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COUNTERCYCLICAL FERTILITY IN CANADA: SOME EMPIRICAL RESULTS

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Résumé — Cette étude trouve une évidence empirique pour appuyer la prétention que le comportement de la fécondité canadienne a été contrecyclique durant la période 1948-1984, basée sur un modèle proposé par Butz et Ward. En utilisant des donnés globales pour le taux total de fécondité, les salaires des époux et des épouses et la proportion des femmes employées, on a eu recours à l'analyse de regression multivariée afin d'appuyer l'hypothèse contrecyclique. Une comparaison des résultats américains et canadiens indique qu'il n'y a pas de différence importante dans l'ampleur des souplesses estimées tout le long de 1975. Cependant, l'évidence canadienne après 1975 suggère que d'autres variables, comprenant peut-être la politique publique, ont aussi joué un rôle dans la fixation du comportement de la fécondité.

Abstract — This paper finds empirical evidence to support the claim that Canadian fertility behaviour has been countercyclical over the period 1948-1984 based on a model proposed by Butz and Ward (1979). Using aggregate data for the total fertility rate, male and female earnings and the proportion of women employed, multivariate regression analysis is used to support the countercyclical hypothesis. A comparison of American and Canadian results indicate that there is not a significant difference in the magnitude of the estimated elasticities through 1975. However, Canadian evidence after 1975 suggests that other variables, perhaps including public policy, have also played a role in determining fertility behaviour.

Key Words — fertility, economic-demographic interactions

Introduction

The most developed approach to modeling fertility behaviour is based on standard microeconomic demand theory (see, for example, Becker, 1960, 1965; Mincer, 1963). Maximizing utility, subject to the household budget constraint, results in a specification where the demand for children depends on the price (cost) of children, the prices of complements (such as the costs of education and daycare), household income, personal preferences and technology (for example, better birth control methods). Empirical studies of fertility behaviour, which were generally based on cross-sectional data, found that when the cost of children was held constant, fertility varied directly with household income (the income effect), and, when household income was held constant, fertility varied inversely with the price of children (the substitution effect).

Since most of the studies were cross-sectional, they did not provide information on the impact of aggregate economic activity on fertility over time. Until the baby bust of the 1960s, it was widely accepted, in many disciplines, that fertility varied directly with the business cycle. After the bust, researchers looked to non-economic factors, such as changes in preferences and technology, to explain the declining fertility profile.

Time-series research, when it was undertaken, followed in the tradition of the microeconomic model (see, for example, Gregory *et al.*, 1972, or Wachter, 1975; Easterlin [1969] proposed an expanded model which also included "supply" factors). Butz and Ward (1979) developed a model which attempted to explain both the baby boom of the 1950s and the baby bust of the 1960s as experienced in the United States, basically relying on an economic model. An important feature of the Butz and Ward model was the inclusion of both male and female earnings and the differentiation between households in which the wife was part of the labour force and households in which she performed non-labour-market activities. On the basis of the data and their time-series approach, they concluded that fertility had moved countercyclically during the period from the end of World War II until 1975. To support this conclusion of countercyclical fertility, they relied partly on the pattern of the residuals from their regression, partly on out-of-sample prediction and partly on the larger absolute value of the elasticity of fertility with respect to the female wage rate than with respect to male income.

The purpose of this paper is to employ the Butz and Ward methodology to compare the American and Canadian experiences through 1975. Our results indicate that the Canadian data also support the hypothesis of countercyclical fertility. The paper also extends the period of analysis to 1984, and our findings suggest that, even with the severe recession of 1981-1982, fertility behaviour continued to exhibit a countercyclical pattern.

Even a casual examination of the data suggests that fertility may be countercyclical in Canada. When the unemployment rate was at its minimum in 1965 and 1966 (at roughly 3.6 per cent), the decline in the total fertility rate (as measured by the annual change) was at its maximum over the entire period from 1948-1984. Similarly, in the early 1980s when the unemployment rate had increased to over 11 per cent, the decline in the total fertility rate had slowed substantially and even increased slightly in 1984.

