Canadian Studies in Population, Vol. 12 (1), 1985, pp. 1-30

THE FERTILITY RATE IN CANADA, 1950-1976: A SOCIO-ECONOMETRIC ANALYSIS

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Abstract — This paper attempts to explain the declining fertility rate in Canada since the mid-fifties, a phenomenon that Canada has shared with much of the Western world. Use is made of a four-equation model, which determines simultaneously the fertility rate, an age-specific female labour force participation rate, age-specific marital ratio (proportion of women who are married) and the infant mortality rate. Our findings support the view that the age-specific female labour force participation rate (20-44 years) and the age-specific marriage rate (15-44 years) were the most important variables in determining the fertility rate over the sample period. Other important findings are: (1) the relative roles of female education, wage rate and divorce rate in determining the female participation rate; (2) support for both the "additional worker" and "discouraged worker" hypotheses as possible motivations for female participation in the labour force; and (3) the conclusion that the availability of eligible males (per female) is perhaps the most important determinant of the marital ratio.

Key Words — **fertility, socio-economic factors**

Introduction

The post-war decline in fertility experienced in the West has stimulated a substantial body of research designed to analyze the extent to which economic causes help explain this phenomenon. This paper is an attempt to study this problem using Canadian data. In contrast with some earlier attempts (Adelman, 1963; Weintraub, 1962), the present study examines this problem in the context of an interdependent system and thus reflects views expressed by Okun (1965), Simon (1969) and Schultz (1973). As such, our approach shares certain common features with Madduri and Gupta (1974) and Singh and Chari (1974) although our model specification differs from these earlier attempts in some important respects. Definitions of variables and statistical methodology are discussed in the next section, the model and empirical results follow.

Measurement of Variables and Choice of Statistical Methodology

Before we discuss the specification and estimated results of our system of equations, it is appropriate to explain the variable legends and their measurement and the estimation technique employed in this paper. The variable symbols and their definitions are shown below.

Endogenous Variables

GFR : General Fertility Rate (number of live births per 1000 females, aged 15-49);

FPR : Female Participation Rate in the 20-44 age group (percent) = 100 x (number of females 20-44 in the labour force/number of females 20-44 years);

MR : Proportion Married among females 15-44 years (percent) = 100 x (married females 15-44 years/number of females 15-44 years);

IMR : Infant Mortality Rate (number of infant deaths per 1000 live births);

Predetermined Variables

EDF : Educational Level of Female Population = median number of years of schooling attained by women, not attending school, 15-44 years old;

RDIV : Divorce Rate = (number of divorces per 100,000 married females, 15-44 years age group);

POPRATIO : Male-Female Population Ratio in the 15—44 years age group;

YPC : Per Capita Income (five-year average of per capita personal disposable income at 1971 prices);

HCS : Hospital Rated Capacity (number of hospital beds and cribs per 1000 population);

URATEP : Unemployment Rate Among Males in the Prime (25-55) age group;

URATEF : Unemployment Rate Among Females;

WSER : Average Weekly Wages and Salaries in the "Service" Industry. This is used as proxy for female wage rate. This variable is found to be highly correlated with wage rates in sectors that employ a large proportion of females; for example, trade, banking, and finance.

Certain salient points regarding the measurement of variables are noteworthy. First, the fertility rate measured is neither the crude birth rate nor the sum of the age-specific fertility rates; it is the general fertility rate (*GFR*). Second, we have tried to use socio-economic variables that are as specific as possible to the most fecund age groups. Thus our female labour force participation rate is for the 20-44 years age group. However, lack of suitable data has somewhat constrained this effort. For example, the *MR* and *RDIV* variables could only be constructed for the 15-44 years age group; and, given this limitation, we were compelled to use the male/female population ratio in the same age group for the sake of consistency.

Our estimation technique is rather standard and can be easily summarized. First, we use the two-stage least squares estimator because of its simplicity and its well-known asymptotic properties. However, all our equations had rather low Durbin-Watson statistics in the initial round of estimation. Consequently, we have used a modified two-stage least squares estimator, which used a Cochrane-Orcutt iterative procedure to estimate the coefficient of correlation between current and lagged residuals and which used appropriate instruments to ensure consistent estimation (Fair, 1970).

The Model

As stated above, ours is an interdependent system, which, while primarily focussed on the declining *GFR* in Canada in the post-war period, contains four endogenous variables: *FR, FPR, MR* and *IMR*. The system contains four equations: the fertility behaviour equation, the female labour force participation rate equation, the marriage rate equation, and the infant mortality rate equation. While we recognize that equations in an interdependent system are not regressions in the classical sense, it is convenient to christen each equation after the variable on which it is normalized. All the equations in the system are linear.

The model is socio-econometric — rather than strictly econometric — in that it incorporates interaction between economic as well as social variables; for example, the fertility rate, the female labour force participation rate, and the age-specific marital and divorce ratios. A brief description of the structural specification follows.

The General Fertility Rate Equation (*GFR*)

In the final specification the *GFR* equation has been specified as:

$$GFR = a_0 + \underset{(-)}{a_1 FPR} + \underset{(+)}{a_2 MR} + u_1 \qquad (1)$$

It may be useful at this stage to examine the variables included in, and some of the variables excluded from, Equation 1. Recent literature focusses on the role of the opportunity-cost of childbearing in determining the fertility rate. Through the inclusion of the female labour force

participation rate, our intention is to capture the myriad influences that affect the opportunity-cost of fertility.

Studies based on cross-sectional data have made use of the female wage rate. Time series on female wage rates simply do not exist in Canada. Aside from non-availability of data, we also felt that female wage rates do not reflect the full range of determinants that dictate the choice between working and childbearing. We have, therefore, considered it preferable to include the female labour force participation rate directly as an endogenous variable in our model.

