.0028)	0.9923
Births:	**Within 2yrs**	0.1611 (0.2360)	1.1748	- 0.0354 (0.2549)	0.9652
	Over 2yrs	– 0.0422 (0.2396)	0.9587	0.3543 (0.2847)	1.4252

Notes: * Significant at .05 level;
** significant at .01 level; and
*** significant at .001 level.

Data in table 4b show that the negative effect of age at prior move, here indexed by the age at first migration, is highly significant for all age segments. However, the logit coefficients are rather insubstantial in size.

Note that for all age segments, the odds of moving is diminished by one per cent for every year of increase in a women's age at first migration. As expected, the redution in the odds of a second move for women at the youngest age segment is slightly, but not significantly, more than the reductions in the odds of a second move for those in the later age segments. Nevertheless, evidence for the hypothesized effect of age at prior move is in the expected direction.

Timing of births

The estimated effects of the timing of births on risks of moving are shown in tables 4a and 4b. This analysis considers only the reported live births. Other pregnancies, though terminating in wastage, can have an impact on the women's propensity to migrate, but are altogether overlooked. Because it is remotely possible for those at the two youngest age segments to have had experienced recent or earlier births, estimates of the effects of the timing of births are only for age segment 48-72 and up. Given what is available, it is clear that the timing of the births exerts mostly negative effects on the odds of migration.

In general, the effect of more recent births, i.e. those occurring two or more years from start of the segment, on the risks of a first migration is less clear. However, its effect on the odds of a second migration is consistently negative for most age segments, except for the oldest segment. It is strongest for the youngest age segment. The chances for a repeat migration among those with births occurring farther away from the start of segment 48-72 is 85 per cent of the odds of migration for those not having any births. Note that this decrease in odds tends to diminish across age segments. In fact, the occurrence of earlier births at the start of the oldest segment is associated with an increase in the odds of migration of 43 per cent relative to those without births. This suggests that whatever disruptive effects births bear on migration diminishes over time, perhaps superseded by other family circumstances and needs as mothers go through the different stages of rearing children.

Of particular interest is the greater negative effect of an earlier birth (.8560) than a more recent birth (.9127) at the youngest age segment. This implies that the biological impediments to mobility arising from recent births are not as strong as the other factors linked with raising children captured by earlier births. At least this seems to be the case for the two younger segments. On the whole, both the hypothesized short-run and the long-run negative effects of recent fertility on migration put forward in a previous section are empirically substantiated.

Parity

Central to the analysis is the question of how the number of children a woman has affects her propensity to migrate. Data in tables 5a and 5b present evidence of a negative effect of parity on migration, supported by logit coefficients that are relatively large in size for all age segments and that are, for most segments, statistically significant. More specifically, the more are the number of children, the larger is the decrease in the chances of migration.

For the first migration, it is revealed that, at the youngest age segment, the odds of moving for women with one child is 60 per cent less compared with women without children. For women with two to three children, the odds are reduced further to 77 per cent less than the odds of moving for those without children. Much the same can be said of the next two age segments. By contrast, the negative effect of parity decreases as the number of children increases for the last two segments. At the oldest age segment, having one child reduces the chances of moving to 43 per cent of the odds of moving associated with not having a child. Having four or more children, on the other hand, is associated with an odds of migrating that is 79 per cent of the odds of moving for women without children. Implied by the contrasting pattern of the effect on the odds of moving for the youngest and the oldest age segments is that, over time, the constraints to migration posed by transitions to higher parity are brought down. A plausible explanation is that, with the "ageing" of more children, a pool of labour force necessary to conduct daily household activities becomes available. This in turn increases the likelihood of migration of women at older ages even if characterized by higher parity which can tie her to the home. It should be borne in mind, however, that the negative impact of parity on the odds of a first migration remain despite the increase in the chances of moving observed at older ages.

The effect of parity on the chances of a second move is not as clear as that obtained for the first migration. But the negetive effect, now of lesser magnitude, still persists. The pattern obtained for the oldest age segment in the model for first migration is similarly observed for the first two segments of the second migration. At segment 0-24, the chances of migration for those with one child is 47 per cent less than the odds of moving for those without children. However, the odds of moving for those with four or more children is only 2 per cent less than the odds for those without children. The diminished inhibiting effect on migration as number of children increases is also true for the next segment. Estimates for the older segments are not as stable owing to the depleted sample, but they still yield the same pattern.

Table 5a: Parity by age segments for first migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

