

## Development and Childlessness in Taiwan\*

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### ABSTRACT

This paper examines the relationship between modernization and childlessness in the localities (the hsiens and major cities) of Taiwan in 1966. Taiwan has been characterized by both considerable economic development since the end of World War II, and a concomitant fertility decline. In this paper we show rather considerable variation in childlessness among its hsiens and principal cities. A framework based on theories of modernization and development is then shown to provide a satisfactory interpretation of this variability. Generally, among the Taiwanese localities, there is a positive association between levels of development and rates of childlessness. We find more childlessness, presumably voluntary, in the more developed localities, and less in the less developed areas.

The association between modernization and fertility is one which has received extensive treatment in demography, mainly because the relationship is a basic premise for demographic transition theory. However, studies relating development. With the exception of recent analyses of selected developing countries (Poston and Trent, forthcoming), and of the states of Mexico (Poston, Briody, et al., 1983; forthcoming), demographers have paid little attention to the manner in which the development process influences levels of childlessness. Perhaps it has been assumed that since most married women desire and have children, few will be childless; and to the extent that childlessness does exist among populations, it should be characterized by little if any variation. Both of these assumptions have been examined in recent years and have not been supported (Veevers, 1972, Poston and Trent, 1982).

This paper examines the relationship between modernization and childlessness in the localities (the hsiens and major cities) of Taiwan in 1966. Taiwan has been characterized by both considerable economic development since the end of world

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War II, and a concomitant fertility decline. Indeed, demographers have generally conceded that the economic transformations accounted in many ways for the fertility declines (Freedman et al., 1963; Davis, 1967). And in the course of these developments, there has been a widening of the regional differences which have always been prominent throughout the island.

In this paper we show rather considerable variation in childlessness among the hsien and principal cities of Taiwan. A framework based on theories of modernization and development is then shown to provide a satisfactory interpretation of this variability. Generally, among the Taiwanese localities, there is a positive association between levels of development and rates of childlessness. In the next section, we review selected empirical studies of childlessness relevant to this inquiry. The theoretical model focusing on modernization is next set forth. Later sections deal with the data, method, and findings of our research.

### PRIOR STUDIES

One of the earliest census-based studies of childlessness was Grabill and Glick's (1959) analysis of the United States in 1950. Similar studies have examined childlessness in the U.S. in 1970 and over time (see Kunz, et al., 1973; Poston, 1974; Poston and Gotard, 1977; Davis 1982; among other), as well as in Canada (Veevers, 1972; Wolowyna, 1977).

There have been fewer studies concentrating on international patterns of childlessness in developed and developing countries; one was conducted which showed considerable variability among 65 countries (Poston and Trent, 1982). Another focused on 36 developing countries in circa-1970 (Poston and Trent, forthcoming) and investigated the relationship between childlessness and modernization. Hypotheses predicting negative relationships between three modernization components dealing with structural development, health conditions and female status, and childlessness, were supported, with health conditions showing the highest correlation. This theoretically-grounded analysis of childlessness represented, in some ways, an advance over earlier brief, and mainly descriptive international studies by Thompson and Lewis (1965), Bogue (1969), and others.

There have been other analyses with similar results. Studies conducted by Romaniuk of the James Bay Indians (1974) and of Zaire (1980), by Tabutin of Western Zaire (1982), by Poston, Briody and their colleagues of Mexico (1983; forthcoming), and by others (Erickson et al., 1979; Romaniuk, 1968; Brass, 1968)

have generally shown decreases in childlessness during a country's or region's early stages of modernization. Or as Romaniuk noted for Zaire during the twenty-year period from the 1950s to the 1970s, a time which was characterized by improvements in the provision of health services and reductions in malnutrition, "populations in which formerly infertility was high experienced a dramatic reduction in childlessness" (1980: 304).

