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# **Unemployment and Non-Employment: Heterogeneities in Labour Market States\***

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## **Abstract**

Determining how to distinguish between unemployment and non-participation is important and controversial. The conventional approach employs *a priori* reasoning together with self-reported current behaviour. This paper employs an evidence-based classification of labour force status using information about the consequences of the behaviour of the non-employed.

We find that marginal attachment—defined as desiring work, although not searching—is a distinct labour market state, lying between those who do not desire work and the unemployed. Furthermore, there are important heterogeneities within these non-employment states. Two subsets of non-participants—both engaged in “waiting”—display behaviour similar to the unemployed.

JEL codes: C82, E24, J60

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## I. Introduction

The determination of which members of the non-employed are counted as unemployed is a central task for statistical agencies worldwide, and is an important question for economic research and policy.<sup>1</sup> The non-employed may be a heterogeneous group, ranging from those with a strong attachment to the work force to others having little or no labour force attachment. The conventional criteria for making a division in the non-employed are (principally) “availability for work” and “job search,” with individuals who are available for and looking for work classified as unemployed (U), and the remainder classified as out-of-the-labour force (O). Relatedly, those classified as either employed (E) or unemployed constitute the set of labour force participants.

While such classification has proven useful for monitoring and analysing economic and labour market developments, the behaviour of individuals is potentially very diverse, and it is unlikely that any simple categorization into two labour force states will adequately capture this diversity. *Within* each of the standard labour force classifications, there may be significant heterogeneity. Some of the unemployed may be more eager to find work than are others, for example, and some individuals classified as non-participants may have a significantly stronger attachment to the work force than have others. Because of these difficulties, countries differ at a point in time in how they implement broad concepts such as availability for work and job search. In addition, in many countries there have been changes in the definitions used over time.

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 (see Zagorsky 1996; Macredie 1997). Another example is that of “discouraged workers,” defined as 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 the United States prior to 1967 and in Canada prior to 1975 but now are classified as out-of-the-labour force.<sup>2</sup> The treatment of full-time and part-time students is another area in which different countries have adopted different procedures.<sup>3</sup> A final example is that of “(short-term) future job

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<sup>1</sup> See, e.g., the President’s Committee to Appraise Employment and Unemployment Statistics (1962), the National Commission on Employment and Unemployment Statistics (1979), the Organization for Economic Cooperation and Development (1987, 1995), and Statistics Canada (1999).

<sup>2</sup> In practice, in both countries it is unclear to what extent discouraged workers were included among the unemployed.

<sup>3</sup> See Statistics Canada (1998) for details on current differences between Canada and the United States.

starts” -- those who report that they were not searching because they had a job to start within the next 4 weeks. Such individuals were classified as unemployed in the U.S. prior to 1994 but are now included among non-participants. In Canada, as in many countries, this group is classified as unemployed. However, those not searching because they have a job to start more than 4 weeks after the survey are treated as out-of-the-labour force.

There are many reasons why such measurement and classification issues are important, both in principle and in a quantitative sense. Considerable attention is paid to comparatively small month-on-month changes in the unemployment rate, for example, and to cross-country differences in such rates and their changes, and measurement is naturally central to all such discussion. Much analysis addresses durations in various non-employment states, and the measurement of such spell lengths—particularly in the presence of multiple classification changes within a single non-employment spell—is critical for this work (see, e.g., Hall (1970), Clark and Summers (1979)). In macroeconomic terms, measures of fluctuations in labour markets are affected by cyclical participation and labour force withdrawal, with the main changes being driven by individuals who are on the margin of the various classification systems currently in use. Finally, flow-based macroeconomic analysis of labour markets often replaces the notion of active search for employment with the idea of productive “*waiting*” for new jobs to emerge (see, e.g., Blanchard and Diamond 1992). Random matching of workers and jobs is replaced by “stock-flow” matching, as in Coles and Smith (1998) and Coles and Petrongolo (2002). This flow-based theoretical approach does not square well with a measurement system based chiefly on observed job search.

The conventional approach to these difficult measurement issues has been to employ *a priori* reasoning about appropriate definitions together with the self-reported current behaviour of survey respondents. For example, most countries use reported job search (rather than a weaker criterion such as the expressed desire for work) based on the idea that those looking for work display by their behaviour a strong attachment to the labour force. Those who say they desire work (but are not currently searching) are not providing enough evidence of their labour force attachment to warrant being classified as unemployed, on this view. According to this reasoning, “discouraged workers” are more appropriately classified as non-participants than as unemployed. Similarly, this approach provides a justification for the requirement of “active job search” in measuring the unemployed, 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 some merit. Classifications are based on observable activities (or at least self-reports thereof). This method of measuring labour force activities has become widely used, including recent adoption in many European countries that previously relied on administrative data on unemployment benefit programs for these purposes. However, debates about appropriate definitions cannot be resolved by appealing to *a priori* reasoning about what constitutes evidence of sufficiently strong desire for work to warrant classification as unemployed. For example, whether those who do not search because of discouragement should be treated as unemployed or non-participants cannot be resolved without some appeal to evidence.

In this paper we employ an evidence-based classification of labour force status using information about the consequences of the behaviour of the non-employed. We classify individuals in the same labour force state if they display equivalent behaviour in terms of their *subsequent labour force status*. For example, one might regard two groups as being equally attached to the labour force if they are equally likely to be employed in a subsequent period. Our approach generalizes this intuitive notion to all labour force states. This method thus involves examining the labour force transition behaviour of various subsets of the unemployed and non-participants.

This paper addresses these issues using Canadian evidence drawn from Labour Force Survey (LFS) data for the period 1997-2000. The LFS recently underwent a major revision, with the new survey in place since January 1997. Use of these new data permits us to examine several important issues that have not been previously addressed. First, the LFS now contains evidence on alternative measures of labour force attachment (such as a professed “desire for work”) in *each* survey month. Seasonal factors play an important role in the determination of labour market activity, and analysis of seasonality was necessarily beyond the scope of earlier work in this area which had such information only for March (and, for two years, September). Second, for the analysis in this paper we have access to a unique data set in which the LFS public use file is augmented by information on labour force status and job search for all subsequent months that each respondent remains in the survey. Since the rotation group structure of the LFS has an individual surveyed for six consecutive months, this permits investigation of behavioural outcomes at 1 to 5 months beyond the initial survey date. (In past work, the linkage was only for one month into the future.) Third, as a consequence of these factors, we can observe various

labour market states as both origin and destination states. In particular, if we adopt the four-state model that divides the out-of-the-labour force group into two subsets according to desire for employment, the augmented LFS data permits full assessment of transitions between any pair of these states. Finally, the new LFS provides more information on heterogeneity within labour market classifications than was previously available, so we can use evidence on behavioural outcomes to assess a wide range of classification procedures. For example, we analyze here “temporary layoffs” and “future job starts,” categories not examined in previous work.

In terms of significant findings, our main results are as follows. Marginal attachment (M) to the labour force—defined as having an expressed desire for work, although not currently searching—is a distinct labour market state, lying between the non-attached (N)—those who report that they do not desire work—and the unemployed (U). Furthermore, there are important heterogeneities within each of the three non-employment states U, M and N. Within U, job searchers are distinct from both temporary layoffs and (short-term) future job starts, having lower transition probabilities into employment and much higher probabilities of remaining unemployed. Within M, the “waiting” sub-category displays very strong attachment to the labour market, moving into jobs at a faster rate than unemployed job searchers. According to the official definition, these individuals are currently classified as out-of-the-labour force. In contrast, the non-waiting sub-categories of M are distinct from the waiting group, and fall midway between U and N in terms of measures of labour force attachment. Finally, within N, individuals classified as long-term future job starts—those with jobs to start at a definite date in the future, more than a month ahead of the interview date—transit into employment *in the next month* at a rate that is an order of magnitude higher than the average rate for the balance of the N group, and at a rate higher than that of the officially unemployed. Furthermore, formal tests of equivalence of M(Waiting) and U and N(LTFS) and U do not consistently reject equivalent behaviour. Our interpretation is that these results warrant reassessment of whether members of both the M(Waiting) and N(LTFS) categories are best classified as out-of-the-labour force.

The paper is structured as follows. We first provide a more detailed explanation of the methodology, and then study evidence on labour force transitions of various subsets of the non-employed. We begin with examination of the behaviour of the three labour market classifications discussed above: unemployed, marginally attached (non-searchers who express a desire for work) and non-attached. We then investigate heterogeneity within the unemployed category, where differences among temporary layoffs, (short term) future job starts, and job searchers are examined. The remainder of the paper 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, and including 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 various tests of equivalence, tests that largely confirm the evidence presented in the earlier sections. The final section concludes.

## II. Methodological Overview

The methodology underlying this research can be summarized in the context of a Markov model of labour market states and transitions.<sup>4</sup> 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.”

Given this structure, 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.<sup>5</sup> For example, denoting the month-to-month transition probability from M to E as  $p_{ME}$ , and analogously for other states, a test of the equivalence of M and N amounts to testing whether the conditions

$$p_{ME} = p_{NE} \quad (1a)$$

$$p_{MU} = p_{NU} \quad (1b)$$

jointly hold in the data. If these conditions are true, this implies that there is no significant difference between M and N from this behavioural, forward-looking standpoint.<sup>6</sup> Thus the usual

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<sup>4</sup> Note, however, that the method can accommodate non-Markovian behaviour, such as when transition probabilities exhibit dependence and vary with the elapsed duration of a spell.

<sup>5</sup> Flinn & Heckman (1983) is the basic reference on this approach. See also Tano (1991), Gönül (1992) and our own earlier work, Jones & Riddell (1998, 1999). Related examples of the use of subsequent labour market status for the analysis of job search behaviour in the U.S. and Canada include Bortnick and Ports (1992) and Osberg (1993).

<sup>6</sup> Note that the test of equivalence involves exit rates into states other than those being tested. That is, if those in M and N transit into both E and U at the same rates, they can be pooled into a single state O without any loss of information.

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, to test the equivalence of U and M one would test whether the conditions

$$p_{UE} = p_{ME} \quad (2a)$$

$$p_{UN} = p_{MN} \quad (2b)$$

jointly hold. If so, there is no behavioural difference between those searching for work and those who want a job but are not searching. In these circumstances this methodology implies that the measurement of unemployment should be based on the desire for work rather than on job search.

One might also find that both pairs of restrictions, (1a) and (1b), and (2a) and (2b), are rejected by the data. In these circumstances, both the pair U and M, and the pair M and N are distinct states in terms of labour market transition behaviour. When both equivalences are rejected, it may nonetheless be possible to order the states in terms of their degree of labour force attachment. For example, one might find that  $p_{UE} > p_{ME} > p_{NE}$  and  $p_{UU} > p_{MU} > p_{NU}$  and  $p_{UN} < p_{MN} < p_{NN}$ .<sup>7</sup> This ordering means that M represents an intermediate state between U and N. The marginally attached are more likely to obtain employment than the non-attached, but less likely to obtain employment than their not-attached counterparts, while the probability of labour force withdrawal is least for the unemployed and greatest for the non-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 non-attached.

Analogous to this example, our procedures permit testing the equivalence of a variety of states, including sub-categories of the unemployed (e.g., according to temporary layoff or job search status) 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 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, with the augmented LFS data one can also investigate the structure of transition probabilities over a *longer* time frame. We have addressed this in two ways. First, to supplement the study of employment at month 2 in previous work we examine the hazards into employment

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<sup>7</sup> In our earlier research (Jones and Riddell, 1999) we were able to observe 4 states (E,U,M,N) in the origin month but only 3 states (E,U,O) in the destination month so we were not able to fully order the

at each of months 3, 4, 5, and 6 after the survey date, disregarding whatever happens in any intervening months. To do so, 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. Although it may be informative to consider both approaches, the former method—based on observation at one particular point in time—is the closer analog of the standard LFS definition of unemployment in a particular reference week. Since the “any month” results are voluminous and turn out, by and large, to be quite 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 1997-2000. Thus, we are using the revised 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.<sup>8</sup> 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 survey for six consecutive months. Each month one rotation group enters the sample and another exits. 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 frame will still be covered by the LFS.

