Unemployment and Labour Force Attachment:

A Study of Canadian Experience 1997-1999

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I. Introduction

This report has two objectives: (i) to summarize the approach, methodology and results of our recent research into the labour market behaviour of persons with varying degrees of attachment to the labour market and (ii) to apply this approach to new data from the revised Labour Force Survey (LFS). The general approach builds closely on our earlier published work (Jones & Riddell 1998, 1999), which in turn has a foundation in earlier research by Flinn & Heckman (1983). In essence, the approach employs data on *behavioural outcomes*—such as whether a person will be employed in the future—as a way of testing the meaningfulness of different labour force related variables. In particular, it allows us to rank various groups within the population of persons not in the labour force in terms of their behavioural similarity to the unemployed.

The unemployment rate and labour force participation rate are widely used measures of labour force activity. Both are based on separating the non-employed into two groups: unemployed and non-participants. The reason for doing so is that the non-employed are very heterogeneous, with some having a strong attachment to the labour force and others having little or no labour force attachment. The conventional criteria for making this distinction are "availability for work" and "job search." Those who are available and looking for work are classified as unemployed (U) and the remainder are classified as out-of-the-labour force (O).

This method of classifying activities has proven useful for monitoring and analysing economic and labour market developments. Nonetheless, it is also generally recognized that the behaviour of individuals is very diverse, and it is unlikely that any simple categorization into two labour force states will adequately capture this diversity.

As a consequence, there may be disagreement about how best to distinguish between unemployment and non-participation. As a result of this disagreement, there is a need for additional measures of labour force status so that the diversity can be more clearly expressed.

The difficulties are associated with the "grey areas" that inevitably arise in making a sharp distinction between unemployment and out-of-the-labour force. Within each of these groups there may be significant heterogeneity. That is, some of the unemployed may be more eager to find work than are others. Similarly, some of those classified as non-participants may have a stronger attachment to the work force than have others. Because of these difficulties, countries may differ in how they implement broad concepts such as availability for work and job search. There may also be changes over time within a country in the definitions used.

Several examples illustrate these differences. The United States requires "active job search" for classification as unemployed whereas in Canada and most other OECD countries any job search method – including only "passive search methods" – is sufficient. Another example is that of "discouraged workers" – those who state that they want work but are not searching because they believe that no work is available. Discouraged workers were, at least in principle, included among the unemployed in Canada prior to 1975 and in the United States prior to 1967 but now are classified as out-of-the-labour force.[1] The treatment of full-time and part-time students is another area in which different countries have adopted different procedures. (See Statistics Canada, 1998, for details on current differences between Canada and the United States.)

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[1] In practice, in both countries it is unclear to what extent discouraged workers were included among the unemployed.

The conventional approach to these difficult measurement issues has been to employ a priori reasoning about appropriate definitions together with the self-reported behaviour of survey respondents. For example, most countries use job search rather than a weaker criterion such as the expressed desire for work on the basis that those who are looking for work are displaying by their behaviour their strong attachment to the labour force. Those who say they want work but are not searching are not providing enough evidence of their labour force attachment to warrant their being classified as unemployed. According to this reasoning, "discouraged workers" are more appropriately classified as non-participants than as unemployed.

The same kind of reasoning is used to justify the requirement of "active job search" for measurement as unemployed, and thereby treating those using only "passive search" – such as "looking at job ads" – as non-participants. According to this perspective, why should we consider someone who only looked at ads to be serious enough about finding work to be treated as unemployed?

The conventional approach has important advantages. The classifications are based on observable activities and are for the most part consistent across countries and over time. As a consequence of the desire for data that yields internationally comparable estimates, this method of measuring labour force activities has become widely used, including in recent years adoption in many European countries that previously relied on administrative data on unemployment benefit programs for these purposes.

In this paper we supplement the a priori classification of labour force status with information about behavioural outcomes. We classify individuals in the same labour force state if they display equivalent behaviour in terms of their subsequent labour force

status. For example, we may regard two groups as being equally attached to the labour force if they are equally likely to be employed in a subsequent period. This method thus involves examining the labour force transition behaviour of various subsets of the unemployed and non-participants.

This type of evidence can be used to identify groups that deserve consideration for inclusion in supplementary measures of unemployment, the principal focus of this report. In particular, some subsets of those classified as out-of-the-labour force may display transition behaviour that is closer to that of the unemployed than is the case for other non-participants. In these circumstances, those groups whose behaviour is closest to the unemployed are, according to this approach, better candidates for inclusion in any supplementary measures of unemployment than those groups whose transition behaviour is less similar to the unemployed.

Our first research in this area used data from the Survey of Job Opportunities (SJO) over the period 1979-92. The SJO, carried out in March of most years during this period, asks the non-employed who are not looking for work whether they want work and, if so, their reasons for not searching. We refer to those who state that they desire work as "marginally attached" and the remainder as "non-attached". This corresponds to separating the out-of-the-labour force category (O) into two subsets – marginal attachment (M) and non-attachment (N). By linking data from the March SJO to the subsequent month's LFS, the labour force transition behaviour of the unemployed (U), marginally attached (M) and non-attached (N) can be compared.

This methodology can also be applied to heterogeneity within the unemployment category. For example, the transition behaviour of "active" and "passive" job searchers

can be compared, and both can be compared to that of the marginally attached as well as to other subsets of the non-participant category.

This general approach seems to be a promising method for bringing evidence to bear on the difficult questions of how best to measure unemployment and labour force participation and on the related questions of how best to design supplementary measures of unemployment. We do not claim that these issues can be resolved on the basis of this type of evidence alone. However, we do believe that this approach can help make more informed decisions on these important issues.

In this paper, the results are based on Labour Force Survey data for the period January 1997- April 1999. The LFS recently underwent a major revision, with the new survey in place since January 1997. Because of the changes to the questionnaire, it is worth investigating whether the findings of our previous research with the SJO (a supplement to the LFS) continue to hold with the revised survey. In addition, seasonal factors may play an important role in the determination of labour market activity and status, and seasonality has necessarily beyond the scope of our earlier work that relied on SJOs that were almost all held in March each year. The new LFS provides monthly information on the desire for work among non-searchers, as well as reasons for not searching. Thus there is richer information on the marginal attachment group than was previously available.

The report is structured as follows. The next section provides a more detailed explanation of the methodology. Remaining sections provide evidence on labour force transitions of various subsets of the non-employed. First we examine the behaviour of the three groups discussed above: unemployed, marginally attached, and non-attached.

This is followed by an investigation of heterogeneity within the unemployed category. Differences among temporary layoffs, future job starts, and job searchers are first examined. A subsequent section assesses differences among job seekers by methods used for job search, including "active" and "passive" methods.

The remainder of the report examines heterogeneity among those classified as out-of-the-labour force. Differences within the marginal attachment category are examined, according to their stated reasons for not searching for work. This includes an analysis of discouraged workers. The next section then analyses differences within the non-attached category, in particular between "long term future job starts" and the remainder of the non-attached. The penultimate section presents more formal results on our various tests of equivalence, tests that largely confirm the evidence presented in the earlier sections. The final section summarizes our conclusions.

II. Methodological Overview

The methodology of this research can be summarized in the context of a Markov model of labour market states and transitions. Suppose, for instance, that we envisage the existence of four distinct labour market states: employment E, unemployment U, marginal attachment M and not-attached to the labour force N. The states E and U use conventional definitions, while M and N are obtained by dividing non-participants into two subsets, M and N (i.e., the out-of-the-labour-force group $O = M + N$). M and N can be defined in various ways. One approach we have employed in earlier work is to think of the marginal attachment group M as comprised of persons who, although not currently searching for a job (and hence not classified as unemployed), report that they "want a

job." If we then examine the probability of moving, from one month to the next, from one such state to another, the Markov restriction means that this probability is completely determined by the current labour market state. (This rules out, therefore, situations where the transition probability depends on how long a person has remained in a given state.)

Given this Markov structure, an assessment of whether two labour market states are behaviourally equivalent amounts to testing whether the transition probabilities out of the two states are equal, either unconditionally or conditional on a set of observable explanatory variables. For example, denoting the month-to-month transition probability from M to E as pME, and analogously for other states, a test of the equivalence of M and N amounts to testing whether the conditions

$$pME = pNE \qquad (1a)$$

$$pMU = pNU \qquad (1b)$$

jointly hold in the data. If this example were true, this would imply that there was no significant difference between M and N from this behavioural, forward-looking standpoint, and the usual breakdown of labour market activity into three states, E, U and O, would be appropriate, where O represents out of the labour force and amounts to the sum of M and N.

Similarly, a test of the equivalence of U and M involves testing whether the conditions

$$pUE = pME \qquad (2a)$$

$$pUN = pMN \qquad (2b)$$

jointly hold. If these restrictions hold, there is no significant behavioural difference between those who are searching for work and those who want a job but are not

searching. In these circumstances this methodology would imply that the measurement of unemployment should be based on the desire for work rather than on job search.

Of course, it is possible that both pairs of restrictions [1a and 1b and 2a and 2b] are rejected by the data. In these circumstances, U and M are distinct states in terms of labour market transition behaviour and similarly M and N are distinct states. In this case, it may be possible to order the states in terms of their degree of labour force attachment. For example, we may find (as was the case in our earlier research – see Jones and Riddell, 1999) that $pUE > pME > pNE$ and $pUU > pMU > pNU$ and $pUO < pMO < pNO$.[2] Thus M is an intermediate state between U and N in that the marginally attached are more likely to obtain employment than the not attached but less likely to obtain employment than their attached counterparts, while the probability of labour force withdrawal is least for the unemployed and greatest for the not attached. Such a finding would indicate that the marginally attached are distinct from the unemployed but nonetheless are closer to the unemployed in terms of their degree of labour force attachment than are the not attached. If these results are obtained, the M group would be a better choice than the N group for any supplementary measures of unemployment.

Analogous to this example, our procedures permit testing of equivalence for a variety of states, including sub-categories of the unemployed (e.g., according to different job search methods) and sub-categories of the marginally attached group (e.g., according to the reason specified for "not searching" for a job). In addition, it is possible to estimate models of the determinants of these transition probabilities and to test whether the same

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[2] In our earlier research we were able to observe 4 states (E,U,M,N) in the origin month and 3 states (E,U,O) in the destination month. In this paper we can observe all 4 states in both months so that the latter inequality would be $pUN < pMN < pNN$.

estimated model holds for two different origin states, thereby testing the framework conditional on this model structure and the associated set of explanatory variables.

Finally, one can also investigate the structure of transition probabilities over a longer time frame. We have addressed this in two ways. First, we examine the hazards into employment at each of months 3, 4, 5, and 6 after the survey date (supplementing the study of employment at month 2 reported so far). To give an example, we look at the transition probability of being, say, employed in month 4 given the reported status in month 1 (and disregarding whatever happens in any intervening months). As noted below in the discussion of data, we must contend with smaller sample sizes at these longer horizons owing to the rotation group structure of the LFS. Second, we also examine the hazard into employment in *any* subsequent month covered by the survey. The former method—based on observation at one particular point in time—is the closer analogue to the LFS employment in a reference week, although it may be informative to consider both approaches. Since these results turn out to be voluminous and, by and large, consistent with the results using the initial month-to-month approach, we summarize the key findings in the text but omit the detailed tabular and graphical evidence.

