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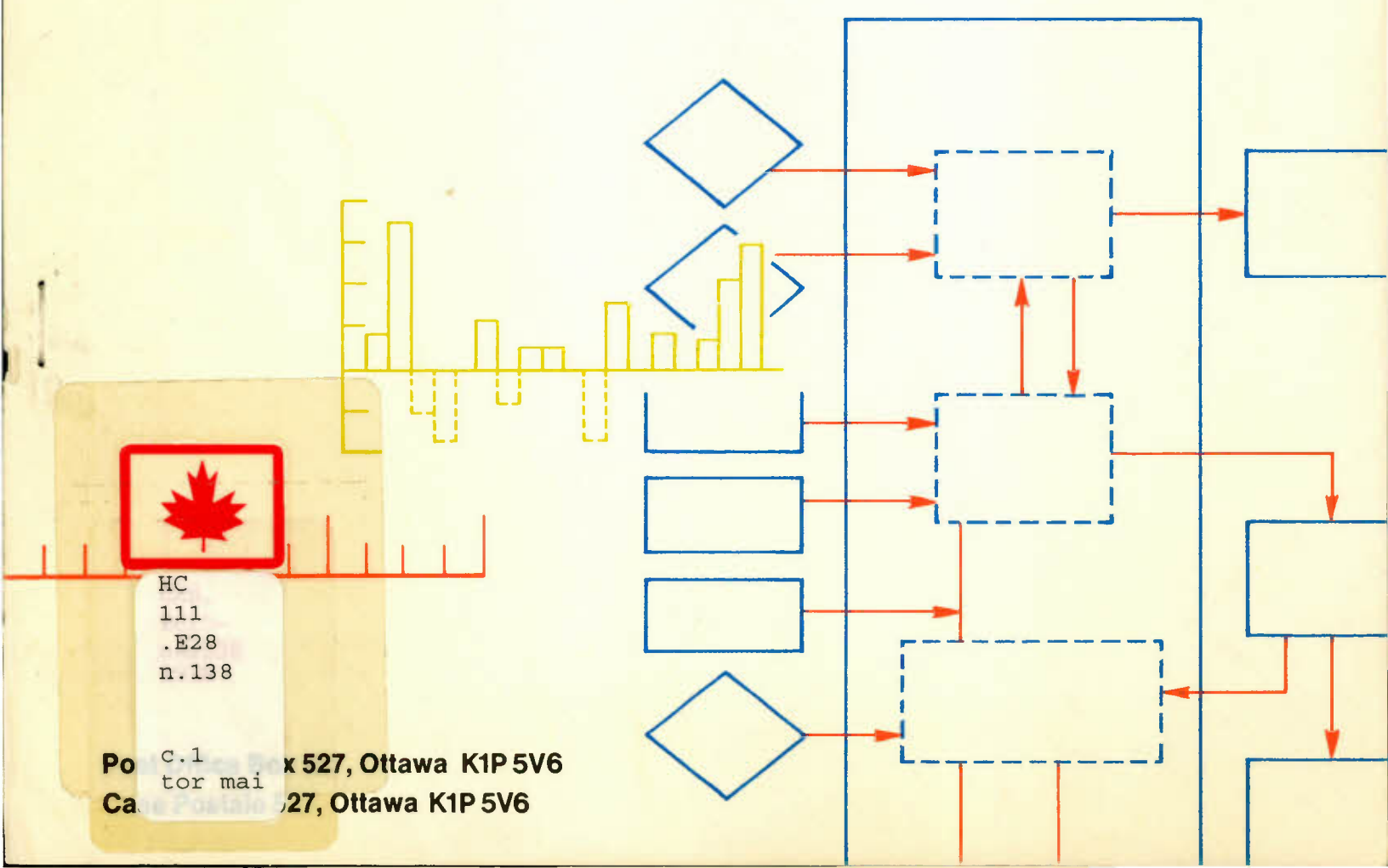

DISCUSSION PAPER NO. 138

Reservation Wages, Duration of Job Search and Labour Markets*

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SUMMARY

Two major explanations of unemployment in recent years -- search theory and the theory of contracts -- emphasize its voluntary nature. If these explanations are correct, then they have profound implications for public policy. Provision of labour market information, for instance, may turn out to be as important a factor in reducing unemployment as increases in aggregate demand. Despite the significance of these issues, only limited empirical testing of the new theories of unemployment has been undertaken with Canadian data.

This paper examines unemployment from the viewpoint of search theory, focusing exclusively on duration of unemployment. Search theory holds that unemployment is a productive investment on the part of individuals. Briefly, the reasoning goes like this. It is argued that imperfections in the labour market generate a diversity of wages for a given type of skill. Given the absence of complete information about the distribution of wage offers, it would pay an unemployed individual not to automatically accept the first wage offer that comes along but to search for an appropriate offer. This search, however, cannot be prolonged indefinitely because search involves costs. To maximize his gain, an individual could balance the expected gain and cost from extra search. The wage offer at which this balancing occurs is defined as the reservation wage (RW). Search theory holds that individuals behave as if they possess a notion of the RW for which they hold out -- wage offers below the RW are rejected and the first one equal to or exceeding RW

will be accepted. The RW then represents the worker's asking wage or his wage demand and we use the three terms synonymously. It should also be noted that by deliberately holding out for the RW the individual voluntarily tailors his duration of unemployment. This is described as "frictional unemployment" since it arises from "employment acceptance frictions". It is also regarded as voluntary unemployment because it depends on the individual's rational choice. Thus, frictional unemployment is seen to be productive under these circumstances because it maximizes the individual's gain.

Support for the search theory explanation of unemployment -- and voluntariness of the magnitude of unemployment duration -- will be demonstrated if it can be shown that individuals do behave as if they have a reservation wage. Accordingly, our first objective is to put the RW hypothesis empirically to the test.

The second objective of this paper is to examine the behaviour of RW over the duration of unemployment. One of the recurring issues in economic theory and policy is the nature of economic adjustments which unemployed workers are willing to make in order to obtain employment. The labour market must be sufficiently flexible to accommodate changes in consumer tastes and technology. Labour market is often cited as an example of a market with unusually severe rigidity against downward wage adjustments. We wish to examine these wage adjustments as the duration of unemployment lengthens.

These two issues are examined for different classes of workers and alternative labour market conditions. Low-wage workers are treated as a group and distinguished from high-wage workers; unionized individuals are examined separately from the non-unionized. Differences in unemployment rates are used as a proxy for identifying different states of the labour market. Our data are drawn from the Labour Force Tracking Survey developed by the Department of IT&C and represent a pooled sample of cross-section and time series observations covering the period 1973-1978. These data were generated through surveys of selected communities across Canada where severe layoffs were threatened. Individuals in the sample were asked to report their employment experiences over the previous five years.

The major problem in testing the RW hypothesis lies in the fact that reservation wage is inherently unobservable. What is generally observed from the data relates to the wage rate an individual actually obtains after a period of unemployment. Adopting a methodology developed by Kiefer and Neumann (1979), we use observations on post-unemployment wage rates to estimate the RW function in two steps. In the first step, a function determining expected wages, $\hat{w}$, is generated for each individual. This variable represents wage expectations held by individuals with different demographic and labour market characteristics. In the second stage, $\hat{w}$ is used along with variables representing cost of search to determine RW. The hypothesis consistent with search theory is that a higher $\hat{w}$ will increase RW while anything that increases cost of search will reduce RW.

These expectations are borne out by empirical tests for both males and females: wage expectations are highly significant in raising the RW and higher search costs tend to lower RW. In other words, the individuals in our sample behave as if they possess a notion of reservation wage. This evidence means that unemployment behaviour of these individuals is characterized by search for a better job rather than search for any job. Given their wage expectations, the individuals exercise some control on the length of their duration of unemployment. If the duration of unemployment was entirely a function of job availability then a statistically significant relationship between RW and $\hat{w}$ and cost of search would not have been observed. Thus our results suggest that at least a part of the unemployment can be attributed to "employment acceptance friction"; a rough estimate would suggest that about one-fifth of the observed duration may be related to search-theoretic variables.

On the issue of flexibility we find that the RW is not rigid over the duration of unemployment. Rather, it decreases as unemployment duration lengthens. However, this downward flexibility is extremely low -- the decrease is barely .12 per cent per month (in real terms). If the RW was $120 (in real terms) per week at the start of the search period then it would decline (for an average duration of 24 weeks) by .72 per cent or approximately $1, clearly a very small decline.

Higher degree of downward flexibility is observed if high-wage workers (defined by weekly wages greater than $150) as a group are considered. For males it is .36 per cent per

month and for females .80 per cent per month. For lower-wage workers (defined by weekly wages less than $150) the degree of flexibility is not significant. Our results also indicate that unionized workers exhibit a somewhat larger decline in RW (.20 for males and .16 for females), than non-union workers (for whom the decline is not significant). We also find that a dismal economic climate, approximated, for example, by higher unemployment rates, is also associated with larger rates of decline.

Our results provide evidence of considerable dynamism in labour market adjustment process. Economic stimuli in the form of wage expectations and search costs are seen to be important determinants of an individual's duration of unemployment. Thus an individual is shown to be actively engaged in the search for a specific wage offer, rather than passively awaiting any job offer.

The evidence on active job search is provided by a number of other indicators. Some 40 per cent of individuals in the sample expressed a willingness to accept a wage cut. Some 62 per cent of males (48 per cent of females) looked for work in other industries in addition to the industry of their previous attachment. A roughly comparable figure applies to searching in other occupations. Close to one-third of the individuals in the sample conducted search while they were employed.

