LABOUR FORCE PARTICIPATION RATES AND POVERTY IN CANADIAN METROPOLITAN AREAS

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ABSTRACT

A theoretical model is developed explaining participation in the labour force in terms of the utility obtained from working, the likelihood of obtaining a job, and the costs associated with getting a job. Both discouraged and added worker behaviour are explained in terms of the model and the much greater likelihood of finding evidence of the former is noted.

Regression analysis is then applied to 1961 census tract data for the major cities of Canada in order to discover the determinants of labour force participation rates and especially the influence of unemployment on these rates. Separate regressions are run for high, middle, and low income tracts. Regressions are also separated by sex. For males, it is found that unemployment, wage levels, age, education, and marriage are important in determining participation rates. The influence of these variables differs significantly among the income groups. A strong discouraged worker effect is found. For women, similar results are found, but children, housing conditions, ethnic variables and the unemployment and earning rates of males also influence their labour force behaviour. Some slight evidence for added worker behaviour was found among the higher income groups.

Similar regressions were then run using 1951 census data. Although there was evidence that the influence of some of the socio-demographic variables had changed over time, discouraged worker behaviour still predominated over added worker behaviour for all groups with the exception of higher income women.

The results of this thesis were found to conform with the results obtained in earlier studies in the U.S. and Canada.
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The purpose of this thesis is to examine the determinants of labour force participation by men and women in the major Canadian cities and to discover if any differences exist between the labour force behaviour patterns of people at different income levels. Such differences would have important implications for such problems as reducing poverty and minimizing unemployment.

Economic theory suggests that the supply of labour is primarily determined by the prevailing level of wages. However, recent empirical research has revealed that the supply of labour responds more to the level of unemployment than to the wage level. These findings have been reconciled by assuming that movements in wages and unemployment rates are closely related. However, given present conditions in the labour market, this assumption no longer appears to be justified. Theory would lead us to believe that a fall in wages would occur in response to rising levels of unemployment. In fact, no significant tendency for wages to fall has been observed in recent decades in spite of periods of high and fairly prolonged unemployment. Consequently, the second chapter of this thesis presents a model which explains how the supply of labour could vary in response to changes in
unemployment levels regardless of whether or not wages are responsive to labour market conditions.

The remaining chapters will be devoted to testing the model empirically, using 1961 and 1951 census data. Regression analysis will be used to find the important determinants of participation rates and statistical tests will be made to see if differences in the influence of these determinants exist among income groups. Finally, the results will be compared to those obtained in earlier studies.

The relationship between poverty and the willingness of its victims to work is not a new idea in the field of economics. As early as the sixteenth century, mercantilist writers felt that poverty was both necessary and sufficient to induce the labouring classes to undertake useful and productive work.¹

Though this view did not completely disappear with the waning of mercantilism, an alternative view was becoming more prevalent by the time of Adam Smith. Poverty, according to Smith, was not an incentive to labour. On the contrary, high wages were necessary to induce and enable people to produce effectively.

The liberal reward of labour... increases the industry of the common people. The wages of labour are the encouragement of industry, which, like every other human quality, improves in proportion to the encouragement it receives. A plentiful subsistence increases the bodily strength of the labourer, and the comfortable hope of bettering his condition, and of ending his days perhaps in ease and plenty, animates him to exert that strength to the utmost. Where wages are high, accordingly, we shall always find the workmen more active, diligent, and expeditious, than where they are low. 2

Thus, very early in the science of economics, a dichotomy arose. On the one hand, there were those (such as the mercantilists) who felt that poverty encouraged people to work and indeed, was a necessary incentive. On the other hand, there were those (e.g. Smith) 3 who believed the opposite.

This conflict still exists in current labour market theory, only now one refers to the 'additional worker' hypothesis or the 'discouraged worker' hypothesis. The former hypothesis maintains that low wages and/or high unemployment will force people into the labour force who might not, other-


wise, choose to work. An example is the wife of the low-income or unemployed man who must contribute to the family income, but who would really prefer staying home and presumably will do so as soon as circumstances permit.

The 'discouraged worker' hypothesis maintains that poor labour market conditions have the opposite effect. Potential workers now feel that their chances of getting a job are much reduced and any job they do get will offer them much less monetary and psychic income. Much of the work that has been done recently has been seeking to determine to what extent each of these hypotheses is operative.

The remainder of this chapter will be concerned with the key articles of the current decade. First, I shall examine studies done in the United States and Canada on these hypotheses. Second, I will review relevant U.S. studies on poverty.

Although Jacob Mincer's classic study, "Labour Force Participation of Married Women" deals with only one rather atypical part of the labour force, there is justification for examining it. First, it has become a classic in the field. Second, studies have shown that labour force participation

by adult males is remarkably stable relative to other labour force groups and is not very responsive to changes in such variables as unemployment rates or wage levels. Hence, much of the variability in the total labour force can be explained by the behaviour of 'secondary workers' such as married females.

A study of Mincer's theory requires the introduction of new terms. Under the additional worker hypothesis, we saw that a fall in wages would lead to a rise in labour force participation rates. If we assume that a person's alternative uses of time consist only of wage-work or leisure, a fall in wages would result in an increase in leisure. With goods divided into wage goods (goods bought with wages) and leisure, we see that the additional worker hypothesis becomes the 'income effect' of demand theory. This effect is positive between wages and leisure since leisure is a 'normal' good and, therefore negative between wages and work.

Under the discouraged worker hypothesis, bad labour market conditions and falling wages would cause falling labour force participation rates. Again, translating this into a work-leisure choice, a rise in wages will make the price of leisure rise, thus making leisure a relatively more expensive good. Hence, according to the substitution effect of demand theory, less leisure will be consumed and more labour
market activity will take place. This we will call the 'wage effect'. These effects are shown in Figures 1 and 2.

Figure 1
Net Income Effect or Additional Worker Behaviour

earnings per unit of time

leisure per unit of time

Figure 2
Net Wage (Substitution) Effect or Discouraged Worker Behaviour

earnings per unit of time

leisure per unit of time
Additional and discouraged worker behaviour are usually explained in terms of the unemployment rate rather than in terms of wage levels. The conversion from income/substitution effects to added/discouraged worker effects is made by assuming that wage levels (annual earnings if not hourly rates) move in opposite directions to unemployment. However, given the existing downward stickiness of wages even with very high rates of unemployment, the theory would be improved if the link between wages levels and unemployment were not required. A theory which does not require this link is presented in Chapter II.

The conclusions of Mincer's study are as follows:

1. the wage effect tends to be considerably stronger than the income effect;

2. the wage effect is weakened by the presence of young children. These findings are confirmed on other data later in the study;

3. transitory changes in income are much more likely to induce changes in wives' labour force participation than those of permanent income. Mincer shows this by:

5Mincer, op. cit., p. 77.

6Ibid., p. 88.

7Ibid., p. 80 and following.
noting that more educated men tend to have higher lifetime earnings (permanent income) and a steeper age income profile than those with less education. He also notes a high labour force participation rate among wives of young men with high education levels and concludes that their working is primarily to fill the gap between low present (transitory) income and the higher permanent income levels. This seems like a reasonable hypothesis although more highly educated men tend to marry better educated women and education in women may reflect a taste for market work.

If valid, Mincer's findings about the effects of transitory versus permanent income are important for the study of poverty problems. His conclusions imply that it is not low income per se, but only low income relative to permanent or expected income that is important in inducing married women to work. In poor families, incomes are low; but, in general, they are not expected to rise significantly over time. Hence, this inducement to poor wives to raise income by working does not exist.

Cain's study on married female participation rates tends to confirm Mincer's findings. However, Cain goes further than Mincer in his analysis of the non-white labour mar-

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9Ibid., pp. 52-71.
ket. Negro wives participate more in the labour force *cet. par.* than white wives although their participation rates are not rising as quickly over time. While their response to changes in wages is greater than that of white wives, their response to family income and the presence of children is less.\(^{10}\) Cain's explanations for the higher labour market activity of non-white wives show that black marriages are less secure, thus inducing black women to remain in the labour force while married. He also believes that black females are discriminated against less than black males. He also suggests that small and crowded quarters encourage women to work outside the home by reducing the amount of housework necessary and by providing the presence of other adults able to help with housework and the care of children. The variable he chooses to represent this factor (the percent of husband/wife families without their own household) turns out to have a positive and significant coefficient in his regression on married female participation rates.\(^{11}\)

We turn now to studies concerned with the effects of changes in labour force participation rates, especially as these changes related to the problems of unemployment and

\(^{10}\) Cain, *op. cit.*, p. 81.

\(^{11}\) Ibid., p. 83.
the goal of providing 'full' employment. In an interesting article, Alfred Telia\textsuperscript{12} discussed this problem and was led to expect a discouraged worker reaction which his empirical results later confirmed. The implications of this discouraged worker phenomenon bode rather ill for a full employment policy. For example, during a recession the government practices a program which increases employment. This, of course, absorbs some of the unemployed. However, the improved labour market conditions now attract more (jobless) workers into the labour force so that actual unemployment rates are not lowered by nearly so much as anticipated. Telia also notes that females tend to be more responsive to changes in employment conditions than males. Consequently, increasing jobs for females would have an even smaller effect on the unemployment rate than would increasing jobs for males.

Telia concludes "a relatively full employment goal by 1965 presupposes sustained employment gains well beyond the experience, not only of recent years, but of the post-war period as a whole."\textsuperscript{13} He notes further that growing numbers of teen-agers who have high labour force elasticity would intensify the problem.


\textsuperscript{13}Telia, op. cit., p. 467.
In "Labor Force Sensitivity to Employment by Age, Sex," Telia deals with the problem of the disguised unemployed (i.e. those who would enter the labour force as demand conditions approached the full employment level). Considerable disguised unemployment is found in the 14-24 age group of both sexes. It was negligible for men in the central age groups, but high for women aged 25-55. The ratio of disguised to reported unemployment was higher in the female groups than in the male groups in all cases. The author then makes projections of the amounts of disguised employment for 1970; but his failure to take into account such factors as the changing patterns of school attendance among the younger age groups make his projections suspect.

Telia concludes that disguised unemployment will make the attainment of full employment goals more difficult, especially for younger workers and middle-aged women whose labour force elasticities are fairly high. However, very little slack exists among men in the central age groups. Hence jobs will have to be created for young and female workers as opposed to prime aged males. Such jobs will have to appear in very large numbers if full employment is


15 Note that this conclusion contradicts the point of view in Telia's earlier article. See William G. Bowen
to be maintained and unemployment (both disguised and reported) kept to a minimum.

Bowen and Finegan wish to determine the labour force behaviour patterns among various age-sex groups to see if these changed from 1940 to 1960. It is expected that labour force participation will be determined by tastes, affluence and incentives. The measurable variables which represent these categories will differ from group to group.

Discouraged worker patterns of behaviour were found for all groups including married women whom one would expect on a priori grounds to be most likely to display added worker behaviour. Education tended to encourage participation, while unearned income tended to discourage it.

When Bowen and Finegan turn to the question of disguised unemployment, their results are similar to those of Telia. Although the discouraged worker effect was present for all groups in all years, the most sensitive groups were older males and teen-aged boys. Married women and teen-aged boys.

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16 Bowen and Finegan, op. cit.
females were in an intermediate category. In 1940, however, it was the married women who were the most sensitive to unemployment conditions. The authors also noted that sensitivity to market conditions had increased considerably over time. No reasons are offered for this trend, but it was suggested that unemployment being lower in the 40's than in the 30's may have lessened the discouragement effect. I would suggest that the general level of affluence in the 50's and 60's (as reflected in such things as better welfare systems, old age security and larger cushions of savings and credit) may add to the discouragement effect.

Bowen and Finegan estimate total hidden unemployment for urban areas in 1950 and 1960 at over half a million in both years. Married women contributed significantly to this group. The authors confirm Telia's finding that prime aged males were little affected by disguised unemployment.

Mincer's later work, "Labor Force Participation and Unemployment," provides a convenient review of the work done in this field to 1966. He concludes that secondary workers in the aggregate display considerable responsiveness to labour market conditions -- a reaction which is less clear when the secondary worker group is disaggregated into its component parts. Here, long term institutional factors play a more distinct role. Mincer specifically mentions plans which decrease the participation rates of older men and increasingly
large minimum wage levels which reduce job opportunities for teen-agers and encourage employers to hire prime age males instead. He thus enforces the opinion of many writers who feel that unemployment among young people is of sufficient magnitude to become a major social problem, while very little employment slack exists among prime age males.