In this context, the present data are superior to those used in our earlier research, chiefly because more detailed information on the non-employed is available in each month under study. In contrast, in Jones and Riddell (1999), work that used 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

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non-employment states. However, we did find that  $p_{UE} > p_{ME} > p_{NE}$  and  $p_{UU} > p_{MU} > p_{NU}$  and  $p_{UO} < p_{MO} < p_{NO}$ .

identification of finer gradations of labour market status in every month surveyed, and as a consequence the results reported here are more comprehensive and more reliable.

#### **IV. Empirical Results**

We report first on basic patterns in the data, looking at average transition rates and the behaviour of the transition probabilities over the sample period. Since these simple results are very informative, we present much of this data graphically. 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.

##### **a. Transitional Behaviour from Three Non-Employment States**

Table 1 reports the average transition rates (or hazards) on a consecutive month-to-month basis for 1997-2000. The first panel shows the average hazard from the three non-employment states (U, M, N) into the four categories (E, U, M, N) as well as into non-participation O. For transitions into employment, there is a clear difference between U and M as origin states, with the hazard from unemployment being about 23%, 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 3.5%. These differences are numerically large, and we 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 unconditional differences reflect 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, as well as into the composite state  $O=M+N$ . 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 21%, an order of magnitude

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<sup>8</sup> For a description of the LFS and the 1997 version of the survey questionnaire, see Statistics Canada,

higher than the pNU hazard (2.4%), while for the hazard into N, pMN is 34% 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 non-attached 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 be associated with 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 transition probabilities can be seen graphically. Figures 1A-1E present the hazards from the three non-employment states into employment in months 2-6 respectively after the initial interview (in month 1). Thus Figure 1A shows transitions in consecutive months and is the graphical analog of the Table 1 results; it uses 5/6th of the LFS sample. The subsequent Figures 1B-1E show transitions between more widely separated months (months 3, 4, 5, and 6 after the initial observation in month 1, respectively) and are necessarily restricted to smaller overlapping samples. Nonetheless, the pattern of the results is remarkably consistent across the figures for destination months 2 to 6. In each case, we find the clear ranking  $pUE > pME > pNE$  in *every* month of the sample. 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. Finally, relative to the values graphed in Figure 1A, the move to a longer time horizon raises the hazards, as would be expected (e.g., pUE in Figure 1A lies between 0.15 and 0.35, while in Figure 1E, over a six month interval, it lies between 0.30 and 0.55). Similarly, although not shown here, 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 paper, and that alternative measures that reflect longer time horizons yield broadly similar

conclusions on degrees of labour market attachment. These results exhibit considerable stability over time in the ranking of the three non-employment states.

Finally, we also graph month-to-month transition rates into the three non-employment states in Figures 2-4. Figure 2 shows transition rates into unemployment, with a clear and consistent separation given by  $p_{UU} > p_{MU} > p_{NU}$  in every month, in line with the evidence from the preceding set of figures. Figures 3 and 4 show transition rates *into* M and N, evidence that was not previously available prior to the new LFS. Again, these hazards display a consistent pattern. In Figure 3,  $p_{MM} > p_{UM} > p_{NM}$ , with the diagonal term  $p_{MM}$  being around 0.32 (compared, e.g., with a  $p_{UU}$  average value of around 0.60 in Figure 2). Relative to unemployment, then, the marginally attached state is not very stable and does not represent an absorbing state from which few people exit. Finally, in Figure 4,  $p_{NN}$  is typically over 0.90, indicating a very high degree of stability in this state, and  $p_{MN} > p_{UN}$  in every month, consistent with U being “more attached” to the labour force than the marginal group M.

#### **b. Transitional Behaviour from Sub-Categories of Unemployment**

We next turn to the behaviour of transitions from three unemployment sub-categories, temporary layoffs (TL), job searchers (JS), and (short-term) future job starts (FJ). The second panel of Table 1 reports average hazards from these unemployment sub-categories, and the related time series are shown in Figures 5-8.

For transitions into employment, the FJ group has the highest average hazard at 70%, compared with a figure of 19% for the job searchers group. Although these series do vary through time, as is illustrated in Figure 5, the ranking is consistently that FJ unemployed are more likely to move into employment than TL unemployed, who in turn are more likely to become employed than the JS group. Approximately, these differences in the various  $p_{UE}$  hazards are counterbalanced by differences in the  $p_{UU}$  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 the second panel of Table 1 and Figures 7 and 8 confirm. Although there is no clear ranking of the  $p_{UM}$  and  $p_{UN}$  hazards for the TL and FJ sub-categories, the JS sub-category indicates the lowest labour force attachment in that the transition probability into M and N is highest for this group.

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.

### c. 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 new LFS data permit disaggregation of the M group according to the reason specified for not searching, the four sub-categories being Waiting, Personal, Discouraged, and Other. The Waiting group includes those “Waiting for replies or recall”<sup>9</sup>; 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, and the augmented LFS data allows us to investigate this issue more fully here. We also report results for the aggregated “Non-Waiting” group (Personal + Discouraged + Other).

The third panel of Table 1 reports average hazards for the four 'reasons for not searching' codes within the marginal group and Figures 9 and 10 graph two of these 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 or the combined “non-waiting” group. The waiting hazard has an average of 28% and exhibits monthly values in excess of 40%, in contrast to the other three hazards that have average values in the 7-11% range (9% for the non-waiting group as a whole). 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 third panel, by a much lower hazard into N, so the waiting group are both more likely to move into 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 broad or supplementary measures of unemployment. Indeed, those in the waiting category display a greater labour force attachment than do the officially unemployed. They are significantly more likely to become employed and they are approximately equally

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<sup>9</sup> One reason why there may exist individuals who report that they are not searching because they are expecting recall to a former job yet are not classified as “temporary layoffs” is that in Canada those awaiting recall to a seasonal job are not treated as on temporary layoff.

likely to exit the labour force.<sup>10</sup> This evidence suggests that this group should perhaps be classified as unemployed—a conjecture that we formally test later in the paper.

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 9 clearly illustrates, although there are moderate differences in the respective hazards for staying in the marginal attachment state (Figure 10). The Discouraged are the most stable sub-category within the marginal group, in that their likelihood of remaining marginally attached ( $pM(D)M$ ) averages nearly 42% and exceeds that of the other three sub-categories in almost all months (Figure 10). However, from Table 1, there is not much difference between the average hazards into N for the Discouraged and Other sub-categories, both of which lie below that for the Personal group and above that for the Waiting group. 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.

#### **d. 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 not engaged in job search who have a future job start at a point *more than* four weeks away from the survey date. In Canada, as in many other countries, such individuals—referred to as long-term future job starts (LTFS)—are categorized as N, absent the usual job search and availability criteria for categorization as U. They 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 included 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, we graph the hazards into E and U for these two groups, compared to the hazard for the marginally attached, in Figures 11 and 12.

The LTFS group displays a large hazard into employment (in the *next* month); at 27%, it is essentially 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 22%, compared with a 2% average for the NA population. Most of these differences are associated with a much

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<sup>10</sup> The transition rates  $pUN=.134$  and  $pM(W)N=.154$  are not statistically significantly different from each

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 93% for the NA group). Moreover, the behaviour of these average values is also reflected in the time series hazards, where LTFS is clearly distinct from the NA group in every month. There is therefore considerable heterogeneity within the N group as a whole.

Indeed, comparison of the LTFS group with the marginally attached, as in Figures 11 and 12, shows that the LTFS members have a higher probability of entering employment than the M group (Figure 11), although the two groups have fairly similarly average hazards into unemployment (Figure 12). The  $p_N(\text{LTFS})U$  series is more choppy than the  $p_{MU}$  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. In addition, they also exhibit greater attachment than those who state that they want work (i.e., the marginal attachment category). Indeed, the LTFS group has a higher transition rate into employment than those classified as unemployed, and a likelihood of being employed in the following month that is similar to that of the marginal waiting group.

The definition of the LTFS group, with the particular specification that the job start be more than four weeks ahead of the survey, naturally raises a question about labour market behaviour in *subsequent* months. As mentioned above, we have investigated this in two ways: first, using hazards into employment at each of months 3, 4, 5, and 6 after the survey; and second, using the hazard into employment in *any* subsequent month. The results at these longer horizons are consistent with the month-to-month results. In each subsequent period, the transition rates into E for LTFS are above those for the NA and the M groups. Similarly, the results for employment at any subsequent date show  $p_N(\text{LTFS})E > p_{ME}$  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, and stronger attachment than the marginal group who state that they desire work.

## V. Econometric Results of Equivalence Testing

In addition to these unconditional transition probabilities, it is important to address whether these findings are also present conditional on a set of observable control variables. To

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other (see Table 1).

do this, we have estimated a number of multinomial logit models of the determinants of transition probabilities into employment and the non-employment states. These models allow us to test the restrictions (1a) and (1b), or (2a) and (2b), and their analogues for tests of heterogeneity within labour force categories. Essentially, the method 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 thus employ a common 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.<sup>11</sup>

#### **a. Tests of Equivalence across Standard Labour Market Classifications**

The first set of test statistics resulting from this estimation are presented in Table 2. In each case, the estimated multinomial 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 1 and 3 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.

#### **b. Tests of Equivalence within Standard Labour Market Classifications**

We also test heterogeneity within the categories U, M and N. For unemployment, we test and reject the equivalence of job search and non-search (temporary layoff or short-term future job start) unemployment, the results being in columns 1 and 2 of Table 3. We also reject the separate test of equivalence of each of the three U sub-categories (job search, temporary layoff,

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<sup>11</sup> Use of a multinomial logit procedure, while convenient, does raise the issue of the independence between the possible outcomes, and of whether, e.g., the relative transition rates into E and U would remain unaltered were the option of remaining in M or N removed. We have also estimated binary logit models of transition rates into employment alone, however, and the pattern of test statistics is very similar in that case. None of the qualitative results are altered by using tests based on binary logit models.

and future starts) in the final two columns of that table. For both tests, p-values equal 0.00 in each month.

Within the marginal classification, we reject the equivalence of the waiting and non-waiting sub-categories, which is hardly surprising given the average hazards in Table 1. We also reject the more stringent hypothesis that each of the marginal sub-categories (Waiting, Discouraged, Personal, and Other) are equivalent. Both of these results are given in Table 4.

Finally, we test and decisively reject the hypothesis that long term future job starts are equivalent to the non-attached within the N category. However, although their average transition rates were an order of magnitude different in Table 1, relatively small sample sizes mean that these estimates and associated test statistics only converge for 27 of the 48 months of data that are available. When they do converge, the rejections of equivalence are decisive (see Table 5).

### c. “Mixed” Tests of Equivalence

Finally, we address econometric testing of three tests of equivalence that compare labour market sub-categories across the traditional lines of classification. As we saw in Figure 9, there is apparently considerable heterogeneity within the marginal group, the principal demarcation being between those in the waiting subset and those in non-waiting sub-categories. In terms of transition rates into employment, for example, the waiting group displays an average monthly rate of 28%, in excess of the average transition rate of 23% from unemployment. (Note that if we were to focus solely on job searchers within the unemployed, this latter figure would fall to less than 20%.) The likelihoods of the marginal waiting group and the officially unemployed exiting to non-attachment N are also quite similar (average transition rates of .154 and .134 respectively). These similarities suggest that it may be appropriate to pool U and M(W) into a broader category of unemployment.

A related mixed test is to compare conventionally defined unemployment with the long-term future job starts subset of the N category. On average, the transition rate from N(LTFS) to employment is 27% monthly, somewhat higher than the 23% average transition rate from unemployment. In addition, members of this long-term future job start group also have relatively low probabilities of remaining non-attached (compared to the very high degree of stability displayed by the balance of the N group). In the Appendix, Table 1 shows that the average rate at which N(LTFS) members *remain* as N(LTFS) month-on-month is 24%, compared with the diagonal transition probability for the N(NA) of 93%. Again, there is a *prima facie* case for assessing whether N(LTFS) and U are behaviourally equivalent.

The final mixed test we perform compares these two groups M(W) and N(LTFS) directly, while not directly addressing the issue of whether each group is equivalent to U.