This responsiveness of individuals to economic stimuli is considerably greater for high-wage individuals. As

noted above, the RW for low-wage workers declines only modestly with search duration. Since our sample is dominated by the low-wage category, the overall flexibility of workers' wage demands is also low. This difference between the high and low wage categories demonstrates the significance of unemployment insurance and other social security schemes in determining the duration of unemployment. These schemes replace a large fraction of income lost through unemployment; the legal replacement fraction could go as high as 87 per cent in many cases (when legally admissible part-time earnings are taken into account). Unreported part-time work of "cash-on-the-barrel head" variety can produce income even greater than obtained from full-time work. Under these circumstances there is no incentive to the low-wage earners to lower their wage demands. For the high-wage workers, on the other hand, social security schemes replace a smaller fraction of income. Unemployment time is seen by these workers as costly, and they react to it by lowering their wage expectations.

The policy implications of this research are as follows. Any government program that lowers the cost of search is likely to increase reservation wages which would tend to increase the duration of unemployment. The role of unemployment insurance is a key factor in determining frictional unemployment. By lowering the cost of search, UI adds to frictional unemployment which, however, also contributes to a better worker-job match. The role of UI and the contribution UI makes to productivity of the economy are important areas that need a

good deal more study. The question whether search itself is productive is examined in a forthcoming paper.

A second implication is that frictional unemployment could be reduced considerably if the speed with which employers are contacted were increased, e.g., through the provision of better labour market information. Availability of job banks at the Canada Employment Centres (CECs) is a step in this direction. However, the low penetration rate of CECs in the labour market is a major weakness. Improvement of this mechanism could lower the frictional component of unemployment.

A third implication of our analysis is that programs which raise wage expectations, e.g. some types of job creation, would also tend to raise the frictional component of unemployment. In designing manpower policies this effect should also be taken into account.

RÉSUMÉ

Deux explications principales du chômage au cours de ces récentes années -- la théorie de la recherche d'emploi et la théorie des contrats -- soulignent sa nature volontaire. Si ces explications sont exactes, elles ont alors des implications profondes sur la politique publique. La disposition de l'information sur le marché du travail, par exemple, peut s'avérer un facteur aussi important de réduction du chômage que l'augmentation de la demande globale. Malgré l'importance de ces questions, peu de tests empiriques des nouvelles théories du chômage ont été entrepris à partir de données canadiennes.

Ce document étudie la question du chômage du point de vue de la théorie de la recherche d'emploi, se limitant exclusivement à la durée du chômage. Cette théorie soutient que le chômage est un investissement productif de la part des particuliers. En résumé, le raisonnement est celui-ci. On prétend que les imperfections du marché du travail donnent lieu à une diversité de salaires pour une compétence donnée. En l'absence de renseignements complets sur la distribution des offres salariales, il serait rentable pour un individu en chômage de ne pas accepter automatiquement la première offre salariale qui lui est faite et de continuer à rechercher une meilleure offre. Cette recherche, cependant, ne peut se prolonger indéfiniment à cause des coûts inhérents à cette recherche. Pour maximiser ses gains, l'individu devrait soupeser les gains prévus et le coût d'une recherche additionnelle. L'offre salariale à laquelle on arrive après un tel

examen est définie comme le salaire de réserve (RW). La théorie de la recherche d'emploi maintient que les individus se comportent comme s'ils possédaient une notion du RW à laquelle ils tiennent -- les offres salariales inférieures au RW sont rejetées alors que celles qui sont égales ou supérieures au RW sont acceptées. Le RW représente alors le salaire demandé par le travailleur, ou sa demande salariale, et nous utilisons les trois termes comme des synonymes. Il faut également noter qu'en tenant délibérément au RW, l'individu façonne la durée de sa période de chômage. La chose est décrite comme du "chômage frictionnel" puisqu'il découle des "frictions de l'acceptation d'un emploi". On considère qu'il s'agit également d'un chômage volontaire parce qu'il résulte du choix rationnel de l'individu. Ainsi, le chômage frictionnel est envisagé comme étant productif dans ces circonstances parce qu'il maximise les gains de l'individu.

L'appui à cette explication du chômage par la théorie de la recherche d'emploi -- et la volonté d'en déterminer la durée -- sera démontré si l'on peut indiquer que les individus se comportent comme s'ils possédaient un salaire de réserve. Par conséquent, notre premier objectif doit être de soumettre empiriquement à l'épreuve l'hypothèse du RW.

Le deuxième objectif de ce document est d'examiner le comportement du RW en fonction de la durée du chômage. Une des questions périodiques de la théorie et de la politique économique est la nature de l'ajustement économique que le travailleur en chômage est disposé à faire en vue d'obtenir un emploi. Le

marché du travail doit être suffisamment souple pour tenir compte des changements dans le goût des consommateurs et la technologie. Le marché du travail est souvent cité comme un exemple de marché d'une rigidité presque sans pareil quand il s'agit d'ajustement salarial à la baisse. Nous voulons examiner ces ajustements salariaux au fur et à mesure que la période de chômage se prolonge.

Nous étudions ces deux questions en fonction de diverses classes de travailleurs et différentes conditions du marché du travail. Les travailleurs à faible salaire sont considérés comme un groupe distinct des travailleurs à salaire élevé; les syndiqués font l'objet d'une étude distincte de celle des non syndiqués. Les différences dans les taux de chômage sont utilisées comme substitution pour identifier les différents états du marché du travail. Nos données sont tirées de l'enquête sur le mouvement de la population active effectuée par le ministère de l'Industrie et du Commerce et elles représentent un échantillon combiné d'observations croisées et temporelles s'étendant sur la période de 1973 à 1978. Ces données ont été recueillies lors de sondages effectués dans diverses localités du Canada où l'on craignait de fortes mises à pied. On demandait aux individus interrogés lors de ces enquêtes de faire part de leur expérience d'emploi des cinq années précédentes.

Le problème principal du test de l'hypothèse du RW réside dans le fait que le salaire de réserve est impossible à observer. Ce qui découle habituellement des données recueillies

a trait au taux salarial qu'un individu touche réellement après une certaine période de chômage. A l'aide d'une méthodologie mise au point par Kiefer et Neumann (en 1979), nous nous servons des observations sur les taux salariaux obtenus après une période de chômage pour estimer le facteur RW en deux étapes. En premier lieu, un facteur déterminant le salaire espéré, $\hat{w}$, est établi pour chaque individu. Cette variable représente les espérances de salaires des individus selon différentes caractéristiques démographiques et du marché du travail. En second lieu, le $\hat{w}$ est utilisé avec des variables qui représentent le coût de la recherche pour déterminer le RW. L'hypothèse conforme à la théorie de la recherche d'emploi est qu'un $\hat{w}$ plus élevé augmentera le RW alors que tout facteur qui contribue à l'augmentation du coût de la recherche contribue aussi à réduire le RW.

Ces phénomènes attendus sont confirmés par des tests empiriques tant chez les hommes que chez les femmes : les espérances de salaire contribuent de façon importante à hausser le RW alors que des coûts plus élevés de la recherche tendent à le réduire. En d'autres termes, les individus, dans notre échantillon, se comportent comme s'ils possédaient une notion du salaire de réserve. Cette certitude signifie que le comportement de ces individus en chômage est caractérisé par la recherche d'un meilleur emploi plutôt que par la recherche de n'importe quel emploi. Étant donné leurs espérances de salaire, les individus exercent un certain contrôle sur la durée de leur période de chômage. Si la durée de cette période de chômage ne dépendait

que de la disponibilité des emplois, on n'aurait pas observé de relation statistiquement importante entre le RW, le $\hat{w}$ et le coût de la recherche. Ainsi, nos résultats démontrent qu'au moins une partie du chômage peut être attribuée à la "friction de l'acceptation d'un emploi"; une estimation grossière laisse entendre qu'environ le cinquième de la durée observée peut avoir trait aux variables liées à la théorie de la recherche d'emploi.

Quant à la flexibilité, on s'est aperçu que le RW n'est pas rigide pendant toute la durée de la période de chômage. Il a plutôt tendance à diminuer au fur et à mesure que se prolonge la période de chômage. Cette flexibilité à la baisse est toutefois extrêmement faible -- la diminution n'est d'environ que de 0,12 % par mois (en termes réels). Si le RW était de $120 (en termes réels) par semaine au début de la période de recherche, il diminuerait alors (après une durée moyenne de chômage de 24 semaines) de 0,72 % ou d'environ $1, ce qui constitue en réalité une bien faible baisse.

On constate une plus grande flexibilité à la baisse quand on étudie le cas des travailleurs mieux payés (définis par des salaires hebdomadaires supérieurs à $150) considérés comme groupe. Pour les hommes, la baisse est de 0,36 % par mois alors que, chez les femmes, elle est de 0,80 % par mois. Chez les travailleurs les moins payés (qui gagnent moins de $150 par semaine), le degré de flexibilité est presque inexistant. Nos résultats indiquent aussi que les ouvriers syndiqués acceptent une plus grande baisse de leur RW (0,20 % chez les hommes et

0,16 % chez les femmes) que les ouvriers non syndiqués (chez qui le déclin est presque nul). Nous avons également découvert qu'un sombre climat économique, marqué par un taux de chômage plus élevé, est également associé à une plus forte baisse.

Nos résultats fournissent la preuve d'un dynamisme considérable du processus d'ajustement du marché du travail. Des stimuli économiques prenant la forme d'espérances de salaire et de coûts de la recherche sont considérés comme des déterminants importants de la durée de la période de chômage d'un individu. On constate ainsi que l'individu recherche activement une offre spécifique de salaire au lieu d'attendre passivement qu'on lui offre n'importe quel emploi.

