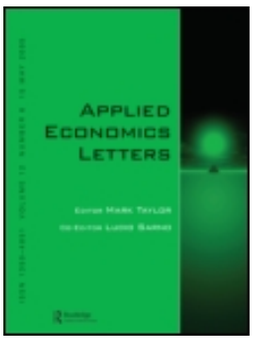

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# The effects of income and children on marital happiness — evidence from middle- and old-aged couples

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# The effects of income and children on marital happiness — evidence from middle- and old-aged couples

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This study finds that marital happiness initially increases with income and then remains more or less constant. It is likely that there exists an optimal number of children.

## I. Introduction

Marital satisfaction has been a long-time concern of sociologists, but not of economists. Although Becker (1981) and Cigno (1991) have developed theoretical models to explain the formation of families from an economic perspective, there has been little research on marital happiness in the economic literature. In spite of economists having recently shown an interest in happiness, in particular in studies (for example, Easterlin, 1995; Kenny, 1999) that found in some developed countries that happiness had stagnated even though income per capita had risen sharply, the focus has tended to be on individuals' satisfaction with life, and little has been written on marital satisfaction. The primary purpose of this study is to examine whether the relationship between happiness and income found in the literature can be applied to explain the marital happiness between couples. Moreover, White *et al.* (1986) and Tsang *et al.* (2003), in depicting a linear relationship between children and marital happiness, conclude that children have a negative effect on marital happiness. An immediate question arises: Why do couples want to have children if children make them unhappier? Therefore, the second purpose of this study is to attempt to find out if there exists an optimal number of children.

## II. The Data

The data used are obtained from the Taiwan Panel Study of Family Dynamics (PSFD). The PSFD starts with 1999, and continues each year. The first cohort, born between 1953 and 1963, was first surveyed in 1999. The second cohort, born between 1935 and 1954, was first surveyed in 2000. The first-year surveys of these two cohorts are combined to form the data set used in this study. The original sample size is 2959. After deleting the divorced, widows and widowers, and taking account of missing data, 1454 observations remain. The data contain detailed information regarding the couples, such as age, educational attainment, family income, years of marriage and the number of children. The marital happiness variable (H) used is the response to the question: 'How strong is your relationship with your spouse?' The answer is based on a five-point scale, ranging from 0 (very weak) to 4 (very strong). Apparently, the responses give rise to ordered data. Table 1 summarizes the relationship between marital happiness and other variables, including the number of children, family income, and years of marriage. A couple with two to four children, a family income of between NT$40,000 and NT$90,000, and a shorter length of marriage tend to have the greatest marital happiness.

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**Table 1. Number of kids, family income, years of marriage and marital happiness**

| Number of kids | Number of observations | Happiness mean | Family income (NT$) | Number of observations | Happiness mean | Years of marriage | Number of observations | Happiness mean |
|---|---|---|---|---|---|---|---|---|
| 0 | 13 | 3.46 | < 20 000 | 499 | 3.42 | < 15 | 221 | 3.62 |
| 1 | 79 | 3.51 | 2–30 000 | 136 | 3.52 | 15–20 | 189 | 3.66 |
| 2 | 431 | 3.57 | 3–40 000 | 133 | 3.52 | 21–25 | 281 | 3.60 |
| 3 | 536 | 3.57 | 4–50 000 | 139 | 3.68 | 26–30 | 219 | 3.57 |
| 4 | 254 | 3.54 | 5–70 000 | 241 | 3.66 | 31–35 | 241 | 3.45 |
| 5 | 94 | 3.41 | 7–90 000 | 103 | 3.68 | 36 < | 303 | 3.41 |
| 6 | 32 | 3.44 | 9–120 000 | 99 | 3.55 | | | |
| 7 | 9 | 3.33 | 12–150 000 | 58 | 3.64 | | | |
| 8 | 6 | 3.17 | 150 000 < | 46 | 3.54 | | | |
| Total/mean | 1454 | 3.54 | | | | | | |