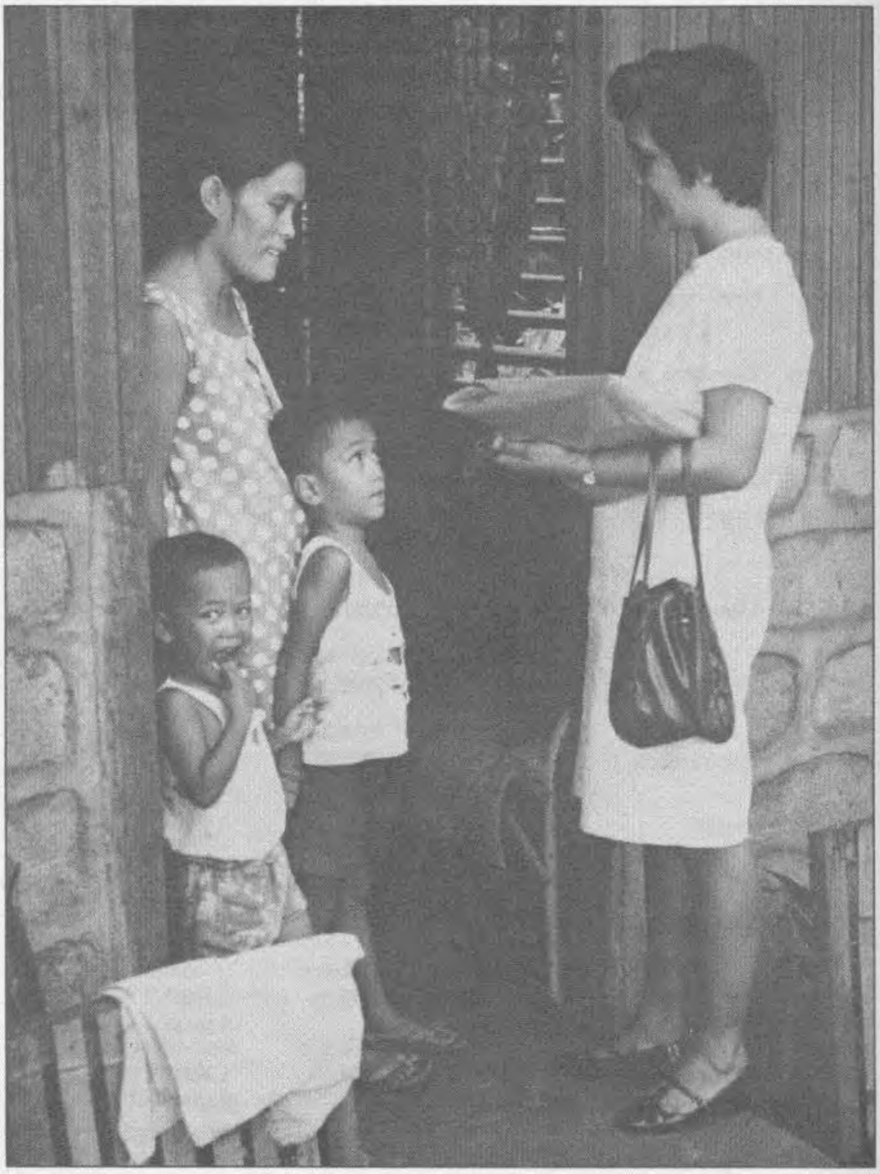
		Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
		Segment 0-24 (N=5,306)		Segment 24-48 (N=4,540)	
Parity:	One	– 0.9093*** (0.3284)	0.4028	– 0.5877*** (0.1535)	0.5556
	Two-three	– 1.4638 (1.1082)	0.2314	– 1.0459*** (0.3419)	0.3514
	Four or more	– –	– –	– –	– –
		Segment 48-72 (N=3,769)		Segment 72-96 (N=3,227)	
Parity:	One	– 0.5050 (0.3545)	0.6035	– 0.5664* (0.2289)	0.5676
	Two-three	– 0.5223 (0.5349)	0.5932	– 0.3333 (0.2355)	0.7166
	Four or more	– 0.8169 (0.9884)	0.4418	– 0.3752 (0.4568)	0.6872
		Segment 96-120 (N = 2,713)		Segment 120-144 (N=2,286)	
Parity:	One	– 0.5583** (0.1953)	0.5722	-0.8490*** (0.2177)	0.4278
	Two-three	– 0.4385 (0.2505)	0.6450	-0.7453*** (0.3169)	0.4746
	Four or more	– 0.2682 (0.3180)	0.7648	-0.2412* (0.2776)	0.7857

Notes: * Significant at .05 level;
** significant at .05 level; and
*** significant at .001 level.

Table 5b: Parity by age segments for second migration: estimates of logistic regression coefficients, standard error (SE) and exponentiated coefficients

		Coeff. (SE)	Exp. coeff.	Coeff. (SE)	Exp. coeff.
		Segment 0-24 (N=2,551)		Segment 24-48 (N = 1,815)	
Parity:	One	-0.6288***	0.5332	- 1.1576	0.3142
		(0.1777)		(0.1313)	
	Two-three	-0.0017	0.9983	- 0.9919***	0.3709
		(0.1822)		(0.1744)	
	Four or more	- 0.0212	0.9790	- 0.4824	0.6173
		(0.2378)		(0.2514)	
		Segment 48-72 (N=1,336)		Segment 72-96 (N= 1,027)	
Parity:	One	- 1.1141***	0.3282	- 0.6240*	0.5358
		(0.2460)		(0.2624)	
	Two-three	-0.9406**	0.3904	-1.1204***	0.3261
		(0.3288)		(0.3192)	
	Four or more	-0.5920	0.5532	-0.7831*	0.4570
		(0.3805)		(0.3837)	
		Segment 96-120 (N=794)		Segment 120-144 (N = 616)	
Parity:	One	- 0.3496	0.7050	-0.5750	0.5627
		(0.3299)		(0.4522)	
	Two-three	-1.2839***	0.2770	-1.3466***	0.2601
		(0.3418)		(0.3921)	
	Four or more	-0.8843*	0.4130	-1.3094**	0.2700
		(0.4020)		(0.4310)	

Notes: * Significant at.05 level;
** significant at .01 level; and
*** significant at .001 level.



Child-rearing is one aspect of family formation which inherently determines the kinds of ties that bind families to their community of residence and which affect the likelihood of women migrating.

Note the reversal in the pattern of the mobility probability from age segment 72-96 onwards, indicating an increase in the probability for a repeat migration at higher parity among older women. However, despite the increased probability of migrating at higher parity among the older women, the negative effect of number of children on migration still remains.

Overall, the hypothesized effect of parity on migration is supported by the present data. This inhibiting effect may be interpreted within an adaptation perspective, with emphasis on the role of the non-monetary costs of migration.

There is general agreement that family development, i.e. changes in both numbers and age composition of members (particularly of children), involves patterns of change resulting in unique familial conditionand circumstances. The presence of four or more children may be viewed as an indirect indicator of the presence of "growing up" children. The restrictive effect that rearing children has on migration can extend to a prolonged period of time. Transitions to higher parity are viewed here as progression towards building family roots. Such root formation can effectively deter migration since residential location determines the kinds of companions that children will have and the kinds of school they will attend.

Child-rearing is one aspect of family formation which inherently determines the kinds of ties that bind families to their community of residence. Thus, more children would mean greater community ties, which translates into diminished likelihood of migration among women with more children relative to those with fewer children and those without children.

The adaptation effects of parity on migration can be stated as follows: the lower the propensity to migrate by women at higher parity is part of an adaptive strategy to cope with second-generation needs, particularly children's socialization. On top of this is the greater cost of relocating associated with more children, which can effectively attenuate migration in view of the long-distance nature of migration in the Philippines. Added to, this is the socialization of the Filipino wife, which impinges on her spatial mobility behaviour, i.e. once married and with children, home is "her place" and housekeeping her task. This is further reinforced by the increased probability of migrating at higher parity among older women. This implies that older mothers at higher parity are in a stage of the family life-cycle where the demands on their time for child-care and other household chores are relatively less than the demands on the time of younger mothers.

