Volume Title: Labor Statistics Measurement Issues

Volume Author/Editor: John Haltiwanger, Marilyn E. Manser and Robert Topel, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-31458-8

Volume URL: http://www.nber.org/books/halt98-1

Publication Date: January 1998

Chapter Title: Unemployment and Labor Force Attachment: A Multistate Analysis of Nonemployment

Chapter Author: Stephen R. G. Jones, W. Craig Riddell

Chapter URL: http://www.nber.org/chapters/c8359

Chapter pages in book: (p. 123 - 155)

4 Unemployment and Labor Force Attachment: A Multistate Analysis of Nonemployment

Stephen R. G. Jones and W. Craig Riddell

Few official statistics are more closely monitored than the rate of unemployment, yet its definition and measurement remain controversial. In most countries, the population is divided into three labor force categories—employment (E), unemployment (U), and out of the labor force (O)—based on the results of household surveys. While employment versus nonemployment is relatively clear-cut, drawing the line between state U and state O is often difficult in practice. Although this latter distinction is usually based on some definition of job search,[1] such a separation does not necessarily correspond well to an economic frame of analysis. The search requirement is typically not defined in terms of either time or monetary inputs and also makes little or no reference to the set of job characteristics, especially the wage, that would make the job acceptable. Missing is some concept of whether a particular type of job search is appropriate for the person concerned; without something of this sort, the distinction between state U and state O might be based on survey responses that contain little or no behavioral content.[2]

Relatedly, there is undoubtedly considerable heterogeneity in the group of people currently classified in state O. Some might be thought close to the unemployed category because of a fairly recent job search or because of an ex-

Stephen R. G. Jones is professor of economics at McMaster University. W. Craig Riddell is professor of economics at the University of British Columbia and an associate of the Canadian Institute of Advanced Research.

The authors are grateful to Arthur Sweetman for excellent research assistance, to the SSHRC for research support, and to Ian Macredie, Scott Murray, and Ray Ryan of Statistics Canada for their assistance in providing access to the data used in this study. They also thank Tom Lemieux, John Beggar, and conference participants for useful comments.

1. The principal exceptions to this rule are for persons awaiting recall to a former job and persons with a future job start at a definite date in the (near) future.

2. See Lucas and Rapping (1969) for a statement of this type.

pressed desire for employment.[3] Others have been detached from the labor force for long periods and have few marketable skills or little desire to participate. One group classified as state O for whom there is some detailed information consists of "discouraged workers," persons who state that they desire work but who did not search because they believed no work to be available. More generally, the O category includes "persons on the margin of the labor force," defined as individuals who indicate that they want work but are not engaging in job search for "personal" or "economic" reasons.[4] There is considerable debate over whether this marginal attachment group should be included among the unemployed[5] or, as is current procedure, treated as out of the labor force.[6]

There are a number of reasons why these definitional questions are important. First, Canadian evidence suggests that the group of persons on the margin of the labor force may number up to one-third the total currently counted as unemployed (Akyeampong 1987).[7] Second, the size of this potentially substantial marginal attachment group may vary cyclically or secularly, which could affect conclusions about the time-series behavior of unemployment.[8] Third, the relative importance of the marginal attachment category will likely vary regionally or by demographic group; this variation could be important for assessment of relative unemployment experiences across regions or demographic groups. Fourth, consideration of unemployment and marginal attachment may be important for the analysis of jobless durations and for an understanding of duration dependence. If these two states are behaviorally equivalent, a period in which there is a spell of marginal attachment in the middle of two spells of unemployment might well be counted as one long spell of unemployment, broadly defined, rather than as three comparatively short spells (U, O, and U,

3. Note, though, that this desire for work is subject to the same qualifications as the job search requirement, in that job characteristics such as the wage are not considered in the survey response.

4. One interpretation of this description is that such marginally attached persons would work at the "going wage" if a job presented itself but their benefit from so doing is not great enough to warrant the time and monetary costs of job search. Strictly speaking, though, the questionnaire definition—like that of job search itself—makes no reference to a "going wage" or other job characteristics.

5. An illustration of this debate is the fact that discouraged workers were in principle included among the unemployed in the United States and Canada in previous versions of the Current Population Survey and Labour Force Survey. E.g., prior to 1967 the Current Population Survey included among the unemployed those who would have been looking for work except that they believed no jobs were available in their line of work or in their community. However, this information was recorded only if it was volunteered by the respondent. Thus the number of discouraged workers actually included among the unemployed was probably undercounted relative to more recent counts based on an explicit question about desire for work and reasons for not searching.

6. Examples of this literature are Akyeampong (1987), Cain (1980), Cohen (1991), Devereaux (1992), Gower (1990), Jackson (1987), Norwood (1988), Organization for Economic Cooperation and Development (OECD 1987), and Stratton (n.d.).

7. As U.S. evidence on the number of discouraged workers, the number of "persons who desire work but think they cannot get jobs" was 12 percent of the total unemployed in 1992 (Department of Labor 1993).