In contrast with the commonly used definition of female labour force participation rate (Gregory *et al.*, 1972, 1973; Singh and Chari, 1974), ours is an age-specific participation rate, since we have considered the age-group of 20-44 years most relevant for the study of fertility rates. An examination of female participation rates in Canada by age during 1950-76 reveals that the participation rate for females in the 20-44 age group gradually increased from 27.3 percent to 52.5 percent, an increase of over 90 percent. It is pertinent to note that over 90 percent of the total live births in Canada in 1971 were attributable to the 20-44 age group.

In a society that, despite its recent state of relative emancipation, still frowns on childbearing outside wedlock, one would expect the proportion of married females in the most fertile age groups to be a significant determinant of the fertility rate. The percentage of married females in the age group 15-44 years increased by 14.4 percent in the 1950s but declined by 7.79 percent during the 1960s; over the entire period 1950-1976, it registered an increase of nearly three percentage points.

Our ultimate choice of *MR*, as defined above, emerged after considerable experimentation with several variables. These reflected both the marital status and the age composition of the female population – that is, women who have ever married as well as various measures of their age composition – either separately or in non-linear combinations (for example, the proportion of women who have ever married, multiplied by the ratio of women in the most fecund age groups, to all women in the fertile age group).

Previous evidence on the performance of the infant mortality rate in explaining fertility behaviour is somewhat mixed. To the extent that parents aim at some optimal family size, it is argued that infant mortality should be included in the analysis in order to reflect the family's replacement needs for children. Weintraub found the relationship to be positive and statistically significant (Weintraub, 1962:812). Adelman included infant mortality as an explanatory variable in her preliminary cross-

sectional study, and found that the partial coefficient of infant mortality in explaining age-specific birth rates fluctuated in direction and was not statistically significant (Adelman, 1963:318). Yet another author claims that the empirical evidence from developing countries indicates that the cross-sectional relationship is positive and statistically significant at both aggregate and individual levels. The estimates of the elasticity of fertility with respect to death rates, whether for all persons or only for children, range from +0.09 to +0.38 (Schultz, 1974:40).

On the other hand, it has been argued that, for the developed countries, the rate of infant mortality is low and no longer a significant factor in fertility behaviour. However, over the sample period, the Canadian infant mortality rate registered a very substantial decline from 41.5 per thousand live births in 1950 to 13.5 in 1976. This lends a certain interest to the effect of the mortality rate on the fertility rate in our sample.

The theoretical underpinnings of the relationship between infant mortality and fertility are varied and complex. Schultz (1969) and Ben-Porath (1976) separate the effects of child mortality on fertility into a "hoarding" effect and a "replacement" effect. While the former reflects the effect of *expected* child mortality and hence of uncertainty, the latter would constitute a response to actual mortality. Both these effects are expected to be strong and positive in developing countries; in developed countries, they are likely to be of much less importance. It is interesting to note that in an empirical study of Puerto Rico, the effect of uncertainty on fertility was found to be negative but statistically not significant (Schultz, 1969:173).

Though not included in our equation specification, it is worth noting some indirect influences on fertility which originate from infant or child mortality. These links between child mortality and fertility are not derived from preferences but rather from biological factors. For example, breast-feeding mothers are believed to be less susceptible to conception (Jain *et al.*, 1970; Jain and Bongaarts, 1981), and child mortality is expected to reduce the length of the interval between births.

None of our attempts to include *IMR* in the *GFR* equation, in either current or lagged (up to five years) form, improves the quality of our empirical results, perhaps on account of multi-collinearity with the other variables. It was therefore considered desirable not to include *IMR* in this equation. However, it is treated as an endogenous variable in the model. Our final structure is, thus, *block recursive*; *GFR*, *MR* and *FPR* are interdependent, and they all, through *GFR*, determine *IMR*.

The exclusion of certain variables from Equation 1 – notably the

level of female education and family income — also invites comment.

While the weight of recent evidence supports the view that the mother's level of education is a major influence upon her childbearing behaviour, the statistical performance of education in explaining fertility has often suffered due to lack of suitable data. For example, Gregory *et al.*, (1972, 1973) define this variable as "the median number of school years of the U.S population," while Singh and Chari (1974) use school enrollment as a proxy for education; thus failing to draw an apparent distinction between a "stock" (educational) and a "flow" (enrollment) level. International cross-section studies have made use of proxy data (Adelman, 1963:317). In this study, we have used age-specific level of schooling in terms of grades completed (women 15-44 years old, not attending school) as an explanatory variable. Although this variable showed a significant change over the sample period — the median number of years of schooling increased from 9 in 1951 to 12 in 1976 — it is highly collinear with the female labour force participation rate in the sample used for this study. It was, therefore, decided to use only the educational level of females as an explanatory variable in Equation 2. Also, in view of its hallowed history (Leibenstein, 1957, and Becker, 1976), the exclusion of some measure of income (for example, per capita income) is solely dictated by statistical reasons. We estimated a number of variants of Equation 1 which included per capita permanent income, but with little success.

The Female Participation Rate Equation

Female participation rate in the 20-44 age group is determined by:

$$FPR = b_0 + \underset{(-)}{b_1 GFR} + \underset{(+)}{b_2 EDF} + \underset{(+)}{b_3 RDN} + \underset{(+)}{b_4 URATEP} + \underset{(-)}{b_5 URATEF} + \underset{(+)}{b_6 WSER} + u_2 \qquad (2)$$

The inclusion of *GFR* hardly needs comment; it explicitly incorporates the hypothesis that the higher the fertility rate, the lower the female participation rate, and it assumes that maternity requires a temporary or permanent withdrawal from the labour force. The inclusion of *URATEP* — the unemployment rate among the prime male age group (25-55) — is designed to test the "additional worker" hypothesis, while

the coefficient *URATEF* — the unemployment rate among the female labour force — would provide a test of the "discouraged worker" hypothesis. According to the former, as unemployment among the primary breadwinners rises, females enter the labour force to supplement family incomes; according to the latter, a high unemployment rate lowers the probability of success in job-search and thus discourages labour-force participation. We would thus expect a positive coefficient on *URATEP* and a negative coefficient on *URATEF*, although their statistical significance is likely to be affected by the fact that both *URATEP* and *URATEF* respond similarly to general economic conditions. *WSER* is a proxy for the female wage rate, and its inclusion in Equation 2 is intended to gauge the strength of the inducement of the wage rate in determining worker participation.