III. Data Overview

The data we employ are drawn from recent Labour Force Surveys (LFS) and cover the period January 1997 to April 1999. Thus, we are using the "new" LFS which includes, among other things, detailed questions each month that permit analysis with a

fine degree of gradation of the labour force status of the non-employed.[3] The outcome-based behavioural approach we adopt means that we must use linked records, so that we can match up an individual's survey response in one month to that individual's labour market outcomes in subsequent months. This linkage utilizes the rotation group structure of the LFS whereby respondents remain in the frame for six consecutive months. Hence, 5/6ths of the sample in any month can be matched to the same individuals in the next month. Correspondingly, for 4/6ths of the sample, the match can go out two months from the starting month, and so on. In the sixth month after a given month, 1/6th of the original sample will still be covered by the LFS.

In this context, we should note that the present data are superior to those used in our earlier research, chiefly because the same questions on labour force status are available in each month under study. In contrast, in our earlier work with the Survey of Job Opportunities (SJO) matched to the subsequent LFS, using the pre-1997 design of the LFS, we had different information available for the origin states (from the SJO) than for the destination states (from the LFS). This led to some econometric limitations and to some hypotheses of interest not being testable with those data. Happily, the structure of the LFS since January 1997 permits the identification of these finer gradations of labour market status in every month surveyed, and as a consequence the results reported here are clearer and more reliable.

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[3] For a description of the LFS and the 1997 version of the survey questionnaire, see the *Guide to the Labour Force Survey* (catalogue no. 71-543-GIF) on the Statistics Canada web site at http:www.statcan.ca/english/concepts/labour/index.htm.

IV. Empirical Results

We report first on the basic patterns in the data, looking at average values over the sample period and the behaviour of the transition probabilities during the period January 1997 to April 1999. Since these simple results are very informative, we present a lot of this data, much of it graphically, as a way of examining the sub-categories within the usual labour market states. We then turn to the econometric results that, to a very large degree, confirm the expectations established by the unconditional data. Finally, we should comment that we have also examined a wealth of related results on longer term transitions, evidence that is too voluminous to include here. These ancillary results complement the main conclusions and are largely consistent with them. Below, we comment on these additional findings where there is a particular lesson to be drawn.

V. Transitional Behaviour from Three Non-Employment States

Table 1 reports the average transition rates (or hazards) on a month-to-month basis for the period January 1997 to April 1999. In the first panel, the average hazard from the three non-employment states (U, M, N) into the four categories (E, U, M, N) is reported. For the transition rate into employment, there is a clear difference between U and M as origin states, with the hazard from unemployment being about 21%, almost double that of the marginal group (12%). In addition, though, there is a clear difference between the M group and the non-attached N group, with the hazard pNE being only 3%. We regard these differences as large, and note that they are consistent with our earlier findings using the SJO-LFS match where we found, for example, month-to-month hazards of 18%, 12% and 3% for pUE, pME and pNE respectively, for the period 1979-

81 and 16%, 12% and 3% respectively for 1984-91. As in that earlier research, we suspect that these initial differences underlie a genuine behavioural difference both between U and M and between M and N. Statistical tests of these and related hypotheses are reported below.

The remainder of the first panel in Table 1 shows the associated pattern of hazards into the three non-employment states, U, M and N. For each destination state, there is a clear difference between origin states U and M and between origin states M and N. For the hazard into U, the average from M is 22%, an order of magnitude higher than the pNU hazard (2.4%), while for the hazard into N, pMN is nearly 33% while pUN is 13%. In each case, the diagonal terms (pUU, pMM, and pNN) are the largest. Examination of these diagonal terms suggests that M is the least stable state, with only a one third chance of remaining in the marginal state from one month to the next, while N is the most stable, with the likelihood of remaining in the non-attached state being 93%. Overall, the pattern of the non-employment hazards is congruent with the findings for the three hazards into employment in that U, M and N appear to have significantly different behavioural consequences. Furthermore, there is a clear ordering of the three non-employment states, with pUE > pME > pNE, as well as pUU > pMU > pNU, and pNN > pMN > pUN, suggesting that M is an intermediate state between U and N in terms of labour force attachment.

The time series properties of these various hazards are displayed in Figures 1-4 for the transitions into E, U, M and N respectively. There is some variation in these hazards over time—variation we interpret as partly seasonal and partly the result of secular changes—but, consistent with the average values in Table 1, the hazards display a

clear separation in each case. Thus there is considerable stability over time in the ranking of these three non-employment states, a feature that was also evident in our previous research with the linked SJO-LFS data.

Finally, we comment briefly on the properties of the transitions over horizons beyond one month, and on how these measures compare with those in the text. Recall that the point-in-time analogues of the month-to-month results focus on the destination month being in month 3, 4, 5 or 6 of the observed survey period. It is notable that the ranking of the states remains constant across the various durations. Relative to the values graphed in Figure 1, the move to a longer time horizon raises the hazards, as would be expected (e.g., pUE in Figure 1 lies between 0.15 and 0.30, while over a six month interval it lies between 0.30 and 0.50). Similarly, the "ever employed" criterion raises all transition rates (over a six month horizon pUE in this case lies between 0.40 and 0.65), but again the ranking of the three transition probabilities remains at pUE > pME > pNE, and these three probabilities are quite distinct. Overall, we conclude from this and other evidence on longer term movements that the central results are not sensitive to the month-to-month transitional evidence used in the body of this report, and that alternative measures that reflect longer time horizons yield broadly similar conclusions on degrees of labour market attachment.

VI. Transitional Behaviour from Sub-Categories of Unemployment

The second panel of Table 1 reports average hazards from three unemployment sub-categories, temporary layoffs (TL), job searchers (JS), and future job starts (FJ), and the related time series are shown in Figures 5-8. For transitions into employment, the FJ

group has much the highest hazard on average at 71%. Although these series do vary through time, as illustrated in Figure 5, the ranking is consistently that FJ unemployed are more likely to move into E than TL unemployed, who in turn are more likely than the JS group. Approximately, these differences in the various pUE hazards are counterbalanced by differences in the pUU hazard, as shown in Figure 6 where the ranking is exactly reversed. This leaves only small monthly probabilities of moving from any of these unemployment sub-categories to either M or N, as the averages in Table 1 and Figures 7 & 8 confirm. Moreover, there is no clear ranking of the pUM and pUN hazards for these three sub-categories.

Once again, if we use the alternative measures of transitions the results are little altered. The magnitudes of the hazards are raised, but the overall properties remain unchanged.

These results indicate that those classified by the LFS as temporary layoffs and future job starts have a very strong attachment to the labour force, a finding that clearly supports current practice of inclusion of these two groups among the unemployed.

VII. Transitional Behaviour by Search Method

The third panel of Table 1 reports average hazards from six unemployment sub-categories, defined according to whether or not the individual reported use of a particular method of job search. We initially look at this breakdown including individuals who reported use of one or more search methods (so that there may be double-counting of individuals within these averages). Below, we also look at the search method breakdown for individuals who reported use of only one search method. As above, the Table reports

the average values over our sample period while the associated graphs, Figures 9-12, give the time series behaviour.

The six search methods are identified in the graphs as follows: Used Public Employment Agency (pea); Checked With Employers (emp); Contacted Relatives (rel); Looked At Ads (lads); Answered Ads (aads); and Used Other Method (oth). "Looked at ads" is considered a "passive" search method because no action is taken which would result in a job offer; the other five methods are considered "active".[4] The bottom row of the third panel in Table 1 also reports the average transition rate for those using one or more active search method, that is for all searchers except those whose only search method was "looked at ads".

There is (perhaps surprisingly) little variation in the average hazards into employment according to the search method used. The lowest average pUE value is 0.174 for "Looked at Ads" and the highest is 0.218 for "Used Other Method" and the range of values is quite small. Similarly, the other three hazards (into U, M and N), shown in the subsequent columns of this panel in Table 1, display considerable uniformity across search method. In addition, while the graphs in Figures 9-12 show some variation through time -- some of which appears to be seasonal in nature – the plotted series do indeed move more or less in unison.

The fourth panel of Table 1 contains the average hazards by job search categories where only one method is reported. When the data are organized in this manner, we see

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[4] The Bureau of Labor Statistics treats any job search activity that has no potential to directly result in a job offer as "passive". Looking at ads does yield information about available jobs but in the absence of additional action (such as answering ads) will not directly result in an offer of employment. According to this distinction, "checked with public employment agency" and "checked with friends or relatives" may also be considered passive search methods.

somewhat greater variation in the transition probabilities associated with different search methods. The passive search method "Looked at Ads" now has an average transition probability into employment of 0.124, almost half the value of the highest single hazard. In contrast, "Checked with Employer" and "Used Other Method" have high hazards into employment on a regular basis, matched by lower averages for these two search methods for the pUU hazard.

In interpreting these data, it is important to keep in mind that many searchers use more than one method in a given month. Thus it is not correct to conclude from the evidence in Table 1 that "looked at ads" is the least effective search method, although this is the case among the subset of individuals who employed only one search method.

Also it should be borne in mind that individuals' decisions about which search methods to use are affected by their economic situation, and will probably vary systematically with job prospects, elapsed unemployment duration, and household circumstances. These average transition rates hence represent the behaviour of individuals who chose to use such a search method (or methods), and cannot be interpreted as evidence of what should be expect to occur where a randomly chosen individual assigned to a particular method of search.

VIII. Transitional Behaviour for Active and Passive Searchers

Another important question for the measurement of labour force attachment is whether there is a difference in future behavioural outcomes between individuals who engage in active job search and those who employ only passive search methods. We address this issue, and compare the labour market behaviour of active and passive

searchers to that of the marginally attached, in Figures 13-16. The average transition rates of active and passive searchers are also reported in the third and fourth panels of Table 1.[5]

The three hazards into employment graphed in Figure 13 show a fairly stable pattern. The hazard from active search pAE is the highest in every month, ranging from 13% to 25%, while the hazards from passive search pPE and from marginal attachment pME move quite closely together with values that are about 5 percentage points lower on average than the active search figures. The passive search hazard is more volatile than that for the marginal group, perhaps as a consequence of sample size, but on average there is not much to choose between the two series. This impression is confirmed in Table 1 which shows that the mean transition rates pME and pPE are .116 and .124 respectively, a difference that is unlikely to be statistically significant. To the extent that the active searchers appear to have different behavioural outcomes than the passive search group, these results provide some support for a protocol that distinguishes between the two groups in reporting unemployment statistics. However, to the extent that the passive search group—like the marginally attached group—exhibits behaviour that is clearly distinct from the N category, it would not appear correct to aggregate the passive searchers with the N group for reporting purposes.

Although the likelihood of being employed in the following month is approximately equal for passive searchers and for the marginally attached, the probabilities of moving to other states (U, M, N) differs substantially between the two groups. Indeed, in these respects active and passive searchers display very similar

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[5] Most searchers use multiple search methods. "Passive" search refers to those who use only "looked at ads".

behaviour (see Figures 14, 15, 16). For example, the hazards pAU and pPU track each other very closely and substantially exceed pMU. This suggests that, relative to active search, passive job search is not simply a transitional state on the way to labour force withdrawal. Figure 16 provides further evidence along this line; passive searchers are slightly more likely to move into non-attachment, but much less so than are the marginally attached.

Reviewing the evidence on longer term transitions, we find that these broad conclusions hold for these alternative ways of characterizing labour market dynamics. The various point-in-time measures for 3, 4, 5 and 6 month horizons show a similar ranking with active search being more attached to the labour force than either passive search or marginal attachment. Similarly, the "ever employed" evidence shows values that are higher for each hazard (e.g., pAE is now about 0.5 over a six month horizon, compared with a value around 0.2 in Figure 13), but the ordering is consistently preserved: pAE exceeds pPE and pME, while these latter two hazards have quite similar values, both in terms of the sample means and the dispersion of the series.

