



National Library  
of Canada

Bibliothèque nationale  
du Canada

Canadian Theses Service    Service des thèses canadiennes

Ottawa, Canada  
K1A 0N4

## NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30, and subsequent amendments.

## AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30, et ses amendements subséquents.

UNIVERSITY OF ALBERTA

FEMALE EMPLOYMENT AND FERTILITY IN CANADA:  
A SEQUENTIAL LIFE-CYCLE ANALYSIS

BY

Wei-Jun Jean Yeung



A thesis submitted to the Faculty of Graduate Studies and  
Research in partial fulfillment of the requirements for the  
degree of Doctor of Philosophy.

DEPARTMENT OF SOCIOLOGY

Edmonton, Alberta  
Fall, 1991



National Library  
of Canada

Bibliothèque nationale  
du Canada

Canadian Theses Service    Service des thèses canadiennes

Ottawa, Canada  
K1A 0N4

The author has granted an irrevocable non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of his/her thesis by any means and in any form or format, making this thesis available to interested persons.

The author retains ownership of the copyright in his/her thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without his/her permission.

L'auteur a accordé une licence irrévocable et non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de sa thèse de quelque manière et sous quelque forme que ce soit pour mettre des exemplaires de cette thèse à la disposition des personnes intéressées.

L'auteur conserve la propriété du droit d'auteur qui protège sa thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

ISBN 0-315-69941-8

Canada

UNIVERSITY OF ALBERTA  
RELEASE FORM

NAME OF AUTHOR: WEI-JUN JEAN YEUNG

TITLE OF THESIS: FEMALE EMPLOYMENT AND FERTILITY IN CANADA: A  
SEQUENTIAL LIFE-CYCLE ANALYSIS

DEGREE: DOCTOR OF PHILOSOPHY

YEAR THIS DEGREE GRANTED: FALL, 1991

Permission is hereby granted to the UNIVERSITY OF ALBERTA LIBRARY to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves all other publication and other rights in association with the copyright in the thesis, and except as hereinbefore provided neither the thesis nor any substantial portion thereof may be printed or otherwise reproduced in any material form whatever without the author's prior written permission.

(SIGNED) .....

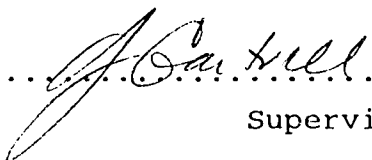
*Wei Jun Jean Yeung*  
1905 Snowberry Ridge Road  
Ann Arbor, Michigan 48103  
United States of America

October 4, 1991

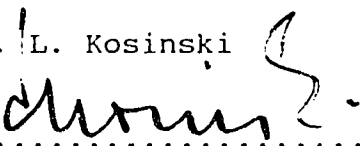
THE UNIVERSITY OF ALBERTA  
FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled FEMALE EMPLOYMENT AND FERTILITY IN CANADA, A SEQUENTIAL LIFE-CYCLE ANALYSIS submitted by WEI-JUN JEAN YEUNG in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY.

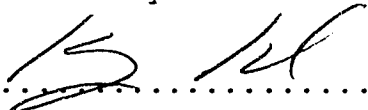
Dr. John W. Gartrell

.....  .....  
Supervisor

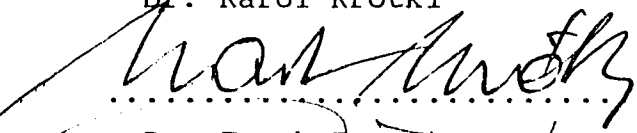
Dr. L. Kosinski

.....  .....

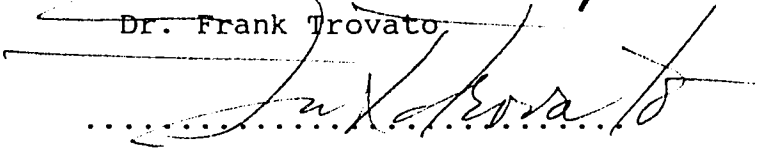
Dr. Harvey Krahn

.....  .....

Dr. Karol Krótki

.....  .....

Dr. Frank Trovato

.....  .....

Dr. Carl F. Grindstaff

.....  .....

External Examiner

Date Sept. 6, 1991 .....

To My Parents, Chin-Ching Lee and Show-Yu Hong

## Abstract

This dissertation examines the relationship between married women's employment patterns and the timing of fertility, using data from the 1984 Canadian Fertility Survey. The dynamic relationship is represented in a sequential life-cycle framework where the "reciprocity" and "sequential ordering" of the employment and childbirth events are captured. This approach assumes that a couple's decisions at one stage of the life course are made in light of perceived benefits and costs associated with past fertility and time-allocation choices. These decisions in turn influence future decisions about fertility and employment behavior. The relationship is hypothesized to vary at different stages of the life cycle. Results indicate that the causal order between fertility and employment is neither a one-way relationship, nor a simultaneous reciprocal, nor a spurious one. Rather, it is in a sequential temporal order that fertility behaviour and wife's employment are related.

Data show that Canadian married women spend a substantial amount of their childbearing years in the labour market, with a relatively low level of job discontinuity. Although family responsibilities remain the major causes for women's job discontinuity, data show that even with children present, once a woman has substantial work experience there is a strong propensity for her to participate in the labour force throughout her childbearing years. A broad range of fertility and employment sequences is observed among married women attempting to reconcile work and family responsibilities.

Employment duration is found to be the most important determinant of the timing and spacing of childbirth. Employment experience before the first child is born has a strong immediate impact as well as significant cumulative effects on fertility and employment status at various stages of the life cycle. Those who work between births tend to have longer birth intervals. This tendency is especially strong for the young and well-educated women. Among socioeconomic variables, education and age at

marriage are significant predictors of employment and fertility status at various stages. Attitudinal variables have less of an impact, and cultural factors such as ethnicity, religiosity and residency are shown to have no effect on employment status and the timing of births.



### Acknowledgement

I am indebted to many people, in different ways, for my dissertation. To Professor John Gartrell, the chairman of my dissertation committee, I am particularly grateful for his continuous guidance and support at each phase of the work. His long-distance coordination while I worked at the Institute for Social Research at the University of Michigan made possible the completion of this dissertation. The insightful and stimulating comments provided by other committee members, Professors Frank Trovato, Harvey Krahn, Leslie Kosinski and Karol Krótki helped improve this dissertation substantially. Special gratitude goes to the external member of my dissertation committee, Professor Carl Grindstaff from the University of Western Ontario, for his prompt and thorough evaluation of this dissertation. His conscientious participation in this research project, expertise contributed significantly to this dissertation.

This dissertation also benefited from Dr. Martha Hill's support, both emotionally and intellectually. Her prompt and helpful comments during her extremely busy schedule are greatly appreciated.

I am very grateful to Dr. Leslie Hayduk for his consultation on issues regarding LISREL, Mr. Chuck Hamphrey for computing assistance, Wes Sealand and Naomi Sealand for their editorial assistance and Ms. Margaret King for handling the administrative requirements for this dissertation.

The Alberta Heritage Scholarship Fund provided financial support for this dissertation during the period of 1986-1988.

Last but not the least, I owe this dissertation to my parents, parents-in-laws and my husband for taking over the "mothering" role from me at the final stage of the thesis production. Without them this dissertation would have never been completed. Bernard's persistent encouragement and confidence in me, though sometimes overwhelming, was the main driving force for the completion of this dissertation. His views on issues involved in this dissertation are refreshing and stimulating.

## TABLE OF CONTENTS

	PAGE
I. INTRODUCTION .....	1
Female Employment and Fertility .....	2
Recent Trends in Female Employment and Fertility Patterns in Canada .....	2
Fertility Levels .....	3
Women's Labour Force Participation .....	5
Policy Concerns of Research on Employment and Fertility	8
Proposed Research Method: Sequential Life-Cycle Analysis .....	10
Outline of The Dissertation .....	14
II. RESEARCH ON FEMALE EMPLOYMENT AND FERTILITY .....	17
General Theoretical Perspectives .....	18
The Role Incompatibility Perspectives .....	18
The Social-Psychological Perspectives .....	19
The New Home Economics Perspectives .....	21
Synthesis of the Perspectives .....	23
Causal Order: Fertility and Women's Employment .....	25
Evidence From Structural Equation Models .....	26
Single-Period Models .....	27
Dynamic Models .....	29
Sequential Life-Cycle Perspectives .....	31
Timing of Birth and Women's Employment .....	33
Summary .....	35
III. RESEARCH METHODS .....	39
Conceptual Framework for the Sequential Life-Cycle Analysis .....	39
Descriptive Analysis of Employment-Fertility Sequences .....	39
Covariance Structure Analysis of the Sequential Life-Cycle Model .....	40

Hypotheses .....	43
Measurement of The Variables .....	45
Data: Canadian Fertility Survey, 1984 .....	46
Statistical Methods: Covariance Structure Model (LISREL) .....	49
 IV. EMPIRICAL FINDINGS FROM THE CANADIAN FERTILITY SURVEY	
(PART I) .....	53
Socioeconomic Characteristics of Currently Married Women .....	54
Work Before Marriage and Between Parities .....	56
Birth Intervals .....	57
Job Interruptions .....	57
Reasons for Job Interruptions .....	59
Full-time or Part-time Employment .....	59
Employment and Fertility Sequences .....	60
Summary .....	63
 V. EMPIRICAL FINDINGS FROM THE CANADIAN FERTILITY SURVEY	
(PART II) Covariance Structure Analysis .....	67
Parity-One Group .....	70
Parity-Two Group .....	73
Parity-Three Group .....	75
Summary of the Findings .....	76
 VI. DISCUSSION AND CONCLUSION .....	78
Limitations of the Study .....	80
Major Findings and Implications .....	82
Policy-related Issues .....	86
Future Research .....	92
 TABLES .....	95
 FIGURES .....	110
 REFERENCES .....	116

## LIST OF TABLES

Table	Description	Page
I.	Employed Women Fifteen Years and Over by Occupation as A Percentage of All Occupations, Canada, 1975, 1980 and 1985 .....	95
II.	Observed and Unobserved Variables Used in the Sequential Life-cycle Models .....	96
III.	Demographic and Socioeconomic Characteristics of Currently Married Women by Parity .....	97
VI.	Employment Patterns and Birth Intervals for Currently Married Women by Parity, 1984 Canadian Fertility Survey..	98
V.	Frequencies of Job Interruptions Longer than One Year and Major Reasons for the First and Second Job-Interruptions by Currently Married Women, by Parity .....	99
VI.	Proportion of Married Women Who Are Mostly Full-time Employed and Reasons for Working Part-time .....	100
VII.	Most Common Fertility/Employment Arrangements Among Married Women Who Have at Least One Child .....	101
VIII.	Variances and Percentage of Errors Incorporated in the Covariance Structure Models, by Parity .....	102
IX.	Unstandardized and Standardized Coefficients (in parentheses) for Parity-One Group .....	103
X.	Total Effects for Parity-One Group .....	104
XI.	Unstandardized and Standardized Coefficients (in parentheses) for Parity-Two Group .....	105
XII.	Total Effects for Parity-Two Group .....	106
XIII.	Standardized and Unstandardized Coefficients (in parentheses) for Parity-Three Group .....	107
XIV.	Total Effects for Parity-Three Group .....	108
XV.	Measures of Division of Labour in the Household among the Spouses .....	109

### LIST OF FIGURES

Figure	Description	Page
1.	Total Fertility Rates and Labour Force Participation Rate for Currently Married Women, Canada, 1931-1990 .....	110
2.	Conceptual Framework for the Sequential Life-Cycle Models .....	111
3.	Flow Chart of Employment and Fertility Sequences for Parity-One Group .....	112
4.	Illustrative Model for Parity-One Group .....	113
5.	Illustrative Model for Parity-Two Group .....	114
6.	Illustrative Model for Parity-Three Group .....	115

**Table of Contents**

<b>Chapter</b>	<b>Page</b>
1. INTRODUCTION .....	2
1.1 Female Employment and Fertility .....	2
1.2 Recent Trends in Canada .....	2
1.2.1 Fertility Levels .....	3
1.2.2 Women's Labour Force Participation .....	5
1.3 Policy Concerns of Employment and Fertility .....	8
1.4 Proposed Research Method: Sequential Life-Cycle Analysis .....	10
1.5 Outline of The Dissertation .....	14

## 1. INTRODUCTION

### 1.1 Female Employment and Fertility

Two of the most significant changes in women's lives since 1960s have been a greater labour market involvement and a smaller family size. The concurrent trends of higher female labour force participation and lower fertility have prompted many researchers to investigate the relationship between them. This nearly universal social phenomenon is especially conspicuous in the industrialized countries. Married women have constituted the most rapidly growing component of the labour force in many industrialized countries. Indeed, the most dramatic change in paid labour force is the increasing presence of women with preschool-age children (Boulet and Lavallee, 1984; Bumpass and Sweet, 1980). During the same period of time, fertility levels declined to below replacement levels in most industrialized countries. Due to a combination of a lowered mortality rate and a declining fertility rate, some countries have started to experience a population loss (e.g. Germany, Netherlands and Sweden).

This dissertation focuses on the situation in Canada. The relationship between married women's fertility and female employment patterns in Canada is examined in detail.

### 1.2 Recent Trends in Canada

Figure 1 provides a historical view of Canadian trends in fertility and the labour force participation rate for married women from 1931 to 1990. The proportion of married women in the Canadian labour force has increased at a phenomenal rate, from 3.5 in 1931 to 22 percent in 1961 to 61 percent in 1990 (Statistics Canada, 1990). The Canadian fertility level has been on the decline during most of this period, except for the interruption of the postwar baby boom. In the three decades since 1960 the total fertility

rate has fallen from a high of close to 4 to 1.7. The negative relationship between the fertility rate and the female participation rate since 1960 is clearly illustrated in Figure 1.

### 1.21 Fertility Levels

The current fertility levels in Canada are below the replacement level, and this has been the case since 1980. This low fertility level is the second low fertility cycle in Canada's history. The first took place between the two world wars and reached its lowest level during the Great Depression of the 1930s. The second began at the turn of the 1960s and still continues. At the peak of the post-war baby-boom in 1959 the crude birth rate was 27.4 births per 1000 persons. By 1978, it had fallen to 15.3 and has remained more or less at that level to this day (14 in 1990).

Canadians now have fewer children later in their lives with longer birth intervals, and more women may choose to forgo parenthood altogether (Romaniuc, 1984). In the 1960s, the average age of mothers at the birth of their first child was 23.5, whereas in 1980 it had risen to nearly 25 (Romaniuc, 1984). Some women may have merely been postponing births, and, if they do in fact "catch up" later on, the completed fertility rates could be somewhat higher than the currently observed Total Fertility Rate of 1.7 births per woman. Data from the 1981 Canadian Census show that the rate of childbearing in the age group 30-34 is on the increase. The proportion in this cohort giving birth to their first child is rising. Women who had delayed childbearing for various reasons appear to have begun to "catch up". Large families have virtually disappeared and most couples now have only two children.

A study in Canada by Grindstaff et.al. (1969) shows that the proportion of women who remain childless, although



still a minority, seems to be on the increase. They also report that the average number of children ever born to ever-married women aged 35 in Canada was 2.15, with over 10 percent childless and 11 percent having four children or more. Forty-one percent had two children. They found no particular cultural norm or religious affiliation independent of the socioeconomic characteristics that are significant determinants of the fertility behaviour.

Findings in Balakrishnan et al. (1985) on contraceptive use in Canada reveal that a majority of Canadian women, especially married women, practice contraception. Currently, married women have the highest overall level of the use of contraceptives (73%). Only five percent of currently married women are not using any method of birth control.

A combination of a smaller proportion of women getting married, later marriage, fewer children in marriage and a high contraception level leads to the current below-replacement fertility rate in Canada. One important demographic implication of this low fertility is that the Canadian population will cease to increase within the next generation or so (Grindstaff, 1986). A recent government report endorses the view that "... without immigration, continuation of Canada's below-replacement fertility rates would eventually lead to Canada's disappearance" and that the population will stop growing in 2021 (Canada Employment and Immigration Advisory Council, 1991) .

This low fertility level also has important implications for Canadian labour supply since it leads to a decline in the number of young people and a proportional increase in the elderly. This impact on Canada's population structure has caused some concern among researchers in different disciplines (e.g. demographers, economists, sociologists) and policy makers. Some of them have argued that there is a need for a pro-natal policy to encourage

higher fertility rates among Canadian women (Beaujot, 1986; Romaniuc, 1984; Mathews, 1984). Measures such as tax credits and direct financial payments have been proposed. The pronatal policy in Quebec, drawing inspiration from some of the European countries where attractive baby bonuses are granted, is one such example. Some evidence is shown that in 1989 the number of births in Quebec increased by 5.7 percent compared to the previous year, and this is attributed to the birth incentives by that province (Samuel: 1990). Although some are skeptical regarding the effects of pronatalist policies<sup>1</sup>, the implementation of the policy reveals the concerns of Canadians, or at least French Canadians, about their low fertility levels.

The debate on the future course of fertility is a subject of considerable speculation. Grindstaff (1986) Ryder (1979) and Easterlin (1978) have all noted that there are both research and political questions in terms of just how far (and for how long) fertility can decline. The implications of these trends and patterns are much debated in the demographic literature.

### **1.2.2 Women's Labour Force Participation**

As shown in Figure 1, the extent of labour force involvement of Canadian women has increased substantially over the past few decades<sup>2</sup>. For mothers under 35 with preschool children, the participation rate went up from 28 percent in 1961 to 48 percent in 1981. Although it is true that women earn less than their male counterparts and that

---

1. An extensive analysis of pronatalist policies in Europe concluded that "pronatalist policies have had limited effects." (Hohn, 1987).

2. The rate of participation for women over 15 years of age in the work force rose from 24 percent in 1951 to 30 percent in 1961, 40 percent in 1971, 53 percent in 1981 and 59 percent in 1990 (Statistics Canada, 1990a).

they experience less career mobility (Boyd, 1982), it is evident that the role of Canadian women in the labour force is changing. Women now constitute 43 percent of Canada's labour force. As noted in a recent report women accounted for 73 percent of Canada's employment growth between 1980 and 1987 and they are entering the labour force at a rate that is one of the highest in the developed world (Status of Women Canada, 1989: 13).

As noted by many studies, a major shift in Canadian family patterns in the past generation has been the replacement of the traditional family, where the husband was the wage-earner and wife the homemaker, with the so-called "symmetrical family" in which both husband and wife participate in the labour force and contribute to the family income (Eichler, 1983; Nakamura and Nakamura, 1985; Huber, 1986; Grindstaff et al., 1989). In 1968, nearly two-thirds of families in Canada consisted of a breadwinner-husband and a wife at home with or without children. Today, that pattern is followed by fewer than one in six Canadian families. Sixty-two percent of Canadian mothers with children under age 16 are now in the paid labour force and 61 percent of mothers with children six years of age and younger are employed (Status of Women, Canada, 1989: 41). Pryor (1984) found that the most important difference in the composition of family income in recent years was the increasing share provided by wives. In 1971, 25.2 percent of the family income was contributed by wives. By 1981 this figure had reached 28.1 percent. Grindstaff and Trovato (1987), using individual data, report that married women are generally junior economic partners of their spouses. "On average, all women contribute 22 percent of their families' annual income while working women provide approximately 33 percent of the total. The extent of junior partnership, however, is conditioned by women's human capital resources." They also find that of those women who were employed full-

time, one-third of them are in professional occupations, primarily concentrated in teaching and medical care.

Historically, women have concentrated in low-status, low-paying jobs such as domestic service, factory work and office work. Table 1 shows the changes in proportion of women in each major occupation categories in Canada from 1975 to 1985. Between 1970 and 1985, the number of women in managerial and administrative jobs more than doubled. However, we also note that despite the gains women have made in recent years, in 1985, fifty eight percent of Canadian women employed outside the home are still clustered in clerical, sales and service jobs that occupy the lowest end of the pay spectrum. Laws (1976) shows that Canadian women's work histories are characterized by major discontinuities. Women's continued responsibility for domestic work inhibits their full and continuous employment commitment. More recent evidence demonstrates a greater continuity of employment among Canadian younger women and those with higher education (Robinson, 1986).

In terms of attitude toward the market employment, there is some evidence indicating that many women tend to view their jobs outside of home as a secondary role to their family responsibilities. Wilson (1986) points out that "Despite these changes, attitude studies show that the beliefs and expectations of many Canadians conform to rather traditional definitions of the primacy of women's family responsibilities". She also notes that women's labour-force activity has typically responded to economic fluctuations and the changing demands of the labour force, particularly in the early years when women first started to participate in the labour force. Wilson (1986) claims that family economic position would have deteriorated significantly without the escalating contribution of wives (p.102). Consequently increased female labour-force participation does not merely reflect women's "enlightened dispositions"

to equality, but also a response to the need for additional income (Wilson, 1986: 103).

Other factors related to this change in family patterns are associated with changes in the life course of Canadian women since the early 1960s. For example, age at first marriage has risen from 21.2 for brides in 1965 to 23.7 in 1985. Over the same period of time, the proportion of women ever married decreased from 95 percent to 85 percent; the proportion of marriages dissolved by divorce has increased from 11 percent in 1965 to 42 percent in 1986. Clearly the magnitude of these changes, combined with decreases in fertility and increases in longevity have meant that the amount of time devoted to childrearing has been reduced dramatically and that the diversity of life-course paths has multiplied to include various combinations of education, career, motherhood, marriage or cohabitation, recreation, and leisure.

### **1.3 Policy Concerns of Female Employment and Fertility**

The continual interest in this topic is guided not only by the theoretical significance of the relationship but also by its policy implications for both labour market and demographic policies.

Since children are likely to be a major impediment to women's employment, knowledge of how fertility affects female employment behaviour helps to improve the ability to forecast the labour-supply behaviour of women.

On the other hand, the pattern of women's labour force participation has been identified as a crucial factor in shaping the future fertility trends. Ryder (1979) maintains that three complex factors account for the current record-low fertility in North America: (1) the changing roles of women; (2) the efficiency and availability of contraception/abortion and (3) the opportunity for diverse economic and social choices on the part of women which

competes effectively with childbearing. At a time when fertility rates in many industrialized countries are below the replacement level, understanding of the vital factors which may affect future fertility trends becomes especially important.

Research indicates that women are now showing a more continuous pattern of attachment to the work place. There is evidence of substantial work attachment among young women in the periods immediately before and after the birth of the first child, the time when women traditionally withdraw from gainful employment (Robinson, 1986; Boothby, 1984; Boyd, 1982; Bumpass and Sweet, 1980; Shapiro and Mott, 1979). Boothby (1984) points out that one of the policy interests of female employment concerns private pension plans. As women continue to show greater attachment to their jobs, more women become eligible to receive pensions which are not available for most temporary or part-time jobs. Other related policy issues that are of particular interest to women's groups include those of child care, parental leave, unemployment insurance and employment equity.

Another policy-related issue concerns the opportunities for on-the-job training for women. Many employers have been reluctant to invest in training married women because they move in and out of the labour force frequently. As women have a more continuous attachment to the labour force, employers should start to invest more on female employees.

Given its significant implications for future fertility trends and the labour market outlook in Canada, there is a pressing need to examine this topic using adequate data. Results from the United States or other countries are not directly transferrable to Canada. It has been reported that Canadian couples typically postpone childbearing for a longer period of time than do Americans. On the other hand, they tend to space children closer together and so complete their families sooner (Rodgers and Whitney, 1981). There

are also economic factors which may cause the differences in employment behaviour, such as the differences between the Canadian and U.S. tax schemes. Nakamura and Nakamura (1990) note that "U.S. couples typically file joint tax returns while Canadian wives who work are taxed as separate individuals just like their husbands.", which may tend to encourage female participation. In general, Canadian government has more generous family and work policies than the United States but less favorable programs than those provided in Scandinavian countries. A study on Canada's situation is vital.

#### **1.4 Proposed Research Method: Sequential Life-Cycle Analysis**

The inverse association between fertility and female employment in the industrialized countries has been well established both at the aggregate level and at the individual level. However, the dynamic aspects of the relationship have not been addressed fully.