Lastly, the inclusion of the divorce rate, *RDIV*, is intended to test the presumption that, as the rate of divorce rises, the female labour force participation rate also rises, partly because of economic necessity and partly because of the wish of divorcees to find wider human interaction in a work environment.

The Marital Rate Equation

We specify the *MR* equation as:

$$MR = C_0 + \underset{(-)}{C_1 FPR} + \underset{(+)}{C_2 POPRATIO} + \underset{(?)}{C_3 RDIV} + u_3 \qquad (3)$$

Unlike earlier time-series analyses of fertility behaviour (Easterlin, 1968, 1969; Gregory *et al.*, 1972; Singh and Chari, 1974) but like Venieris (1973) and Wachter (1975), this study considers age-specific marriage proportion as an endogenous variable in the simultaneous equation model.

There are similarities, as well as significant dissimilarities, between the motivation and specification of our *MR* equation and that of Freiden (1974). First, consonant with Frieden's suggestion, but unlike his specification, we recognize the interdependence between *GFR* and *MR*. The lack of suitable time-series data on male-female wage differentials for the economy as a whole prevents us from testing the effect of "gains from marriage" on the marriage rate. Nor do we fully subscribe to the Becker-Freiden view that the male-female wage differential (or ratio)

reflects the gains from marriage to both the partners in a symmetric fashion.

The reason for using *POPRATIO* (ratio of males to females in the 20-24 age group) is clear: the larger the *POPRATIO*, the greater the availability of eligible males per female. We would, therefore, expect a positive coefficient for *POPRATIO*.

Freiden (1974) suggests that the cost of divorce may be a significant determinant of the marriage proportion. One may argue that the sharp increase in *RDIV* in the sample period reflects the ease of obtaining divorce and hence, in some sense, a decline in the "cost" of divorce. But at this point, two mutually incompatible arguments can be made. It may well be that since the increasing ease of divorce facilitates correction of bad marriages, it may increase willingness to experiment with marriage. But is it not equally plausible that the ease of obtaining a divorce (and hence the increase in *RDIV*) in no way adequately reflects the real cost of trauma and dissolution of marriage and may, in fact, inhibit marriage? In empirical samples, it is probable that both these effects determine the sign and statistical significance of estimated coefficients, not unlike the problem encountered in the estimation of cross price-elasticity between two goods that are both substitutes and complements.

The divorce rate, *RDIV*, measures the proportion of married females (in the 15-44 age group) whose marriages are dissolved in a given year, and, as such, it reflects costs-financial as well as social-psychological – as well as the changing of laws which govern divorce. Thus it is only an approximate index of the "cost of divorce" as envisaged by Freiden (1974). On the other hand, we feel that the variable we have chosen more fully reflects the type of causation that Freiden may have considered.

Note that, in Canada, the divorce rate increased almost four-fold since the legislative changes of 1968. These changes simplified the process by which divorce petitions could be filed and extended their grounds: from adultery (virtually the only grounds under the old legislation) to 15 additional grounds. Prior to 1968, the divorce rate remained almost unchanged – 296 in 1950 and 280 in 1960. The sudden jump in the divorce rate in the late 1960s and 1970s (1644 in 1976) suggests that the stock of marriages – that is, older marriages – may be experiencing a significant correction (or reduction). If the above surmise is correct, then this factor very probably negates any possible positive influence of the accessibility of corrective measures on new marriages, and hence on the observed marriage rate in Canada.

The Infant Mortality Rate Equation

$$IMR = d_0 + \underset{(+)}{d_1 GFR} + \underset{(-)}{d_2 YPC} + \underset{(+)}{d_3 HCS} + u_4 \qquad (4)$$

In our specification of the *IMR* equation, we consider two other factors (in addition to the *GFR*) which directly or indirectly affect *IMR*. The prevention of death via better nutrition, improved health and nursing care, and hospital services during childbirth is directly influenced by the general level of economic development. The role of *GFR* in Equation is neither precise nor clear. In non-affluent societies one would expect that the available resources per child would be smaller in larger families; and, therefore, *IMR* would be correspondingly higher. In addition, high fertility usually means more higher-order births, often with higher maternal age and with less family planning. It seems reasonable to suggest that higher-order births run higher mortality risks than favoured lower-order births.

Whether one would expect to find a similar relationship in an affluent society like Canada and, if so, determining the strength of such a relationship, are likely to be quite problematical. Thus our *a priori* explanations are a positive (but not necessariliy significant) coefficient for *GFR*, and a negative coefficient for *YPC* and *HCS*.

Empirical Results

The statistical methodology used for estimating Equations 1 to 4 has been noted above. It is also worth mentioning that although the coefficients of determination do not have the usual interpretation, they are provided here as an approximate measure of "goodnes of fit".

Table 1 shows the estimates of the structural parameters and related statistics. The reduced form coefficients (impact multipliers) are provided in Table 2. These measure the total impact-direct as well as indirect-of a unit change in a predetermined variable on an endogenous variable. Thus, whereas the divorce rate, *RDIV*, has no direct impact on the fertility rate, a unit increase in *RDIV* causes a decrease of .0064 in the fertility rate because of its effect on the female participation rate (*FPR*) and on *MR* and the interdependence between *GFR*, *FPR*, and *MR*. In Table 2, we also convert multipliers into mid-sample-point elasticities, which measure the percent change in an endogenous variable due to a one per-

TABLE 1. ESTIMATED RESULTS

(The t ratios are given in parentheses. The upper 1 per cent point for the corresponding F distribution is given in parentheses after each calculated F.)

