

# 行政院國家科學委員會補助專題研究計畫成果報告

## 家庭所得稅對台灣婦女生育行為的影響

### The Effect of the Family Income Tax on Fertility Behaviors in Taiwan

計畫類別：個別型計畫      整合型計畫

計畫編號：NSC - 89 - 2415 - H - 004 - 060

執行期間：89年8月1日至90年7月31日

計畫主持人：黃智聰

計畫參與人員：潘俊男（兼任碩士級研究助理）

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#### 一、中英文摘要

本文利用 1990 至 1996 年的地區別合併資料 (panel data) 與 1995 至 1998 年的人力運用調查的家庭別混合資料 (pooling data)，研究家庭所得稅中的免稅額的價值對一般生育率與已婚婦女生育行為的影響。以合併資料估計固定效果模型與以混合資料估計 logit 計量模型後，實証結果顯示，就整體樣本而言，免稅額價值的提高將有提高一般生育率與鼓勵台灣已婚婦女多生育小孩的效果。然而，本文也發現，免稅額價值對生育率與生育決策的邊際效果相當的小。並且，政府欲藉此來增加嬰孩初生數的成本將相當的大。

關鍵詞：生育、免稅額、家庭所得稅、臺灣  
JEL 分類號：H24, H31, J13, J18

#### Abstract

This study utilizes official regionally-based panel data on Taiwan, from 1990 to 1996 and selected family-level pooling sample drawn from the Manpower Utilization Survey of Taiwan Area during the period 1995 to 1998 to investigate the value of the family income tax personal tax exemption, in terms of its effect on birth behavior. Once the data is deflated, and estimates of the different specifications of the fixed-effects model for the former data and logit model for the latter are carried out, the estimation results demonstrate that the value of personal tax exemption has a positive and statistically significant effect on the general fertility rate and the probability of married

couples to have one more child. The magnitude of the influence is, however, small. The cost to the government, to induce a single additional birth, would be very high.

**Keywords:** Birth, family income tax, fertility, personal tax exemption, Taiwan

**JEL Classifications:** H24, H31, J13, J18

#### II. Motivation and Purpose

In recent years, the issue regarding the advancing age of Taiwan's population has been a cause for growing concern. This issue could be illustrated by the upward trend in the ratio between the total population and people over the age of 65, and the downward trend of the general fertility rate (hereafter, GFR).<sup>1</sup> According to the *Monthly Statistics of the Republic of China* provided by the Directorate-General of Budget, Accounting and Statistics, Executive Yuan, Republic of China, the proportion of the total population over the age of 65 was 8.62 percent in 2000, up from around 5.28 percent in 1986. This was accompanied by a simultaneous decline in the GFR from 0.6 percent in 1986 to 0.48 percent in 2000. These two distinctive features have pushed Taiwan into a post-demographic transition phase.<sup>2</sup>

<sup>1</sup> The definition of the general fertility rate is the birth rate per hundred women between the ages of 15 and 44.

<sup>2</sup> Leete (1987) characterizes three distinctive features of the post-demographic transition phase of several countries in East and Southeast Asia. They are the postponement of death, a conspicuous rise in the age

In an attempt to mitigate this population aging problem, and to avoid some of the socioeconomic issues created by the phenomenon, understanding the major determinants of people's demand for children is necessary. The Economic Theory of Fertility constructed by Becker (1960) and Schultz (1973) sees the demand for children modeled as a utility maximization problem which is subject to income constraints; a couple's demand for children depends upon the relative magnitude of the marginal utility and upon the marginal cost of having children. If the former is greater than the latter, then the couple will decide to have children, and vice versa for not having them. However, whilst marginal utility - which represents people's preferences - varies amongst different people, marginal cost is affected by external economic factors, such as the wife's wage, family income,<sup>3</sup> and so on.<sup>4</sup>

Economists now suggest that measures are required to actively encourage people to have more children by providing incentives. Many studies have been conducted and have proved a positive influence of the personal tax exemption in a family income tax (hereafter, PTE) on the number of births, and the birth rate in the United States (e.g., Whittington et al., 1990; Georgellis & Wall, 1992; Gohmann & Ohsfeldt, 1994; Whittington, 1992, 1993).<sup>5</sup> This is because the PTE can reduce the cost of bringing up children, and therefore can help encourage people to have more children. However, this hypothesis has not yet been examined in Taiwan.

For the first purpose of this study is to

investigate the influence of the PTE on the birth rate. The present paper utilizes the official 1990~1996 regionally-based panel data adopted in this research covers 16 counties and 7 cities within Taiwan, and is sourced from the Departments of Statistics at the Ministry of the Interior, and the Ministry of Finance, and the Department of Health at the Executive Yuan, ROC, to estimate the fixed-effects model. In addition, the second purpose is to examine the influence of the PTE on married couple's demand for children. The family-level sample drawn from the Manpower Utilization Survey of Taiwan Area (hereafter, MUSTA) conducted by the Directorate-General of Budget, Accounting and Statistics, Executive Yuan, ROC during the period 1995 to 1998 is thus adopted to estimate the logit model.

The estimation results of the above empirical models are discussed in the following section.