Earlier research on the relationship between fertility and female employment tend to base the results on static models. Changes in the patterns of employment and the timing of fertility over a woman's life-cycle were rarely taken into account. Most of them are one-period models which examine the relationship between completed family size (e.g. children ever born) and a woman's work status at a specific point in time or some types of cumulated measures of work experience (e.g. years worked since marriage). The major criticism to these static models, as noted in the literature, is that both fertility and employment are likely to vary with different stages of the life-cycle (e.g. Ní Bhrolcháin, 1986, 1985; Heckman and Macurdy, 1980; Namboodiri, 1974). Cramer (1980) criticizes the one-period models for being conceptually inadequate because information at one point in time or cumulative average measures do not

reflect the lagged effect that fertility and employment may have on each other. Most women tend to have children between the ages of 20 and the late 30s. The probability of having a child declines drastically thereafter. On the other hand, women do not, typically, either "work" or "not work" throughout marriage but alternate between being in and out of the work force at different stages of their life-cycle.

A substantial literature suggests that the stage in the family life cycle affects women's employment and career patterns (reviewed in Waite, 1980). In turn, employment behaviour may have potentially different implications for childbearing behaviour at different stages. Ní Bhrolcháin (1980) notes that work at different stages of the life-cycle may have varying connections with fertility behaviour and that different strategies may be adopted for combining employment and childbearing. For example, women may attempt to shorten the time from first interruption to final return to work or to postpone births in order to complete their education or vocational training to establish themselves in a profession. It is also possible that the occurrence of recent births is likely to discourage work participation in the short run, particularly if child care is not readily available or is of less than the desired quality, while at a later stage of the life cycle a larger family size may encourage a mother's labour force participation to meet growing income demands. Viewed over a longer time horizon, early work experience, particularly in a well-paid job, may be expected to raise opportunity costs, delay entry into marriage and reduce lifetime fertility. Early and rapid childbearing, on the other hand, may limit opportunities for participation in the labour market.

This life cycle consideration makes the task of estimating and interpreting relationships between women's work and fertility a challenging one. This dissertation



examines the complex relationship between fertility and female employment with two different approaches. The first approach reconstructs women's fertility and work history with the retrospective data collected in the Canadian Fertility Survey (CFS) and traces their decision-making process back to the period before marriage. This approach allows us to see whether a woman had worked before she married, whether she stopped working at the time of each birth, and whether she returned to work after each birth. The second approach uses structural equation models to examine the causal order of fertility and employment in a sequential order. These sequential life-cycle models attempt to incorporate the dynamic nature of both women's employment and fertility. Variations in fertility and women's employment behaviour at different stages of the life cycle are taken into account. The intertemporal effects of employment status and fertility can also be observed. In the models, long-term effects of decisions at a specific point of time can be distinguished from the short-term effects.

Both approaches examine the timing of births and duration of employment at various stages throughout the marriage under the premise that married couples make and modify their plans concerning family-building and wives' employment over time. Labour force participation and fertility behaviour are viewed as having an impact on each other, but the impact is assumed to vary at different life-cycle stages. The underlying assumption of the sequential life-cycle framework is that couples' decisions on whether or when to have a child, and when to start or stop working are made in light of perceived benefits and costs associated with past fertility and time-allocation choices at various points in time. These decisions in turn influence future decisions on fertility and employment behaviour. This assumption is supported by evidence from studies which find

couples' plans concerning childbirth are contingent on their employment and financial situation (Silka and Kiesler, 1977; Thornton and Kim, 1977). It has also been demonstrated that women's employment behaviour at an earlier stage is a strong predictor of their employment status at a later stage.

Thus, a logical implication is that outcomes associated with each birth/employment status appear as causal factors at the next decision point in a sequential model. It is useful to think of this sequential life-cycle process in terms of individual life-course strategies that are updated continuously as individuals are faced with a dynamic system of experiences, choices, constraints and chance outcomes.

This research focuses on the timing of birth rather than the number of births. As Ní Bhrolcháin notes, interest in the quantum outcome as the main potential influence on fertility of women's employment may well be misplaced, and certainly represents only a partial appreciation of the demographic significance of recent trends in women's involvement in the work force. She points out that the pace of childbearing is likely to be an important element in the interleaving of women's working lives and their fertility behaviour, but it is a neglected one (1986:44). The norm of having one or two births seems to be so pervasive nowadays that variation may be more a timing than a number decision. Canadian researchers Rajulton et al. (1988) also note the reasons as to why the timing of births is becoming more relevant in Canadian Fertility. They content that given the long reproductive span of more than 30 years, when the desired family size is low (one or two children), the births can be timed at various intervals. A woman can plan a longer schooling career, a later marriage and still achieve the desired family size. Or they can plan to bear children early, then return to school or enter the work force. In other words, women with the same number of children could use very different strategies, in terms of the timing of

births and employment outside of home, to cope with their lives during the childbearing years.

Data on women's employment have rarely before been combined with high-quality fertility data in the same survey to permit the analysis of the work-fertility relationship in Canada. The first nation-wide fertility survey, the Canadian Fertility Survey, was conducted in 1984. It provides an excellent opportunity for the analysis in this dissertation with detailed retrospective data on fertility and employment histories of Canadian women.<sup>3</sup> Along with fertility and employment information, CFS also collected data about women's background, socioeconomic attainment, attitudes toward fertility and employment, and contraception practice. This valuable information can help better explain the relationship between work and fertility.

### 1.5 Outline of the Dissertation

As proposed, the relationship between Canadian married women's fertility and employment behaviour is examined with a sequential life-cycle approach. The focus of this dissertation is on timing and spacing of births rather than the number of children.

This dissertation is organized in six chapters. In Chapter Two, previous theoretical and empirical research is reviewed. Chapter Three describes the research designs of this study. This includes the conceptual framework used for the analysis, expected relationships among the variables, statistical methods and the data source used in the analysis. The empirical findings of the analysis are

---

<sup>3</sup>The Family History Survey which was conducted in 1984 also provides retrospective data on Canadian women's employment. However, many variables that are important to this study such as income and attitudes toward family and work are not available in the FSH.

presented in Chapters Four and Five. Chapter Four provides a socioeconomic profile for the sample which is essential for understanding the complex relationship between fertility and employment. It also examines in detail the employment and fertility patterns at different stages of the life cycle with reconstructed fertility-employment histories. Data on the number of job interruptions, different sequences of employment and fertility for juggling family responsibilities and jobs, reasons why a woman stops working and the birth intervals are presented. These materials help set the stage for the analysis of covariance structure models which are presented in Chapter Five. Chapter Six concludes this dissertation of a summary of the findings and a discussion on the policy implications of the results and directions for future research in this area.

## Table of Contents

Chapter	Page
2. RESEARCH ON FEMALE EMPLOYMENT AND FERTILITY .....	17
2.1 General Theoretical Perspectives .....	18
2.1.1 The Role Incompatibility Perspective .....	18
2.1.2 The Social-Psychological Perspective .....	19
2.1.3 The New Home-Economics Perspective .....	21
2.2 Synthesis of the Perspectives .....	23
2.3 Causal Order: Fertility and Women's Employment ...	25
2.4 Evidence From Structural Equation Models .....	26
2.4.1 Single-Period Models .....	27
2.4.2 Dynamic Models .....	29
2.5 Sequential Life-Cycle Perspectives .....	31
2.6 Timing of Birth and Married Women's Employment ...	33
2.7 Summary .....	35

## 2. Research on Female Employment and Fertility

Discussion in this section is limited to micro-level studies since it is at this level that analysis in this dissertation is done. No attempt is made to survey the experience of the developing world. A different pattern of relationship between fertility and employment is observed in the less-developed countries. The difference is frequently attributed to the opportunity structure for women in terms of access to and rewards from market employment, education and family planning in these less-developed countries (Goldstein, 1972; Standing, 1981; Yeung, 1984; Lloyd, 1990).<sup>4</sup>

The scope of this dissertation is also limited to women's, rather than men's, employment behaviour. In patriarchal societies, like most developed countries, it is mainly women's responsibility to care for children after birth. Because children absorb mother's time and also require other resources, mother's work represents both a constraint on their rearing and a productive resource for their support. The same relationship between man's employment and fertility is not found.

This chapter is organized into seven sections. The first section is an overview of three general theoretical perspectives. This overview is followed by a critique and synthesis of these perspectives. The third section addresses the issue of causal ordering between fertility and employment. This is followed by a review of the empirical evidence from the various causal models and a discussion of

---

<sup>4</sup>In some of the less developed countries, a positive relationship is observed between fertility and female employment (Goldstain, 1972). Some studies have suggested that given the strong familial norms and economic values of children and low-cost child care substitutes, extra earnings from the wife may enable the family to have more children.

problems in them. The discussion then turns to the strength of the sequential life-cycle model and how this framework is useful in explaining the employment-fertility relationship. A final section summarizes the review.

## **2.1 General Theoretical Perspectives**

A number of different explanations have been suggested to account for the relationship between fertility and female employment. Theoretical discussion on this topic can be broadly classified into three groups: 1) the role incompatibility perspective, 2) social-psychological perspective and 3) new home economic perspective.

### **2.1.1 The Role Incompatibility Perspective**

The role incompatibility perspective views the inverse relationship between fertility and labour force participation as a result of the conflicts between the roles of mother and worker for those who jointly occupy these two roles (Stycos and Weller, 1967; Mason and Palan, 1981). From this perspective, the critical factor is that career building takes place over the same years during which families are formed and children are raised. As Terry (1975) points out, two types of role conflict may occur: normative incongruities and time incongruities. Normative incompatibility occurs when a woman's participation in the labour force, particularly if she has young children, is "frowned upon" by the society unless there is economic necessity in the absence of a male breadwinner. Time conflict may result from the time allocation between child care and the employment. As a solution, women in the childbearing years are in a dilemma of either restricting fertility to remain in the labour force, dropping out of the labour force for childbearing and childrearing, somehow combining both roles, or convincing their male partners to take an increased parenting role.

Adding to the original formulation of the role incompatibility perspective, Mason and Palan (1981) suggest that household structure is an important dimension to be considered. In extended families where grandparents or other relatives are available to take care of children while the mother is at work, the incompatibility between women's work and fertility is less important.

To measure role conflict and evaluate its effects upon fertility is nevertheless a difficult task. The most often used measures of role-incompatibility are only crude proxies: an urban/rural dichotomy or women's occupation or job location. This assumes that jobs in rural settings are less incompatible to mother's duties at home than jobs in urban areas and that jobs far from home present more conflicts with childcare duties than those close to home. Since such measures are very crude and have multiple interpretations, much of the evidence which attempts to show the impact of role conflict is highly speculative. The role-incompatibility perspective, notwithstanding its common-sense appeal, is difficult to operationalize. Discussions about incompatibility also remain at a very general level and do not fully identify elements that help elucidate the contextual structure in which conflicts between work and fertility arise.

### **2.12 Socio-Psychological Perspective**

Some researchers have argued that the causal link between fertility and female employment should be examined at the individual, social psychological level (e.g. Fortney, 1972; Hoffman and Wyatt, 1960). Blake (1965) suggests that companionship, satisfaction, creativity or stimulation intrinsic or complementary to the work would reduce women's desire to have a large family. This perspective also explains the relationship of fertility and female employment in terms of the trade-offs between the



psychological costs and benefits that can be obtained from working and childbearing. The psychological benefits of working outside the home may include social interaction, satisfaction gained from the material rewards and the nature of the jobs and self-actualization. The costs of working outside of home may include the lack of time for oneself or one's family, stress in one's job or disapproval from family members or society in general.

To the extent that employment is perceived to be an alternative to motherhood and the socio-psychological rewards are seen to outweigh the rewards of childbearing, female employment will have a depressing effect on fertility. Proponents of this approach contend that women who have a more traditional sex-role orientation are more likely to devote their lives to child-bearing and child-rearing activities than those with less traditional sex-role orientation and lower self-esteem. Mott (1982) attempts to show that the socio-psychological factors are responsible for the changing patterns of female employment in the recent two decades. Bagozzi and Van Loo (1972,1984) propose a model and show that fertility and female employment are caused by common "taste factors" such as the value of children, role-egalitarianism and attitude toward women's employment between the spouses. Results of several studies (Mason, 1974; Stolzenberg and Waite, 1977), however, found minimal importance of the sex-role orientation in determining a woman's fertility and employment experiences. The inconsistency of the findings may partly be attributed to the substantial measurement errors which commonly characterize attitudinal variables and failure in these studies to appropriately control for exogenous variables that may influence the socio-psychological factors. The difficulties in operationalizing the theory greatly hinder the development of research on this perspective.

Ridley (1971) criticizes the socio-psychological

perspective for assuming that women work out of a preference for having an occupation rather than out of economic need. Preference for having an occupation or a "career" may only apply to the case of middle- and upper middle-class women. She emphasizes the "economic necessity" in the relationship between the wife's employment and fertility. In these situations, the increasing number of children in the family may push the women into the labour force in order to maintain the standard of living for the whole family.

### **2.13 The New Home-Economics Perspective: The Rational Calculus of Children**

One of the most significant theoretical developments in the area of work and family in the 1980s comes from economics. Becker's work A Treatise on the Family (1981) extends conventional microeconomic theory to the family, an area of scholarly inquiry previously outside the scope of economics. Briefly, Becker argues that households derive utility from commodities that are produced with some combination of market goods and non-market time. Since small children are time-intensive commodities, and the substitution of market goods (e.g., day-care centers and restaurant-prepared meals) may be of questionable quality and difficult to arrange, mothers will reduce labour force participation in order to devote their time to this form of production within the home.

In Mincer's work (1963) children are viewed as consumer durables and parents are thought to maximize the utility function of children. This perspective assumes that women who have children will have to forego employment, at least for a period of time. The income foregone when a woman stops working is considered as an indirect cost of having children, namely the opportunity cost. It is mainly through this concept of "opportunity cost" that the new home economics theories explain the inverse relationship between

fertility and female employment. A woman who is considering having a child would presumably evaluate whether the costs involved in bearing a child are worth the market earnings she would have to forego in order to have a child. It is suggested that the opportunity costs correlate positively with women's earnings and that fertility is an inverse function of the opportunity costs. Under similar conditions, the utility of children decreases along with a rise in the cost of childbearing and the opportunity costs for mothers (Becker and Tomes, 1976; Mincer, 1963; Turchi, 1975; Easterlin, 1973). The existence of a direct causal relationship from economic activity per se to fertility is most likely if the opportunity costs are high and any interruption of economic activity to have children would lower their expected life-time earnings.

Economists have used this perspective to try to predict the effects of children on female labour supply. Easterlin refines the concept for the costs of children and takes into account both direct and indirect costs of children. The direct effects of time, effort and expense of having and caring for children are usually viewed as affecting a woman's labour supply behaviour via her "reservation wage" function. The indirect effects are via job-related human capital accumulation. Women who have children and who work less during their active child-bearing and child-rearing years will accumulate less on-the-job experience because of their reduced labour force participation. Wives' wages are seen to have two opposite effects on fertility. On the one hand, the "income effect" which comes from the extra family income contributed by the wife allows the couple to have more children. On the other hand, the "substitution effect", which comes from the opportunity costs of the wife's job, have a negative impact on fertility. The substitution effects, as shown in the literature on industrialized countries, often outweigh the income effects

in industrialized countries.

Easterlin also introduces the notion of the "potential income", arguing that income at one point in time may not be an adequate representation of the income relevant to household decisions. Rather, it is the long-term income prospects of the household, i.e. the "potential income" or sometimes called the "permanent income", that influences these decisions.

The new home-economics perspective is helpful in formalizing research in this area. The inadequacy of the analogy between children and consumer durables, however, has been forcefully argued by many scientists (e.g. Blake, 1965). Furthermore the new home-economics theories do not consider the dynamics of fertility. As pointed out by Schultz (1978: 286), there is evidence that the direct association between numbers of children and the wife's labour supply is nonlinear, with the first child having by far the greatest effect, however, the framework used by economists to interpret differences in fertility unfortunately says little about the factors affecting the timing and spacing of childbearing.

## 2.2 Synthesis of The Perspectives

The role-incompatibility perspective represents the origin of the conceptualizing task in this area of study. The social-psychological perspective focuses more on the impact of satisfaction with children, values of children, and feelings about oneself. The new home-economics theories focus on the impact of monetary costs (direct and indirect effects) and time costs (direct time expenditures and foregone use of time, e.g. lost labour force participation). Certain overlaps exist between these general theoretical perspectives. Several people have attempted to synthesize the essential elements in these perspectives (e.g. Hout, 1978; Cramer, 1979, 1980). Easterlin (1973) and Bagozzi and

Van Loo (1978,1982,1984) emphasized the significance of a woman's "taste" for work which represents the degree of her motivation for employment independent of the wage rate. The stronger the "taste" for work, the more likely a woman will opt for working and having a smaller family. A high opportunity cost may encourage a shift in preference for market over domestic activity and thus lead to lower fertility. Scanzoni (1975) relates the concept of sex-role orientation to the utility maximization model. Women are likely to seek nontraditional kinds of rewards when they perceive alternative rewards that seem equally or more attractive than a child and when a child is too costly (beyond solely monetary factors) relative to other potential benefits. This is likely to occur when sex-role norms prescribe potentially available rewards other than child bearing. To the extent that women perceive relative social and economic benefits from employment, they are more likely to enter the job market and limit the size of their families.

One could view the role-incompatibility, socio-psychological and micro-economic perspectives as complementary to one another. Each perspective places an emphasis on different aspects of the employment-fertility relationship. The inverse relationship between female employment and fertility could be explained with a combination of the following factors:

(1) the practical dilemmas (both in terms of time and of social norms) a woman may face in carrying out a double burden of competing and very often conflicting tasks and responsibility,

(2) the changing attitudes of women as they begin to perceive employment as a legitimate alternative or complementary source of satisfaction and identity to motherhood, and,

(3) the economic rewards from the work place which both

increase the attraction of employment and increase the price of children through the opportunity costs.

A synthesized framework of these three general perspectives provides sound explanations for the inverse relationship between fertility and employment at a general level. Lacking in this synthesized framework, however, are: (1) the specification of the causal ordering of the relationship, and (2) the dynamic nature of the relationship (for example, the timing of births and variations in employment status over time). In the remaining sections of this chapter, issues of causal ordering and the dynamic aspects of the fertility/women's employment relationship are discussed.

### 2.3 Causal Order: Fertility and Women's Employment

The causal relationship between fertility and female employment remains unclear. Does employment outside of the home cause women to have fewer children or is the smaller family size that enables women to have a greater involvement in the labour force? Empirical evidence supporting either direction of causal ordering abounds (for example, by Felmler, 1984; Sweet, 1973; Bowen and Finegan, 1969; Cain, 1966; Gendell, 1965). Several researchers maintain that simultaneous reciprocal effects exist between fertility and employment (e.g. Cramer, 1980; Turchi, 1975, Willis, 1973). On the one hand, a large family size may either constrain a woman from participating in the labour force or necessitate her participation in the labour force. On the other hand, a woman's employment outside of home may either limit the number of children she has or enable her to have more children. When faced with the actual problem of coordinating work and home life, a couple's decisions about wife's work and children influence each other and may change over time.

Other researchers have argued that the relationship

between fertility and employment is spurious. That is to say, both decisions about working and having children are the results of some set of common antecedent factors. Mincer hypothesizes that the choices of labour and family size are not causally related to one another, rather they are simultaneously determined by the same basic economic variables (1963:78). Bagozzi and Van Loo (1978, 1982, 1984) and Scanzoni (1975) report that both fertility and female labour force participation are caused by common "taste factors" such as the value of children, sex-role orientation and attitude toward wife's work. The association between fertility and employment disappears when these variables are controlled and simultaneous causal effects are allowed between fertility and employment. Bagozzi and Van Loo argue that the greater the role egalitarianism between the spouses, the greater the extent of the wife's labour force participation and the smaller the family size. Terry (1975), Rosenberg (1972) and Cramer (1980) contend that the couple's socioeconomic background and family-size norms determine both the wife's employment and fertility behaviour.

Thus, debates regarding the causal relationship are divided into four views: (1) fertility is the causal factor, (2) women's employment is the causal factor, (3) a simultaneous reciprocal effect exists between them and, (4) the relationship is spurious. Empirical evidence regarding the causal relationship is reviewed in the following section.

#### **2.4 Evidence From Structural Equation Models**

Early studies on the relationship between fertility and female employment were mostly descriptive. They tended to treat either fertility or labour force participation as the dependent variable, and the other as the predictor variable. Structural equation models were developed later

to investigate the complex relationship between fertility and women's employment. It has been recognized that if reciprocal causation exists between these two variables, unidirectional models would be misspecified a priori. They would therefore likely yield biased estimates of the effects of labour force participation on fertility (or vice versa). Unfortunately, the evidence from these studies is not consistent. The inconsistency is perhaps a result of the different measures of fertility and employment and the different statistical methods used in the studies.

Studies which attempted to investigate the reciprocal effects of female labour force participation and fertility have used two major types of models: single-period models and dynamic models.

#### **2.41 Single-Period Models**

Single-period models, usually based on cross-sectional data, examine the relationship between completed family size and employment status at a certain point in time or the length of employment since marriage. Specifically, they allow for simultaneous reciprocal causation between single-period measures or cumulative measures of fertility and employment (e.g. Waite and Stolzenberg, 1976; Smith-Lovin and Tickamyer, 1978; Bagozzi and Van Loo, 1978, 1982; Cramer, 1980). Previous studies on fertility and employment which used one-period models have yielded somewhat contradictory findings. Waite and Stolzenberg (1976) conclude that while mutual causation is evident, labour force plans play a more important role in affecting fertility expectations than the reverse. Smith-Lovin and Tickamyer (1978) find a strong effect of fertility on years employed but only a very weak effect in the opposite direction.

Cramer (1980) notes several plausible explanations for the seemingly contradictory results reported in these two



studies. First, the former examines the relationship between future expectations of fertility and employment status (measured by the intended total number of children and future plan for labour force participation), whereas the latter deals with the actual experiences of the women at the time of the survey (measured by children ever born and employment status at the time of the survey). Secondly, Cramer suspects that the contradictory findings may have resulted from the potential problems of multicollinearity which frequently plague non-recursive models. As a consequence of the presence of near multicollinearity, standard errors of the estimates tend to become very large and the estimated parameters become unreliable (inefficient). Thirdly, the positive correlations which were found between the disturbance terms of labour force participation and fertility in both studies suggest that common factors for both fertility and female employment may have been omitted from the models. In other words, the models are likely misspecified. Finally, these two studies both use the two-stage least square (2SLS) estimation procedures which yields inefficient estimates. Discrepancies in the estimates may actually occur simply as an artifact of the statistical procedures used.

Cramer (1980) criticizes such one-period models on both methodological and conceptual grounds. A major methodological drawback of nonrecursive models is multicollinearity, since such nonrecursive models are often underidentified. He also notes that the one-period models are conceptually problematic because cross-sectional data at one point in time do not reflect properly the lagged effects that fertility and employment have on each other. Cramer thus argues that longitudinal data are required to examine a proper specification of life cycle events in a dynamic model.

## 2.42 Dynamic Models

Dynamic models are usually based on longitudinal data and examine the causal relationship between a woman's employment and fertility experiences according to the temporal sequences in which they occur (e.g. Gurak and Kritz, 1982; Cramer, 1980; Hout, 1978; Namboodiri, 1964). Studies which use dynamic models, however, also have mixed results. Hout (1978) and Cramer (1980) both used dynamic models with U.S. data to conclude that the dominant effects are from fertility to employment in the short run and from employment to fertility in the long run. In their models, fertility and employment decisions made in past years are taken as exogenous to decisions made in the current period. Cramer (1980) and Gurak and Kritz (1982) use Ordinary Least Squares (OLS) to estimate their dynamic models. OLS, however, is problematic in this analytic context. Since individuals differ in their preferences for market versus nonmarket activities, and if, as is likely, these unobserved characteristics are persistent through time, the estimated coefficients will reflect this unobserved heterogeneity. Hout (1978) uses two-stage least squares procedures which tend to yield inefficient estimates and have multicollinearity problems due to weak instrumental variables. Yeung (1988) uses a maximum likelihood LISREL procedure to estimate a dynamic model for the U.S. and concludes that fertility has a stronger short-term influence on work behaviour than vice versa in the first five years of marriage. This study, however, is limited by considering only the initial stage of marriage and examining the number, rather than the timing, of children born.