1. General Fertility Rate Equation

$$GFR = -58.44 \underset{(.73)}{} - \underset{(1.74)}{1.1344\ FPR} + \underset{(2.86)}{2.9153\ MR}$$

$DW = 1.81 \quad \rho = .92 \quad R^2 = .9851 \quad F(2,23) = 762.3$ (5.66)

2. Female Participation Rate Equation

$$FPR = 7.7867 - \underset{(5.42)}{.1206\ GFR} + \underset{(3.38)}{3.2665\ EDF} + \underset{(1.88)}{.0016\ RDIV} + \underset{(.72)}{.1573\ URATEP}$$
$$- \underset{(1.01)}{.3050\ URATEF} + \underset{(2.52)}{.07471\ WSER}$$

$DW = 2.03 \quad \rho = .18 \quad R^2 = .9982 \quad F(6,19) = 1741.1$ (3.94)

3. Marital Rate Equation

$$MR = -4.3206 - \underset{(1.64)}{.2251\ FPR} + \underset{(1.87)}{77.6173\ POPRATIO} - \underset{(.38)}{.0008\ RDIV}$$

$DW = 1.39 \quad \rho = .77 \quad R^2 = .8947 \quad F(3,22) = 62.3$ (4.82)

4. Infant Mortality Rate Equation

$$IMR = 36.0591 + \underset{(2.16)}{.1160\ GFR} - \underset{(2.22)}{.0040\ YPC} - \underset{(.94)}{2.3768\ HCS}$$

$DW = 2.06 \quad \rho = .75 \quad R^2 = .9880 \quad F(3,22) = 602.0$ (4.82)

cent change in a predetermined variable when those changes are measured at the sample means. A full discussion of the empirical results would necessitate (1) analysis of each estimated equation separately, and (2) analysis of the four equations taken as an interdependent system.

The estimated coefficients of a particular right-hand variable in Table 1 measure the change in the left-hand variable in an equation (for example, *GFR* in Equation 1) caused by a unit change in a particular right-hand variable. Since their magnitude depends on the units of measure-

TABLE 2. IMPACT MULTIPLIER COEFFICIENTS AND MID-POINT IMPACT ELASTICITIES

(within parentheses)

Predetermined Variables / Endogenous Variables	RDIV	POPRATIO	EDF	URATEP	URATEF	WSER	YPC	HCS	CONSTANT*
GFR	-.0064 (-.04)	288.6 (3.1)	-7.469 (-.82)	-.3592 (-.014)	.6965 (.027)	-.1706 (-.1292)	0	0	-118.58
FPR	.0023 (.04)	-34.81 (-1.04)	4.1662 (1.20)	.2006 (.02)	-.3890 (.04)	.0953 (.1896)	0	0	22.088
MR	-.0013 (-.01)	85.45 (1.37)	-.9378 (-.15)	-.0451 (-.002)	.0876 (.0053)	-.0215 (-.0239)	0	0	-9.2926
IMR	-.0007 (-.02)	33.48 (1.34)	-.8654 (-.35)	-.4167 (-.06)	.0808 (.0113)	-.0198 (-.0550)	-.004 (-.3522)	-2.38 (-.5474)	22.303

* = reduced form

ment of the left-hand variable and of the right-hand variable in question, one should, therefore, be cautious in drawing conclusions from a casual comparison between coefficients. The estimated R^2 is only an approximate indicator of "goodness of fit" – that is, the closeness of correspondence between the estimated and actual observations on the left-hand variable – and does not have the usual interpretation in an interdependent equation system.

Care must also be taken in interpreting the *t* ratios, indicated within parentheses under each coefficient. To say that a given *t* ratio and, therefore, the associated coefficient are not different from zero at a specified level of significance, say 10 percent, is not to reject that it is even less significantly different from any other number, say between zero and the estimated value of the coefficient itself. The former only implies that, if one were to consider the estimated coefficient to be different from zero, the probability of being wrong could be as high as 10 percent. But to assert, on that basis, that it is in fact zero exposes one to yet another, and often more serious, error.

Based on the usual statistical criteria, the estimated results are quite acceptable. All the coefficients have the expected sign – that is, on a qualitative basis, the results are plausible. Thus as *FPR* rises, *GFR* falls; and as *MR* rises, *GFR* also rises.

Some of the coefficients deserve special mention. While the coefficient of *URATEP* is positive – supporting the additional-worker hypothesis, and the coefficient of *URATEF* negative – supporting the discouraged-worker hypothesis, the corresponding *t* ratios are low because of high collinearity between *URATEP* and *URATEF*. As mentioned above, both these unemployment rates respond in a similar way to changes in general economic conditions. The coefficient of *RDIV* is very small, possibly because the two opposing ways in which *RDIV* influences *FPR* tend to cancel each other out.

While the *GFR* and *FPR* equations are both very robust and interesting, the *MR* equation suffers from an inability to test Becker's (1974) economic theory of marriage due to non-availability of suitable data. For this purpose, a cross-sectional sample would have been more appropriate. The coefficient of *FPR* indicates that women still choose between marriage and working. As in Freiden (1974), *POPRATIO*, the relative availability of eligible males, remains a significant determinant of *MR*.

Despite the fact that the sample period simple correlation coefficient between *GFR* and *IMR* is .88, the effect of *IMR* in Equation 1 is

swamped by its high correlation with *FPR* (-.94). The close relationship between *GFR* and *IMR* is, however, reflected in Equation 4. This result is also appealing from the theoretical point of view since the *IMR* is expected to vary directly with higher order births.

A critical test of an equation system is its performance in explaining the behaviour of the endogenous variables taken together; that is, in recognizing their independence. For this purpose, the impact multiplier coefficients in Table 2 rather than estimated coefficients in Table 1 must be used.