8. Some evidence of a secular decline in the proportion of "discouraged workers" in Canada in the early 1990s is provided in Akyeampong (1992).

respectively). More generally, a period of "waiting" in the marginal attachment state may be as productive (in terms of future employment) as a period of actual job search (cf. Hall 1983). Furthermore, it is likely that this issue of behavioral equivalence may vary by age, sex, and region. Finally, and more generally, Card and Riddell (1993) found that most of the divergence in Canadian-U.S. unemployment rates in the 1980s could be attributed to differences in the probability that a nonemployed person was counted as unemployed, although the reasons for this difference were not identified. Further work on the nature of nonemployment and specifically on the mechanics of its division into unemployment and nonparticipation is clearly warranted.

To date, most discussion of these labor market categorization issues has been a priori in nature (e.g., OECD 1987), although Stratton (n.d.) examined the past labor market behavior and current demographic characteristics of U.S. discouraged workers, relative to those of the unemployed, and concluded that these two groups appear different in this retrospective sense. Our goal in this paper is to extend this debate by using a framework that enables the appropriate survey criteria to be determined on empirical grounds rather than a priori. This framework involves examining whether different labor force groups differ in terms of their transition probabilities among labor force states. In particular, we assess whether the marginally attached are behaviorally distinct from those counted as unemployed. We also evaluate whether members of the marginal attachment group differ behaviorally from the balance of those classified as out of the labor force.

Our approach for this evaluation of behavioral equivalence extends the procedure proposed by Flinn and Heckman (1982, 1983), who tested (and rejected) Clark and Summers's (1979) idea that unemployment and out of the labor force are not distinct states for white male high school graduates.[9] In turn, this issue was further analysed by Gönül (1992), who employed a broader sample of male and female youth. It should be noted that these authors used the National Longitudinal Survey youth data, in which only the states E, U, and O are observed.[10] In the population as a whole, however, the O category must include many persons with very little genuine labor force attachment (e.g., full-time students and the retired). The behavior of many such unattached persons is surely distinct from that of the unemployed. For both measurement and policy purposes, a more important question is whether the marginal attachment subset of O is distinct from U or the rest of those in O. Equivalently, this issue amounts to whether unemployment should be defined by some sort of

9. Three-state models (i.e., with states E, U, and O) are employed by Blau and Robins (1986), Burdett et al. (1984), Tano (1991), and Van den Berg (1990).

10. Note also that the existing work must grapple with the serious problem that in the National Longitudinal Survey youth data, individual nonemployment spells (rather than proportions of time) are not identified. Flinn and Heckman exclude from their sample all nonemployment spells that are partially spent in unemployment, while Gönül allows for all possible cases in a combinatorial fashion, given some maintained assumptions.

job search requirement or perhaps by a weaker requirement such as an expressed desire for work. Clearly, to address this question empirically requires data that identify marginal attachment to the labor force.

This paper builds on the testing framework established in Jones and Riddell (in press), which examined only aggregate data. The present focus is rather on the demographic and regional components of these labor market categorization issues and on how these components vary through time.

4.1 Statistical Framework

The framework for analysis is a Markov model of transitions among various labor force states. We consider four states: employment (E), unemployment (U), marginal attachment (M), and not in (and not marginally attached to) the labor force (N). Both employment and unemployment correspond to those conventionally measured in the Labour Force Survey but the latter two states, M and N, arise from separating the usual "out of the labor force" category O into two components, according to marginal attachment status. In this paper, such marginal attachment status represents individuals who did not engage in job search in the reference period but who nonetheless report that they desired work. The balance of the population then falls in the "not attached" state (N) that consists of nonemployed individuals who *neither* searched for *nor* desired work.

The dynamic structure is summarized by a four-by-four transition matrix P, where the ij element p_{ij} gives the probability of an individual's being in state j in the next period given that the individual is in state i in the current period:

$$P = \begin{pmatrix} pEE & pEU & pEM & pEN \\ pUE & pUU & pUM & pUN \\ pME & pMU & pMM & pMN \\ pNE & pNU & pNM & pNN \end{pmatrix}. \tag{1}$$

Given this Markovian structure, a necessary and sufficient condition for the states of marginal attachment (M) and not attached (N) to be behaviorally identical is that the probability of a transition from M to E equals that of a transition from N to E *and* the probability of a transition from M to U equals that of a transition from N to U:

$$\begin{aligned} pME &= pNE, \\ pMU &= pNU. \end{aligned} \tag{2}$$

If this condition holds, the four-state model is equivalent to a three-state model where the conventional categorization (E, U, and O) is appropriate. Given equation (2), the desire-for-work question would convey no information regarding labor force status.

Another polar case would obtain if, given the desire-for-work question, in-

formation on job search itself conveyed no further information about labor force status. This would correspond to the idea that those in the marginal attachment group are not behaviorally distinct from the unemployed, a view that would suggest that the conventional job search requirement for unemployment is too narrow, and would hold if

$$pUE = pME, \qquad pUN = pMN. \tag{3}$$

If conditions (2) and (3) were to both fail, one might well expect some ordering of attachment such as

$$pUE > pME > pNE, \tag{4}$$

which would suggest use of a four-state model and would provide a reason for the reporting of unemployment, marginal attachment, and nonattachment to the labor force as distinct labor force states. From the perspective of data collection, a finding that *pME* substantially exceeds *pNE* would suggest considerable value in the inclusion of a desire-for-work question.