A comparison between Canada and the U.S.A. is quite useful given the different situations in the two countries. First of all, the baby boom in Canada was of somewhat smaller magnitude, and the timing of the boom and bust did not coincide exactly with that in the U.S.A. Second, there are a number of social programmes in Canada, which typically do not exist in the U.S.A., that may affect fertility behaviour. For example, the family allowance programme and maternity benefits paid under the unemployment insurance programme are available in Canada and, while difficult to quantify, they may have an effect on fertility behaviour.

The outline of this paper is as follows: the next section briefly reviews the Butz-Ward model and sets out the model to be estimated. The third section discusses the data, its sources and construction where appropriate. The fourth section presents the estimation results, and the final section summarizes the paper.

The Model

The model used in this paper follows the Butz and Ward (1979) model of countercyclical fertility behaviour. The Butz-Ward model incorporates the difference in the fertility behaviour of employed and non-employed wives. In the model, an increase in the husband's income, *ceteris paribus*, will cause a greater increase in fertility among wives who are already employed relative to those who are not employed. This follows from the substitutability of income from male and female sources.

If the income of the husband rises, fewer hours need to be spent by the wife participating in labour market activities. The opportunity cost of her time, in the basic Butz-Ward model, will continue to be her wage rate. Since non-employed wives cannot spend fewer hours in the labour market, the shadow price of their time will vary with the husband's income alone. If the husband's income increases, fertility will increase.

In this model, there are three possible reactions to an increase in the female wage rate. First, if the new wage rate is still below the reservation wage, then the woman would not enter the labour force and there would be no change in the probability of having a child. Second, if the female wage increase is sufficient to induce some women to enter the labour force, then the probability of a birth will decrease by a proportion of the women who become employed. Finally, an increase in the wage of an employed woman would raise the opportunity cost of having children and would thus reduce the probability of her having a child.

Following the basic model developed by Butz and Ward (and using their notation), the probability of a woman in her childbearing years having a birth in a given year (denoted by B) is specified as

$$B = \begin{cases} B_1 = B_1(Y_m, W_f(Y_m), X) \\ \quad = B_1(Y_m, X) & \text{Non-employed Wives} \\ \\ B_2 = B_2(W_f, Y_m, X) & \text{Employed Wives} \end{cases} \tag{1}$$

In this formulation, the probability of a birth depends on the income of the husband (Y_m), the female wage rate (W_f) representing the opportunity cost of the wife's time, and a vector of other variables (such as tastes and preferences) given by X. The opportunity cost for a non-employed wife (W_f) is a function of her husband's income.

Define K as the proportion of households in which the wife is employed, then system (1) can be re-written as

$$B = (1-K)\, B_1 + K\, B_2 \tag{2}$$

That is, the total probability of a birth is a weighted average of the probability of a birth to a woman who is non-employed or employed.

The change in the probability of a birth can arise from changes in the female wage rate, male income, or changes in the labour force status of a woman. These changes in labour force status arise through changes in K which, in turn, are a result of changes in the female wage rate or male income.

Totally differentiating equation (2) and substituting expressions for db_1, dB_2 and dK, the specification of the Butz and Ward model is obtained as

$$dB = (1\text{-}K)\,(ÇB_1/ÇY_m)\,dY_m + K\,((ÇB_2/ÇW_f)\,dW_f + (ÇB_2/ÇY_m)$$
$$dY_m) + B_2\text{-}\,B_1)\,((ÇK/ÇW_f)\,dW_f + (ÇK/ÇY_m)\,dY_m) \qquad (3)$$

This equation is transformed into elasticities, and the last term, which is small in magnitude since it is the difference in birth probabilities, is eliminated. This results in

$$d(lnB) = ((B_1/B)\,óB_1Y_m)\,(1\text{-}K)\,d(lnY_m) + ((B_2/B)\,óB_2Y_m)\,K$$
$$d(lnY_m) + ((B_2/B)\,óB_2W_f)\,K\,d(lnW_f) \qquad (4)$$

where *óxy* is the elasticity of *x* with respect to *y*.