For *GFR* and *FPR*, the estimated values correspond closely with the observed values. The average error is less than five percent; the simple coefficient of determination between *GFR* and estimated *GFR* is 0.83, whereas between *FPR* and estimated *FPR* it is .98. The system solution for *MR* is not as good as the *MR* equation, taken in isolation. The observed series for *MR* starts at 59.4 in 1950, reaches a maximum 67.8 in 1958 and drops to 62.2 in 1976, whereas the calculated values start at 65.2 in 1958, rise to 66.0 in 1956 and drop to 61.4 in 1976. We must, therefore, conclude that the *MR* equation is not very satisfactory. Lastly, except for the initial five years or so, the calculated values for *IMR* correspond closely with the actual values. Even if the initial five years are included, the simple coefficient of determination between the observed and calculated *IMR* is 0.91.

In sum, in terms of the primary focus of this paper, the declining fertility rate observed in Canada, the model performs quite well. It also manages to catch the significant interdependence between the fertility rate and the female participation rate. Its other accomplishments are modest and suggest the value of continuing effort.

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Received December, 1979; revised January, 1985.

APPENDIX TABLE 1. BIRTH RATE IN CANADA, 1950-1976

Years	General Fertility Rate[a]
1950	107.700
1951	109.200
1952	113.000
1953	114.800
1954	117.200
1955	116.500
1956	116.600
1957	118.000
1958	115.800
1959	116.300
1960	114.100
1961	111.500
1962	108.300
1963	105.300
1964	100.200
1965	90.300
1966	81.500
1967	76.100
1968	72.900
1969	72.300
1970	71.200
1971	67.700
1972	63.400
1973	61.500
1974	60.600[b]
1975	61.200[b]
1976	60.300[b]

Notes: a. General Fertility Rate: number of live births per 1,000 females 15-49 years group.
b. Estimate (data by telephone, Statistics Canada).

Source: Statistics Canada, **Vital Statistics: Volume I Births 1974**, Cat. No. 84-204 (Annual), Ottawa: June, 1976, Table 6, p. 10.

APPENDIX TABLE 2. FEMALE POPULATION BY AGE, CANADA, 1950-1976

Year	Totals 15 + Years	15-19 Years	20-24 Years	25-44 Years	45 + Years
1950	4759	533	557	1970	1699
1951	4838	526	551	2027	1734
1952	4955	533	553	2086	1783
1953	5058	540	554	2135	1828
1954	5170	550	556	2185	1879
1955	5273	563	559	2228	1923
1956	5368	576	562	2258	1962
1957	5517	600	574	2327	2021
1958	5645	627	582	2359	2077
1959	5763	649	585	2383	2146
1960	5879	676	590	2405	2208
1961	5995	704	597	2422	2272
1962	6120	744	612	2431	2333
1963	6252	788	635	2437	2392
1964	6404	833	662	2453	2455
1965	6563	873	693	2474	2523
1966	6742	909	734	2502	2597
1967	6929	941	780	2531	2677
1968	7111	968	827	2558	2758
1969	7290	991	869	2588	2842
1970	7476	1016	911	2625	2924
1971	7656	1040	948	2669	2999
1972	7838	1061	980	2725	3072
1973	8029	1093	972	2824	3140
1974	8254	1116	1010	2917	3211
1975	8480	1131	1053	3012	3285
1976	8667	1149	1068	3079	3371

Source: Statistics Canada, Vital Statistics-Volume II Marriages and Divorces 1973, Cat. 84-205 (Ottawa: March, 1975), Table 2, pp. 6-7.

APPENDIX TABLE 3. FEMALE EMPLOYMENT BY SELECTED AGE GROUPS, CANADA, 1950-1976

Year	Totals 15 + Years	14-19 Years	20-24 Years	25-44 Years	45 + Years
1950	1071	194	248	425	204
1951	1116	202	260	444	210
1952	1133	189	246	469	229
1953	1172	207	252	481	232
1954	1199	210	248	493	248
1955	1236	210	248	513	265
1956	1320	225	255	540	300
1957	1401	228	254	580	339
1958	1443	224	260	595	364
1959	1508	236	258	622	392
1960	1597	245	268	657	427
1961	1674	253	275	680	466
1962	1737	259	289	696	493
1963	1807	264	300	718	525
1964	1912	279	320	752	561
1965	2019	296	346	778	599
1966	2169	321	389	826	633
1967	2296	331	419	873	673
1968	2391	333	455	903	700
1969	2508	336	490	968	714
1970	2570	327	499	1006	738
1971	2686	337	524	1056	769
1972	2796	360	542	1123	771
1973	2992	396	574	1202	819
1974	3161	436	596	1301	828
1975	3397	453	633	1452	859
1976	3534	451	651	1528	904

Sources: For 1950-52: Statistics Canada, **The Labour Force Nov.,1945-July, 1958**, DBS Reference Paper No. 58, p. 34.

For 1953-74: Statistics Canada, **The Labour Force, Jan.,1975**, Cat. 71-001 Monthly, (Ottawa: Jan.,1975), Table 34, p. 61.

For 1975 and 1976: by telephone from the Labour Force Survey Section, Statistics Canada.

APPENDIX TABLE 4. PARTICIPATION RATES OF EMPLOYMENT OF WOMEN BY SELECTED AGE GROUPS, CANADA, 1950-1976

Year	15 + Years	15-19 Years	20-44 Years	45 + Years
1950	22.5	36.4	26.6	12.0
1951	23.1	38.4	27.3	12.1
1952	22.9	35.5	27.1	12.8
1953	23.2	38.3	27.3	12.7
1954	23.2	38.2	27.0	13.2
1955	23.4	37.3	27.3	13.8
1956	24.6	39.1	28.1	15.3
1957	25.4	38.0	28.8	16.8
1958	25.6	35.7	29.1	17.5
1959	26.2	36.4	29.7	18.3
1960	27.2	36.2	30.9	19.3
1961	27.9	35.9	31.6	20.5
1962	28.4	34.8	32.4	21.1
1963	28.9	33.5	33.1	22.0
1964	29.9	33.5	34.4	22.8
1965	30.8	33.9	35.5	23.7
1966	32.2	35.3	37.6	24.4
1967	33.1	35.2	39.0	25.1
1968	33.6	34.4	40.1	25.4
1969	34.4	33.9	42.2	25.1
1970	34.4	32.2	42.6	25.2
1971	35.1	32.4	43.7	25.6
1972	35.7	33.9	44.9	25.1
1973	37.3	36.2	46.8	26.1
1974	38.2	39.1	48.1	25.8
1975	41.1	40.0	51.3	26.1
1976	40.8	39.2	52.5	26.8

Sources: For employment data see, (i) DBS, **The Labour Force Nov.,1945-July,1958**, Reference Paper No. 58, (Ottawa: 1958), p. 34; (ii) Statistics Canada, **The Labour Force, Jan.,1975**, Cat. No. 71-001, Vol. 31, No. 1 (Ottawa: Feb.,1975), Table 34.