4.2 Data Collection and Construction

The data we employ are drawn from the Survey of Job Opportunities (SJO), an annual supplement to the monthly Canadian Labour Force Survey (LFS). The SJO provides information on the desire for work among those who did not engage in job search during the reference period; it also collects self-reported reasons for not searching. We use the 13 SJO files that cover March for the years 1979–92 (in March 1990, the survey was not administered).[11]

For the present longitudinal analysis, we then *match* these SJO files on an individual basis with the subsequent month of the LFS itself. Since the LFS rotation group structure has a respondent being surveyed for six consecutive months and then dropped, it follows that (approximately) five-sixths of the respondents to the SJO will also be present in the LFS in the subsequent month.[12] Our data file contains the complete SJO information for each March together with the LFS labor force status (E, U, or O) for the following April. Accordingly, the *empirical* transition matrix from the three SJO nonemployment states to the three LFS states is given by

11. The SJO was also administered in September of 1981 and 1984, which gives some slight insight into the seasonal patterns of marginal attachment, but we do not use those two files in the current analysis. However, it is worth noting that the broad pattern of our results below also holds for those two data sets.

12. In the old U.S. Current Population Survey, discouraged worker questions were asked only of members of the two outgoing rotation groups, which would preclude the longitudinal matching we shall undertake. In future work, however, we plan to exploit the monthly discouraged worker questions in the new Current Population Survey (beginning January 1994) to study the dynamics of this marginal attachment.

$$P_{SJO \to LFS} = \begin{pmatrix} pUE & pUU & pUO \\ pME & pMU & pMO \\ pNE & pNU & pNO \end{pmatrix}. \tag{5}$$

Since we do not observe the full transition matrix corresponding to matrix (1), the data evidently set some limits on the tests we can perform. In particular, while condition (2) can be tested with these data (essentially since both destination states E and U are observed unambiguously in the LFS), we are unable to test the latter part of condition (3), that $pUN = pMN$, because O (which is just M + N) and not N is observed in the destination month. Testing of condition (3) must then be partial, assessing only the first equation that governs transitions into employment.

We should also comment briefly on the fact that our work is based on linked record data and is accordingly subject to the problems of missing data and classification error (see, e.g., Abowd and Zellner 1985; Meyer 1988; Poterba and Summers 1986; Romeo 1992a, 1992b; Stasny 1988).[13] Missing data can arise, for example, when persons in the March sample move before the April survey, and a major concern is that such moves may be correlated with labor force status (such as when an individual moves to take a job), so that data are missing on a nonrandom basis. Classification errors occur when an individual's labor force status is incorrectly classified, such as when someone who is in fact employed is counted as unemployed. These errors can occur because of incorrect responses to questions (perhaps associated with proxy responses), misunderstandings by the interviewer, or errors that occur in the data capture process. If random, these errors tend to be offsetting in cross-sectional samples. However, classification error can bias results based on gross flow data even if the errors are random because a single misclassification can give rise to two incorrectly recorded transitions. In the present context we note that the battery of supplemental SJO questions asked in the March survey (which pertain to particular labor force states) means that the problem of classification error is likely to be chiefly associated with the April LFS data.[14] We do not have access to LFS reinterview data that could serve to check the accuracy of these April figures, however.[15]

In practice, we should note that the distinction between unemployment and nonparticipation typically depends on more than job search. For persons on temporary layoff and for those with a job to start at some definite date in the future, job search is not required in order for the respondent to be categorized

13. In part because of these problems, Statistics Canada does not regularly publish the gross flow data created by linking adjacent LFSs. However, these data are available on request and have been used in a number of studies.

14. Compare the analysis of Poterba and Summers (1995).

15. Using Canadian data on gross flows of labor, LeMaître (n.d.) questions the assumption of serially independent classification errors that underlie standard correction procedures based on reinterview data. Singh and Rao (1991) report classification error estimates that are based on reinterview data but that do not rely on independence of classification error.

as unemployed and the key criterion is rather that of current availability for work.[16] Thus our methodology could be employed for two related purposes: first, to examine whether the criteria for determining the status of "temporary layoffs" and "future job starts" are appropriate and, second, to examine whether availability for work is the best criterion for distinguishing between unemployment and out of the labor force for these individuals.

The data that we use in this paper represent a subset of the full SJO-LFS match, in that we only use part of the full nonemployed group, and it is important to explain the nature of the data carefully before proceeding. For employment, we follow the LFS so that respondents are classified as employed if they worked in the reference week (the week prior to the survey, usually the week containing the 15th of the month) or if they had a job but did not work for reasons such as illness, family responsibilities, bad weather, and vacation.[17] For the nonemployed, there are four circumstances to address: "no job attachment," "future job starts," "temporary layoffs," and "permanently unable to work."