La preuve de cette recherche active d'un emploi est fournie par un certain nombre d'autres indicateurs. Quelque 40 % des individus interrogés lors de l'enquête se sont dits disposés à accepter une baisse de salaire. Quelque 62 % des hommes (48 % des femmes) étaient de plus à la recherche d'un emploi dans des industries autres que celle où ils avaient déjà occupé un poste. Des chiffres à peu près semblables valent pour la recherche d'un emploi dans d'autres professions. Près d'un tiers des individus interrogés avaient commencé la recherche alors qu'ils étaient encore au travail.

La capacité des individus de répondre à des stimuli économiques est considérablement plus grande chez les individus à salaire élevé. Comme nous l'avons déjà indiqué, le RW des

travailleurs à faible salaire ne décline que de façon modérée tout au cours de la période de recherche. Étant donné que notre échantillon est dominé par la catégorie à faible revenu, la flexibilité d'ensemble des demandes salariales des travailleurs est également faible. La différence entre les catégories à fort salaire et à faible salaire démontre l'importance de l'assurance-chômage et des autres programmes de sécurité sociale dans la détermination de la durée de la période de chômage. Ces régimes remplacent une bonne partie du salaire perdu par suite du chômage; la fraction de remplacement légal peut atteindre 87 % dans de nombreux cas (quand on tient compte des revenus admissibles tirés du travail à temps partiel). Les gains non rapportés provenant d'emplois à temps partiel peuvent même produire un revenu supérieur à celui qui découlerait d'un emploi à plein temps. Dans de telles circonstances, il n'y a aucune incitation pour les travailleurs à faible salaire à réduire leurs demandes salariales. Pour les travailleurs à revenu élevé, d'un autre côté, les programmes de sécurité sociale ne remplacent qu'une faible partie du revenu. Ils considèrent donc toute période de chômage comme coûteuse et ils réagissent en diminuant leurs espérances de salaire.

Les implications de cette recherche sur la politique sont les suivantes. Tout programme gouvernemental qui diminue le coût de la recherche est susceptible d'augmenter les salaires de réserve qui tendront à prolonger la période de chômage. Le rôle de l'assurance-chômage devient un facteur essentiel dans la détermination du chômage frictionnel. En réduisant le coût de la

recherche, l'assurance-chômage ajoute au chômage frictionnel qui, cependant, contribue à un meilleur équilibre travailleur-emploi. Le rôle de l'assurance-chômage et sa contribution à la productivité de l'économie sont des éléments importants qui méritent qu'on s'y attarde davantage. La question de savoir si la recherche elle-même est productive est examinée dans un autre document à venir.

Une deuxième implication est que le chômage frictionnel pourrait être réduit de façon considérable si on augmentait la vitesse avec laquelle les employeurs sont contactés, au moyen, par exemple, de meilleures informations sur le marché du travail. La disponibilité de banques d'emploi dans les Centres d'emploi du Canada (CEC) est un pas dans cette direction. Le faible taux de pénétration du marché du travail par les CEC constitue toutefois une faiblesse marquée du système. L'amélioration de ce mécanisme pourrait réduire la composante frictionnelle du chômage.

Une troisième implication de notre analyse est que les programmes qui élèvent les espérances salariales, comme certains types de création d'emploi, tendent également à augmenter la composante frictionnelle du chômage. Il faut donc tenir compte de cet effet dans la conception de politiques de main-d'oeuvre.

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Section 1: Introduction

1.1 The Setting

For more than a decade now economists have puzzled at the excessively high rates of unemployment coexisting with high rates of inflation. For the unemployment rate to be high, the flow into unemployment, or the duration of unemployment spells must increase; or the two may combine to produce the result. Both the flow and the duration of unemployment may be influenced by structural, cyclical, seasonal or frictional elements. Since, in recent years, unemployment has been high even at full employment levels,[1] and seasonal unemployment by its nature is more or less a stable component over the years, attention has naturally turned on the structural and frictional causes of unemployment. In this paper, we examine frictional[2] unemployment and our focus is exclusively on the duration component.[3]

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1 See contributions such as "Why Is Unemployment Rate So High at Full Employment", by R.E. Hall, BPEA, 70:3, and "Turnover in the Labour Force", BPEA, 72:3.

2 Frictional unemployment is variously defined by different authors. An essential element of all definitions, however, is that this kind of unemployment is associated with the time required to match workers with existing jobs. Hence, it is voluntary in the sense that the jobs desired by the workers are already in existence. See "Structural Unemployment in the United States", U.S. Department of Commerce, Washington, 1966, and texts such as Belton M. Fleisher, Labor Economics, Prentice Hall, 1970. Some authors distinguish between the frictional and structural components by considering the former a short-run and the latter a long-run phenomenon. See S. Ostry and M.A. Zaidi, Labour Economics in Canada, (Toronto: Macmillan), 1979.

3 Search theory also deals with the question of flows into unemployment but we do not tackle that problem in this paper.

Economists of all persuasions have always recognized that a certain degree of frictional unemployment -- that is, the unemployment which accompanies transition between jobs, -- was necessary for the smooth functioning of real world labour markets. Hence such unemployment was assumed to be benign and voluntary in nature. What is more significant, however, is that the magnitude of frictional unemployment was assumed more or less to be given and hardly subject to the influence of social policy. Thus, in their theoretical work, the classical economists saw no difficulty in assuming the availability of perfect labour market information to all participants. Even the Keynesian Revolution which challenged many of the classical propositions did not quarrel with this view of labour markets.[4]

The perception of frictional unemployment changed significantly with the publication by G. Stigler of two articles in the early 1960s which provided a convincing economic rationale for the occurrence and duration of frictional unemployment.[5] Contrary to the assumption of perfect knowledge (information) about market conditions implied by the classical economists, the real world labour market presents a dispersion of wage offers to job seekers and the latter do not know in

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4 In defining full employment, Keynes wrote that "full employment means the absence of 'involuntary unemployment' but not of 'voluntary', 'frictional', or presumably 'seasonal' unemployment", J.M. Keynes, General Theory, Macmillan and Co., (London, 1964), pp. 15-16.

5 G.J. Stigler, "The Economics of Information", Journal of Political Economy, 69, June 1961, pp. 213-225, and "Information in the Labor Market", Journal of Political Economy, Supplement, 70, October 1962, pp. 94-105.

advance the wages an employer may offer. Under these conditions, it may pay an unemployed individual to invest his time and money in seeking out information about job offers. The time so spent is productive of job offers but would appear in the official statistics as unemployment. Hence, imperfect information in the labour market provides economic rationale for voluntary unemployment, which is seen as part of the frictions in the functioning of the labour market. Search unemployment is another name for this phenomenon.

1.2 Policy Issues

It is one thing to view imperfect labour market information as a factor causing unemployment; it is quite another to treat this factor as a unitary (or sole) explanation of all unemployment. Using Stigler's work as their point of departure, some search theorists began to consider all unemployment as resulting from employment-acceptance friction.[6] This extreme view as well as search theory generally has received considerable criticism. Critics of search theory argue that search for a job rather than a better job characterizes most unemployment experience. Layoffs and new entrants are offered as examples. Most unemployment flows are market initiated rather than chosen voluntarily by job seekers. Furthermore, search can be conducted

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6 See E.S. Phelps (ed.) Microeconomic Foundations of the Employment and Inflation Theory, 1969. Most of the contributions to this volume, especially that of A. Alchian, fit this description.

See also R. Barro (1977). The view that unemployment is basically voluntary in nature is shared by the theory of contracts. See Baily (1974), D. Gordon (1974) and Grossman (1975).

on the job so that one does not have to be unemployed to conduct job search.[7] These criticisms, it should be underscored, apply to specific uses of search theory and not to the theory *per se*. From our point of view the chief contribution of search theory consists in explaining why frictional unemployment arises and the demonstration that this type of unemployment is in fact dependent on factors which can be influenced by aggregate demand management and labour market policies.

With respect to the demand management policies the issue is best seen in the context of the natural rate theory. This theory asserts that attempts to lower the unemployment rate below a certain natural rate will generate ever-increasing rates of inflation. At constant rates of inflation, any reduction in the unemployment rate will be purely temporary. As defined above search unemployment, a term which we use interchangeably with voluntary unemployment, was assumed by many economists to represent the natural rate of unemployment. To effect a permanent reduction in the unemployment rate would imply that search unemployment must also be trimmed, and search unemployment, according to the natural rate theory, depends on real and not monetary factors. Hence demand management policies that do not change the real phenomena operating in an economy would only have temporary effect on the unemployment rate.

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7 Most of these criticisms were first raised by J. Tobin in "Unemployment and Inflation", AER, December 1972. See also R. Gordon (1973).

The linkage with the manpower and labour market information policies needs to be treated in greater detail. According to the search theory, once unemployed, an individual tailors his duration of unemployment in accordance with the marginal calculus of expected (discounted) returns and expected costs of additional search. The duration of unemployment that results is optimal for the individual. The policy question arises because of a possible conflict between what is optimal for an individual and what is optimal for society. This question is relevant because both the expected returns and the cost of search are influenced by governmental policy. The argument is best illustrated with reference to the cost side of the ledger, where unemployment compensation (UI) plays an important role. For a large percentage of the unemployed individuals, especially those at the lower end of the wage spectrum, UI payments replace a large fraction of their normal wages. This heavy subsidization of search costs has two effects: it induces individuals into unemployment and it lengthens the duration of search. Both these factors add up to a high rate of (frictional) unemployment, which is considered to be socially undesirable.