Results for these three mixed tests are given in Table 6. The results are strikingly different from those reported in previous tables. For the test of equivalence of U and M(W), there are 16 of the 48 month-year samples in which the null hypothesis is not rejected at the 1% level. In the remaining two-thirds of the samples, equivalence is rejected but inspection of the LR values indicates that the rejections are not decisive as in previously reported tests. We conclude that U and M(W) are similar but not identical states in terms of their dynamic transition behaviour. Our basis for this conclusion is two-fold. First, although formal equivalence is rejected in a majority of samples, the rejections are not strong and in a significant minority of cases we do not reject equivalence. Second, to the extent that formal tests reject equivalence, it is principally because  $p_{M(W)E} > p_{UE}$  rather than the reverse. The average transition rates into the other pure destination state,  $p_{UN}$  and  $p_{M(W)N}$ , are not significantly different from each other. Thus in terms of the exit rates into E and N, the marginal waiting group displays similar, or somewhat higher, attachment to the labour force than those officially classified as unemployed.

Tests of the equivalence of U and N(LTFS) are shown in columns 3 and 4 of Table 6. Equivalence is rejected in a majority of the month-year samples, but there is a small minority of months (5 out of 48) in which the null hypothesis is not rejected. Again, inspection of the test statistics reveals that the rejections are not strong. These results accord with the average transition rates (and associated standard errors) in Table 1 that suggest that U and N(LTFS) are similar in their degree of labour force attachment, with the likelihood of being employed in the next month being somewhat higher for the N(LTFS) group ( $p_{N(LTFS)E} = .270$  versus  $p_{UE} = .231$ ) but the likelihood of labour force withdrawal also being somewhat higher ( $p_{N(LTFS)NA} = .226$  versus  $p_{UNA} = .130$ ). Thus LTFS display somewhat stronger attachment on the basis of movements into employment but weaker attachment on the basis of labour force withdrawal. Although the moderate differences in transition rates result in formal rejection of equivalence in the majority of samples, it is nonetheless the case that N(LTFS) is distinctly different from the remainder of the non-attached category, NA, as well as from the non-waiting subset of the marginal attachment group, M(NW). As is the case for M(W), the N(LTFS) is much more similar to the officially unemployed than to other labour force states.

The final two columns in Table 6 report tests of equivalence of M(W) and N(LTFS). Although for these two states the average transition rates into employment are very similar and are not statistically significantly different from each other (see Table 1), the tests reject

equivalence in almost all months. These rejections, which are again not as strong as in previous tables, reflect a higher likelihood of labour force withdrawal (exit into non-attachment) for the future job starts group ( $p_{N(LTFS)NA} = .226$  versus  $p_{M(W)NA} = .135$ , as shown in Appendix Table 1).

A final issue arising is whether this pairwise non-equivalence of U, M(W) and N(LTFS) in the majority of months supports keeping these states distinct in the reporting of labour market statistics. Note that the three groups within the current official definition of U are also behaviourally distinct (see the results in Table 3 above), but are nonetheless aggregated based on *a priori* views about what constitutes strong attachment to the labour force. Ultimately, given that a small number of states is desired for economy of reporting and interpretation, the issue may come down to which sub-categories are best grouped together. In this light, our view is that the principal salient characteristic of both M(W) and N(LTFS) is the very high transition rate into employment, and that based on this both groups could be better classified with the unemployed rather than out-of-the-labour force.<sup>12</sup> The fact that for both groups the transition rate into non-attachment is similar to that of the unemployed reinforces this view.

## VI. Conclusions

This paper 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 1997-2000. The goal is to apply this approach to address heterogeneities in labour market states and thereby to assess the appropriate classification of individuals to these alternative states. The method 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 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 do not claim that this evidence alone can necessarily resolve all of these contentious issues.

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

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<sup>12</sup> Over the 1997-200 period, the average unemployment rate would rise from 8.0% to 8.4% if the M(W) group were treated as unemployed, and to 8.7% if LTFS were also classified as unemployed.

1. 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 approximately four times that of the not-attached group.
2. Differences among the non-employment states U, M and N in their transition probabilities into employment are quite stable over time in recent years and are consistent with our earlier Canadian research that used the SJO-LFS dataset for selected months in the period 1979-92.
3. Differences in the transition rates into employment are matched by analogous behaviour of the movements into the three non-employment states U, M and N. Based on formal tests of equivalence, we conclude that M is a distinct intermediate state between U and N in terms of labour force attachment.
4. Evidence from 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, supports these conclusions. Thus there is nothing unusual about the behaviour on a month-to-month basis.
5. Among the unemployed, the (short term) 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. Temporary layoffs and future job starts are also less likely to exit the labour force than are job searchers. These results support the current practice of including temporary layoffs and future job starts among the unemployed.
6. Within the marginally attached group, we also find evidence of heterogeneity. The “waiting” sub-category has a substantially higher transition probability into employment, and a substantially lower likelihood of exiting into non-attachment, 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. Indeed, comparison of M(W) and U suggests that the waiting group should be treated as unemployed rather than out-of-the-labour force. In particular, their average transition probability into E exceeds that of those officially classified as unemployed and their average transition rate into N is not significantly different from that of the unemployed. Formal tests reject equivalence of U and M(W) in the majority of months; however, the rejection arises because the marginal

waiting group displays somewhat stronger labour force attachment than the unemployed, rather than the reverse.

7. There is not a substantial 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 report that they want work and are not searching for “Personal” and “Other” reasons.
8. There is also significant 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. Indeed, the LTFS group moves into employment *in the next month* at a rate that exceeds that of the unemployed. These conclusions are reinforced when we consider longer-term transition rates. Although the likelihood of withdrawal to non-attachment is also higher for the LTFS group than for the unemployed, the overall behaviour of LTFS is much closer to that of the unemployed than to the remainder of non-participants.
9. The findings relating to the M(W) and LTFS groups illustrate the difficulties associated with *a priori* reasoning and the insights that can result from the evidence-based approach. Two principal exceptions are traditionally made to the job search requirement for classification as unemployed -- temporary layoffs and future job starts. In both cases the individuals are engaged in waiting rather than searching. Our analysis supports these exceptions. But how does one draw the line between these groups and others involved in waiting? Our findings suggest that the criteria for distinguishing between temporary layoffs and others engaged in similar waiting behaviour (such as those in the M(W) category) and between short-term and long-term future job starts may be too stringent.

Overall, the results from this study are consistent with the findings in our earlier work. These data are richer than the SJO-LFS match previously available, principally since they permit identification of a range of labour market states in both the origin and the destination months, permit analysis of time horizons beyond month-to-month, and provide data on all months in each year. We were also able to analyse the behaviour of those classified as “temporary layoffs” and “long term future job starts”, categories not examined in our previous work. The findings 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

Transitions to Transitions from	E	U	M	N	O (=N+M)
<b>Non-employment states</b>					
U	0.231 (0.006)	0.576 (0.007)	0.058 (0.004)	0.134 (0.005)	0.193 (0.006)
M	0.124 (0.008)	0.214 (0.010)	0.322 (0.012)	0.340 (0.012)	0.661 (0.012)
N	0.035 (0.001)	0.024 (0.001)	0.014 (0.001)	0.927 (0.002)	0.941 (0.001)
<b>Unemployment states</b>					
Temporary layoffs	0.474 (0.027)	0.410 (0.026)	0.049 (0.011)	0.067 (0.013)	0.116 (0.017)
Job searchers	0.193 (0.006)	0.606 (0.008)	0.060 (0.004)	0.141 (0.006)	0.201 (0.006)
Future job starts	0.701 (0.036)	0.159 (0.029)	0.037 (0.015)	0.103 (0.024)	0.140 (0.028)
<b>Marginal attachment states</b>					
Waiting	0.279 (0.025)	0.268 (0.025)	0.300 (0.026)	0.154 (0.021)	0.454 (0.028)
Non waiting (=P+D+O)	0.092 (0.008)	0.203 (0.011)	0.325 (0.013)	0.380 (0.014)	0.705 (0.013)
Personal (P)	0.094 (0.011)	0.174 (0.015)	0.296 (0.018)	0.436 (0.019)	0.732 (0.017)
Discouraged (D)	0.072 (0.014)	0.222 (0.022)	0.417 (0.026)	0.289 (0.024)	0.706 (0.024)
Other (O)	0.110 (0.022)	0.259 (0.030)	0.299 (0.032)	0.332 (0.033)	0.631 (0.034)
<b>Non attachment states</b>					
Long term future job starts	0.270 (0.032)	0.218 (0.029)	0.048 (0.015)	0.465 (0.035)	0.513 (0.036)
Not attached	0.034 (0.001)	0.022 (0.001)	0.014 (0.001)	0.930 (0.002)	0.944 (0.001)

**Notes:** Based on matched LFS data for the period January 1997-December 2000.

Standard errors are in parentheses.

**TABLE 2: Test Statistics for Likelihood Ratio Test of Equivalence**

Sample	M=N test		U=M test	
	LR value	p value	LR value	p value
197	1548.30	0.00	493.97	0.00
297	1350.15	0.00	404.96	0.00
397	1290.48	0.00	493.40	0.00
497	1446.13	0.00	412.42	0.00
597	1050.88	0.00	309.49	0.00
697	995.47	0.00	311.52	0.00
797	1044.80	0.00	328.09	0.00
897	1171.18	0.00	370.52	0.00
997	968.98	0.00	428.06	0.00
1097	1074.64	0.00	385.73	0.00
1197	949.02	0.00	310.71	0.00
1297	1074.68	0.00	349.52	0.00
198	1419.29	0.00	281.74	0.00
298	1247.57	0.00	314.72	0.00
398	1198.88	0.00	504.56	0.00
498	1139.55	0.00	378.60	0.00
598	1041.81	0.00	314.07	0.00
698	921.85	0.00	443.68	0.00
798	928.75	0.00	281.98	0.00
898	1098.93	0.00	238.64	0.00
998	1111.96	0.00	241.07	0.00
1098	970.92	0.00	317.68	0.00
1198	976.43	0.00	432.12	0.00
1298	1027.30	0.00	310.94	0.00
199	1158.28	0.00	389.71	0.00
299	1206.21	0.00	275.33	0.00
399	1207.17	0.00	330.53	0.00
499	1063.97	0.00	304.32	0.00
599	799.45	0.00	298.75	0.00
699	843.00	0.00	206.88	0.00
799	904.09	0.00	298.05	0.00
899	773.10	0.00	309.90	0.00
999	809.77	0.00	306.60	0.00
1099	770.13	0.00	299.70	0.00
1199	843.63	0.00	229.18	0.00
1299	875.50	0.00	335.97	0.00
100	1068.13	0.00	209.65	0.00
200	856.17	0.00	274.61	0.00
300	949.41	0.00	282.11	0.00
400	821.34	0.00	282.76	0.00
500	650.24	0.00	269.03	0.00
600	745.33	0.00	191.57	0.00
700	493.84	0.00	271.22	0.00
800	637.48	0.00	372.49	0.00
900	899.81	0.00	331.72	0.00
1000	1024.11	0.00	359.78	0.00
1100	644.513	0.00	350.09	0.00
1200	1030.95	0.00	322.26	0.00

Notes: Based on matched LFS data for the period January 1997-December 2000.

**TABLE 3:** Tests of Heterogeneity of U Categories

Sample	U(JS)=U(NS) test		U(JS)=U(TL)=U(FS) test	
	LR value	p value	LR value	p value
197	303.29	0.00	396.82	0.00
297	201.00	0.00	237.43	0.00
397	285.87	0.00	340.24	0.00
497	462.34	0.00	530.30	0.00
597	375.49	0.00	435.84	0.00
697	295.77	0.00	323.51	0.00
797	283.35	0.00	327.97	0.00
897	540.92	0.00	586.47	0.00
997	224.04	0.00	270.88	0.00
1097	183.37	0.00	231.25	0.00
1197	216.35	0.00	273.47	0.00
1297	180.06	0.00	216.97	0.00
198	472.29	0.00	509.55	0.00
298	193.95	0.00	242.32	0.00
398	249.42	0.00	313.62	0.00
498	406.41	0.00	501.70	0.00
598	294.46	0.00	346.11	0.00
698	274.11	0.00	348.62	0.00
798	289.57	0.00	346.74	0.00
898	442.17	0.00	483.69	0.00
998	226.18	0.00	261.12	0.00
1098	176.29	0.00	217.66	0.00
1198	155.30	0.00	229.07	0.00
1298	226.33	0.00	288.27	0.00
199	222.93	0.00	311.44	0.00
299	207.71	0.00	251.70	0.00
399	331.70	0.00	389.40	0.00
499	350.47	0.00	435.30	0.00
599	274.32	0.00	342.83	0.00
699	256.21	0.00	304.07	0.00
799	249.35	0.00	279.75	0.00
899	571.04	0.00	634.54	0.00
999	177.27	0.00	239.82	0.00
1099	172.52	0.00	217.13	0.00
1199	200.07	0.00	247.96	0.00
1299	140.03	0.00	184.77	0.00
100	190.27	0.00	253.84	0.00
200	180.92	0.00	215.80	0.00
300	276.57	0.00	315.83	0.00
400	335.92	0.00	423.93	0.00
500	192.90	0.00	244.65	0.00
600	180.49	0.00	214.36	0.00
700	156.30	0.00	210.51	0.00
800	417.39	0.00	467.48	0.00
900	180.20	0.00	224.73	0.00
1000	102.20	0.00	152.53	0.00
1100	179.03	0.00	224.53	0.00
1200	95.63	0.00	141.34	0.00

Notes: Based on matched LFS data for the period January 1997-December 2000.