"No job attachment" refers to persons without a job in the reference week (including a job from which the individual was temporarily laid off) who did not have a job scheduled to start at a definite date in the future. For these individuals, the distinction between state U and state O is based on job search, specifically on whether the respondent searched for work at least once in the previous four weeks. "Future job starts" refers to persons who were nonemployed in the reference week but who have a job to start at a definite date in the future: there is a subdivision into short-term and long-term future starts according to whether the new job start is one to four weeks away or more than four weeks away. "Temporary layoffs" refers to those who report that they did not work last week because of a temporary layoff from a job to which they expect to be recalled. Short-term future job starts and temporary layoffs are classified as state U or O depending on availability for work in the reference week, and job search is not required for individuals in these two categories to be classified as unemployed.[18] In contrast, long-term future starts are treated

16. As described in more detail later, availability for work is used to distinguish state U from state O for those with a job to start within four weeks ("short-term future starts"), while job search is employed for those with a job to start in more than four weeks ("long-term future starts").

17. See Statistics Canada (1992) on the details of the LFS questionnaire.

18. The determination of availability for work in the reference week is based on responses to question 63 on the LFS: "Was there any reason . . . could not take a job last week?" Persons who answer no are classified as unemployed, as are those who answer yes because of "own illness or disability," "personal or family responsibilities," or "already has a job." (Individuals answering yes for these reasons are considered available for work even though they may have been temporarily unavailable during the reference week.) On the other hand, those who answer yes to question 63 because they are "going to school" or "other" reasons are regarded as unavailable and are hence classified as out of the labor force, even if they are categorized as temporary layoffs or short-term future job starts.

The one exception to this occurs for full-time students looking for full-time work, who are classified as not in the labor force, even though they may (also) be temporary layoffs, short-term future job starts, or unattached job seekers.

similarly to the no job attachment group in the LFS in that the distinction between state U and state O is based on job search.

The SJO provides information about expressed desire for work and reasons for not searching for work. The coverage of the SJO is restricted to nonemployed persons who are not seeking work or on temporary layoff. That is, within the group of those not seeking work, the SJO solicits information from future job starts (short term and long term) and those with no job attachment. Appendix table 4A.1 details the groups surveyed.[19]

The focus of the paper is on the no job attachment group; the question of whether labor force activity should be classified in terms of job search or in terms of desire for work is clearly most relevant for this group. Over our sample period as a whole, the no job attachment category represents the bulk of both unemployment (85 to 90 percent) and not in the labor force (93 to 94 percent). Future job starts represent 4 to 6 percent of U and less than 1 percent of O; there are too few such individuals to permit the analysis carried out in this paper.

Our particular use of the SJO data is its information on the marginal attachment group, which is based on the response to the SJO question "Did . . . want a job last week?" Persons who respond yes to this question (and who are classified by the LFS as O)[20] are placed in the M category; the remainder are treated as not attached (N). Additionally, the N category also includes those who are classified as O by the LFS and who did not respond to the SJO (i.e., those permanently unable to work and temporary layoffs classified as O). Appendix table 4A.1 gives the details for each case.

4.3 Transition Rates

We first examine the properties of the observed transition rates from the empirical matrix (5). Consistent with our interest in the demographic breakdown of these rates, we address the differences by age, sex, and region. In each case, as discussed above, we focus on the no job attachment group, which excludes those on temporary layoff and those classified as being future job starts. Analysis of the future job starts group within each demographic and regional subsample is precluded by considerations of sample size.

4.3.1 Age

Figures 4.1, 4.2, and 4.3 present the nine transition rates for "youths" (those aged 15 to 24) and "adults" (those aged 25 or over) graphed for each year of

19. The employed and the nonemployed on temporary layoff or permanently unable to work do not respond to the SJO, while job seekers do not complete the majority of the form, ending at question 11 of the survey.

20. However, note that persons who are classified by the LFS as U and who respond to the SJO naturally remain in the U category for the purposes of our empirical analysis.