The foregoing illustrates the possible conflict between the optimality conditions of unemployment duration for the individual and the society. The questions then arise as to how much investment a society should make in the provision of labour market information; whether search should be subsidized at all or whether alternatively the emphasis should be

on the provision of more jobs; whether search should be subsidized in a given market only or be extended to spatially segregated markets through the means of mobility grants; whether search should be subsidized at all or the individual should be retrained for a different job market. Hence UI, placement services, training, mobility and job creation programs all enter into the picture.

1.3 Objectives of the Paper

To answer these complicated policy questions it is imperative, first, to understand the nature and speed of labour market adjustments exhibited by workers. No matter which labour market policy is pursued one would like to know how the unemployed are likely to respond to it. Search theory presents one view of how the adjustment process works; the process is described in terms of the costs and rewards to search. If the search theoretic view is correct then employment-acceptance friction would be shown to be a cause of unemployment and the factors which regulate this frictional component would also be identified. The implication for public policy is that the frictional component of unemployment can be altered by affecting the cost of information gathering, the expected wage offers and the probability of obtaining a job.

Accordingly, the primary purpose of this paper is to investigate the reservation wage behaviour of unemployed individuals. In the language of search theory the term reservation wages (RW) has a specific meaning: RW is identified by that wage rate which equates the expected marginal gain with expected

marginal cost of extra search. Hence, our objective is to examine whether individuals behave according to the RW strategy and if they do, what are the factors which affect the setting of reservation wages. Support for the RW hypothesis would imply support for a search-theoretic view of unemployment, i.e., at least a part of the unemployment is due to employment-acceptance friction.

A second objective is to determine how flexible RW is during the period of unemployment. An inflexible RW implies that job seekers do not see fit to moderate their wage demands as the duration of unemployment increases. RW will be flexible only if either the expected rewards or the costs vary with the unemployment duration. A number of authors have contended that social assistance programs have acted to make workers inflexible in their wage demands. We know that UI replaces a large percentage of the pre-unemployment wages. Since unemployment also carries with it a positive leisure component on the one hand, and on the other, there are monetary and other costs of working which reduce the net compensation from work, these factors make UI compensation a still higher replacement percentage. Hence, reservation wages have less downward flexibility.

It is possible, however, that the impact of duration on RW varies for different labour markets and for different economic climate. The position of high wage workers may differ since UI does not replace as large a fraction of their pre-unemployment wages. This would suggest that high-wage earners would exhibit greater flexibility in their wage demands. On

the other hand, unions are often alleged to create rigidities in the labour market. Do they also cause inflexibility in wage demands of unionized workers? A third objective of the paper, then, is to isolate the high from the low-wage earner groups and union from non-union workers to examine their RW behaviour separately.

Finally, the expected rewards from search are clearly dependent upon demand conditions. In a slack labour market, measured, for example, by a high unemployment rate, an unemployed individual is likely to set his RW lower (than in a buoyant economy) and is prone to exhibit flexibility in wage demands. A fourth objective of this paper is to test this proposition.

In order to pursue these objectives we make use of data drawn from the 1978 Labour Force Tracking Survey developed by the Canada Department of Industry, Trade and Commerce. This Survey covers individuals from selected communities who were laid off or who voluntarily left their jobs as a result of a plant shutdown or a cutback in production. Survey teams gathered the list of such individuals from specific employers within designated localities and an attempt was made to contact each individual on the list. From the individuals contacted information was sought concerning their employment/unemployment records for the last five years, from 1973 to the cutoff date in summer 1978. The data relate to all completed unemployment episodes, single or multiple, as the case may be. Each episode contains information on pre- and post-unemployment wages,

selected personal and human capital characteristics and motivational and financial attributes of the individual and some characteristics of the household to which he/she belongs. Since search theory is primarily a theory of voluntary unemployment its predictions are likely to be most observable for individuals who voluntarily quit their job. For this reason, in this paper, our sample is further restricted to unemployment episodes which began when individuals quit their job. Sample means are given in Table 1.

Two limitations of the data should be noted. First, the sample based on plants experiencing major layoffs or shutdown may not, of course, be representative of the Canadian work force. However, this limitation is mitigated to some extent by inclusion in the sample of unemployment/employment history of an individual's past five years. A second limitation of the sample is that it is also potentially affected by the contact rate. Highly mobile individuals, especially those who move out of the communities surveyed, are likely to dominate the individuals who could not be contacted.

Table 1

SUMMARY OF SAMPLE MEAN VALUES
OF SELECTED VARIABLES

		MALES	FEMALES
EDUCATION	(years)	9.4	9.7
TRAINING	(years)	0.7	0.3
AGE	(years)	28.5	28.7
UNION	(%)	52.8	51.8
JOBTENURE	(weeks)	116.7	115.7
ONJSEARCH	(%)	32.8	26.3
FLEXWAGE	(%)	43.5	39.1
FLEXINDUS	(%)	62.1	48.2
FLEXOCCUP	(%)	58.8	45.8
D	(weeks)	24.1	35.4
SPOUSEY	(%)	13.6	47.2
SAVINGS	(%)	76.4	69.7
OTHERY	(%)	7.3	8.4
UIB	(%)	70.2	70.8
NXEMP	(weeks)	40.6	46.8
MARITAL	(%)	46.0	53.0
FLEXPART	(%)	7.0	7.6
FAMILY SIZE	(per earner)	0.6	1.1
PRE-WAGE ($1971)	(weekly)	128.94	90.42

For precise definition of variables see Table 2.

Table 2

LIST OF VARIABLES AND THEIR DEFINITIONS

W_t	= Real post-unemployment weekly wage rate ($1971).
PRE-WAGE	= Real pre-unemployment weekly wage rate ($1971).
EDUCATION	= Years of schooling.
TRAINING	= Years of training.
INDUSTRY	= A set of five dummy variables representing different industries. The last category 'others' is omitted from regressions.
OCCUPATION	= A set of ten dummy variables representing occupations. The last category 'others' is omitted from regressions.
UNION	= 1 if union member 0 otherwise
GPROGRAM	= 1 if participated in a government sponsored training, relocation or welfare program 0 otherwise
PROVINCE	= A set of six dummy variables; British Columbia is the category omitted from regressions.
AGE	= Actual age in years.
AGE (squared)	= Actual age in years squared.
AGE x EDUCATION	= Interaction variable.
JOBTENURE	= Duration of previous job (prior to the unemployment episode).
REASON QUIT 1	= Quit job for reasons of job dissatisfaction.
REASON QUIT 2	= Retired with or without company pension.
REASON QUIT 3	= Returned to school/training.
REASON QUIT 4	= Other reasons such as fired, maternity, illness or injury, etc. Omitted from regressions.

Table 2 (Cont'd)

ONJSEARCH	= 1 if looked for job before leaving last job 0 otherwise
FLEXWAGE	= 1 if willing to accept wages lower than at previous job 0 otherwise
FLEXINDUS	= 1 if searched for job both same as and other than previous 0 otherwise
FLEXOCCUP	= 1 if searched for a job both same as and other than previous 0 otherwise
FLEXPART	= 1 if worked part time during the period looking for a job 0 otherwise
MARITAL	= 1 if married 0 otherwise
FAMILY SIZE	= Number of dependents divided by the number of earners in the family.
SAVINGS	= 1 if used own savings 0 otherwise
UIB	= 1 if a UI beneficiary 0 otherwise
SPOUSEY	= 1 if used spouse's income 0 otherwise
OTHERY	= 1 if had other sources of income 0 otherwise
D	= Weeks looking for work.
NXEMP	= Weeks of employment in the next job.
NLOOKED	= Weeks not looked for a job.

Section 2: Determination of Reservation Wages

2.1 Basic Search Model

Since labour market information is an economic resource, with attendant costs and benefits, an individual job seeker must, in order to maximize the benefits from search, decide when to stop searching. Standard search models purport to show that this maximization (of income or wealth) problem can be solved by setting up a reservation wage (RW). Some of the key assumptions of the basic search model are:

(i) The searcher knows the wage distribution, F(W), which is given exogenously and is stationary.

(ii) The cost of search, C, is known to the searcher.

(iii) The probability of generating a job offer is given and constant over each period of time.

With these assumptions it can be demonstrated that the optimal policy for a job searcher is to reject all job offers below the RW and accept any other offer:

$$W \geq RW \text{ accept any offer}$$
$$W \leq RW \text{ reject all offers} \qquad (1)$$

The RW is obtained by equating the expected marginal gain to the expected marginal cost. The former is derived from the (unimodal) probability distribution F(W), assumption (i), and the costs are obtained from assumption (ii). Assumption (iii) provides a link between the RW and the duration of search (D).