Mincer also makes a point of relevance to the discussion of poverty and labour market activity. Noting that the only group whose labour force participation pattern varies inversely with the business cycle is non-white adult females, he concludes "the 'additional worker' is more likely to be a low-income person than the 'discouraged worker'."¹⁷ The implications of this statement for poverty problems would be even more important if one could validly infer the converse, namely that a low income person is more likely to be an additional worker. Mincer concludes by noting that the disguised unemployment as measured by studies such as Tellä's is not strictly additive with reported unemployment since those who are out of the labour force are not willing to work at the going real wage, demanding at least lower costs

of 'search'. Although others have presented this point of view, the general consensus is that reducing the weight given to the disguised unemployed in calculating the manpower gap does not eliminate the problem of unemployment, although it may lessen it.

Mincer feels the increasing labour flexibility of secondary workers will cause growing and persistent amounts of unemployment to be observed in the economy. This will be intensified by the fact that downward rigid wages deny many workers even the option between unemployment and low paying jobs.

In a more recent study, Cain also finds discouraged worker effects. However, he postulates that in cases of low income, "need" would be of more importance than "price" in the decision to enter the labour force. Hence, for low income groups the negative effect of high unemployment rates on participation rates would not be felt or at least would be weaker than in the case of secondary workers. To test this view he runs a separate regression on participation rates of non-white wives, the majority of whom he assumes to have low incomes. In these regressions the coefficient.

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19Ibid., p. 288.

20Ibid.; p. 289; equations 1, 2 and 3.
of the unemployment variable is insignificant at the 5% level. Thus, he concludes that for this low income group, the discouraged worker effect does not exist. However, he does note that unemployment, even if it does not discourage labour force participation, substantially reduces the average number of weeks and hours worked by the women most of whom are engaged, voluntarily or otherwise, in part-time work.

Another group on whom the effects of low income were tested were families headed by females. This is another group in which poverty is prevalent. (Some doubt may arise as to whether family heads of either sex should be classified as secondary workers, but Cain so classifies them). Here, too, none of the coefficients on unemployment are significant at 5%. Whether similar results would prevail in a more general study of poverty is an interesting question. However, even though there is no significant discouraged worker effect, no evidence is found for added worker effects. The unemployment variable merely becomes irrelevant to the decision to enter the labour force.

We turn now from American to Canadian studies. Very little has been done in this field to date. One of

21Cain, op. cit., p. 291.
the first studies was *Unemployment and Labor Force Participation: The Canadian Experience* by Robert Swidinsky. In it, both time series and cross-sectional data are used.

The time series work gives results quite different from those of the U.S. In the U.S. studies, the discouraged worker effect was consistently upheld, while the additional worker effect was only found in Cain's results for Negro wives. Swidinsky's study, however, finds evidence of both the added worker and the discouraged worker effect. The added worker effect dominates for males from 19 to 65 years, although the discouraged worker effect operates in the extreme age groups. In the aggregate, males show no sensitivity in either direction to unemployment conditions. Females as a whole display a discouraged worker pattern of behaviour, although those 45 years of age and older tend to behave like added workers.

The cross-section study reveals a consistent discouraged worker effect with the coefficients on unemployment for males being negative and significant at the 5% level.

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for all age groups except those 35-54. In this age group, there was no significant reaction to changes in employment conditions. For women, the coefficients on unemployment are again negative throughout, though they are only significant for those below 25. This would contradict U.S. findings which tend to show that secondary workers in general and women in particular were more responsive to labour market conditions.

Though the discouraged worker hypothesis is weakly upheld by Swidinsky, no evidence is given in the cross-section work for added worker behaviour. An attempt is made to reconcile the difference between cross-section and time series results by introducing migration. However, as in Bowen and Finegan's work, the migration variable proves to have little explanatory power.

Concerning differences between the U.S. and Canada, Swidinsky notes that the discouraged worker effect is less clearly predominant in Canada than in the U.S. The cross-section results which represent long run influence, are fairly similar. In the time series which show cyclical

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24 Telia, "The Relation of Labor Force to Unemployment.

changes, the differences are more obvious. Swidinsky also notes that patterns of participation, e.g. rising rates for married women and falling rates for older men, are changing in Canada at much faster rates than in the United States. He feels that this implies that the U.S. is approaching an equilibrium pattern which Canada will attain as she matures industrially. When industrial maturity and the higher income levels that go with it are reached in Canada, we can then expect our labour force behaviour patterns to resemble more closely those in the United States.

An article by Pierre-Paul Proulx tends to confirm Swidinsky's results. Using time series data and regressing the participation rates for the various age-sex groups on a trend term and on either the unemployment rate or an excess demand for labour variable, Proulx found that added worker behaviour was exhibited by men in the aggregate and by those 20-24 years old. Also, women over 45 displayed added worker behaviour. The discouraged worker phenomenon was upheld by teen-aged boys and young women (20-24). In conclusion,


27 Ibid., p. 275. No regression was given for women of all ages together, women under 20, women aged 25-45, prime age males and men over 65.
Proulx notes that the major difference between his results and the U.S. results is the predominance of additional worker behaviour in Canada. He explains its existence as due to lower income levels in Canada, which means that families are more likely to encourage additional labour market activity instead of dissaving or going into debt. The results of this behaviour would be to create business cycles that appear to be more pronounced than in the U.S. In recessions, the added worker as opposed to discouraged worker behaviour causes a higher reported unemployment rate. As conditions improve, workers tend to leave the labour force, making it difficult to generate increasing real production and encouraging inflation. However, as income levels rise in Canada, Proulx, too, feels that our labour market behaviour will approach that of the U.S. However, if Canadians measure their income, not by its absolute level, but relative to the United States, the problem may be of much longer duration.

A second Canadian article published at the same time as Proulx's leads to different results. Because they are interested in the long term as well as short term reaction to unemployment, Officer and Andersen include variables re-

presenting not only the usual unemployment rates, but also rates for those unemployed more than one month, more than three months and more than six months. These are significant for many age-sex groups, indicating that the reaction to unemployment may take a long time. However, the results obtained are quite different from the conclusions of either Proulx or Swidinsky. Officer and Andersen find a discouraged worker effect predominating for all the male groups and for the youngest female group. However, net additional worker behaviour is displayed by the remaining female groups. They also find that men behave like additional workers in response to short term cyclical variations in the unemployment rate, but become discouraged as a result of long term unemployment. Although the coefficient on the variable representing the current unemployment rate is positive for many male groups, its positive effect is outweighed by the negative coefficients on the variables representing unemployment of one, three or six months duration. Thus, we conclude that in Canada the short term cyclical behaviour tends to be as indicated by Swidinsky and Proulx, while in the long term a different pattern is observed which more closely approximates the U.S. pattern.

In the aggregate, Officer and Andersen do find out that for Canada in 1950 to 1967, the additional worker effect did tend to outweigh the discouraged worker effect.\textsuperscript{29} They

\textsuperscript{29} Officer and Andersen, \textit{op. cit.}, p. 286.
also find that the income effect on participation rates was positive, a conclusion which would contradict the ideas of earlier authors.

We now turn to studies dealing specifically with the question of poverty. Since no work on this question has been done with Canadian data, the articles we will examine deal with conditions in the United States. In "Urban Poverty and Labor Force Participation," Joseph D. Mooney examines the relationship between the unemployment rate and labour force participation in poor urban areas — namely those census tract regions of median family incomes less than 2/3 of the median family income for the Standard Metropolitan Area as a whole. Only the largest metropolitan areas (population 500,000+) were used. The poverty tracts were then classified as N, W or N*, where N indicates a tract which is predominantly non-white, W indicates a tract which is predominantly white, and N* indicates a tract in which whites and non-whites were mixed in fairly equal numbers.

Mooney first notices that participation rates for the N areas are higher for both sexes than is the case in the W areas. He attributes this at least partially to

higher average age in the W areas. He then regresses the unemployment rate of the Standard Metropolitan Area on the labour force participation rates of all males over 14 and finds that for the N tracts and for the poverty tracts taken as a whole the coefficient is significantly negative. However, the coefficient, though negative, is not significant at 5% for either the W or N* tracts.

Results are similar for all females and married women (husband present), except that N* tracts now also have significantly negative coefficients. These results provide clear evidence of a discouraged worker pattern of behaviour.

To further test his results, Mooney runs regressions for all females 14+ (i.e. not just those in poverty areas) and all married women (husband present). He then repeats the process for the two categories, but separates them as to colour. Judging by the size of the coefficients, and in all but one case by the level of statistical significance, the Negroes were more responsive to demand conditions, and displayed a stronger discouraged worker effect. Mooney concludes, "it seems clear that the low income worker is more likely to be a discouraged worker than an additional worker especially if 'she' is a non-white married woman with husband present." Mooney ends by saying that the poor

31 Mooney, op. cit., p. 115.
attempt to lift themselves out of poverty by entering the labour market in greater numbers as economic conditions improve. His solution to poverty problems would then be a long period of 'good times' which would encourage multiple earners in poor families. The multiple earners, in turn, would help the family to rise from poverty.

The final item to be examined here is "Labour Force Participation Within Metropolitan Areas" by John E. Parker and Lois B. Shaw. The authors are concerned with measuring the influence of the additional worker versus the discouraged worker effect. They use census tract data as opposed to aggregate metropolitan data so that they are able to look at many factors in finer detail than would otherwise be possible and so that they can test for differences among low, medium and high income areas.

In their regressions on male participation, Parker and Shaw find a general discouraged worker effect that was very strong in the low income areas, weaker in the middle income group and insignificant in the high income group. Education was positive, but significant (by a 't' value greater than 2) only for the lowest income group. The per

cent of non-whites tended to reduce participation rates at all income levels for men, while the proportion of men in the prime age group was positively correlated with labour market activity.

For women, two regressions were run, one for all females 14+ and one for married women with husband present. We will look at both of these together. A negative coefficient for the female unemployment rate for the metropolitan area indicates a discouraged worker effect, but unlike the case for males, this effect is strongest in the highest income group, and becomes insignificant for the lowest. However, added worker behaviour in response to the male unemployment rate in the tract is present in the high income groups. Education shows inconsistent results since the variable represents average education in the tract not differentiated by sex. Hence, two influences will exist here. Higher education of women will tend to encourage participation since it may indicate a taste for market work and since it is the key to better paying and more pleasant jobs. On the other hand, higher education for males, though it may be indicative of a more favourable attitude to women working, is usually correlated with higher income on their part and thus provides less "need" for a wife to work. Female earnings have a significantly negative coefficient in the low income groups perhaps be-
cause many women workers in this group work on a part-year or sporadic basis and higher earnings would have caused more of them to have temporarily dropped out of the labour force during the census week. This would represent a backward sloping supply curve of labour. However, the coefficient becomes significantly positive for the high income group. Such behaviour would tend to widen the gap between rich and poor. Reactions to male earnings and the presence of children tend to be negative, as do reactions to the supply of female labour. A demand for labour variable does not perform well.

Conclusions from this study are not very optimistic. The strong discouraged worker behaviour exhibited by males in the low income areas indicates that 'boom' conditions are needed to pull them into the labour force. This conclusion is similar to that of Mooney. The lack of additional worker behaviour on the part of low income women tends to re-enforce this conclusion. In fact, we must conclude that, contrary to the opinions of Mincer and Cain, the additional worker is more likely to be a higher income worker than anyone else. If one had to make a policy prescription for the solution of the poverty problem based on the results of Parker, Shaw, one could probably do no better than suggest the Keynesian remedy of a high general level of aggregate demand.
CHAPTER II
A MODEL OF LABOUR FORCE PARTICIPATION

There has been much controversy as to what factors induce people to enter the labour force. As noted in Chapter I, much of the controversy has centered around whether people, especially poor people, work more in response to the negative incentives of need and fear of want or to the positive incentives of the prospect of good working conditions and more generous wage levels.