**Table 2. Results of the regressions**

| | (1A) | | (1B) | | (2) | | (2A) | |
|---|---|---|---|---|---|---|---|---|
| | Coeff. | *t* value | Coeff. | *t* value | Coeff. | *t* value | Coeff. | *t* value |
| Constant | 2.738 | 11.450*** | 2.738 | 11.454*** | 2.628 | 10.699*** | 2.845 | 13.136*** |
| $K$ (# of kids) | 0.192 | 2.103** | 0.192 | 2.105** | 0.181 | 1.981** | 0.02 | 0.639 |
| $K^2$ | −0.024 | −2.042** | −0.024 | −2.042** | −0.022 | −1.879* | | |
| MAYR | −0.013 | −2.884*** | −0.013 | −2.886*** | −0.01 | −2.198** | −0.009 | −1.94* |
| $I$ (Income) | $3.1 \times 10^{-4}$ | 0.430 | $3.3 \times 10^{-4}$ | 0.578 | 0.005 | 2.076** | 0.006 | 2.223** |
| $I^2$ | $1.4 \times 10^{-8}$ | 0.032 | | | | | | |
| $(I - I_1^*) D_1$ | | | | | −0.005 | −1.998** | −0.005 | −2.148** |
| SEX | −0.119 | −1.738* | −0.119 | −1.742* | −0.131 | −1.919* | −0.13 | −1.909* |
| EDUH | 0.007 | 0.655 | 0.007 | 0.658 | 0.002 | 0.163 | 0 | 0.041 |
| DEDU | 0.010 | 0.868 | 0.010 | 0.875 | 0.013 | 1.132 | 0.013 | 1.146 |
| DAGE | −0.008 | −1.225 | −0.008 | −1.225 | −0.006 | −0.938 | −0.007 | −1.037 |
| WORKH | 0.001 | 0.745 | 0.001 | 0.747 | $2.5 \times 10^{-4}$ | −0.169 | $1.8 \times 10^{-4}$ | −0.124 |
| $\mu_1$ | 0.512 | 6.578*** | 0.512 | 6.578*** | 0.513 | 6.574*** | 0.513 | 6.582*** |
| $\mu_2$ | 1.438 | 31.791*** | 1.438 | 31.792*** | 1.439 | 31.792*** | 1.437 | 31.776*** |
| $\mu_3$ | 2.352 | 50.366*** | 2.352 | 50.366*** | 2.356 | 50.375*** | 2.352 | 50.351*** |
| Log-likelihood | −1285.133 | | −1285.134 | | | | −1283.169 | |

*Notes*: *** 1% significance; ** 5% significance; * 10% significance.
$\mu_1$, $\mu_2$, and $\mu_3$ are the lower limits of categories 1, 2, and 3, respectively.

## III. The Econometric Model

Since happiness is ordered and discrete, an ordered probit model is used. As mentioned earlier, it is found in the literature that income is unlikely to enter the regression in a linear form. The traditional model, like Equation 1, uses a quadratic equation to fit the happiness regression.

$$H_i = \beta_0 + \beta_1 \boldsymbol{X}_i + \delta_1 K_i + \delta_2 K_i^2 + \alpha_1 I_i + \alpha_2 I_i^2 + \varepsilon_i \tag{1}$$

where $\boldsymbol{X}_i$ is a character vector, excluding family income ($I_i$), the number of children ($K_i$) and its square ($K_i^2$) in the case of respondent $i$, and $\varepsilon_i$ is the error term which follows a standard normal distribution. $\boldsymbol{X}_i$ includes sex (male is 1), years of marriage (MAYR), age difference (DAGE = husband's − wife's), the husband's educational attainment (EDUH), the difference in terms of educational attainment (DEDU = husband's − wife's), and working hours per week (WORKH). The problem is that neither of the coefficients $I_i$ and $I_i^2$ is significant in quadratic form, as shown in (1A) in Table 2. Even though Equation 1 degenerates to a linear form of family income, as shown in (1B) in Table 2, it is still not significant. The conclusion from this is that income is irrelevant to marital hap-

piness, a finding that surely goes against common sense.