For population data see, Statistics Canada, **Vital Statistics: Volume II Marriages and Divorces 1973**, Cat. No. 84-205 (Ottawa: March 1975), Table 2, pp. 6-7.

APPENDIX TABLE 5. PERMANENT PER CAPITA PERSONAL DISPOSABLE INCOME, CANADA, 1950-1976

Years	Personal Disposable Income Per Capita Current Dollars	Implicit Price Index Personal Expenditure 1971 = 100	Personal Disposable Income Per Capita 1971 dollars	Permanent[a] Per Capita Income 1971 dollars	Permanent[a] Per Capita Income Index 1950 = 100
	(1)	(2)	(3)	(4)	(5)
1946	n.a.	46.2	1284	---	---
1947	773	50.5	1403	---	---
1948	878	57.3	1592	---	---
1949	921	59.4	1651	---	---
1950	969	61.2	1701	1526	100.0
1951	1102	67.4	1873	1644	107.7
1952	1170	69.0	1918	1747	114.5
1953	1194	68.8	1912	1811	118.7
1954	1169	69.5	1931	1867	122.3
1955	1231	69.5	1931	1913	125.4
1956	1325	70.6	1962	1931	126.5
1957	1367	72.8	2023	1952	127.9
1958	1423	74.7	2076	1985	130.1
1959	1455	75.6	2101	2019	132.3
1960	1487	76.3	2120	2056	134.7
1961	1475	76.8	2134	2091	137.0
1962	1579	77.8	2162	2119	138.8
1963	1646	79.0	2195	2142	140.4
1964	1713	80.0	2223	2167	142.0
1965	1846	81.6	2268	2196	143.9
1966	1994	84.3	2343	2238	146.6
1967	2116	87.2	2423	2290	150.1
1968	2262	90.8	2523	2356	154.4
1969	2424	94.3	2621	2475	162.2
1970	2536	97.7	2715	2525	165.5
1971	2779	100.0	2779	2612	171.2
1972	3124	104.0	2890	2706	177.3
1973	3617	111.6	3101	2821	184.9
1974	4236	123.9	3443	2986	195.7
1975	4896	137.1	3810	3205	210.0
1976	5481	147.2	4091	3467	227.2

Note: a. Five-year moving average.

Sources: Col. 1: Department of Finance, Canada, **Economic Review April 1978** (Ottawa 1978), Reference Table 12, p. 131.

Col. 2: Statistics Canada, **National Income and Expenditure Accounts**, Vol. 1, Cat. No. 13-531 (Ottawa: May 1976), Table 7, and **Systems of National Accounts, 1962-1976**.

APPENDIX TABLE 6. INFANT MORTALITY, TOTAL AND RATE, CANADA, 1950-1976

Years	Total Number of Deaths	Rate per 1000 Live Births
1950	15,441	41.5
1951	14,673	38.5
1952	15,408	38.2
1953	14,859	35.6
1954	13,934	31.9
1955	13,884	31.3
1956	14,399	31.9
1957	14,517	30.9
1958	14,178	30.2
1959	13,595	28.4
1960	13,077	27.3
1961	12,940	27.2
1962	12,941	27.6
1963	12,270	26.3
1964	11,169	24.7
1965	9,862	23.6
1966	8,960	23.1
1967	8,151	22.0
1968	7,583	20.8
1969	7,149	19.3
1970	7,001	18.8
1971	6,356	17.5
1972	5,938	17.1
1973	5,339	15.5
1974	5,192	15.0[b]
1975	5,130[b]	14.3[b]
1976[c]	4,847[b]	13.5[b]

Notes: a. Under one year age.
b. Estimates.
c. Data by telephone, Statistics Canada file.

Source: Statistics Canada, **Vital Statistics Volume III Deaths 1975**, Cat. No. 84-206 Annual (Ottawa: May, 1976), Tables 20 and 21, pp. 109-112.

APPENDIX TABLE 7. RATED CAPACITY OF OPERATING PUBLIC HOSPITALS, CANADA, 1950-1976

Year	Rated Capacity[a]	Rated Capacity Per 1000 Population
1950	71,543[c]	5.21
1951	74,672[c]	5.33
1952	74,106[c]	5.13
1953	76,224	5.13
1954	79,281	5.19
1955	84,761	5.40
1956	86,433	5.37
1957	90,154	5.43
1958	94,665	5.54
1959	100,059	5.72
1960	101,352	5.67
1961	100,506	5.51
1962	106,718	5.74
1963	111,165	5.87
1964	114,545	5.94
1965	117,021	5.96
1966	122,315	6.11
1967	126,182	6.18
1968	129,856	6.26
1969	132,340	6.28
1970	135,877	6.36
1971	138,280	6.41
1972	141,074	6.46
1973	142,069	6.42
1974	147,167	6.56
1975	151,793	6.66
1976	152,109[c]	6.66

Notes: a. Rated (Bed) Capacity: The number of beds and cribs which the hospital is designed to accommodate on the basis of established standards of floor area per bed as of December 31.

b. Operating Public Hospitals: Recognized by the province as a public hospital which is not operated for profit and accepts all patients regardless of ability to pay.

c. Estimate: 1976 data by telephone, Hospitals Section.