**TABLE 4:** Tests of Heterogeneity of M Categories

Sample	M(W)=M(NW) test		M(W)=M(D)=M(P)=M(O) test	
	LR value	p value	LR value	p value
197	110.92	0.00	312.40	0.00
297	140.02	0.00	311.52	0.00
397	141.48	0.00	406.42	0.00
497	159.66	0.00	275.97	0.00
597	193.67	0.00	323.73	0.00
697	149.39	0.00	266.74	0.00
797	143.65	0.00	236.09	0.00
897	152.27	0.00	267.00	0.00
997	141.49	0.00	233.98	0.00
1097	107.64	0.00	234.89	0.00
1197	115.22	0.00	264.28	0.00
1297	98.91	0.00	199.26	0.00
198	128.99	0.00	290.22	0.00
298	140.52	0.00	281.02	0.00
398	168.15	0.00	301.94	0.00
498	148.35	0.00	291.27	0.00
598	201.47	0.00	314.58	0.00
698	95.49	0.00	213.32	0.00
798	107.34	0.00	243.00	0.00
898	122.93	0.00	249.47	0.00
998	81.96	0.00	261.41	0.00
1098	99.30	0.00	225.65	0.00
1198	111.83	0.00	223.78	0.00
1298	70.18	0.00	213.67	0.00
199	114.66	0.00	257.49	0.00
299	127.75	0.00	279.09	0.00
399	187.01	0.00	335.75	0.00
499	205.25	0.00	357.87	0.00
599	197.90	0.00	321.52	0.00
699	126.54	0.00	240.66	0.00
799	109.90	0.00	202.83	0.00
899	84.60	0.00	181.69	0.00
999	103.76	0.00	209.95	0.00
1099	85.77	0.00	157.03	0.00
1199	109.73	0.00	209.49	0.00
1299	64.91	0.00	215.14	0.00
100	121.60	0.00	241.44	0.00
200	113.04	0.00	235.53	0.00
300	160.88	0.00	343.23	0.00
400	190.14	0.00	329.03	0.00
500	142.76	0.00	312.97	0.00
600	90.50	0.00	178.45	0.00
700	112.57	0.00	240.87	0.00
800	51.90	0.00	167.16	0.00
900	75.73	0.00	221.26	0.00
1000	57.22	0.00	167.22	0.00
1100	43.51	0.02	190.62	0.00
1200	88.47	0.00	205.82	0.00

Notes: Based on matched LFS data for the period January 1997-December 2000.

**TABLE 5:** Tests of Heterogeneity of N Categories

<b>N(LTFS)=N(NA) test</b>		
<b>Sample</b>	<b>LR value</b>	<b>p value</b>
197	342.06	0.00
297	329.10	0.00
397	552.25	0.00
497		
597		
697		
797	782.51	0.00
897		
997		
1097	119.04	0.00
1197	165.29	0.00
1297	171.94	0.00
198	333.41	0.00
298	315.50	0.00
398	641.35	0.00
498	314.14	0.00
598		
698		
798	857.37	0.00
898	297.55	0.00
998	190.11	0.00
1098		
1198		
1298	248.65	0.00
199	213.11	0.00
299		
399	471.59	0.00
499	383.20	0.00
599		
699		
799		
899		
999		
1099	151.38	0.00
1199	168.30	0.00
1299		
100		
200	417.54	0.00
300	543.44	0.00
400		
500		
600		
700	1015.12	0.00
800	162.76	0.00
900	154.91	0.00
1000		
1100	177.13	0.00
1200	397.19	0.00

Notes: Based on matched LFS data for the period January 1997-December 2000. A blank indicates that the model did not converge.

TABLE 6: Mixed Category Equivalence Tests

Sample	U=M(W) test		U=N(LTFS) test		M(W)=N(LTFS) test	
	LR value	p value	LR value	p value	LR value	p value
197	61.52	0.00	100.63	0.00	151.12	0.00
297	42.30	0.03	63.72	0.00	94.34	0.00
397	49.02	0.01	163.49	0.00	112.57	0.00
497	96.96	0.00	65.84	0.00	79.83	0.00
597	46.30	0.01	50.56	0.00	66.69	0.00
697	43.98	0.02	57.69	0.00	93.95	0.00
797	71.56	0.00	60.38	0.00	82.67	0.00
897	42.55	0.03	56.55	0.00	58.68	0.01
997	73.51	0.00	70.79	0.00	94.32	0.00
1097	56.72	0.00	48.02	0.01	101.20	0.00
1197	58.66	0.00	50.39	0.00	81.62	0.00
1297	52.66	0.00	65.08	0.00	75.86	0.00
198	71.86	0.00	66.56	0.00	137.21	0.00
298	51.06	0.00	48.12	0.01	121.68	0.00
398	34.68	0.15	75.04	0.00	111.68	0.00
498	39.29	0.05	45.06	0.01	86.17	0.00
598	68.25	0.00	57.59	0.00	108.10	0.00
698	39.77	0.05	40.44	0.05	94.73	0.00
798	44.02	0.02	51.34	0.00	64.86	0.00
898	33.62	0.18	65.00	0.00	94.32	0.00
998	43.44	0.02	45.84	0.01	76.06	0.00
1098	62.24	0.00	86.47	0.00	113.39	0.00
1198	81.91	0.00	56.17	0.00	79.07	0.00
1298	64.59	0.00	54.43	0.00	96.38	0.00
199	51.76	0.00	40.03	0.05	93.66	0.00
299	36.74	0.10	50.12	0.00	109.97	0.00
399	56.00	0.00	169.84	0.00	176.50	0.00
499	64.34	0.00	55.30	0.00	78.91	0.00
599	58.87	0.00	58.88	0.00	101.94	0.00
699	63.35	0.00	72.61	0.00	99.63	0.00
799	36.54	0.10	78.64	0.00	85.38	0.00
899	70.27	0.00	56.86	0.00	76.15	0.00
999	22.32	0.67	42.28	0.03	52.09	0.01
1099	53.04	0.00	39.68	0.04	64.10	0.00
1199	72.98	0.00	86.20	0.00	97.65	0.00
1299	46.05	0.01	35.69	0.12	81.04	0.00
100	63.36	0.00	56.18	0.00	120.63	0.00
200	51.51	0.00	63.27	0.00	86.74	0.00
300	37.44	0.09	152.93	0.00	147.36	0.00
400	42.23	0.02	60.84	0.00	65.30	0.00
500	48.41	0.01	84.72	0.00	70.46	0.00
600	63.01	0.00	52.73	0.00	75.19	0.00
700	44.93	0.01	70.34	0.00	74.57	0.00
800	20.69	0.80	57.18	0.00	59.08	0.00
900	50.74	0.00	95.80	0.00	103.56	0.00
1000	44.08	0.01	130.98	0.00	84.37	0.00
1100	58.72	0.00	97.71	0.00	48.22	0.07
1200	30.99	0.27	56.85	0.00	80.97	0.00

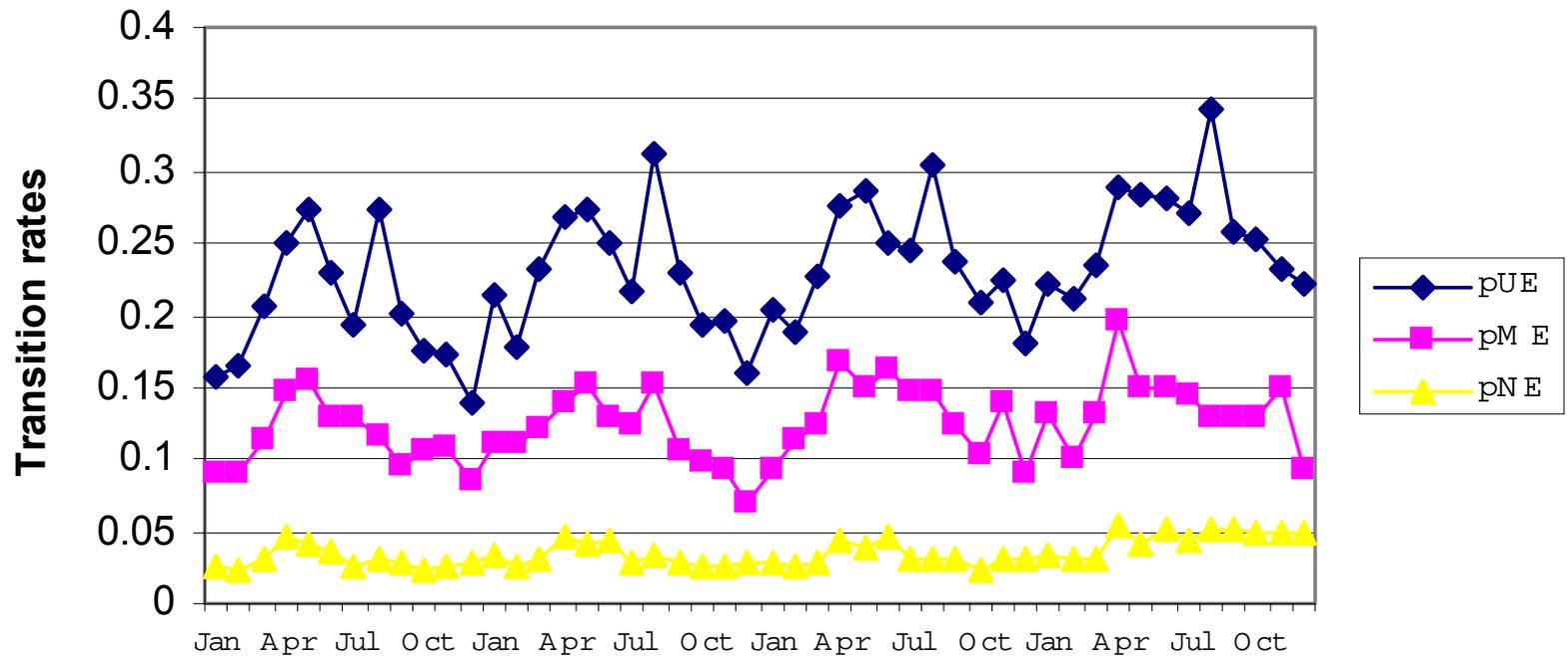
Notes: Based on matched LFS data for the period January 1997-December 2000.