Conclusion and policy implications

The methodological approach in this analysis has shown that the relations examined can vary and that the size of the effects and even the direction of the effects of the same covariate can differ across age segments. The hypothesized effects of the covariates, in particular the effects of cumulative and recent fertility on the odds of migration, are supported. As gleaned from the results, an important factor that needs to be addressed with more direct measures in future analyses are the ages of the children. The proposition that the diminishing tendency to migrate with increasing numbers of children and with the occurrence of births can be strengthened with the inclusion of this variable in the equations. The applicability of some theoretical arguments commonly employed in past studies of the effects of migration on fertility has been shown to hold for the study of the effects of fertility on mobility. Most importantly, this analysis offers important policy recommendations based on the finding that pre-migration fertility inhibits migration and somehoe poses a barrier to women's access to the benefits accruing from spatial mobility.

The emerging theme in this analysis of the effects of fertility on women's spatial mobility in the Philippines is the centrality of the married women's child-bearing and child-rearing functions that inhibit their geographic mobility in both disruption and adaptation perspectives. The added roles of child-bearing and child-rearing, which marriage endows women with, should not interfere with their access to the benefits derived from spatial mobility, if and when desired. If they do, measures that would help to keep the barriers to women's spatial mobility to a minimum should be adopted.

In so far as marriage is a prerequisite to child-bearing for the majority of women in the Philippines, an increase in the female age at marriage through legal reforms seems compatible with exploring interests beyond the family and child-bearing, which spatial mobility is believed to promote. It is also possible that delayed marriage can assure individual women that they could take such interests with them into married life. Hopefully, such interests can modify their fertility preference and behaviour in a way that would not hinder spatial mobility when desired. Within marriage, it is important that the interval between marriage and first birth as well as for subsequent births must be lengthened to allow for increased chances of migration, should it be desired. Provision of more effective fertility regulation services that could smooth out the demands of child-bearing and child-rearing over a woman's life-cycle would be worth undertaking by both the Government and its cooperating agencies.

These recommendations are premised on the fact that, in the Philip pine context, the spatial mobility of women, among other social processes, is beneficial not only to individual females but also to their kin. For a country with a distinctly young population and what may be an enduring penchant for spatial mobility, the challenge facing Philippine population policy makers is the promotion of fertility behaviour and practices conducive to and consistent with spatial mobility goals. Furthermore, the findings illustrate the close relationship between population growth and population distribution policies which are most often artificially distinguished in national development plans.

Footnotes

1. The areal units which constitute the spatial hierarchy in ascending order in the Philippines are defined as follows: a *barangay* is the smallest recognizable political area; a *poblacion* is usually the centre of a "municipality" and is commonly the site of the administrative government agencies; the city and the municipality are the autonomous units that make up a "province", derived from the Spanish word *provincia.* The province is the larger administrative subdivision; when provinces are grouped together based on geographic proximity and socioeconomic integration, they form a "region".

2. The logit model is of the following form: **Log (p/(1-P)) = Xb** where "X" is a matrix of predictors and **"b"** is the vector of parameters to be estimated.

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Demographic Health Survey : Xay Thani District of Vientiane Prefecture, Lao People's Democratic Republic

There appears to be a large, latent, unmet need for modern contraceptive spacing methods

By Peter J. Foley and Davone Vongsak*

This article contains a sectoral demographic and health survey primarily intended to give policy makers concrete data on the demographic and health situation in Xay Thani district, which is located within a 30-60 kilometre radius of Vientiane, capital city of the Lao People's Democratic Republic (Lao PDR).

* **The authors of this article are Peter Foley, Senior Researcher, International Committee on Applied Research in Population (ICARP) Asia, and Davone Vongsak, Vice President, Lao Women's Union. This study was conducted during June through August 1991.**

There are 123 villages in Xay Thani, the total population of which is approximately 200,000. Thirty villages were selected in a proportional probabiity random sampling. Lists of married women of reproductive age (MWRA) for each village selected were used to sample systematically these women aged 15 to 44 years old. The questionnaire was modelled after the DHS (Demographic and Health Surveys) administered by IRD (the Institute for Resource Development). The sample size was 1,608. Tests of sample error of the sample mean and standard error of the sample proportions at the 95 per cent confidence interval for the sets of data presented below indicate a small range of error. The data presented, therefore, can be taken to represent the demographic and health situation of Xay Thani district.

Given Xay Thani's close proximity to the capital and therefore the

Table 1: Frequencies of married women of reproductive age according to possession of selected household items

Indicator	Frequency	%
Have electricity?		
Yes	953	59.4
No	649	40.4
Have radio?		
Yes	887	55.4
No	715	44.6
Have television?		
Yes	403	25.2
No	1,197	74.8
Have refrigerator?		
Yes	145	9.1
No	1,454	90.9
Have bicycle?		
Yes	1,146	71.4
No	458	28.6
Have motorcycle?		
Yes	205	12.8
No	1,398	87.2
Have car?		
Yes	27	1.7
No	1,574	98.3

Table 2: Percentage distribution of married women of reproductive age by husband's occupation and respondent's occupation

Occupation	Husband %	Wife %
Government employee	22.7	5.8
Private employee	6.4	1.1
Farmer	61.6	67.4
Labourer	6.5	1.2
Shopkeeper	1.0	6.2
Other	1.8	18.3
	N = 1,588	N= 1,593

availability of health and social services not available in many other parts of Lao PDR, the social, economic and health conditions in Xay Thani are likely to be better than in most areas of the country. For example, Xay Thani has a paved road that circles around the district. There is a regular bus service. The District Hospital is located along this paved road. Many goods, including contraceptives, come from neighbouring Thailand and can be found in the local markets. The extent of the difference between Vientiane and the rest of Lao PDR is typified by the ratio of population per physician. The United Nations Development Programme (UNDP) lists Vientiane's ratio of one doctor per 1,400 persons, whereas for the rest of the country, there was only one doctor per 12,600 people in the year 1989.

Thus, findings of the DHS may be taken as a best-case scenario of conditions in Lao PDR. Nevertheless, table 1 shows that 85 per cent of the Xay Thani population are without motor transport and 40 per cent are without electricity.

Although Xay Thani is within Vientiane prefecture, table 2 shows that over 60 per cent of the community are involved in farming.

The mean age of the respondents was 29 years. The age distribution is shown in table 3 on the next page.

Questions concerning respondents' abiity to read a newspaper and those about the level of education produced nearly identical profdes of the population. The survey found that approximately 81 per cent of the MWRA respondents could read a newspaper. The 19 per cent who were unable to read corresponds to the percentage of MWRA with no formal education.