Sources: DBS, **Hospital Statistics 1971: Hospital Beds**, Cat. No. 83-210 (Ottawa: 1973); Statistics Canada, **Hospital Statistics: Vol. I Beds, Services, Personnel 1975**, Cat. No. 83-227 (Ottawa: April, 1978).

APPENDIX TABLE 8. TOTAL AND MARRIED FEMALES, AGE GROUP 15-44, CANADA, 1950-1976

Years	Females 15-44 Years ('000)	Married Females 15-44 Years ('000)	Married Females as percentage of total females 15-44 Years
1950	3,060	1,817	59.37
1951	3,099	1,890	60.98
1952	3,172	1,966	61.97
1953	3,230	2,021	62.56
1954	3,291	2,082	63.26
1955	3,350	2,129	63.55
1956	3,399	2,284	67.19
1957	3,484	2,354	67.56
1958	3,552	2,410	67.84
1959	3,604	2,448	67.92
1960	3,671	2,490	67.82
1961	3,722	2,518	67.65
1962	3,787	2,543	67.15
1963	3,860	2,563	66.39
1964	3,948	2,593	65.67
1965	4,040	2,627	65.02
1966	4,145	2,672	64.46
1967	4,266	2,729	63.97
1968	4,378	2,786	63.63
1969	4,486	2,849	63.50
1970	4,599	2,908	63.23
1971	4,656	2,968	63.74
1972	4,766	2,967	62.25
1973	4,889	3,033	62.04
1974	5,043	3,118[a]	61.83
1975	5,196	3,200[a]	61.59
1976	5,296	3,296[b]	62.24

Notes: a. By interpolation between 1973 and 1976 data for each five year subgroup.
b. 1976 census data.

Sources: Col. 1: For 1951: Population Estimates by Marital Status, Age and Sex, 1957. Cat. No. 91-203 (April 1959).
For 1952-55: Vital Statistics, Vol. II, 1971. Cat. No. 84-205, (June 1974). pp. 16-17.
For 1956-59: Population Estimates by Marital, Age and Sex, 1959. Cat. No. 91-203 (January 1961).
For 1960: Vital Statistics, Vol. II, 1971, pp. 16-17.
For 1961-67: Population Estimates...1967. (June 1969).
For 1968-71: Population Estimates...1971. (June 1973).
Col. 2: (i) Population Estimates by Marital Status, Age and Sex, Cat. No. 91-203 (January, 1957).
(ii) Population Estimates...1960. Cat. No. 91-203, (March 1962), pp. 2-3.

APPENDIX TABLE 9. UNEMPLOYMENT RATE, TOTAL POPULATION AND TOTAL FEMALES, CANADA, 1950-1976

Year	Unemployment Rate	
	Total	Female
1950	3.6	2.1
1951	2.4	1.1
1952	2.9	1.5
1953	3.0	1.6
1954	4.6	2.6
1955	4.4	2.6
1956	3.4	1.9
1957	4.6	2.3
1958	7.0	3.6
1959	6.0	3.0
1960	7.0	3.6
1961	7.1	3.7
1962	5.9	3.3
1963	5.5	3.3
1964	4.7	3.1
1965	3.9	2.7
1966	3.6	2.6
1967	4.1	3.0
1968	4.8	3.4
1969	4.7	3.6
1970	5.9	4.5
1971	6.4	5.1
1972	6.3	5.3
1973	5.6	5.1
1974	5.4	4.9
1975[c]	7.1	6.4
1976[c]	7.1	8.4

Sources: DBS, **The Labour Force January 1974**, Cat. No. 71-001 (Ottawa: 1974).
Cat. No. 71-001, **The Labour Force January 1975**, Table 31, p. 57 for Col. 1, and Table 36, p. 63 for Col. 2.
1975 and 1976 data: by telephone, Labour Force Survey Section.

APPENDIX TABLE 10. DISSOLUTION OF MARRIAGES (DIVORCES) AND RATES, CANADA, 1950-1976

Year	Number of Divorces	Rate Per 100,000 Population	Rate Per 100,000 Female - 15 years and Over	Rate Per 100,000 Married Females 15-44 years
1950	5,386	39.3	113.175	296.4
1951	5,270	37.6	108.929	278.8
1952	5,650	39.1	114.026	287.4
1953	6,160	41.5	121.787	304.8
1954	5,923	38.7	114.565	284.5
1955	6,053	38.6	114.792	276.1
1956	6,002	37.3	111.811	262.8
1957	6,688	40.3	121.225	284.1
1958	6,279	36.8	111.231	260.5
1959	6,543	37.4	113.535	267.3
1960	6,980	39.1	118.728	280.3
1961	6,563	36.0	109.475	260.6
1962	6,768	36.4	110.588	266.1
1963	7,686	40.6	122.937	299.9
1964	8,623	44.7	134.650	332.5
1965	8,974	45.7	136.730	341.6
1966	10,239	51.2	151.869	383.2
1967	11,165	54.8	161.134	409.1
1968	11,343	54.8	159.513	407.1
1969	26,093	124.2	357.928	915.9
1970	29,775	139.8	398.274	1023.9
1971	29,685	137.6	387.735	1000.2
1972	32,389	148.4	413.230	1091.6
1973	36,704	166.1	457.143	1210.2
1974	45,019	200.6	545.420	1443.8
1975	50,611	222.0	596.828	1581.6
1976	54,207	235.8	625.441	1644.6

Sources: Statistics Canada, Vital Statistics: Vol. II - Marriages and Divorces, 1976, Cat. No. 84-205 Annual (Ottawa: August, 1978), Table II, pp. 28-29.