This formulation implies that a change in male income affects the probability of a birth which is a weighted average of the income elasticities with weights depending on the proportion of employed and non-employed wives. The effect of a change in the female wage rate is proportional to the ratio of employed females to the total number of females (as given by *K*).

A functional form of equation (4) is given by

$$ln(B) = \alpha_0 + \alpha_1 K\,ln(Y_m) + \alpha_2 (1\text{-}K)\,ln(Y_m) + \alpha_3 K\,ln(W_f) \qquad (5)$$

where $\alpha_1 > 0$, $\alpha_2 > 0$, $\alpha_3 < 0$. The expectation that a_3 is negative implies that the substitution effect associated with an increase in the female wage rate outweighs the income effect. That is, while it could be argued that an increase in the wife's earnings may be sufficient to increase household income to the extent that the family can acquire more of all normal goods (including children), it is hypothesized that the substitution effect, which raises the opportunity cost of non-labour-market activity, dominates this income effect.

Collecting terms in equation (5) and incorporating time subscripts, results in a possible specification to be estimated:

$$ln(B_t) = \beta_0 + \beta_1 K_t\,ln(Y_{mt}) + \beta_2\,ln(Y_{mt}) + \beta_3 K_t\,ln(W_{ft}) + \varepsilon_t \qquad (6)$$

where B_t = fertility rate in period *t*

K_t = (1-female unemployment rate/100)*(female participation rate) in period *t*

= ratio of the number of females employed to the number of women in the source population

Y_{mt} = annual male income in constant dollars in period

W_{ft} = female hourly wage rate in constant dollars in period t

ε_t = random disturbance term

The Data

The dependent variable in this analysis is the log of the total fertility rate. The total fertility rate is defined as the hypothetical number of children a woman would have by the end of her childbearing years if she were subject to the set of current period fertility rates. This figure is different from the birth rate (defined as the number of births per thousand women) since the total fertility rate is independent of age structure.

Unfortunately, reliable, consistent time-series data for male income and the female hourly wage rate do not exist for Canada for the entire sample period 1948-1984. As a result, these series must be constructed based on data from published sources. Because of the importance of these estimates in the results that follow, the construction of these variables is set out in some detail.

For the period from 1963 to 1984, the data for both male income and the female wage rate are based on Taxation Statistics of Revenue Canada. In particular, the data are from category "employees" in the table titled "All Returns by Age, Sex and Occupation." This category is likely the most appropriate since for the female wage it better measures the opportunity cost of having a child. These data are converted into an hourly wage rate (by dividing by the hours worked by week multiplied by 52) before entering the regressions. Male income is, however, left in annual terms and, as noted by Butz and Ward, this, in effect, assumes that the hours worked by men are independent of current fertility.

For the period from 1947 to 1962, male annual income is derived from industrial weekly wages and male employment, by industry. The time series for current dollar male annual income ($Y_m\$$) is computed as

$$Y_m\$ = 52\ \Sigma_i(WEEKW_i{*}MEMP_i)/\ \Sigma_i\ MEMP_i$$

where $WEEKW_i$ = average weekly wage for all employees in the ith industry,

$MEMP_i$ = number of male employees in industry i.

The industries included in this calculation are forestry; mining; manufacturing; construction; transportation, communication and storage; public administration; trade; finance, insurance and real estate; and other services.

The current dollar annual male income is a weighted average of industrial weekly wages where the weights are the share of male employment in each industry. In some sense, this measure provides a lower bound for the estimate of male income since it assumes that male and female employees receive the same weekly wage by industry. Aggregate male income is different from female income only in the sense that men historically may have acquired skills appropriate for employment in higher paying industries.