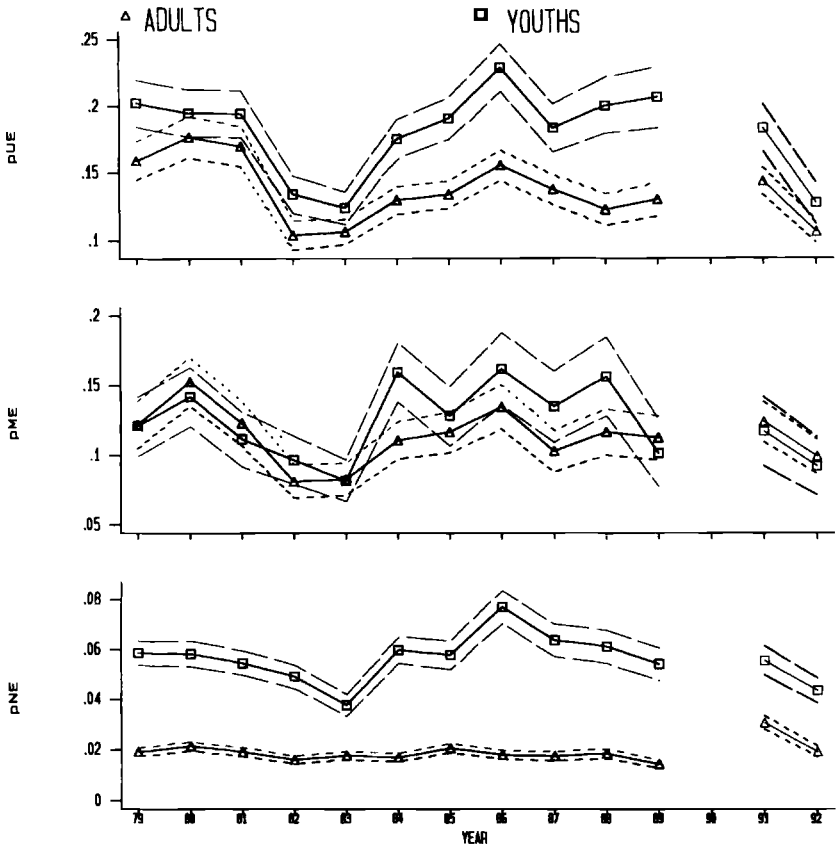

Fig. 4.1 Transitions into employment by age

Note: To accommodate a maximal amount of information, the vertical scales on these graphs (and those in subsequent figures) are not uniform and do not necessarily start at zero. The long- and short-dashed lines represent 95 percent confidence intervals.

the SJO-LFS sample.[21] The transitions into employment in figure 4.1 show a hazard from unemployment for youths that is often significantly higher than that for adults, especially for the later part of the 1980s. The transition rate from marginal attachment is less clearly different by age group, although the youth group point estimate is usually higher, while the hazard from N is roughly three times as large for youths as for adults. All three series display

21. Throughout the paper we use the LFS weights in calculating transition rates. Thus the *pUE* hazard is the fraction of the weighted number of unemployed in March who are employed in April. The division between youths and adults at age 25 matches that available in the Canadian monthly gross flow data.

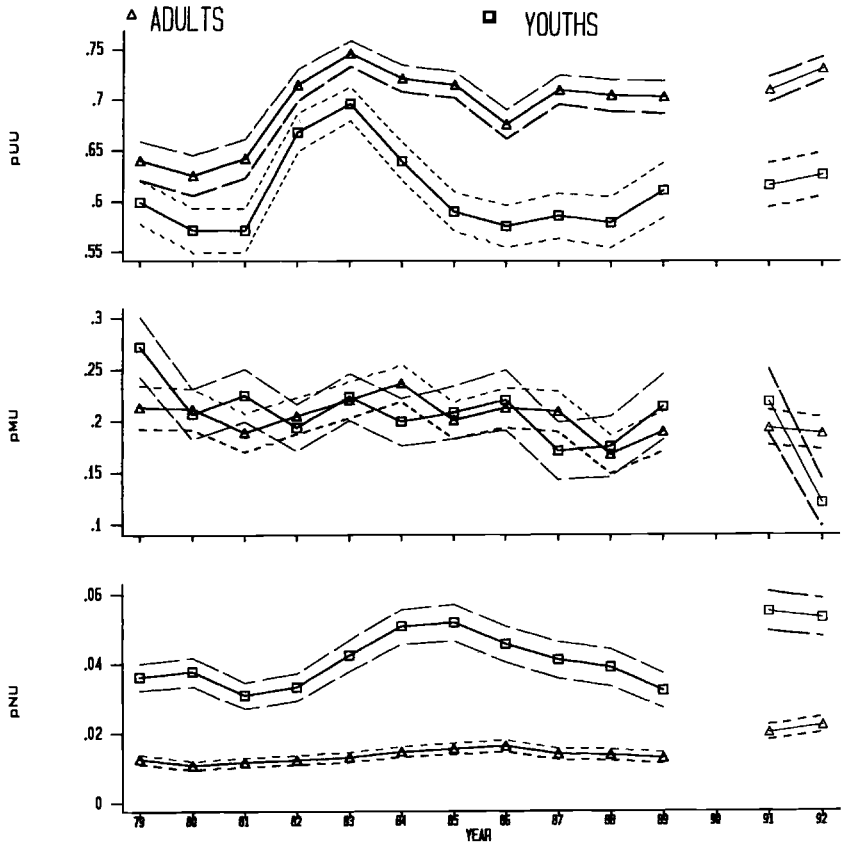

Fig. 4.2 Transitions into unemployment by age

some temporal stability, subject to the influence of the recessions in 1981–82 (from which recovery was particularly slow in Canada) and the early 1990s.

The hazards into unemployment in figure 4.2 exhibit analogous variations by age. The probability of remaining in unemployment is always significantly lower for youths than for adults, especially after 1983, while there is little difference in the transition rate from marginal attachment into unemployment. Finally, the hazard from N into unemployment, like that from N into employment, is significantly higher for youths. From figure 4.3, we can relatedly see that the hazard from U to O is also higher for youths, reflecting a lower degree of labor force attachment, while again there is very little difference by age in the hazard out of M into O. The hazard from N to O is high and relatively stable for both age groups but is significantly higher for the adult group.