In dealing with the labour supply we are concerned primarily with changes at the margin, i.e. with the marginal worker. Who is the marginal worker? It is most useful in this context to define a marginal worker in terms of his or her labour force behaviour rather than by age, sex or other socio-demographic characteristics. Consequently, the marginal worker will be defined by the process of elimination. The two groups to be eliminated are:

(1) those who are indisputably in the labour force, i.e. those who are holding down a job at the point of time in question; and

(2) those who are definitely not in the labour force, i.e. those who are incapable of holding down any job by reason of age (either extreme) or other disability.
We are left with a body of marginal workers who are poten­
tially employable, but not at work and who may or may not
be actively searching for work. If they are actively search­
ing for work, they are considered as being in the labour
force, otherwise not.¹

Whether or not a marginal worker will be searching
for work and, therefore, in the labour force at any point
in time depends upon three factors: the utility of a job,
the probability of getting that job, and the costs associa­
ted with getting it. Initially, we will assume that a per­
son looks for work in only one particular job category at a
time and is indifferent between all jobs in that category.
This assumption will be dropped later.

Every job category (e.g. the j-th) has a certain
utility associated with it [u(j)]. This utility will depend
upon income earned on the job, the non-pecuniary advantages
and disadvantages associated with it and the number of hours
it requires. The latter moves in the opposite direction to
utility by reducing the amount of time available for lei­
sure or other activities.

¹For further extension of the concept of a marginal
worker, see "A Theory of Labour Force Participation," by
Russell S. Uhler and Roslyn Kunin, Discussion Paper No. 35,
Department of Economics, University of British Columbia (March,
1970). It is doubtful whether a worker collecting unemployment
insurance can be considered a marginal worker since a condition
of his receiving benefits is that he is looking for work. Hence,
he is, in effect, hired by the Unemployment Insurance Commission
to look for work.
The probability of finding a job in a given category, \( j \), is \( P_j \). Several factors contribute to this probability. One of the most important is the amount of time spent searching for a job, \( t \), in any period of time, \( T \), e.g. 24-hours. We may refer to \( t \) as the intensity of search. The probability of obtaining a job without spending any time looking for it, though usually small, is not necessarily zero. There is always the possibility of receiving a spontaneous offer of employment. However, the probability does increase with the intensity of search.

\[
\frac{\partial P_j}{\partial t} > 0 \tag{1}
\]

but we assume

\[
\frac{\partial^2 P_j}{\partial t^2} < 0 \tag{2}
\]

since diminishing returns will prevail.

Another obvious factor influencing the probability of obtaining a job is the general level of economic activity in the relevant field, or -- more specifically -- the general rate of unemployment, \( N \). A more specific unemployment rate could be used, but it will be necessary to use a general rate later and so for the sake of consistency it will also be used here.
When the unemployment rate is high, the probability of obtaining work is low and *vice versa*.

\[ \frac{\partial P_j}{\partial N} < 0 \]  

The total amount of time a person has been looking for work will also influence the probability of his getting a job. If this factor is called \( A \) for the accumulated total time of job search, we would expect \( P_j \) to fall as \( A \) rises because a rational individual would explore the most promising avenues to employment at the beginning of any period of job hunting and leave the less fruitful prospects for later.

Other influences on the chances of a person getting work are individual factors, such as the age, sex, skill level, education, work history and personality of the person involved. We will refer to these factors collectively as \( I \).

The probability of obtaining a job in the \( j \)-th category \( P_j (t, N, A, I) \) depends upon the intensity of search, the accumulated total time spent looking for work, the unemployment rate and the characteristics of the individual who is seeking employment. The expected utility of a job search is thus:

\[ E [u(j)] = u(j) P_j (t, N, A, I) \]
and we can deduce

\[
\frac{\partial E[u(j)]}{\partial t} = u(j) \frac{\partial P_j(t,N,A,I)}{\partial t} > 0 \tag{5}
\]

\[
\frac{\partial^2 E[u(j)]}{\partial t^2} = u(j) \frac{\partial^2 P_j(t,N,A,I)}{\partial t^2} < 0 \tag{6}
\]

\[
\frac{\partial E[u(j)]}{\partial N} = u(j) \frac{\partial P_j(t,N,A,I)}{\partial N} < 0 \tag{7}
\]

and

\[
\frac{\partial E[u(j)]}{\partial A} = u(j) \frac{\partial P_j(t,N,A,I)}{\partial A} < 0 \tag{8}
\]

The costs associated with getting a job will be expressed in terms of disutility to insure comparability with the benefits which are described in terms of utility. It will be assumed that the costs of search increase with the amount of time spent searching, and that they do so at an increasing rate.

\[
\frac{\partial C(t)}{\partial t} > 0, \quad \frac{\partial^2 C(t)}{\partial t^2} > 0 \tag{9}
\]

The latter inequality can be explained by the rising marginal utility of leisure as the total amount of leisure time available falls. This implies that every extra hour of search sacrifices an increasingly valuable hour of leisure. Reinforcing this tendency is the fact that a
person will first engage in search where the costs other than time (e.g. travel expenses, etc.) are lowest, and only later undertake the more expensive searches.

It is probable that the costs of search vary with factors other than time -- for example, with the unemployment rate or with the accumulated amount of time spent searching for a job. For the sake of simplicity, we shall now ignore these possibilities; although their consequences will be considered later in this chapter.

We are now able to determine whether the marginal worker will be in the labour force. If there is some positive \( t \) such that \( E[u(j)] > C(t) \), he will be in the labour force, otherwise not.\(^2\)

\[\frac{\partial E[u(j)]}{\partial t} - \frac{\partial C(t)}{\partial t} = \lambda \]

\[T - X - t = 0\]

\[-\lambda = 0 \text{ for } X > 0\]  

where \( \lambda \) is a Lagrange multiplier and \( X \) is a slack variable. When the constraint is not binding \( (X > 0) \) the problem is equivalent to the one in which the inequality constraint is ignored. For example, the marginal worker whose benefit-cost situation is illustrated in Figure 3 by \( C(t) \) and \( E[u(j)] \) will be in the labour force spending \( t^* \) out of each basic time period, \( T \) searching.

\(^2\)We note in passing that the optimal time to spend searching for a job is that \( t \) which maximizes \( E[u(j)] - C(t) \) subject to the constraint \( t \leq T \). These conditions are

\[\frac{\partial E[u(j)]}{\partial t} - \frac{\partial C(t)}{\partial t} = \lambda \]

\[T - X - t = 0\]

\[-\lambda = 0 \text{ for } X > 0\]  

(10)
It is now relatively easy to describe discouraged worker behaviour in terms of the model. In this case, a rise in the unemployment rate \( N \) causes a fall in \( E[u(j)] \) to \( E[u(j)]' \) in Figure 3. Since \( E[u(j)]' \) is now everywhere below \( C(t) \), the optimum time of search becomes zero and the marginal worker will drop out of the labour force.

The analysis may easily be extended to cover the situation where a person searches for work in \( m \) job categories rather than just one at a time. In this case

\[
E(u) = \sum_{j=1}^{m} u(j) P_j(t_j, N, A, I) \tag{11}
\]
where the symbols are as defined earlier and the $j$'s refer to the different job categories. The cost function now becomes:

$$C = \sum_{j=1}^{m} C_j(t_j)$$  \hspace{1cm} (12)$$

with the subscripts again referring to the job categories.

The condition for participation in the labour force now becomes $E(u) = \sum [u(j)] P_j(t_j, N, A, I) > C = \sum C_j(t_j)$ for some $t > 0$ where $t$ now becomes $\sum t_j$.\(^3\)

Again the discouraged worker effect results from the upward shift of the unemployment rate in general and all or most of the $N_j$'s in particular. This lowers $E(u)$ to some position below $C$ where the optimum time of search becomes zero and results in a discouraged worker leaving the labour force.

Extending the model to include an explanation of added worker behaviour is somewhat more difficult. We will begin by analyzing the first case where there is only one job category under consideration and then extend the analysis to the multi-job case.

\(^3\) The marginal worker now allocates his time in order to maximize $E(u) - C$ subject to $t \leq T$. These conditions are:

$$\frac{U(j)}{\partial t_j} - \frac{\partial C_j}{\partial t_j} = \lambda$$

$$T = X = t = 0$$

$$-\lambda = 0 \text{ for } X > 0$$

$$\hspace{1cm} (13)$$
Added worker behaviour exists when an increase in unemployment leads to increased labour force participation or – on the less aggregated level – when it causes a person to enter the labour force. Such behaviour could obviously only apply to a marginal worker who was not in the labour force before the rise in the unemployment rate.

As we have just seen, a rise in \( N \) \( \text{set. par.} \) lowers \( E[u(j)] \) relative to \( C(t) \) and thus reduces the likelihood of a person entering the labour force. However, a rise in \( N \) may also have the effect of reducing income in a family through workers being laid off or through the number of hours of work being reduced. If we assume that each family has a level of income which it confidently expects to be able to maintain – i.e. permanent income – current income may actually fall below this level as economic conditions worsen and as \( N \) increases. This results in negative transitory income, the latter being defined as the difference between actual current and permanent income. Making the usual assumption of falling marginal utility of income, a reduction in family income will make the utility of an extra dollar of income rise. Since, as was shown above, the utility of a job \( u(j) \) consists to a considerable extent of the utility of the income derived from it, \( u(j) \) would rise as family income \( (Y_F) \) fell. Thus

\[
u(j) = f(Y_F), \quad \frac{\partial u(j)}{\partial Y_F} < 0, \quad \frac{\partial Y_F}{\partial N} < 0 \quad (14)
\]
where \( f \) denotes a functional relationship and therefore

\[
\frac{\partial u(j)}{\partial N} = \frac{\partial u(j)}{\partial Y_f} \cdot \frac{\partial Y_f}{\partial N} > 0
\]  

(15)

Thus the total change in \( E[u(j)] \) as a result of a change in \( N \) becomes

\[
\frac{\partial E[u(j)]}{\partial N} = u(j) \frac{\partial P_j(t_j,N,A,I)}{\partial N} + \frac{\partial u(j)}{\partial N} P_j
\]  

(16)

the first term on the right hand side being the negative, discouragement effect and the second term being the positive added worker effect. In order for the added worker effect to be observed, equation (16) must be positive by an amount sufficient to raise \( E[u(j)] \) to a position \( E[u(j)]' \), where \( t^* > 0 \). Such a situation is depicted in Figure 4.

**Figure 4**

*Added Worker Behaviour*
Again, it is not too difficult to describe added worker behaviour in terms of a job search in many job categories. Figure 4 would be represented in terms of \( E(u) \) and \( C \) rather than \( E[u(j)] \) and \( C(t) \) as in (10) and (11). Condition (16) would become

\[
\sum_{j=1}^{N} \frac{\partial E(u)}{\partial N} = \sum_{j=1}^{m} \frac{\partial P_j}{\partial N} \sum_{j=1}^{m} \frac{\partial u(j)}{\partial N} P_j \tag{17}
\]

In order to get added worker behaviour, equation (17) must be positive and the change must be large enough so that for some \( t > 0 \), \( E(u) > C \).

In summary, if we designate the first term on the right hand side of equation (16) or (17) as \( d \) for the discouragement effect; and the second term as \( a \) for the added worker effect, we can reach the following conclusions. Given a rise in \( N \) and a marginal worker in the labour force, \(|d| \) must exceed \(|a| \) by an amount sufficient to reduce \( t \) to zero if discouraged worker behaviour is to be observed. For added worker behaviour to be observed, \(|a| \) must exceed \(|d| \) by an amount sufficient so that a worker who was not previously in the labour force would now find it worthwhile to begin to look for work. The implications of a fall in \( N \) can be deduced in a similar manner.

The above conditions imply that added worker behaviour would not be very widespread. However, the likelihood of finding evidence of added worker behaviour is de-
creased still further by the costs of job search, which may increase as economic conditions worsen and unemployment rises. During times of boom and labour shortages, employers will bear much of the costs of search (apart, of course, from the potential employees' time). "Help wanted" advertising will be considerable, travel costs will often be paid by those hoping to hire workers, and so on. When unemployment increases and the supply of potential employees begins to exceed the openings available for them, conditions will change. "Work wanted" advertisements will increase relative to the "help wanted" columns. Travel and other incidental costs of job hunting will also be passed on increasingly to the job seeker.