Felmlee (1984), based on results from event-history models, notes that having babies increases the likelihood of exiting from employment but high wages reduce rates of leaving because of pregnancy. In addition, independent of wages or fertility, the longer the woman is on the job, the

less likely she is to leave it. The life-course alternatives for women will be related to the timing of childbirth, with late childbearers having more human capital resources to draw upon.

The inconsistency of the previous results from dynamic models may be partly attributed to the arbitrary cut-off points which were used for the events under investigation. Davis (1978) and Heise (1970), among others, have pointed out that one must know the time lag necessary for the effects to occur in order to properly infer causal relationship from analysis using longitudinal data. The problem of course is that we rarely, if ever, have enough information about the detailed structure of a process to exactly specify the lag. Thus, using panel design to discover causal direction requires information that, for all practical purposes, depends on knowing causal directions. The key issue therefore is to have a well-developed theory. Since longitudinal data which provide a detailed history of women's employment and fertility behaviour are scarce, application of the dynamic models is greatly restricted. Furthermore, the construction, specification and appropriate testing of sound causal models relating employment and fertility behaviour as they develop over time are highly demanding not only of data but also of technical resources. Evidence on the causal ordering between fertility and women's employment has not clearly supported either of the four possibilities in the debate. The inconsistent evidence can be attributed to many factors mentioned above such as measurement problems and estimation procedures. The most important reason, however, is that the conceptual framework in most of the studies is inadequate. In the next section, sequential life-cycle approaches are discussed as an alternative and superior conceptual model.

## 2.5 Sequential Life-Cycle Perspectives

The rationale for using a sequential life-cycle model to study the employment/fertility relationship is that the birth of each child tends to alter a couple's perceptions in a way they cannot entirely anticipate, causing them to reevaluate initial decisions about fertility at each parity (Rosenzweig, 1976; Namboodiri, 1972; Mishler and Westoff, 1955). This same sequential process applies to the wife's employment. Experience of labour force participation tends to alter perceptions of working outside of the home, and this may cause a woman to reevaluate time allocation and household budgets.

Namboodiri argues against focusing on completed family size as the key decision in fertility analysis: "While any couple may even at the time of marriage have some idea about how many children to have altogether, it is unlikely that a firm decision will be made once and for all immediately after marriage. It seems more logical to assume that decisions would be made sequentially, each step dealing with the addition of a(another) child to the family (Namboodiri, 1972:198)." Westoff and Ryder (1972) show that a proportion of couples will change their desires at each birth under the circumstances that couples have the opportunity to reconsider their decisions during each successive birth interval. Several people have emphasized the different sequences in the life cycle that decisions on fertility and employment are likely to be made by the couple. Thornton and Kim (1977) and Silka and Kiesler (1977) have also demonstrated that a couple's fertility plans are contingent on their employment and financial situations.

Rosenzweig (1976) notes that whether or not a woman expects to bear additional children at a certain age and how much she participates in the labour force are functions of the existing number of children, the accumulated stock of wage-augmenting work experience and a vector of

characteristics of the household which remain fairly constant throughout the marriage. He found that the accumulated work experience of women and birth parity were significant determinants of sequential decisions regarding market employment, and to a less extent, fertility.

Hofferth (1983) proposes a sequential decision-making framework for analysis on fertility. She maintains that fertility decisions are made simultaneously with other family choices -- a couple decides how many children to have, when to have them and how much time to allocate to market work together with how much education to attain. She argues that this process is further complicated by evidence that these choices may not be made once for all, but change as circumstances and experience dictate. One of the characteristics of the sequential model is that each birth is associated with a different type or level of outcome, depending on family size. Thus, analysis is done by each parity. The estimations of her models, however, are done with OLS which is problematic for the problem of unobserved heterogeneity discussed earlier.

Economic analysis of the distribution of fertility and work force participation over the life cycle uses this same logic (see, e.g. Carlinear et al., 1984; Moffit, 1984; Ward and Butz, 1980; Heckman and McCurdy, 1980). These life-cycle models assume that labour-supply decisions are made within a dynamic framework. Labour-supply decisions at any moment in time are a function of current and future wages, wealth, rate of discount and preference and other variables (both current and future) as dictated by the problem under consideration.

Turchi (1975) contends that while couples must make their fertility decisions early in the life cycle for biological reasons, the same is not true of labour force participation. The asymmetry between fertility and labour-supply decisions is also emphasized by Oppenheimer.

Once children are born, couples are no longer entirely free to rethink their decisions about fertility. But it is still possible to modify the couple's decisions about wife's labour-force behaviour, both her total labour supply over the life-cycle and how it will be distributed (Oppenheimer, 1982:23).

## 2.6 Timing of Birth and Married Women's Employment

Empirical results having a bearing on timing of birth are not seen very often. Speculation has centered on whether the increase in the employment of married women may promote shorter birth intervals. Keyfitz (1977) has suggested that married women's need or desire to work may provide a motivation for speedier family completion and that this is made possible by increasingly efficient contraception. For the mother who must give up a job in order to look after the family, two or three children of about the same ages cost less in lost earnings than would the same number of children spread over her reproductive life (1977:329). Ní Bhrocháin (1986) notes that those who do not intend or wish to resume paid work may be motivated to have longer birth intervals. She listed several motives for doing so. Families of children more widely spaced are easier to manage logistically. Where the expectation is that there will be only one earner, the financial burden of childbearing is eased by longer spacing. Women envisaging no other role than that of housewife and mother may extend the period of intensive motherhood by longer intervals. Women who are not interested in pursuing jobs outside the home might attempt to legitimize their economic inactivity by lengthening the period during which dependent children are present and needing care. Bernhardt (1986), based on Swedish data, reports that whether women stay at home for at least one year after the first birth is strongly related to their educational level. The differential impact of

transition to parenthood has become less pronounced over time, with different groups of women tending to become more alike in their behaviour. He also finds the most pervasive of all predictors of staying at home one year after child birth is early labour-force withdrawal. This is consistent with findings in the U.S. by Waite (1984) that the effect of parenthood is restricted largely to a sub-group of women who leave work before the first birth.

Evidence supporting an association between marital employment and shorter or longer birth intervals is available for both patterns. Westoff et al. (1961), Namboodiri (1964) and Bumpass and Sweet (1980) report that employment during marriage is associated with longer birth intervals while Deville (1977) and Ní Bhrolcháin (1980, 1985) found an association between faster completion of childbearing and wife's economic activity.

Hoem and Hoem (1989) showed that the strongest factor in the propensity of having a second birth is a woman's employment status, her educational level and whether she is cohabiting or is married. Women's employment and educational level have an important impact on having the third births as well, but the most important determinants for having a third child are demographic variables, such as the age at first birth and the interval which elapsed between the first two births.

One important factor in the relationship -- women's motivation -- is not directly measured in any of these studies. For women who are not motivated to participate in the labour force, for whatever reasons, longer intervals between births seem to be a preferable strategy. For those who are work-motivated, a speedier return to work is desirable after the interruption in labour force participation occurring at the time of first birth. Two general strategies which might be adopted by the latter group of women are suggested by Ní Bhrolcháin (1986).

First, the women do not return to work until after the last child and hasten work resumption by shorter intervals and/or a faster return after last birth and/or reduced parity. As pointed out by Ní Bhrolcháin, accelerating intervals and reducing parity could both result in a speedier work return but need not be associated, so they are potential alternatives. Second, the women resume work before the birth of the next child, if there will be one. In the second situation, a longer birth interval is expected.

Mott (1972) shows a clear positive relationship between the length of a parity interval and the probability of a woman working in the interval. Ní Bhrolcháin (1983, 1985, 1986) found a strong positive association between interbirth working and birth intervals and the speed of return to the labour force. In other words, the longer a woman is able to postpone the birth of her next child, the greater is the likelihood that she returns to work. There is also a very strong relationship between whether one works or not in one parity interval and working probabilities in the next higher order interval. Thus, a woman who delays the birth of her next child may not only increase her likelihood of working in that interval but may even affect her working chances after her next birth. Furthermore, the higher the parity interval in which the woman is working, the greater is the predictive value of that participation for subsequent participation. This is consistent with the premise that the higher the parity interval in which a woman is working, the greater her work commitment. The predictive value of work participation declines sharply once the pattern of participation is interrupted.

## **2.7 Summary**

In conclusion, the following important lessons can be learned from previous research on fertility and female employment:



■ Synthesizing role-incompatibility, social psychology and new home-economic perspectives leads to a sound general explanation of the relationship between fertility and employment. However, the causal ordering between employment and fertility is not specified and the dynamics of the relationship have not been incorporated into the theoretical framework.

■ The unidirectional models which treat one variable as dependent on the other are misspecified a priori if mutual causation exists between these two variables. Models which allow fertility and employment to influence each other are needed to examine the complex relationship.

■ One-period models are conceptually less adequate than the dynamic models in explaining the relationship between fertility and female employment.

■ The sequential life-cycle approach which allows for variations in employment and fertility behaviour during a woman's life course are conceptually superior to other dynamic models. They also avoid the problem of using arbitrary cut-off points for fertility and employment events, as in some other dynamic frameworks.

■ Timing of birth is becoming a more important aspect than number of births in research on this topic in industrialized areas where fertility is below replacement level in many countries.

■ To establish a non-spurious relationship as well as to assist in explaining the relationships, relevant demographic, economic and sociopsychological factors should be incorporated in the models.

■ Ordinary Least Squares is an inadequate method to use in dynamic models and two-stage-least-squares often yields inefficient estimates for analytic models which attempt to unravel the complex relationship between fertility and female employment.

Based on above discussions, this dissertation attempts to examine the timing and spacing of childbirth and employment behaviour of Canadian married women with a sequential life-cycle approach. The research design for this study is developed in the next chapter.

### Table of Contents

Chapter	Page
3. RESEARCH METHODOLOGY .....	39
3.1 Research Design For Sequential Life-Cycle Analysis.	39
3.1.1 Descriptive Analysis of Employment-Fertility Sequences.....	39
3.1.2 Covariance Structure Analysis of Sequential Life-Cycle Models .....	40
3.2 Hypotheses .....	43
3.3 Measurement of The Variables .....	45
3.4 Data: Canadian Fertility Survey, 1984 .....	46
3.5 Statistical Methods: Covariance Structure Model (LISREL) .....	49

### 3. RESEARCH METHODOLOGY

#### 3.1 Research Design for Sequential Life-Cycle Analysis

This chapter develops research designs for a sequential life-cycle analysis of Canadian women's employment patterns and fertility behaviour. As noted earlier, the underlying assumption of the sequential life-cycle approach is that couples' decisions concerning fertility and employment are made in light of the perceived benefits and costs associated with past fertility and time-allocation choices. These decisions in turn are expected to influence future decisions about fertility and employment. Thus, conceptually, outcomes associated with each birth/employment status appear as causal factors at the next decision point. This temporal ordering between events and the concept of sequential progression of life events are the essence of the sequential life-cycle analysis. Two different, but complementary, sequential life-cycle approaches are used in this study.

##### 3.1.1 Descriptive Analysis of Employment-Fertility Sequences

The first approach involves descriptive analysis based on employment and fertility histories to examine couple's fertility and employment sequences during the wife's childbearing year. Data presented in this section include:

- if or how long married women work before marriage,
- whether they stop working before a birth, between births or after a birth,
- if they stop working at one point, whether they return to work after each interruption,
- the reasons for job interruptions,
- full-time or part-time employment, and
- birth intervals.

This approach also uses flow charts to depict the sequences of employment and fertility behaviour at different stages among Canadian couples and to identify the most

common behaviour paths.

### **3.1.2 Covariance Structure Analysis of the Sequential Life-cycle Models**

The second approach entails using the covariance structural models to examine the causal order of the fertility and employment events in a sequential order. The conceptual framework for the sequential life-cycle models is presented in Figure 2. This model assumes that fertility and work are the major events during a married woman's childbearing years, thus largely ignores other possible pursuits during this period (e.g. continued education or leisure). The model incorporates background characteristics of the couples along with economic and socio-psychological variables to explain the fertility-employment relationship. Employment and fertility status are measured at various points in time. Employment status is measured by the length of employment before the first child, between births and after the last child is born. Fertility measures are birth intervals. Early work experience is expected to influence the pace of family formation and employment status at later stages. The first birth interval is expected to be a deciding factor in the wife's employment pattern following the first birth, which in turn influences fertility behaviour at the subsequent stage.

To establish a nonspurious relationship between fertility and female employment, various background characteristics of the couple are included as control variables. These variables are chosen based on evidence in previous literature that they have a significant impact on both fertility and women's employment behaviour. These variables include age at marriage, wife's educational attainment, wife's occupational status, and husband's potential income. It is well established in the literature

that the earlier a women gets married the sooner she has a first child and the larger her completed family size. This can be explained by a longer exposure to the possibility of pregnancy and the more traditional role-orientation often found among women who marry early. These women are also found to have a lower degree of involvement in the labour market due both to their lower level of human capital and weaker interest in pursuing a career outside the home. Women's educational attainment is one of the most persistently significant predictors of both fertility and employment behaviour. A higher education, which often leads to more non-traditional attitudes, later age at marriage and more knowledge about contraception, tends to result in a lower level of fertility and more intensive pursuit of jobs or other interests outside the home. A woman's occupational status is closely related to her educational attainment. The better educated a woman is the more likely she is to participate at a higher status level in the labour force. Occupations with a higher status are usually accompanied by higher wages, increasing employment incentives as well as opportunity costs for bearing children.

Two socio-psychological variables, women's familial norms and attitudes toward female employment, are also included in the model to examine the theoretically important relationship between these predispositions. Familial norms reflect a woman's preference for children while attitude toward women's employment reflects her perception of the propriety of working outside the home. Women who have stronger familial norms are expected to have earlier first birth and less involvement in the labour market. Those who view employment outside the home as an appropriate role are expected to do the opposite.

The socioeconomic background and attitudinal variables are assumed to remain relatively stable over time. They are treated as exogenous variables and are expected to influence

both fertility and employment behaviour at different points in time. Although it is recognized that the societal norms about appropriate gender roles influence individuals' predisposition and behaviour, these variables are taken as known in the model. This is done primarily to avoid identification problems of the model. Not allowing these variables to vary over a woman's life cycle is clearly a limitation that can be improved upon in future research.

The covariance structural analysis is done for those who have one to three children and are in their first intact marriage. Those who had a previous marriage are excluded from the analysis to eliminate the complicating effects of disrupted marital histories in decisions on employment and family size. Whether to have children in a second or third marriage, especially for those who have children from a previous marriage, is expected to be a very different decision-making process from that in an intact first marriage. Premarital births are also excluded from the analysis since premarital births are often unplanned. Those who have a premarital birth are expected to experience a sequence of life events of marriage, childbirth, education and employment that deviates from that experienced by those who have children after they are married.

Analysis is done by parity. This is in line with Hout's (1978) argument that exogenous variables may interact with parity in the determination of fertility. Each parity status is seen as a different progression stage, each associated with a different type or level of outcome. For the parity-one group, the number of expected births in the future is incorporated in the model as fertility plans for those who have not completed the family formation processes. Women with four children or more are excluded from the analysis because structural models for higher parities become quite complicated to interpret and they represent a relatively small proportion of the population (n=381).

### 3.2 Hypotheses

Employment and fertility status are expected to have intertemporal correlations. Thus, status at one point in time is expected to correlate with that at later stages. Employment duration before the first birth (including employment before marriage) is expected to have a negative effect on how soon a couple starts their family. The longer a woman works before she gets married the longer the first birth interval is expected to be. The first birth interval in turn influences the subsequent employment duration which then influences the following birth interval. Early work experience, often shown to indicate a woman's commitment to work, is expected to be an important predictor of subsequent work activities. Correlations between birth intervals are less clear. For those who have three children, one would expect that they have short birth intervals throughout the childbearing process. For those with fewer children, a woman may have a long first birth interval and a short second birth interval to compensate for the late start or vice versa. In such cases, a negative relationship may be observed between the birth intervals.

Wife's occupational status is used as a proxy for the opportunity cost of having a child. Women with higher occupational status, which entails a higher opportunity cost, are expected to have fewer children. If women remain out of the labour force throughout their childbearing years, those among the same parity group who have a higher status occupation may shorten the birth interval(s) in order to return to the labour force as soon as possible. Women with lower status occupations tend to have longer birth intervals. On the other hand, if a woman returns to the labour market shortly after a child is born then subsequent birth intervals may be lengthened, especially for those with a high status job.

Based on findings in Terry (1975) and Lindert (1978),



the relationship between employment and fertility is expected to be stronger during the early stage of marriage than at later stages. Due to social norms and biological factors, most women have children at the early stage of marriage. Since infants and preschool children make particularly great demands on mother's time and attention, role conflict between a mother and a worker is likely to be especially acute at the initial stage of marriage.

Based on human-capital theory, a woman tends to have fewer children and is less likely to have another child as she spends more time in education and the labour force. This is because the opportunity cost of having a child, is income foregone by spending time caring for children instead of in the labour market, which is an higher the greater is education and labour market experience. It is expected that age at marriage, within parity groups, has a positive effect on both the employment duration before first birth and the first birth interval. Those who marry early tend to start having children earlier and have less involvement in the labour force during their life time. As for education, better-educated women tend to get married later and have a higher propensity for participating in the labour force. Early school leaving not only implies less educational and skill development but is also frequently associated with early marriage and childbearing. Women with higher occupational status, by virtue of the superior economic and non-economic rewards of their jobs, tend to be motivated to have a greater attachment to their jobs and to have fewer children due to the higher opportunity costs for having children. Occupational status is used here as a proxy for the "opportunity costs" of having a child. Husband's income, according to microeconomic perspectives, has a negative impact on wife's labour force participation but has a positive impact (i.e. the income effect) on fertility when everything else is held constant.

### 3.3 Measurement of the Variables

The observed and unobserved variables used for analysis in this dissertation are shown in Table 2. Employment status is measured by the length of employment in months before and after each birth. Birth intervals are also measured in months. Wife's education is measured by years of schooling completed. Wife's occupational status is used as a proxy for the opportunity cost of having a child. The quality of data on women's income collected in Canadian Fertility Survey is not very good (because of substantial missing data). Thus, women's occupational status is used instead. It is measured by a 11-category scale, with 11 denoting the most prestigious occupation (managerial and administrative jobs) and 1 the least prestigious occupation (unskilled workers, labourers). Women with more prestigious occupations tend to be more work-motivated than others and have higher opportunity costs. Husband's potential income is used to capture the long-term income prospects of the household, net of wife's income. As suggested by the new home economics, this is a better representation of the income concept relevant to household decisions than the current income. A decision to have a child or to work is most certainly not based only on the current wage rate, but on an estimate of future earnings. It is computed by coefficients obtained from the regression of the natural log of the husband's actual income on his education and age and work experience.<sup>5</sup>

---

<sup>5</sup>Derivation of Husband's Potential Income (HPINC) :  

$$\text{LOG}(\text{HPINC}) = -92.730 + (19.298 * \text{AGE}(\text{H})) \\ + (-.170 * \text{SQEXP}) + (11.746 * \text{EXP})$$

Experience:  $\text{EXP} = \text{AGE}(\text{H}) - \text{EDUCATION}(\text{H}) - 6$   
 Squared experience:  $\text{SQEXP} = \text{EXP} * \text{EXP}$   
 Actual Income (ACTINC):  

$$\text{LOG}(\text{ACTINC}) = a + b_1\text{AGE} + b_2\text{EXP} + b_3\text{SQEXP}$$

Two attitudinal measures are included in the models, indicating the value women attach to having children and working outside the home. The indicators used here are responses to questions regarding the importance of having at least one child and being able to take a job outside the home to be generally happy in life. These two variables are measured on a four-point scale with 1 denoting "very important" and 4 denoting "not important at all". These two indicators are expected to be very crude measures of a women's attitudes toward family and employment. As most attitudinal measures in social science, both the validity and reliability of these two indicators are not expected to be very high. Fortunately, this limitation on indicators can be offset to some extent in the covariance structure models where measurement errors in indicators are allowed rather than assuming perfect measurement in most causal models. More discussion on measurement errors is provided in Section 3.5 in this Chapter and in Chapter Four.

#### **3.4 Data: Canadian Fertility Survey, 1984**

Data from the Canadian Fertility Survey (CFS) are used for this dissertation. Based on a national sample, CFS was conducted in the spring of 1984 by three Canadian university institutes: Population Research Laboratory at the University of Alberta, University of Western Ontario and the Survey Research Center at the University of Montreal. The purpose of the Survey was to collect information on history of pregnancy, marriage, birth control and female employment patterns along with attitudes toward some issues related to marriage and the family. Retrospective data were collected on the timing of each birth and of each job entry and interruption.

The survey was carried out with centralized telephone interviews done from five Canadian cities: Montreal, Toronto, Regina, Edmonton and Vancouver. The target

population of the survey was made up of all women born between Jan 1, 1934 and December 31, 1965 (i.e. those between the ages of 18 and 49 at the time of the survey). The sample was generated with a two-stage probability selection process<sup>6</sup>. The first stage involved selecting a household by means of a computerized generation of random telephone numbers. The second stage involved choosing an eligible respondent in each selected household (the selection of an eligible respondent from within households that meet survey criteria was also carried out by the computer). The total sample size for the survey was 5,315. The overall response rate was 70%, slightly lower than that found in face-to-face surveys but comparable to that of other telephone surveys (Balakrishnan et al. 1985:210). Overall, 26.9 percent of the interviews were conducted in French and 73.7 percent in English (Krótki, 1989).

Since the sample was drawn based on lists of telephone numbers, only those households that could be reached by direct dialing were included in the study. The Yukon and the North West Territories were not included for reasons of cost and efficiency. Fortunately, these two limitations are not expected to have severe impact on the representativeness of the national sample, since the groups of people who fall into these categories were estimated to be quite low. According to Statistics Canada, as of the 1981 census only 2.1 percent of private households in Canada do not have telephones and only 0.2 percent of women over the age of 18 lived in the excluded areas (Tremblay and Trudel, 1984). Although the proportions for these groups are small, one needs to bear in mind that these are often poor or native Indian people. Detailed description of the data collection and data processing of CFS can be found in Tremblay and

---

5. This sampling method was originally developed at the Survey Research Center at the University of Michigan.

Trudel (1984); and the history and methodology of CFS are documented in Krótki (1989).

Two issues regarding the data on employment and fertility collected in CFS should be emphasized. First, the definition of job entry is starting work on a regular basis that lasts for at least six straight months, including unpaid work with family business. Secondly, "job interruption" is defined as having stopped for at least a year. Information about short-term work discontinuity (periods of less than one year without a job) was not collected in CFS. This is a limitation in the data set which maybe more problematic for younger women who tend to have more short-term discontinuities.

Respondents were asked to recall the dates of each birth, job entry and job interruption. These retrospective employment and fertility data constitute the backbone of the sequential analysis in this study. An advantage of retrospective histories is that they cover an individual's full history (including events that occurred prior to the survey). Although retrospective data are subject to memory biases, evidence concerning marital history data has shown that there is substantial agreement between retrospective histories and panel data which are collected every year (Lillard and Waite, 1989).<sup>7</sup> However, errors of recall is likely to be higher for the work history data than for marital or fertility history data. While women are likely to remember dates of birth and marriage relatively well,

---

<sup>7</sup>Lillard and Wait (1989) compared retrospective history and panel data on marital status collected in the Panel Study of Income Dynamics and conclude that the two sets of data match quite well, especially for some groups of people. "We found that dates of first marriage matched best for those who were either married as of the initial interview or who married during the survey in the most typical pattern - living at home until marriage and then moving out. For those people dates from the panel and retrospective histories matched very well indeed." (p.252)

recalling dates of entry, exit and reentry to the labour force is likely to involve some errors, particularly among older women.