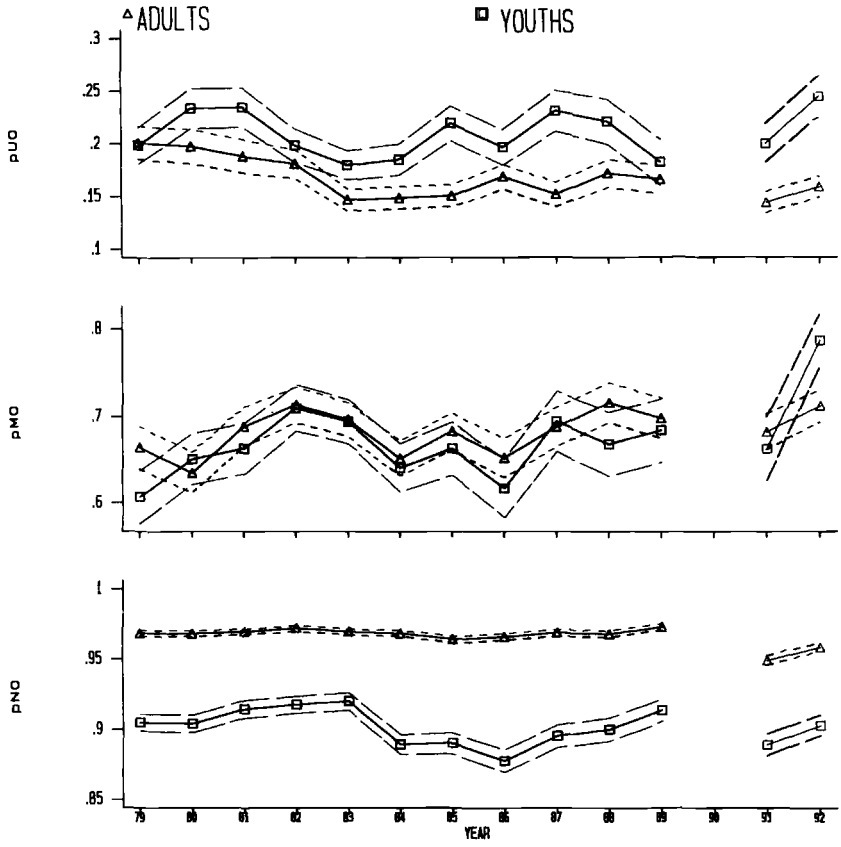

Fig. 4.3 Transitions out of the labor force by age

4.3.2 Sex

Figures 4.4, 4.5, and 4.6 present the nine empirical hazards for the 13 SJO-LFS samples broken down by sex. The hazards into employment in figure 4.4 are all somewhat higher for men than for women, this being especially true for the transition rate from N, and cyclical patterns are strong in all three series. The rates into unemployment in figure 4.5 are also higher for men, although there is some sign of convergence in the probability of remaining unemployed in the later part of the sample. Analogously, the hazards into O in figure 4.6 are higher for women for each origin state, with the difference from unemployment being proportionately greatest. Interestingly, in view of the close similarity of the hazards from marginal attachment for youths and adults, all of the hazards from marginal attachment are different by sex, with men more likely to transit into employment or unemployment and with women significantly more likely to transit into nonparticipation.