The accumulated time of job search $A_j$ over all periods will also tend to increase the costs of search as $A_j$ rises.\(^4\)

In summary,

$$\frac{\partial C_j(t_j)}{\partial N} > 0, \quad \frac{\partial C_j(t_j)}{\partial A_j} > 0, \quad j = 1, 2, \ldots, m \quad (18)$$

Further, as $N$ increases, and/or as the length of time a person has been out of work increases, it is likely that the utility of leisure will decrease. Since leisure

\(^4\)Uhler and Kunin, op. cit.
foregone is a major component of $C$, this may cause a fall in $C$. This would result in a decrease of the discouragement effect and an increase in the likelihood of added worker behaviour. As a result, the changes described in (18) should be taken as net of these effects.

It is possible that those individual factors which we have lumped together and labelled $I$ may influence not only the probability of obtaining a job, but also the utility derived from the job. For example, the utility of a job (both pecuniary and non-pecuniary returns), will probably be greater for a person with higher education than for a person with lower skills. It is hoped to take as many of these $I$ factors as possible into account when we build the empirical model.

Although the model was developed throughout to apply to the marginal worker, it can easily be extended to non-marginal workers, i.e. to those who are holding down a job at the relevant point in time and to those incapable of holding down a job. For the former, we simply make the probability of getting his present job equal to unity at a point in time and the costs of obtaining it zero. If he is not considering alternate jobs (analogous to the one-job case described above), this means that he will stay at his present job as long as $u(j) > 0$. The variable, $u(j)$ is measured net of any disutilities of labour, etc., which
may be associated with $j$. If the worker is considering changing jobs, the full model applies, but with the special conditions of $C_j = 0$ and $P_j = 1$ still relevant for the job he is holding.

The rational worker will consider changing jobs when job categories outside his present job exist where the expected utilities in these categories exceed the costs of search by an amount greater than the utility of his present job, since if $j$ refers to the job he holds, $E[u(j)] - C_j = u(j)$ given that $P_j = 1$ and $C_j = 0$. (See footnote 3, this chapter).

For the person who is incapable of holding a job, we may say that $P_j = 0$ by definition for all $j$; hence, $C > E(u)$ everywhere and the person will never enter the labour force.

One obvious advantage of the theoretical model just described is that unlike the more usual income-leisure model, it does not rely on the empirically weak link between wage levels and unemployment rates in order to explain the supply of labour in terms of discouraged and added worker effects. (See Chapter I).

We now convert the theoretical model into a statistical model which is capable of being empirically tested. The theoretical model was developed in terms of an individual worker. Since disaggregated data were not readily
available, we must first express the relationships on a more aggregated level, measuring labor supply in terms of labor force participation rates. The influence of sex, one of the I factors, will be taken into account by estimating separate relationships for men and women. As mentioned at the beginning of this thesis, the influence of income levels will be considered by estimating separate relationships for the different income groups. These relationships can then be compared.

The theoretical model tells us that participation rates will depend on N, \( u(j) \), t, A, and I. A statistical measure of N is easily found: the general unemployment rate prevailing in the relevant labour market. If the discouraged worker effect predominates (and it is suggested above that it will), we would expect N to have a negative influence on participation rates. If added worker effect predominates, there would be a positive influence.\(^5\) In equations on female participation rates, the male unemployment rate in the tract will also be included in an attempt to discover if added worker behaviour exists.

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\(^5\) It has been suggested (see J. T. Montague and John Vanderkamp, *British Columbia Labour Force: A Study in Labour Market Adjustment*, Institute of Industrial Relations, University of British Columbia, 1966, Chapter 3) that using an employment variable as independent variable where participation rates are the dependent variable, leads to difficulties since, if the unemployment rate is defined as \( U/L \) where U is the number of unemployed and L is the labour force, there will arise a spurious of negative correlation.
The variable \( u(j) \) is very difficult to measure. The closest we can come is to substitute an earnings variable since earnings are expected to be a major component of the utility of a job. Since the utility of a job, especially for secondary workers, often depends upon the expected income of other family members, male earnings were included in the equations for females. They would be expected, from the model, to have a negative influence on female participation rates. It is one of the weaknesses of this study that there is no measure available for the non-pecuniary benefits of a job. However, at least some of the influence of these non-pecuniary factors will be captured in the variables subsumed under \( I \).

At the census tract level (at which the data were collected), there is no measure available for either \( t \) or \( A \), the intensity or accumulated time of search. Therefore, they are not included in the empirical work, although other

with participation rates which are defined as \( L/P \) where \( P \) is the population. A problem still exists if we redefine unemployment rates as \( U/P \) since, by definition, \( L/P = U/P + E/P \), where \( E \) are the employed. However, we will avoid these problems in this thesis since the unemployment rate will be the general unemployment rate in an urban area and the participation rates will be sex-specific and for a given census tract. Where unemployment rates for the tracts are used, these will be the male unemployment rates regressed on female participation rates.
studies indicate that it especially does add considerably to the discouraged worker effect, as the model would predict.

We are now left with only the \( I \) factors to consider. Age will influence the participation rates by increasing the probability of getting a job for those in the prime working years -- usually defined as 25 to 54. National origin may play a part by influencing either \( P_j \) or \( u(j) \). Therefore we will include variables representing those who are French and those who are neither British nor French. Education is expected to have a positive influence on labour supply by influencing \( P_j \) and possibly \( u(j) \). A measure of skill might also have been included here, but none was available. Marriage is expected to increase male participation rates by increasing \( P_j \) and possibly \( u(j) \) and to decrease female participation rates by lowering \( u(j) \) and possibly \( P_j \). Similarly, children will deter female labour force participation, while the presence of other adults in the home will tend to encourage it.

By rendering the variables in the theoretical model statistically testable as just described, we can specify relationships of the form

\[ MPT = a + b_1 TUU + b_2 AMY + b_3 FT + b_4 OT + b_5 EDT \]
\[ + b_6 AMT + b_7 MRD + e_m \]  \hspace{1cm} (19)

and

\[ FPT = c + d_1 TUU + d_2 MUT + d_3 AMY + d_4 AFY + d_5 FT \]
\[ + d_6 OT + d_7 EDT + d_8 AFT + d_9 CF + d_{10} CFT + d_{11} MRD \]
\[ + e_f \]  \hspace{1cm} (20)

where \( a \) and \( c \) are constants, the \( e \)'s are random error terms and the \( b \)'s and \( d \)'s are the coefficients of the variables. The variables themselves are as defined in the appendix.

Equations (19) and (20) will be estimated by means of multiple regression; the linear form being adopted since there appears to be no justification for using a more complex form. The results of the regression analysis are given in the following chapters.
We now turn to the empirical work of the thesis. The main hypothesis concerns the influence of labour market conditions, especially the unemployment rate, on the labour supply. We will test the discouraged versus added worker hypothesis presented in the preceding model and will test the influence of the variables which our model has led us to believe will affect participation rates.

The hypothesis that significant differences in labour force behaviour patterns exist among different income groups will also be tested. The tests will compare the regression relationships for the different income groups as well as individual coefficients in the regression.

The regression results for males in 1961 are given in Table I with the variables as defined in the appendix and the standard errors of the coefficients given in parentheses. The observations originally were census tracts in the eight metropolitan areas of Canada having populations over 250,000 in 1961: Montreal, Toronto, Vancouver, Hamilton, Winnipeg, Ottawa, Edmonton, and Calgary. Calgary, however, was replaced by Halifax to obtain more geographic diversity even though the latter is under 250,000 population.
Table I
Regression Results for 1961
Dependent Variable = MPT

<table>
<thead>
<tr>
<th>Variable</th>
<th>P</th>
<th>M</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>41.3245***</td>
<td>55.9986***</td>
<td>47.2617***</td>
</tr>
<tr>
<td></td>
<td>(1.2086)</td>
<td>(3.7387)</td>
<td>(3.9486)</td>
</tr>
<tr>
<td>TUU</td>
<td>-11.3117***</td>
<td>-6.5917***</td>
<td>-4.7367***</td>
</tr>
<tr>
<td></td>
<td>(1.2086)</td>
<td>(0.7603)</td>
<td>(1.0728)</td>
</tr>
<tr>
<td>AMY</td>
<td>0.0063***</td>
<td>0.0007</td>
<td>-0.0007*</td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td>(0.0009)</td>
<td>(0.0004)</td>
</tr>
<tr>
<td>FT</td>
<td>-0.0428***</td>
<td>-0.0147</td>
<td>0.0096</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.0124)</td>
<td>(0.0213)</td>
</tr>
<tr>
<td>OT</td>
<td>-0.0333</td>
<td>0.0146</td>
<td>0.0088</td>
</tr>
<tr>
<td></td>
<td>(0.0215)</td>
<td>(0.0217)</td>
<td>(0.0271)</td>
</tr>
<tr>
<td>EDT</td>
<td>0.0864</td>
<td>-0.0168</td>
<td>0.2431***</td>
</tr>
<tr>
<td></td>
<td>(0.1113)</td>
<td>(0.0862)</td>
<td>(0.0739)</td>
</tr>
<tr>
<td>AMT</td>
<td>0.5475***</td>
<td>0.373</td>
<td>0.1685***</td>
</tr>
<tr>
<td></td>
<td>(0.0591)</td>
<td>(0.0467)</td>
<td>(0.0520)</td>
</tr>
<tr>
<td>MRD</td>
<td>0.1256***</td>
<td>0.1708***</td>
<td>0.4844***</td>
</tr>
<tr>
<td></td>
<td>(0.0475)</td>
<td>(0.0375)</td>
<td>(0.0620)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.6437</td>
<td>0.3930</td>
<td>0.5454</td>
</tr>
<tr>
<td>S.E.E</td>
<td>4.3856</td>
<td>5.8468</td>
<td>5.6808</td>
</tr>
</tbody>
</table>

*** = significant at 1%
** = significant at 5%
* = significant at 10%

Numbers in parentheses are standard errors of coefficients.
Attention was confined to the largest centres since census tracts in smaller communities were not felt to be sufficiently homogeneous to provide meaningful observations.

The average incomes of family heads in each tract were adjusted by a price index for the city. Then, all tracts were divided into quartiles on the basis of this adjusted income figure. The lowest income quartile was labelled P; the middle two M; and the highest R. In order to maintain consistency between periods, the tracts were divided on the basis of income of the family head YHT instead of family income YFT because only YHT was available for 1951.

In examining the results, we look first at the 'economic' variables, TUU and AMY. The coefficient on the unemployment variable is negative and significant at the 1% level for all income groups indicating a general predominance of discouraged worker behaviour. This is in agreement with our model, with earlier studies made in the U.S., and with those Canadian studies based on cross-section data. In Table I, the R group exhibits the least discouraged worker effect and the poor, the most. That a significant difference in the magnitude of the discouraged worker effect exists can be seen in the F values in Table II.

The earnings variable AMY behaves as expected in the P tracts. Here it is positive and significant at the
Table II
Chow¹ Test Results On Regression Coefficients
1961 Data
Dependent Variable = MPT

<table>
<thead>
<tr>
<th>Income Groups</th>
<th>P &amp; M</th>
<th>M &amp; R</th>
<th>P &amp; R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>(1 &amp; 790)</td>
<td>(1 &amp; 790)</td>
<td>(1 &amp; 522)</td>
</tr>
<tr>
<td>TUU</td>
<td>8.20***</td>
<td>1.95</td>
<td>15.04***</td>
</tr>
<tr>
<td>AMY</td>
<td>14.44***</td>
<td>2.79*</td>
<td>37.57***</td>
</tr>
<tr>
<td>FT</td>
<td>1.81</td>
<td>0.95</td>
<td>4.36**</td>
</tr>
<tr>
<td>OT</td>
<td>2.07</td>
<td>0.02</td>
<td>1.47</td>
</tr>
<tr>
<td>EDT</td>
<td>0.42</td>
<td>5.21**</td>
<td>1.17</td>
</tr>
<tr>
<td>AMT</td>
<td>4.22**</td>
<td>8.52***</td>
<td>21.00***</td>
</tr>
<tr>
<td>MRD</td>
<td>0.44</td>
<td>18.29***</td>
<td>21.15***</td>
</tr>
<tr>
<td>(Degrees of Freedom)</td>
<td>(7 &amp; 790)</td>
<td>(7 &amp; 790)</td>
<td>(7 &amp; 522)</td>
</tr>
<tr>
<td>Total Regression</td>
<td>7.04***</td>
<td>3.54***</td>
<td>13.07***</td>
</tr>
</tbody>
</table>

*** = regression coefficients significantly different at 1%
** = regression coefficients significantly different at 5%
* = regression coefficients significantly different at 10%

1% level. The small magnitude of the coefficient can be explained by recalling that the earnings variable is measured in dollars. Hence, for low income men, higher earnings do induce greater rates of labour force participation.