### 3.5 Statistical Methods

Covariance structure models are used to estimate the proposed models. LISREL VI (Linear Structural Relationship) a maximum likelihood procedure developed by Jöreskog (1973, 1977) and Jöreskog and Sörbom (1979, 1984), is the program used here. This procedure analyzes systems of linear structural relations among variables (Jöreskog, 1985; Fox, 1984). The LISREL models have the capacity of incorporating both observed and unobserved (latent) variables. This is an advantage over other structural equation models that assume zero measurement errors for the variables.

A covariance structure model consists of a structural equation model and a measurement model. The structural equation model is a theoretical structure involving the relationships among unobservable, hypothetical constructs referred to as latent variables. Each latent variable, although not directly measurable, can be evaluated by one or more observable indicator variables. The measurement model specifies how the latent variables or hypothetical constructs are measured in terms of the observed variables and is used to describe the measurement properties of the observed variables. Measurement errors for the latent variables may be adjusted for in the model. The covariance structure model combines the factor analytic and the structural equation models by merging them into a single model that simultaneously estimates latent variables from observed variables and estimates the structural relations among the latent variables (Long, 1983:56).

In its general form, the covariance structure model consists of three equations. First, a structural equation model which specifies the causal relationship among latent

variables. It can be represented in the form as follow:

$$\eta = B\eta + \Gamma\xi + \zeta$$

where  $\eta$  is a vector of latent, endogenous variables and  $\xi$  is a vector of latent, exogenous variables;  $\zeta$  is a vector of errors in the equations.  $B$  is a matrix relating the endogenous variables to one another.  $\Gamma$  is a matrix of coefficients relating the exogenous variables to the endogenous variables.

In addition to the structural equation, there are two measurement equations. In the first measurement model, the observed  $x$ -variables are linked by the loading matrix  $\Lambda_x$  to the latent  $\xi$  variables:

$$x = \Lambda_x \xi + \delta$$

In the second equation, the observed  $y$ -variables are linked by the loading matrix  $\Lambda_y$  to the latent  $\eta$  variables:

$$y = \Lambda_y \eta + \epsilon$$

$\delta$  and  $\epsilon$  are vectors of the errors of measurement in  $y$  and  $x$ , respectively.

The covariance structure model decomposes the variances and covariances of the observed  $x$ 's and  $y$ 's into a function of the loading matrices  $\Lambda_x$  and  $\Lambda_y$ , the variances and covariances of the  $\xi$  and  $\eta$ , and the variances and covariances of the  $\delta$  and  $\epsilon$ .

To complete specification of the general model, four other variance/covariance matrices of coefficients are required.  $\Phi$  is a matrix which contains the covariances among the indicators of the exogenous latent variables. The remaining three matrices all contain variance/covariances of the various "error variables".  $\Psi$  matrix contains the

covariances among the structural disturbance terms ( $\zeta$ s).  $\theta_\epsilon$  and  $\theta_\delta$  contain coefficients among the errors in measurement of the endogenous concepts ( $y$ s and  $x$ s) respectively. The covariances among the observed variables can be expressed as functions of these eight matrices.

The estimates for the models are obtained by using a maximum likelihood method. The purpose of the estimation procedure is to find a set of parameters which will maximize the probability that the differences between observed data and that implied by the specified model can be attributed to mere sampling fluctuation. The chi-square statistic provides a test of the proposed model against the general alternative hypothesis that the variables are simply correlated to an arbitrary extent (Bentler and Bonett, 1980). A chi-square goodness-of-fit test is performed whenever maximum likelihood estimates are computed. A nonsignificant chi-square value is desirable. Large values of the chi-square relative to degrees of freedom indicate that the model does not provide an adequate fit of the data.

Maximum likelihood estimators have desirable asymptotic properties, are approximately unbiased, have as small a sampling variance as any other estimators and are approximately normally distributed. The method used here is a full-information procedure where all the parameters are estimated simultaneously. A limited information technique, sometimes referred to as the single-equation method, estimates each equation separately without using information about restrictions in other equations. Full-information techniques have the advantage that the estimation of each parameter utilizes the information provided by the entire system (Long, 1983). Such methods yield more efficient parameter estimates under the assumption of multinormality. This is an advantage over the procedure of two-stage least squares (2SLS). On the other hand, its disadvantage is that since the estimation of each parameter is dependent upon



every other parameter in the model, estimates of each parameter are affected by misspecification in any equation of the model.

A model is identified when all parameters are uniquely estimable from the data and not identified when there is not enough information to uniquely estimate certain parameters (Lomax, 1982).

The advantages of using the covariance structure model for this study are as follows.

- The strength of providing more efficient estimates than 2SLS or OLS for sequential life-cycle models.
- The ability to incorporate measurement errors of the indicators. This is important for this study since retrospective data on employment and fertility history and attitudinal variables used in this analysis are by no means perfect measures.
- The capacities that the short-term effects can be distinguished from the long-term effects, and the direct effects from the indirect effects. These are important properties for a research design of which temporal ordering and sequencing of events are central elements.
- The ability to test whether problems of multicollinearity among estimated parameters exist in the model.

## Table of Contents

Chapter	Page
4. Empirical Findings from the 1984 Canadian Fertility Survey (Part I) .....	53
4.1 Demographic and Socioeconomic Characteristics For Currently Married Women by Parity .....	54
4.2 Employment Before Marriage and Between Parities ....	56
4.3 Birth Intervals .....	57
4.4 Job Interruptions .....	57
4.5 Reasons for Job Interruptions .....	59
4.6 Full-time or Part-time Employment .....	59
4.7 Employment and Fertility Sequences .....	60
4.8 Summary .....	63

#### **4. EMPIRICAL FINDINGS FROM THE CANADIAN FERTILITY SURVEY**

Materials covered in this chapter are organized in the following order. A demographic and socio-economic profile is first presented for the study sample, namely those who are married at the time of the Canadian Fertility Survey interview. Then fertility and employment patterns among Canadian married women are described in detail, using the reconstructed fertility and work history.

##### **4.1 Demographic and Socioeconomic Characteristics of the Sample**

The sample size for women who were married at the time of the interviews in 1984 is 3287. Table 3 shows the demographic and socioeconomic characteristics of women who were married in 1984 by parity. Fifteen percent of these women had not had any children by that time. About 80 percent of these childless women said that they would like to have a child in the future, and the average number of children expected in the future is 1.1. Almost eighteen percent of the sample had one child. Thirty-three percent of them had not completed their child-bearing activities (with an average of .6 additional child expected in the future). Parity-two and parity-three-plus groups, represent 66.7 percent of all the currently married women, who have mostly completed their childbearing activities.

A high correlation between age and parity levels is clearly seen here. Much of the variation observed in the socioeconomic characteristics across parity groups reflects the age effects. Table 3 indicates that the earlier a woman gets married and has a child, the more children she is likely to have during the childbearing years. For those who are childless, the mean age at marriage is 23, two and a half years older than those who have three or more children. The mean age at first birth for the parity-one group is 25.1 as opposed to 21.6 for those who had 3 or more children.

Overall, couples who have more children have received less education. This is consistent with the human resources theory that educational attainment increases one's human capital, thus the opportunity costs of having children. Husband's potential income increases with parity levels. Family income for the childless women is higher than that for other groups, presumably because these women contribute more to their families than those who have children. Although women with no children contribute significantly more to their family income they remain "junior economic partners" of their families. This is consistent with findings reported in Grindstaff and Trovato (1987). The figures for family income are also in agreement with the report by the Labour Canada that the highest average family income (\$43,176) was received by families without children under six years of age and with the wife in the labour force in 1983 (Labour Canada, 1986).

Parity levels also appear to be related to women's attitude toward family and employment outside of home. Those who have more children are shown to be more "traditionally-oriented". More than half of the women who have three or more children, as opposed to 30 percent in the childless group, consider it as very important to have at least one child. Working outside the home is perceived to be more important for those at the other end of the spectrum. More childless women consider taking a job outside the home as very important than do the other groups.

The rest of this chapter provides details on employment and fertility behaviour for the study sample. Information presented includes birth intervals, employment patterns before marriage and between parities, the number of job interruptions for longer than a year and major reasons for leaving the work force.

Table 4 presents data on the extent of labour market involvement at each childbearing stage and birth intervals.

#### 4.2 Work Before Marriage and Between Parities

Overall, most wives (over 90%) have worked sometime in their lives, with a slightly lower proportion in the highest parity group<sup>8</sup> (see Table 4). The proportion of the marital life (up to the time of the interview) in which a woman is in the labour force declines from .82 for the childless women to .37 for those who have more than three or more children. Although marital duration is not controlled for in the calculation of this proportion, the pattern suggests that the number of children may have a significant impact on wife's employment status. Occupational status of the wife is negatively related to parity level. Six percent of the childless women, as opposed to less than two percent of those who have more than three children, were in managerial or professional categories. Many of these women worked before they got married. A third of the women in the highest parity group, as opposed to 15 percent of the childless women, did not work before marriage. The mean duration of employment before marriage for those who have ever worked before becoming married is slightly less than 4 years for childless women. The duration of work before marriage steadily declines to two and a quarter years for the highest parity group.

For those who have children, their work behaviour has a clear pattern. Those with more children are less likely to work before family formation or during the child-bearing years. Women with one child work for an average of two years before they have a first child. Women with 3 or more children work very little before the first birth, and half of the women who have two children do not work between the first and the second births. For those with three or more

---

<sup>8</sup>As noted earlier, the definition used in CFS for the status of "being employed" is having worked for six months or more. The incidence of "job interruptions" reported here refers to interruptions which are longer than one year.

children, 70 percent of them do not work between the second and the third birth. For those who work between births, the mean duration of employment is typically short.

As to employment after the birth of the last child among those who have ever worked, seventy five percent of the parity-one group women are in the labour force after the birth of the child. Sixty-five percent of the parity-two group reenter the labour force after the second child and 60 percent of those who have three or more children have returned to the labour force again by the time of the interview after their most recent child.

#### **4.3 Birth Intervals**

A clear pattern in birth intervals for this sample is that those with more children generally have shorter birth intervals while those with fewer children tend to space their children further apart. Women who have only one child at the time of the interview waited for more than 3 years before starting the family while those with two children waited for two years and those who have 3 or more children had their first child about one year after the marriage. Similarly, the average second-birth interval for those with two children is nine months longer than those with 3 or more children. Birth intervals appear to be positively related to each other. Those who have longer first birth interval tend to have a longer subsequent birth interval(s). It is one of the objectives of this paper to determine whether the birth spacing is related to employment behaviour.

#### **4.4 Job Interruptions**

Table 5 shows the frequency of job interruptions that are longer than one year and the major reasons reported for these job interruptions. The frequency of job interruption increases with parity level. Almost three quarters of the childless women have never stopped working while about

twenty percent of them have one interruption. Half of the women who have one child have never stopped, and a third of them stopped once and ten percent stopped twice. About 18 percent of the women in the parity-two group stopped for two times or more. Overall, only about 4 percent (n=113) of the those who have ever worked have had three or more prolonged job interruptions (5.6% for parity three group).

These numbers indicate a relatively high level of continuity in women's employment. Although a discontinuity rate at such level is still likely to be higher than that for men, data presented here are in contrast with the common perception that married women often have frequent job interruptions and low attachment to their jobs. It also contrasts with an earlier study which demonstrates that women's work histories are characterized by major discontinuities (Law, 1976). Despite the fact that these numbers may overstate the extent of job continuity for the sample because short-term interruptions are not captured and that we do not know how frequently these women change employers, this relatively low rate of job-interruption is consistent with evidence from the Family History Survey (Robinson, 1986).

Data collected in Canadian Fertility Survey on short-term job interruptions are very limited. The only information available is whether a woman has stopped working "fairly often" for less than a year.<sup>9</sup> The percentage of women who answered "Yes" is 21.9 for the whole sample (14 percent for childless women, 20 percent for parity-one group, 30 percent for parity-two group and 25 percent for women with three or more children). Once again, having more children seems to be related with a more frequent short-term

---

<sup>9</sup>The survey question is: "Since you started working, have you stopped working fairly often for periods of less than one year?"

job interruptions. These numbers, although most likely to be higher than those observed among men, do not indicate a very high level of discontinuity in employment. This study, unfortunately, does not provide a comparison between work continuity between men and women.

#### **4.5 Reasons for Job Interruption**

Some variations across parity groups are observed as to why a woman stops working, especially between the childless women and those who have children. The most commonly reported reasons for a job interruption of longer than one year for the childless women are studies, moving and labour-market related reasons. Family-related factors are predominant factors for women who have children to stop working in both their first and second job interruption. Marriage is another important reason for exiting from the labour force for the first time, whereas moving and labour-market related factors are more important in the second job interruption. This pattern is observed in all three parity groups. Only a very small number of the childless women (n=24) have two job interruptions.

#### **4.6 Full-Time or Part-Time Employment**

Table 6 shows the proportion of women who were mostly full-time employed (30 hours or more a week) and reasons for taking part-time jobs for those who mostly worked less than 30 hours a week. For the sample as a whole, 85.5 percent of the sample have worked mostly full-time. As number of children increases, women are more likely to opt for part-time employment. Overall, most women work mostly full-time. This, however, does not mean that they have never worked



part-time since they started working<sup>10</sup>. For those who mostly work part-time, the motivations for doing so are either labour-market related (no work, dismissal, temporary work, partial time work only) or family-related (pregnancy, sick leave, education of children). For those with children, family and marriage (without reference to children) are the reasons often mentioned, although labour-market factors are also very important reasons for working part-time.

Data presented above show that a majority of married women work before marriage and many of them work during childbearing years after marriage. In general, the more children a woman has the less involved she is in the labour-market. These tables also suggest that the frequency of prolonged job-interruptions among Canadian married women is low and that these interruptions are often prompted by family-related reasons. It is of interest to examine in greater detail how these married women juggle their family duties and jobs outside the home at this life stage when family formation and career establishment often take place at the same time. In the following section, paths of employment and fertility sequences are charted to show how many different sequences of employment and child, in terms of the timing of birth and job interruption patterns, are observed among these women. Most common sequences are then identified for each parity group.

#### **4.7 Employment and Fertility Sequences**

Realistically, most people probably make decisions sequentially with overall elements of planning for the future. The basic assumption of the sequential life-cycle

---

<sup>10</sup>The percentage of female working mostly part-time presented here, thus, is not representative of the national average of female part-time workers.

approach is that decisions concerning children and work are made and revised by couples over their life course.

Decisions made may differ depending on how many children a woman has, if or when she first starts working, if or when she stops working before and after each birth, and if or when she returns to work again after each interruption.

To avoid complexity, the flow charts are truncated at two job interruptions that are longer than a year. This, however, should not seriously bias the overall picture since only 114 women (or 3 percent of the sample) have three or more job interruptions.

Figure 3 shows the flow chart of employment and fertility sequences for parity one group. While eighty-two percent of women with one child have work experience before their first child is born, about eleven percent of them start working after the first child is born and 6.3 percent have never worked. Similar flow-charts are prepared for the other two parity groups but not presented here due to the complexity of the charts.

These flow charts show a wide spectrum of different patterns of fertility and employment. In total, 136 different paths of fertility and employment sequences (out of a total of 193 possibilities) are identified. Some of the most common sequences are identified for each parity group<sup>11</sup>. Table 7 shows the most common work/employment arrangements by parity levels. For those who have one child at the time of the interview, twenty-one out of twenty-one possible sequences are identified. Thus, there are at least some women in each possible path. About forty percent of them start working before they have the first child and have not stopped for longer than one year since then. Hence,

---

<sup>11</sup>These numbers may have slightly underestimated the divergence of the fertility-employment sequences due to missing values on dates of births and spells of employment for some respondents (n=120).

having the first child does not seem to have prohibited them from returning to work. The second-most popular sequence is to start working before having the first child, stop before the first birth and not return to work again (15%). Ten percent of those who have one child stop working before the first child and reenter the labour force after they have the first child. Eight percent of the parity-one group started working only after they had the first child and had not stopped since then. A small proportion of women (6%) have never worked for more than six months and an even smaller percentage of women (3%) stop working after the birth of the child and did not start again until the time of the interview.

For the parity-two group, forty-six different sequences out of fifty-three possibilities are identified. This clearly illustrates the fact that life becomes more complicated when another child is added to the family. A wife can start working either before, during or after the family building process. She must decide whether or not to start between each childbirth and whether or not to reenter the job market after each birth. About one fifth of these women with two children start working before the first child and have not stopped for more than one year since then. Eighteen percent of the parity-two group start working, stop once before the first child, and do not start again after the first child. Other common ways of handling family responsibilities and work are to start working after having the second child and never stop or to start working before the first child, stop once during childbearing years and start working again after having the second child. Eight percent have never worked outside the home environment. From Table 2 we know that most of these women have completed childbearing and do not expect to have more children.

For women who have three children or more, 68 different sequences are identified, as combinations of possibilities

compound. Very different patterns are observed for this group. The most common sequence for this group (15 percent) is to start working before the first child, stop before the first child and not return to work again. The next common arrangement is to have never worked (13%). Twelve percent of this group start working only after the third child and have not stopped for more than a year since then. Nine percent of them start working before the first birth and never stopped for more than a year during the time they were bearing children. The two other popular arrangements are to start and stop working before the first child or to start working again only after the third birth.

The broad picture we get from these flow charts is that many women with one or two children start working before their first child and have not stopped for longer than a year during the time they have their children. A small proportion of them stop working before they have the first child and do not start again after that time. In contrast, women with three or more children are more likely to stop working before they start the family-building process and stay out of labour force during the childbearing years. However, many women with three or more children joined the labour force after they have their most recent child. Thus these patterns suggest that women with one child have a strong propensity to return to the work force after the first birth. Women who have two or more children appears to have stayed out of the labour force for longer periods of time. It is not clear from above statistics, however, whether this pattern should be attributed to attitudinal differences, socioeconomic characteristics or the number of children a woman has.

#### **4.8 Summary**

The analysis presented above can be summarized as follows:

- In general, a fairly strong family norm is evident among the Canadian married women. Even among the childless women, about a third consider having at least one child as very important. A majority of them expect to have at least one child during their childbearing years (granted that expectations do not necessarily translate into reality).
- Those who have three or more children start their families very soon (about one year after they get married) and have shorter intervals between births. Those who have fewer than three children generally have their first child later and have longer subsequent birth interval(s).
- Most Canadian married women participate in the labour force. Less than 10 percent have never worked.
- Employment patterns appear to be closely related to fertility status.
- A majority of the married women who have ever worked, particularly among low parity groups, is employed before they get married.
- Working outside the home during marriage appears to have become a common practice and is considered to be important by a sizeable proportion of women, particularly among those who have not had any children.
- Women with one or two children have a higher propensity to remain in the work force during their childbearing years while those with three or more children tend to either stop working before having their first child or entirely withdraw from the labour market during the childbearing age.
- Family-related factors (e.g. pregnancy, childcare) are predominant reasons for job interruptions for women who have children.
- The overall frequency of job interruptions is relatively low.

These data provide valuable information on the employment and fertility patterns of Canadian women. What

they do not tell us are the factors that determine these behaviour patterns and the causal ordering of the employment duration and the timing of each birth. The complex interrelationship among the socio-economic characteristics of the couples and the decision-making process of employment and fertility are explored in the next chapter with covariance structure analysis.

**Table of Contents**

<b>Chapter</b>	<b>Page</b>
5. Empirical Findings from the 1984 Canadian Fertility Survey (Part II): Covariance Structure Models for Fertility and Women's Employment .....	67
5.1. Parity-One Group .....	70
5.2. Parity-Two Group .....	73
5.3. Parity-Three Group .....	75
5.4. Summary of The Findings .....	76

**5. Empirical Findings from Canadian Fertility Survey, 1984  
(Part II): Covariance Structure Models for The Relationship  
Between Fertility and Employment**

This chapter presents the results from the covariance structure analysis. The analysis is restricted to women who have one to three children. Three sub-samples are excluded from the causal analysis, each for a different reason. Women who had a premarital birth (n=205) are excluded since premarital births are often unplanned, thus the assumption of rational decision-making in the sequential life-cycle model is problematic for this group of women<sup>12</sup>. Women who have more than one marriage (231 or 7% out of all currently married women) are excluded from the analysis to avoid the complications that a divorce could introduce to the decisions about children and work. It is expected that women who have experienced a marital dissolution, especially those who have children from a previous marriage, will behave very differently from those who have not had a divorce. Women who have more than three children (n=381) are excluded from the analysis since the covariance structure models for them are too complicated for interpretation. The resulting sample size is 2091, with 501 women in parity one group, 1031 in parity two group and 558 women in parity three group. Analysis is performed by parity. Although it is recognized that interaction effects between the parity levels and age may exist, the analysis was not performed both by parity and by age for two reasons. First, since age and parity levels are highly correlated (i.e. younger women tend to cluster in parity-one group and older women in parity-three group), one is confronted with

---

<sup>12</sup>If this women with apremarital birth were analyzed in the proposed model, the timing of births is likely to be the predominant causal factor in the model.



the sample-size constraints when separate estimates for age groups within the same parity group are attempted. Secondly, even when large enough sample is available for separate analysis within each parity group, the characteristics among the sub-groups become so homogeneous that the problem of multicollinearity arises.<sup>13</sup>

As discussed earlier, one of the advantages of covariance structure analysis is its capacity to incorporate measurement errors of the indicators into the models to reflect the validity and reliability of the measures. This characteristic is very important for social research since many of our measures lack precision, especially those for abstract concepts. Table 8 shows the variances in the observed variables and the percentage of error variances incorporated in the covariance structure models by parity. The assignments of these error variances, although somewhat arbitrary, are estimates based on knowledge and experience about the various measures in social surveys.<sup>14</sup>

Literature which discusses reliability and validity assessment in LISREL models can be found in Entwisle and Hayduk, 1982 and Bielby and Hauser, 1977.

In general, a higher percentage of error variances is incorporated in models for a higher parity group since recall errors are expected to be higher for older women. A lower percentage of errors is expected for indicators for relatively stable and clearly defined concepts that respondents are likely to report with a high degree of accuracy. Ranges of percentage of error variance for age at

---

<sup>13</sup>Separate estimations were attempted for two different age groups within the parity-two group. The model for the older women, however, suffers from the problem of multicollinearity. And the coefficients obtained for the younger group are similar to those obtained in the model where the two age groups are combined.

<sup>14</sup>Allowing error variances of the indicators to be estimated often causes the models to become underidentified.

marriage and wife's education are 5%-9%. Wife's occupational status and husband's potential income are expected to have a higher error variance (10%-18%) since these are indicators of less well-defined concepts. Wife's occupational status is a 11-category variable; errors may arise from misreporting at the data collection stage or misclassification at the coding stage. Also, since this variable is a crude measure of the concept of "opportunity costs" a higher level of errors is expected. Measurement errors in husband's potential income is expected to be higher because this index is calculated based on husband's age, education and income. Errors in the index could arise from any one of the components. The variables for employment duration and birth intervals, which are subject to higher recall biases, are allowed an even higher percentage of measurement errors (12%-25%) in the model. These measures are duration of work and birth intervals at various stages of life course. As a rule of thumb, measures for work history are expected to have higher levels of measurement error than those for fertility history, and reports for events that are in the distant past are expected to be less accurate than those for more recent events. For the two attitudinal measures, since they are very crude measures of abstract concepts, a high percentage of measurement errors (35%) is incorporated in the model. These error variances compensate for the limitations in both the validity and reliability of the indicators.