IX. Transitional Behaviour of the Marginally Attached by Reasons for Not Searching

The marginally attached group is made up of a variety of different types of individuals with different reasons for simultaneously reporting no job search and yet reporting a desire for a job. The available data permit some disaggregation of the M group according to the reason specified for not searching, the four sub-categories employed here being Waiting, Personal, Discouraged, and Other. The Waiting group

includes those "Waiting for replies or recall"; Personal includes "Own illness or disability", "Caring for own children", "Other personal or family responsibilities", and "Going to school". Discouraged refers to those not searching because "Believes no work available". In our earlier work, we found important heterogeneity within the marginal group, so it is essential that we investigate this issue here.

The fifth panel of Table 1 reports average hazards for the four reason codes within the Marginal group and Figures 17-20 graph the hazards for the whole sample period. Addressing first the various hazards into employment, the striking result is that the hazard out of "Waiting," pM(W)E, is much higher than the hazards from the other three sub-categories. The Waiting hazard has an average of over 26% and exhibits monthly values of up to 40%, in contrast to the other three hazards which have average values in the 6-10% range. This difference is consistent with the importance found for the Waiting group in our earlier work. These results indicate that the Waiting group exhibits stronger attachment to the labour market than the remainder of those who state that they desire work. The higher value of pM(W)E is accompanied, as can be seen from the final column in the Table and from Figure 20, by a much lower hazard into N, so the Waiting group are both more likely to move in employment and less likely to leave the labour force than the other members of the marginal category. Finally, we note that the distinctive properties of the Waiting group also hold for transitions longer than one month ahead. Thus there is considerable evidence to support the inclusion of the Waiting sub-category of marginal attachment in supplementary measures of unemployment.

One other point worth noting from these results is the behaviour of the Discouraged group, a sub-category of the marginally attached that has traditionally

received considerable attention in policy debate. Our results show little difference between pM(D)E and the two other non-waiting hazards (pM(P)E and pM(O)E), as Figure 17 clearly illustrates, and not much difference in the respective hazards for moving into unemployment (Figure 18), although the Personal sub-category is lower than the other three in this case. The Discouraged are the most stable sub-category within the Marginal group, in that their likelihood of remaining marginally attached (pM(D)M) averages about 43% and exceeds that of the other three sub-categories in almost all months (Figure 19). However, there is not much difference between the hazards into N for Discouraged and the Other sub-categories, both of which lie below that for the Personal group (pM(P)N) and above that for the Waiting group (pM(W)N) in Figure 20. Again, these conclusions are supported using the longer horizon measures of transitions. Overall, this evidence does not support the view that the Discouraged constitute a particularly distinctive sub-category of the marginally attached.

X. Transitional Behaviour for Long-Term Future Job Starts and Other Non-Attached

A further set of issues in labour force attachment and the measurement of labour force status arises for individuals who have a future job start at a point more than four weeks away from the survey date. Such individuals, referred to as long-term future job starts (LTFS), are categorized as N (in the absence of the usual job search and availability criteria for categorization as U), and are hence treated differently than individuals with a job start at a definite date within four weeks of the survey—Short-Term Future Job Starts—who do not have to meet the search criterion to be numbered among the

unemployed. The final panel of Table 1 reports average hazards for this LTFS group and for the rest of the not attached group (NA). In addition, Figures 21-24 display the hazards for these two groups, compared to the hazard for the marginally attached.

The LTFS group displays a large hazard into employment (in the *next* month); at 25%, it is almost an order of magnitude higher than that of the rest of the NA group. The LTFS individuals also have a high average transition rate into unemployment, about 23%, compared with a 2% average for the NA population. Most of these differences are associated with a much lower probability that a LTFS group member will remain in the N category in the next month, this average being under 50% (compared with a "stay-put" probability of over 93% for the NA group). Moreover, the behaviour of these average values is also reflected in the monthly figures graphed in Figures 21-24, where LTFS is clearly distinct from the NA group in every month. There is therefore considerable heterogeneity within the N group as a whole.

If we then compare the LTFS group with the marginally attached, as in Figures 21-24, we can see that the LTFS members have a higher probability of entering employment than the M group (Figure 21), although the two groups have fairly similarly average hazards into unemployment (Figure 22); the p(LFTS)U series is more choppy than the pMU series, probably as a consequence of sampling error, but their central tendencies are very similar. Thus, on the criterion based on behavioural outcomes for employment and unemployment in the next month, the LTFS group is certainly more strongly attached to the labour force than the remainder of the non attached group. Indeed, they also exhibit greater attachment than those who state that they want work (i.e. the marginal attachment category).

The definition of the LTFS group, with the particular specification that the job start be more than four weeks ahead of the survey date, naturally raises a question about labour market behaviour in *subsequent* months. We have investigated this in two ways, as mentioned above: first, using hazards into employment at each of months 3, 4, 5, and 6 after the survey date; and second, using the hazard into employment in *any* subsequent month covered by the survey. The results at these longer horizons are quite consistent with the initial month-to-month results. At each subsequent month, the hazards for LTFS are above those for the NA and the M groups. Similarly, the results for employment at any subsequent date show p(LTFS)E > pME in every month. Thus consideration of longer-term employment outcomes reinforces the conclusion that the LTFS group exhibits much stronger attachment to the labour force than the remainder of the non-attached category.

XI. Econometric Results of Equivalence Testing

In addition to the unconditional transition probabilities presented in Table 1 and in the many associated Figures, it is important to address whether these findings are also present conditional on a set of observable control variables. To do this, we have estimated a number of multinomial and binary logit models of the determinants of transition probabilities into employment and the non-employment states. These models allow us to test the restrictions such as equations (1a) and (1b) or (2a) and (2b). Essentially, our method then examines whether two different origin states (such as M and U, say) give sets of estimated coefficients that are insignificantly different from one another, in a statistical sense. Equivalently, we are testing whether we could simply *pool*

the two origin states in question, and still reach the same estimated model for the determination of these transition probabilities. If the estimated coefficients are indeed insignificantly different, so that one could pool the two states without loss of information, then we will regard the two states as behaviourally equivalent. Conversely, if we reject pooling and the two sets of coefficients are statistically different at an appropriate level of significance, then we conclude that the two states are behaviourally distinct.

The main results from this estimation are contained in Table 2. In each case, the estimated multinomial or binary logit model contains as explanatory variables: age, education, gender, marital status and province. The models are estimated separately for each of the monthly samples. For ease of interpretation, we report the p-values in addition to the values of the likelihood ratio statistics.

In each sample, the tests clearly reject the equivalence of M=N and U=M. This can be seen from the large values of the likelihood ratio test statistics in columns 4 and 5 of Table 2, and the p-values of 0.00 for all months for both tests. Thus these formal statistical tests confirm the evidence from Table 1 and Figures 1-4 that suggests that U, M and N are distinct states.

The tests of the equivalence of active and passive search are much less conclusive. In seven of the samples, the equivalence of A=P is not rejected at the 5% level of significance (i.e. the p-value equals or exceeds 0.05) and in all samples the values of the test statistics are much lower. These results suggest that active and passive searchers are not clearly distinct from each other in their degree of labour force attachment, although their behaviour is modestly different in some months. In contrast, the binary logit tests clearly reject the equivalence of passive search (P) and out-of-the-

labour force (O=M+N) in all samples. Thus in terms of the degree of labour force attachment, passive searchers appear to be closer to active searchers than to non-participants.

XII. Conclusions

This report has applied the methodology and techniques from our recent research to study labour force attachment using the best and most recent Canadian data, drawn from the LFS 1997-1999. The goal is to apply this approach to the issue of the selection of alternative measures of unemployment. The approach relies on use of behavioural outcomes to determine an appropriate set of labour market categories, the central idea being that individuals in one group are classified as being more attached to the labour force state than those in another group if they display a greater likelihood of being employed in some future period, and a lower probability of labour force withdrawal. We believe that this approach is an important supplement to existing methods of categorization that rely chiefly on self-reported current information, although we reiterate that we do not think that this evidence alone can resolve all of these contentious issues.

While the report contains many findings, it is useful to summarize the principal results of applying this methodology to the recent LFS data as follows.

    a)   Breaking down the non-employed group into three potential sub-categories, unemployed (U), marginal attachment (M), and not-attached to the labour force (N), there is a clear behavioural difference between each pair of these sub-categories. The unemployed move into jobs much more quickly than the marginally attached, who in turn transit into employment with a probability four times that of the not-attached group.

b) The differences among the non-employment states U, M and N in their associated transition probabilities into employment are quite stable over time in recent years and are consistent with our earlier research that used the SJO-LFS dataset for 1979-92.

c) These differences in the transition rates into employment are also matched by analogous behaviour of the movements into the other three states, U, M and N. Based on all four destination states, we conclude that M is a distinct intermediate state between U and N in terms of labour force attachment.

d) These differences are also evident at longer time horizons (in months 3 through 6 after the initial survey) and using an alternative measure of "ever" being employed, subsequent to the initial survey month, so there is nothing unusual about the behaviour on a month-to-month basis.

e) Turning to heterogeneity among the unemployed, the Future Starts group has the greatest hazard into employment, followed by those on Temporary Layoff, with Job Searchers as a whole having a lower transition probability into employment. These results support the current practice of including temporary layoffs and future job starts among the unemployed.

f) Within the search group, reported individual search methods do not lead to large variation in the hazard into employment. This finding may be due to use of multiple search methods by many job seekers, as well as to individuals choosing the methods they expect to be most effective for their circumstances. However, there are some differences between "active" and

"passive" searchers. On average, active search is more likely to lead to employment than is passive search. However, formal statistical tests do not reject the equivalence of active and passive job searchers in all samples. To the extent that these outcomes by search type are different, our results therefore give some grounds for reporting active and passive search statistics separately. However, tests clearly reject the equivalence of passive searchers and non-participants; thus our results do not lend support for aggregating passive searchers with those classified as out-of-the-labour force.

g)   Within the marginally attached group, we also find some evidence of heterogeneity. The "Waiting" sub-category has a higher transition probability into employment than is the case for the remainder of the marginal attachment group. This evidence indicates that those who state that they desire work but are not searching because they are "waiting for recall or replies" deserve strong consideration for inclusion in supplementary measures of unemployment.

h)   There is no clear difference in terms of subsequent labour market behaviour between the "Discouraged" group and the balance of the marginal category. This evidence suggests that discouraged workers do not exhibit stronger labour force attachment than those who want work and are not searching for "personal" and "other" reasons.

i)   Finally, there is also some heterogeneity within the not-attached group. The principal reason is the high degree of attachment displayed by long-

term future job starts, with a transition rate into employment that is an order of magnitude greater than that recorded by the rest of the not-attached. This conclusion is reinforced when we consider longer-term transition rates, which is a natural thing to do when considering job starts that are supposed to be more than four weeks in the future.

Overall, the results from this study are very consistent with the findings in our earlier work. These data are richer than the SJO-LFS match we previously worked with, principally since they permit identification of a range of labour market states in both the origin and the destination month. They bolster the position that, for measuring labour market attachment, data on subsequent labour market outcomes can be an important and robust supplement to data on current activities.