The implications of the basic search model are that the RW is negatively related with the cost of search and positively related with expected returns from search:

$$RW = h\ (F(W), C) \qquad (2)$$
$$\qquad\quad +\quad -$$

2.2 Estimation Problems

There are two problems in estimating equation (2) directly. First the RW is not directly observable. What is observable is the wage offer an individual actually accepts even though, as is apparent from equation (1), the lower cut-off point on the wage offer distribution is dictated by the RW. Hence, we are able to approximate RW by using observation on wage offers actually accepted. This is possible if the factors determining the RW, i.e., expected wages and the cost of search, are explicitly introduced in equation (2). In addition, certain assumptions regarding the normality of error term in (2) are required. The proof of this proposition is contained in a recent contribution from Kiefer and Neumann.[8]

The second problem in estimating equation (2) may be stated as follows. If all the factors which enter in the determination of F(W) are also the determinants of C, then it is impossible to test the hypotheses implied by equation (2). An example may help to clarify this problem. Suppose that the cost of search is dictated entirely by the wages an individual foregoes by leaving a job. Suppose also that expected wages are also entirely determined by the pre-unemployment wages of

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8 Nicholas M. Kiefer and George R. Neumann, "An Empirical Job-Search Model with a Test of the Constant Reservation-Wage Hypothesis", JPE, Vol. 87, No. 1, 1979, pp. 89-107.

an individual. Since one and the same variable enters in determining both the F(W) and (C), equation (2) cannot be estimated in this case. We argue that this problem does not hold for our data since we are able to categorize variables (X's) which affect RW in three subsets: X^W, X^{WC} and X^C, where X^W's are those variables which enter in the determination of F(W) but not in the determination of C; X^{WC}'s affect both F(W) and C; and X^C's affect only C but not F(W).

In view of these considerations it is possible to estimate equation (2). Combining it with equation (1) we can use observations on wage offers actually accepted to estimate the RW function. We do this in two steps. At the first stage we estimate a wage offer function, F(W), where the arguments are X^W and X^{WC}:

$$W_i = g\ (X_i^W,\ X_i^{WC}) \tag{3}$$

where W_i's are wage offers accepted by individual i in the sample; X_i^W and X_i^{WC} have been defined above. The second stage of our estimation would then consist of estimating:

$$RW_i = h\ (\hat{w}_i,\ X_i^{WC},\ X_i^C) \tag{4}$$

where $\hat{w}_i$'s are estimated values from equation (3) and X_i^{WC}, X_i^C retain their previous designation.

2.3 Estimating Equations and Definition of Variables

We now wish to flesh out the two equations, define the variables that enter these equations as arguments and point out the suggested direction of their impact. The estimating equations are as follows:

Wage Offer Function

$$\log W = \sum_m a_m X_m^W + \sum_p a_p X_p^{WC} + e^O \qquad (5)$$

Reservation Wage Function

$$\log RW = b_1 \hat{w} + \sum_p b_p X_p^{WC} + \sum_q b_q X_q^C + e^R \qquad (6)$$

where:

$\log W$ and $\log RW$ = natural logarithm of the real (in 1971 dollars) weekly wages in period t

X_m^W = variables which affect wage offer distribution

X_p^{WC} = variables which affect wage offers as well as cost of search

X_q^C = variables which affect cost of search

$\hat{w}$ = estimated values of wage offer from equation (5)

a,b = coefficients, and

e^O, e^R = disturbance terms.

Variables Entering the Wage Offer Function

The subset identified by X^W includes all the variables which affect the wage offer function but do not enter into cost determination. The wage offer distribution that an individual faces may be said to depend on: (a) state of the market indicators, and (b) human capital characteristics of the individual. In addition to these variables since our individuals in the sample are not otherwise identical, a number of control variables have to be included.

Market indicators are identified by a set of dummy variables identifying various provinces,[9] called PROVINCE. We

9 The unemployment rate, u, is also used at a later stage in the analysis. See Section 3.

assume that, on balance, a tighter labour market would imply larger wage offers relative to other markets. Hence, in such cases the impact on W_i would be positive.

Variables representing industry, occupation and unionization, INDUSTRY, OCCUPATION, UNION respectively, represent both the market characteristics (in that the mean wage values differ by industry, occupation and union) as well as productivity characteristics of an individual. By the same token, whether an individual who searches over different industries, FLEXINDUS, or over different occupations, FLEXOCCUP, would be an element in determining wage offers since mean wages differ among industries and among occupations. By broadening the market being searched FLEXINDUS is likely to be positively associated with wage offers. FLEXOCCUP, on the other hand, may exert a negative effect since transfer of human capital from one occupation to another may be costly.

An individual's market productivity characteristics are captured by a number of variables such as education (EDUCATION), training (TRAINING), age (AGE), reason for job leaving (REASON QUIT) and previous wages (PRE-WAGE). The relevance of the first three is obvious. EDUCATION is likely to be positively associated with wage offers, as would be the case with TRAINING and AGE. There may be some non-linearities in AGE which are captured in the model by introducing AGE^2. Similarly, since age and education may be correlated, a term AGE x EDUCATION is introduced. The variable (PRE-WAGE) is

likely to be positively correlated with the post-unemployment wages.[10]

REASON QUIT needs a word of explanation. Our data permit differentiation between four types of quits: quitting for job related reasons, retirement, return to school and others. The last category is omitted in a dummy variable set up. Individuals quitting for job related reasons presumably do so to look for a better job. Other categories of quitting are probably more determined by extra-economic factors and should not exhibit any strong impact on post-unemployment wages. Thus, relative to the excluded category, quitting for job related reasons should exert a positive impact on expected wages.

Finally, three variables are introduced as controls. Whether an individual is willing to accept a pay cut (FLEXWAGE) is a signal to the employers. This willingness should have a negative impact on wage offers. On-the-job search (ONJSEARCH) is another variable of interest, and one that has been neglected in the search literature. In our sample, some individuals quit after beginning their search on the job while others quit first and then search. We hypothesize that, *ceteris paribus*, those who have searched on the job should be better informed about the job market and are therefore likely to exert a positive influence on expected wage offers. Tenure on the last job (JOBTENURE) is another control variable. It is assumed that longer tenure is likely to send a positive signal to the employer thereby improving the value of wage offers.

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10 See Finis Welch, "What Have We Learned from Empirical Studies of Unemployment Insurance", Industrial and Labour Relations Review, Vol. 30, No. 4, July 1977, pp. 451-461.

Variables in the Reservation Wage Function

Excepting JOBTENURE, OCCUPATION and INDUSTRY all other variables described above enter the reservation wage function, either as part of the X^{WC} set or as controls. The variables of primary interest are the ones which enter X^{C}, i.e., variables which affect costs but not wage offers, and $\hat{w}$, the expected value of wage offers. The search theoretic hypothesis is that $\hat{w}$ should be positively related to the reservation wage while the X^{C} variables should have a negative sign.

Variables in the X^{C} set measure the financial burden unemployment is likely to impose on an individual. A married person (MARITAL) is likely to have greater financial responsibilities, other things being equal, than an unmarried person. Consequently, he might be expected to set his RW higher if wages from work have to meet those commitments. Family size (FAMILY SIZE) is similarly an indication of financial responsibilities and its impact on RW may be similarly interpreted.

An individual who has a part-time job during unemployment (FLEXPART) can afford to wait out longer and set up a higher reservation wage. FLEXPART is included to capture this phenomenon. Non-wage income can take a number of forms, income from spouse (SPOUSEY), savings (SAVINGS), and other income sources (OTHERY). Each of these should have a positive impact on RW. Tenure on the next job (NXEMP) is another variable of some interest. The longer an individual expects to work on the next job the more cautious he will be in setting

up his reservation wages. This suggests a positive relationship between RW and expected tenure. Put in another form, an individual may choose to lower RW if he expects to work only a short time at the job so obtained.[11]

2.4 Results and Their Interpretation

The Wage Offer Function

Estimates for the wage offer function are provided for males and females separately in Table 3. Results for males are considered first. Most of the variables included in the function are significant, especially the human capital variables such as education, training and age. Occupational and industry dummy variables do not perform well but provincial dummies, representing labour market conditions are highly significant.

A number of other researchers have estimated wage offer functions.[12] However, our specification incorporates certain novel features which deserve mention. FLEXWAGE, the willingness to accept lower wages is used as an explanatory variable. This variable could capture prior beliefs about the

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11 This implies a trade-off between two features of a job, namely wages and tenure which may appear to contradict the exogeneity of NXEMP. We do believe that RW and NXEMP are jointly determined, hence NXEMP should also be endogenous in the system. What we are saying here is that part of the movements of RW are explained by movements in NXEMP and the latter could therefore be used as a control variable.

12 See R.E. Hall, for instance, "Wages, Income and the Flows of Work in the U.S. Labor Force", in Income Maintenance and Labor Supply Econometric Studies, Watts and Cain (eds.), University of Wisconsin, Institute for Research on Poverty, 1973.

Table 3

WAGE OFFER FUNCTION (OLS ESTIMATES)
(Standard error in parentheses)

	MALES	FEMALES
Constant	-0.760	-0.866
EDUCATION	0.006 (0.003)	0.010 (0.006)
TRAINING	0.012 (0.002)	0.003 (0.007)
AGE	0.011 (0.002)	0.008 (0.004)
AGE (SQUARED)	-0.0001 (0.00003)	-0.00006 (0.00004)
AGE x EDUCATION	-0.0002 (0.0001)	-0.0003 (0.0002)
UNION	0.016 (0.007)	-0.010 (0.012)
JOBTENURE	-0.00001 (0.00001)	-0.000009 (0.00003)
REASON QUIT 1	0.017 (0.007)	0.001 (0.010)
REASON QUIT 2	-0.056 (0.044)	0.018 (0.141)
REASON QUIT 3	0.041 (0.016)	-0.059 (0.036)
ONJSEARCH	0.034 (0.007)	0.025 (0.011)
FLEXWAGE	-0.032 (0.006)	-0.008 (0.011)
FLEXINDUS	0.032 (0.012)	-0.016 (0.020)
FLEXOCCUP	-0.037 (0.012)	0.003 (0.020)
LOG PRE-WAGE	0.301 (0.021)	0.328 (0.038)

Table 3 (Cont'd)