Tables 9 to Table 14 present results for the covariance structure analysis by parity. Religiosity and childhood residency status were included in an earlier model for estimation. They were shown to have no effect on fertility and employment behaviour, thus were later removed from the model

### 5.1 Parity-One Group

Table 9 shows the unstandardized and standardized coefficients in the model for the parity-one group.<sup>15</sup>

Figure 4 highlights the interrelationship between employment and fertility behaviour. The most important predictors for employment duration before the child is born are age at first marriage and women's education. One year's delay in getting married causes a woman to participate in the labour market for 7.6 more months before the first child is born. One additional year of education decreases the employment duration before the first birth by 5.6 months. This negative relationship seems surprising at first but when one holds age at marriage and other variables constant, the longer a woman remains at school, the shorter the period of time available in the job market before the first birth. Wife's occupation and husband's potential income are also significant determinants of how long a woman works before she has a baby. The higher a woman's occupational status, the longer she works before she has a baby. Husband's earning potential has a positive effect on duration of wife's work before the first birth. This reflects mostly the effects of husband's education and age, and hence, his attitude toward his wife's employment behaviour.

A woman's early working experience is the most important determinant of how soon a couple have their first

---

<sup>15</sup>In a second model, family norms and attitude toward employment are specified to have no effect on employment duration after the first birth and the expected number of birth in the future. It could be argued that these attitudinal variables have a more important influence on fertility and employment behaviour at the early stage of marriage and only indirectly influence behaviour at later stages through employment and fertility status at prior stages. Estimates from this second model (d.f=2) are very close to those from the just-identified model with a chi-square of 1.18 and a probability level (p) of .55 and the largest fitted residual being .013.

child. The more work experience a woman has in this early stage the longer the couple waits to start their family. Age at marriage is also a strong predictor. One year's delay in marriage reduces the first birth interval by seven months. This reflects a phenomenon that people who married late try to "catch up" in the family building process with those who married earlier by shortening their birth intervals. The better educated a woman is and the higher her husband's potential income, the longer the first birth interval tends to be. This suggests that young career-oriented couples tend to devote this initial stage of marriage to career development and delay having a child. This tendency indicates a change in people's aspirations on childbearing and on other non-familial pursuits. Attitude toward children also has the expected impact. The more important a woman considers having at least one child, the sooner she has a child.

Husband's potential income is the most important predictor of the wife's employment status after the child is born. The higher the potential income, the more likely the wife is to be in the labour force in this period of time. Once more, this is mainly an education-dominating effect, thus reflecting husband's attitude toward wife's employment. The longer the first birth interval, the shorter period of time the wife works after the birth. Wife's education is positively correlated with how long she works after the first child. The later a woman gets married, the less time she works after the first birth.

It is interesting to note that attitude is not a significant predictor of work before the baby is born but is important in determining the woman's work status after the birth. This is probably because employment before the first birth is such a common phenomenon that most women consider it appropriate and do work whereas after the birth of a child only those who are more work-motivated return to

employment. Earlier employment behaviour has a positive impact on employment after the first birth. This is consistent with findings in the literature that "state dependency" exists between employment behaviour at different points in time, those who work at initial stage are more likely to return to the labour force at a later time.

Expected number of children in the future is most strongly determined by wife's education, employment status and how soon the first child is born. The more highly educated the wife is, the longer she works after the first child is born. The later the first child is born, the fewer children a woman expects to have in the future. For those who plan to have more children, they are likely to shorten the time in the labour force at this stage in order to have the second child sooner. The likelihood of having more children is reduced for those who remain in the labour market at this stage.

Table 10 shows the total effects of the predictors on the dependent variables. Indirect effects can be seen by comparing the coefficients in this table to those in Table 9. Education and occupational status have indirect effects on employment status after the first child through early employment experience. Early employment status also has an indirect effect on later employment status through the intervals of births.

From Figure 4, it is evident that with the socioeconomic and attitudinal variables held constant, employment and fertility behaviour have reinforcing effects on each other in a sequential manner. The effect of employment duration before the first birth on the timing of birth is stronger than that of first birth interval on women's work after the first birth. Employment duration before birth is positively correlated with how long a woman works after the first child is born. The sooner the couple has their first child the more children they expect to have

in the future.

## 5.2 Parity-Two Group

Data presented earlier show that very few women in the parity-two group expect to have more children in the future (mean number of children expected in the future is .1 and only 7% of them said they expected to have more children). This group of women is treated as if they have completed their child-bearing activities. Thus, the ultimate dependent variable for the covariance structure model for this group is the employment status after the second birth. Table 11 reports the standardized and unstandardized coefficients for the model. The total coefficient of determination for the structural equation is .82.<sup>16</sup>

Similar patterns to the parity-one group are observed for the parity-two group at the initial stage of marriage (before the first child is born). Age at marriage, years of schooling and wife's occupational status are the most important determinants of a woman's early employment behaviour and first birth interval. Employment duration before the first birth is the strongest predictor of how soon a couple starts a family. Husband's potential income has a positive impact on the first birth interval. Again, this may be a reflection that young and well-educated people tend to delay marriage and childbearing and focus on career establishment at this stage.

The most important predictor for whether, and how long the wife works after she has a first child is the work experience in the prior interval. The next significant factor is age at first marriage. The later a woman gets

---

<sup>16</sup>A second model specifies that family norms have no impact on employment behavior after the second birth. The chi-square for this model is .14 ( $p=.71$ ), the largest fitted residual is .087.

married the less time she spends in the labour market between the first and the second births. The first birth interval, although significant, is a less important determinant of employment between the first and second birth than these two variables. The longer the couple waits to have the first birth, the shorter interval the wife works between the first and second birth. The better educated the woman is, the longer she works between the first and the second birth.

How soon the second child is born is most strongly determined by the employment duration between the first and the second births. The longer a woman works during the interval the later the birth of the second child. Higher education leads to a shorter second birth interval. Earlier employment behaviour has a negative impact on the second birth interval. Data also indicate that husband's income tends to lengthen the second birth interval.

Employment status after the second birth is affected by husband's potential income and employment before the second child. The higher the husband's potential income the longer his wife works after completing childbearing.

Table 12 shows the indirect effects through the covariance structure model. Cumulative effects of an early status on a later status through decisions made in between can be seen from this table. Once more, it is apparent that employment duration and fertility timing influence each other in a sequential order (see Figure 5). Employment duration at a prior stage has a relatively stronger impact on the timing of the subsequent births than vice versa. Although the timing of births also has a significant negative effect on employment behaviour at the next stage, early employment is a stronger determinant of subsequent employment than the timing of previous births.

### 5.3 Parity-Three Group

The model for this group is truncated at employment status after the third child since very few women who have three children expect to have more children in the future. Again, similar patterns to lower parity groups are observed in employment before first birth and the first birth interval. Early employment experience and age at marriage largely determine when a couple starts a family. Employment between first and second births is positively related to prior employment experience. The later the wife gets married, the less time she is likely to work before the second birth. However, how soon the first child is born has no effects on the employment status after the first birth. Attitude toward working is an important factor at this period.

The major determinant of the timing of the second birth is how long the wife works between the first and second child. The longer she is in the job market, the later the second child is born. The intervals are positively correlated. Employment after the second child is determined by employment in the previous interval and the second birth interval. The longer the second birth interval, the shorter period a woman works after the second birth and before the third birth. This reflects a phenomenon in which women delay the childbearing process in order to have a given number of children with less employment once they are all born. The third birth interval is determined by duration of work immediately before the third child is born and by employment status during the prior interval. Employment after the third birth is mostly determined by the employment status during the previous period and the third interval. Employment and fertility status for this group of women are very stable throughout the marriage. Employment behaviour in the preceding period is positively related to that in the subsequent period, and an earlier birth interval is



positively correlated with subsequent birth interval. Attitude toward female employment is an important determinant of work status, especially relating to employment after the third birth, and of birth intervals. Those who consider female employment to be very important tend to return to work after the first child as well as after the most recent child is born.

The sequential causal order is again seen for this parity group in Figure 6. Once more, employment status has a larger effect on the timing of births than the reverse.

#### 5.4 Summary

In this chapter, the results from covariance structure models of timing of births and wife's work patterns are presented. Overall, the results show that the sequential life-cycle models are consistent with data for married women. When socioeconomic and attitudinal variables are held constant, employment and fertility behaviour are shown to be correlated with each other in a temporal order. By and large, a similar relationship pattern is found across the three parity groups. Findings can be summarized as follows:

- Age at first marriage, wife's education and her occupational status determine how much work experience a woman has before she starts a family. This early employment behaviour largely determines her employment patterns at subsequent stages in marriage. Those who work before the first birth are likely to be more involved in the labour market again at later stages.

- Early employment experience appears to be the major reason for Canadian women to postpone the first birth. It also has cumulative effects on fertility status at later stages. Employment duration at each stage significantly prolongs the birth intervals at later stages. The timing of birth has significant but relatively smaller effects on how

long a woman works during the next interval.

■ Interbirth employment tends to prolong the subsequent birth intervals. Whether or not the woman returns to work after giving birth to a child is more significantly determined by employment status in a previous stage than the timing of birth.

■ Demographic factors are also important determinants for fertility timing. The younger the age at marriage and/or the age at first birth, and the shorter the interbirth interval, the more rapid the pacing of subsequent birth(s).

■ The socioeconomic characteristics in general have expected effects on employment and fertility behaviour. That is, women with high levels of educational attainment and higher occupational status tend to work between births. The young well-educated couples in two-income families tend to postpone childbearing and may eventually have fewer children. What is observed here clearly reflects changes in people's attitudes and aspirations toward children and other non-familial pursuits.

■ Religiosity and the childhood residency status are insignificant predictors for the timing of fertility and wife's employment behaviour.

**Table of Contents**

<b>Chapter</b>	<b>Page</b>
6. Conclusion .....	78
6.1 Limitations of the study .....	80
6.2 Major Findings and Implications .....	82
6.3 Policy-related Issues .....	86
6.4 Future Research .....	92

## 6. Conclusion

This dissertation has attempted to overcome certain conceptual and methodological problems identified in the literature in the area of fertility and women's employment by applying a sequential life-cycle approach to the topic, focusing on the timing of fertility and employment events, and using covariance structure models to estimate a dynamic framework.

Results from this study clearly indicate that fertility and employment status are closely correlated in a sequential order and that the relationship varies at different stages of the marriage. The question of whether it is employment outside the home that causes women to have fewer children or whether it is the smaller family size that allows women to participate more in the labour force is posed improperly. This study has shown that the causal order between fertility and employment is neither a one-way relationship, nor simultaneously reciprocal, nor spurious. Rather, it is in a sequential temporal order that the employment status and fertility behaviour are related. A combination of the nature of "reciprocity" and that of "sequential ordering" between fertility and employment status can best capture the dynamics of the relationship.

The three general theoretical perspectives of "role incompatibility", "socio-psychological trade-offs" and "household utility maximization" contain useful concepts to explain the relationship between women's employment and fertility behaviour. Nevertheless they need to be placed in a sequential life-cycle context in order to elucidate the dynamics of the relationship. The new home-economics perspectives seem to have gained more mileage than the other two in the literature. This is largely due to two factors: (1) the major variables required in new home-economics models, namely the socioeconomic and demographic variables, are more readily available in major social surveys than

measures for psychological/attitudinal factors and those for incompatibilities between work and family responsibilities; (2) the conceptual frameworks for the two other perspectives are not as well developed. This however, does not mean that the economic dimension is more important than others to research in this area. Recent conceptual development of a socio-psychological framework for work and family size decisions by Baggozi and Van Loo (1990) is an example of significant progress in the socio-psychological approach. Efforts to operationalize such conceptual frameworks will undoubtedly be a challenging but very important endeavor. Ideally, though difficult to attain, future research in this area should aim for a synthesized model where structural, micro-economic and psychological factors influence couple's fertility and employment behaviour, which in turn has feedback effects on the structural, micro-economic and psychological factors. Studies which are built on sequential life-cycle concepts and use longitudinal or retrospective data about fertility and employment histories will prove to be the most fruitful.

### **6.1 Limitations of the Study**

Several limitations hamper the analysis in this dissertation. First, this study fails to allow the characteristics of the couple to vary throughout the marriage. For example, taking into account changes in socioeconomic characteristics or attitudes toward family and employment over the life course would improve the analysis substantially. Achieving this, however, calls for a more sophisticated, and possibly a very different, research design. This limitation, however, may not be as detrimental as it sounds because for most people these characteristics remain relatively stable throughout the lifetime.

Second, an important independent variable of interest, "motivation" for work, is not directly measured. Hence, we

know why women stop working but don't know much about why they work. This motivation factor is only partially captured by the indicator of "women's attitude toward work" in our analysis. Variations in "career commitment" and "motivations to work" are likely to be very important determinants of the timing and continuity of the labour force participation for married women.

Third, the effect of short-term discontinuation of employment is unknown since data on job interruptions shorter than a year are limited in the Canadian Fertility Survey. This information may be particularly important for younger women since they are more likely to have short job interruptions for childbearing. More precise measures of the extent of labour force involvement, in terms of months or hours, are likely to improve the analysis.

Fourth, this study confines itself to individual-level analysis and largely takes institutional factors that may influence both fertility and women's employment for granted. These factors may include labour market structure, unemployment rates, the adequacy of child-care facilities and government policies concerning family and labour structure. The structural perspectives on the relationship generally explain the negative effects of women's employment on fertility through the growing economic independence of women. Traditional economic structure produces a reciprocal state of dependency between the sexes by discouraging women from participating in the labour force. Thus, the family was based on a "breadwinner" model where wives were dependent on their husband's incomes and the husbands were dependent on wives for the care of home and children. The possibility for women to become more self-sufficient reduces this state of dependency and provides women with alternative ways for self-actualization through channels other than childbearing and homemaking. This broad economic structural explanation is useful for understanding the general trends

in the family, gender roles and childbearing behaviour. However, integrating individual-level data with aggregate-level analysis is an exceedingly challenging task in social research. Recent attempts by some social surveys (e.g. the Panel Study of Income Dynamics, Institute for Social Research at the University of Michigan) to match individual level data with information on census geographical districts are likely to make important contributions to social research in this direction.

Another problem with this study is that the sequential life-cycle approach assumes fertility behaviour to be the result of a conscious and rational decision-making process. This assumption, however, is less problematic for studies in Canada where contraceptives are widely used and the success rate of birth regulation is high (Balakrishnan et al., 1985). A related limitation of the analysis is the assumption of the fecundity of women. By assuming so, those who are involuntarily infertile are implicitly excluded from the models.

## **6.2 Major Findings and Implications**

Despite these limitations, this study provides some new and useful insights regarding Canadian women's fertility and employment behaviour. Among the major findings, the divergent paths of birth and employment sequences among Canadian women emerge as quite important. It is well known that in the 1960s, most women left the work force during pregnancy and remained out of the labour force at least until their youngest child entered school. As of January, 1991, a little over 60 percent of women with pre-school children were in the labour force (Statistics Canada, Catalogue 71-001, 1990). A question often asked about this trend is how women cope with both familial responsibilities and work outside the home. The actual behaviour paths, however, have never been documented previously. The

typology of employment-fertility sequences presented here is useful because each state of childbirth, job entry, and job interruption has significant immediate implications as well as cumulative effects on behaviour at later stages of life. Critical turning points for decision-making can be identified from the flow charts of the sequences. Missing in this analysis, however, are the day-care arrangements for children and the flexibility or constraints of women's jobs.

The divergent paths shown here suggest that Canadian married women attempt to have both employment and family during their child-bearing years, and that reconciling these two roles is not easy to do. The diversity of sequences is indicative of the wide variety of innovative strategies used to fit both roles into their lives (a new challenge that women in previous generations did not have to face) under different constraints experienced by each family. Two extreme fertility-employment patterns among the married women are observed. One path, usually taken by young, low-parity women, is to start working before marriage, postpone first birth and return to the labour force relatively soon after the childbirth. This pattern tends to be associated with longer birth interval(s) and decreased family size. The other path, usually taken by women with high parity, is to have little work experience before marriage, start a family soon after the marriage, have more children within relatively short intervals, then return to work only after the last child is born or remain out of the labour market. Between these two extremes, there is a broad range of different strategies for juggling work and family. Most common sequences for each parity are identified.

Results from the causal analysis show that many working women opt for gaining more work experience before the family-building process starts and delaying having the first child. Behaviour at this initial stage is critical in that it has both strong immediate and cumulative effects on



fertility and employment status at later stages. A longer first birth interval tends to be followed by lengthy subsequent birth intervals and/or reduced family size. Early employment experience influences fertility status at later stages both directly and indirectly through its impact on first birth interval and through its impact on employment behaviour at later stages. There is a strong positive relationship between interbirth employment and birth intervals. There is also a very strong relationship between employment duration at one parity interval and that in the next higher order interval. A woman who delays the birth of her next child may not only increase her likelihood of working in that interval but affect her chances of working after her next birth. It is crucial that this chain interaction be recognized in the employment-fertility relationship. Findings here support the hypothesis that the higher the parity interval in which a woman works, an indicator of her work commitment, the greater is the predictive value of that participation for subsequent fertility status.

The work and fertility patterns observed for Canadian women are in general agreement with findings in the United States that employment during marriage is associated with longer birth intervals (Bumpass and Sweet, 1980). The pattern hypothesized by Keyfitz (1977) and others that women who are motivated to work tend to shorten their birth intervals in order to return to the work force sooner was not observed here. Rather, the opposite is true. Canadian women who have greater labour force involvement, both those who have a high occupational status and those with a lower occupational status, have longer birth intervals. This finding reflects the fact that Canadian women do not typically take prolonged leave from work after the childbirth. They leave the labour market for a short period of time and reenter promptly thereafter. This behaviour

pattern may mean that married women perceive the penalties for taking a prolonged leave, in the forms of income foregone or reduced earning power over time or the risk of becoming unemployed, to be very severe. It could also mean that the non-monetary "motivation" for returning to the labour market after the childbirth is very strong among Canadian married women. Since one would expect the rate of depreciation of human capital and the motivation for returning to work to be greater the greater one's accumulated stock of human capital (Mincer, and Polachek, 1974), the likelihood for taking long leaves for highly educated and well-paid women is especially small. What is observed here is the behaviour outcome of changes in women's fertility and economic aspirations undergone over the past few decades.

Both the descriptive and causal analysis show that Canadian married women are in the labour force for a substantial proportion of their childbearing years. This pattern is consistent with Shaw's findings (1983, p.49) for the United States, based on a multinomial logit analysis of National Longitudinal Survey data, that even with children present, once a woman has a history of continuous work, family considerations do not cause her to work less. Picot (1987) obtains similar results for Canadian women using data from the Statistics Canada's Family History Survey.

Overall, women's marital and family responsibilities remain the key determinants of work discontinuity. Being pregnant or having family duties increases the possibility of job discontinuity. However, the extent of job interruptions is shown to be relatively low. It has become such a common phenomenon for married women to participate in the labour force while raising their children that a new social norm is in the forming.

Our findings do not support the hypothesis that the incompatibility between employment and fertility is the

strongest at the initial stage of the marriage. Rather, the conflict is observed throughout the entire employment/fertility stages. The correlations between the two status at later stages are cumulative of, and stronger than, that at the early stage of the marriage. The analysis also shows that employment status is a more important determinant than other demographic and socioeconomic variables on the timing of birth in Canada. This is a distinct pattern from that observed in other countries. In Sweden and Norway, demographic and socioeconomic factors dominate the timing of birth patterns (Hoem and Hoem, 1989; León, Gómez de, 1990). Possible explanations for such distinct patterns are discussed in the following section.

### **6.3 Policy-Related Issues**

We have seen that many Canadian women, especially those who are young and well-educated, pursue both employment and family by having longer birth intervals and possibly a smaller family size. These findings lend support to the prediction that Canada's supply of female paid labour will increase enormously because the influence of "participation suppressors" such as prolonged childbearing will decline and the influence of "participation stimulants" such as delayed marriage and higher education will increase (Jones et al., 1990). Jones et al. provide evidence that women's lives are becoming increasingly "individualized" and "dissimilar" to each other, the predominant patterns identified in this study clearly indicate that a substantial level of commonality in women's behaviour exists, and explanations for such common patterns need to be sought. It is possible that the "increasingly dissimilar behaviour patterns" observed in Jones et al.'s book reflect the uncertainties in women's attempt to cope with new challenges in lives when appropriate institutional support is lacking. It is not clear whether the extent of dissimilarity will decrease or

not when institutional adjustments catch up with the behaviour changes.

These findings raise crucial policy questions. If female employment continues to increase and women continue to lengthen the birth intervals and/or reduce family size in order to cope with both family and work roles, the Canadian fertility level is likely to decline further. This decline has important implications for the age structure of the population and the labour supply in Canada. The proportion of elderly in the population will continue to rise (if one does not consider the immigration factor) and problems of labour shortage will become more severe. While the growth of the total population has been slowing down for some time, the growth of the population at labour force ages has continued so far largely because the baby boomers has moved into these ages. The future outlook of the Canadian labour force, however, will reveal a slow growth and an aging labour force. According to some projections, the labour force growth rate will be down to 7 percent in the 10 years around the turn of the century, and start to decline after 2016 (Beaujot, 1990). As noted by Krótki, out of a declining labour force, even a female labour force participation rate as high as that in Sweden cannot provide additional number to the current size of labour force (1990: 67).

To avoid the undesirable social outcomes of a severe labour shortage and high dependency ratio, Canadian women bear dual responsibilities. On the one hand, women are needed in the work force to compensate for a declining labour supply. On the other hand, the society needs to sustain childbearing for an increasingly aging population. Given that childbearing is exclusively, and childrearing mostly, women's responsibilities, ways of easing conflicts between work and family need to be sought seriously. As Romaniuc and Krótki observe (1990), the trade-offs and

compromises between the competing requirements of work and family can be costly to the family (e.g., child neglect and child delinquency) or to the individuals concerned in terms of economic achievement. They point out that institutional support enabling couples, and particularly wives, to realize their family aspirations while minimizing the economic cost associated with work disruption must be sought. (Krótki and Romaniuc, 1990: 57).

It is important, however, that the promotion of childbearing not be at the expense of the gains that women have made in the last few decades. Policy makers need to recognize that it is an irreversible trend for married women to participate in nondomestic gainful pursuits. Any policies that do not take this trend into account will have only limited demographic effects. Programs which address the pressures resulted from making work and children day-to-day priorities have arisen gradually. Many of these issues are at the forefront of the feminist critiques. They include: (1) improving the paternity benefits, (2) providing more flexible working schedules for women and, (3) promoting a more egalitarian society.

Governments in the industrialized countries have addressed these issues at different paces with varying priority levels. Among the most supportive policies designed to promote the integration of work and family are those implemented by the Scandinavian governments. An interesting observation has been made that Scandinavian countries emphasize the principle of egalitarianism while North American countries tend to place more emphasis on the concept of "individual freedom" (Kalleberg and Rosenfeld, 1989). The Swedish family policies include a heavily subsidized program for public child care and generous rules for maternity and parental leave with compensation from the

social security system for earnings foregone<sup>17</sup> (Klevmarcken and Tasiran, 1991). Although the direct effects of these policies on Sweden's fertility rates are not clear, evidence shows that the decline in the Swedish fertility rate has leveled off in the last decade with some recent evidence of temporal increases.

In contrast to the Scandinavian countries, Canada lacks coherent family-work policies. There is no public child care program in Canada corresponding to the Swedish model and most Canadian women have much less generous maternity and parental leave opportunities. In Canada, benefits for maternity leave are the same as for illness. A recent study noted that Canada ranked twenty-second out of 23 countries in terms of the level of maternity benefits provided<sup>18</sup> (Canadian Advisory Council on the Status of Women, 1987: 11). Recent policies relevant to women's work and fertility in Canada include the Amendments to the child care leave provisions of the *Canada Labour Code*, which took effect in 1985, allowing parents of either sex who are employed in industries under federal jurisdiction to add 24 weeks of unpaid paternal leave to the 17 weeks of unpaid maternity leave provided by the Code. As well, paid maternity leave of up to 15 weeks is provided under the *Unemployment Insurance Act*. *The National Strategy on Child Care*, announced in 1987 by the federal government, represents the

---

<sup>17</sup>In Sweden, today the mother and father can share 450 days for each child and these days have to be used before the child becomes 8. This includes 360 days with 90 percent compensation and 90 days with a smaller compensation (Klevmarcken and Tasiran, 1991).