Presumably, however, these studies may not be that germane for an understanding of modernization and childlessness in the localities of Taiwan. Even in 1966, Taiwan could hardly be thought of as being in the incipient stages of modernization. Following Taiwan's annexation to Japan in 1895, the island experienced a dramatic reduction in its crude death rate (to less than 20 by the end of World War II). Also, during the early decades of the twentieth century, the Japanese sponsored various modernization programs in Taiwan in agriculture and industry. The major economic transformation of Taiwan occurred, however, after World War II. Between 1946 and 1964, for example, the population 15 years and over with at least a junior high school education increased from slightly more than 5 percent to 25 percent; and over the same period, employed males in manufacturing and services increased from about 30 to more than 50 percent (Republic of China, 1975; 1976). The population living in urban areas also grew during this period; Davis (1967:735) has reported an increase in the proportion urban from less than half to almost two-thirds between 1950 and 1964. The situation in Taiwan with respect to the association between economic development and childlessness, therefore, is somewhat different from those developing countries (cited above) where the relationship has been studied empirically. Indeed, we will argue below that among the localities of Taiwan in 1966, levels of development should be positively, not negatively, related to rates of childlessness. The next section of this paper develops more fully this theoretical perspective.

### THEORETICAL MODEL

As noted earlier, we will endeavor in this paper not only to describe the variability in childlessness in the hsiens and major cities of Taiwan in 1966, but also to account for this variation with a theoretical model dealing with modernization. Prior to outlining the model, however, we discuss briefly the immediate causes of childlessness.

Childlessness may be voluntary or involuntary; that is, a woman may decide

voluntarily to have no children, or may be unable to have them because of involuntary factors. Childlessness in a single population, necessarily, may be both voluntary and involuntary. In examining the association between modernization and childlessness, therefore, one needs to keep in mind the two different types of childlessness.

Involuntary childlessness is due mainly to subfecundity, that is, the diminished capacity to reproduce" (McFalls, 1979:3), and the various causes of subfecundity include genetic factors, psychopathology, disease, nutritional deficiencies and environmental factors. Voluntary childlessness, on the other hand, is a more elusive concept. Unlike involuntary childlessness, the voluntary decision to refrain from having children is seldom a matter decided upon once and only once in one's lifetime (Veevers, 1973). Indeed, Cutright and Polonko (1977) have noted that "given opportunities to engage in alternative roles, some women will find other activities more rewarding than childbearing and successive postponements will eventually result in voluntary childlessness" (1977:60). If the question of not having children becomes thus a matter for rational evaluation, and "motherhood [is placed] more squarely in competition with other social roles" (Bumpass, 1973:68), then the factors causing increases in voluntary childlessness should be similar to those leading to decreases in fertility. After all, voluntary decisions not to have, or to have, a child are aspects of the same phenomenon. Therefore, the major features of development involving industrialization, urbanization, increased female participation in the nonagricultural labor force, and increased educational attainment, especially for women, among other factors, should be associated positively with voluntary childlessness. And since these factors are among the major influences of fertility decline, it follows that fertility and voluntary childlessness should be inversely related, an hypothesis that has been indirectly supported in earlier analyses (Poston and Gotard, 1977; Poston and Trent, 1981).

But where does Taiwan fit in this scheme? We have noted above that Taiwan is clearly not in its initial stages of development and has been undergoing large-scale modernization since the end of World War II; for that matter, development programs were initiated on the island as early as the turn of the century; While it is true that on most development indicators, Taiwan is not usually placed in the same category as the U.S. and the countries of Western Europe, the island is not a newcomer to modernization programs.

This point is a relevant one for this paper since voluntary childlessness does not usually begin to appear in population until after some exposure to modernizing

influences. The studies reviewed above have generally shown that childlessness decreases (and fertility increases) during a population's early stages of modernization. The development mechanisms, particularly those dealing with the improvement of health conditions, cause childlessness to decline because it is mainly involuntary, and fertility, as a consequence, increases. As the modernizing influences continue, fertility eventually begins to decline, and childlessness experiences an increase, as it becomes more and more voluntary. There should remain a somewhat constant amount of involuntary childlessness in the various subregions because minimum levels of infertility will always be present irrespective of the levels of modernization.