A time series is available for the hourly female wage rate (in current dollars) in the manufacturing sector from 1947 to 1969, but there is a gap in the data for the years 1961 and 1962 when the survey was not taken. In order to fill in the gaps in this series, the female hourly wage rate in manufacturing, *FWAGE*, was related to the aggregate manufacturing wage rate, *INDUST* (which is available for all years and is calculated as the average weekly earnings of an employee in manufacturing divided by the average number of hours worked per week) and a dummy variable (*SICDUM*) to account for changes for changes in the Standard Industrial Classifiçation which occurred in 1961. This variable has a value of zero until 1956, and a value of 1 thereafter (the data are based on the 1961 Standard Industrial Classification from 1957 to 1969) and enters as both an intercept and slope dummy. The result of this regression was:

$$FWAGE_t = \underset{(5.10)}{0.1306} + \underset{(27.10)}{0.5363}\ INDUST_t + \underset{(5.67)}{0.12854}\ (INDUST_t{*}SICDUM_t) - \underset{(7.29)}{0.2695}\ SICDUM_t$$

$R^2 = .999$; D.W.(adjusted for 1 gaps) = 1.41; Sample = 1947-1969
17 degrees of freedom

Substituting in the explanatory variable values for 1961 and 1962 yields estimates for the female wage rate in manufacturing for these years. As an alternative to this female manufacturing wage rate series, the wage rate for all service industry employees was used for the period from 1947 to 1962 to proxy the female wage rate. However, the results reported in the next section did not change significantly with this alternative measure.

In order to obtain constant dollar male income and female hourly wage rates, the current dollar series were deflated by the 1981-based Consumer Price Index (CPI).

The female employment ratio, *K*, can be computed either by using the female unemployment rate and labour force participation rate for all women or by using the ratio of female employment to the total female civilian non-institutional population as reported by Statistics Canada. The data are included as Appendix A to this paper.

Estimation Results

Following Butz and Ward, a technique of two stage least squares is used to estimate the model. *K* is treated as endogenous since changes in fertility behaviour are likely to affect female labour force participation. In choosing appropriate instruments, Heckman and Willis (1977) argue that the transaction cost of taking a job — such as search activities and other fixed costs incurred by both employer and employee — make it more likely that a woman will work this period if she worked last period. This is especially true if it meant that she would have to incur many of these costs again if she chose to leave and then re-enter the labour market at some point in the future. Thus, there is a state dependence in labour market behaviour indicating that lagged female employment should be one of the instruments.

Butz and Ward use current and lagged female wage rates and male income as instruments for *K*. This leaves out lagged female employment, although they do acknowledge that this instrument should theoretically be included. They do not report their results using all of the instruments as they claim that "since the data on employment ratios are highly serially correlated, there remains some doubt that *K* has been purged of its endogenous component" (1979:322, footnote 11). For completeness, results using both sets of instruments are presented in this paper.

While the basic model estimated for the Canadian data is that of equation (6), two dummy variables are introduced. One dummy variable, *LFSDUM*, with a value of 1 until 1965 and zero thereafter, is included to capture any structural changes that may have occurred in the relationship as a result of the change in the labour force survey in 1966. The other dummy variable, *DUM*63, is used to account for the change in definition of the male income and female wage rate data that begins in 1963. *DUM*63 has value 1 from 1948 through 1962 and is zero thereafter. These variables are included as intercept dummies only.

Results for the United States and Canada covering the period 1948 through 1975 are presented in Table 1. Since *t*-statistics must be interpreted with caution when using two stage least squares with small samples, *F* statistics are also shown as summary measures of the explanatory power of the regressions.

The regression results give considerable support to the hypothesis of countercyclical fertility in Canada and are very similar to the results found for the U.S.A. by Butz and Ward. They are also in general agreement with the aggregate results of Ram and Norland (1982) for Canada. In general, all variables are significant and have the expected signs. Importantly, the sign of the estimated coefficient on the female wage rate — reflecting the opportunity cost of having a child — is negative, while the sign of the estimated coefficient on male income — reflecting a measure of household income — is positive. The estimated coefficient on the variable $K\ ln(Y_m)$ is not significantly different from zero in the Canadian regression using the same instruments as in Butz and Ward. This is likely due to the aggregate nature of the data used. The fertility behaviour of older female age groups is likely not affected as much by male income as is that of the younger age groups due to a build-up of wealth, health considerations of the women and preferences. Consequently, on aggregation, this effect may net out. Indeed, Butz and Ward find the estimated coefficient on this variable is negative and significant for the 20-24 age group. However, in the Canadian case, leaving out the variable $K\ ln(Y_m)$ did not change the regression results significantly. The coefficient on $ln(Y_m)$ increased in magnitude to 1.5 and the significance of the coefficient on the dummy variable for the definition change in the labour force was reduced.