	MALES	FEMALES
OCCUPATION		
Managerial	-0.006 (0.021)	0.065 (0.038)
Clerical	-0.006 (0.020)	0.029 (0.030)
Sales & Service	-0.023 (0.018)	0.046 (0.032)
Primary	0.056 (0.019)	-0.075 (0.070)
Processing	-0.019 (0.017)	0.013 (0.029)
Machining	0.013 (0.019)	0.078 (0.033)
Fabricating	-0.013 (0.017)	0.006 (0.028)
Construction	-0.006 (0.019)	0.017 (0.054)
Transportation	0.011 (0.018)	0.026 (0.038)
INDUSTRY		
Manufacturing	0.005 (0.010)	0.012 (0.020)
Construction	0.061 (0.015)	0.064 (0.075)
Transportation	-0.006 (0.017)	-0.085 (0.060)
Trade & Finance	0.029 (0.013)	-0.008 (0.019)
PROVINCE		
Newfoundland	-0.076 (0.022)	0.017 (0.143)
New Brunswick	-0.109 (0.022)	-0.114 (0.037)
Quebec	-0.082 (0.012)	-0.109 (0.030)
Ontario	-0.055 (0.014)	-0.044 (0.030)
Manitoba	-0.062 (0.020)	-0.096 (0.046)
R^2	.34	0.27
$\bar{R}^2$	.33	0.24
No. of Observations	1975	877

offer function. An alternative interpretation of this variable could be as follows. Search theory assumes that wage offers are exogenously given to individuals. This assumption is better approximated if we hold constant the influence any individual-market dynamics may have. Individuals willing to accept lower wages, we find, do end up receiving lower wages, possibly by revealing their expectations more readily.

Wage flexibility is only one response to expectations regarding market opportunities. Another response could be to cast the net wider and extend search to other industries and occupations. FLEXOCCUP, or search extending to other occupations in addition to one's own may, however, involve a loss from non-transferability of occupation-specific human capital. The negative coefficient we obtain for FLEXOCCUP, on this interpretation, could measure the loss of human capital involved in embarking on a new occupation. FLEXINDUS, on the other hand, representing search in other industries need not entail such a loss. In fact, by adding to the variability of wage offers, searching among more industries than one, should have a positive effect on wage offers. The coefficient on FLEXINDUS we observe to be positive (and significant) for males.

On-the-job search is a much neglected aspect of labour market search behaviour. In an earlier work we have provided evidence on the magnitude and pervasiveness of this phenomenon in Canadian labour markets.[13] In the wage offer

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13 Hasan and Gera (1979).

function we find this variable to be positively related to wage offers and to be significant. Job searchers who conducted on-the-job search on average get higher resulting wage than those who did not search while employed. Specifically, on-the-job search contributed to a 3.4 per cent higher wage for males and 2.4 per cent for females.

Job quitting can occur for various reasons. As we explained earlier leaving a job for family reasons is not the same thing as quitting because of job related reasons. We find that quitting for job related reasons exerts a positive influence on wage offers relative to other types of job leaving. Union membership is another factor making significant contribution to wage offers for males.

Results for females are by and large consistent with those obtained for males. Where the direction of coefficients are different the results for females are statistically not significant. For example, UNION exerts a positive (and significant) impact on wages for males; for females the estimated coefficient is negative but not significant.

The Reservation Wage Function

Using the estimated values from the wage offer function, the RW model is estimated and the results are presented in Table 4 for males and females. In each case, we find that the expected wage variable, $\hat{w}$, exerts a highly significant effect on reservation wages. As we would expect from search theory its impact is positive. We now consider the results for males first:

As explained earlier the cost side is captured by a number of variables representing financial burden imposed by unemployment. Excepting OTHERY all the variables operate in the expected direction. Being married serves to raise the RW, as does family size per earner, availability of savings, income from spouse and part-time earnings during unemployment. Marital and saving status, however, are the only variables which are statistically significant.

Expected tenure on the next job is highly significant and tends to raise RW. In fact, expected tenure can be treated as an endogenous variable. A job seeker with a higher expected tenure would tend to set a higher reservation wage. In certain cases, unemployed individuals with longer search time may take any job offer by lowering their RW as a stop-gap measure and compensate for it by reducing the expected tenure. Results in Table 4 also indicate that the RW declines with age, education, training and unionization although the coefficients are not significant. Provincial dummies, which are highly significant in wage offer function, lose most of their importance in the reservation wage function.

Results for females support the broad conclusion that both wage expectations and cost variables operate in the expected direction. Family size (per earner) becomes a highly significant variable for females, while use of savings loses its significance.

The major conclusion to emerge from the results for males and females is that individuals do respond to wage expectations and to costs of unemployment. These factors lead them

Table 4

RESERVATION WAGE MODEL
OLS ESTIMATES
(Standard error in parentheses)

	MALES	FEMALES
Constant	-.018	-0.06
EDUCATION	-.004 (.003)	-0.0007 (0.006)
TRAINING	-.002 (.002)	-0.007 (0.007)
AGE	-.002 (.003)	0.002 (0.004)
AGE (SQUARED)	.00001 (.00003)	-0.00003 (0.00005)
AGE x EDUCATION	.00009 (.00011)	0.0001 (0.0002)
UNION	-.008 (.006)	-0.006 (0.009)
REASON QUIT 1	-.003 (.006)	0.007 (0.009)
REASON QUIT 2	.002 (.042)	-0.098 (0.135)
REASON QUIT 3	-.012 (.016)	-0.026 (0.034)
ONJSEARCH	.574 (.007)	0.0009 (0.011)
FLEXWAGE	.004 (.006)	0.004 (0.010)
FLEXINDUS	.003 (.012)	-0.002 (0.018)
FLEXOCCUP	-.003 (.012)	0.011 (0.018)

Table 4 (Cont'd)

	MALES	FEMALES
PROVINCE		
Newfoundland	-.005 (.022)	-0.090 (0.138)
New Brunswick	-.017 (.022)	-0.020 (0.037)
Quebec	-.014 (.013)	-0.030 (0.029)
Ontario	-.004 (.014)	-0.041 (0.027)
Manitoba	-.008 (.006)	-0.021 (0.050)
MARITAL	.015 (.008)	0.0001 (0.014)
FLEXPART	.013 (.011)	0.014 (0.017)
FAMILY SIZE	.0005 (.003)	0.009 (0.003)
SPOUSEY	.0003 (.010)	-0.022 (0.013)
SAVINGS	.018 (.007)	0.001 (0.010)
OTHERY	-.015 (.011)	0.021 (0.016)
NXEMP	.0005 (.00007)	0.0005 (0.0001)
$\hat{w}$	.972 (.046)	0.824 (0.080)
R^2	.37	.29
$\bar{R}^2$	.36	.27
No. of Observations	1975	877

to behave as if they are following a reservation wages strategy. Hence a portion of the variation in the unemployment duration is explained by search-theoretic considerations. Employment-acceptance friction is an important part of the observed unemployment.

The fact that our sample is drawn from communities where major layoffs had occurred strengthens the importance of our conclusions: support for search-theoretic explanations in markets where average duration of unemployment is high (24 weeks for males and 35 for females) is re-assuring. This length of unemployment is not usually considered to be of the frictional variety.

Our results do not, of course, suggest that all of the observed duration of unemployment is frictional. In fact, Table 5 which contains regression estimates of duration of unemployment on the variables used in the reservation wage function provides us with an R^2 of .22 for both males and females. This implies that search theoretic variables available from our data, account for about one-fifth of the variability in unemployment duration. In their work Kiefer and Neumann explain about one-third of the unemployment duration. The difference between the two results may lie, in part, in the different nature of the two samples (only quit cases in our sample) and, in part, in differences in techniques of estimation. Kiefer and Neumann use the Maximum Likelihood technique of estimation. In subsequent work we intend to broaden our sample to all unemployed and to use the Maximum Likelihood Estimation approach.

Table 5

DURATION MODEL
OLS ESTIMATES: DEPENDENT VARIABLE log (D)
(Standard error in parentheses)

	MALES	FEMALES
Constant	0.940	1.212
EDUCATION	0.001 (0.009)	0.001 (0.018)
TRAINING	-0.008 (0.007)	0.046 (0.022)
AGE	-0.004 (0.007)	-0.021 (0.012)
AGE (SQUARED)	0.0001 (0.00008)	0.0003 (0.0001)
AGE x EDUCATION	-0.0001 (0.0003)	-0.0003 (0.0006)
UNION	0.031 (0.018)	0.164 (0.029)
JOBTENURE	...	...
REASON QUIT 1	-0.006 (0.018)	-0.044 (0.030)
REASON QUIT 2	-0.002 (0.119)	-0.066 (0.410)
REASON QUIT 3	0.502 (0.047)	0.051 (0.110)
ONJSEARCH	0.035 (0.019)	0.001 (0.034)
FLEXWAGE	-0.038 (0.018)	-0.006 (0.032)
FLEXINDUS	0.010 (0.033)	-0.006 (0.056)
FLEXOCCUP	-0.006 (0.033)	0.003 (0.056)
PROVINCE		
Newfoundland	0.237 (0.062)	0.318 (0.420)
New Brunswick	0.103 (0.063)	0.236 (0.113)
Quebec	0.169 (0.038)	0.066 (0.091)

Table 5 (Cont'd)

	MALES	FEMALES
PROVINCE (Cont'd)		
Ontario	0.108 (0.040)	0.150 (0.084)
Manitoba	-0.170 (0.057)	-0.378 (0.139)
MARITAL	-0.070 (0.023)	0.0632 (0.045)
FLEXPART	0.225 (0.032)	0.092 (0.053)
GPROGRAM	0.146 (0.035)	0.210 (0.069)
NLOOKED	-0.002 (0.0007)	-0.002 (0.0009)
FAMILY SIZE	-0.009 (0.009)	-0.002 (0.012)
SPOUSEY	0.005 (0.029)	0.082 (0.042)
SAVINGS	0.066 (0.020)	0.065 (0.031)
OTHERY	0.093 (0.033)	0.030 (0.052)
UIB	0.270 (0.019)	0.261 (0.032)
NXEMP	-0.0007 (0.0001)	-0.001 (0.0003)
$\hat{w}$	-0.288 (0.129)	-0.296 (0.059)
R^2	0.22	.22
$\bar{R}^2$	0.21	.19
No. of Observations	1,975	877

... indicate variables excluded from the estimation function.