When we turn to the R tracts, the coefficient on AMY has a negative sign. Before we announce that statistical evidence has been found for the existence of a backward sloping supply curve of labour, some qualifications are in order. First, it will be noted that the coefficient is not significant at even the 10% level. This might imply that the correlation between AMY and some other independent variable in the regression has pushed the former into insignificance. This indeed appears to be the case. AMT is fairly highly correlated with the education variable EDT (for example, in the R tracts $R^2$ between AMY and EDT = 0.7). Re-running the regressions for the M and R groups as in Table I, but with the EDT variable omitted does produce positive coefficients on AMY, but these coefficients are still not statistically significant. This leads to the conclusion that an extra dollar of earned income is not very important in influencing the labour force behaviour of males in the upper income groups. Similar conclusions can be reached concerning the middle income group.

The above can be explained by placing the emphasis on the word 'earned' in the previous paragraph. As one moves up the income scale, progressive income tax rates
and other factors may work to make extra wages and salary income less attractive and unearned income more attractive. Thus, a salesman might be more responsive to the offer of a company car which provides him with the equivalent of several thousand dollars of tax free income per year than to the offer of even a sizeable wage increase. Similar considerations would not apply in low income tracts.

We look now at the socio-demographic or \( I \) variables, first examining \( FT \) and \( OT \) which represent the per cent of the population of French national origin and those of neither French nor British origins respectively in each tract. \( FT \) was only significant for the \( P \) group. Elsewhere even the signs were not consistent. It seemed unavoidable to conclude that national origin had little influence on labour force behaviour patterns of males. Such a conclusion will not be justified for females, as will be shown later. The nature of the census tract data precluded breaking down the ethnic variables into any finer categories, although it would have been interesting to see if any significant differences existed between sub-groups.

Since it was felt that the national origin factor may have had diminishing influence as people became "Canadianized," it was decided to try variables representing New Canadians to replace \( FT \) and \( OT \). However, these variables were not significant and if anything, they 'explain' even less of the variation in \( MPT \) than \( FT \) and \( OT \).
With respect to the education variable EDT we notice considerable differences between income groups. For the P and M tracts, education had no significant influence on participation rates. This is not surprising since EDT, it will be recalled, is the proportion of the population not in school who had at least started university. It may be asked why such a high level of education was chosen. Again, an appeal must be made to the way in which census tract data were broken down. In the category below those with at least some university, those individuals who had finished high school and those who had only partly completed high school, were lumped together. It was felt that in Canada, even in 1961, being a high school drop-out did not confer much advantage in the labour market.

When we move from the P and M to the R tracts we find that EDT is positive and significant at 1%. This confirms the general observation that more educated people within this category are more likely to be in the labour force.

The variable AMT or the proportion of males over 15 in the prime working years of 25 to 54, has a positive influence and is significant at the 1% level. However, it should be noted that the magnitude of the coefficient is relatively high for the P group, low for the M group, and lower still for the R group. Age seems to be of
lesser importance in the decision to participate in the labour force for the higher income than the lower income men. One would expect that the influence of this variable would be exhibited by a tendency for richer people to remain in the labour force after age 54 rather than to enter it much before 25. This can be explained by the education factor which, as we have seen, was more important for the upper income groups and had the effect of increasing labour force participation. Increased education would tend to reduce participation rates among those younger than 25.

The greater influence of age on the labour force behaviour of P groups may be explained partially by demand-for-labour factors. (Though we are primarily concerned with supply factors in this thesis, the fact that the data are ex post implies that all demand influences cannot be eliminated). Employers filling low-paying jobs appear to be more reluctant to hire and less reluctant to fire those of advancing years than employers filling white collar, professional and executive positions which are usually better paid. This may encourage more workers in P areas to retire earlier than those in M and R areas. Age specific data would be necessary to test these speculations, but such data are not available at the tract level. Chow tests confirm that significant differences exist between groups.
The final independent variable to be dealt with here is MRD or the proportion of the population over 15 in the tract which is married. It would be expected that marriage would have a positive effect on the labour force participation rates of males, and this indeed appears to be the case. However, we note that as one moves from the lower to the higher income groups the positive influence of marriage becomes significantly stronger. (See Table II). Whether this is because married men in higher income groups feel more obligated to work (or at least look for work) than those in lower income groups, or whether the former are more likely to postpone marriage until a firm attachment to the labour market has been made, we cannot say.

Finally, Chow tests were run on the total regressions given in Table I to test if noteworthy differences could be found among the income groups in their overall labour force behaviour. As can be seen in Table II, differences significant at the 1% level were found for all possible pairs of groups. Thus, we conclude that men at different income levels do differ in labour force participation.

We now turn from regressions on MPT for the various income groups to the regressions on the female participation rate, FPT, which are given in Table III. Sources, etc., are the same for this table as for Table I. The coefficients of TUU are once more negative throughout and
Table III

Regression Results for 1961

Dependent Variable = FPT

<table>
<thead>
<tr>
<th>Variable</th>
<th>P</th>
<th>M</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>84.6877***</td>
<td>96.7589***</td>
<td>127.0914***</td>
</tr>
<tr>
<td></td>
<td>(6.0417)</td>
<td>(4.8995)</td>
<td>(9.4423)</td>
</tr>
<tr>
<td>TUU</td>
<td>-7.3103***</td>
<td>-7.7492***</td>
<td>-4.5857***</td>
</tr>
<tr>
<td></td>
<td>(1.4837)</td>
<td>(0.8205)</td>
<td>(1.1700)</td>
</tr>
<tr>
<td>MUT</td>
<td>0.1632</td>
<td>1.1582***</td>
<td>2.1766***</td>
</tr>
<tr>
<td></td>
<td>(0.1563)</td>
<td>(0.2516)</td>
<td>(0.5595)</td>
</tr>
<tr>
<td>AMY</td>
<td>0.0019</td>
<td>-0.0041***</td>
<td>-0.0025***</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td>(0.0008)</td>
<td>(0.0004)</td>
</tr>
<tr>
<td>AFY</td>
<td>0.0083***</td>
<td>0.0052***</td>
<td>0.0017</td>
</tr>
<tr>
<td></td>
<td>(0.0016)</td>
<td>(0.0011)</td>
<td>(0.0015)</td>
</tr>
<tr>
<td>FT</td>
<td>-0.0958***</td>
<td>-0.1357***</td>
<td>-0.0962***</td>
</tr>
<tr>
<td></td>
<td>(0.0163)</td>
<td>(0.0113)</td>
<td>(0.0231)</td>
</tr>
<tr>
<td>OT</td>
<td>0.0265</td>
<td>-0.0629***</td>
<td>-0.0630***</td>
</tr>
<tr>
<td></td>
<td>(0.0243)</td>
<td>(0.0183)</td>
<td>(0.0296)</td>
</tr>
<tr>
<td>EDT</td>
<td>0.3635**</td>
<td>0.4040***</td>
<td>0.1654**</td>
</tr>
<tr>
<td></td>
<td>(0.1353)</td>
<td>(0.0762)</td>
<td>(0.0769)</td>
</tr>
<tr>
<td>AFT</td>
<td>-0.4078***</td>
<td>-0.3834***</td>
<td>-0.6994***</td>
</tr>
<tr>
<td></td>
<td>(0.0619)</td>
<td>(0.0402)</td>
<td>(0.0782)</td>
</tr>
<tr>
<td>CF</td>
<td>0.1928***</td>
<td>0.1765***</td>
<td>0.5930***</td>
</tr>
<tr>
<td></td>
<td>(0.0454)</td>
<td>(0.0672)</td>
<td>(0.1955)</td>
</tr>
<tr>
<td>CFT</td>
<td>-6.6832***</td>
<td>-10.6173***</td>
<td>-14.0012***</td>
</tr>
<tr>
<td></td>
<td>(1.1919)</td>
<td>(0.9150)</td>
<td>(1.6192)</td>
</tr>
<tr>
<td>MRD</td>
<td>-0.5887***</td>
<td>-0.2760***</td>
<td>-0.6275***</td>
</tr>
<tr>
<td></td>
<td>(0.0509)</td>
<td>(0.0315)</td>
<td>(0.0723)</td>
</tr>
<tr>
<td>R²</td>
<td>0.7566</td>
<td>0.7452</td>
<td>0.5840</td>
</tr>
<tr>
<td>S.E.E.</td>
<td>4.7119</td>
<td>4.7428</td>
<td>5.7712</td>
</tr>
</tbody>
</table>

*** = significant at 1%
**  = significant at 5%
*   = significant at 10%

Numbers in parentheses are standard errors of coefficients.
statistically significant again, indicating a general discouraged worker effect. ¹

When we examine the coefficients on MUT, we come across the first piece of evidence of the existence of any added worker behaviour. Since MUT represents the male unemployment rate within the tract, a positive coefficient indicates that increasing unemployment among men in a given neighbourhood encourages increasing labour force participation among the women in that neighbourhood. (Ideally, this information would be at the household or family level). In other words, we find added worker behaviour. Such behaviour exists at a high level of statistical significance for women in the M and R groups, but for P tracts, the coefficient on MUT was not significant.

We turn now to the relationship between male earnings and female participation rates. Theory would lead us to anticipate a negative relationship between these variables and this is borne out. However, for the P tracts, the coefficient is not statistically significant. This would imply that the range over which male incomes in the P tracts.

¹Sex-specific urban unemployment rates were tried in the regressions on both MPT and FPT replacing TUU, but did not perform differently and were too closely correlated with TUU to be used along with it. Hence, TUU was retained as indicative of general economic conditions.
vary is not sufficient to induce changes in female participation rates. However, we may conclude that as male earnings in P tracts approach those of M or R tracts, female participation rates would be reduced.

Theory would lead us to believe that males or females would respond positively to a change in their own earnings; a conclusion which was not completely borne out in Table I for reasons mentioned above. Nevertheless, it does appear to be valid for Table III. The response is strongest for middle income groups and less strong in the R groups where more women would be able to obtain jobs offering 'fulfillment' or other non-pecuniary satisfactions and in P tracts where necessity would encourage women to work at whatever wage level was prevailing.

Next, we examine the I variables beginning with nationality. Although nationality factors did not appear to have much influence on the working plans of men, their effect is quite different for women. The FT and OT variables represent the proportion of the tract population which is French and neither British nor French respectively. Both FT and OT significantly deter female labour force participation. The effect is least for the P group. It can also be seen that being of French origin is more likely to deter participation of women than being a member of other non-British nationalities. We may tentatively conclude that
the more traditional attitude to women's roles prevalent in these groups provided the deterrent. It will be interesting to see whether the influence of these variables has diminished since 1961.

As was the case in the regression on MPT, it is possible that FT and especially OT may be merely proxies for another variable such as immigration. Consequently, variables representing immigration were tried in the regressions replacing FT and OT. The coefficients were negative and significant, but again, the immigration variable did not appear to 'explain' as much as FT and OT.²

A possibility exists concerning ambiguity of the education variable EDT since the measure of education has not been broken down by sex. Education of women, cet. par. tends to encourage their participation in the labour force, but education of their husbands and the higher income which

²The negative influence of the immigration variables came as somewhat of a surprise since earlier studies such as N. H. W. Davis and M. L. Gupta's Labour Force Characteristics of Post-War Immigrants and Native-Born Canadians, 1956-67 (Special Labour Force Studies No. 6, DBS, September 1968), indicate higher female participation rates for immigrants than for native-born Canadians. This result may have been obtained because Davis and Gupta, op. cit., p. 16, standardized only for age, but not for income, education, children, etc. Had they taken these factors into account it is possible that their results would have conformed more closely with those of this thesis.
results tend to discourage female participation. This is especially true when the education is of the post-secondary variety. Furthermore, education of men and women -- whether by household or tract -- is often correlated. Hence, any coefficient on our EDT variable could be explained by the predominance of one or the other of the influences just mentioned.