Table 3: Percentage distribution of married women of reproductive age, by age group

Age group (years)	%
15-19	5.1
20-24	20.9
25-29	27.3
30-34	22.4
35-39	16.6
40-44	7.7
Total	100

N = 1,605

Table 4: Percentage distribution of married women of reproductive age, by number of years of formal education

Years of education	% married women
None	19.1
1-4	35.5
5-8	35.2
9+	10.2
Total	100

N=1,605

Table 5: Percentage distribution of married women of reproductive age according to years of formal education, by age group

Age group	Educationa1 level (years)			
(years)	None	1-4	5-8	9+
15-19	9.8	34.1	50.0	6.1
20-24	5.7	27.8	49.8	16.7
25-29	11.4	32.9	41.8	13.9
30-34	19.8	42.6	29.5	8.1
35-39	37.1	40.4	17.6	4.9
40-44	47.6	34.7	16.9	0.8

N = 1,605

Interestingly, there is a marked disparity between levels of education among age groups. That 87 per cent of the 35-39-year-old age group and 48 per cent of the 40-44-year-old age group are without any formal education is noteworthy. Based on both the levels of education and the ability to read a newspaper, the estimated literacy rate is 80 per cent among Xay Thani's MWRA.

This literacy rate is in sharp contrast UNDP's estimate of adult literacy for Laotian females being 35 per cent in 1989. In Xay Thani at least, it appears that the majority of MWRA have the potential to educate themselves through reading. Another potential source of education in Xay Thani is through radio and television where the survey found that 55 per cent of the respondents owned radios and 25 per cent owned televisions. Importantly, 85 per cent of the MWRA responding said they found it acceptable for "family planning information to be provided on radio or television".

These potential sources of education could be useful in helping MWRA acquire vital information to stem the high infant mortality rate (the UNDP estimate for Lao PDR was 117 per thousand in 1988) by using contraceptive spacing methods and treating their children with oral rehydration therapy (ORT). The survey results illustrate this point. Data indicate an infant mortality rate of 143 per thousand and a current diarrhoea rate for the youngest children of 12 per cent, but with only one fourth of mothers using ORT to treat children with diarrhoea.

The table below shows a high fertility rate among the older women and the corresponding rate of living children indicates a high child mortality

Table 6: Mean number of live births and mean number of living children by age group

Age group (years)	Mean live births	Mean living children
< l9	1.25	1.09
20-24	2.25	2.00
25-29	3.47	3.10
30-34	5.31	4.57
35-39	6.58	5.71
40-44	7.91	6.86
All	4.37	3.82

N= 1,545

Table 7: Percentage of married women of reproductive age who responded correctly to tbe question on wben in the ovulation cycle was the safe period, by age group

Age group (years)	% correct response
15-19	12.7
20-24	16.0
25-29	14.4
30-34	17.4
35-39	15.4
40-44	17.9

N = 1,594

rate. Although an infant mortality rate cannot be determined from these data, the expected rate in all likelihood should be high. In any case, unless bii spacing practices increase, i.e. the contraceptive prevalence rate (CPR), a high rate of fertility and a correspondingly high rate of child mortality will continue.

Knowledge of reproductive fertility is very low. Approximately 86 per cent of Xay Thani's MWRA do not know at what point during their monthly cycle they have the greatest chance of becoming pregnant. This lack of knowledge is consistent throughout the age groups listed in table 7.

The MWRA are equally ill-informed about contraceptives, as can be observed from table 8. Three quarters or more of the MWRA of Xay Thani have no knowledge of IUDs, condoms, tubectomy, vasectomy, periodic abstinence or withdrawal, as preventatives of pregnancies. For oral pills, those not knowing the method was 65 per cent. Knowledge of where to get modern contraceptive methods was almost negligible, with over 84 per cent or more of the women not knowing where to obtain the contraceptive methods listed in table 8.

It is not unexpected, therefore, that the survey found that the CPR for Xay Thani to be 17.6 per cent for modern contraceptive methods (pill = 9.3; IUD = 3.0; injectable = 4.1; and others = 1.2 per cent) and 20.4 per cent for any method. Nor was it surprising to learn that 17 per cent of the MWRA interviewed were pregnant with an additional 3 per cent not sure.

Table 8: Percentage of married women of reproductive age knowing specific contraceptive method and percentage of ever use of a method

Family planning method	% knowledge of method	% ever use of method
Pill	35.3	13.6
IUD	23.1	4.7
Injectable	25.7	5.8
Condom	16.0	1.2
Tubectomy	19.8	1.9
Vasectomy	16.3	0.4
Abstinence	15.5	3.6
Withdrawal	12.1	1.1
Other	18.7	6.3

N = 1,595

Table 9: Percentage distribution of married women of reproductive age responded as to where to obtain modern contraceptives

Supply sources	% MWRA response
Government hospital	2.7
Government health centre	0.1
Family planning clinic	0.2
Private doctor	2.2
Private hospital	1.0
Drug-store/pharmacy	8.2
Friends/relatives	1.1
Other	0.1
Do not know	84.4
Total	**100**

N = 1,605

Table 10: Percentage of married women of reproductive age who are current contraceptive users and who are users of a modern method, by age group

Age group (years)	% use of any method	% use of modem method
< 19	3.6	1.8
20-24	13.2	12.1
25-29	23.3	20.8
30-34	22.3	18.5
35-39	23.8	20.3
40-44	24.5	20.9
	N = 1,349	N=1,349

Table 10 indicates that married women below 20 years of age rarely use contraceptives. The 20-24-year-old cohort shows a CPR for modern contraceptive methods of only 12.1 per cent. The proportion of contraceptive use increases with the age of the MWRA.

Further evidence of a latent demand for family planning methods, particularly from women over 30 years -- of whom over 70 per cent do not want to be pregnant -- is indicated in table 11. The very high percentage of the 15-19-year old MWRA who want to be pregnant is noteworthy.

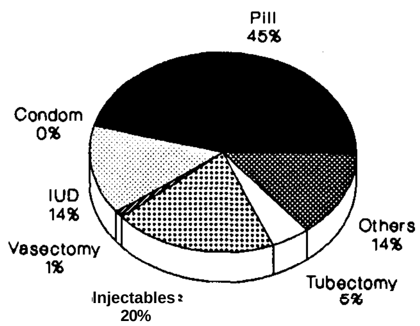
On the other hand, 71 per cent of the MWRA wanted a total of three children or more and the mean number of wanted children was almost five.