Taiwan in 1966 was in this latter position and as a whole had experienced extensive modernization since the end of World War II, its fertility had declined, and voluntary childlessness should have begun to appear. Given differences in the levels of development in the hsiens and major cities of Taiwan at this time, however, we expect to find more of this childlessness, presumably voluntary, appearing in the more developed localities, and less in the less developed areas. Put differently, all of the hsiens and major cities of Taiwan should be characterized by low, and rather constant, presumably involuntary, levels of childlessness. But to the extent that the childlessness rates of the areas vary, these differences should owe to differences among the areas in levels of voluntary childlessness. Accordingly, we would hypothesize that among the localities of Taiwan in 1966, the higher the levels of development, the higher the rates of childlessness.

## DATA AND METHODS

The childlessness data for this analysis were taken from questions on number of children ever born as reported in the *1966 Taiwan and Fukien Census of Population and Housing* (Republic of China, 1969). The data on which the modernization and development indicators are based were taken from 1966, 1946-1967 *Statistical Abstracts of Taiwan* (Republic of China, 1966, and the *1964 Taiwan Demographic Fact Book* (Republic of China, 1965).

### The Localities of Taiwan

In 1966 Taiwan was divided into 22 separate localities; sixteen of the localities were hsiens (or counties) with populations in 1966 ranging from over one million (Taipei Hsien) to slightly more than 100,000 (Penghu Hsien). Five of the

localities were the separate large cities of Taipei, Keelung, Taichung, Tainan and Kaohsiung; Taipei City was the largest with a population of over 1.3 million, and Keelung was the smallest in population size (about 280,000). The 22nd locality was the Yangmingsang Administrative Area with a population of almost 150,000. See the locations of the 22 localities in Figure 1.

Administratively, the hsiens have jurisdiction over all places lying within their boundaries, except for the five large cities just mentioned. Because these cities are more developed and more densely populated than the other places in Taiwan, "they are directly under the jurisdiction of the Taiwan Provincial Government and thus have a status comparable to the Hsiens" (Republic of China, 1981:560).

### The Measurement of Childlessness

The denominator for the childlessness rate used in this study pertains to ever-married women, that is, the married, widowed, divorced, and separated. The numerator refers to ever-married women who report zero children ever born to them.

We have computed for each of the 22 localities of Taiwan a Marital Childlessness Rate (MCR), and it may be defined as

$$\text{MCR} = L/P$$

where L represents the number of ever-married women between the ages of 25-39 with no children ever born to them, and P represents the total population of ever-married women between the ages of 25-39. A map of Taiwan, divided into the 22 localities, each locality shaded according to one of five levels of childlessness, is provided in Figure 1; the actual values of the childlessness rates are reported for the localities in Table 1. The rates vary from a low of .020 in Yunlin Hsien and .021 in Tainan Hsien, to highs of .041 in the Yangmingsang Administrative Area and .045 in Taipei City. For every 1000 ever-married women in the 25-39 age group in Yunlin Hsien, 20 were childless in 1966, whereas in Taipei City for every 1000, 45 were childless.

When the final version of this analysis was written (late 1983), detailed subregional data on childlessness from the 1980 Taiwan Census had not yet been released. However, we do have available data for 1980 for the entire island. Table 2 shows a comparison of age-specific childlessness rates for Taiwan for the years of 1966 and 1980. Among women aged 25-29, 5 per cent were childless in 1966, while 10 per cent were childless in 1980. Similar increases may be observed for women aged 30-34 and 35-39. An increase from 1.8 per cent to 3.8 per cent

occurred among women of the former age group, and an increase from 1.9 to 2.2 per cent among the latter. These higher levels of childlessness are likely indicative of increases in voluntary childlessness in Taiwan between 1966 and 1980. We know of no evidence to suggest that these increases have been due to increases in infertility.

### The Independent Variables

To test the hypothesis anticipating a positive relationship between modernization and childlessness, we followed the guidance of Goldscheider (1971) and selected twelve development indicators dealing with urbanization, divorce commerce, health, information, education, economic activity, professional occupations, and female status. These indicators are listed, defined, and their sources provided in Table 3.

The expected relationships between most of the development indicators and childlessness are rather straightforward, given the general hypothesis of a positive association between modernization and childlessness. Three of the indicators, however, deserve additional discussion.