However, there is an alternative to Equation 1 which is to use a piecewise regression model. That may be expressed as in Equation 2 below:

$$H_i = \beta_0 + \beta_1 X_i + \delta_1 K_i + \delta_2 K_i^2 + \left[ \alpha_1 I_i + \sum_{j=1}^{J} \gamma_i (I_i - I_i^*) D_j \right] + \varepsilon_i \qquad (2)$$

where $I_j^*$ is the $j$th breaking point, $D_j$ is the dummy variable which is 1 if $I_i > I_j^*$, and $J$ is the number of breaking points. Neither $I_j^*$ and $J$ are assigned in advance, but are instead determined by the data. More specifically, the search for the first breaking point, $I_1^*$ ($j=1$), starts with NT\$5000 (about US\$180), to which NT\$1000 is then added each time, with $D_j$ being correspondingly defined, as either one or both $t$ values of $\alpha_1$ or $\gamma_1$ is insignificant at the 5% level. The search for the first breaking point will stop if both of the $t$ values for $\alpha_1$ and $\gamma_1$ are significant. Then, to avoid multicollinearity, the search for the second breaking point, $I_2^*$ ($j=2$), starts with $I_1^* + \text{NT\$5000}$, using the same procedure as for finding the first breaking point, but based on the condition that all of the $t$ values of $\alpha_1$, $\gamma_1$, and $\gamma_2$ are significant at the 5% level. This searching procedure will stop at the $j$th breaking point if one or more of the $\alpha_1$, $\gamma_1$ to $\gamma_j$, is not significant at the 5% level when the breaking point has reached the maximal income in the data set.

## IV. Results and Discussion

The searching procedure involves stopping at $j=1$, and the first (and the only) breaking point is NT\$45 000. The results are shown in Column 2 in Table 2. Before family income reaches NT\$45 000, each increase of NT\$1000 changes the probability of this individual shifting to five different happiness categories. Since $\alpha_1$ is positive and significant at the 5% level, this ensures that the probability assigned to the happiest category ($H=4$) rises, while that relating to the worst category ($H=0$) declines.

After reaching NT\$45 000, all of the marginal probability effects above turn out to be replacing $\alpha_1$ with $\alpha_1 + \gamma_1$. However, $\alpha_1 + \gamma_1$ is very close to 0, and its $t$ value is only 0.491. This implies that after family income reaches NT\$45 000, income has no significant effect on marital happiness. This conclusion is actually consistent with Table 1. Table 1 shows that marital happiness reaches the maximum when family income is about NT\$40 000 to NT\$50 000, and then remains more or less constant until NT\$90 000 is reached. Though it seems to decline beyond NT\$90 000, the number of observations decreases so as to not provide convincing evidence of the declining trend in the regression.

In addition to income, years of marriage is negative and significant at the 5% level, and SEX is significant at the 10% level. The former means that, the longer the marriage, the less happy the marriage will be. This finding coincides with Table 1. The latter implies that husbands are generally less happy than their wives. The number of children is positive and significant at the 5% level, and its square is negative and significant at the 10% level. This implies that children can increase marital happiness, but only at a decreasing rate. As a matter of fact, the coefficients imply that the optimum number of children is about four. It is possible that the number of children might be an endogenous variable. That is, the happiness of a marriage may be a determinant of the number of children for a couple. When the Wu-Hausman test is conducted, the exogeneity cannot be rejected.[1] Table 1 seems to show that, as concluded by White *et al*. (1986) and Tsang *et al*. (2003), the more children there are, the less happy the couples become. To see whether a negative linear relationship exists between the number of children and marital happiness, (2A) in Table 2 intentionally omits the square of the number of children ($K^2$). The number of children is found not to be significant, leading to the conclusion that the linear model does not appropriately explain the relationship between the number of children and marital happiness in relation to the data set.[2]

[1] The test procedure follows Johnston and DiNardo (1997), pp. 257–59. The instrumental variables for $K$ and $K^2$ are MAYR, the husband's wage, educational attainment and age, and the wife's wage, educational attainment and age. It should be noted that since the number of children is a nonnegative integer, the Poisson model is used. Estimates of $\hat{K}$ and $\hat{K}^2$ are then added in Equation 2, and a $x^2$ statistic with 2 degrees of freedom is computed. The $x^2$ is found to be 0.808 and its $P$ value is 0.668. Therefore, exogeneity cannot be rejected.

[2] One might doubt that different income levels could result in different optimal numbers of children. The intersection of $I \times K$ is also tested in each model, but it is insignificant and does not change the conclusion.

## V. Conclusion

This study finds that marital happiness initially increases with income and then remains more or less constant. The number of children does not cause marital happiness to linearly deteriorate. On the contrary, it is likely that there exists an optimal number of children.

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