**APPENDIX TABLE 1: Average Transition Rates for All Destinations**

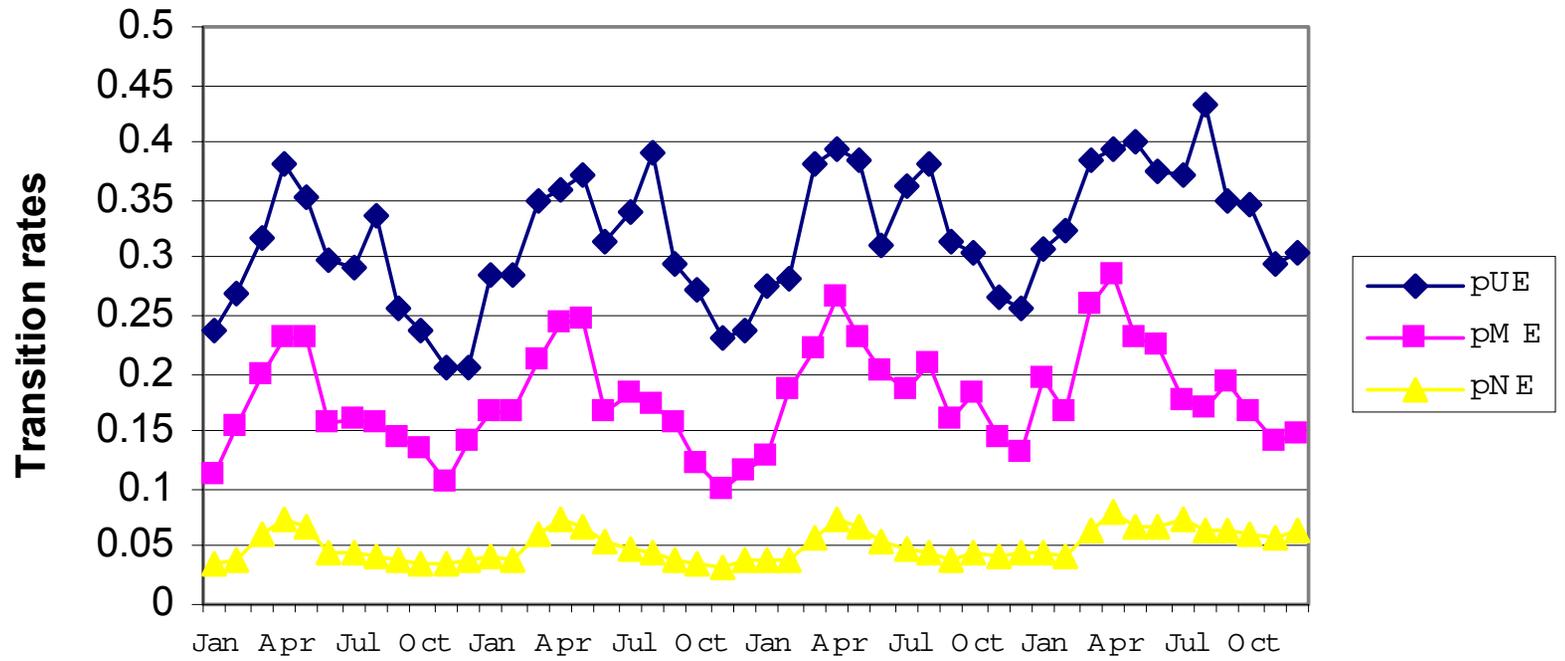
Transitions to:	U (temp layoff)	U (job searcher)	U (ST future start)	M (waiting)	M (NW)	M (personal)	M (isc)	M (other)	N (LT future start)	N (NA)
Transitions from:										
U (temp layoff)	0.265 (0.024)	0.127 (0.018)	0.017 (0.006)	0.036 (0.010)	0.013 (0.006)	0.005 (0.003)	0.003 (0.003)	0.005 (0.003)	0.012 (0.005)	0.055 (0.012)
U (job searcher)	0.005 (0.001)	0.595 (0.008)	0.006 (0.001)	0.011 (0.002)	0.049 (0.003)	0.023 (0.002)	0.014 (0.002)	0.012 (0.002)	0.004 (0.001)	0.137 (0.006)
U (ST future start)	0.022 (0.011)	0.062 (0.019)	0.076 (0.020)	0.022 (0.011)	0.015 (0.009)	0.007 (0.005)	0.004 (0.004)	0.005 (0.003)	0.009 (0.006)	0.094 (0.023)
M (waiting)	0.025 (0.009)	0.214 (0.023)	0.028 (0.008)	0.234 (0.023)	0.066 (0.014)	0.021 (0.008)	0.027 (0.009)	0.018 (0.007)	0.019 (0.007)	0.135 (0.020)
M (NW)	0.002 (0.001)	0.197 (0.011)	0.004 (0.002)	0.014 (0.003)	0.311 (0.013)	0.161 (0.010)	0.095 (0.008)	0.055 (0.006)	0.004 (0.002)	0.376 (0.014)
M (personal)	0.002 (0.001)	0.169 (0.014)	0.004 (0.002)	0.007 (0.003)	0.289 (0.018)	0.251 (0.017)	0.017 (0.005)	0.022 (0.005)	0.003 (0.002)	0.433 (0.019)
M (disc)	0.003 (0.002)	0.217 (0.021)	0.003 (0.002)	0.026 (0.008)	0.391 (0.026)	0.039 (0.010)	0.318 (0.024)	0.033 (0.009)	0.005 (0.003)	0.284 (0.024)
M (other)	0.002 (0.002)	0.252 (0.030)	0.005 (0.004)	0.019 (0.009)	0.279 (0.031)	0.059 (0.016)	0.048 (0.015)	0.172 (0.026)	0.005 (0.003)	0.327 (0.033)
N (LT future start)	0.018 (0.008)	0.090 (0.020)	0.109 (0.020)	0.027 (0.011)	0.021 (0.010)	0.012 (0.007)	0.005 (0.004)	0.004 (0.003)	0.239 (0.030)	0.226 (0.030)
N (NA)	0.000 (0.000)	0.021 (0.001)	0.001 (0.000)	0.001 (0.000)	0.013 (0.001)	0.008 (0.001)	0.002 (0.000)	0.002 (0.000)	0.001 (0.000)	0.929 (0.002)

**Notes:** Based on matched LFS data for the period January 1997-December 2000.  
Standard errors are in parentheses.

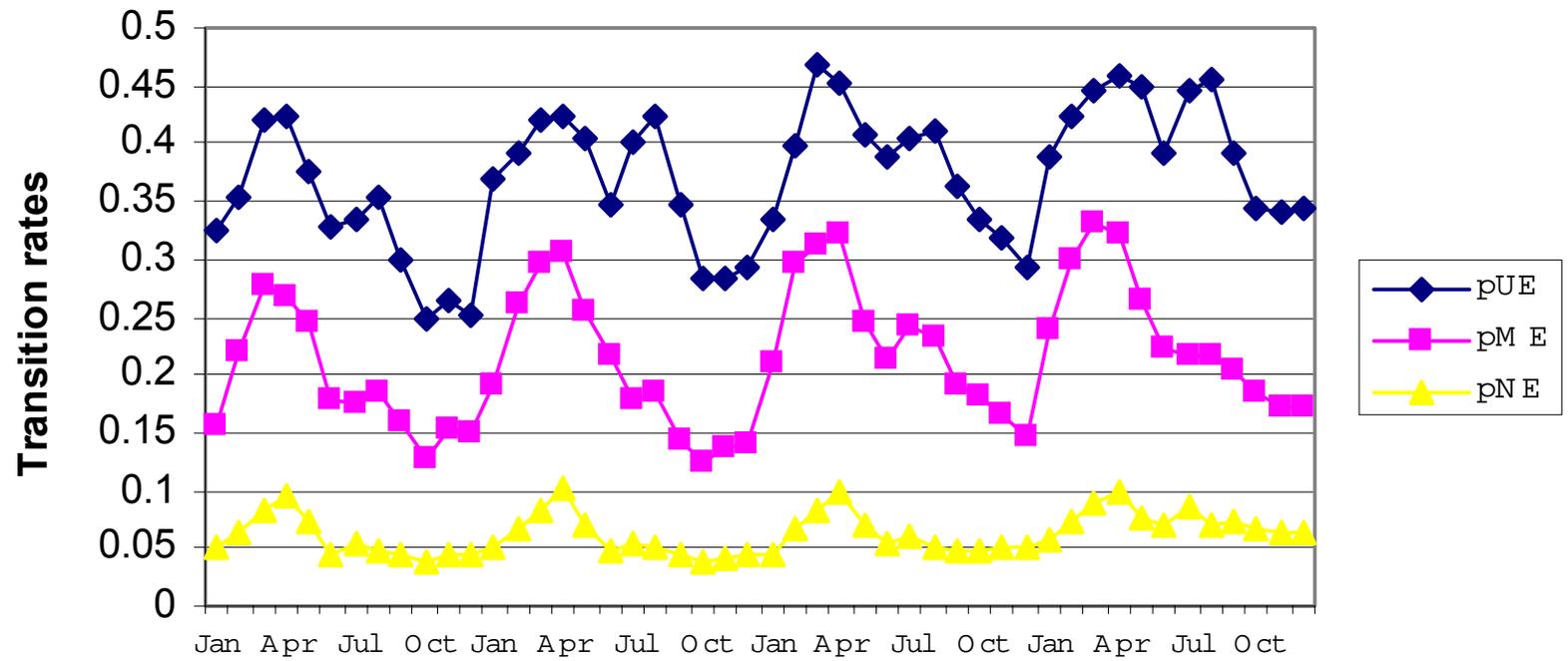
**Figure 1A**  
**Transition rates into employment**



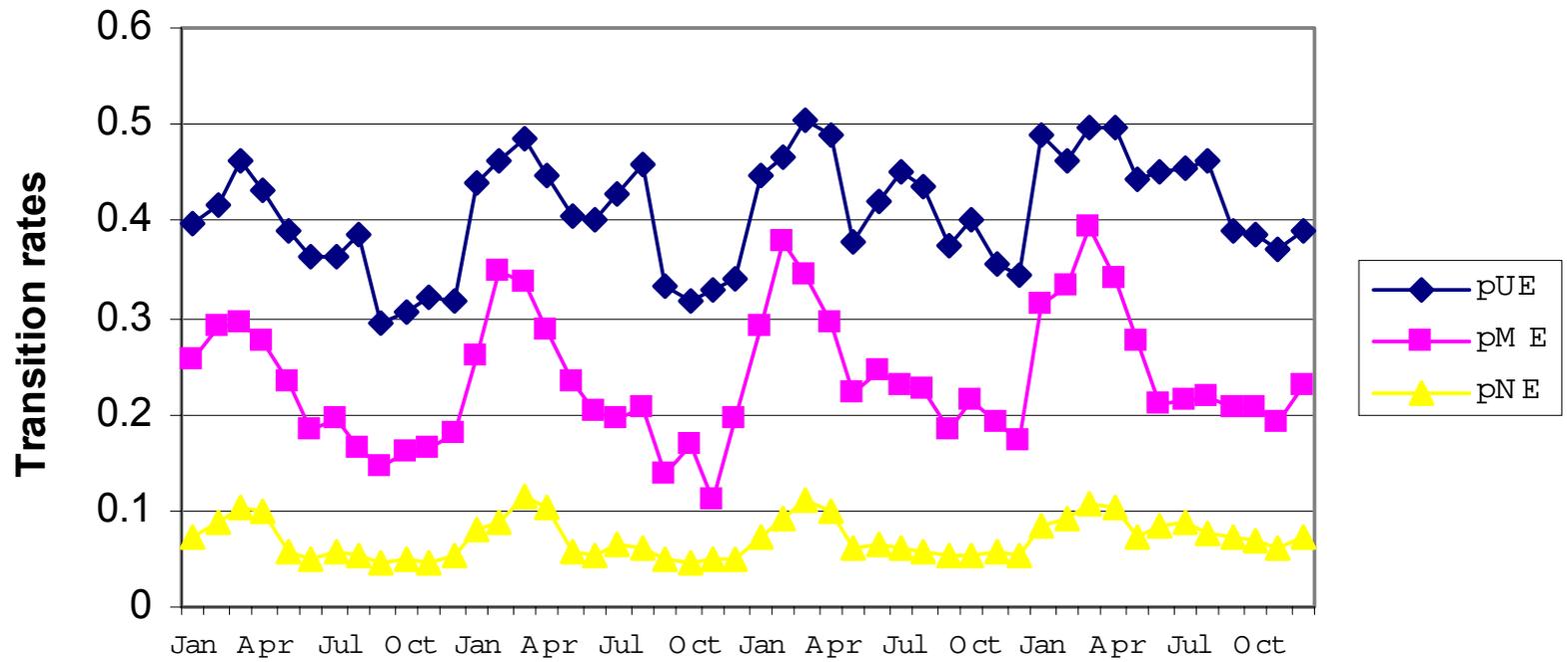
**Figure 1B**  
**Transition rates into employment (1-3 months)**