The elasticities for male income and the female wage rate are presented in part B of Table 1. These elasticities are calculated as follows: the elasticity of fertility with respect to the female wage rate is $(K\beta 3)$ while the elasticity with respect to male income is $(K\beta 1 + \beta 2)$. The elasticities and standard errors are calculated at the sample mean of *K*. Using either set of instruments, the Canadian results are very similar to those in the U.S.A. A one per cent increase in male income in Canada increases the fertility rate by approximately 1.4 per cent, but it is reduced by 1.5 per cent for a one per cent increase in the female wage rate, *ceteris paribus.*

Butz and Ward also report results for different childbearing age groups and find that their hypothesis is supported for the 20-24 and 25-34 age groups, but not for the 35-39 group. Ram and Norland (1982) find that Canadian data for the 15-24, 20-24 or 20-44 age groups do not support the Butz-Ward hypothesis. However, Canadian data on male income and female wage rates are of dubious quality for these different age groups and were estimated by Ram and Norland

TABLE 1. U.S. AND CANADIAN TOTAL FERTILITY RATE REGRESSION RESULTS, 1948-1975

A. Regression Results

	Constant	$K \ln(W_f)$	$\ln(Y_m)$	$K \ln(Y_m)$	LFSDUM	DUM63
U.S. Results	-4.570 (1.64)	-4.745 (2.93)	1.316 (2.51)	-0.239 (0.04)	--	--
	$R^2 = .95$	D.W. = 1.53	24 degrees of freedom			
Canadian Results I	-10.264 (3.93)	-5.236 (5.08)	1.213 (3.48)	0.573 (1.50)	0.259 (2.14)	0.342 (4.00)
	$R^2 = .97$ $F(5,22) = 180.48$	D.W. = 1.81	22 degrees of freedom			
Canadian Results II	-10.009 (4.03)	-5.339 (5.81)	1.173 (3.72)	0.626 (2.09)	0.275 (2.77)	0.351 (4.68)
	$R^2 = .97$ $F(5,22) = 171.55$	D.W. = 1.80	22 degrees of freedom			

B. Elasticities

	Female Hourly Wage	Male Annual Income
U.S. Results	-1.732 (2.93)	1.308 (4.24)
Canadian Results I	-1.548 (5.08)	1.383 (4.85)
Canadian Results II	-1.579 (5.81)	1.358 (4.88)

Notes:

1. Absolute value of t-statistics given in parentheses. D.W. = Durbin Watson statistic.
2. U.S. results from Butz and Ward (1979), Tables 1 and 2.
3. Canadian Results I : use current and lagged wages and income as instruments as well as LFSDUM and DUM63.
4. Canadian Results II: use current income and wages, lagged female employment, LFSDUM and DUM63 as instruments.
5. Elasticities are calculated at the mean of K over the sample period 1948-1975 (0.2957).

for the non-survey years. Because of the importance of these data in this analysis, it is preferable to analyze the total fertility rate only.

With the recession of 1981-1982, another opportunity arises to examine the hypothesis that fertility is countercyclical. As a result, the period of analysis was extended to 1984. Table 2 sets out the results for the period 1948-1984. As this table shows, the magnitude, signs and summary statistics for both specifications are very similar as are the elasticities set out in part B of Table 2.

In order to further examine these results, the null hypothesis that the elasticities on male income and female wage rates are the same magnitude, but opposite in sign, was undertaken for the first two sets of results in Table 2. The computed absolute *t*-statistics are 1.41 for Canadian Results I and 2.80 for Canadian Results II. In the second case, the null hypothesis that the elasticities are the same could be rejected at the five per cent level of significance. This indicates that if both male income and the female wage rate increase by one per cent, the net effect is a statistically significant decline in the fertility rate. Finally, note that the elasticities in Table 2 are calculated at the mean of K. In fact as K changes these elasticities change in different ways. For Canadian Results II, the female wage rate elasticity becomes more negative over the sample, beginning at -0.99 in 1948 and reaching -2.02 by 1984. At the same time the male income elasticity rises from 0.68 in 1948 to 0.87 in 1984. This may suggest that fertility is becoming more countercyclical over time.