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TABLE 1

Average Transition Rates January 1997 to April 1999

Transitions to:	E	U	M	N
Transitions from:				
Non-Employment States:				
U	0.215	0.598	0.060	0.127
	(0.006)	(0.007)	(0.003)	(0.005)
M	0.116	0.222	0.334	0.328
	(0.008)	(0.010)	(0.011)	(0.011)
N	0.031	0.024	0.014	0.931
	(0.011)	(0.000)	(0.001)	(0.001)
Unemployment States:				
TL	0.470	0.421	0.050	0.060
	(0.025)	(0.025)	(0.011)	(0.012)
JS	0.177	0.628	0.062	0.133
	(0.006)	(0.007)	(0.004)	(0.005)
FS	0.706	0.163	0.041	0.091
	(0.037)	(0.029)	(0.016)	(0.023)
Job Search by Search Method (one or more methods):				
Used Public Agency	0.186	0.650	0.052	0.111
	(0.012)	(0.015)	(0.007)	(0.010)
Checked with Employer	0.200	0.597	0.061	0.142
	(0.009)	(0.011)	(0.005)	(0.008)
Contacted Relatives	0.192	0.616	0.053	0.139
	(0.015)	(0.018)	(0.008)	(0.013)
Looked at Ads	0.174	0.635	0.054	0.137
	(0.010)	(0.013)	(0.006)	(0.009)
Answered Ads	0.203	0.626	0.047	0.124
	(0.016)	(0.020)	(0.009)	(0.014)
Used Other Method	0.218	0.625	0.050	0.107
	(0.022)	(0.025)	(0.011)	(0.016)
Active Searcher	0.181	0.628	0.060	0.131
	(0.020)	(0.030)	(0.016)	(0.023)

TABLE 1 (continued)

Average Transition Rates January 1997 to April 1999

Transitions to:	E	U	M	N
Transitions from:				
Job Search by Search Method				
(single search method only):				
Used Public Agency	0.153	0.636	0.077	0.134
	(0.024)	(0.032)	(0.017)	(0.022)
Checked with Employer	0.200	0.553	0.080	0.167
	(0.013)	(0.017)	(0.009)	(0.013)
Contacted Relatives	0.169	0.595	0.082	0.154
	(0.035)	(0.046)	(0.026)	(0.034)
Looked at Ads	0.124	0.628	0.076	0.171
	(0.020)	(0.030)	(0.016)	(0.023)
Answered Ads	0.176	0.619	0.067	0.138
	(0.036)	(0.047)	(0.024)	(0.033)
Used Other Method	0.223	0.587	0.063	0.127
	(0.036)	(0.043)	(0.021)	(0.029)
Marginal Attachment by				
Reasons for Not Searching:				
Waiting	0.265	0.271	0.322	0.143
	(0.022)	(0.022)	(0.023)	(0.018)
Personal	0.086	0.180	0.303	0.432
	(0.010)	(0.014)	(0.017)	(0.018)
Discouraged	0.066	0.240	0.426	0.269
	(0.012)	(0.020)	(0.023)	(0.021)
Other	0.105	0.269	0.308	0.319
	(0.022)	(0.032)	(0.033)	(0.033)
Non-Attachment:				
LTFS	0.253	0.225	0.052	0.471
	(0.032)	(0.030)	(0.016)	(0.036)
NA	0.030	0.023	0.014	0.933
	(0.001)	(0.001)	(0.001)	(0.001)

*Standard errors in parentheses

TABLE 2

Probability Values and Likelihood Ratios for LR Tests of Equivalence

Sample	Multinomial Logit Tests					Binary logit test		
	M=N U=M			A=P		P=O		
	P-Value	Likelihood Ratio M=N	Likelihood Ratio U=M	P-Value	Likelihood Ratio	P-Value pPE=pOE pPA=pOA	Likelihood Ratio pPE=pOE	Likelihood Ratio pPA=pOA
0197	0.00	4871.8	1756.4	0.00	64.5	0.00*	23.0	1905.7
0297	0.00	4480.3	1645.3	0.00	40.2	0.00	44.4	1873.0
0397	0.00	4186.3	1608.9	0.00	44.5	0.00	35.1	1704.4
0497	0.00	3935.0	1326.6	0.02	32.9	0.00	80.7	1478.7
0597	0.00	3262.9	1106.8	0.05	28.5	0.00	50.7	1241.4
0697	0.00	3438.0	1298.3	0.00	38.5	0.00	63.1	1211.4
0797	0.00	3092.4	1132.6	0.32	20.2	0.00	27.9	1286.1
0897	0.00	3062.6	1033.8	0.00	45.4	0.00	109.6	1414.6
0997	0.00	3442.7	1365.8	0.00	37.3	0.00	57.6	1364.0
1097	0.00	3723.5	1359.7	0.02	32.3	0.00	38.6	1313.6
1197	0.00	3732.0	1414.0	0.01	34.7	0.00	31.3	1467.3
1297	0.00	4006.1	1396.1	0.01	35.4	0.00	34.7	1445.9
0198	0.00	4104.8	1149.8	0.01	33.6	0.00	63.0	1479.6
0298	0.00	4068.0	1486.9	0.00	68.9	0.00	67.1	1483.2
0398	0.00	3253.1	1298.5	0.23	21.9	0.00	38.7	1390.8
0498	0.00	3292.7	1240.5	0.00	40.3	0.00	27.0	1256.7
0598	0.00	3102.7	1081.3	0.01	36.8	0.00	79.8	1246.5
0698	0.00	**	1047.7	0.00	38.3	0.00	89.2	976.6
0798	0.00	2967.5	995.3	0.00	39.3	0.00	97.9	1176.1
0898	0.00	2943.0	837.6	0.05	28.9	0.00	60.0	1258.1
0998	0.00	3285.3	1000.0	0.00	58.1	0.00	55.9	1152.8
1098	0.00	3508.0	1254.8	0.07	27.6	0.00	42.6	1264.8
1198	0.00	3634.4	1370.4	0.00	37.5	0.00	70.9	1361.3
1298	0.00	3790.1	1250.6	0.00	52.8	0.00	57.7	1373.9
0199	0.00	3851.1	1359.8	0.10	25.8	0.00	51.5	1471.1
0299	0.00	4056.2	1291.5	0.01	34.6	0.00	42.8	1397.3
0399	0.00	3849.4	1360.8	0.14	24.6	0.00	51.9	1284.4
0499	0.00	3231.7	1250.1	0.00	37.9	0.00	50.2	1025.4
d.f.		*27*	*27*		*18*		*9*	*9*