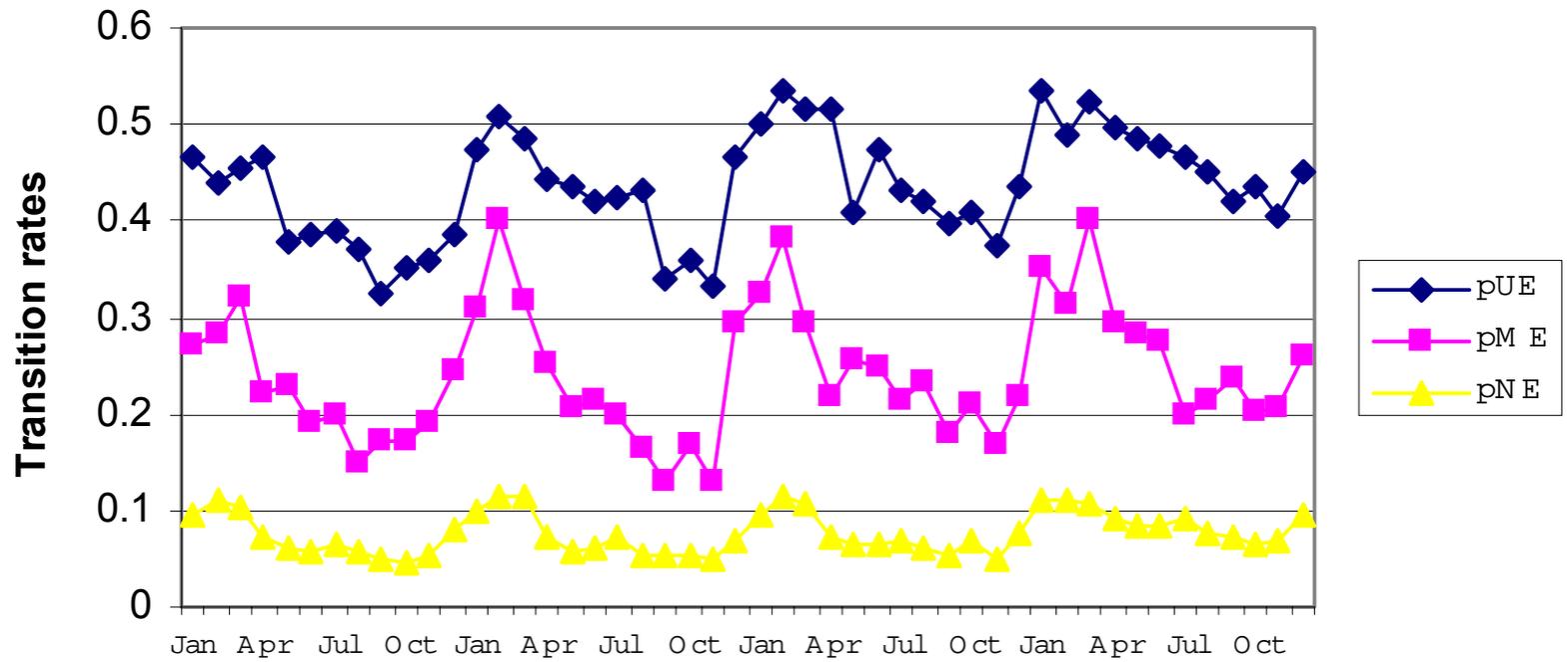
**Figure 1C**  
**Transition rates into employment (1-4 months)**



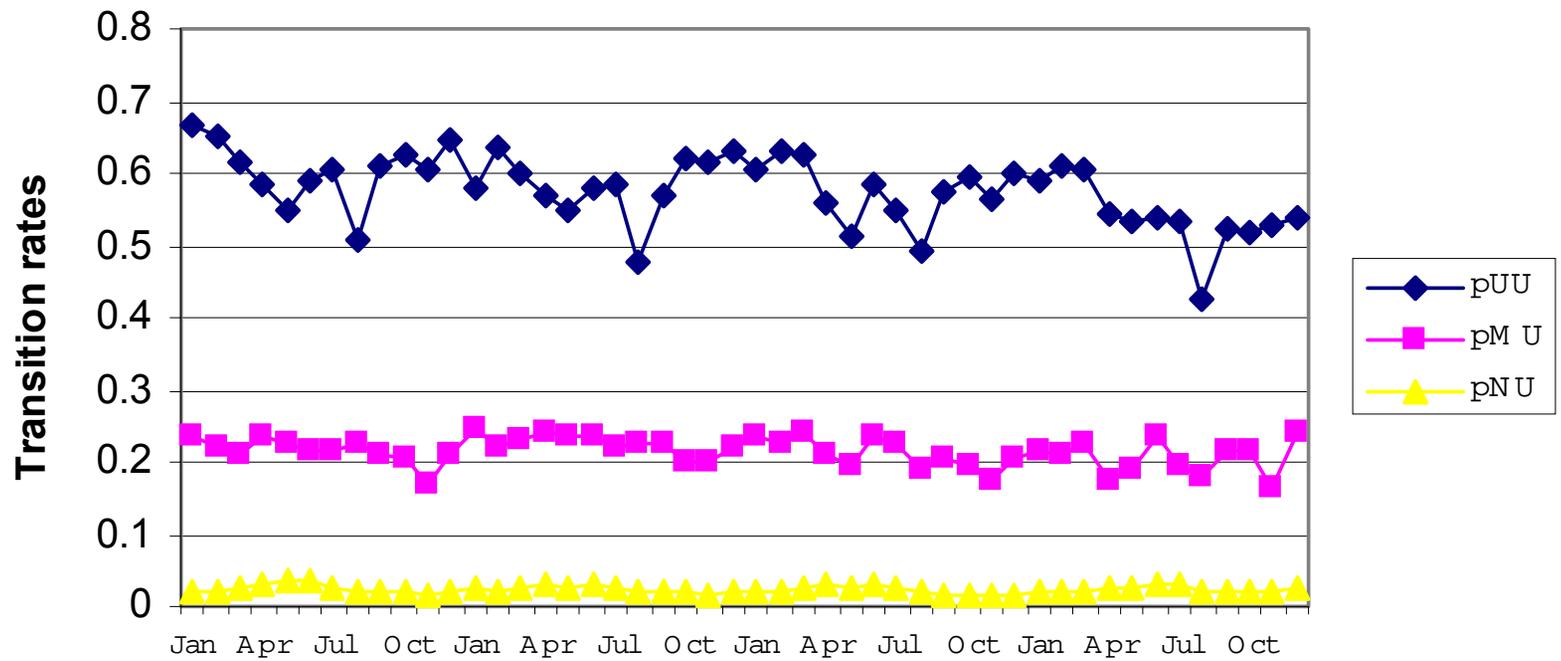
**Figure 1D**  
**Transition rates into employment (1-5 months)**



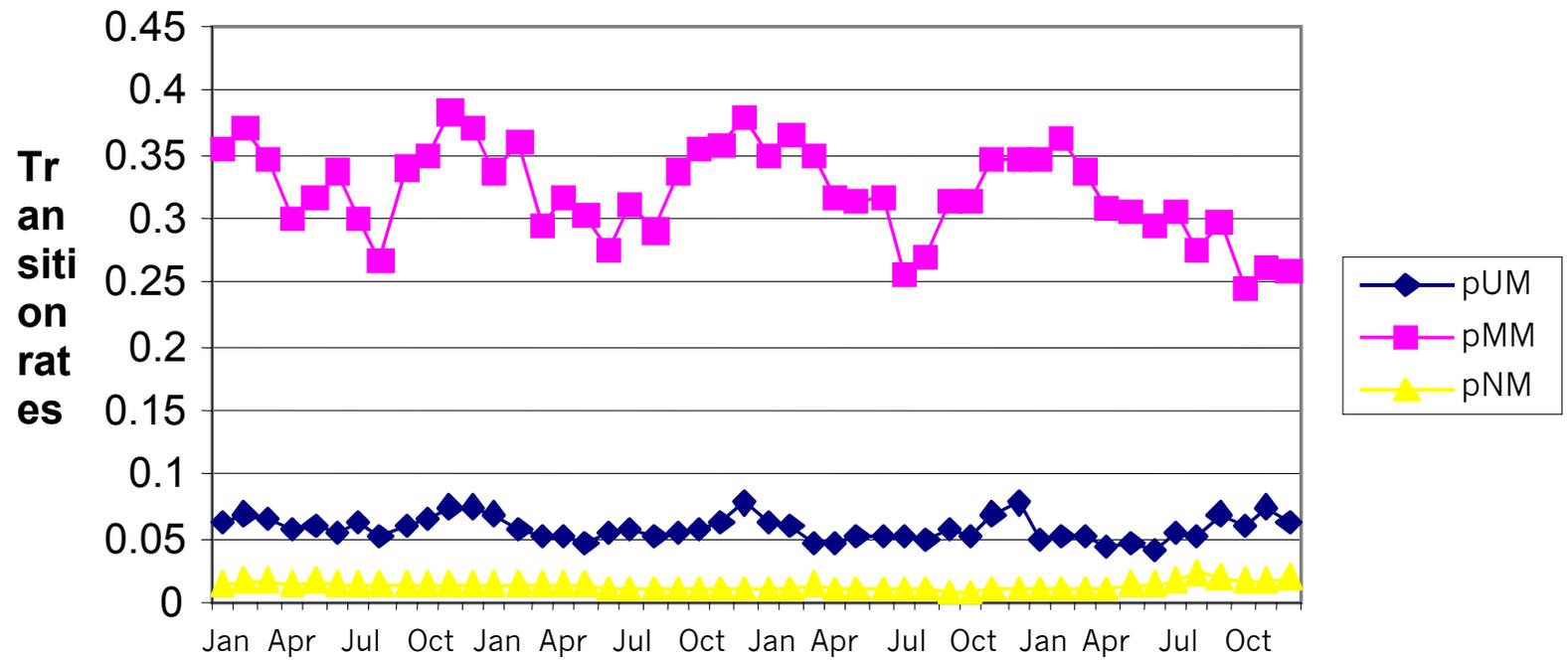
**Figure 1E**  
**Transition rates into employment (1-6 months)**



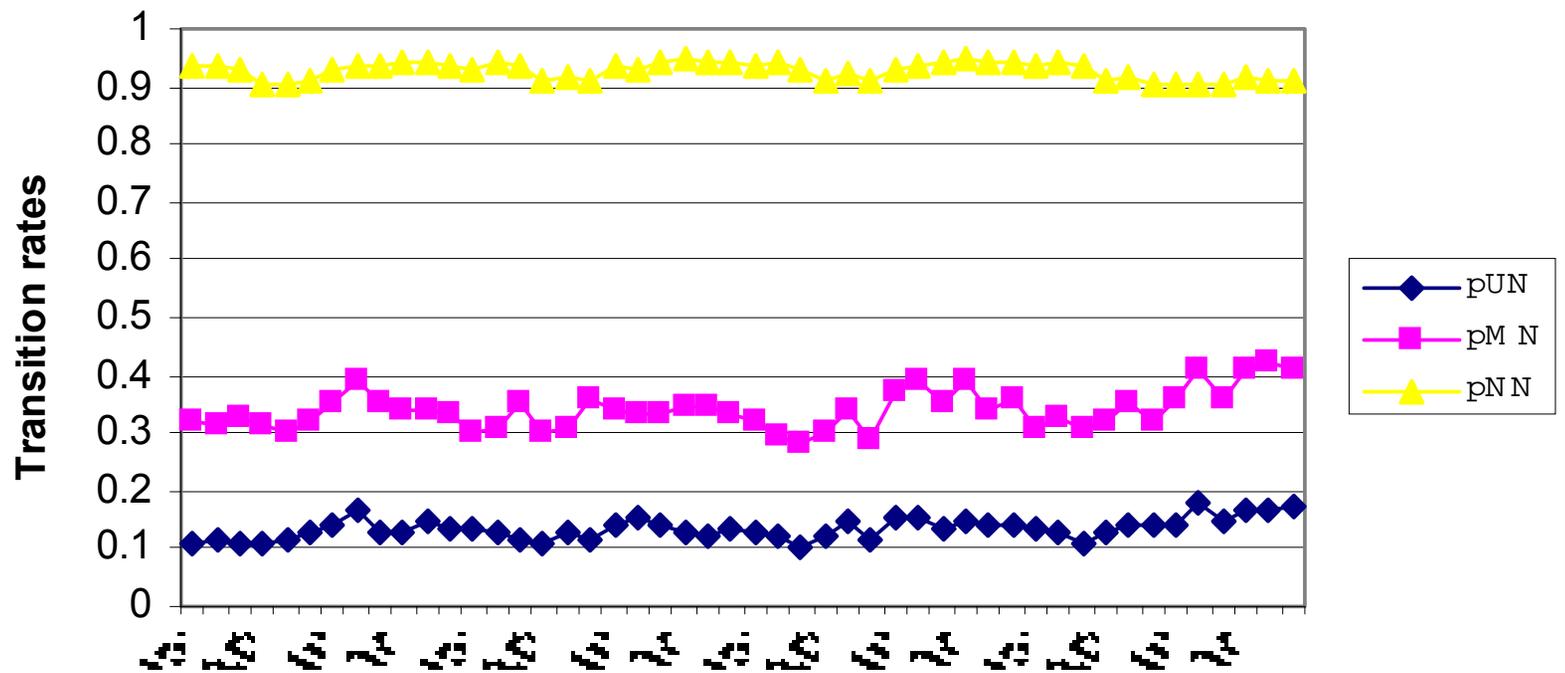
**Figure 2**  
**Transition rates into unemployment**