Section 3: Reservation Wages and Duration of Unemployment

3.1 Issues

The existence of rigidity in wages has long distinguished the labour market from other markets and the concept has been at the centre of controversy for both economic theory and policy. In the preceding section we used search theory to describe the adjustment mechanism in the labour market i.e., how individuals determine their asking wages. We now proceed one step further and inquire how the reservation wages behave as the duration of search (unemployment) lengthens. Do individuals increase, reduce or keep their asking wages constant over the duration of search?

Any one of these three options is theoretically feasible. Reservation wages would be constant if search duration does not affect the returns or the costs of search. Fluctuations in the RW would then come about only if at least one of two factors, returns or costs, were in some manner altered by search duration. If returns increase with duration, costs remaining unchanged, then RW will rise with the length of search. Only one author has suggested this possibility.[14] Most empirical literature, on the other hand, has supported the contrary notion, that of declining reservation wages. A number of different formulations have been presented why this may occur. Some of these will now be reviewed.

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14 D.T. Sant, "Reservation Wage Rules and Learning Behaviour", Review of Economics and Statistics, February 1977, pp. 143-149.

In most cases, the decline in RW is a direct consequence of the underlying assumptions rather than from the optimizing strategy. Holt (1970) assumes downward revision of acceptance wage due to higher psychic and financial cost; in Gronau's (1971) model, it is a direct result of his assumption of finite remaining working life; Kasper (1967) accepts it by appealing to the classical proposition of declining marginal utility of leisure and the searcher's depletion of assets and savings; Salop (1973) ensures it by introducing a notion of systematic search which begins with the job searcher sampling his best opportunities before moving on to less lucrative areas; Whipple (1973) alludes to the gain from early employment, such as the improvement of skills to counter the current disutility of lowering one's acceptance wage.

3.2 Estimation Procedure

Although it would be useful to identify the separate influence of factors mentioned above in generating fluctuations in the RW over the search duration, if they occur, data at our disposal force us to limit our inquiry. We use the duration of unemployment (D) as a catch-all variable, instead. Using this variable equation (6), p. 16, now becomes:

Variable Reservation Wage Function

$$\log RW = b_1 \hat{w} + \sum_p b_p X_p^{jc} + \sum_q b_q X_q^{c} + g.D + e^{R} \qquad (7)$$

and the hypothesis simply is that the coefficient (g) of duration variable should have a negative sign, i.e., reservation wages should fall as D lengthens. Other elements of equation (7) retain this previous interpretation.

3.3 Results and Their Interpretation

Estimated coefficients from equation (7) are presented in Table 6. These results are best examined in relation to the constant reservation wage model, the results of which are also presented in Table 6 for comparison. A comparison of coefficients between the constant and variable reservation wage functions exhibits little change for most of the variables. That is, inclusion of the duration variable does not affect the stability of other coefficients which provides support to our specification. Our results suggest that reservation wage declines .03 per cent per week for both males and females. This translates into a monthly decline of .12 per cent. Other researchers have come up with a wide range of monthly estimates -- from 2.5 per cent (Kiefer and Neumann, 1979), 0.4 per cent (Kasper, 1967) to 0.06 per cent for young males (Stephensen, 1976).

The empirical evidence presented by other researchers has supported the hypothesis of declining RW. However, a wide variety of results have been reported. Kasper (1967), using the data obtained from the files of Employment Security Offices in the state of Minnesota on 3,000 male workers registered with them for extended unemployment insurance benefits finds that on average the asking wage declines by 0.38 per cent per month. Fishman *et al.* (1968), using the data of Arms Control and Disarmament Agency survey of workers laid off from aerospace companies show that acceptance wage on the average declines at the rate of about 1.25 per cent per month. Stephensen (1974),

Table 6

RESERVATION WAGE MODELS: CONSTANT VERSUS DECLINING
OLS ESTIMATES
(Standard Error in Parentheses)

	Males		Females	
	Constant Reservation Wage Function (1)	Variable Reservation Wage Function (2)	Constant Reservation Wage Function (3)	Variable Reservation Wage Function (4)
Constant	-.018	.025	-.06	-.045
EDUCATION	-.004 (.003)	-.004 (.003)	-.0007 (.006)	-.0009 (.006)
TRAINING	-.002 (.002)	.0004 (.002)	-.007 (.007)	-.005 (.007)
AGE	-.002 (.003)	-.002 (.003)	.002 (.004)	.001 (.004)
AGE (SQUARED)	.00001 (.00003)	.00001 (.00003)	-.00003 (.00005)	-.00003 (.00005)
AGE x EDUCATION	.00009 (.00011)	.00009 (.0001)	.0001 (.0002)	.0001 (.0002)
UNION	-.008 (.006)	-.007 (.006)	-.006 (.009)	-.001 (.009)
REASON QUIT 1	-.003 (.006)	-.004 (.006)	.007 (.009)	.004 (.009)
REASON QUIT 2	.002 (.042)	.003 (.042)	-.098 (.135)	-.097 (.135)
REASON QUIT 3	-.012 (.016)	-.012 (.016)	-.026 (.034)	-.028 (.034)
ONJSEARCH	.0006 (.007)	.001 (.007)	.0009 (.011)	-.000009 (.010)
FLEXWAGE	.004 (.006)	.004 (.006)	.004 (.010)	.002 (.010)
FLEXINDUS	.003 (.012)	.003 (.012)	-.002 (.018)	-.0008 (.018)
FLEXOCCUP	-.003 (.012)	-.003 (.012)	.011 (.018)	.010 (.018)

Table 6 (Cont'd)

	Males		Females	
	Constant Reservation Wage Function (1)	Variable Reservation Wage Function (2)	Constant Reservation Wage Function (3)	Variable Reservation Wage Function (4)
PROVINCE				
Newfoundland	-.005 (.022)	.010 (.022)	-.090 (.138)	-.090 (.140)
New Brunswick	-.017 (.022)	.015 (.022)	-.020 (.037)	-.011 (.040)
Quebec	-.014 (.013)	.011 (.013)	-.030 (.029)	-.027 (.030)
Ontario	-.004 (.014)	.003 (.014)	-.041 (.027)	-.035 (.027)
Manitoba	-.008 (.006)	.009 (.020)	-.021 (.050)	-.025 (.045)
MARITAL	.015 (.008)	.014 (.008)	.0001 (.014)	.0001 (.014)
FLEXPART	.013 (.011)	.016 (.011)	.014 (.017)	.0180 (.020)
FAMILY SIZE	.0005 (.003)	.0002 (.003)	.009 (.003)	.009 (.003)
SPOUSEY	.0003 (.010)	.0007 (.010)	-.022 (.013)	-.018 (.013)
SAVINGS	.018 (.007)	.018 (.007)	.001 (.010)	.003 (.010)
OTHERY	-.015 (.011)	-.013 (.011)	.021 (.016)	.021 (.016)
NXEMP	.0005 (.00007)	.0005 (.00007)	.0005 (.0001)	.0005 (.0001)
$\hat{w}$	.972 (.046)	.966 (.046)	.824 (.080)	.823 (.080)
g	...	-.0003 (.0001)	...	-.0003 (.0001)
R^2	.37	.37	.29	.30
$\bar{R}^2$	.36	.36	.27	.28
No. of Observations	1975	1975	877	877

... indicate variables excluded from the estimation function.

using the data on teenagers seeking full-time employment in Indiana, finds that acceptance wage declines by only 0.06 per cent per month. Barnes (1975), using a 1962 cross-sectional sample of older workers registered with Employment Service offices in 12 cities spread across six states finds that the acceptance wage declines by 1.19 percentage points in the first month of unemployment, 2.38 in the second month, 3.45 in the third month and so on.

Although the evidence supports the declining acceptance wage hypothesis, there are some major problems with the empirical analysis in these studies. The analysis attempted by Kasper, by Fishman *et al.*, and by Barnes does not control for any of the economic and demographic factors which are known to affect the cost and returns of search and therefore the selection of acceptance wage by an individual. Furthermore, the definition of acceptance wage used by these authors is not the same as the concept implies by the search hypothesis. Kasper uses the response to a question on the current wage sought by workers; Fishman *et al.*, use the post-unemployment wage at the new job; Barnes uses the average wage of the longest job in the past five years. Only Stephensen uses the desired concept of a minimum wage below which an offer will be refused. The recent study by Kiefer and Neumann is also free of these strictures. While Stephensen comes up with a very low estimate (0.06 per cent per month), Kiefer and Neumann arrive at a relatively high rate of decline of 2.5 per cent per month. Stephensen's data suffer from the problem that those who have

the largest relative decline are least likely to be observed, while the Kiefer and Neumann data are restricted to individuals who were permanently separated from employment.