In the first place to the extent that increased divorces represent a transformation from a traditionally-oriented to a secular society, we would expect a positive association between the divorce rate and childlessness. Secondly, the greater the concentration of the labor force in agriculture, the less the modernization; accordingly a negative relationship is expected between this indicator and childlessness. Finally, the closer the percentage of females graduating from college is to the percentage of males graduating from college, the higher and the more enhanced the position of females in the society; we thus would expect a positive relationship between this measure of female status and childlessness.

Positive relationships are expected with childlessness for the urban, banking, health, college and information indicators of development. The illiteracy indicator should be negatively related with childlessness. The economic activity indicators pertaining to commerce and public service, and the professional occupations measure, should also be positively associated with childlessness. We turn now to the results of our study.

## RESULTS

The general distribution of the marital childlessness values is congruent with what is generally known about regional differences in Taiwan. Generally, the

highest childlessness rates are found in the largest cities. Indeed, of the seven localities with the highest childlessness rates, four are cities (Taipei, Kaohsiung, Taiwan and Keelung) and one is the Yangmingsang Administrative Area. Also one of these localities is the Taipei Hsien. All of these localities are characterized by higher standards of living and well being than many of the other localities (Republic of China, 1980:560). Conversely, the locality with the lowest childlessness rate, Yunlin Hsien, is characterized by rather low levels of socioeconomic development on most indicators; for example, it has one of the two highest rates of female illiteracy, and the highest proportion of its male labor force employed in agriculture, of all the Taiwanese localities. There are, of course, exceptions, but for the most part this analysis suggests that the more developed localities have the higher childlessness rates, and vice versa.

In order to test the modernization-childlessness hypothesis, the zero-order correlation coefficients have been computed between the marital childlessness rate and the twelve modernization indicators among the twenty-two localities of Taiwan in circa-1966. They are presented in Table 4. In all twelve tests of the modernization-childlessness hypothesis, the expected results are obtained.

All of the zero-order correlations with childlessness are significant and The public service indicator of development has the highest correlation with the dependent variable ( $r = .83$ ). In addition to the public service measure, five more indicators (health, female college, illiteracy, commerce, and professionals) report correlations with childlessness of at least .74. The lowest correlation with childlessness occurs for the banking indicator ( $r = .44$ ), but even it is of reasonable magnitude, and, like all the other correlations in Table 4, is in the direction expected. The results reported in Table 4 support the hypothesis that among the 22 localities of Taiwan in circa-1966, the higher the levels of development, the higher the rates of marital childlessness.

## DISCUSSION AND CONCLUSION

We began this analysis by hypothesizing that, among the hsiens and major cities of Taiwan in 1966, levels of modernization should be positively related to childlessness. We showed considerable variation in childlessness among the hsiens and major cities of Taiwan. Generally, among the Taiwanese localities, we found a positive association between levels of development and rates of childlessness.



Our findings may be examined in light of investigations of modernization and childlessness conducted in other countries. As discussed earlier in this paper, many sub-regional studies of the relationship between modernization and childlessness have concluded that general decreases in childlessness occur during a country's or region's early stages of modernization. These decreases are indicative of declines in fertility. For example, Romaniuk demonstrated this association among the James Bay Indians (1974) and in Zaire (1980), Tabutin in Western Zaire (1982), and Poston, Briody and their colleagues in Mexico (1983; forthcoming). However, we concluded that while these studies are our principal guides in understanding the relationship between childlessness and modernization in less developed areas, they are not that germane for an understanding of the phenomenon in Taiwan. Although Taiwan is typically classified as a developing area, we have also noted that the island is clearly not in its initial stages of development, and hence, not a newcomer to modernization programs. In fact, Taiwan had been involved in modernization programs as early as the turn of the century, and has been undergoing large-scale modernization since the end of World War II.

While Taiwan is not usually placed in the same social and economic categories as the U.S., Canada, and the countries of Western Europe, its present fertility levels are very much of the "Western" type. In the late 1970's and early 1980's Taiwan's Total Fertility Rate was around 2.7 (Population Reference Bureau, 1981), considerably lower than most developing regions and only slightly higher than most developed areas. Therefore, we expected the relationship between childlessness and modernization in the localities of Taiwan to reflect a "Western" pattern.