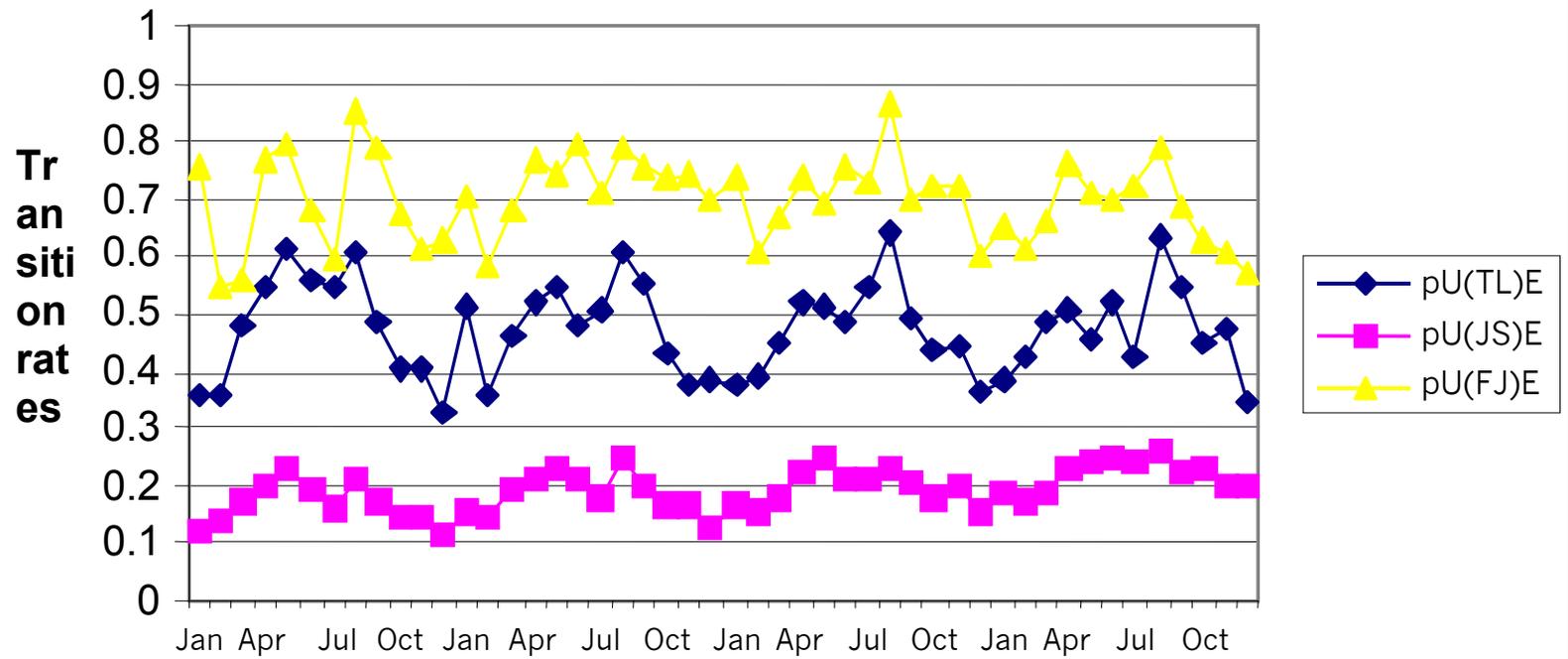
**Figure 3**  
**Transition rates into marginal attachment**



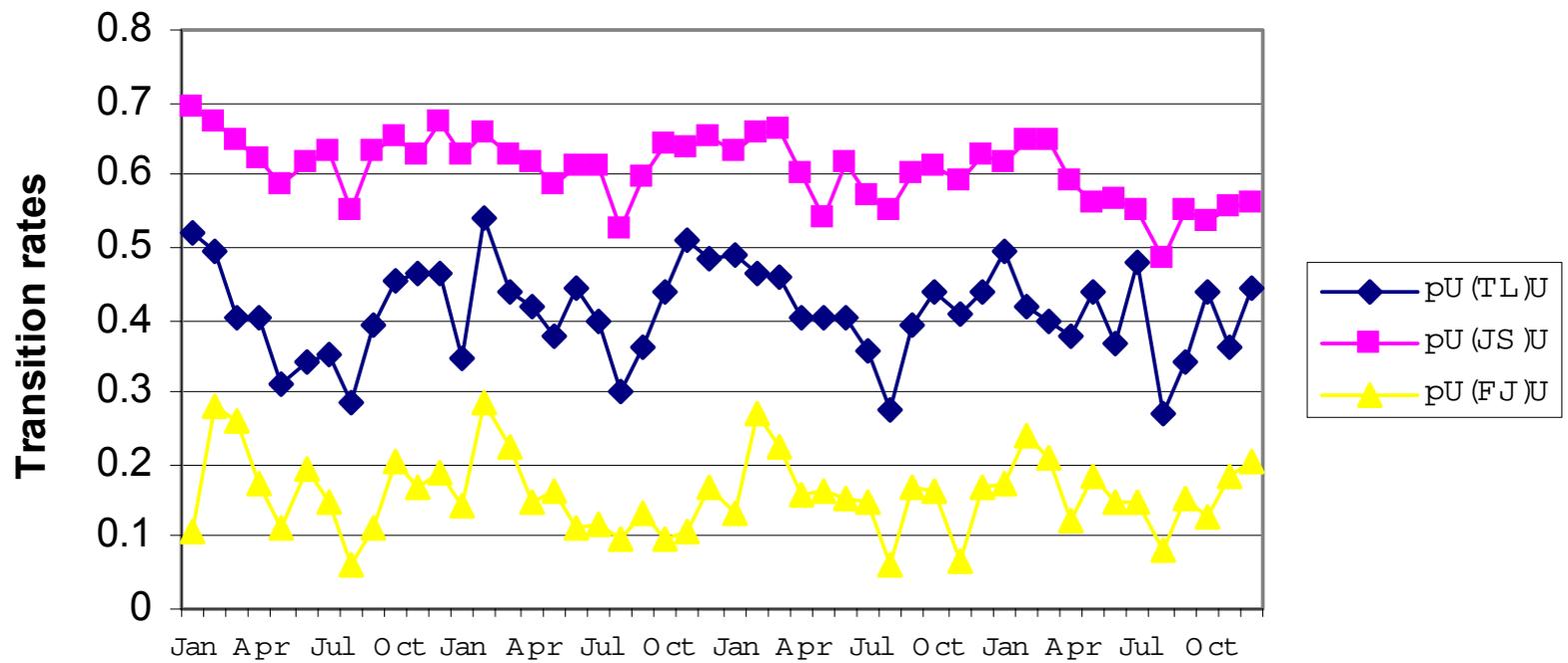
**Figure 4**  
**Transition rates into no attachment**



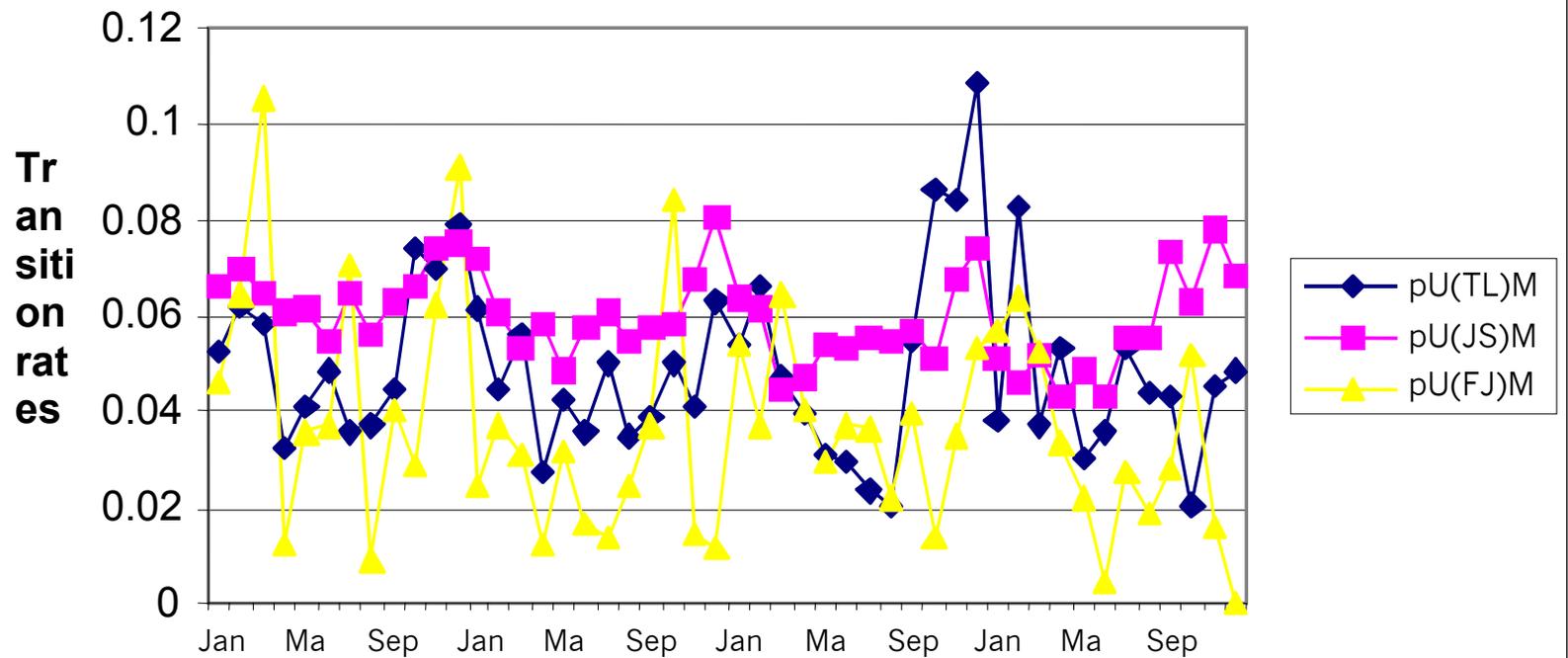
**Figure 5**  
**Transition rates into employment: unemployed categories**