APPENDIX TABLE 11. MALE/FEMALE RATIO IN THE AGE-GROUP 20-44, CANADA, 1950-1976

Years	Male Number ('000)	Female Number ('000)	Male/ Female Ratio
1950	2530.7	2527.0	1.0015
1951	2552.3	2578.0	0.9900
1952	2627.0	2638.8	0.9955
1953	2695.9	2689.1	1.0025
1954	2752.0	2740.8	1.0041
1955	2804.7	2786.8	1.0064
1956	2883.9	2829.4	1.0193
1957	2925.8	2896.2	1.0102
1958	2971.6	2941.1	1.0104
1959	3001.6	2967.9	1.0113
1960	3022.4	2994.7	1.0092
1961	3036.5	3018.1	1.0061
1962	3055.9	3043.2	1.0042
1963	3081.6	3071.5	1.0033
1964	3124.8	3114.9	1.0032
1965	3177.9	3166.9	1.0035
1966	3251.6	3236.4	1.0047
1967	3344.9	3311.2	1.0102
1968	3433.9	3384.5	1.0146
1969	3517.5	3456.9	1.0175
1970	3604.3	3535.1	1.0196
1971	3689.2	3616.2	1.0202
1972	3780.5	3705.1	1.0204
1973	3875.7	3797.1	1.0207
1974	4016.5	3927.1	1.0228
1975	4157.1	4064.7	1.0227
1976	4203.6	4147.2	1.0136

Source: Statistics Canada, **Vital Statistics Volume II - Marriage and Divorces 1973**, Cat. No. 84-205 Annual (Ottawa: March 1975), Table 2, pp. 2-7; Updating Vital Statistics Section files, Ottawa.

APPENDIX TABLE 12. LEVEL OF SCHOOLING OF MALES AND FEMALES, 15-44 YEARS AGE, NOT ATTENDING SCHOOL, CANADA, 1951, 1961, 1971 AND 1976

(NUMBERS)

Level of Schooling	MALE				FEMALE			
	1951	1961	1971	1976	1951	1961	1971	1976
Less than 5 grades completed	172	181	122	97	132	146	112	90
5-8 grades	1,276	1,153	899	662	1,127	1,010	804	610
Grade 9	a	351	424	384	a	357	402	374
Grade 10	a	438	505	542	a	472	529	546
Grade 11	a	311	436	435	a	403	564	505
Grade 12	1,108	314	619	645	1,359	455	804	807
Grade 13	b	207	148	98	b	277	171	95
Post-secondary, non-university--some	b	b	80	427	b	b	75	355
Post-secondary, non-university--with certificate	b	b	47	640	b	b	28	761
University only - some	185	119	167	273	222	104	145	209
University only - degree	74	145	236	307	28	60	109	159
Total 15-44 years, not attending school	2,815	3,219	3,683	4,510	2,868	3,284	3,743	4,511

Notes: a. Included in grade 12; b. Included in "university only--some" group.

Sources: Unpublished data, Statistics Canada;
For 1951: Dominion Bureau of Statistics, **1951 Population: Cross Classification Characteristics**, (Ottawa: 1953), Table 27;
For 1961: Dominion Bureau of Statistics, **1961 Population: Schooling by Age Group**, Cat. No. 92-557, bulletin 1.3-6 (Ottawa: 1963), Table 102;
For 1971: Statistics Canada, **1971 Population: The Out-of-School Population**, Cat. No. 92-743, Bulletin No. 1.5-3 (Ottawa: July, 1974), Table 4;
For 1976: Statistics Canada, **1976 Population: Demographic Characteristics--Level of Schooling by Age Groups**, Cat. No. 92-827, Bulletin 2.8 (Ottawa: August, 1978), Table 29.

APPENDIX TABLE 13. LEVEL OF SCHOOLING OF MALES AND FEMALES, 15-44 YEARS AGE, NOT ATTENDING SCHOOL, CANADA, 1951, 1961, 1971 AND 1976

(PERCENTAGES)

	MALE								FEMALE							
	1951		1961		1971		1976		1951		1961		1971		1976	
	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %
1. Less than 5 grades	6.1	---	5.6	---	3.3	---	2.2	---	4.6	---	4.4	---	3.0	---	2.0	---
2. Grades 5-8	45.3	51.4	35.8	41.4	24.4	27.7	14.7	16.9	39.3	43.9	30.8	35.2	21.5	24.5	13.5	15.5
3. Grade 9	a	---	10.9	52.3	11.5	39.2	8.5	25.4	a	---	10.9	46.1	10.7	35.2	8.3	23.8
4. Grade 10	a	---	13.6	65.9	13.7	52.9	12.0	37.4	a	---	14.3	60.4	14.1	49.3	12.1	35.9
5. Grade 11	a	---	9.7	75.6	11.8	64.7	9.6	47.0	a	---	12.3	72.7	15.1	64.4	11.2	47.1
6. Grade 12	39.4	90.8	9.8	85.4	16.8	81.5	14.3	61.3	47.4	91.3	13.9	86.6	21.5	85.9	17.9	65.0
7. Grade 13	b	---	6.4	91.8	4.0	85.5	2.2	63.5	b	---	8.4	95.0	4.6	90.5	9.1	67.1
8. Post-secondary (university, non-university,etc.)	9.2	100.0	8.2	100.0	14.5	100.0	36.5	100.0	8.7	100.0	5.01	100.0	9.5	100.0	32.9	100.0

Notes: a. Included in Grade 12.
b. Included in "Post-secondary" group.

Source: See Appendix Table No. 12.

APPENDIX TABLE 14. AVERAGE WEEKLY WAGES AND SALARIES, SERVICE INDUSTRY, CANADA: 1950-976

Year	Amount $
1950	30.80
1951	33.80
1952	35.60
1953	38.60
1954	40.50
1955	42.30
1956	44.60
1957	48.00
1958	50.20
1959	52.20
1960	54.90
1961	57.30
1962	58.80
1963	59.70
1964	61.90
1965	65.30
1966	69.80
1967	74.90
1968	78.90
1969	83.80
1970	90.10
1971	98.10
1972	106.90
1973	113.90
1974	125.60
1975	143.30
1976	169.80

Source: Statistics Canada, Labour Division, **Employment, Earnings, and Hours**, Cat. Nos. 72-201 (Annual) and 72-002 (Monthly).