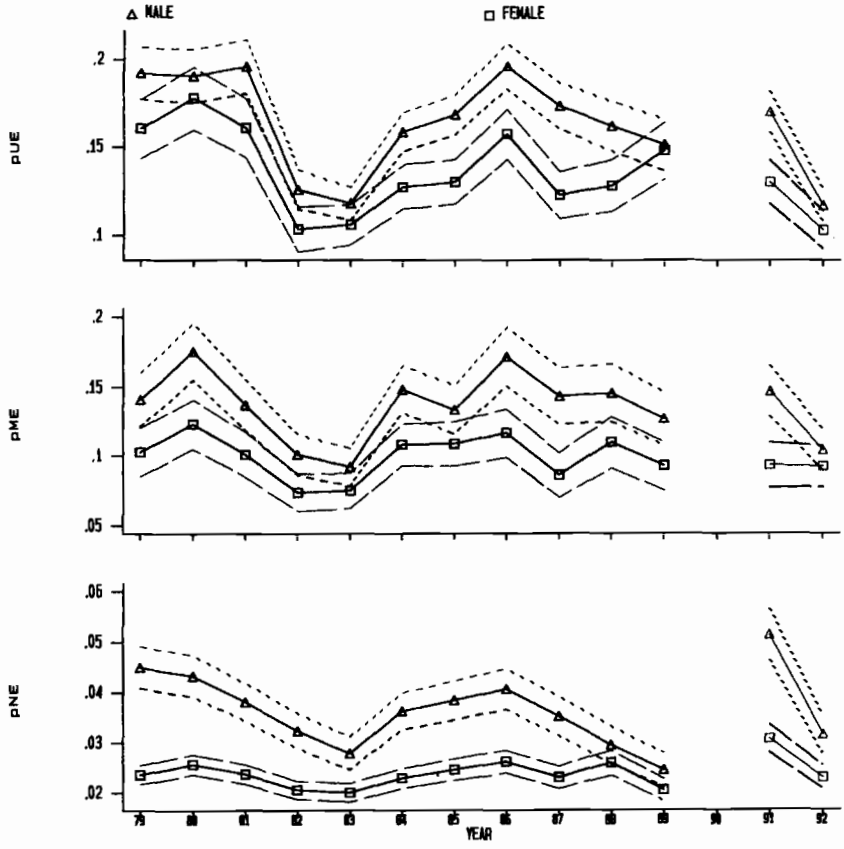

Fig. 4.4 Transitions into employment by sex

4.3.3 Region

The nine hazards disaggregated by region for each year of the SJO-LFS sample are presented in figures 4.7, 4.8, and 4.9. The hazards into employment in figure 4.7 display considerable regional variation, varying by as much as 100 percent from lowest to highest region in a given year. The Prairies tend to have high transition rates (from all three origin states), while those in Quebec tend to be among the lowest. Figures 4.8 and 4.9 give the hazards into unemployment and nonparticipation, respectively, a notable feature being the uniform rise in the probability of remaining unemployed in the early 1980s, together with the relatively uniform failure of this probability to improve much throughout the rest of the decade. Also, the widening of the diversity of regional experience during the 1980s for the hazard from U into O is remarkable, with Ontario, Quebec, and the Atlantic provinces having by 1989 transition rates double those of the Prairies and British Columbia.

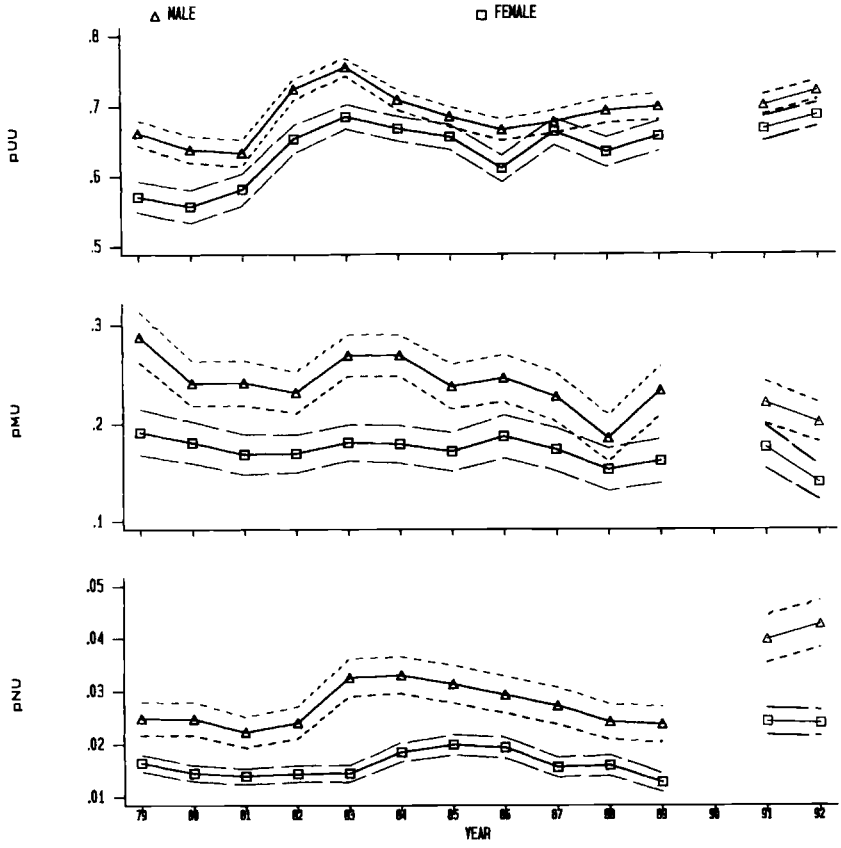

Fig. 4.5 Transitions into unemployment by sex

4.3.4 Behavior of Nonparticipants

In each of these nine graphs, we should note an issue that arises with the final two years of these SJO-LFS data, which is that there is some sign of temporal instability compared with the levels and trends from the late 1980s. This phenomenon is most clear for *pNU* by age (fig. 4.2), for *pNE* and *pNU* by sex (figs. 4.4 and 4.5), and for *pNE*, *pNU*, and *pNO* (figs. 4.7, 4.8, and 4.9) for the regional analysis. We suspect that these apparent disjunctions reflect the changing nature of nonparticipants in the early 1990s. In particular, an especially sharp decline in labor force participation was experienced during the 1990–92 recession. For example, the overall participation rate fell by 1.4 percentage points from November 1989 to November 1992, with the analogous figure for youth being a drop of 5.9 percentage points (Sunter 1993). Furthermore, during the subsequent weak recovery, participation rates—including those for adult women—failed to resume their pre-1990 trends. Clearly, the