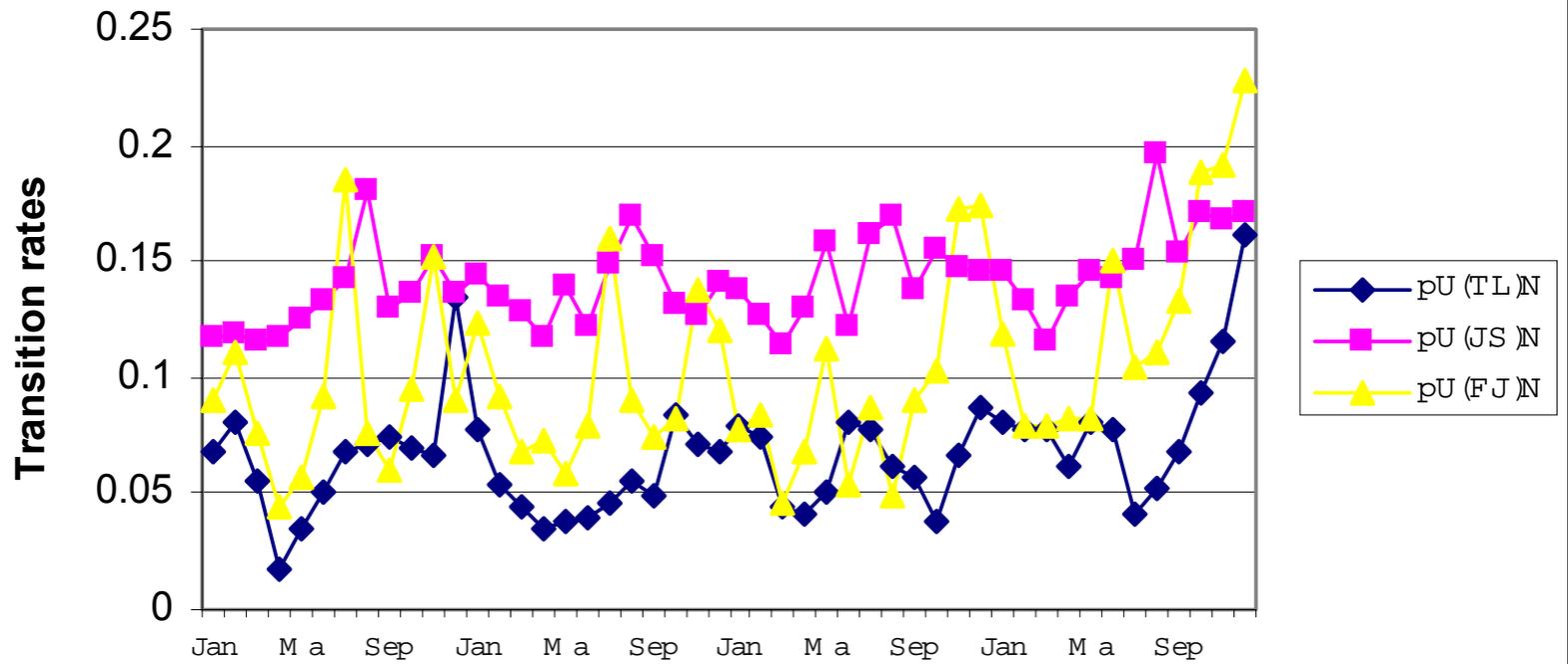
**Figure 6**  
**Transition rates into unemployment: unemployed categories**



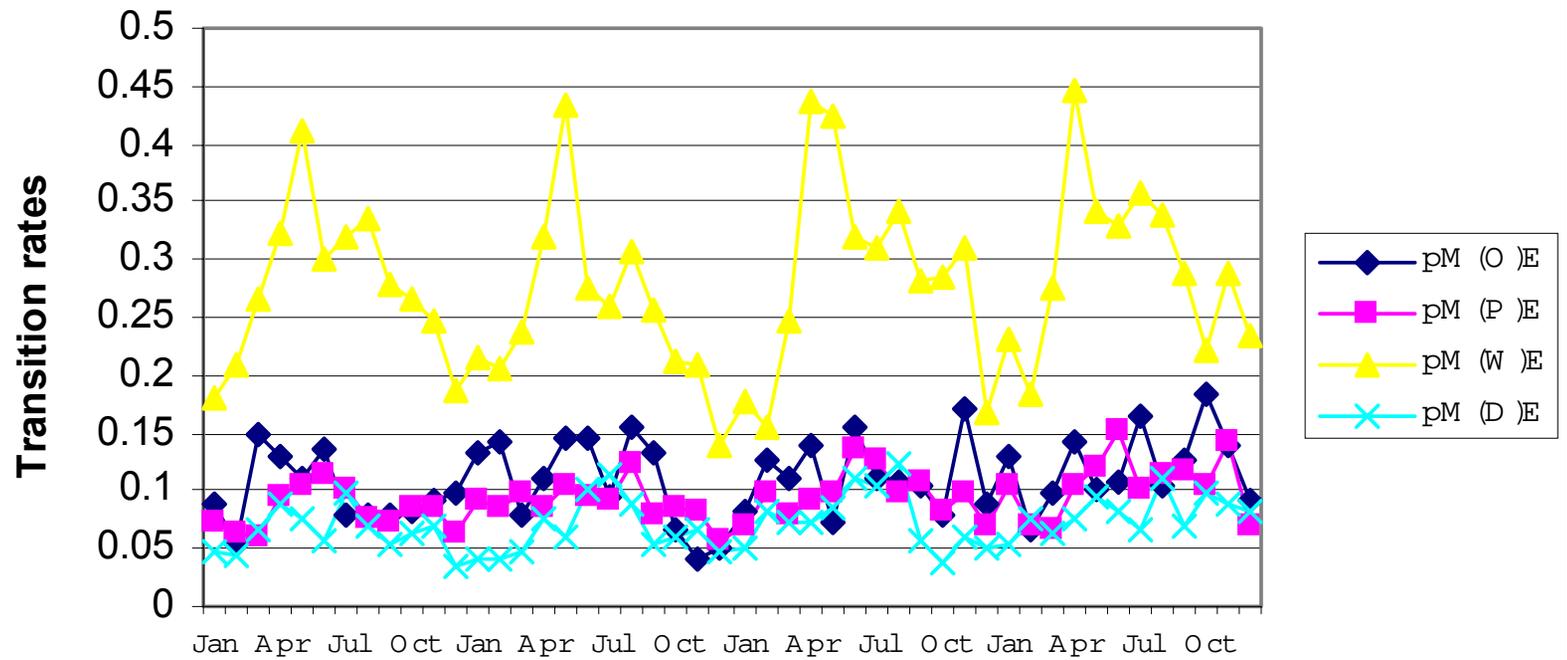
**Figure 7**  
**Transition rates into marginal attachment:**  
**unemployed categories**



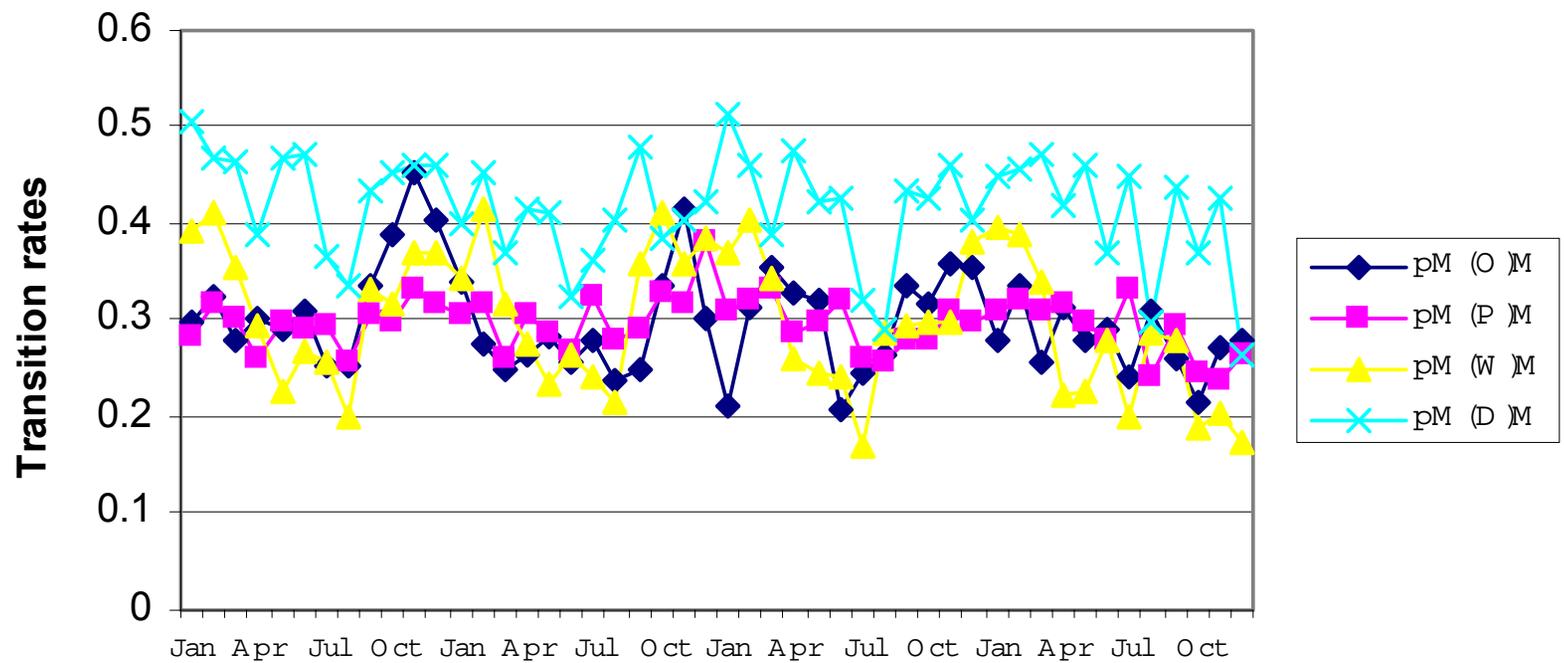
**Figure 8**  
**Transition rates into no attachment:**  
**unemployed categories**



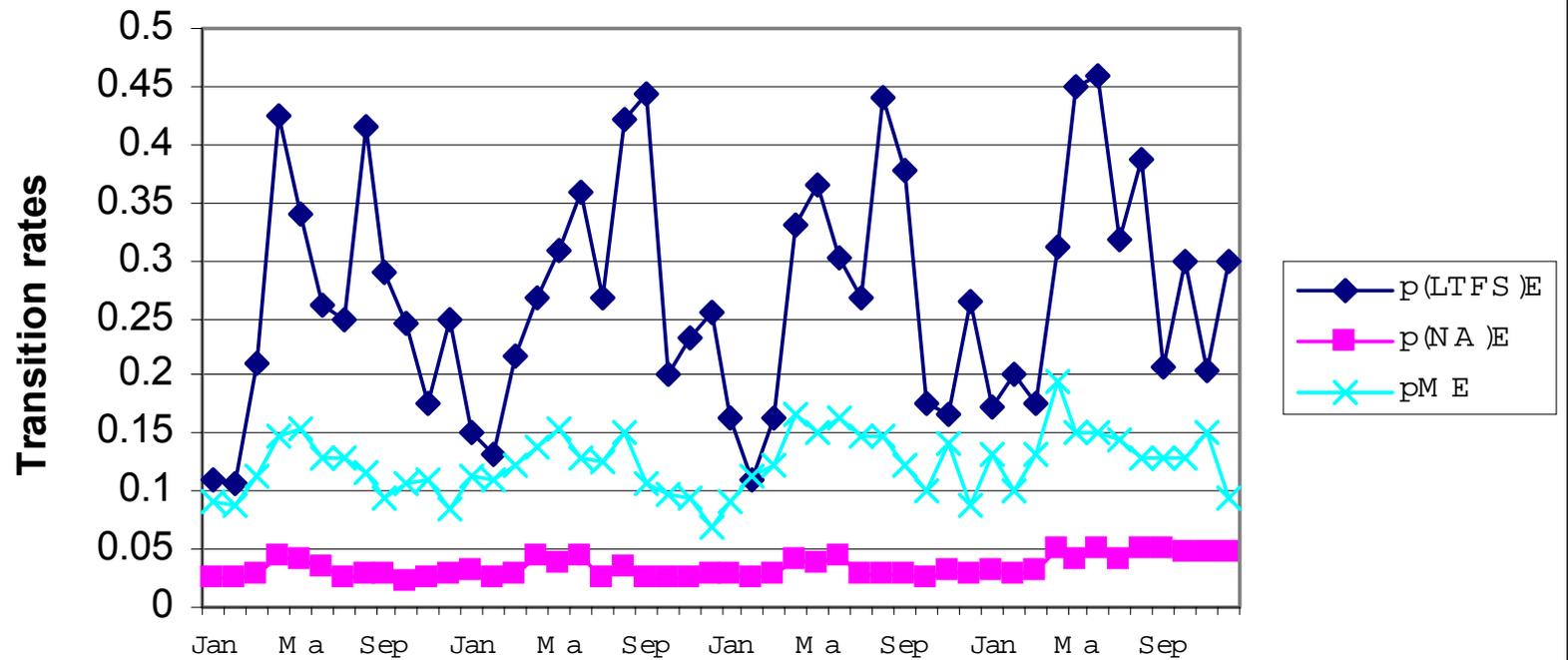
**Figure 9**  
**Transition rates into employment:**  
**marginally attached by reason for not looking**



**Figure 10**  
**Transition rates into marginal attachment:**  
**marginally attached by reason for not looking**



**Figure 11**  
**Transition rates into employment:**  
**L.T. future start, other not attached and marginally attached**



**Figure 12**  
**Transition rates into unemployment:**  
**L.T. future start, other not attached and marginally attached**