<sup>18</sup>Nineteen of the countries, including Italy, Ireland, Portugal, and Austria, have maternity benefits programs giving benefits equivalent to 80% to 100% of the employee's usual earnings for periods of between six weeks and nine months. In Canada, the benefits are equivalent to only 60 percent of the worker's usual earnings, up to a maximum weekly limit (\$297 as of 1986).

Canadian government's commitment to help meet the child care needs of Canadian families. The Refundable Child Tax Credit was increased from \$384 to \$559 per child in 1988 and a prepayment plan was introduced, reducing the waiting time for eligible families.

A distinct fertility-employment pattern from what is observed here is noted in a study on Sweden. Swedish women postpone their first child for market work much longer than their North American counterparts and have a tendency to bear their second child and possibly a third in a relatively quick sequence (Klevmarken and Tasiran, 1991). It has been speculated that this may be because a long first birth interval enables the Swedish women to get a well-paid job so that they can enjoy high maternity and parental benefits for both the first and second child if the second child is born before the first is two and a half years old. Well-educated Swedish women are found to have a higher probability of bearing a second child than less educated women, once they have a first child. Canadian women do not postpone the birth of their first child as long as Swedish women do. For them, early work experience prolongs the first birth interval, and the probability of having a second child decreases thereafter. The chances of having a third child are even slimmer for a well-educated working women. A lesson can be learned from the Swedish experience. Namely, the economic incentives may prolong the first birth interval, especially among the highly educated women. If contingent policies which encourage second and third births are not available, one might actually expect a drop rather than an increase in the fertility level. This is relevant to the findings presented here as Canadian working women tend to lengthen birth intervals in reconciling family and work roles. The costs of providing economic incentives need to be carefully evaluated against their benefits. The effect of economic incentives on fertility decisions remains

a very open issue that needs more research.

Four alternative work schedules which aim to modify the pattern of paid work were proposed by the Canadian Advisory Council on the Status of Women. They are: compressed time, flextime, reduced hours of work and part-time work and maternity and parental leave (Canadian Advisory Council on the Status of Women, 1987: 11). It is not clear how widely these schedules have been implemented and how effective they have been. Examining the roles of part-time employment, shift work, and other time-sharing strategies as ways of combining family responsibilities with continued employment is also of interest. In 1984, over a quarter of all employed Canadian women worked part-time. The majority of part-time work was done by those in the 25-44 year age bracket and in the service-producing industries (Labour Canada, 1986). Part-time jobs are more common in Scandinavian countries than in Canada. Perhaps that is an important factor which makes possible today's nearly 90 percent female labour force participation rate in Sweden.

Another way to ease the integration of family and work is to encourage male partners to assume more responsibility in childcare and housework. As rightly pointed out by Beaujot (1990: 35), a shared consensus that children are important to the future of the society and that having and caring for children is an important part of normal adult roles for both men and women should be built into the Canadian society. Research on housework and childcare, however, shows that sex-role ideology changes very slowly, and changes in behaviours are even slower. Ericksen et al. (1979) and Kelleberg and Rosenfeld (1989) found no net effect of children (under 12) on the household division of labour. Even Swedish couples who share roles more than their North American counterparts, in practice lag behind the egalitarian ideology (see Haas, 1981 and Kelleberg and Rosenfeld, 1989). It is women who tend to make the



adjustments to dual responsibilities in the home and the labour market. Policies aimed at helping mothers return to or continue employment might leave the household division of labour unchanged.

An examination of data from the Canadian Fertility Survey (see Table 15) shows that 40 percent of the childless women, as opposed to 20 percent of women who have three or more children, said that housework was shared equally among spouses. More than a third of women with one child, as opposed to a quarter of women with 3 or more children share infant care responsibilities (diapering and feeding). It is not clear what this cross-sectional data indicates but there seems to be a tendency for male partners of childless women and women with fewer children (often younger women) to share housework and infant care.

Issues of integrating family and work roles will take on added importance in the years ahead. As Kamerman notes, if the separation of work and family lives has been a significant characteristic of industrial societies, the integration of work and family roles may become a key feature that differentiates the most advanced of these societies from the others (Kamerman, 1979). In Canada, there is ample room for improvement in this area. Currently, we are observing a "cultural lag" on these aspects of social lives where institutional adjustment has not kept pace with changes in human behaviour.

#### **6.4 Future Research**

Earlier discussions have pointed out various limitations of this analysis that can be improved upon in future research. Several other directions for future research are identified in this section. One dimension that needs to be explored is the impact of social class on the fertility-employment relationship. Burris (1991) reported that family/work prioritizing and structuring exhibit

considerable variation according to class and marital status. His study suggests that contradictions between work and family responsibilities are more pronounced for working-class women, particularly single mothers. At a time when lone-parent families are increasing, this is clearly an important dimension of the relationship that is in need of research programmes.

Power relations between spouses is another element that needs more study. Research on power relations within a family unit assumes that power derives from resources developed within the labour market, such as education, earnings, and occupation. As women increase their participation in the labour market, it will be of interest to see how the power structure changes and how that influences couple's fertility decisions. Davis (1984) has questioned the extent to which societies based on an egalitarian sex-role system can survive, that is, reproduce themselves. Keyfitz (1986:152) agrees with Davis that low fertility is the ultimate natural outcome of gender equality. In theory, it would be much more satisfactory to model all intertemporal joint decisions about schooling, market work, family and children by both the husbands and wives. In practice, however, it will be difficult to specify such a model which does not entail unrealistic demands for data and estimation techniques.

Other areas in need of future research include the effects of various policies on fertility and employment behaviour. International comparisons of the impact of various policies on employment and fertility trends will be valuable.

In terms of research methodologies, event-history analysis which make use of histories of fertility and employment will be a useful tool for research in this area. It can be used to estimate the hazard of entering and leaving a job, the transition rate of moving from having no

child to one child, from one child to two children and so on. Time-varying covariates can also be included as predictors of these transition rates. This will help us better understand the determinants of the timing and spacing of births and that of employment decisions. Conceptually, it may be useful to model women's employment as a competing risk of educational pursuit, childbearing, and marriage. The problems with the event history analysis, however, are that the criteria of "reciprocity" and "sequential ordering" of women's employment and childbirth events can not be adequately incorporated in the models, and short-term and long-term effects, direct and indirect effects of variables cannot be distinguished in such analysis design.

Future survey data that will help answer the yet unresolved questions in this area of research include psychological factors such as the "motivations" for women to work and satisfaction gained from work place and from the family, better income data for each job, child-care mode and costs, detailed data on hours of work by each employment spell, and paternal benefits and other institutional support offered by the employers. As noted, continued research on the issues of female employment and fertility will become increasingly important for Canada as well as for other countries.

**Table 1: Employed Women 15 years and Over by Occupation as a Percentage of All Occupations, Canada, 1975, 1980 and 1985.**

Occupations	1975	1980	1985
All Occupation	100.0%	100.0 %	100.0%
Managerial and administrative	3.4	4.9	8.7
Natural Sciences	0.8	1.3	1.4
Social Sciences	1.4	1.8	2.2
Teaching	7.2	5.9	6.0
Clerical	36.1	34.6	31.7
Service	16.6	18.1	18.2
Sales	10.4	10.4	9.6
Medicine and Health	9.5	8.6	9.3
Agriculture	3.0	2.8	2.6
Fabricating	5.9	5.4	4.4
Others	5.7	6.2	5.9

Source: Statistics Canada, Women in The Workplace: Selected Data. 1987. Cat. 71-534.

**Table 2: Unobserved (Latent) and Observed Variables Incorporated In The Sequential Life-Cycle Models**

Latent Variables	Observed Variables
<u>Endogenous Variables (ns):</u>	<u>ys :</u>
Employment Status (t1)	months worked before first birth (including work before marriage)
Fertility Status (t2)	first birth interval (in months)
Employment Status (t3)	months worked between 1st and 2nd births
Fertility Status (t4)	second birth interval (in months)
Employment Status (t5)	months worked between 2nd and 3rd births
Fertility Status (t6)	third birth interval (in months)
Employment Status (t7)	months worked beyond the 3rd birth
Fertility Status (t8)	# of children beyond the 3rd birth
<u>Exogenous Variables (xs):</u>	<u>xs :</u>
Age at first marriage	age in complete years
Wife's education	completed years of schooling
Wife's occupation	11-category occupation codes: 11 - managerial and administrative 10 - professionals, specialists 9 - technicians 8 - teachers 7 - junior supervisors 6 - administrative support, including clerical 5 - sales 4 - service 3 - unskilled workers, labourers 2 - others 1 - never worked
Husband's potential income	calculated based on husband's education, age and current income
Attitudinal variables:	In order for you to be generally happy in life, is it very important, important, not very important or not important at all ... (1-4 point scale)
Familial Norms	... to have at least one child
Attitude toward women's employment	... to be able to take a job outside the home

**Table 3: Demographic and Socioeconomic Characteristics for Currently Married Women by Parity, Canadian Fertility Survey**

Characteristics	Childless (n=508, 15.5%)	Parity 1 (n=585, 17.8%)	Parity 2 (n=1175, 35.7%)	Parity 3+ (n=1018, 31.0%)
<b><u>Demographic</u></b>				
Age	28.8	30.9	34	39.1
# more children expected(% expect more children)	1.1 (78.2%)	.6 (32.6%)	.1 (7.6%)	.0 (1.6%)
Age at Marriage	22.9	21.8	21.3	20.4
Age first Birth	n.a.	25.1	23.6	21.6
Marital Duration	6.4 (yrs)	9.4	13.3	17.5
<b><u>Socio-Economic</u></b>				
Wife's education (in years)	13.6	12.7	12.6	11.3
Husband's education (in years)	13.6	12.9	12.8	11.7
Husband's potential income (in hundreds)	\$264.0	\$284.5	\$308.4	\$312.0
Family income (in hundreds)	\$420.2	\$369.2	\$393.0	\$387.8
Childhood residence (% urban)	28%	25%	30%	35%
Religiosity (% attend weekly)	21.6%	25.0%	29.4%	41.0%
<b><u>ATTITUDINAL</u></b>				
.. to have at least a child (% very important)	30%	45%	45.9%	55.6%
.. to take a job outside of home(% very important)	35%	28.7%	28.0%	21.8%

**Table 4: Employment Patterns and Birth Intervals for  
Currently Married Women, 1984 Canadian Fertility Survey**

	Childless (n=508)	Parity 1 (n=585)	Parity 2 (n=1175)	Parity3+ (n=1018)
<b><u>% Ever Worked</u></b>	92.5%	94.0%	92.4%	86.7%
<b><u>Occupation</u></b> (% managerial & professional)	6.4%	3.2%	2.1%	1.7%
<b><u>Proportion of marital life working</u></b>	.82	.67	.52	.37
<b><u>Work before marriage</u></b>				
% did not work	15.2	18.4	26.0	33.8
mean duration work (in months)	43.9	39.0	32.5	26.9
<b><u>Work before 1st child since marriage</u></b>				
% did not work	n.a.	17.2	24.6	40.0
mean duration work	n.a.	25.2	16.0	2.4
<b><u>Work between 1st and 2nd child</u></b>				
% did not work	n.a.	n.a.	51.4	67.0
mean duration work	n.a.	n.a.	15.4	9.3
<b><u>Work between 2nd and 3rd child</u></b>				
% did not work	n.a.	n.a.	n.a.	70.0
mean duration work	n.a.	n.a.	n.a.	10.0
<b><u>% Work After Last Child</u></b>	n.a.	75%	65%	60%
<b><u>Birth Interval</u></b> (in months)				
1st birth Interval	n.a.	38.8	27.5	14.5
2nd birth Interval	n.a.	n.a.	38.0	29.4
3rd birth Interval	n.a.	n.a.	n.a.	38.7

**Table 5: Frequencies of Job Interruptions Longer than One Year and Major Reasons for The First and Second Job-Interruptions by Currently Married Women Who Have Ever Worked, by Parity**

	Childless Women	Parity-one Group	Parity-two Group	Parity-three plus group
Number of job Interruptions	n=470	n=548	n=1084	n=880
None	73.1%	48.0%	30.8%	23.9%
Once	21.1%	38.3%	48.7%	48.7%
Twice	4.8%	11.6%	16.9%	20.9%
3 times or more	1.0%	2.1%	3.7%	6.5%
Reasons for First job interruption (of those who have ever worked and stopped at least once )	n=125	n=283	n=742	n=663
	1.studies (21.6%)	1.family related (50%)	1.family related (62.%)	1.family related (54.3%)
	2.moving (16.6%)	2. moving (9.8%)	2. moving (7.6%)	2.marriage stay at home (12.8%)
	3.labour-market related (14.4%)	3.marriage stay at home (9.0%)	3.labour-market related (4.8%)	3.labour market (6.3%)
Reasons for Second job interruption (of those who stopped at least twice)	N.A.	n=71	n=198	n=219
		1.family related (26.9%)	1.family related (57.5%)	1.family related (48.4)
		2.labour-market related (22%)	2.labour-market related (11.8%)	2.labour-market related (13.9%)
		3.moving (8.7%)	3.moving (.8%)	3.moving (7.9)

Note: Family related reasons: pregnancy, sick leave, education of children; Marriage, stay at home (without reference to children); Labour-market related reasons: no work, dismissal, temporary work, partial time work only



**Table 6: Proportion of Married Women Who Are Mostly Full-Time Workers Among Those Who Have Ever Worked and Reasons for Working Part-Time by Parity Levels, Canadian Fertility Survey, 1984**

	Child-less	Parity 1	Parity 2	Parity 3+
% Full Time	91.6%	88.4%	81.1%	78.5%
The three most important reasons for working mostly part-time	1. Labour-market related factors 2. have good time, spare time 3. studies	1. Labour-market related factors 2. Family-related factors 3. husband's objection	1. Family-related factors 2. Labour-market related 3. marriage	1. Labour-market related 2. Family-related 3. marriage

Note: Source Questions in Canadian Fertility Survey: Q712. For this period as a whole [since you started working], have you worked mostly 30 hours or more a week?

Q713. [If not,] Why have you mostly worked less than 30 hours a week?

**Table 7: Most Common Fertility/Employment Sequences among  
Currently Married Women Who Have at Least One Child**

Total Number of different sequences identified = 136

**PARITY-ONE GROUP: (n=557)**

**Number of sequences identified=21**

1. Started working before 1st birth and never stopped since then (39.0%)
2. Started working before 1st birth, stopped once before 1st birth and never started again (14.8%)
3. Started working before 1st birth, stopped once before 1st birth and started again after 1st birth (10.8%)
4. Started working after 1st birth and never stopped since then (8.2%)
5. Never worked for more than six months (6.3%)
6. Started working before 1st birth, stopped after 1st birth and did not start again (2.9%)

**PARITY-TWO GROUP: (n=1083)**

**(Number of sequences identified = 46)**

1. Started working before 1st birth, never stopped since then (19.7%)
2. Started working and stopped before 1st birth and did not start again (18.0%)
3. Started working after 2nd birth and never stopped since then (9.7%)
4. started working and stopped before 1st birth, and started after 2nd birth (8.8%)
5. Never worked for more than 6 months (8.1%)
6. Started working before 1st birth, stopped once between 1st and 2nd birth, and started again after 2nd birth (3.9%)

**PARITY-THREE PLUS GROUP: (n=911)**

**(number of sequences identified = 69)**

1. Started working and stopped before 1st birth, and did not start again (15.3%)
2. Never worked for more than six months (13.0%)
3. Started working after 3rd birth and hadn't stopped since then (11.6%)
4. Started working before 1st birth and never stopped (9.0%)
5. Started and stopped before 1st birth and started again after 3rd birth (6.1%)
6. Started working after 3rd birth, stopped once and started again (3.2%).

**Table 8: Variances and Percentage of Error Variances Allowed  
in The Sequential Life-Cycle Models by Parity**

Variables	Parity One Var(%error)	Parity Two Var(% error)	Parity Three Var(% error)
Age at Marriage	8.96 ( 7%)	10.42 ( 8%)	8.17 ( 9%)
Wife's Education	7.13 ( 5%)	7.59 ( 6%)	8.14 ( 7%)
Occupational status	5.35 (10%)	5.29 (12%)	6.00 (15%)
Husband's Income	3685.25(15%)	4053.04(17%)	4460.71 (18%)
Familial Norms	.77 (35%)	.83 (35%)	.73 (35%)
Attitude toward female employment	.73 (35%)	.82 (35%)	.88 (35%)
Work Before 1st CH	2456.97(15%)	1875.86(20%)	1364.18 (25%)
1st birth interval	1099.17(13%)	520.18(15%)	313.67 (18%)
Employment Since first Child to Now	2805.11(13%)	n.a.	n.a.
Work Between 1st & 2nd Child	n.a.	462.56(17%)	328.64 (20%)
2nd Birth Interval	n.a.	464.40(12%)	373.46 (14%)
Work Since Second Child to present	n.a.	3199.45(15%)	n.a.
Work Between 2nd & 3rd Births	n.a.	n.a.	556.08 (13%)
3rd Birth Interval	n.a.	n.a.	817.03 (12%)
Work Since Third Child to present	n.a.	n.a.	3628.07 (15%)
# Expected Children	.73 (13%)	n.a.	n.a.

Table 9: Unstandardized and Standardized (in Parentheses) Coefficients for the Parity-One Group

	Employment Before 1st Child	First Birth Interval	Employment After 1st Birth	Expected # of Births in the Future
Employment Before 1st Birth	---- (.790)	.535*** (.790)	.210* (.195)	.006* (.332)
1st Birth Interval	----	----	-.340* (-.332)	-.009* (-.340)
Employment Since 1st Birth	----	----	----	-.006** (-.363)
Age at 1st Marriage	7.634*** (.482)	-7.136*** (-.665)	-3.453 (-.202)	-.069* (-.250)
Wife's Education (in Years)	-5.635** (-.320)	3.669** (.308)	5.630* (.297)	.115* (.375)
Wife's Occupation (in 11 groups)	4.207* (.202)	-.692 (-.049)	2.662* (.118)	-.043* (-.118)
Husband's Potential Income	.156* (.191)	.168** (.303)	.304* (.345)	-.003* (-.215)
Familial Norms	-5.391 (-.084)	-4.833* (-.111)	6.940 (.100)	-.062 (-.055)
Attitude Toward Female Employment	.269 (.004)	3.421 (.076)	-13.437* (-.187)	-.025 (-.022)
R <sup>2</sup>	.39	.63	.21	.32

Total Coefficient of determination for structural equations=.79

\*: T-Value &gt; 2, \*\*: T-Value &gt; 5, \*\*\*: T-Value &gt; 8

Table 10: Total Effects for the Parity-One Group

	Employment Before 1st Birth	First Birth Interval	Employment Since 1st Birth	Expected # of Births in the Future
Employment Before 1st Birth	----	.535	.028	.006
1st Birth Interval	----	----	-.340	-.007
Employment Since 1st Birth	----	----	----	-.006
Age at 1st Marriage	7.634	-3.048	-.814	.006
Wife's Education (in Years)	-5.635	.652	7.034	.118
Wife's Occupation (in 11 groups)	4.207	1.560	3.015	-.050
Husband's Potential Income	.156	.252	.251	-.006
Familial Norms	-5.391	-7.720	8.434	-.075
Attitude Toward	.269	3.566	-14.593	.031

Table 11: Unstandardized and Standardized (in Parentheses) Coefficients for the Parity-Two Group

	Employment Before 1st Birth	First Birth Interval	Employment Between 1st & 2nd Birth	Second Birth Interval	Employment After Second Birth
Employment Before 1st Birth	---- ( .665*** ( .873)	.248* ( .483)	-.190* ( -.359)	-.012 ( -.009)	
1st Birth Interval	----	-.308* ( -.319)	.139 ( .140)	-.762* ( -.297)	
Employment Between 1st & 2nd Births	----	----	.769*** ( .748)	1.201** ( .452)	
2nd Birth Interval	----	----	----	-.933** ( -.361)	
Age at 1st Marriage	7.193*** ( .566)	-4.716*** ( -.698)	-2.885* ( -.442)	1.077* ( .160)	-4.206* ( -.243)
Wife's Education (in years)	-4.856** ( -.341)	2.855** ( .377)	1.810* ( .247)	-3.061** ( -.407)	-6.078* ( -.313)
Wife's Occupation (in 11 groups)	5.058** ( .281)	-1.203* ( -.126)	1.345* ( .145)	-.779 ( -.082)	2.746* ( .112)
Husband's Potential Income	.058* ( .087)	.046* ( .130)	-.049* ( -.144)	.112** ( .319)	-.414** ( .456)
Familial Norms	.021 ( .007)	-2.232* ( -.082)	3.408* ( .129)	-2.209* ( -.081)	3.137 ( .045)
Attitude Toward Female Employment	6.326* ( .123)	.955 ( .035)	-3.320* ( -.126)	2.037 ( .075)	-18.019** ( -.257)
R <sup>2</sup>	.40	.58	.17	.55	.41

Total Coefficient of determination for Structural Equations=.82

\*: T-Value > 2, \*\*: T-Value > 5, \*\*\*: T-Value > 8

Table 12: Total Effects for the Parity-Two Group

	Employment Before 1st Birth	First Birth Interval	Employment Between 1st & 2nd Birth	Second Birth Interval	Employment Since Second Birth
Employment Before 1st Birth	-----	.465	.105	-.044	-.198
1st Birth Interval	-----	-----	-.308	-.098	-1.040
Employment Between 1st & 2nd Births	-----	-----	-----	-.769	.483
2nd Birth Interval	-----	-----	-----	-----	-.933
Employment since 2nd Birth	-----	-----	-----	-----	-----
Age at 1st Marriage	7.193	-1.372	.678	-1.000	-3.125
Wife's Education (in years)	-4.856	.598	.421	-1.733	-4.353
Wife's Occupation (in 11 groups)	5.058	1.148	2.246	.148	4.371
Husband's Potential Income	.058	.073	-.057	.067	.226
Familial Norms	.021	-2.222	4.097	.628	9.162
Attitude Toward Female Employment	6.326	3.896	-2.950	-.890	-23.772

Tab. 13: Unstandardized and Standardized (in Parentheses) Coefficients for the Parity-Three Group

	Employment Before 1st CH	First Birth Interval	Work Between 1st & 2nd CH	Second Birth Interval	Work Between 2nd & 3rd CH	Third Birth Interval	Work After Third Birth
Employment Before 1st Birth	-----	.395*** (.777)	.245* (.483)	-.200* (-.358)	-.091 (-.133)	.122 (.145)	-.440 (-.253)
1st Birth Interval	-----	-----	-.198* (-.196)	.310* (.277)	.105 (.077)	-.244 (-.146)	.020 (.006)
Employment Between 1st & 2nd Births	-----	-----	-----	.896*** (.811)	1.195** (.880)	1.036* (-.626)	1.120 (.327)
2nd Birth Interval	-----	-----	-----	-----	-.778** (-.634)	.547* (.367)	-.836* (-.270)
Employment Between 2nd & 3rd Births	-----	-----	-----	-----	-----	.984*** (.807)	.801* (.317)
3rd Birth Interval	-----	-----	-----	-----	-----	-----	-.538* (-.260)
Age at 1st Marriage	6.916*** (.590)	-3.213** (-.546)	-2.150* (-.362)	.737 (.112)	-.581 (-.072)	-2.246* (-.228)	-.535 (-.026)
Wife's Education (in years)	-3.504* (-.301)	2.303* (.395)	1.689* (.287)	-1.534* (-.235)	-1.284 (-.161)	-.074 (-.008)	-8.408* (-.417)
Wife's Occupation (in 11 groups)	5.170** (.365)	-1.345* (-.189)	.393 (.055)	-.025 (-.003)	.610 (.063)	-.210 (.017)	2.931 (.119)
Husband's Potential Income	.003 (.006)	.017 (.063)	-.018 (-.069)	.029 (.097)	.030 (.081)	.081* (.184)	-.346** (.376)
Familial Norms	.839 (.018)	-.768 (-.033)	.730 (.031)	.683 (.034)	-1.686 (-.053)	-3.008 (-.077)	.000 (.000)
Attitude Toward Female Employment	2.690 (.064)	.673 (.032)	-3.479* (-.163)	2.396* (.101)	-1.680 (-.058)	4.990* (.141)	-18.093* (-.247)
R <sup>2</sup>	.45	.41	.18	.59	.37	.54	.41