* pPE=pPO is .01

** did not converge

Figure 1
Transition Rates Into Employment
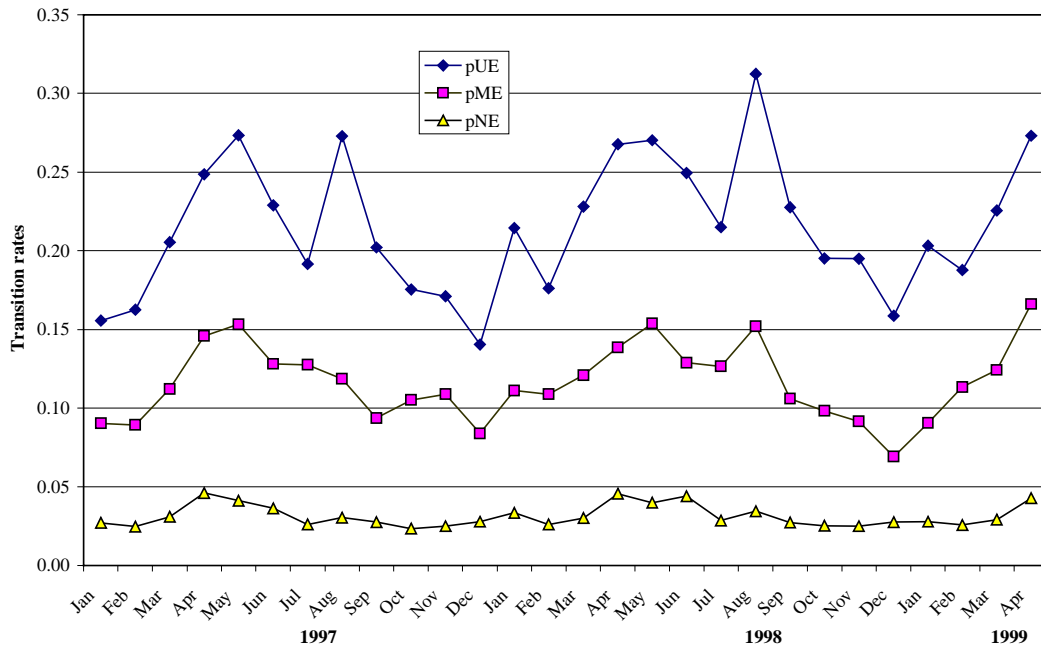
Figure 2
Transition Rates Into Unemployment
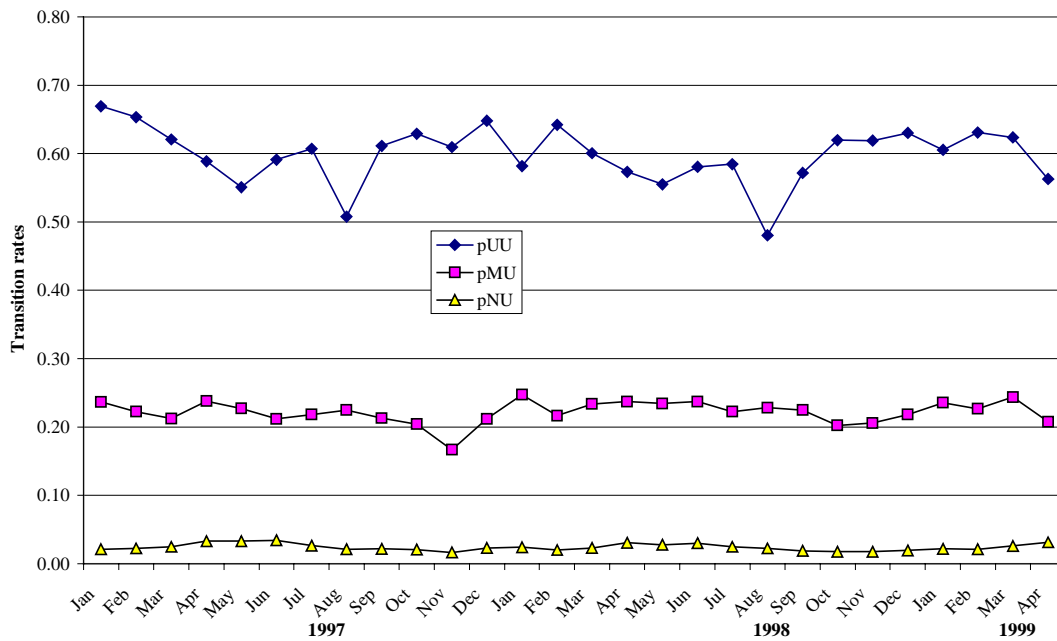
Figure 3
Transition Rates Into Marginal Attachment
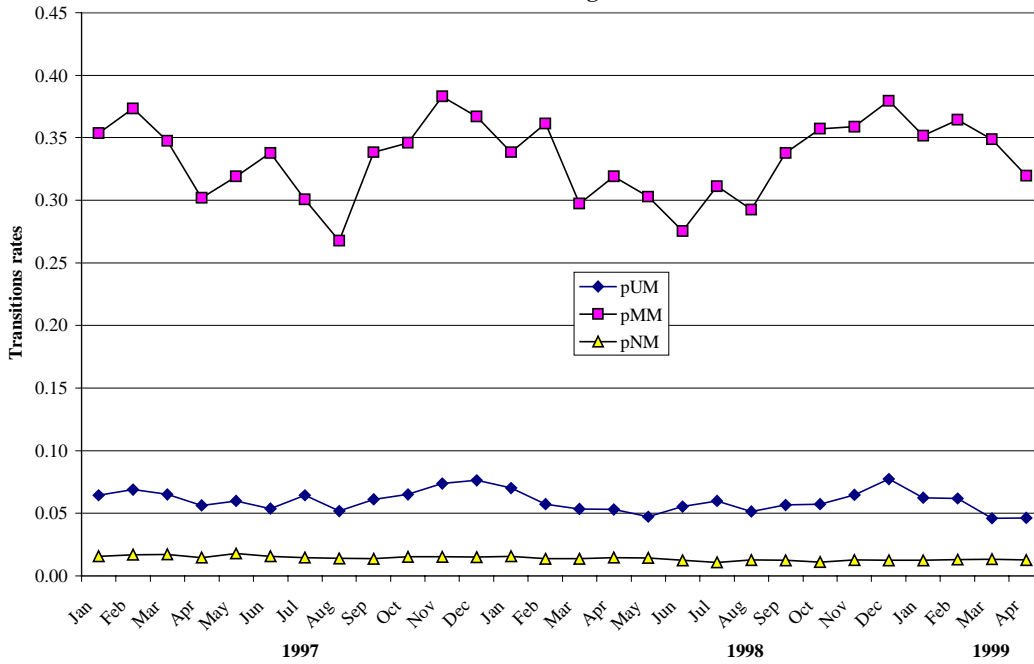
Figure 4
Transition Rates Into No Attachment
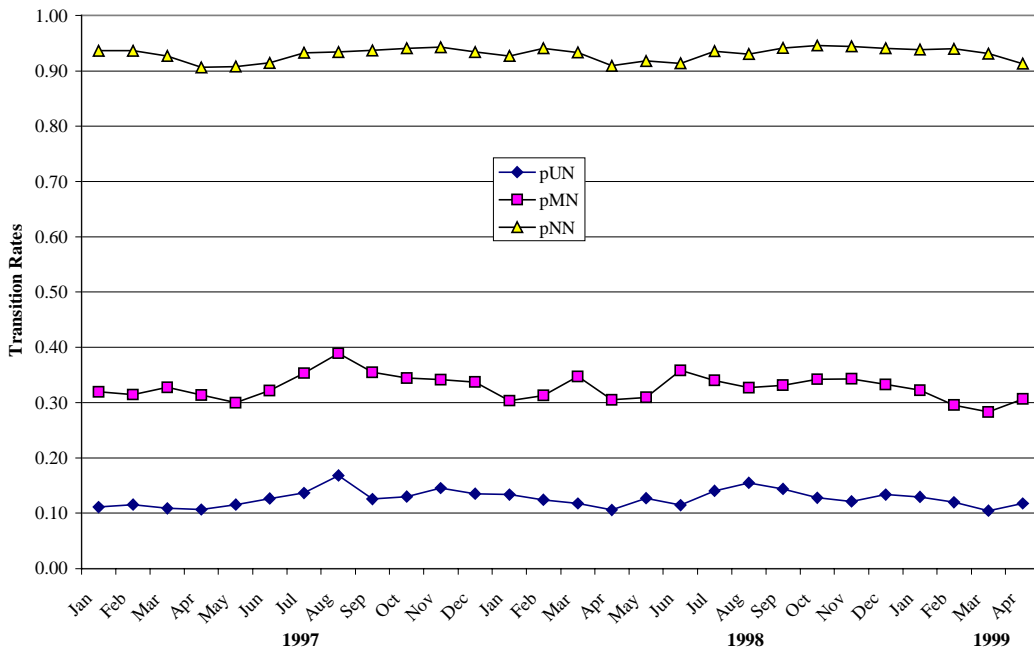
Figure 5
Transition Rates Into Employment:
Unemployed Categories
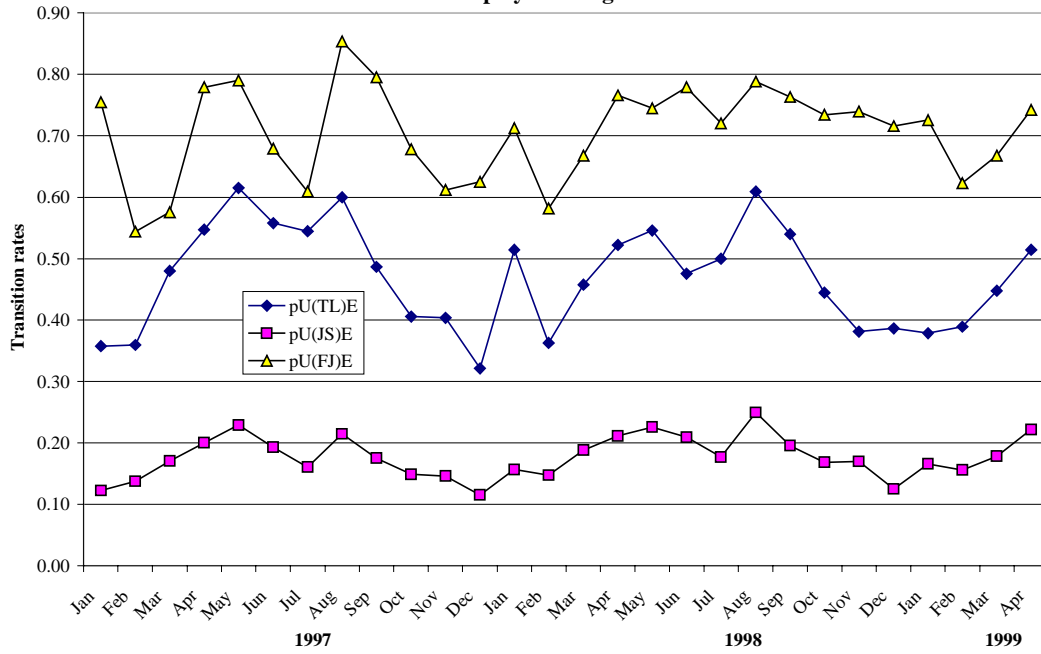
Figure 6
Transition Rates Into Unemployment:
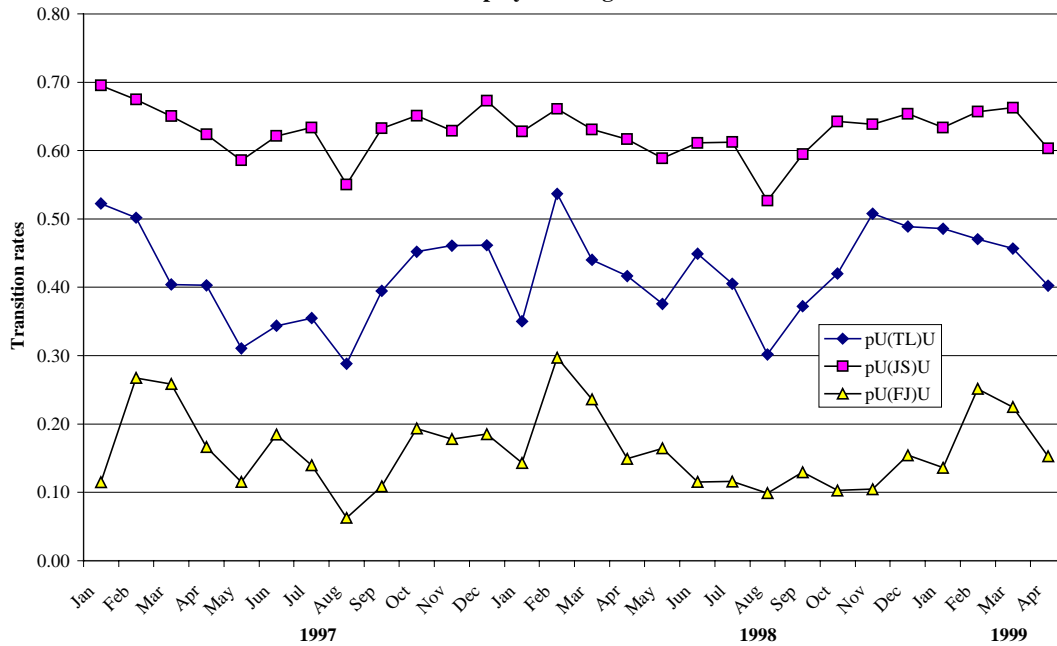**Unemployed Categories**

Figure 7
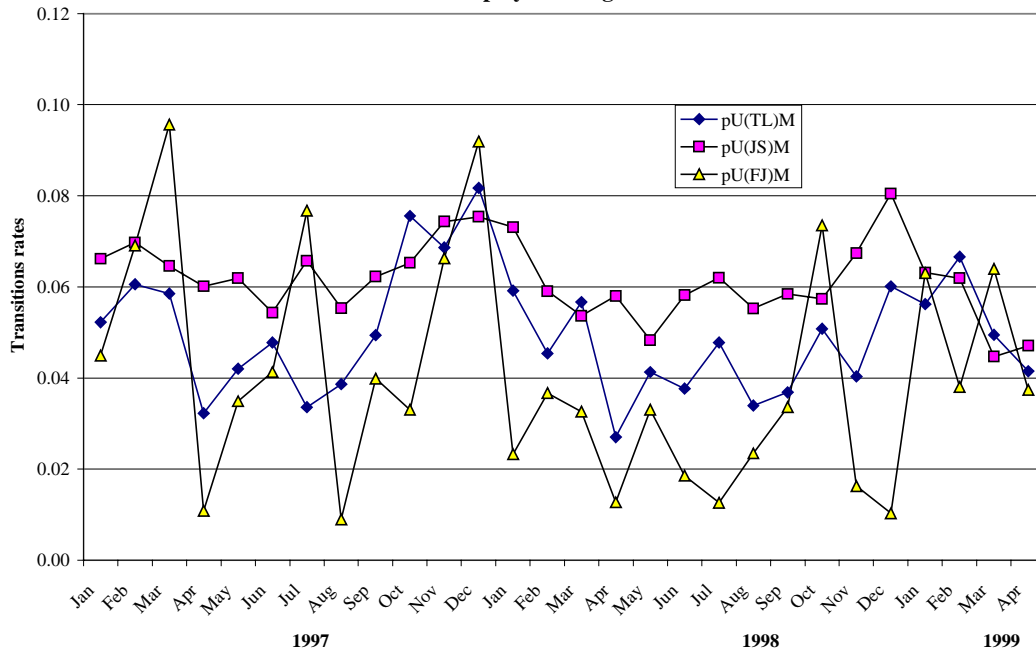**Transition Rates Into Marginal Attachment:**
Unemployed Categories