While the model extended to 1984 still fits the data very well, the results exhibit some autocorrelation. This is likely caused by an omitted variable and a candidate may be social programmes introduced by the government which effectively reduce the opportunity cost of childbearing. For example, family allowance benefits increased substantially in the 1970s and, with the unemployment insurance revisions of 1971, maternity benefits were paid for 15 weeks. While it is beyond the scope of this paper to assess the effect of these separate programmes on fertility (for an examination of this issue, see Hyatt and Milne, 1991), a dummy variable is introduced for the period 1971 through 1984 in an attempt to proxy the introduction of the programmes. In this case, the dummy is introduced multiplicatively with the variable $K\ ln(W_f)$ and the results are shown in Table 2 as Canadian Results III. The introduction of this variable eliminates the autocorrelation and substantially reduces the elasticity of the fertility rate with respect to the female wage rate. This indicates that there was some effect on fertility post-1970 likely caused by government programmes.

Finally, it is worth considering whether the model can predict future fertility rates with any accuracy. To undertake this, data for the dependent and independent variables were collected for 1985 and 1986 and out-of-sample forecasts

TABLE 2. CANADIAN TOTAL FERTILITY RATE REGRESSION RESULTS, 1948-1984

A. Regression Results

	Constant	K $\ln(W_f)$	$\ln(Y_m)$	K $\ln(Y_m)$	LFSDUM	DUM63	DK $\ln(W_f)$
Canadian Results I	-4.492 (2.98)	-3.821 (2.56)	0.516 (3.29)	0.646 (1.53)	0.401 (4.27)	0.288 (2.40)	--
	R^2 = .97 F(5,31) = 224.62		D.W. = 1.11	31 degrees of freedom			
Canadian Results II	-4.614 (3.04)	-4.272 (4.83)	0.505 (3.23)	0.778 (3.29)	0.426 (6.67)	0.320 (3.86)	--
	R^2 = 0.97 F(5,31) = 213.91		D.W. = 1.17	31 degrees of freedom			
Canadian Results III	-2.941 (2.59)	-1.135 (1.40)	0.404 (3.53)	0.147 (0.77)	0.325 (6.91)	0.193 (3.13)	-0.385 (5.35)
	R^2 = 0.98 F(6,30) = 358.07		D.W. = 2.03	30 degrees of freedom			

B. Elasticities

	Female Hourly Wage	Male Annual Income
Canadian Results I	-1.273 (2.56)	0.732 (3.75)
Canadian Results II	-1.423 (4.83)	0.764 (4.23)
Canadian Results III	-0.650 (2.18)	0.467 (3.03)

Notes:

1. The first two sets of results are based on different instruments as described in the notes to Table 1. The elasticities are computed at the mean of K over the sample period 1948-1984 (0.3331).

2. Canadian Results III are based on the set of instruments as for the Canadian Results II and the elasticities are computed at the mean of K over the period 1971-1984 (0.4278).

were done on the basis of the results in Table 2. Table 3 presents these results. The results indicate that all three models predict the total fertility rate for 1985 and 1986 quite well, especially Models II and III. In these cases the percentage error, on average, is under 3 per cent. This is further evidence of support for the countercyclical results found in this paper.

Conclusions

This paper has examined the hypothesis that fertility may be countercyclical in Canada, as has been suggested by Butz and Ward for the U.S.A. For the sample period 1948-1984, there is support for this hypothesis as indicated by the significant difference in male income and female wage elasticities, the fit of the model to the data in terms of capturing the turning points and even through a casual examination of the data.