Several studies have indicated that childlessness, presumably voluntary, and fertility vary inversely in developed countries. Poston and Kramer (1981) found evidence of this pattern in their longitudinal analysis of childlessness in the United States. Support for the hypothesis that development levels are directly related to childlessness has also been found in a sample of developed countries of the world (Poston and Trent, 1981; Trent, 1982). Also, aspects of this relationship have been indirectly documented in other empirical studies conducted in the United States (for example, see Poston, 1974; Freshnock and Cutright, 1978). Thus, these studies indicate that as modernization results in fertility declines, childlessness increases, as it becomes increasingly voluntary in character.

In the analysis reported here, we found that among the hsiens and major cities of Taiwan, childlessness and levels of modernization were positively related,

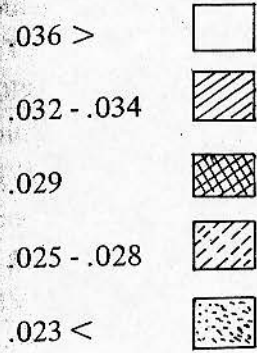
suggesting the presence of varying although small amounts of voluntary childlessness in the more developed areas on the island. Let us emphasize that while we reported considerable variation in the rates of childlessness among the Taiwanese localities, these rates are still considerably lower than those reported for other developed areas of the world (see Poston and Trent, 1982).

As the childlessness rates reported here would suggest, childlessness in Taiwan is in fact still rather uncommon. The highest rate reported indicates that only 45 out of 1000 women in Taipei City are childless. Coombs and Sun (1981:123) have argued that over time in Taiwan, "the cultural norms have prescribed both marriage and children for all women and this has not changed to date." The authors have also noted that "childlessness is almost wholly involuntary" (Coombs and Sun, 1981:1237). We agree that Taiwanese familial values are and have been pronatalist, particularly through the 1960's, and indeed our results are not incongruent with those of Coombs and Sun (1981). Most of the childlessness in Taiwan and in its hsiens and major cities is most likely involuntary. Our analysis simply suggests that to the extent that levels of childlessness vary among the subregions of Taiwan, these differentials are reflecting variability in the voluntary component of the phenomenon. And these differentials are best understood by considering the modernization levels of the subregions. The one exception probably lies in a depressed area such as Hualien Hsien which shows a comparatively higher rate (.036) of childlessness. This higher rate found in a less developed area may be indicative of unchecked infertility in this area in 1966.

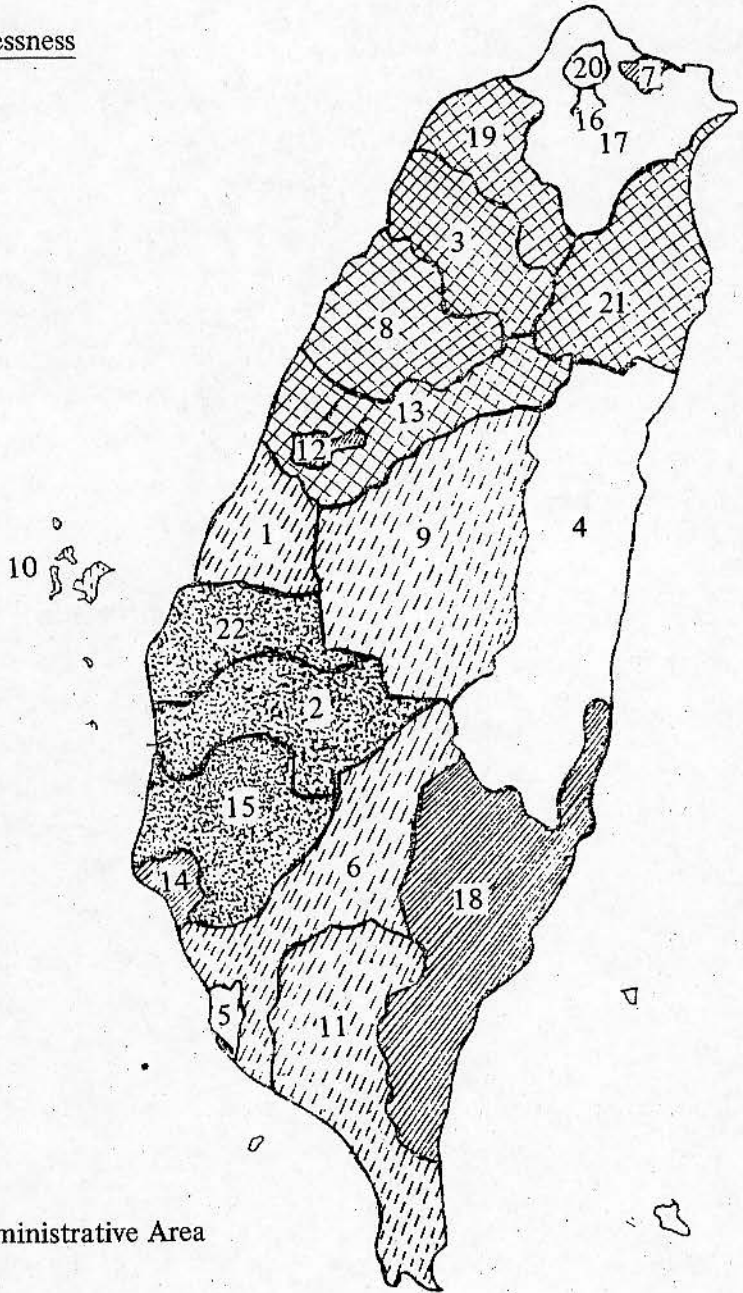
In conclusion, our study has suggested that the variability in childlessness levels among the hsiens and major cities of Taiwan is reflecting differences in the voluntary levels of childlessness. We would thus expect that as Taiwanese fertility continues to decline, these reductions should be followed by further increases in Taiwanese levels of childlessness.