Table 11: Percentage of married women of reproductive age who desire to become pregnant, by age group

Age group (years)	% yes	% no	% unsure
15-19	43.0	44.3	12.7
20-24	29.4	57.4	13.2
25-29	26.8	64.6	8.7
30-34	21.3	70.5	8.2
35-39	22.3	71.2	6.5
40-44	21.1	73.2	5.7

N=l,566

Breakdown of current users by method



N = 277

This desire for so many children may be partially the result of a high infant mortality rate. Birth spacing could be a major factor in reducing this mortality rate while at the same time improving maternal health. Encouraging the 15-19-year-old age group to delay a first pregnancy (see table 11) would also have a positive impact on maternal and child health. The desire for spacing is strongly indicated in the finding that 75 per cent of the MWRA said that they intended to use a family planning method to avoid pregnancy at some time in the future.

Other important family health interventions are improved clean water supply and toilet facilities. In addition to the questionable purity of the majority of the population's water supply as impediments to family health, the survey also found that 58 per cent of the respondents reported having no toilet facilities.

Out of the 1,510 responses, only 6 per cent of the MWRA reported having no children under six years old. Although two thirds of the MWRA having children below six said they had health cards for their children, there were 766 missing cases.

More significant is the finding that 35 per cent of the MWRA said that their youngest child had not been given a vaccination to prevent disease.

Table 12: Percentage distribution of married women of reproductive age by source of drinking water and source of household water

Water source %	Drinking water %	Household water %
Rainwater	1.3	1.2
Well with cover	3.8	3.8
Well without cover	87.3	82.3
Piped into residence	3.2	3.1
Public tap	2.6	2.5
River or canal	1.7	7.1
Other	0.1	0
Total	100	100
	N = 1,595	N= 1,585

Table 13: Percentage distribution of married women of reproductive age according to practice of boiling water before consumption

Response	%
Yes	84.0
No	12.3

N = 1,546

Table 14: Percentage distribution of married women of reproductive age by type of toilet facilities used

Type	%
Flush	1.2
Septic tank	21.6
Latrine	18.0
None	58.1
Other	1.1
Total	100

N = 1,600

Table 15: Percentage distribution of married women of reproductive age by number of children whose age is below six years

No. of children	%
0	6.4
1	33.6
2	45.1
3	13.8
4+	1.1
Total	100

N = 1,510

Table 16: Percentage distribution of married women of reproductive age who possess health card for youngest child under six years of age

Responses	%
Yes, card seen	21.3
Yes, card not seen	46.0
Do not know	32.1
Total	100

N = 839

Table 17: Percentage distribution of married women of reproductive age whose youngest child ever had vaccination to prevent him/her from getting disease

Response	%
Yes	63.4
No	35.0
Do not know	1.6
Total	100

N = 1,356

In Xay Thani district of the Lao People's Democratic Republic, the primary impediment to family planning using modern methods is the lack of knowledge about contraceptive methods and where to get them. (Photo courtesy of J. Danois)

In summary, the DHS of Xay Thani indicates a pressing need for education and provision of birth spacing methods, safe drinking water and sanitation in order to improve family health.

The data presented suggest that policy makers might consider development programmes that focus on latrine construction, digging covered wells or providing other means for supplying clean drinking water, and instituting literacy programmes. The high rate of illiteracy among the 35-44-year-old age group highlights the need for an adult literacy programme. The data further suggest that there is a large, latent, unmet need for modern contraceptive spacing methods in Lao PDR. There appears to be little objection to modern contraceptive methods and a desire by the vast majority of the women of Xay Thani to delay pregnancy in the future. The survey found that a primary impediment to family planning using modern methods was the lack of knowledge about contraceptive methods and where to get modern contraceptives. A comprehensive family planning programme might also be considered in order to overcome this obstacle.

The Demographic Situation in Cambodia *

The population of Cambodia will reach 9.0 million in 1992. It is estimated to be currently growing at a rate near 2.5 per cent per annum, or an absolute increase of about 220,000 persons a year, according to the Department of Statistics (DOS), Ministry of Planning, Government of Cambodia.

Among the population aged 18-64 years, there are only 80 males per 100 females. The deficit of males results in at least 20 per cent of adult females being single, widowed, separated or divorced. Half the population is under age 17 as a result of high fertility rates since 1980. The infant mortality rate has been estimated to equal 116 per thousand live births. A total of 170,000 persons are internally displaced, and about 350,000 are in camps along the country's western border.

The United Nations (1991) projects the mid-1992 population to be 8.6 million and expanding at an annual rate of 2.2 per cent. Although the DOS figure is only 4.5 per cent greater than the United Nations figure, the latter is influenced by the former and the impression of accuracy given by their similarity is essentially spurious.

Ministry of Health and United Nations estimates indicate that mortality is high in Cambodia, with a crude death rate of about 15 per thousand population and the infant mortality rate well over 100 per thousand live births. Fertility is relatively high, with the crude birth rate probably close to 40 per thousand. All of these figures are actually only reasonable assumptions, however, and not based on any existing data. During the period 1970-1979, statistical work came to a complete stop. Most, if not all, statistical documents were destroyed. Nonetheless, the aforementioned rates are discussed in more detail hereinafter.

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* **From a report on a Demographic and Statistical Assessment Mission to Cambodia, 31 October – 13 November 1991, prepared by Jerrold W. Huguet, Population Affairs Officer, Population Division, ESCAP.**

While the methodologies employed by DOS and the United Nations to estimate the past and current population should have excluded most of the population currently in camps in Thailand, it is likely that the DOS estimates do not do so entirely, as discussed below.

The Government of the-then People's Republic of Kampuchea carried out a population count in 1980. The count is described by DOS as a general population survey, but it was probably more of an administrative count, with communes reporting their population to districts, districts to provinces, and provinces to the national Government. Cambodia currently has 19 provinces and two municipalities. Each province is divided into districts, and the districts are divided into communes. Each commune has several villages. As a result of the administrative requirements and set-up of the country, a wide range of information and data is available. However, only a part of this statistical information is being collected, processed and analyzed in a systematic manner, and not all the processed and analyzed data are published and disseminated (Al-Akel, 1991).

The total population was reported to equal 6.40 million, but Muscat and Stromseth (1990) reason that the figure may well have been inflated by local offcials because access to resources distributed by Phnom Penh was based partially on the population in their jurisdiction. Nonetheless, the United Nations bases its projection of the population of Cambodia on the figure of 6.48 million in 1980, with no new data since that date, but with birth and death rates that are assumed to be reasonable. The data provided by the Department of Statistics are also projections from 1980, but using a figure of 6.50 million for mid-year. DOS has projected the population to 1990 by increasing it by 2.8 per cent each year (equivalent to an exponential growth rate of 2.76 per cent a year). It has then projected the population to the year 2000 by applying annual increments of 2.5 per cent (an exponential growth rate of 2.47 per cent). The basis for the growth rate of 2.8 per cent assumed for the period 1980-1990 is a demographic survey conducted by the Ministry of Health in 1982 that showed a crude birth rate (CBR) of 45.6 and a crude death rate (CDR) of 17.6, but no documentation for these rates or the methodology of the survey had been provided to the Mission.