Total Coefficient of determination for structural Equations=.80,

\*: T-Value > 2, \*\*: T-Value > 5, \*\*\*: T-Value > 8



Table 14: Total Effects for the Parity-Three Group

	Employment Before 1st Birth	Employment Before 1st Birth Interval	Employment Between 1st & 2nd Births	Employment Between 1st Birth Interval	Employment Between 2nd & 3rd Births	Employment Between 2nd Birth Interval	Employment Since Third Birth	Employment Since Third Birth Interval
Employment Before 1st Birth	----	.390	.167	.070	.095	-.220	-.108	
1st Birth Interval	----	----	-.198	.132	-.235	-.197	-.395	
Employment Between 1st & 2nd Births	----	----	----	.896	.497	-.054	.798	
2nd Birth Interval	----	----	----	----	-.778	-.217	-1.343	
Employment Between 2nd & 3rd Births	----	----	----	----	-----	.984	.272	
3rd Birth Interval	----	----	----	----	-----	-----	-.538	
Age at 1st Marriage	6.916	-.517	-.355	-1.128	-.814	-2.330	-2.439	
Wife's Education (in years)	-3.504	.937	.646	.038	-.123	-1.498	-5.450	
Wife's Occupation (in 11 groups)	5.170	.671	1.525	.514	1.630	.572	2.948	
Husband's Potential Income	.003	.018	-.021	.015	-.006	.102	-.249	
Familial Norms	.839	-.440	1.022	1.494	-1.750	-4.759	.677	
Attitude Toward Female Employment	2.690	1.721	-3.162	-.444	-5.177	2.835	-28.085	

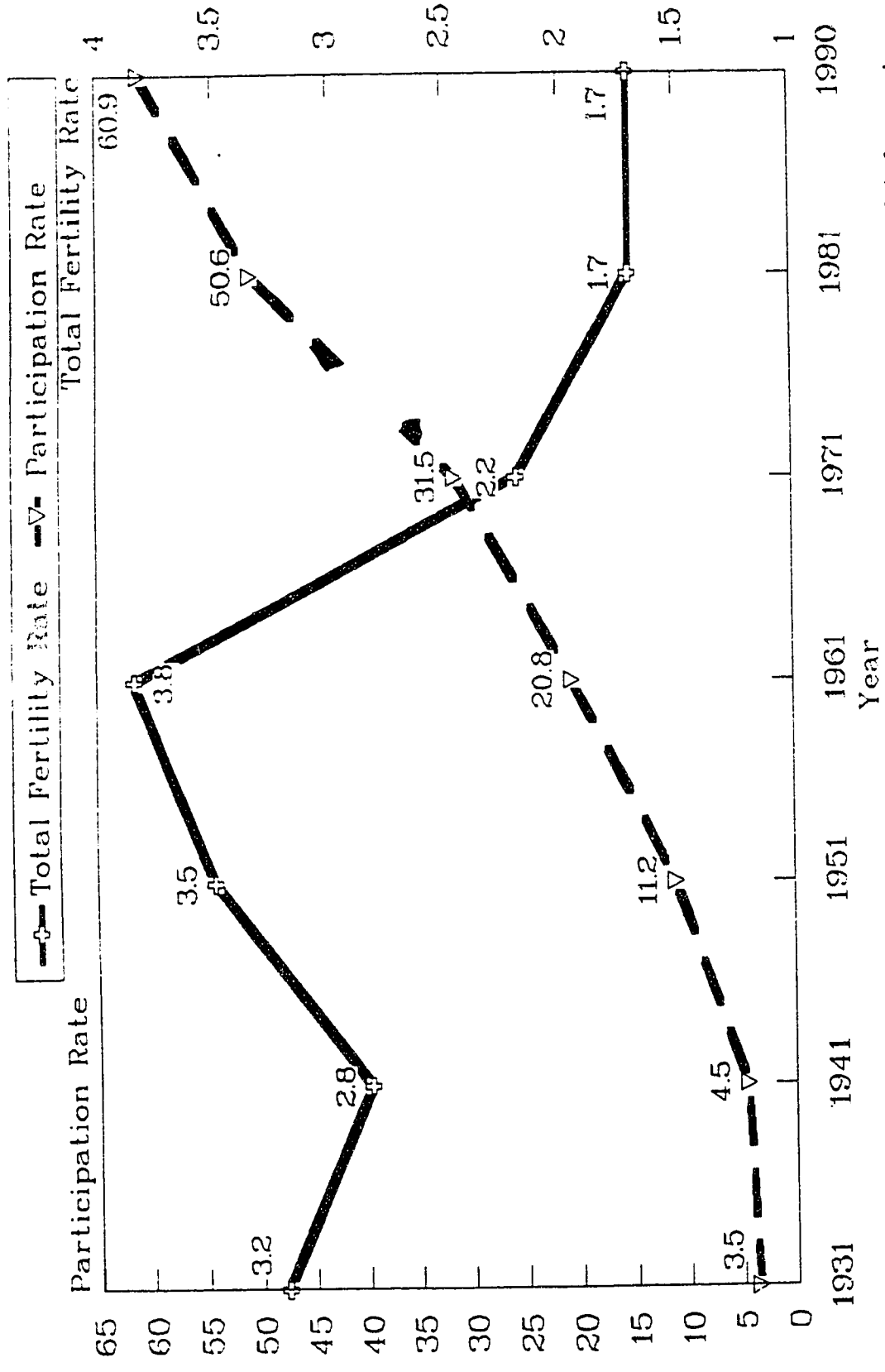
**Table 15: Measures of Division of Labour in The Household Among Spouses  
by Parity, 1984 Canadian Fertility Survey**

Who does the following ..	Childless	Parity 1	Parity 2	Parity 3 +
Cooking % always wife % equally shared	19.1 % 19.4	24.8% 18.2	27.9% 14.6%	32.6% 11.2%
Housework % always wife % equally shared	14.4 38.8	18.6 27.4	20.9 24.0	27.6 20.0
Diapering, feeding baby % always wife % equally shared	N.A.	17.3 36.5	18.4 30.5	29.3 23.4
Shopping for Children's Clothing % always wife % equally shared	N.A.	34.7 26.2	36.0 21.5	42.1 21.1
Supervise children's schoolwork % always wife % equally shared	N.A.	19.2 46.7	16.6 48.0	22.1 40.8

Note: Survey Question: Q703. Would you say that it is always you, mostly you, equally you and your husband/partner or mainly your husband/partner ....

- (a) ..... who does the cooking
- (b) ..... who does the housework
- (c) ..... who took care of changing the diapers and feeding the baby
- (d) ..... who went shopping for the children's clothing
- (e) ..... who supervise the children's school work

Figure 1: Total Fertility Rate and Labour Force Participation Rate of Married Women, Canada, 1931-1990



Note: The participation rate series breaks in 1975, the year in which major revisions were made to the Labour Force Survey.  
 Source: Statistics Canada, Labour Force Survey and Vital Statistics, Canada.

Figure 2: Conceptual Framework for Sequential Decision-Making Models

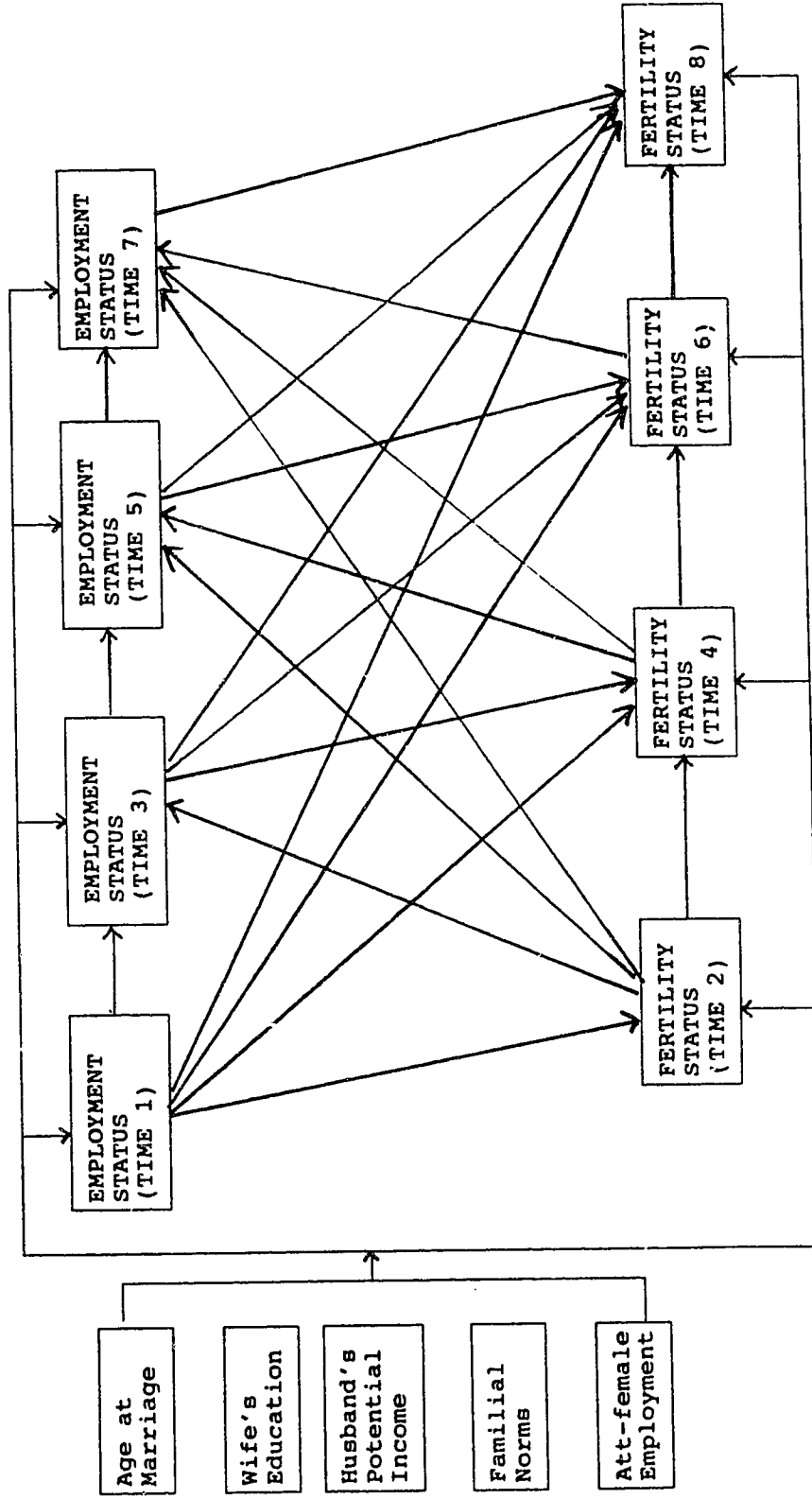


FIGURE 3: FLOW CHART OF EMPLOYMENT AND FERTILITY SEQUENCES FOR PARITY-ONE GROUP, NUMBER AND (PERCENTAGE OF) CASES IN EACH CATEGORY

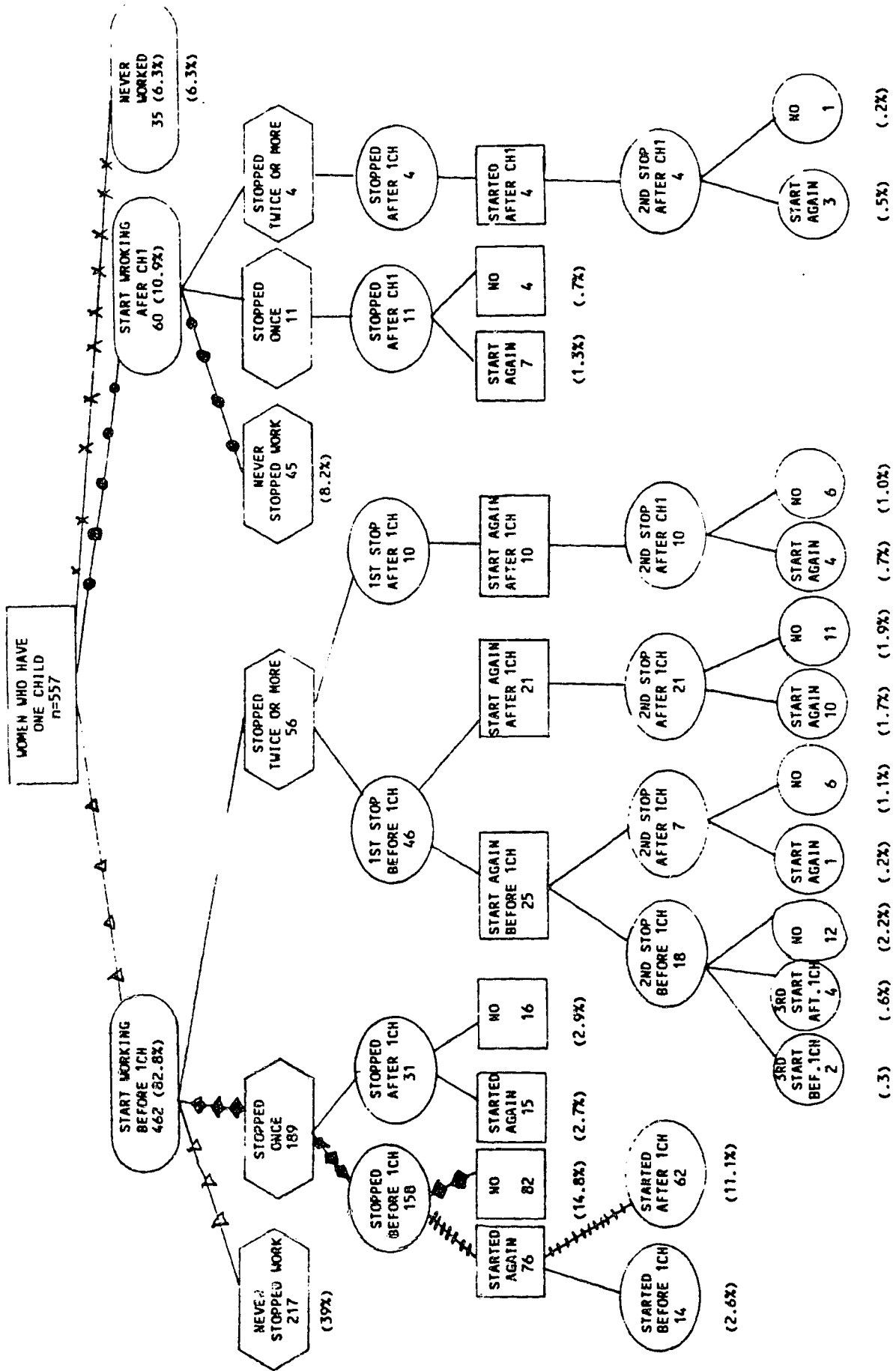
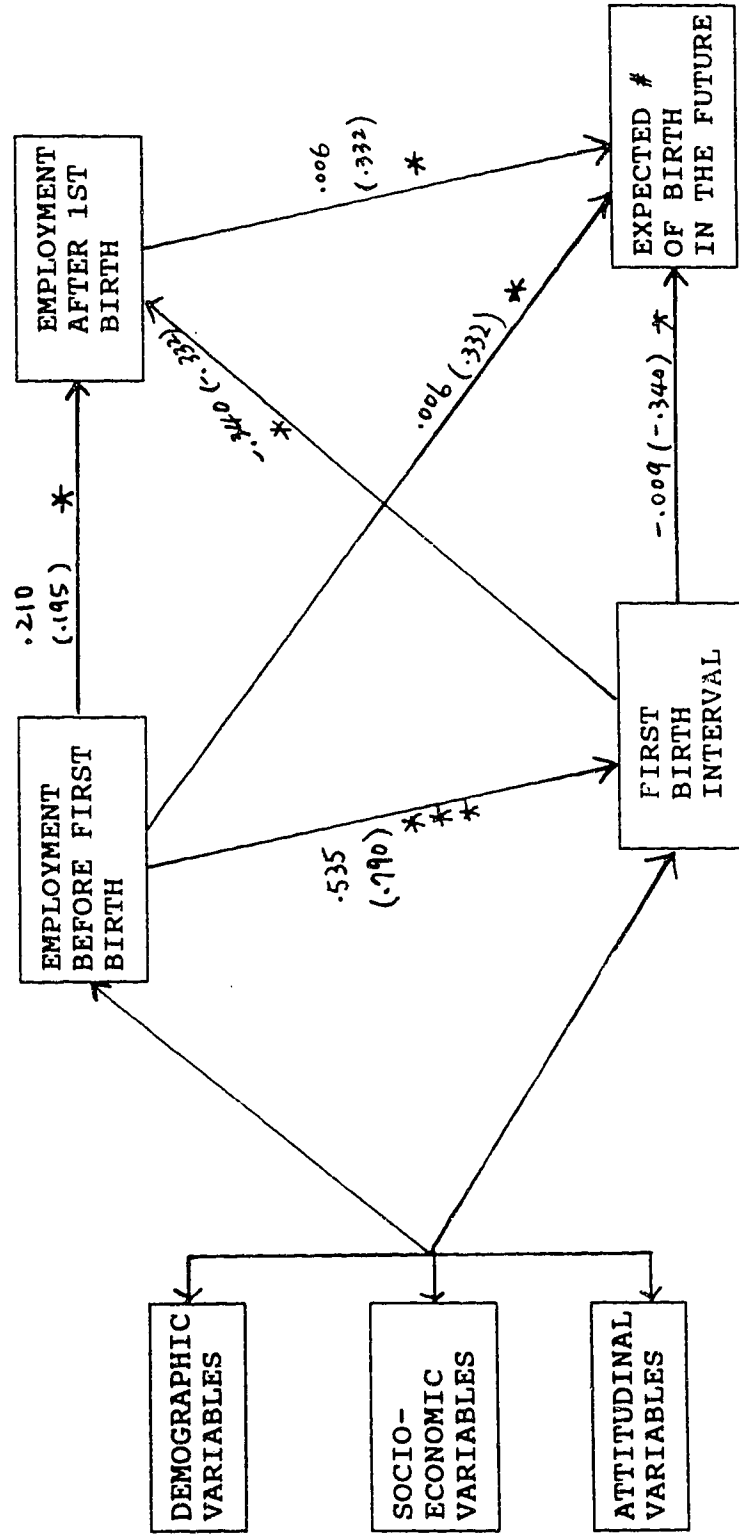
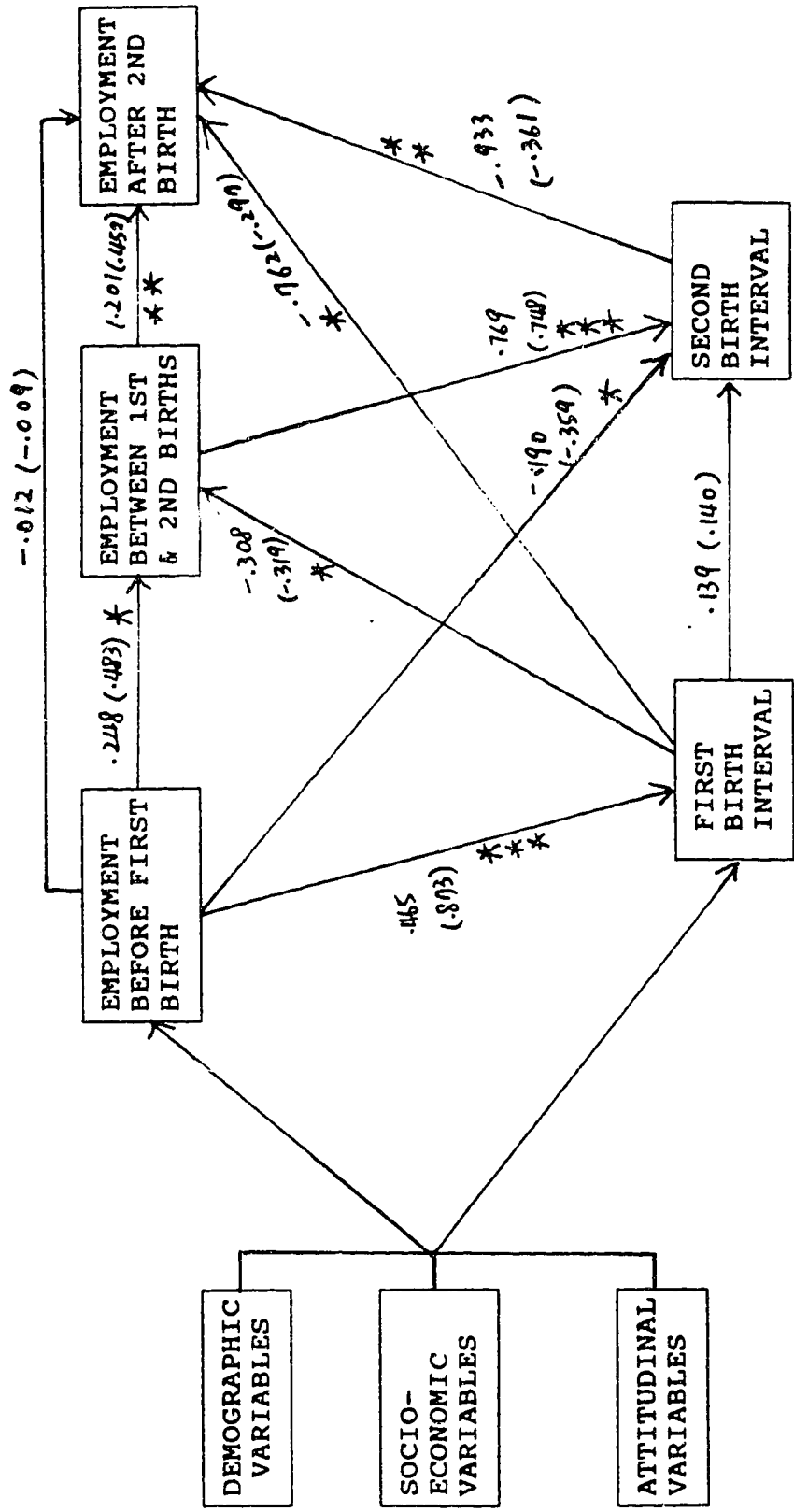