Figure 1  
TAIWAN  
Geographic Divisions\*

Rates of Marital Childlessness



1. Changhwa Hsien
2. Chiayi Hsien
3. Hsinchu Hsien
4. Hwalien Hsien
5. Kaohsiung city
6. Kaohsiung Hsien
7. Keelung City
8. Miaoli Hsien
9. Nantou Hsien
10. Penghu Hsien
11. Pingtung Hsien
12. Taichung City
13. Taichung Hsien
14. Tainan City
15. Tainan Hsien
16. Taipei City
17. Taipei Hsien
18. Taitung Hsien
19. Taoyuan Hsien
20. Yangmingsang Administrative Area
21. Yilan Hsien
22. Yunlin Hsien



\*Map adapted from one provided in the 1965 Taiwan Demographic Fact Book, Republic of China. Published by Department of Civil Affairs, Taiwan Provincial Government, Republic of China, October, 1966.

Table 1.

## BATES OF MARITAL CHILDLESSNESS: LOCALITIES OF TAIWAN, 1966

Taipei	.045
Yangmingsang Adm.	.041
Kaohsiung City	.036
Hwalien Hsien	.036
Taipei Hsien	.036
Tainan City	.034
Keelung City	.034
Taitung Hsien	.032
Taichung City	.032
Hsienchu Hsien	.029
Taichung Hsien	.029
Miaoli Hsien	.029
Taoyuan Hsien	.029
Yilan Hsien	.029
Penghu Hsien	.028
Changhwa Hsien	.026
Pingtung Hsien	.026
Nantou Hsien	.025
Kaohsiung Hsien	.025
Chiayi Hsien	.023
Tainan Hsien	.021
Yunlin Hsien	.020

Table 2.

## Age-specific Childlessness Rates for Taiwan, 1966 and 1980

	1966	1980
25-29	5.0	10.0
30-34	1.8	3.8
35-39	1.9	2.2

Source: "An Extract Report on the 1980 Census of Population and Housing, Taiwan-Fukien Areas, Republic of China."  
of the Executive Yuan, June, 1982.

Table 3

MARITAL CHILDLESSNESS RATE, 1966

Source: 1966 Taiwan and Fukien Census of Population and Housing, Vol. 2, Table 4.

POPULATION DENSITY: PERSON PER SQUARE KILOMETER, 1965

Source: Statistical Abstract of the Republic of China, 1966, Table 18.