For comparison, in its projection for the period 1980-1985, the United Nations assumed a CBR of 45.5, a CDR of 19.7 and a growth rate of 2.59 per cent a year. For the period 1985-1990, it assumed a CBR of 41.4, a CDR of 16.6 and a growth rate of 2.48 per cent a year. It must be emphasised that these figures are merely plausible estimates, and are not based on any reported data. The reduced growth rate of 2.5 per cent assumed by DOS for its projections between 1990 and 2000 is not substantiated by any data. The impression of a declining growth rate is derived from survey data, such as those reported for Takeo province, as follows:

Year	CBR	CDR	Growth rate (%)
1981	47	7	4.0
1984	31	7	2.4
1987	24.2	5.8	1.84
1989	21	3.8	1.72

Two observations are in order concerning these figures. First, it is not clear if the data are from a sample survey, or if they are from registration data for a sample of communes within the province. Second, the reported CBR implies that about one-third of all births were not reported (at least since 1984), and at least half of all deaths were not reported (relative to the United Nations estimates). With these levels of incomplete reporting, it is not possible to make any valid inference regarding the natural growth rate, which is the difference between the birth and death rates.

As Takeo is a province near Phnom Penh and should enjoy certain administrative advantages as a result, such survey results would seem to imply that population data have virtually no validity, and information about more remote provinces must be essentially non-existent.

For comparison, the United Nations assumes a CBR of 36.5, a CDR of 14.6 and a growth rate of 2.20 per cent in its medium variant for the period 1990-1995. The United Nations indicates the degree of uncertainty of these figures, however, by assuming a growth rate of 2.62 per cent for the same period in the high variant, and 2.03 per cent in the low variant.

It is possible that the estimates of both DOS and the United Nations are too high. The Cambodian demographer, Ea Meng-Try, in an article in ***Population and Development Review*** cited by Muscat and Stromseth (1990), placed the 1980 population at 6.1 million and estimated that the CBR was 35, the CDR was 15, and the growth rate was 2.0 per cent.

The demographic recovery in Cambodia was apparently much stronger than foreseen by Ea, however. Were the rates estimated by him maintained for five years, the proportion in the 0-4 age group could not be over 15 per cent, but UNICEF (1988) estimated that proportion to be 20.5 per cent in 1987, which would require a CBR of at least 47 per thousand.

In sum, there currently is no reliable basis for estimating the population size and growth rate, or birth and death rates in Cambodia. Assumptions about plausible figures, however, indicate that the population will reach 9.0 million in 1992, excluding about 170,000 Cambodians and their children who were in Thailand prior to the population count in 1980. Reasonable estimates would place the CBR around 40 (with a likely range from 35 to 45), the CDR near 15, and the growth rate at approximately 2.5 per cent a year. The infant mortality rate remains high; the United Nations (1991) projects it to equal 116 per thousand live births for the period 1990-1995.

In October 1991, there were 350,000 Cambodians in camps in Thailand. The number not included in the population projections for the country is estimated as follows. In 1989, the camp population equalled 285,000 and a survey by Lynch (1989) indicated that two-thirds of the adult population had arrived at the border in 1980 or before. The survey also found that 63.3 per cent, or 180,000, were age 10 and over, i.e. they were born during or before 1980. Thus, 120,000 persons in the camps had moved to the border before the population count and were presumably not included. Assuming a rate of natural increase of 3.0 per cent a year, the population not included in the projections of the Cambodian population will have expanded to 172,000 in 1992.

Sex and age composition

The population count in 1980 recorded the age of the population, but a detailed breakdown has not been made available. DOS has reported that 47 per cent of the population comprised persons less than 16 years of age. It is important to recall that in 1980 there was a considerable deficit of males, and that the proportion of the population aged 0-4 years was exceptionally low because of low fertility and high mortality rates between 1975 and 1979. Because of the high birth rate after 1980, the population under age 12 in 1992 comprises an unusually large proportion of the population and the overall sex ratio becomes more normal with each passing year.

A UNICEF (1988) assessment gave the following age distribution for 1987: ages 0-4,20.5 per cent; ages 5-14, 24.4 per cent; and ages 15 and over, 55.1 per cent. As the post-1980 "baby boom" continues and the population ages, by 1992 the proportion under five years of age will decline slightly, and that aged 5-14 years will increase substantially. A crude approximation would be that the population aged 0-4 will equal 19 per cent, and that aged 5-14 will equal 28 per cent of the total.

Table 1: Population of Cambodia by sex and broad age group, mid-year 1992

Age group	Total	Male	Female
All ages	9,001,315	4,269,394	4,731,721
0 - 4	1,710,250	867,097	843,153
5 - 14	2,520,368	1,260,184	1,260,184
15 - 17	450,066	225,033	225,033
18 - 64	4,050,592	1,798,463	2,252,129
65+	270,039	118,817	151,222

Notes: 1. The total population is as projected by the Department of Statistics, Ministry of Planning. The total is distributed by assuming the following age distribution, then applying the following proportion female to each age group. See the text for discussion of the assumptions.

Age group	Percentage of total	Per cent female
0 - 4	19	49.3
5 - 14	28	50.0
15 - 17	50.0	
18 - 64	45	55.6
65+	3	56.0

2. Excludes approximately 170,000 of the 350,000 Cambodian population in camps in Thailand.

DOS has reported that in a survey in eight provinces, 48 per cent of the population was aged 18 years and over. The United Nations estimates that 3 per cent of the population is aged 65 years and over, thus the population aged 18-64 would equal 45 per cent of the total. The population aged 15-17 may then be calculated as a residual comprising 5 per cent of the total. These figures are shown in table 1 and are applied to the total 1992 population to calculate the number in the various age categories.