The positive influence appears to be clearly dominant. Whether this is because the positive incentives provided by women's education (better jobs and salaries, more 'taste' for market work, etc.) outweigh the negative influence of more educated husbands, or whether it is because more educated husbands are more likely to tolerate or even encourage working wives (though later results do not uphold the latter conclusion), we cannot say. Nevertheless, we can say quite unequivocally that the higher the educational attainment in an area, the more likely it is that the women in that area are in the labour force. This conclusion holds for all income groups.

The age variable for females AFT was set up in a different manner than AMT. The latter was the proportion of men in the age group most likely to be in the labour force in a society such as ours. A positive correlation with MPT

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was expected and obtained. For women, a similar age variable might have been used indicating the proportion of women who were in the age brackets beyond which they would likely be attending school and before which they would consider retirement. Cet par., a positive coefficient would be expected. However, other things are not equal. For women, the prime working years are the ones where child bearing and child raising duties are likely to be particularly onerous. And the presence of children, as we shall see below, has a very strong negative influence on female participation rates. Consequently, AFT refers to the proportion of the female population over 15 who are 55 years or older, an age group for which the probability of getting, keeping or even desiring a job is likely to diminish.

AFT bears a negative coefficient for all groups. The influence of age is significantly stronger in the R group as is shown by the F values in Table IV. This is in contrast to what was found for AMT where the influence of age was least important for the R group. In spite of the fact that men in high income areas tend to remain in the labour force more than those of other income groups as age advances -- or perhaps even because of this fact -- women in high income areas tend to participate less in market work as they grow older. The effects of age for the M and P groups follow the same pattern for both sexes.
Table IV

Chow\textsuperscript{1} Test Results On Regression Coefficients
1961 Data

Dependent Variable = FPT

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>F Values</td>
<td>F Values</td>
<td>F Values</td>
</tr>
<tr>
<td>(Degrees of Freedom)</td>
<td></td>
<td>(1 &amp; 782)</td>
<td>(1 &amp; 782)</td>
</tr>
<tr>
<td>TUU</td>
<td></td>
<td>0.06</td>
<td>5.40**</td>
</tr>
<tr>
<td>MUT</td>
<td></td>
<td>11.31***</td>
<td>3.26*</td>
</tr>
<tr>
<td>AMY</td>
<td></td>
<td>14.05***</td>
<td>2.33</td>
</tr>
<tr>
<td>AFY</td>
<td></td>
<td>2.32</td>
<td>3.60*</td>
</tr>
<tr>
<td>FT</td>
<td></td>
<td>4.00**</td>
<td>2.74*</td>
</tr>
<tr>
<td>OT</td>
<td></td>
<td>8.62***</td>
<td>0.00</td>
</tr>
<tr>
<td>EDT</td>
<td></td>
<td>0.06</td>
<td>5.01**</td>
</tr>
<tr>
<td>AFT</td>
<td></td>
<td>0.10</td>
<td>15.00***</td>
</tr>
<tr>
<td>CF</td>
<td></td>
<td>0.04</td>
<td>4.93**</td>
</tr>
<tr>
<td>CFT</td>
<td></td>
<td>6.82***</td>
<td>3.79**</td>
</tr>
<tr>
<td>MRD</td>
<td></td>
<td>27.12***</td>
<td>23.61***</td>
</tr>
<tr>
<td>(Degrees of Freedom)</td>
<td></td>
<td>(11 &amp; 782)</td>
<td>(11 &amp; 782)</td>
</tr>
<tr>
<td>Total Regression</td>
<td></td>
<td>7.11***</td>
<td>5.22***</td>
</tr>
</tbody>
</table>

\* = regression coefficients significantly different at 10%
\*\* = regression coefficients significantly different at 5%
\*\*\* = regression coefficients significantly different at 1%

\textsuperscript{1}See Gregory C. Chow, "Tests of Equality Between Sets of Coefficients in Two Linear Regression," \textit{op. cit.}
We have already begun to analyze the influence of family responsibilities on the working patterns of females in setting up the age variable. Family responsibilities also lie behind the importance of the three variables that remain: CF, CFT, and MRD. CF stands for crowded families and represents the proportion of dwellings in each tract inhabited by two or more families. This variable was suggested by Cain⁴ who used it to explain a higher participation rate for married Negro women than for married white women. In our study, as in Cain's, the influence of CF is positive and significant. The presence of more than one family per household means that there is likely to be more than one woman to share the housekeeping and child care duties, making it easier for at least one of them to remain in the labour force. It should be noted that this variable is not merely a proxy for crowded conditions and low income. First, its influence is even stronger in the R tracts than in the M and P areas. That this difference is significant can be seen in Table IV. Second, CF was not highly correlated with CDT, a variable representing crowded conditions as measured by the number of persons per room. CDT had a negative influence on participation.

rates, probably because crowded conditions most often exist when there are many children present. It was not included in the final regression since the effect of children is taken into account by the CFT variable, to which we now turn.

One of the most important factors in determining whether or not a woman will be in the labour force is whether or not she has children at home. It is usually felt that the younger and more numerous the children, the less likely the woman is to be in the labour force. Also, earlier studies have usually found that the higher the level of family (or husband's) income, the less likely a woman is to leave her children and enter the labour market. Census tract data were not broken down sufficiently to allow us to test for the influence of children's age, but our results confirm that the number of children do have a strong negative influence on participation rates.

The marriage variable MRD is significant in the regressions for women, as it was in the regressions for men, but its influence tends to go in the opposite direction. Marriage in our culture has generally provided an incentive for men to enter and remain in the labour force. Marriage for women, on the other hand, has traditionally provided a

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5 See, for example, Sylvia Ostry, The Female Worker in Canada, 1961 Census Monograph, DBS, Ottawa, 1968.
means of support alternative to earnings in the labour market and an occupation in the form of household and childcare work alternative to a career outside the home. Also a significant, if diminishing, amount of disapproval is aroused by married women working, especially if they are also the mothers of young children. Hence, our very significant and negative coefficients on MRD for all income groups. We should note that marriage tends to be less of a deterrent to labour market activity in the M income group than in either the P or R groups. No difference in the influence of marriage was found between those in the two extreme income groups. (See Table IV).

One more variable was tried in the regression on FPT. It represents the excess demand for female labour in the metropolitan area. However, this variable did not add anything meaningful to the results and was dropped.

As was the case in the equations on MPT, Chow tests were run to determine whether the equations for the different income groups were significantly different from each other. All groups were found to be significantly different by this test at a level of significance of 1%, as shown in Table IV.
CHAPTER IV

EMPIRICAL RESULTS FOR 1951

In order to provide a temporal perspective, regressions analogous to those in Tables I and III were run on 1951 data. Data were available for a smaller number of census tracts in 1951 than 1961 making some changes necessary. Only the three largest metropolitan areas (Vancouver, Toronto, and Montreal) were used. To obtain P & R tracts, the lowest and highest quartiles of tracts by income of family head in each city were chosen. The remaining tracts were called M. This change was possible because the cities were more homogeneous than was the case in the larger sample used for 1961. Since the cities were divided into income categories separately, no adjustment for price differences was needed.

One important change in the data available was that the 'adult' population used in determining participation rates, etc., was defined as those 14 years old and over, rather than those 15 years and over as was the case for 1961. However, since those 14 years old in 1951 (born in 1937) represented a fairly small proportion of the population, this change should not bias our results. Further, age data for 1951 were not broken down by sex. The effects of these changes will be noted when examining the results obtained for AFT and AMT.
The 1951 regressions on MPT are presented in Table V. Looking first at TUU, we find that the coefficients on this variable again have negative signs indicating discouraged worker behaviour. However, for the R tracts, the coefficient, though negative, is not significantly different from zero indicating that in 1951 the unemployment rate had little, if any, influence on the working habits of wealthy men. By 1961, as we have seen, this group did exhibit more discouraged worker behaviour.

The influence of earned income was positive for the P group and negative for the M group, while for R tracts it was zero. The last can be explained in a manner similar to that used to explain the insignificant coefficients on ANY in Table I. It is a little more difficult to explain the significantly negative coefficient in the M group since it is usually postulated that the middle class is least likely to have a backward sloping supply curve of labour.

When we turn to the variables on nationality we again find a situation different from that prevailing in 1961. In the later year, neither FT nor OT exerted any appreciable influence on male participation rates. In 1951, however, males in predominantly French areas in low and middle income tracts showed a greater tendency to be
Table V
Regression Results for 1951
Dependent Variable = MPT

<table>
<thead>
<tr>
<th>Variable</th>
<th>P</th>
<th>M</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>45.7323*** (7.8892)</td>
<td>78.2331*** (5.3283)</td>
<td>49.4208*** (5.5257)</td>
</tr>
<tr>
<td>TUU</td>
<td>-10.3247*** (2.0560)</td>
<td>-9.8351*** (1.1652)</td>
<td>-0.5611 (2.1157)</td>
</tr>
<tr>
<td>AMY</td>
<td>0.0118*** (0.0030)</td>
<td>-0.0057*** (0.0022)</td>
<td>0.0000 (0.0009)</td>
</tr>
<tr>
<td>FT</td>
<td>0.1251*** (0.0237)</td>
<td>0.0726*** (0.0149)</td>
<td>0.0369 (0.0314)</td>
</tr>
<tr>
<td>OT</td>
<td>0.0240 (0.0313)</td>
<td>0.0099 (0.0259)</td>
<td>0.0283 (0.0410)</td>
</tr>
<tr>
<td>EDT</td>
<td>0.0555 (0.0785)</td>
<td>0.1451** (0.0650)</td>
<td>-0.0407 (0.0818)</td>
</tr>
<tr>
<td>AMT</td>
<td>0.1949 (0.1286)</td>
<td>0.1477** (0.0711)</td>
<td>0.0757 (0.1156)</td>
</tr>
<tr>
<td>MRD</td>
<td>0.1004 (0.0818)</td>
<td>0.2463*** (0.0590)</td>
<td>0.4588*** (0.1046)</td>
</tr>
<tr>
<td>R²</td>
<td>0.3994</td>
<td>0.3416</td>
<td>0.4231</td>
</tr>
<tr>
<td>S.E.E.</td>
<td>5.7170</td>
<td>4.0411</td>
<td>6.0716</td>
</tr>
</tbody>
</table>

*** = significant at 1%
**  = significant at 5%
*   = significant at 10%

Numbers in parentheses are standard errors of coefficients.
in the labour force than other males. However, even between the P and M groups, a significant difference exists as shown in Table VI. OT did not display any discernible effect.

The education variable EDT operates as expected for the M group, though at a lower level of significance than it did in 1961. However, it has no effect in either the P or R areas. At this point it may be worthwhile to note a difference in the definition of EDT for 1961 and 1951. In the latter year, EDT referred to the proportion of the population not attending school who had at least one year of university. In the earlier year, the variable was the proportion of population having 13 or more years of school. This is a much more ambiguous definition since in some provinces (e.g., Quebec), 13 years of school would include two years of university, while in others (e.g., Ontario), grade 13 was included in the high school system. This ambiguity probably contributed to the results obtained.