Figure 8
Transition Rates Into No Attachment:
Unemployed Categories
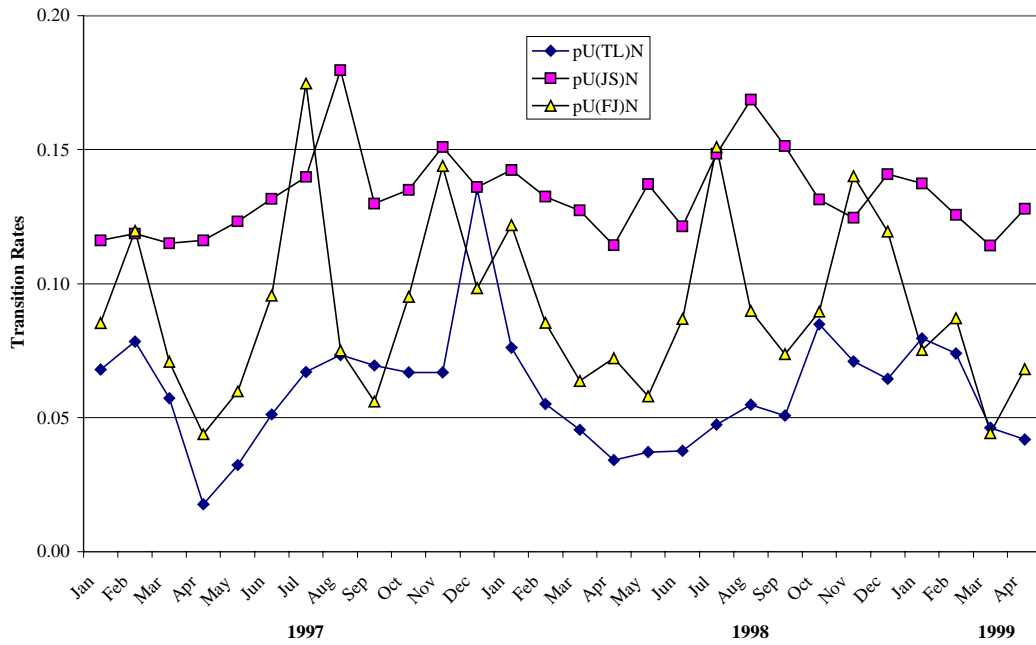
Figure 09
Transition Rates Into Employment:
Job Search Categories
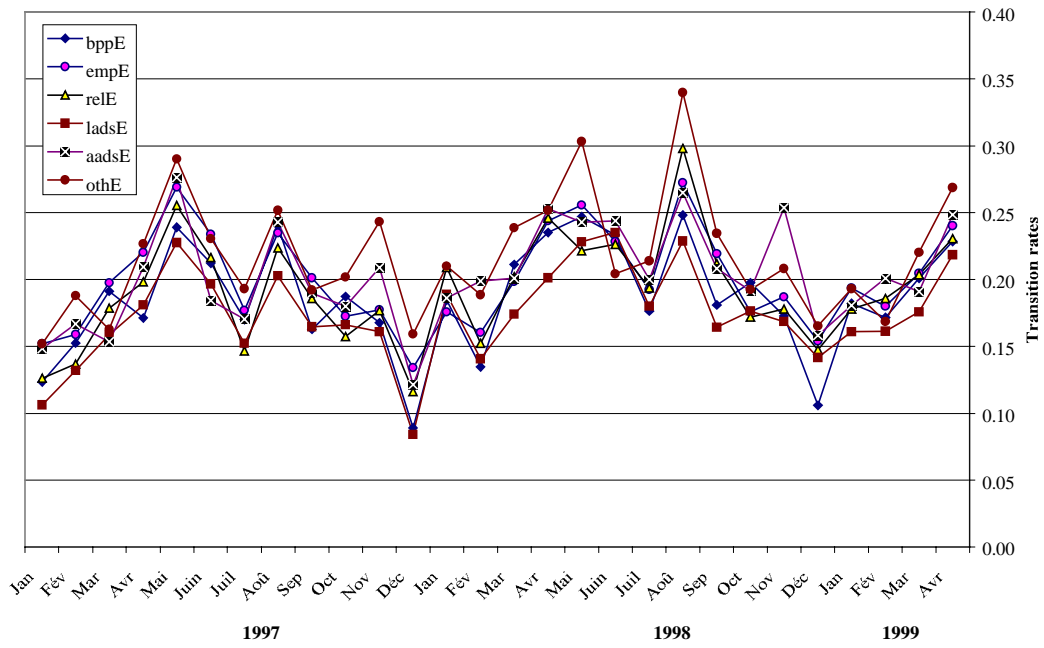
Figure 10
Transition Rates Into Unemployment:
Job Search Categories
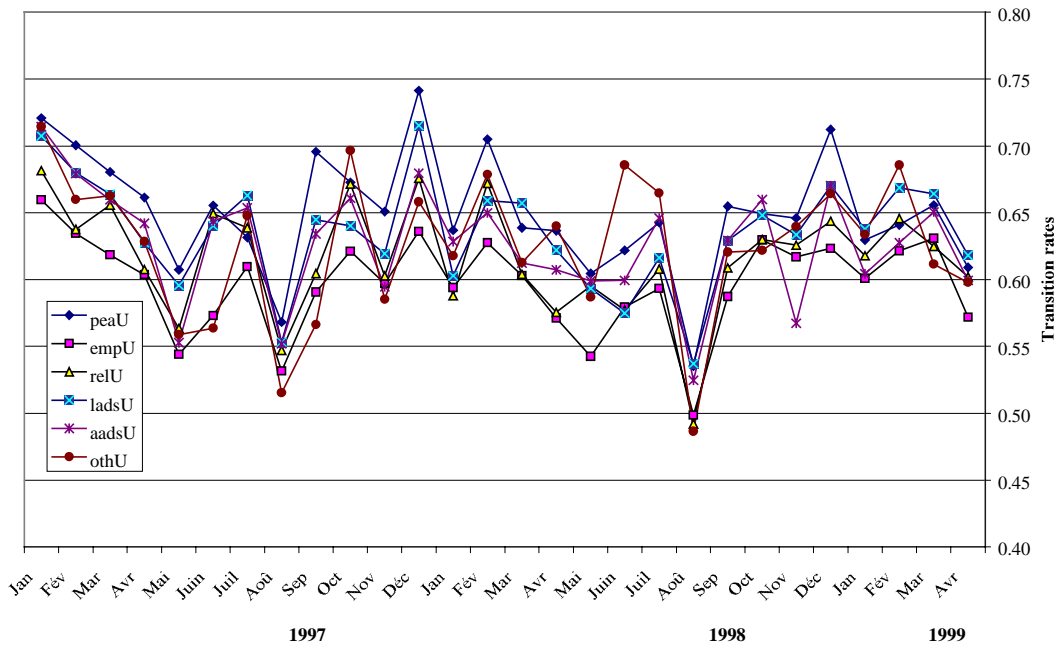
Figure 11
Transition Rates Into Marginal Attachment
Job Search Categories
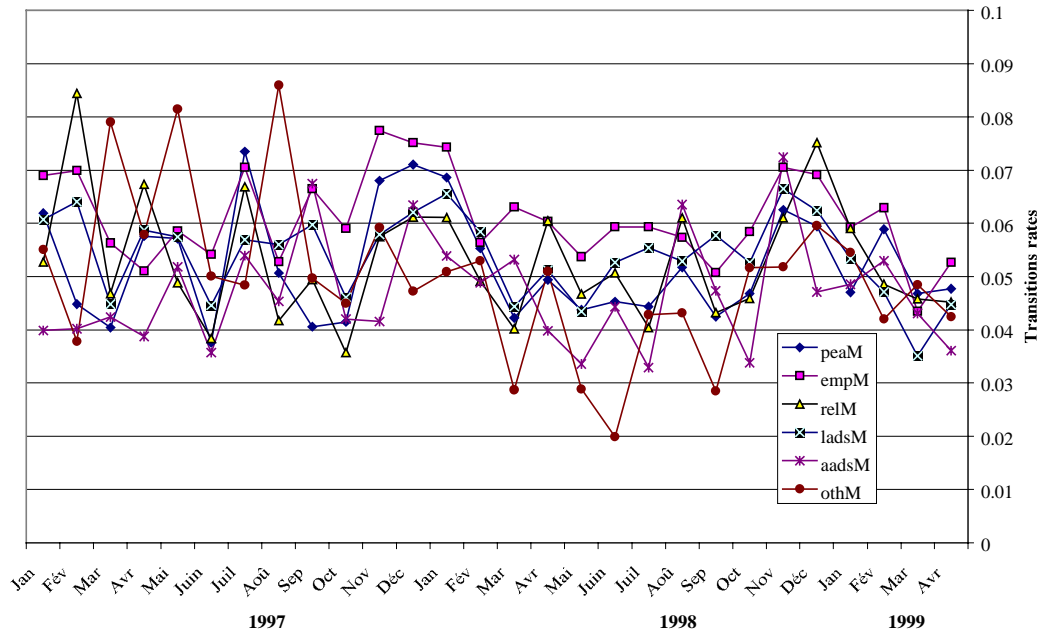
Figure 12
Transition Rates Into No Attachment:
Job Search Categories
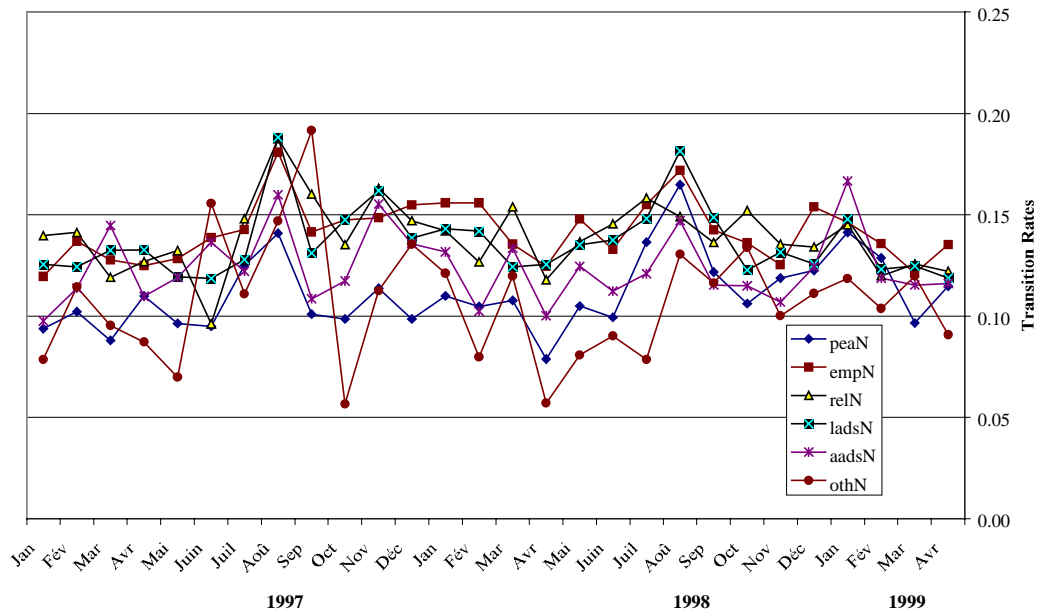
Figure 13
Transition Rates Into Employment:
Active and Passive Searchers, and Marginally Attached
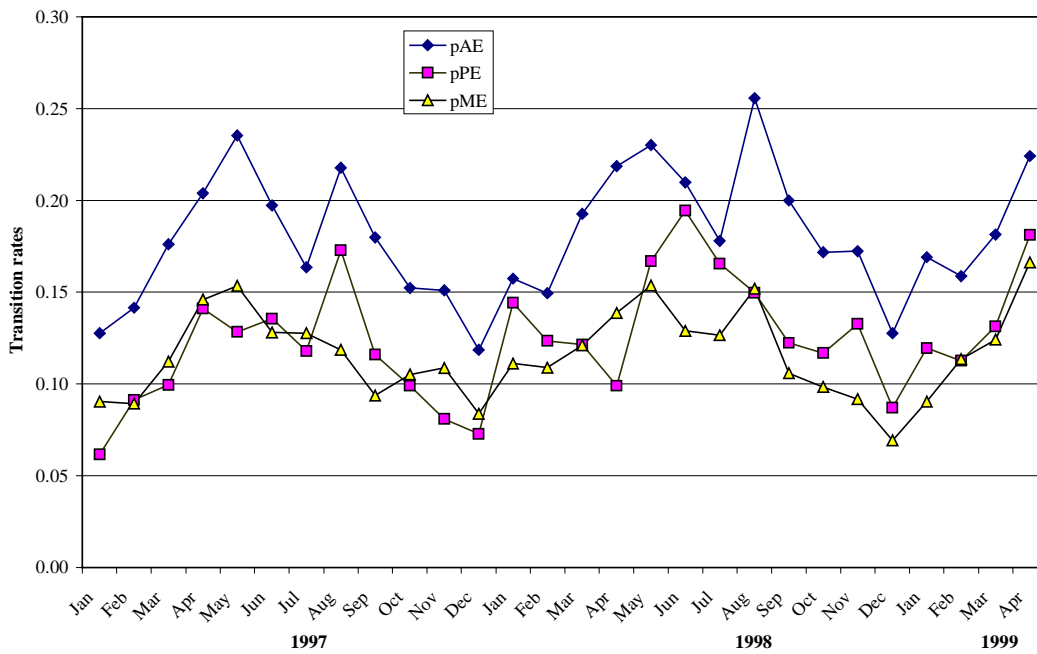
Figure 14
Transition Rates Into Unemployment:
Active and Passive Searchers, and Marginally Attached
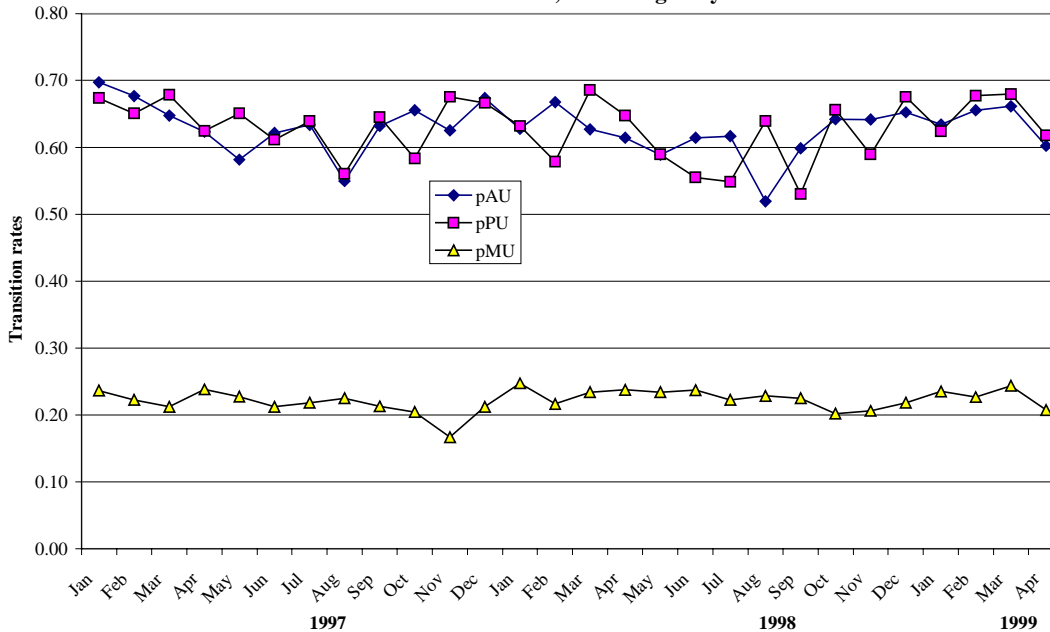
Figure 15
Transition Rates Into Marginal Attachment:
Active and Passive Searchers, and Marginally Attached
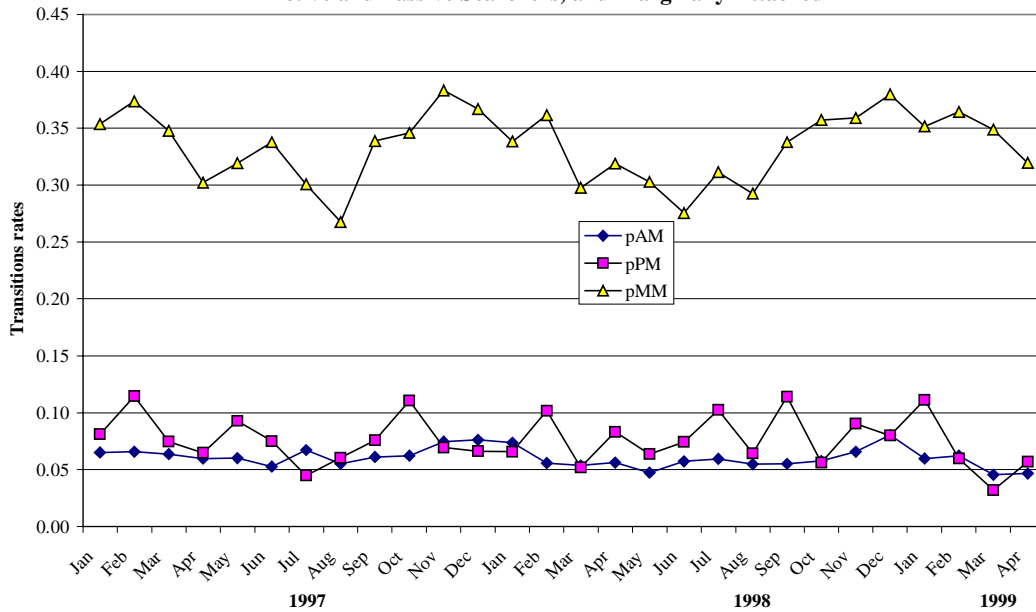
Figure 16
Transition Rates Into No Attachment:
Active and Passive Searchers, and Marginally Attached
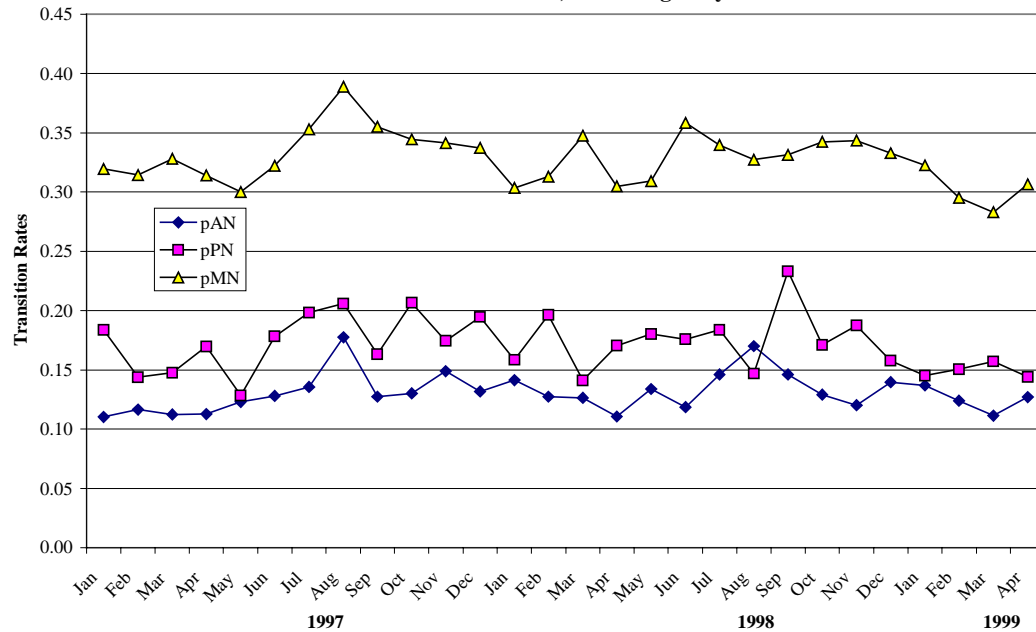
Figure 17
Transition Rates Into Employment:
Marginally Attached by Reason for Not Looking
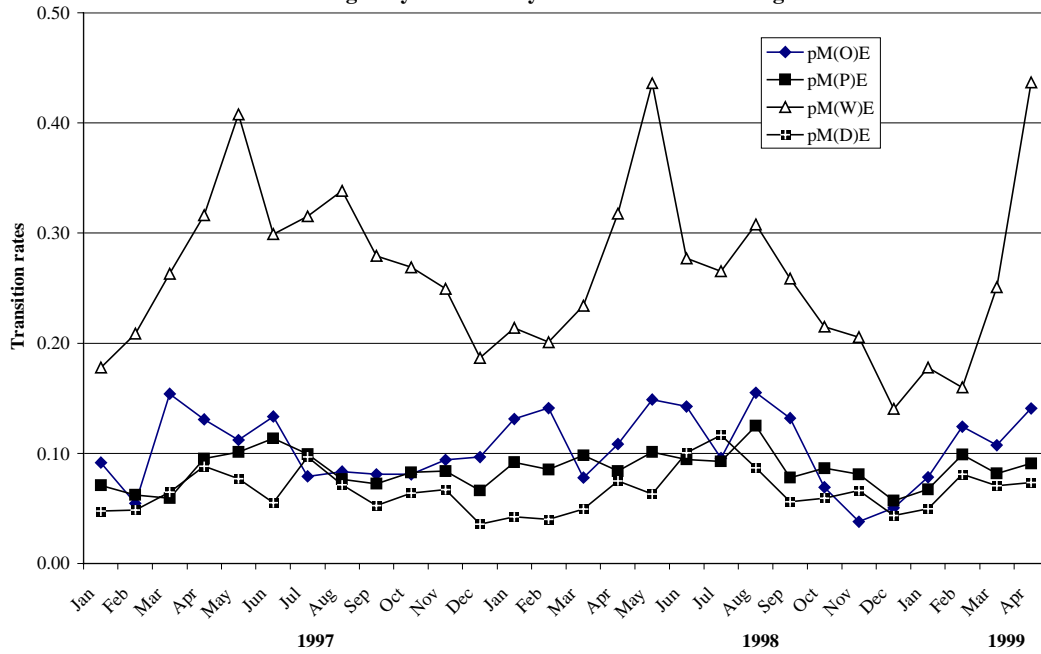
Figure 18
Transition Rates Into Unemployment:
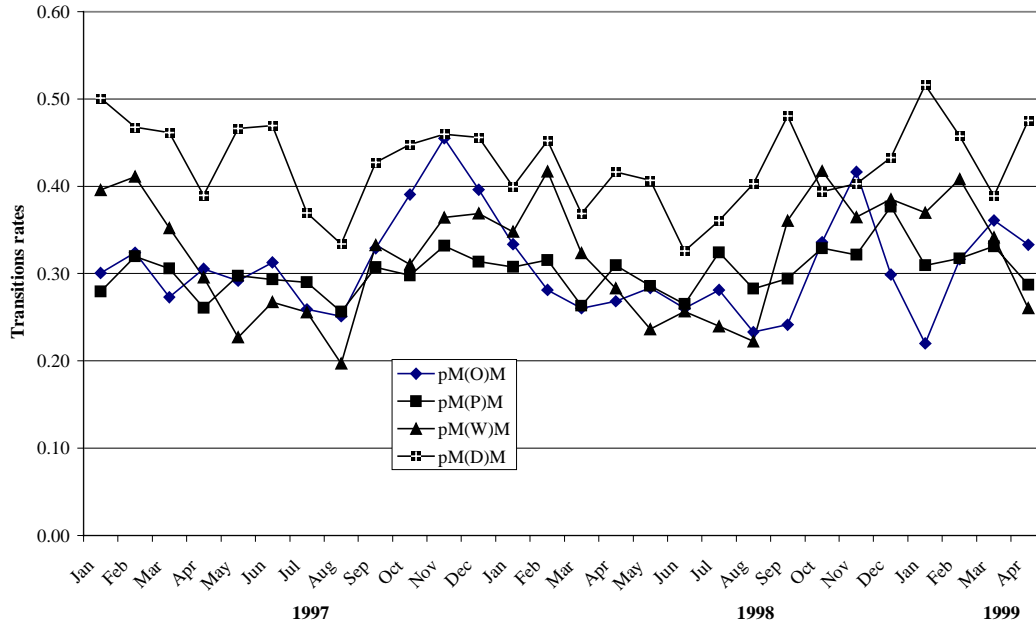**Marginally Attached by Reason for Not Looking**
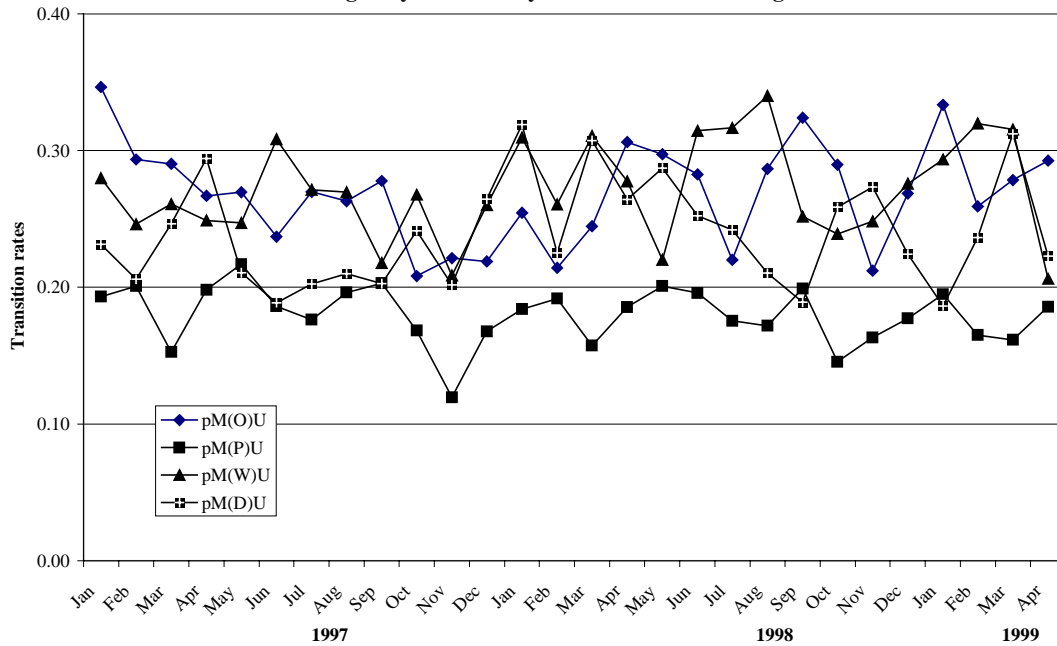
Figure 19
Transition Rates Into Marginal Attachment:
Marginally Attached by Reason for Not Looking