DIVORCES PER 1000 POPULATION, 1965

Source: Statistical Abstract of the Republic of China, 1966, Table 31 and Table 18.

DIVORCES PER 1000 POPULATION, 1965

Source: Statistical Abstract of the Republic of China, 1966, Table 31 and Table 18.

Computed dividing the total number of registered divorces in 1965 by the total number of inhabitants in 1965, multiplied by 1,000

BANK BRANCH OFFICES PER 1,000 POPULATION, 1967

Source: Statistical Abstract of Taiwan Province, 1946-1967, Table 248.

Statistical Abstract of China, 1966, Table 18.

Computed by dividing the total number of bank branch offices in 1967 by the total number of inhabitants in 1965, multiplied by 1,000.

PHARMACISTS, DOCTORS, DENTISTS, AND NURSES PER 1,000 POPULATION

Source: Statistical Abstract of the Republic of China, 1966, Table 22 and Table 18.

Computed by dividing the total number of health personnel in 1965 by the total number of inhabitants in 1965, multiplied by 1,000.

NEWSPAPERS PER 1,000 POPULATION

Source: Statistical Abstract of the Republic of China, 1966, Table 185 and Table 18.

Computed by dividing the total number of registered newspapers in 1965 by the total number of inhabitants in 1965, multiplied by 1,000.

PERCENT OF FEMALES 12 YEARS AND OLDER WHO ARE COLLEGE GRADUATES

Source: 1964 Taiwan Demographic Fact Book, Republic of China, Table 12

Table 3, cont.

PERCENT OF FEMALES 12 YEARS AND OLDER WHO ARE ILLITERATE

Source: 1964 Taiwan Demographic Fact Book, Republic of China, Table 12.

PERCENT OF EMPLOYED MALES 12 YEARS AND OLDER IN AGRICULTURE, 1964

Source: 1964 Taiwan Demographic Fact Book, Republic of China, Table 13.

PERCENT OF EMPLOYED MALES 12 YEARS AND OLDER IN COMMERCE

Source: 1964 Taiwan Demographic Fact Book, Republic of China, Table 13.

PERCENT OF EMPLOYED MALES 12 YEARS AND OLDER IN PUBLIC SERVICE, 1964

Source: 1964 Taiwan Demographic Fact Book, Republic of China, Table 13.

FEMALE STATUS, 1964

Source: 1964 Taiwan Demographic Fact Book, Republic of China, Table 12.

Computed by deriving the ratio of percent females with college degrees to percent males with college degrees.

Table 4

ZERO-ORDER CORRELATION COEFFICIENTS BETWEEN  
TWELVE DEVELOPMENT INDICATORS AND RATES

OF MARITAL CHILDESSNESS: LOCALITIES OF TAIWAN, CIRCA - 1966

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<u>Development Indicator</u>	<u>Correlation</u>
Urban (population density: persons per square km)	.62
Divorces (divorces per 1,000 population)	.63
Banking (bank branches per 1,000 population)	.44
Health (pharmacists, doctors, dentists and nurses per 1,000 population)	.76
Information (newspapers per 1,000 population)	.54
Female College (percent of females 12 years and older who are college graduates)	.79
Illiteracy (percent of females 12 years and older who are illiterate)	-.75
Agriculture (percent of employed males 12 years and older in agriculture)	-.69
Commerce (percent of employed males 12 years and older in commerce)	.74
Public service (percent of employed males 12 years and older in public service)	.83
Professionals (percent of employed males 12 years and older in public service)	.75
Female Status (ratio of percent females with college degrees to percent males with college degrees)	.68

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# 臺灣的現代化和無子女率關係之探討

(中文摘要)

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本文探討1966年台灣各地(縣和主要城市)現代化水平和無子女率的關係。第二次世界大戰以後,台灣具有着經濟迅速發展和生育率顯著下降的特點。此文指出,台灣各縣、市的無子女率具有顯著的不同。一個現代化和發展的理論架構對各縣、市無子女率的差別提供了一個令人滿意的解釋。一般地說,經濟發展水平和無子女率是正相關的。我們發現,與欠發達地區相比,在較發達地區,較多的人自願地不生育子女。