The DOS population count in 1980 reported that females comprised 53.7 per cent of the population, yielding a sex ratio of 86 males per 100 females. This may be compared with the sex ratio in Viet Nam in 1979 of 94. In 1980, the sex ratio for chiidren under 15 years of age was reported as close to 101. Thus, the sex ratio for the population aged 15 and over must have been about 75 males per 100 females. By 1992, this would have improved to about 80 as the later birth cohorts reach adult ages. It is assumed that, in 1992, the proportion of females equals 50 per cent for persons aged

5-17, and 55.6 per cent for those aged 18-64. The United Nations estimates are used for the age groups 0-4 (49.3 per cent female) and 65 and over (56.0 per cent). These proportions female are applied to the total population by age to calculate the sex distribution, as shown in table 1. The proportion female in the total population in 1992 will be approximately 52.6 per cent.

The high proportion of widows and of female-headed households in Cambodia is frequently commented upon. The estimates above imply that about 20.0 per cent of the females aged 18-64 could be single or widowed from the demographic deficit of males per se. (The excess of females aged 18-64 equals 20.0 per cent of the total number of females at those ages.) If some males are away from home as migrant workers, in the military etc., at least one quarter of all households could be headed by females for temporary periods.

The dependent population in Cambodia comprises a high proportion of the total. The estimates shown in table 1 indicate that the population aged 0-14 and 65 and over equal those aged 15-64. In fact, DOS estimates that 40 per cent of the total population is employed, so that there are 150 dependents for every 100 persons working.

Population distribution

The Department of Statistics estimates the urban population of Cambodia to be 1,081,000, or 12.6 per cent of the total in 1990. That estimation is much too low for Phnom Penh, however. The figure given for the capital is 478,000, but the registered population in 1990 was 620,000 and the actual total would have been over 800,000.

Phnom Penh is the only large city in the country. It is approximately 18 times as large as the second largest city of Battambang. The Popular Committee of Phnom Penh Municipality estimates that the city's population equals 800,000 in the rainy season and reaches 1.0 million in the dry season, when farmers have less work to do in rural areas. An average size of 900,000 may be assumed for 1991.

The population of Phnom Penh would reach 950,000 in 1992 if it grows at just over 5 per cent a year. In fact, with the employment generated by the rapidly growing presence of international organizations, foreign government representation and non-governmental organizations, the growth rate could be considerably higher.

Provincial cities have very little industry and offer few job opportunities. In order to project the population of the major cities other than

Table 2: Estimated and projected population of major cities in Cambodia, 1987 and 1992

City	1987	1992
Phnom Penh	590,000	590,000
Kompong Som	16,000	18,000
Battambang	45,000	51,500
Kompong Cham	33,000	38,000
Pursat	16,000	18,000
Kompong Chhang	15,000	17,000
Kompot	15,000	17,000
Kratie	14,000	16,000
Svey Rieng	14,000	16,000
Siem Reap	13,000	15,000
Kompong Thom	12,000	14,000
Prey Veng	11,000	13,000

Source: 1987: Kenneth Watts, *et al., Report of the Kampuchea Needs Assessment Study,* New York: United Nations Development Programme, August 1989, p.18. The Phnom Penh population is based on an estimate of 561,000 in 1986 and a growth rate of 5 per cent.

Note: The projected population of Phnom Penh is based on its estimated size of 900,000 in 1991. The population of each other city has been projected by assuming an average annual growth rate of 2.8 per cent between 1987 and 1990, and 2.5 per cent between 1990 and 1992.

Phnom Penh, it was assumed that they are growing only as rapidly as the national population (see table 2). Such an assumption may under-represent the growth rate of the port city of Kompong Som and the regional centres of Battambang and Kompong Cham, but no estimates of the population of those cities have been made available.

Provincial offices estimate the population of their province annually by requesting village heads to report the total by sex to the commune, which reports to the district, which reports to the province. The DOS does not publish and apparently does not use these figures. DOS has prepared a time series of provincial population figures by increasing the total by 2.8 per cent each year from 1981 to 1990, and projects the figure by adding 2.5 per cent each year up to 2000. Thus, all provinces are projected by the same growth rate. This method yields a figure for Phnom Penh that is clearly too low, but the error for other provinces may not be great.

Provincial population totals were estimated for 1986 and 1992 by using independent estimates for Phnom Penh, then pro-rating the non-Phnom

Penh total to the provinces according to their totals projected by DOS (table 3). The results of this method may be compared with figures from three provinces on the next page. All figures have been adjusted to the end of 1990.

Table 3. Estimated and projected population by province, Cambodia, 1981,1986, and 1992

Province or city	Population in thousands 1981	1986	1992
Total	6,682	7,672	9,001
Phnom Penh	329	561	950
Kandal	720	762	863
Kompong Cham	1,066	1,205	1,365
Svay Rieng	292	329	373
Prey Veng	672	758	858
Takeo	531	598	677
Kompong Thom	379	427	484
Siem Reap	477	538	592
Banteay Meanchey	--	--	424
Battambang	718	810	510
Pursat	175	197	224
Kompong Chhnang	221	249	282
Kompong Som City	53	59	67
Kampot	354	399	451
Koh Kong	26	29	33
Kompong Speu	340	383	434
Preah Vihear	69	78	89
Ratanakiri	45	51	58
Stung Treng	39	44	50
Mondulkiri	16	18	20
Kratie	157	177	200

Source: 1981: Data provided by the Department of Statistics (DOS), Ministry of Planning.
1986: Phnom Penh from Kenneth Watts, ***et al., Report of the Kampuchea Needs Assessment Study,*** New York: United Nations Development Programme, August 1989, p. 17. Others are DOS projections pro-rated to total excluding Phnom Penh.
1992: Phnom Penh from table 2. Others calculated as for 1986.

Note: Figures may not sum to national total because of rounding.

Province	Provided by provincial officers	As projected in table 3
Prey Veng	850,000	832,000
Takeo	598,465	656,000
Kompong Speu	420,000	421,000

Thus, the projection method gives a total for Kompong Speu that is virtually identical to that provided by the provincial authorities, a total for Prey Veng that is 2.1 per cent lower, and for Takeo that is 9.6 per cent greater.

The provincial totals projected to 1992 may also be compared with those estimated for 1990 or 1991 by the Cambodian Displaced Persons Working Group and presented in table 4. All of the totals are similar, with the projected totals slightly higher, except for that of Banteay Meanchey province. Some of the population of that province is in camps in Thailand or in inaccessible areas and, therefore, not reported by local authorities.

The projected provincial totals shown in table 3 would be too low in areas with considerable in-migration, such as Kandal, Kompong Som and Koh Kong.