Figure 20
Transition Rates Into No Attachment:
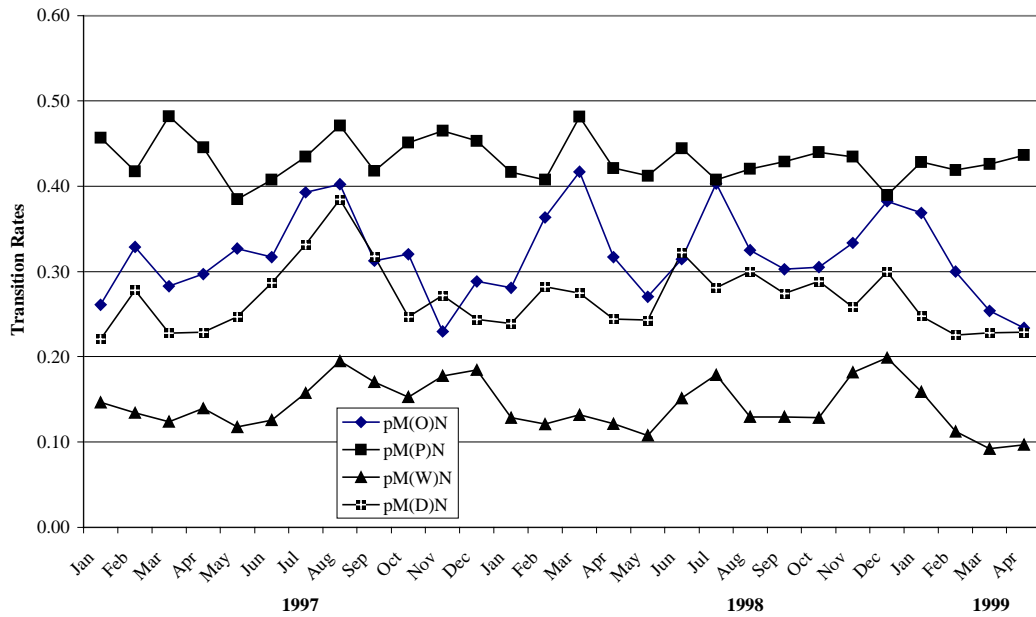**Marginally Attached by Reason for Not Looking**