A second possible explanation for the lesser significance of EDT in 1951 than in 1961 may be offered. It will be recalled that the education variable for 1961 was chosen because job requirements were such that this amount of education was required to give a person an advantage in the labour market. However, in 1951, lower hiring standards and tight labour market conditions indicate that a lower level of schooling (perhaps nine or ten years)
TABLE VI

Chow\(^1\) Test Results on Regression Coefficients
1951 Data

Dependent Variable = MPT

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Degrees of Freedom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TUU</td>
<td>0.05</td>
<td>18.07***</td>
<td>10.94***</td>
</tr>
<tr>
<td>AMY</td>
<td>23.90***</td>
<td>4.29**</td>
<td>12.94***</td>
</tr>
<tr>
<td>FT</td>
<td>4.05**</td>
<td>1.35</td>
<td>5.08**</td>
</tr>
<tr>
<td>OT</td>
<td>0.12</td>
<td>0.16</td>
<td>0.00</td>
</tr>
<tr>
<td>EDT</td>
<td>0.81</td>
<td>3.37*</td>
<td>0.72</td>
</tr>
<tr>
<td>AMT</td>
<td>0.14</td>
<td>0.30</td>
<td>0.47</td>
</tr>
<tr>
<td>MRD</td>
<td>2.31</td>
<td>3.69*</td>
<td>7.24***</td>
</tr>
<tr>
<td>(Degrees of Freedom)</td>
<td>(7 &amp; 394)</td>
<td>(7 &amp; 388)</td>
<td>(7 &amp; 268)</td>
</tr>
<tr>
<td>Total Regression</td>
<td>4.15***</td>
<td>5.79***</td>
<td>5.06***</td>
</tr>
</tbody>
</table>

*** = regression coefficients significantly different at 1%
**  = regression coefficients significantly different at 5%
*   = regression coefficients significantly different at 10%

\(^1\)See Gregory C. Chow, "Tests of Equality Between Sets of Coefficients in Two Linear Regressions," op. cit.
might have been a more suitable cut-off point. This cut-off was not used, however, in order to maintain comparability between the regressions over time.

The AMT variable, though positive as expected, is significant only for the M group because the age data for 1951 were not broken down by sex. Thus the variable indicated the per cent of the total adult population in the relevant age group, i.e. in the prime working years of 25-54. Hence, we must assume that the age distribution of each sex in a tract is identical to the age distribution of the population as a whole. To the extent that this assumption is not valid, the variable will not measure what we desire it to measure. Judging by the results in the regression, the assumption was not entirely justified by the data.

The variable representing marriage performs as expected. It was noted in 1961 that the magnitude of this incentive appeared to be weakest for the lower income group. This conclusion is confirmed by the 1951 results, where the effect of marriage on the labour force behaviour of low income males has shrunk to an insignificant magnitude.

In summary, we conclude that the 1951 regression results for MPT confirm the 1961 conclusions. The most noteworthy differences are the significance of the FT variable for the two lower income groups in 1951, the changing effects of education and the sporadic behaviour of the
earnings variable AMY. The changes in the performance of the age variable AMT are largely due to its different specification. However, our earlier conclusions concerning the predominance of discouraged worker behaviour patterns is upheld. Also upheld and demonstrated by Chow tests in Table VI is a significant difference in the regressions among the three income groups. Similarities between the 1951 and 1961 results exist in spite of the fact that 1951 was a much more prosperous and booming year than was 1961, and in spite of the fact that Chow tests show that the regressions in 1951 are significantly different (at the 1% level) from those of the corresponding income groups in the same cities in 1961. The latter would indicate that definite changes had occurred over time.

The results for FPT are not so consistent. The 1951 regressions are shown in Table VII. The first and most important difference is that for the R group, the TUU variable is positive and very significant. This implies that in 1951 women in higher income areas responded to a worsening of economic conditions by entering the labour force. More relevant to the 1951 period, they responded to an improvement in labour market conditions by leaving the labour force. This is the only case in our investigations where such added worker behaviour is found.
### Table VII

Regression Results for 1951

Dependent Variable = FPT

<table>
<thead>
<tr>
<th>Variable</th>
<th>P</th>
<th>M</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>123.4780***</td>
<td>107.4509***</td>
<td>126.2477***</td>
</tr>
<tr>
<td></td>
<td>(10.5121)</td>
<td>(5.6651)</td>
<td>(8.1565)</td>
</tr>
<tr>
<td>TUU</td>
<td>-4.4034*</td>
<td>-3.3630***</td>
<td>5.9151***</td>
</tr>
<tr>
<td></td>
<td>(2.7133)</td>
<td>(1.1926)</td>
<td>(1.7620)</td>
</tr>
<tr>
<td>MUT</td>
<td>0.3371</td>
<td>0.2848</td>
<td>-1.9362**</td>
</tr>
<tr>
<td></td>
<td>(0.4116)</td>
<td>(0.3609)</td>
<td>(0.9029)</td>
</tr>
<tr>
<td>AMY</td>
<td>0.0164***</td>
<td>-0.0003</td>
<td>-0.0023***</td>
</tr>
<tr>
<td></td>
<td>(0.0037)</td>
<td>(0.0016)</td>
<td>(0.0006)</td>
</tr>
<tr>
<td>AFY</td>
<td>-0.0143***</td>
<td>-0.0017</td>
<td>0.0024*</td>
</tr>
<tr>
<td></td>
<td>(0.0030)</td>
<td>(0.0017)</td>
<td>(0.0014)</td>
</tr>
<tr>
<td>FT</td>
<td>-0.0901***</td>
<td>-0.0650***</td>
<td>-0.1696***</td>
</tr>
<tr>
<td></td>
<td>(0.0289)</td>
<td>(0.0127)</td>
<td>(0.0298)</td>
</tr>
<tr>
<td>OT</td>
<td>-0.0552*</td>
<td>-0.1060***</td>
<td>-0.0610**</td>
</tr>
<tr>
<td></td>
<td>(0.0342)</td>
<td>(0.0194)</td>
<td>(0.0277)</td>
</tr>
<tr>
<td>EDT</td>
<td>0.542</td>
<td>0.1125***</td>
<td>0.0903*</td>
</tr>
<tr>
<td></td>
<td>(0.0857)</td>
<td>(0.0459)</td>
<td>(0.0559)</td>
</tr>
<tr>
<td>AFT</td>
<td>-0.6932***</td>
<td>-0.3408***</td>
<td>-0.7199***</td>
</tr>
<tr>
<td></td>
<td>(0.1555)</td>
<td>(0.0577)</td>
<td>(0.1011)</td>
</tr>
<tr>
<td>CF</td>
<td>-0.0526</td>
<td>-0.0594</td>
<td>-0.3261**</td>
</tr>
<tr>
<td></td>
<td>(0.0559)</td>
<td>(0.0416)</td>
<td>(0.1295)</td>
</tr>
<tr>
<td>CFT</td>
<td>-10.8730***</td>
<td>-11.3604***</td>
<td>-9.5399***</td>
</tr>
<tr>
<td></td>
<td>(1.9413)</td>
<td>(1.0096)</td>
<td>(2.0136)</td>
</tr>
<tr>
<td>MRD</td>
<td>-1.1267***</td>
<td>-0.7328***</td>
<td>-1.0590***</td>
</tr>
<tr>
<td></td>
<td>(0.0891)</td>
<td>(0.0444)</td>
<td>(0.0823)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.7188</td>
<td>0.8581</td>
<td>0.8083</td>
</tr>
<tr>
<td>S.E.E.</td>
<td>5.8627</td>
<td>2.7711</td>
<td>3.8374</td>
</tr>
</tbody>
</table>

*** = significant at 1%
** = significant at 5%
* = significant at 10%

Numbers in parentheses are standard errors of coefficients.
However, for the P and M groups, the TUU variable was negative, indicating a discouraged worker effect. The magnitude of this effect -- and, for the P group, its significance -- is less than it was in 1961.

MUT, the male unemployment rate in the tract, has diminished to insignificance for the M and P groups in 1951. In 1961 evidence of added worker behaviour was found in the M group. Rich women, however, tend to display a significant amount of discouraged worker behaviour in response to MUT. We now see that for high income women a reverse pattern of behaviour prevails in the two years under consideration. In 1951 added worker behaviour is found in response to general economic conditions, but discouraged worker patterns persist in response to the local unemployment rate. In 1961 the opposite occurs.

Whether this change is due to a long run shift in the attitudes of these women to the labour market, or whether the change is in response to the different phases of the business cycle which prevailed in the two years, is not the subject of this study.

The 1961 results showed a negative coefficient on the male earnings variable AMY and a positive coefficient on female earnings. In 1951 this pattern prevails for the R group.
The level of earnings, either their own or that of the men, had virtually no influence on women workers in the middle income range in 1951. This finding is consistent with the results we have found for men in the higher income group in 1951 and for men in both the M and R groups in 1961, where we concluded that factors other than the number of dollars earned determined the decision to work. For men, we speculated that unearned income especially in the form of fringe benefits was important. For women, we may speculate the taste for or against work may dominate the decision to enter or leave the labour force (cet. par.) so that the effect of an extra dollar of income becomes negligible. Of course, one would not expect tastes to remain unchanged from 1951 to 1961 especially in a field like female participation rates where so much change has been observed. Consequently, we should not be surprised to see that as more women entered and remained in the labour force from 1951-1961, they became less enamoured with the idea of working and more sensitive to changes in income -- their own or that of the men in their families. As noted above, such a sensitivity was observed, especially for middle income women in both years of observation.

The behaviour of women in the lower income group and the change in that behaviour over the relevant decade appear to be more complex. The signs on AMY and AFY
are the opposite to what theory would lead us to predict.

AMY now has a positive coefficient and AFY a negative one. One possible explanation for this state of affairs is to say that the significantly positive coefficient on AMY reflects a pattern of discouraged worker behaviour. If male earnings are considered and responded to not only as a component of family income, but also as an indicator of general economic conditions, lower income women may respond to it as they did to the other general economic indicator TUU namely by the display of discouraged worker behaviour.

Though lower male earnings may discourage participation of females; when these earnings approach zero, i.e. when men become unemployed, there is a shift from a discouraged worker to an added worker behaviour pattern on the part of lower income women although the magnitude of the latter behaviour is slight.

The negative sign on the AFY coefficient indicated that poor women in 1951 also tended to present a backward sloping supply curve of labour. Some hypothesis is required as to why such a supply curve might exist. In 1951 women in the lower income groups did not have a firm attachment to the labour market, which their strong discouraged worker behaviour confirms. Consequently, they would only enter the labour force in order to reach some immediate monetary goal. Thus the sooner enough money has been saved to pay for the family
vacation, car, or a down payment on a home, the sooner women will leave the labour force. Hence, after aggregating, higher female earnings would lead to lower participation rates. It is not difficult to explain why this target saving pattern of behaviour is not more generally found. Perhaps the reason is merely rising targets. The increasing number of consumer durables (and not-so-durables) considered necessary, the amounts of higher education one is expected to provide for children, and the cost of housing, for example, are all rising rapidly. Such factors as these, possibly intensified by inflationary pressures, would make targets less and less easily attainable resulting in a more continuous attachment to the labour force.

The institution of consumer credit which became more widespread by 1961 has done much to eliminate the need for savings. People buy now and are faced with the problem of maintaining income at a level sufficient to pay later. Thus, it is not surprising that by 1961 women in the low income groups were displaying a positive response to their own earnings level.

The ethnic variables in 1951 had approximately the same influence as in 1961. One exception concerns the influence of FT, the French variable on higher income women. In 1951 being French was most likely to keep a rich woman out of the labour force, while by 1961, rich women were de-
tered from labour force participation less than middle income women by the fact of being French. Obviously, a change of values has occurred within the decade.

The education variable for women in 1951 displays a pattern not too dissimilar to that found for men of the same year. It is positive throughout, but is only strongly significant for middle class women. The explanations offered would be similar to those used in explaining the influence of EDT on MPT for 1951.

All coefficients on the age variable AFT display the expected negative sign. (It will be remembered that AFT refers to the proportion of population over 54 years old). The only explanation for the good results obtained with AFT as opposed to the much less satisfactory ones obtained with AMT is that the older age groups were fairly evenly populated by the two sexes, while the prime aged group which was used to calculate AMT was not.

We now turn to the family variables, namely CF, CFT, and MRD. The CF variable refers to the proportion of households inhabited by more than one family. In 1951 the influence of CF was negligible for the P and M groups and negative for the R groups. In 1951 approximately 12% of all the households under consideration were occupied by more than one family. Though some of these may
have been doubled up because of a residual housing shortage left over from the Second World War, it is more likely that a considerable portion of the population still accepted the idea that grandparents, for example, should remain in married children's homes. These attitudes would be more likely to prevail in more traditionally oriented homes and these homes would be the ones where similar traditions would prevail against women, especially married or older women, working. Hence, the negative or insignificant influence of CF is not surprising.