Table 4. Number of internally displaced people and families in Cambodia, by province, September 1991

Province	Population		Displaced persons	
	Persons	Families	Persons	Families
Nine provinces	3,279,133	598,834	169,727	33,069
Siem Reap	547,972	96,504	27,399	4,904
Banteay Meanchey	349,587	65,499	47,049	8,840
Battambang	484,890	94,174	31,859	6,452
Pursat	228,155	45,357	5,328	1,016
Kompong Chhnang	277,357	55,302	7,126	1,564
Kampot	437,822	84,094	10,725	2,006
Kompong Speu	426,955	79,974	30,779	6,311
Kompong Thom	446,395	77,930	8,329	1,537
Preah Vihear	80,000	-	1,133	439

Source: **Data provided by the Cambodian Displaced Persons Working Group, Phnom Penh,**

Vulnerable groups

In the first half of 1992, there will be several groups within the Cambodian population that will be especially vulnerable to economic hardship that could imperil their nutritional status and health. Those that are readily identifiable are internally displaced persons, returnees from Thailand, the disabled, and widows and separated women. The standard of living of the entire population is extremely low, with the food supply precarious and health services rudimentary. Many other people may live in pockets of poverty and be vulnerable, so that basic monitoring of the food supply and for disease outbreaks across the country should be implemented.

Internally displaced persons

People across all of the western half of Cambodia were displaced because there had been fighting near their villages or because their fields are mined and cannot be worked. Others were temporarily displaced by floods in August and September 1991, but had mostly returned to their homes by mid-November.

The Cambodian Displaced Persons Working Group estimates that as of September 1991 there were 169,727 displaced persons in nine provinces. The largest displaced populations were in Banteay Meanchey (47,049 persons), Battambang (31,859 persons) and Kompong Speu (30,779 persons) provinces (table 4).

A survey of the health situation of children in displaced persons camps was carried out in 1991 by eight non-governmental organizations (NGOs) and the United Nations Children's Fund (UNICEF), (Merciere, 1991). The researchers concluded that, while the prevalence of severe acute malnutrition is still limited, many of the camps are at the beginning of a slow but serious nutritional crisis. These conclusions were reached by the finding that the prevalence of severe acute malnutrition among children aged 6-59 months was low, exceeding 2.0 per cent in only four of 22 sites. The prevalence of moderate or severe acute malnutrition exceeded 10.0 per cent in six of the 22 sites.

Among the more vulnerable age group of 6-29 months, however, the prevalence of severe acute malnutrition exceeded 2.0 per cent in six of 24 sites. The prevalence of moderate or severe acute malnutrition exceeded 10.0 per cent in 13 of the 24 camps, with the highest rates equalling 34 and 24 per cent of children aged 5-29 months. The health of displaced persons is imperiled by an unsanitary environment and the erratic supply of food assistance.

Returnees

As of November 1991, there are approximately 350,000 Cambodians in camps in Thailand who may begin returning in early 1992. A complete registration is being conducted to determine the province and district to which people want to return. In the interim, it is possible to estimate the approximate number that will return to each province.

Lynch (1989) carried out a survey covering 15,525 persons in three border camps, in which the respondents indicated the province and district to which they preferred to return. The percentages by province from the Lynch survey were applied to the current camp population of 350,000 and the results are presented in table 5. The composition of some provinces and the names of many districts have changed since the Lynch survey, and the percentages have been adjusted to the current provincial structure as accurately as possible from the available information.

Table 5 indicates that 43 per cent of the Cambodians in Thailand, or 151,000 persons, may be expected to return to Battambang province, and 69,000 to Banteay Meanchey province. At least 18,000 may also be expected to return to each of three cities: Phnom Penh Siem Reap and Pursat.

Widowed and separated women

No data on the marital status of the population were made available, but the estimates shown in table 1, which are based on the 1980 population count, indicate that the excess of females aged 18-64 is 450,000. That represents 20.0 per cent of the women of those ages who are necessarily single, widowed, separated or divorced. As discussed above, it is reasonable to assume that one quarter of households are female-headed at least for temporary periods because men are away from home as migrant workers or in the military.

In his survey of Cambodians in camps in Thailand, Lynch (1989) found that only 79.0 per cent of the women aged 15 years and over were married, whereas 95.7 per cent of the men in this age group were. Among the women, 19.8 per cent were widows, and only 1.2 per cent were single or divorced. The proportion widowed would be expected to be somewhat larger among the refugee population than the population in general, lending support to the figures in table 1. A larger percentage of women may have been widowed in their life-time and many could have remarried, but no data on remarriage are available.

Table 5: Estimated number of returnees by province

Province or city	Number	Per cent
Total	**350,000**	**100.00**
Phnom Penh	18,374	5.25
Kandal	10,438	2.98
Kompong Cham	8,116	2.32
Svay Rieng	2,660	0.76
Prey Veng	5,478	1.57
Takeo	13,166	3.76
Kompong Thom	4,171	1.19
Siem Reap	22,499	6.43
Banteay Meanchey	68,918	19.69
Battambang	150,821	43.09
Pursat	18,937	5.41
Kompong Chhnang	4,847	1.38
Kompong Som City	519	0.15
Kampot	5,411	1.55
Koh Kong	609	0.17
Kompong Speu	5,681	1.62
Preah Vihear	654	0.19
Ratanakiri	45	0.01
Stung Treng	45	0.01
Mondulkiri	0	0.00
Kratie	744	0.21
Undecided	7,868	2.25

Note: **The percentage distribution is from James F. Lynch, *Border Khmer: A Demographic Study of the Residents of Site 2, Site B, and Site 8*. Bangkok, November 1989. The percentages from that survey have been applied to an estimated total of 350,000 returnees. The composition of some provinces has changed since the Lynch survey was carried out and the necessary adjustments by district have been made.**

Disabled persons

The Department of Statistics provided data on the disabled population based on the population count conducted in 1980. The total disabled, 44,317, comprise 0.67 per cent of the population of Cambodia; 19,646 are males and 24,671 are female. However, the data could be questioned on three points. First, the figures seem low for a country that had, by 1980, experienced a decade of internal hostilities. Second, the percentage disabled in Battambang province (including the present Banteay Meanchey province), i.e. 0.34 per cent or 2,425 persons, is the fourth lowest in the country, yet much fighting had taken place there. Third, the percentage of disabled in most provinces is higher among females than males, again unlikely following protracted fighting.

Since 1980, the number of persons disabled has certainly increased, although the percentage disabled may not have because of the high population growth rate resulting from high levels of fertility.

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