Robinson and Tomes (1982) find that, in a model of lifetime completed fertility, an increase in the lifetime value of the mother's time actually increases the number of children. It is important to note that this paper deals with *current* fertility and, consequently, the results here are not necessarily inconsistent with those of Robinson and Tomes. Indeed, as Robinson and Tomes note, when they deal with current variables they do obtain the result that children are a female-time intensive activity.

The results in this paper suggest research in several areas. Government programmes which may affect the opportunity cost of children should be measured in order to correctly capture their role in the fertility decision. In addition, there may be non-government programmes that should also be included (for example, the willingness of firms to allow female employees to return to work after maternity leave reduces the cost of job search and therefore lowers the opportunity cost of having a child). It would also be useful, from an empirical point of view, to disaggregate fertility rates by age group. This would allow for different elasticities with respect to the female wage rate for different age groups. Another useful extension would be a regional breakdown. For example, with the sharp decline in fertility rates in Quebec, it would be useful to examine the role of economic variables in this provincial decline.

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TABLE 3. OUT-OF-SAMPLE PREDICTIONS
(PER CENT ERROR)

	Model I	Model II	Model III
1985	4.00	2.40	2.23
1986	4.64	2.47	3.62
Average	4.32	2.44	2.93

Notes:
1. These figures are based on the results reported in Table 2.

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APPENDIX A: DATA

	FERT	YM	FEMWAG	K	CPI
1947	3.595	1771.0	0.58	0.23682	0.20783
1948	3.441	1964.0	0.65	0.23113	0.23725
1949	3.456	2114.0	0.68	0.23144	0.24483
1950	3.455	2210.0	0.72	0.22637	0.25208
1951	3.503	2447.0	0.82	0.23041	0.27867
1952	3.641	2655.0	0.86	0.23149	0.28517
1953	3.721	2823.0	0.91	0.23030	0.28283
1954	3.828	2903.0	0.93	0.23044	0.28458
1955	3.831	3006.0	0.95	0.23294	0.28500
1956	3.858	3182.0	1.00	0.24404	0.28925
1957	3.925	3355.0	1.05	0.25198	0.29833
1958	3.880	3470.0	1.08	0.25285	0.30608
1959	3.935	3599.0	1.11	0.25893	0.30958
1960	3.895	3734.0	1.14	0.26876	0.31350
1961	3.840	3875.0	1.20	0.27619	0.31650
1962	3.756	4059.0	1.24	0.28080	0.32033
1963	3.669	4397.7	1.13	0.28608	0.32567
1964	3.502	4617.9	1.18	0.29555	0.33158
1965	3.145	4900.1	1.21	0.30500	0.33975
1966	2.812	5264.3	1.28	0.34190	0.35242
1967	2.597	5584.7	1.37	0.35124	0.36525
1968	2.453	5966.0	1.49	0.35493	0.37992
1969	2.405	6482.6	1.60	0.36237	0.39700
1970	2.331	6916.8	1.74	0.36107	0.41042
1971	2.187	7367.4	1.85	0.36782	0.42192
1972	2.024	8243.4	2.05	0.37426	0.44225
1973	1.931	9134.4	2.26	0.39106	0.47592
1974	1.875	10578.6	2.61	0.40241	0.52775
1975	1.852	12102.3	3.07	0.40752	0.58467
1976	1.825	13619.5	3.58	0.41361	0.62858
1977	1.806	14797.4	3.90	0.41705	0.67892
1978	1.757	15845.3	4.20	0.43276	0.73933
1979	1.764	17195.6	4.55	0.44703	0.80700
1980	1.746	19120.3	5.09	0.46155	0.88908
1981	1.704	21222.4	5.75	0.47431	1.00000
1982	1.694	23709.5	6.56	0.46073	1.10783
1983	1.680	24786.0	6.87	0.46515	1.17225
1984	1.686	25986.5	7.20	0.47346	1.22317

FERT = Total Fertility Rate
YM = male annual income: 1947-1962 as described in the text; 1962-1984 from *Taxation Statistics*.
FEMWAG = female wage rate: 1947-1962 as described in text; 1962-1984 from *Taxation Statistics*.
K = female employment ratio = female employment/female population
CPI = Consumer Price Index, 1981 = 1.0.