By 1961, however, only approximately 5% of all households contained more than one family. By this time the idea that every nuclear family should maintain a separate dwelling had become the goal and the practice of the vast majority of families. Of those few families who still doubled up, some would maintain that state voluntarily so that the households and childcare duties could be shared and at least one woman would be freer to go to work. Even in those cases where families were doubled up by necessity rather than choice, it is quite likely that the situation would be taken advantage of by at least one woman now entering the labour force.

Another possible reason for the differing influence of CF in the two years is the availability of alternate sources of household help. In 1951 it was still possible to obtain full-time household help reasonably readily,
especially in the higher income group. By 1961, however, such help was much more costly and difficult to obtain, so that even wealthy women wishing to go to work would have to rely more on relatives to provide help at home.

CFT, the variable representing children, displays little change from 1951 to 1961. The marriage variable also works in the predicted direction, but the magnitude of its effect is much larger in 1951 than in 1961. This is not surprising since the traditional objections to married women working have diminished since the earlier year.

Table VIII shows that differences between the labour force behaviour patterns of women in the three income groups existed in 1951 as they did in 1961. After allowing for unavoidable differences in the data and certain changes in tastes, our conclusions are that the 1951 results tend to confirm the 1961 results. The most striking difference is that added worker behaviour was so strongly dominant for women in the higher income areas in 1951. There was also some ambiguity on the influence of the earning variable.
<table>
<thead>
<tr>
<th>Variables (Degrees of Freedom)</th>
<th>P &amp; M (1 &amp; 386)</th>
<th>M &amp; R (1 &amp; 380)</th>
<th>P &amp; R (1 &amp; 260)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUU</td>
<td>0.18</td>
<td>18.02***</td>
<td>10.11***</td>
</tr>
<tr>
<td>MUT</td>
<td>0.03</td>
<td>5.42**</td>
<td>3.45**</td>
</tr>
<tr>
<td>AMY</td>
<td>18.32***</td>
<td>1.55</td>
<td>32.15***</td>
</tr>
<tr>
<td>AFY</td>
<td>13.20***</td>
<td>2.27</td>
<td>26.42***</td>
</tr>
<tr>
<td>FT</td>
<td>0.64</td>
<td>11.09</td>
<td>3.02*</td>
</tr>
<tr>
<td>OT</td>
<td>1.60</td>
<td>1.63</td>
<td>0.01</td>
</tr>
<tr>
<td>EDT</td>
<td>0.23</td>
<td>0.01</td>
<td>0.12</td>
</tr>
<tr>
<td>AFT</td>
<td>6.26**</td>
<td>11.49***</td>
<td>0.02</td>
</tr>
<tr>
<td>CF</td>
<td>1.59</td>
<td>4.95**</td>
<td>4.70**</td>
</tr>
<tr>
<td>CFT</td>
<td>0.07</td>
<td>0.75</td>
<td>0.18</td>
</tr>
<tr>
<td>MRD</td>
<td>17.15***</td>
<td>12.65***</td>
<td>0.26</td>
</tr>
</tbody>
</table>

(Degrees of Freedom) (11 & 386) (11 & 380) (11 & 260)

Total Regression 3.81*** 4.39*** 5.31***

*** = regression coefficients significantly different at 1%
** = regression coefficients significantly different at 5%
* = regression coefficients significantly different at 10%

1 See Gregory C. Chow, "Tests of Equality Between Sets of Coefficients in Two Linear Regression," op. cit.
CHAPTER V

COMPARISONS AND CONCLUSIONS

We have now obtained results on labour force behaviour by census tract for all the years for which appropriate data are available. These results will be compared with those obtained in the studies described in Chapter I.¹

The general U.S. studies² were mainly concerned with the relative magnitude of the discouraged and added worker effects. On this point, there is considerable agreement between our findings and the works cited, since all these studies found a predominance of the discouraged worker effect. Exceptions are found by Bowen and Finegan for prime aged males in 1940 and by Cain [1967] for non-white

¹ One may wonder to what extent valid comparisons may be made between this thesis and other studies which use different control variables, different breakdowns of the labour force, frequently do not take the income factor into account and often apply to different time periods and/or countries. If the results of our thesis do not agree with those of the earlier studies, we would then be justified in explaining the differences as being due to the different specifications of the models. However, if -- in spite of these differences in specification -- the results are still similar; we are probably justified in treating this as a confirmation of our results.

² See Mincer, Cain, Tellar and Bowen and Finegan in the bibliography.

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wives and female family heads. In all cases not having a discouraged worker effect, the urban employment variable was insignificant. No instance of a significantly positive effect of urban employment was found, further weakening the case for added worker behaviour.

However, added worker behaviour was not completely non-existent. Evidence for it was found in the present work by positive coefficients on local male unemployment rates for all women in 1961 and women in P and M tracts in 1951. The women in higher income tracts actually reacted positively to the urban employment rate, thus giving some very strong evidence of added worker behaviour.

Similar evidence of added worker behaviour has been found in these earlier studies and some controversy has arisen over it. Mincer, in his survey article, reaches the same conclusion (based largely on Cain's findings on non-white women) that the added worker is likely to be a low income person. This conclusion contradicts our results and also those of other studies that dealt specifically with poverty. Perhaps an explanation may lie in the fact that Mincer's conclusion was based on data for Negro women and female family heads. While there is a positive correlation between being Negro or being a female family head and being poor, there is certainly no identity and other factors would need to be taken into consideration. For example,
a woman heading a family is in sufficiently special circumstances that some caution must be used before generalizing from her behaviour to that of all low income people.

A point of interest in Bowen and Finegan's cross-section study concerns earnings variables in regressions on male participation rates. In the present study the earnings variable tended to give ambiguous results. It was impossible to take unearned income into account because data were lacking. Bowen and Finegan take both earned and unearned income into account and find that male participation rates are positively correlated with earned and negatively correlated with unearned incomes. We may postulate that similar results would have been obtained in the present thesis had complete earned and unearned income data been available.

In the U.S. studies examined, we found that the discouraged worker effect tends to predominate while very little added worker behaviour exists. In earlier work done using Canadian data, the results are not so consistent, and much more evidence of added worker behaviour is found. For example, Swidinsky's thesis reveals in time series analysis that added worker behaviour predominates for all men except those under 19 and over 64 and for women over 45.
The results of Swidinsky's cross-section work conform more to the results of the present thesis. No evidence was found for added worker behaviour while discouraged worker behaviour was found for all men except those 35-54 and for women under 35. For the remaining age-sex groups no significant reaction to the unemployment rates was found. The differences between Swidinsky's conclusions and those in this thesis may be explained by the differences in the specification of the model.

Using time series analysis, Proulx reaches conclusions similar to Swidinsky, notably the discovery of strong added worker behaviour on the part of men as a group and women over 45. It is possible that the added worker behaviour which appears so consistently for women over 45 can be correlated with the added worker behaviour found for higher income women in this study, since the majority of families with wives in the 45 and over age group would be in their peak income years.

Officer and Andersen also found added worker behaviour for all females except the youngest. However, they found that the discouraged worker effect predominated for male groups.

Let us now compare our results with those studies that are concerned with poverty. Mooney deals almost exclusively with low income tracts in the large metropolitan areas of the U.S., but devotes most of his attention to the differences between racial groups rather than to the differences between income groups. He does find a general discouraged worker pattern prevailing for most women in the low income tracts (as we do) and also finds that for women the discouraged worker effect is greater in poverty areas than in the metropolitan areas as a whole. A similar comparison was not made for men. His results agree with ours where the discouraged worker effect was larger for the P than for the R tracts, with the M tracts usually falling in between, but closer to the P tracts.

The last comparison to be made is between our work and that of Parker and Shaw. Since this study was most analogous to ours in format, a more detailed comparison can be made. Parker and Shaw's observations are census tracts in U.S. metropolitan areas divided, as are ours, into high, medium, and low income areas. Their data are taken from the 1960 U.S. Census and so will be comparable to the 1961 data used here.

In their regressions on male participation rates, the unemployment variable indicated a discouraged worker effect which was strongest in the P tracts and diminished
to insignificance in the R tracts. Their education variable (median years of schooling of population over 25) was positive and significant only in the P tracts, possibly suggesting the usefulness of our different specification of this variable. The earnings variable tended to be positive and significant over all income groups but not for the P tracts — again contradicting our results. However, all Parker and Shaw's earnings variables were taken for the metropolitan area as a whole rather than at the tract level, which may have had some effect. In fact, it is difficult to see the relevance of their variable since earnings will obviously be different in the different tracts. Their age variable, which was specified identically to ours, was positive and significant throughout and also of greatest magnitude in the lower income tracts. A colour variable was introduced and a marriage variable was not. Parker and Shaw's findings for men in American cities are similar to the results we found for Canadian cities, except in cases where comparison is precluded by the differences in specification of the models.

When we turn to regressions on female participation rates, we find, once again, that the results are similar, but with some minor differences. Again, a discouraged worker effect is found in response to the urban unemployment rate, but it rises with income. In the Canadian case, the
discouragement effect falls as income rises. In response to the male unemployment rate in the tract, no significant added worker behaviour is found by the authors. In fact, there is evidence of more discouragement in the P tracts (i.e. a significantly negative coefficient). In the Canadian case, added worker behaviour was found in response to MUT for both the M and R groups.

In the U.S. study, education had a positive influence on participation rates in the P tracts, a negative influence in the R tracts, and an insignificant influence for the middle income women in the U.S. study. We found it to be positive and significant throughout. Again, the different specification of the variable may provide a reason. Both here and in the Parker and Shaw study, the education variable was not differentiated by sex.

Unlike our results, female earnings for Parker and Shaw had a significant positive influence and male earnings had a significant negative influence on female participation rates only for the high income group. The female age variable was rather strongly specified to be the percentage of the female population over 14 who were 18 to 24 and 35 to 59 years, and was only significant in the lowest income groups. Children and marriage also had the expected effects and a demand variable proved insignificant.
A race factor (per cent non-whites) was significant only for the middle income group and was positive. Minority groups in Canada as represented by PT and OT tend to have lower rather than higher, female participation rates. The $R^2$'s for the Parker and Shaw regressions varied from 0.45 to 0.61, indicating that the variables considered tended to 'explain' less of the variation in female participation rates in the U.S. than they do in Canada.
SELECTED BIBLIOGRAPHY


APPENDIX

NAMES OF VARIABLES

All Data From 1961 and 1951 Censuses

AFT per cent of females 15 years and over (% of total population 14 years and over)* in a census tract who are over 54 years of age.

AFY average annual earned income of females in a census tract in $.

AMT per cent of males (% of total population)* 15 (14)* years and over in a census tract who are 25-54 years of age.

AMY average annual earned income of males in a census tract in $.

CDT the number of dwellings in the tract having more than 1.0 persons per room as a per cent of total occupied dwellings in the tract.

CF households in the tract occupied by two or more families as a per cent of the total number of households in the tract.

CFT average number of children per family in the tract.

C6T per cent of families in the tract having children living at home.

EDT number of people in the tract having at least one year of university (13 or more years of schooling)* as a per cent of the population of the tract not attending school.

FPT female labour force (i.e. those working or looking for work) as a per cent of the female population 15 (14)* years and over in the tract.

FT per cent of population in the tract of French national origin.

*Changes in parentheses refer to 1951 data.
FUU. unemployed females (i.e. those looking for work) as a per cent of all females 15 (14)* years and over in the metropolitan area.

IMGR per cent of population in the tract which immigrated to Canada since 1946.

IMGT per cent of population in the tract which was not born in Canada.

MPT male labour force (i.e. those working or looking for work) as a per cent of those males 15 (14)* years and over in the tract.

MUT unemployed males (i.e. those looking for work) in the tract as a per cent of males 15 (14)* years and over in the tract.

MUU unemployed males (i.e. those looking for work) in the metropolitan area as a per cent of males 15 (14)* years and over in the metropolitan area.

MRD per cent of population 15 (14)* years and over in the tract which is married.

OT per cent of population in the tract of neither British nor French national origin.

TUU all people looking for work in the metropolitan area as a per cent of the population 15 (14)* and over in the metropolitan area.

YFT average annual earnings per family in a census tract in $.

YHT average annual earnings per family head in a census tract in $.

* Changes in parentheses refer to 1951 data.