The results presented here are on the low side compared with the Kiefer and Neumann results. A number of reasons may explain this. First, our sample is limited to quits. The individuals are likely to be better aware of the labour markets, and must take a calculated risk in leaving job. Hence, their asking wage is likely to decrease less than that of other workers. A second reason may be found in the differences in the UI program applicable in the two samples. Our sample spans a five-year period (1973-78) during which time some modifications in the benefit structure and eligibility conditions were introduced. Although UI provisions in the U.S. vary by state, it is by and large true that the Canadian UI system has eligibility requirements that are less stringent and more universal than is the case in the U.S. The benefit rate here is generally higher and the benefit duration entitlement longer. Similarly the treatment accorded the quits is more generous. Consequently, the effective value of income replacement through UI is likely to be a larger fraction in the Canadian case, which suggests a lower rate of decline in reservation wages compared with the U.S. situation.

3.4 Impact of Labour Markets and Demand Conditions

Underlying the empirical results presented above is the assumption that except for the factors explicitly held constant in the regression equations, the individuals in the sample

are statistically equivalent in the sense that they sample wage offers from a given distribution and face similar search costs. The validity of this assumption is greater the more homogeneous the sample. If we could construct more homogeneous sub-samples from our data we may find that the observed decline in RW may differ among them.

It stands to reason that low-wage workers may be facing wage offer distribution and search costs that are systematically different from high-wage workers. Hence the behaviour of RW over duration of search will also be different for these workers. It is also possible that membership in unions may make an individual more inflexible in wage demands -- unions often bargain for structured rates of wages and an individual may tie his wage demand to a particular bargained rate. We test these two hypotheses by segregating our samples, first, by wage levels and second by membership in union status. Results from these tests are presented in Table 7.

Looking at panels A and B we observe that high-wage workers, whether male or female, tend to exhibit greater flexibility in wage demands compared with the higher wage groups. Similarly, unemployed individuals belonging to a union are willing to lower their asking wages more than are non-unionized individuals. These two results fit into a consistent behaviour pattern.

There are a number of inter-related reasons why high-wage workers are likely to exhibit greater asking wage flexibility. First, UI and other social compensations to high-wage

Table 7

PERCENTAGE CHANGE IN RW (IN REAL TERMS) OVER AN ADDITIONAL WEEK OF DURATION OF UNEMPLOYMENT BY:

A. WAGE GROUPS

Real Wage	Males	Females
$100 or less	Insignificant	- .04*
$101-150	- .06*	Insignificant
$151 and up	- .09*	- .2*

B. UNION - NON-UNION CATEGORY

Unionization	Males	Females
Unionized	- .05*	- .04*
Non-Unionized	Insignificant	Insignificant

C. UNEMPLOYMENT RATES

U-rates	Males	Females
less than or equal to 7.0	- .04**	Insignificant
7.1 to 8.0	- .05***	Insignificant
8.1 to 9.0	Insignificant	- .14*
> 9.0	- .07***	- .17*

*significant at the 1% level
**significant at the 5% level
***significant at the 10% level

workers leaves uncompensated a part of wage income, this part being larger than for low-wage workers. Second, the rate of depreciation of human capital is likely to be larger for high-wage earners. Third, according to the advocates of 'new unemployment', low-wage earners are primarily in the secondary labour market and their spells in or out of employment produces little effect on their wages. Finally, low-wage workers on or near the minimum wage have little room to exhibit a decline in wages.

Results for the union/non-union categories can be explained by factors operating on the demand as well as on the supply side of the market. Consider the supply side first: non-union workers are low paid relative to the unionized workers; in our sample the difference is about 20 per cent. We have seen above that, for the reasons already mentioned, low-paid workers exhibit a lower rate of decline. Both the minimum wage and UI payments act as a floor and there is less of a margin for the decline of asking wages. The demand side of the market may be reflected in the union preference function.[15]

A union can be an employment- or a wage-maximizer. For a wage maximizing union, those individuals who happen to be laid off get the worst of both the worlds. The union is unwilling or unable to help them find a job. Since their pre-unemployment wages have been bid high, once unemployed, they have to reduce their asking wages that much more. This message

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15 Allan M. Cartter, Theory of Wages and Employment, (Richard D. Irwin, Chicago, 1959).

sinks in as the duration of unemployment lengthens. This result is also in the spirit of contract theory which holds that worker-employer contracts, implicit on the part of individual workers but explicit in the case of unions, tend to insure wage stability at the cost of fluctuations in employment.

We now turn to panel C in Table 7 which reports the decline in RW obtained for markets with different rates of unemployment. In the absence of better proxies these rates are used as cyclical indicators. Search theory would suggest that the mean of wage offer distributions confronting individuals would improve with improving economic conditions and would suggest higher reservation wages. However, to the extent that these fluctuations are foreseen at the commencement of the search process they should have no effect on the reservation wages. Unanticipated changes in the wage-offer distribution will, of course, lead to changes in RW. From our results it would appear that higher rates of unemployment at the start of an unemployment spell causes greater risk averseness among individuals than is the case for low unemployment rates.[16] The view seems widespread that wage demands are likely to be more flexible under recessionary conditions. We find support for this hypothesis in Table 7. A week of unemployment leads to a greater decline in RW the higher the unemployment rate at the beginning of the process. This proposition holds most clearly for women.

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16 In another context, Armknecht and Early (1972) found that risk-taking attitude on the part of workers is diminished more readily than is augmented by cyclical downturn.

Section 4: Conclusions

This paper has explored the dynamics of wage setting behaviour in Canadian labour markets. If search-theoretic explanations provide a reasonable expression of labour market realities, they are likely to be most evident in the case of job leavers. Our sample was restricted to quit cases for this reason, while later work will generalize these results to all the unemployed.

Our results provide evidence of considerable dynamism in labour market adjustment process. Unemployed workers are shown to be responsive to wage expectations and costs related to job search. Their asking wages (reservation wages) are not set arbitrarily but respond to changing economic circumstances. They are positively related to wage expectations and decrease as the cost of unemployed search rises. In responding to changing economic stimuli unemployed individuals behave in a way which is consistent with optimizing behaviour, i.e., they set their reservation wages and tailor their duration of unemployment to maximize benefits from search.

There are a number of other points to responsiveness of individuals to labour market conditions. Some 40 per cent of individuals in the sample express a willingness to accept a lower wage -- a very high percentage indeed. Job seekers exhibit other forms of (non-wage) flexibility as well. Some 62 per cent of males and 48 per cent of females looked for work in industries in addition to their own. A roughly comparable figure applies to searching in alternative occupations. Adding

to indications of responsiveness is the average tenure with previous employers, which turns out to be only slightly longer than two years. We find also that close to one-third of the individuals in the sample engaged in search on the job and that on-the-job search adds about 3 per cent to increases in post-unemployment wages.

Of special interest is the flexibility exhibited by reservation wages as the duration of search increases. We find that the RW declines as the duration of unemployment lengthens. The average rate of decline for the sample as a whole is somewhat low, only .12 per cent per month (in real terms). The low rate of decline appears to be due, in part, to the high income replacement floor provided by social security benefits: the rate of decline in RW for high-wage workers ($150 and above per week) is much larger than the low-wage workers' -- unemployment insurance, minimum floor and other social security benefits being a more important factor for the latter. The higher rate of decline for union workers relative to others can also be explained by the relatively higher wages of the former.

The process of labour market adjustment described above suggests that a part of the variations in the duration of unemployment is due to "employment-acceptance" frictions, i.e., unemployed workers hold out for a particular wage or range of wages rather than automatically accept the first job that opens up. Frictions in the market do not, by any means, explain all of the variations in duration of unemployment, but only a part of it, approximately one-fifth for our sample.

The policies to reduce the frictional component of unemployment also follow the search theory. Any factor which raises wage expectations or lowers the cost of search would tend to increase frictional unemployment. The determinants of wage expectations were discussed in detail in Section 3. From the policy perspective we note that wage expectations move with the cycle, rising with cyclical upswings and declining in recessionary conditions. Thus the frictional component of unemployment is larger during business upturn than it is in recessionary conditions.

More open to policy initiatives is the cost of search aspect of frictional unemployment. We have seen how sensitive the RW flexibility is to income replacement measures. Unemployment insurance benefits are a major element of the social security schemes.[17] By lowering the cost of search UI adds to frictional unemployment which, however, also contributes to a better worker-job match. The role of UI requires a very careful analysis and the contribution UI makes to productivity of the economy is an important area that needs to be researched. As Lars Osberg has stated recently the extent of potential wage and productivity gains due to increased search facilitated by UI has not received much attention in Canada and needs to be addressed urgently.[18] The question whether search itself is productive is examined in a forthcoming paper.[19]

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17 See also M. Feldstein, "Lowering the Permanent Rate of Unemployment", JEC, 1973 who emphasizes the role of UI.

18 Lars Osberg, "Unemployment Insurance in Canada: A Review of Recent Amendments", Canadian Public Policy, Vol. 2, Spring 1979, p. 225.

19 S. Gera and A. Hasan, Labour Turnover and Returns to Search (1979), forthcoming.

A second implication may be stated as follows: Underlying the search-theoretic explanations of unemployment is the assumption that the time taken by job seekers in contacting an employer is more or less constant. Frictional unemployment can be reduced considerably if the speed with which employers are contacted is increased, e.g., through the provision of labour market information. Availability of job banks at the Canada Employment Centres (CECs) is a step in this direction. However, the low penetration rate of CECs in the labour market is a major weakness. Removal of this hurdle can lower the component of frictional unemployment.

A third implication of our analysis is that programs which raise wage expectations, e.g. some types of job creation, would also tend to raise the frictional component of unemployment. In designing manpower policies this effect should also be taken into account.

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