### III. Results and Discussion

#### (1) Fixed-effects Model:

Referring to the empirical results of the fixed-effects model, this study does suggest a positive PTE-fertility relationship in Taiwan, a conclusion which is consistent with other studies (Whittington et al., 1990; Georgellis and Wall, 1992; Gohmann and Ohsfeldt, 1994). However, the magnitude of the influence of PTE on the GFR is rather trivial; the marginal effect being in the range of 0.0012~0.0014, that is, an NT\$1000 (approximately US\$30 US, based on the NT\$/US\$ exchange rate of 33:1.) increase in real value PTE, will produce an increase of 1.2~1.4 births per thousand women between the ages of 15 to 44 in Taiwan. After comparing this with the results of the Whittington et al. (1990) study, the marginal effect of PTE on fertility in Taiwan is even smaller than that in the United States.<sup>6</sup>

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at marriage, and an avoidance of births.

<sup>3</sup> See Cain & Weininger (1973), Blau & Robins (1989), and Mocan (1990).

<sup>4</sup> In addition to economic factors, other factors also play important roles in fertility behavior. Temperature, for example, has a significant influence on the timing of birth (Seiver, 1985; Land & Cantor, 1993; Lam & Miron, 1996).

<sup>5</sup> The value of PTE can affect the decision not only of whether to have children, but also of when to have them (e.g., Dickert-Conlin & Chandra, 1999; Huang, 2000a, 2000b).

<sup>6</sup> In the US, the marginal effect of PTE on the GFR is about 0.16~0.24.

There are a number of other factors significantly affecting the demand for children, influences that are consistent with our expectations. The empirical results show that contraception exerts a significant negative influence on the GFR. High unemployment rate leads to a low fertility rate. Moreover, the result of the significant negative coefficients of the time trend in various specifications, is consistent with the actual phenomena over time, of the downward trend in GFR in Taiwan.

Although, this study thus suggests that the family income tax policy may be an effective tool for bringing about an increase in the general fertility rate in Taiwan, and hence, a means of mitigating Taiwan's population aging problem. However, the cost to the government, to induce a single additional birth, would be very high. The cost to the Taiwan government, in terms of lost tax revenue, was 15.8~48.3 million for each additional birth during those periods.

## **(2) Logit Model:**

The empirical results from the logit model show that the PTE has a significantly positive influence on the probability of having one more child. However, the magnitude of its marginal effect is quite small. A one dollar increase in the PTE will raise the probability only  $1.25 \times 10^{-4}$  percent for all selected families and  $3.20 \times 10^{-4}$  percent for selected families with two or less children. With regard to the subsample with more than two children, the influence of the PTE on the propensity of having one more child turns out to be insignificant. Hence, it is concluded that the PTE encourages only families with few children to have one more child. With those families having two or more children, the PTE becomes ineffective in their birth decision.

The imputed wife's wage rate, serving as the wife's time value, has a positive influence on the birth decision for the first three children, but not for the fourth and any later births. With respect to the families with two or more children, the higher the imputed wife's wage rate is, the lower

the probability is of having another child. From this result, we can find the different influence of the wife's time value on the fertility decision of families with different numbers of children.

The wife's current age shows a significant and negative impact on the fertility decision. No matter what the number of children a family has, the higher the wife's age is, the lower the probability of having one more child will be. This finding is reasonable due to women's fecundity decreasing as the wife becomes older.

Given families with two or less children, families in northern region are less likely to have one more child than those in other regions of Taiwan. However, given families with three or more children, the probability of having one more child for the families in northern, central, and southern Taiwan is lower than for families in the eastern region.

Both the size of children and year variables have a negative influence on the demand for children. The propensity to one more child for families with a large number of children is lower than it is in families with less children. The negative coefficient of the year variable indicates the tendency of having one more children decrease over time under only those families with a small number of children.

Family income and macro-level factors do not play any role in the decision of demand for children. Therefore, we cannot conclude whether children are normal goods or inferior goods in Taiwan. In addition, it could be concluded that the family birth decision is quite independent and is not affected by regional preference and economic situation due to the insignificant influence of aggregate-level factors.

## **(3) Discussion:**

On the whole, although the results support the hypothesis that an increase in PTE will lead to an increase in the demand for children, the government has thus far avoided any attempt to utilize this type of tax policy to solve the aging problem in Taiwan.

In 1999 the chairperson of the Manpower Planning Department of the Council for

Economic Planning and Development (CEPD), Taiwan, suggested the use of a PTE tax policy to encourage Taiwanese families to have their third child. This study demonstrates the validity of this suggestion. However, according to this study, this tax policy could be very costly and thus has since been rebutted by many officials within Taiwan's Ministry of Finance.

Leete (1994) suggests that economic incentives aimed at encouraging childbearing would have to be much generous than those currently offered in several Eastern and Southeast Asian countries. Using the PTE taxation policy might be an alternative means of encouraging people to have more children, but, whether or not the experiences in the U.S.A. and in Taiwan are unique will not be clear until more studies of this nature are conducted in other countries of diverse cultures and income levels.

#### IV. Self Evaluation

The main contribution of this project is to investigate an issue rarely touched by Taiwanese economists and to demonstrate that the value of personal tax exemption has a positive and statistically significant effect on the general fertility rate and the probability of married couples to have one more child.

The first part of this project "Family Income Tax: the Effect on Fertility in Taiwan" was presented in the 2000 Taipei Conference on Public Finance and Welfare, Academia Sinica, Taipei, Taiwan, December 15-16, 2000, and has been submitted to *The Developing Economies*. The second part "Family Income Tax: the Effect on Marital Births in Taiwan" has been submitted to the *Journal of Population Studies*.

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