Figure 4: Illustrative Model For Parity One Group



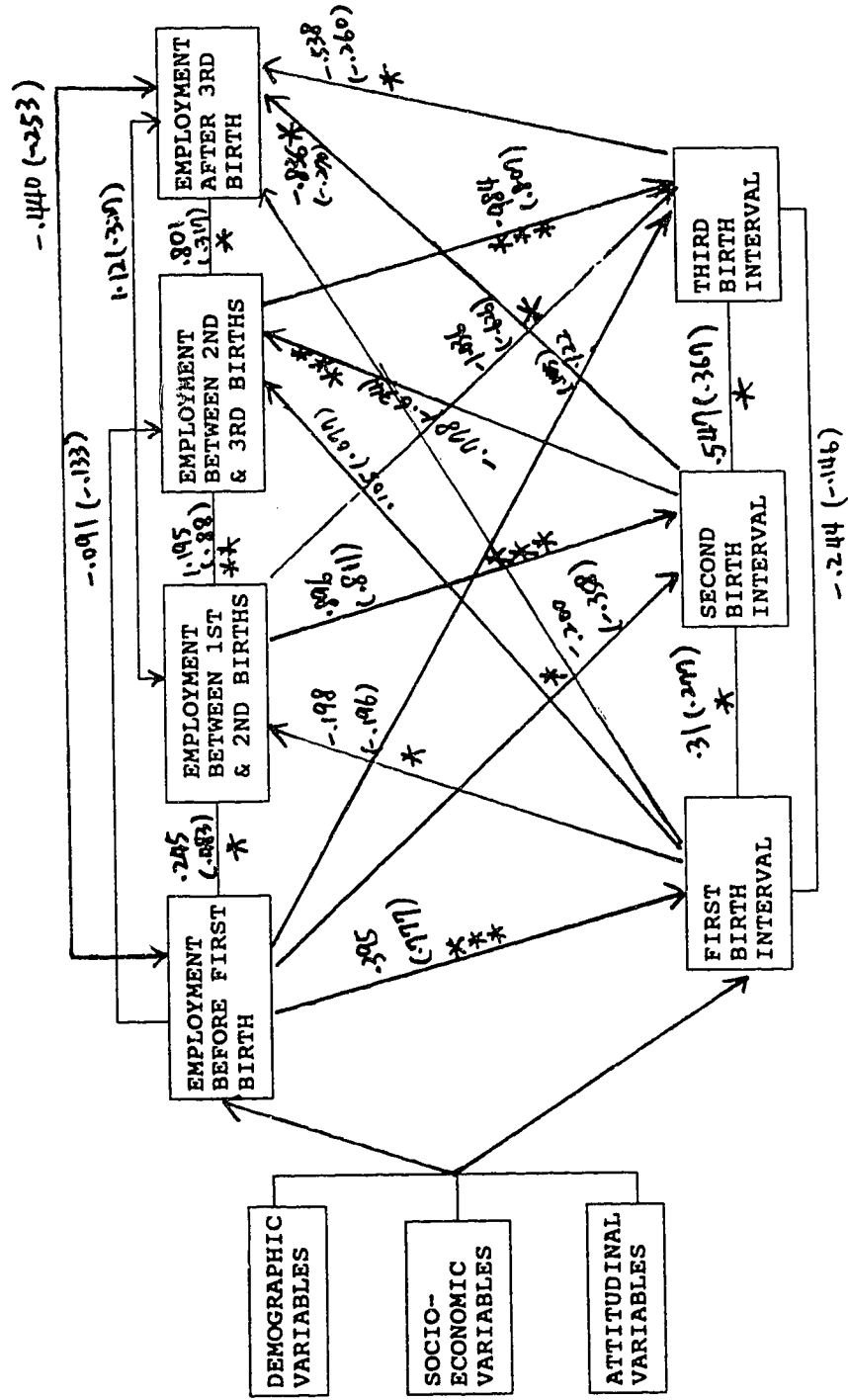
\*: T-Value > 2,    \*\*: T-Value > 5,    \*\*\*: T-Value > 8

Figure 5: Illustrative Model For Parity Two Group



\*: T-Value > 2,    \*\*: T-Value > 5,    \*\*\*: T-Value > 8

Figure 6: Illustrative Model For Parity Three Group



\*: T-Value > 2, \*\*: T-Value > 5, \*\*\*: T-Value > 8



## Bibliography

- Armstrong, Pat and Hugh Armstrong. (1984). The Double Ghetto. Toronto: McClelland and Stewart.
- Bagozzi, R. P. and M. F. Van Loo. (1978). "Toward a general theory of fertility: a causal modelling approach". Demography 15: 301-20.
- Bagozzi, R. P. and M. F. Van Loo. (1982). "Fertility, labour force participation and tastes : an economic psychology perspective". Journal of Economic Psychology 2: 247-85.
- Bagozzi, R. P. and M. F. Van Loo. (1984). "Labour force participation and fertility: A social analysis of their antecedents and simultaneity." Human Relations 37(11): 941-967.
- Bagozzi, R.P. and M. F. Van Loo. (1990). "A purposeful behaviour theory of work and family size decisions." pp. 101-293.
- Balakrishnan, T. R., Karol J. Krótki and Evelyne Lapierre-Adamcyk. (1985). "Contraceptive use in Canada, 1984." Family Planning Perspectives 17(5): 209-215.
- Beaujot, Roderic. (1986). "Dwindling families". Policy Options Politiques, September: 3-7.
- Beaujot, Roderic. (1990). "The family and demographic change in Canada: economic and cultural interpretations and solutions". Journal of Comparative Family Studies 21(1):25-38.
- Becker, Gary S. (1981) A Treatise on the Family. Harvard University Press. Cambridge.
- Becker, Gary S. and N. Tomes. (1976). "Child endowments and the quantity and quality of children". Journal of Political Economy 84 (Part II): 143-162.
- Bentler, P. M. and Bonett, Douglas G. (1980). "Significant tests and goodness of fit in the analysis of covariance structures". Psychological Bulletin 88 (3): 588-606.
- Bernhardt, Eva M. (1986). "Women's home attachment at first birth: The case of Sweden". European Journal of Population 2: 5-29.
- Bielby, William T. and Robert M. Hauser. (1977). "Structural equation models." Annual Review of

- Sociology 3: 137-161.
- Blake J. (1965). "Demographic science and the redirection of population policy". Journal of Chronic Disease 17: 1181-1200.
- Boothby, Daniel (1984). "The continuity of married women's labour force participation in Canada". Canadian Journal of Economics 3:471-80.
- Boulet, Jac-Andre and Lavallee Laval. (1984). The Changing Economic Status of Women. Statistics Canada. Ottawa.
- Bowen, W. G. and A. T. Finegan (1969). The Economics of Labour Force Participation. Princeton University Press.
- Boyd, Monica. (1982). "Sex differences in the Canadian occupational attainment process". Canadian Review of Sociology and Anthropology 19: 1-28.
- Bumpass, L. L. and J. A. Sweet (1980). Patterns of employment before and after childbirth. Vital and Health Statistics Series 23. No. 4. U.S. National Centre for Health Statistics. Hyattsville, M.D.
- Burris, Beverly H. (1991). "Employed mothers: The impact of class and marital status on the prioritizing of family and work." Social Science Quarterly 72(1):50-66.
- Cain, C. G. (1966). Married Women in The Labour Force: An Economic Analysis. Chicago: University of Chicago Press.
- Canada Employment and Immigration Advisory Council. (1991). Immigration in the 1990s. A report to the Minister of Employment and Immigration Advisory Council.
- Canadian Advisory Council on the Status of Women. (1987). Integration and Participation: Women's Work in the Home and in the Labour Force. Canadian Advisory Council on the Status of Women. Ottawa, Ontario.
- Carlinear, G., C. Robinson and Nigel Tomes. (1984). "Life time models of female labour supply, wage rates and fertility". Research in Population Economics 5: 1-28.
- Coverman, Shelley and Joseph Sheley. (1986). "Change in men's housework and child-care time, 1965-1975." Journal of Marriage and the Family 48: 413-422.
- Cramer, J. C. (1979). "Employment trends of young mothers

- and the opportunity cost of babies in the United States". Demography 16: 177-197.
- Cramer, J. C. (1980). "Fertility and female employment: problems of causal direction". American Sociological Review 45:167-190.
- Davis, J. A. (1978). "Studying categorical data over time". Sociological Methods and Research 7: 151-179. San Juan, Puerto Rico.
- Davis, Kingsley. (1984). "Wives and work: consequences of the sex role revolution". Population and Development Review 10(3): 397-417.
- Deville, (1977). "Analyse harmonique du calendrier de constitution des familles en France", Population 32: 17-63.
- Easterlin, Richard A. (1973). "Relative income and the American fertility swing". In Eleanor Scheldon (ed.) Family Economic Behaviour: Problems and Prospects. Philadelphia: J. B. Lippincott Company. pp.167-227.
- Easterlin, Richard A. (1978). "The economic framework for fertility analysis". Studies in Family Planning 6 (March): 54-63.
- Eichler, Margrit. (1983). Families in Canada Today: Recent Changes and Their Policy Consequences. Toronto: Gage.
- Ericksen, Julia A., William L. Yancey and Eugene P. Ericksen. (1979). "The division of family roles." Journal of Marriage and the Family 39: 473-483.
- Felmlee, D. H. (1984). "A dynamic analysis of women's employment exits". Demography 21(2): 171-184.
- Fortney, J. (1972). "Achievement as an alternate source of emotional gratification to childbearing". Paper presented at the Annual Meeting of the Population Association of America, Toronto.
- Fox, John. (1984). Linear Statistical Models and Related Methods With Applications to Social Research. Wiley Series in Probability and Mathematical Statistics. John Wiley and Sons.
- Fried, Ellen Shapiro, and Susan K. Settergren. (1987). "The more things change....". Manuscript, Research Triangle Institute, Research Triangle Park, NC.

- Gee, W. M. (1986). "The life course of Canadian women: A historical and demographic analysis". Social Indicators Research 18:263-283.
- Gendell, M. (1965). "The influence of family building activity on women's rate of economic activity", In Proceedings of the World Population Conference, Belgrade, Vol. 4, Migration, Urbanization, Economic Development. New York, United Nations. pp. 285-286.
- Goldstein, Sidney. (1972). "The influence of labour force participation and education on fertility in Thailand". Population Studies 26(3): 419-436, Population Investigation Committee, London School of Economics, London.
- Grindstaff, Carl F. (1984). "Catching up: the fertility of women over 30 years of age: Canada in the 1970s and early 1980s." Canadian Studies in Population 11: 95-109.
- Grindstaff, Carl F. (1986). "The high cost of childbearing: the fertility of women age 30-44, Canada, 1981". Discussion paper no. 86-7. Population Studies Center. The University of Western Ontario.
- Grindstaff, Carl F. (1989). "Socio-demographic associations with fertility: A profile of Canadian women at age 30." Canadian Studies in Population 16(1): 43-60.
- Grindstaff, Carl F. and Trovato, Frank. (1987). "Junior partners: women's contributions to total husband/wife family income, Canada 1981". Population Studies Centre Discussion Papers no.87-4. London, Ontario: University of Western Ontario.
- Gurak, D. T. and M. M. Kritz (1982). "Female employment and fertility in the Dominican Republic: A dynamic perspective". American Sociological Review 47: 810-818.
- Hass, Linda. (1981). "Domestic role sharing in Sweden." Journal of Marriage and the Family 43: 957-967.
- Heckman, James and McCurdy, Thomas. (1980). "Simple statistical models for discrete panel data developed and applied to test the hypothesis of true state dependence Against The Hypothesis of Spurious State Dependence." Annals de l'insee (Symposium Issue, Proceedings of a conference on Panel Data, Paris, France).
- Heckman, James and MaCurdy, Thomas. (1980). "A life-cycle

- model of female labour supply." Review of Economic Studies 47(1): 47-74.
- Heise, D. R. 1970. "Causal inference from panel data", In F. Borgotta and G. Bohrnsted (eds.) Sociological Methodology, 1970. San Francisco: Jossey-Bass. pp. 3-27.
- Hoem, Britta and Hoem, J. M. (1989). "The impact of female employment on second and third births in modern Sweden." Population Studies 43(1): 47-67.
- Hofferth, Sandra. (1983) "Childbearing decision making and family well-being: A dynamic, sequential model". American Sociological Review 48: 533-545.
- Hoffman, L. W. and F. Wyatt. (1960). "Social change and motivations for having larger families: some theoretical considerations". Merrill-Palmer Quarterly of Behaviour and Development 6: 235-244.
- Hout, M. (1978). "The determinants of marital fertility in the United States, 1968-1970: inference from a dynamic model". Demography 15: 139-160.
- Huber, J. (1986). "Trends in gender stratification, 1970-1985". Sociological Forum 1(3): 476-495.
- Jones, C., L. Marsden and L. Tepperman. (1990). Lives of Their Own: The Individualization of Women's Lives. Don Mills, Ontario: Oxford University Press.
- Jöreskog, K. G. (1973 ). "A general method for estimating a linear structural equation system". In A. S. Goldberger and O. D. Duncan (eds.) Structural Equation Models in The Social Sciences. New York: Seminar Press. pp.85-112.
- Jöreskog, K. G. (1977). "Structural equation models in the social sciences : specifications, estimation and testing". In P. R. Krishnaiah (ed.) Applications of Statistics. Amsterdam: North-Holland. pp. 265-287.
- Jöreskog, K. and D. Sörbom. (1979). Advances In Factor Analysis And Structural Equation Models. Cambridge, Mass: Abt Books.
- Jöreskog, K and D. Sörbom. (1984). LISREL VI: Analysis of Linear Structural Relationship by The Method of Maximum Likelihood. User's Guide.
- Kamerman, Shelia B. (1979). "Work and family in

- industrialized societies." Signs 4: 632-650.
- Kalleberg, Arne L, Rosenfeld, Rachel A. (1989). "Work in the family and in the labour market: A cross-national, reciprocal analysis." Working Paper No. 89-4. Carolina Population Center, The University of North Carolina at Chapel Hill.
- Keyfitz, N. (1977). Applied Mathematical Demography. Wiley. London.
- Keyfitz, N. (1987). "The family that does not reproduce itself". In K. Davis, M.S. Bernstom and R. Ricardo-Campbell (eds.) Below Replacement Fertility in Industrial Societies: Causes, Consequences, Policies. New York: Population and Development Review.
- Keyfitz, N. (1986). "The family that does not reproduce itself." Population and Development Review 12 (Suppl): 139-154.
- Klevmarcken, N. Anders and Tasiran, Ali. (1991). "A comparative study of fertility in Sweden and the United States". Paper presented at the Event-History Conference at Stanford University.
- Krótki, Karol J. (1989). "The history and methodology of the Canadian Fertility Survey of 1984." Population Reprints No. 98. Population Research Laboratory, Department of Sociology, The University of Alberta.
- Krótki, Karol J. (1990). "What the 26 studies do." Canadian Studies in Population 17(2): 65-70.
- Laws, J. (1976). "Work aspirations of women: false leads and new starts". Signs 1(3) Part 2: 33-50.
- Lehrer, Evelyn and M. Nerlove. (1986) "Female labour force behaviour and fertility in the United States". Annual Review of Sociology 12:181-204.
- León, José Gómez C. (1990). "Recent developments in parity progression intensities in Norway, An Analysis Based on Population Register Data." Discussion Paper No. 51, Central Bureau of Statistics. Norway.
- Lillard, Lee and Waite, Linda. (1989). "Panel versus retrospective data on marital histories: Lessons from the PSID." in Individuals and Families in Transition: Understanding Change Through Longitudinal Data. U.S. Bureau of the Census.

- Lindert, Peter. (1978). Fertility and Scarcity In America. Princeton, N. J: Princeton University Press.
- Lloyd, Cynthia B. (1990). "Understanding the relationship between women's work and fertility: the contribution of the World Fertility Surveys." Working Papers. No. 9. The Population Council. New York.
- Lomax, Richard. (1982). "Method and designs: A guide to LISREL-type structural equation modeling." Behaviour Research Methods and Instrumentation 14(1):1-8.
- Long, Scott J. (1983). Covariance Structure Models: An Introduction to LISREL. Quantitative Applications in the Social Sciences Series, No. 34. Sage Publications.
- Mason, K. O. (1974). Women's Labour Force Participation and Fertility. Report 210-622. Research Triangle Institute, North Carolina.
- Mason, O. and K. T. Palan. (1981). "Female employment and fertility in Peninsular Malaysia: The maternal role incompatibility hypothesis reconsidered". Demography 18(4):549-575.
- Mathews, C. (1984). Le Choc. Demographique. Saint-Laurent, Quebec: Boreal Express.
- Mincer, J. (1963). "Market prices, opportunity costs and income effects". In C. Crist (ed.) Measurement In Economics. Stanford University Press. pp. 67-82.
- Mishler, E. and C. F. Westoff, (1955). "A proposal for research on social psychological factors affecting fertility: concepts and hypotheses". in Milbank Memorial Fund (ed.) Current Research In Human Fertility. pp. 121-150. New York: Milbank Memorial Fund.
- Moffitt, R. (1984). "Optimal life-cycle profiles of fertility and labour supply." Research in Population Economics 5: 29-50.
- Mott, Frank. (1972). "Fertility, life cycle stage and female labour force participation in Rhode Island: a retrospective overview". Demography 9: 173-185.
- Mott, Frank. (1982). "Employment revolution: Young American women in the 1970s". Massachusetts Institute of Technology. Oppenheimer, V. K. (1982). Work and the Family: A Study in Social Demography. Academic Press. New York, London.

- Nakamura, Alice and Nakamura, Masao. (1985) "Dynamic models of the labour force behaviour of married women which can be estimated using limited amounts of information." Journal of Econometrics 27: 273-298.
- Nakamura, Alice and Nakamura, Masao. (1990) "Children and female labour supply: A review of selected econometric issues." Working Paper, University of Alberta.
- Namboodiri, N. K. (1964). "The wife's work experience and child spacing". Milbank Memorial Fund Quarterly 42:65-77.
- Namboodiri, N. K. (1972). "Some observations on the economic framework for fertility analysis". Population Studies 26: 185-206.
- Namboodiri, N. K. (1974). "The integrative potential of a family models: an analytical test". Population Studies.
- Ní Bhrolcháin, Marie. (1986). "Women's paid work and the timing of births: longitudinal evidence". European Journal of Population 2: 43-70.
- Ní Bhrolcháin, Marie. (1985). "Birth intervals and women's economic activity". Journal of Biosocial Science 17: 31-46.
- Ní Bhrolcháin, Marie. (1984). "Paid work and the tempo of childbearing: longitudinal evidence". LSHTM Center for Population Studies Research Paper no. 84-3. Memorial Fund Quarterly 42:65-77.
- Ní Bhrolcháin, Marie. (1983). "Birth spacing and women's work: some British evidence." Centre for Population Studies Research No. 83-3. London School of Hygiene and Tropical Medicine.
- Ní Bhrolcháin, Marie. (1980). "Fertility and female employment: what relationship. A review of micro-level issues and evidence". Center of Population Studies. working paper. no. 80-3. London School of Hygiene and Tropical Medicine. University of London.
- Picot, G. (1987). "Modelling the lifetime employment patterns of Canadians." In Proceedings of Conference on the Family in Crisis.
- Pryor, E. (1984). "Canadian husband-wife families: Labour-force participation and income trends, 1971-1981." The Labour Force (May), Statistics Canada: Ottawa,



Catalogue 71-001.

- Rajulton, Fernando; Balakrishnan, T. R. and Chen, Jiajian. (1988). "Change in timing of fertility, a Canadian Experience". Discussion Paper no. 88-6. Population Studies Center, The University of Western Ontario.
- Ridley, Jeanne Clare. (1971). "The changing position of American women: Education, labour force participation and fertility". In Arthur A. Campbell, et al (eds.). The Family In Transition. Washington, D. C: U.S. Government Printing Office.
- Robinson, P. (1986). "Women's work interruptions: results from the 1984 Family History Survey". Statistics Canada. Ottawa.
- Rodgers, R. and Whitney, G. (1981). "The family cycle in twentieth-century Canada." Journal of Marriage and the Family 43(3): 727-740.
- Romaniuc, A. (1984). Fertility in Canada: From Baby-boom to Baby-bust. Statistics Canada. Ottawa.
- Romaniuc, A. and Krótki, K. J. (1990). "Economics and labour". Canadian Studies in Population 17(2): 129-136.
- Rosenzweig, Mark R. (1976). "Female work experience, employment status and birth expectations: sequential decision-making in the Philippines". Demography 13(3): 339-357.
- Rosenzweig, Mark R. (1980). "Life-cycle labour supply and fertility: causal inferences from household models". Journal of Political Economy 88 (2): 328-48.
- Rosenberg, H. (1972). The influence of fertility strategies on the labour force status of American wives. Unpublished dissertation. Ohio State University.
- Ryder, N. B. (1979). "The future of American fertility". Social Problems 26: 359-370.
- Ryder, N. B. and C. F. Westoff. (1972). "Wanted and unwanted fertility in the United States: 1965 and 1970". in C. F. Westoff and R. Parke Jr. (eds.) Commission on Population Growth and the American Future. Vol. I: Demographic and Social Aspects of Population Growth. pp. 467-487. Washington, D. C: U. S. Government Printing Office.
- Scanzoni, J. H. (1975). Sex Roles, Life Styles and

Childbearing. New York: The Free Press.

Schulzt, T. Paul. (1978). "The Influence of Fertility on the Labour Force Behavior of U.S. Married Women," Technical Analysis Paper, ASPER, Department of Labour, 1977; reprinted in R. G. Ehrenberg (ed.) Research in Labour Economics Volume 2: 273-351.

Shaw, L. B. (1983). "Causes of irregular employment patterns." in L. B. Shaw (ed), Unplanned Careers: the Working Lives of Middle-aged Women. Lexington: Lexington Books, PP.45-59.

Shapiro, F. and F. Mott. (1979). "Labour supply behaviour of new and prospective mothers". Demography 16: 199-208.

Silka, Linda and Kiesler, Sara. (1977) "Couples who choose to remain childless." Family Planning Perspectives 9: 16-25.

Ch-Lovin, L. and A. R. Tickamyer. (1978). "Nonrecursive models of labour force participation, fertility behaviour and sex role attitudes." American Sociological Review 39:816-831.

Standing, Guy. (1981). "Women's work activity and fertility" in Determinants of Fertility in Developing Countries Vol 1, Chapter 16, pp.517-546.

Statistics Canada. (1985). Women in Canada. Catalogue 89-503E. Ottawa.

Statistics Canada. (1990a). Labour Force Statistics.

Statistics Canada. (1990b). Historical Labour Force Statistics, Actual Data, Seasonal Factors, Seasonally adjusted Data. Statistics Canada, Labour Force Survey Division.

Statistics Canada. (1990c). Vital Statistics, Birth and Death. Catalogue, 84-204, Annual Report.

Status of Women Canada. (1989). Dimensions of Equality: an Update of the Federal Government Work Plan for Women. Ottawa, Ontario.

Stephenson, Marylee. (1977). Women in Canada. General Publishing Co. Limited, Ontario.

Stolzenberg, R. M., and L. J. Waite. 1977. "Age, fertility expectations and employment plans". American

Sociological Review 42: 769-783.

- Stycos, J. M. and Weller, R. H. (1967). "Female working roles and fertility". Demography 4: 210-217.
- Sweet, James A. (1973). Women In The Labour Force. New York: Seminar Press.
- Terry, G. B. (1975). "Rival explanations in the work-fertility relationship". Population Studies 29: 191-205.
- Thornton, Arland and Kim, Joochul. (1977). "Perceived impact of financial considerations on childbearing." Paper presented at the annual meeting of the Population Association of America, St. Louis, MO.
- Tremblay, V. and Guy Trudel. (1984). Canadian Fertility Survey: Methodological Report. Universite de Montreal.
- Turchi, B. (1975). "Microeconomic theories of fertility: A critique". Social Forces 54: 107-126.
- U.S. Bureau of the Census. (1988). Statistical Abstract of the United States: 1988. 108th ed., Washington: USGPO 1987.
- Waite, Linda J. (1980). "Working wives and the family life cycle." American Journal of Sociology 86: 272-294.
- Waite, L. J. and Stolzenberg, R. M. (1976). "Intended childbearing and labour force participation of young women: Insights from non-recursive models". American Sociological Review 41: 235-252.
- Waite, L. J. and Stolzenberg, R. M. (1984). "Local labour market, children, and labour force participation of wives," Demography 21 (May): 157-170.
- Ward, Michael and Butz, William. (1980). "Completed fertility and its timing: an economic analysis of U.S. Experience Since World War". Journal of Political Economy 88: 917-940.
- Westoff, Charles F., R. G. Potter, P.C. Sagi and Mishler, E. G. (1961). Family Growth and Metropolitan America. Princeton University Press.
- Westoff, Charles F., R. G. Potter and P. C. Sagi, (1964). "Some selected findings of the Princeton fertility study". Demography 1(1):130-35.

- Willis, R. H. (1973). "A new approach to the economic theory of fertility behaviour", Journal of Political Economy 81:14-64.
- Women's Bureau. (1986). Women in the Labour Force, 1985-1986 edition. Labour Canada. Ottawa, Ontario.
- Wilson, S. J. (1986). Women, the Family and the Economy, second edition. McGraw-Hill Ryerson Limited.
- Yeung, Wei-Jun J. (1984) "Fertility and female labour force participation: a meta-method analysis." Paper presented at 1984 annual meeting of the Canadian Population Societies.
- Yeung, Wei-Jun J. (1988). "The reciprocal effects of female labour force participation and fertility". Discussion Paper no. 53. Population Research Laboratory. University of Alberta.