Figure 21
Transition Rates Into Employment:
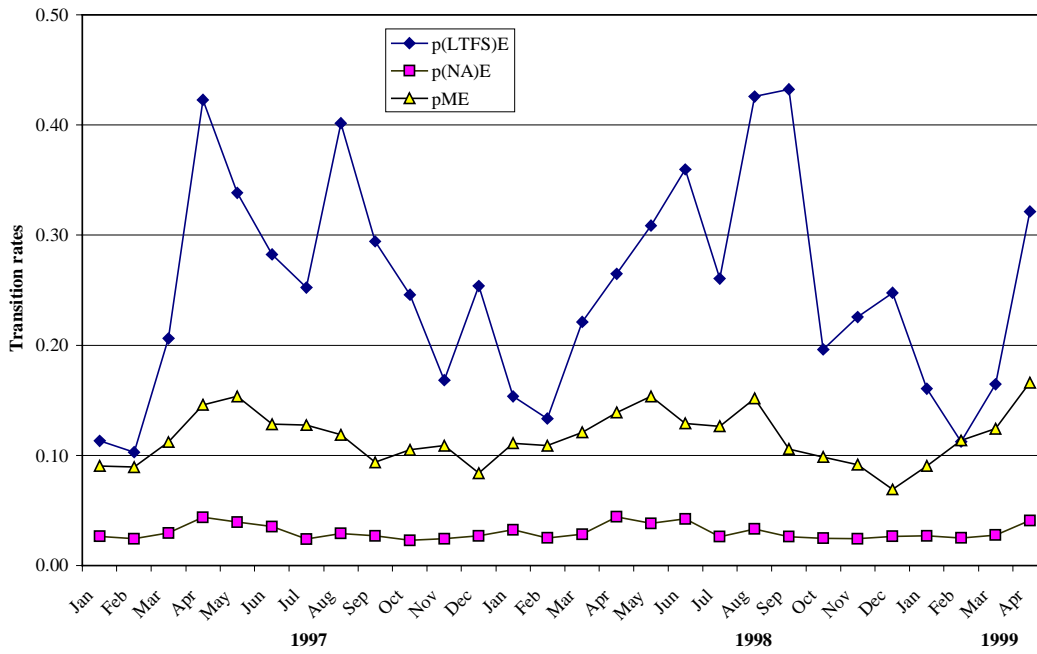**L.T. Future Start, Other Not Attached and Marginally Attached**

Figure 22
Transition Rates Into Unemployment:
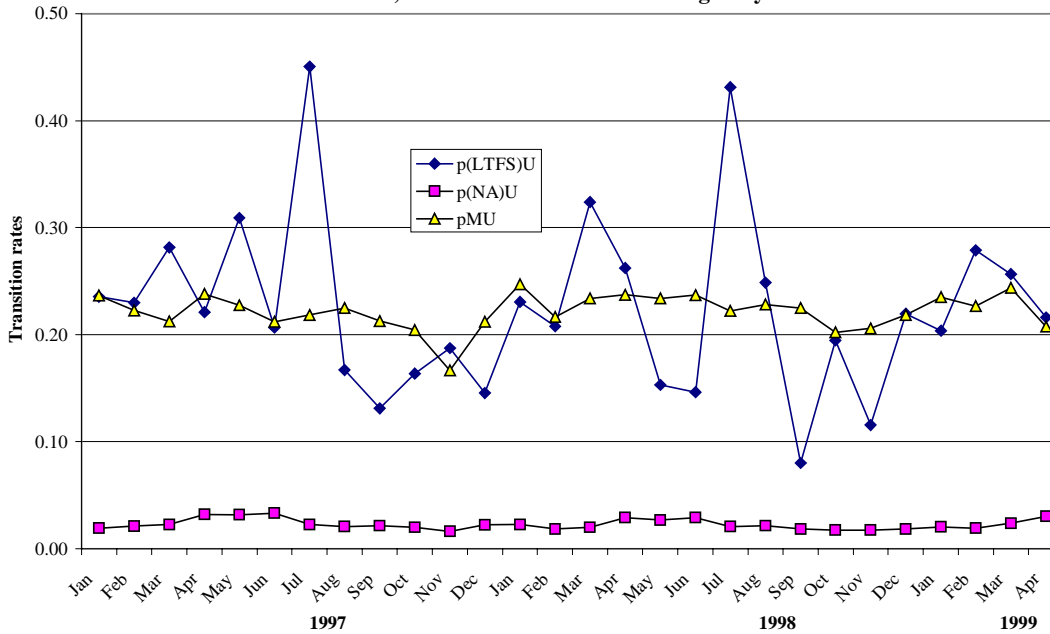**L.T. Future Start, Other Not Attached and Marginally Attached**

Figure 23
Transition Rates Into Marginal Attachment:
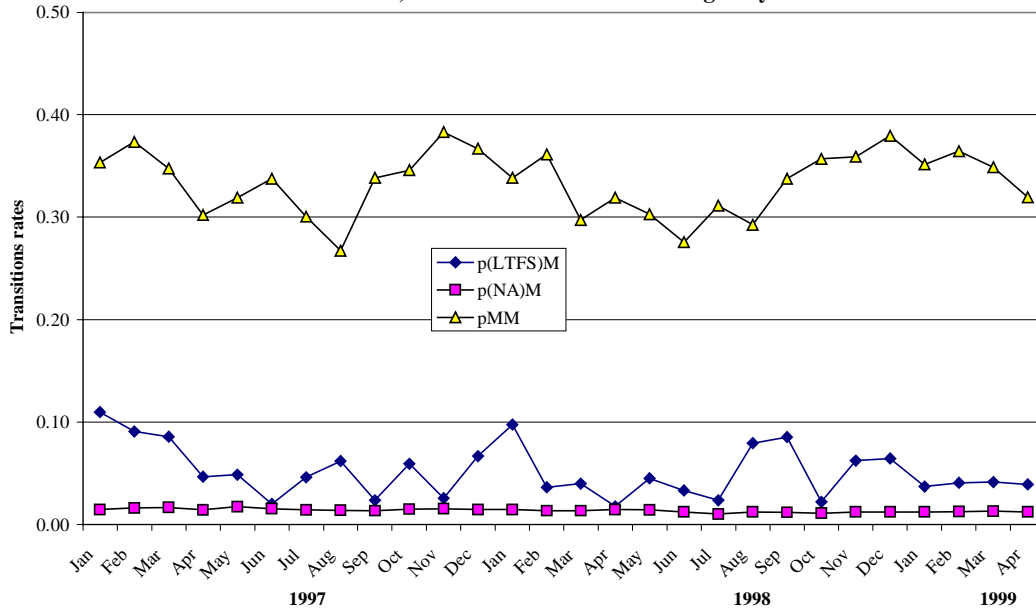**L.T. Future Start, Other Not Attached and Marginally Attached**

Figure 24
Transition Rates Into No Attachment:
L.T. Future Start, Other Not Attached and Marginally Attached