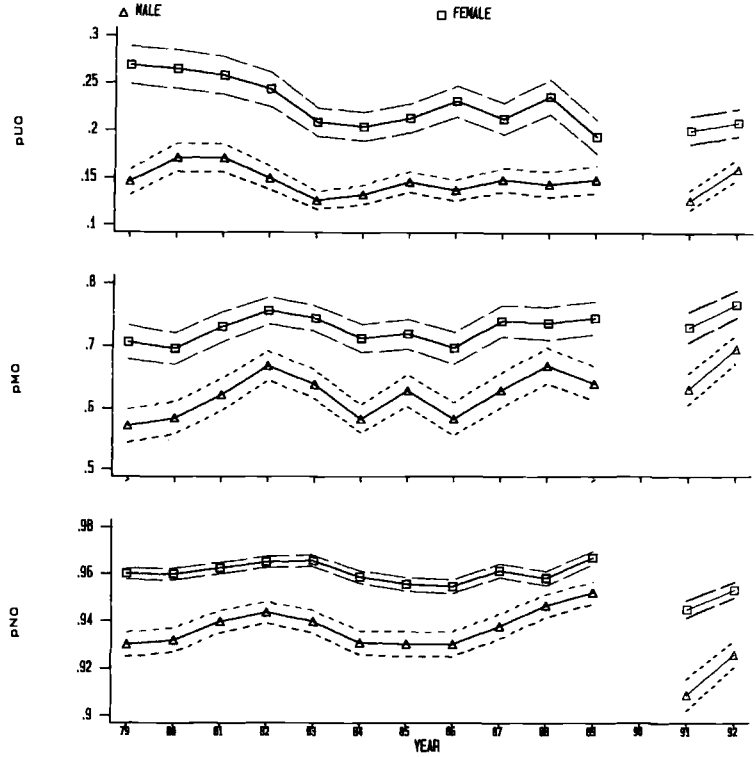

Fig. 4.6 Transitions out of the labor force by sex

unfortunate fact that the SJO was not administered in 1990 makes further analysis of these issues difficult with the present SJO-LFS data.

4.3.5 Comparison of Unemployment and Marginal Attachment Origin States

The preceding figures and associated discussion suggest that there are few differences by age or sex in the hazards out of the marginal attachment category. A related question that is less easy to answer in those figures is whether, within each age or sex grouping, the transition rates out of unemployment differ from those out of marginal attachment. In order to address this issue, the *pUE* and *pME* hazards and associated 95 percent confidence bands are presented by age in figure 4.10 and by sex in figure 4.11.[22]

For both the adult and youth age groups, the point estimate of *pUE* exceeds

22. The estimates and confidence bands are calculated from each individual SJO or LFS sample rather than by pooling the samples.

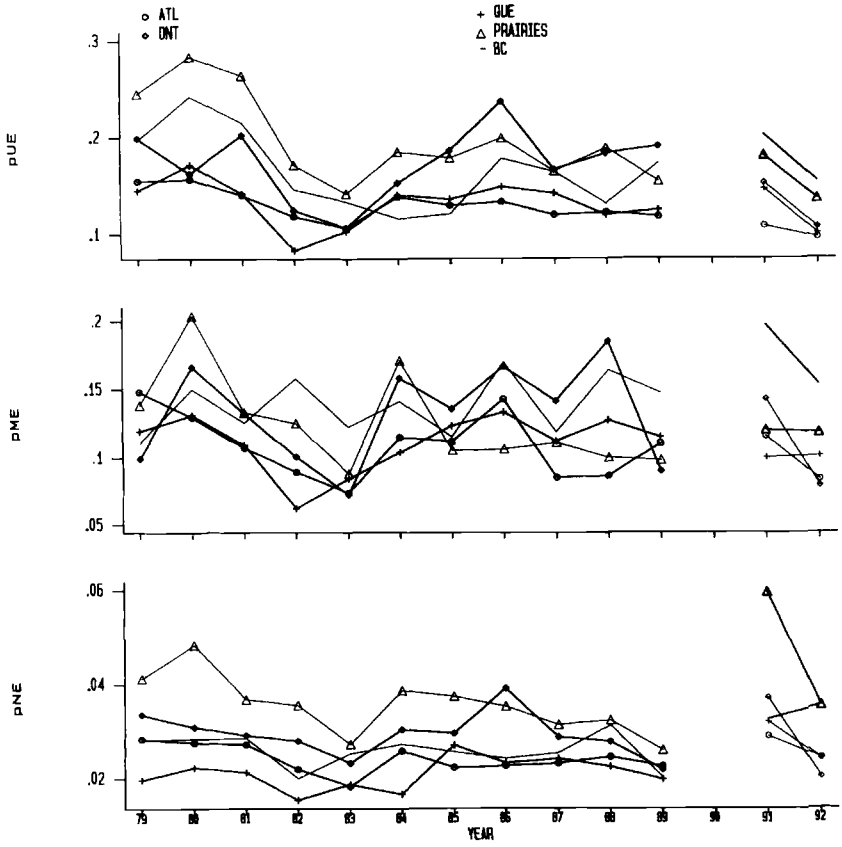

Fig. 4.7 Transitions into employment by region

that of *pME* in each year. However, the two series move closely together over the cycle, and their point estimates are quite close. For adults, the *pUE* and *pME* 95 percent confidence intervals overlap in every year, although, for youths, *pUE* significantly exceeds *pME* except in the 1983–84 aftermath of the recession. On this unconditional basis, then, it appears that the marginal attachment state is behaviorally closer to unemployment for the over age 25 group than for those 15 to 24 years of age.

The closeness of *pUE* and *pME* is also apparent in figure 4.11 for men, with the $pUE > pME$ ordering again accompanied by close comovement over the cycle and by confidence intervals that overlap in most years. For women, the ranking is rather more marked, with *pME* being only two-thirds the value of *pUE* early in the sample and with a distinct separation between the two confidence bands for most years. Thus, while men in the marginal attachment cate-

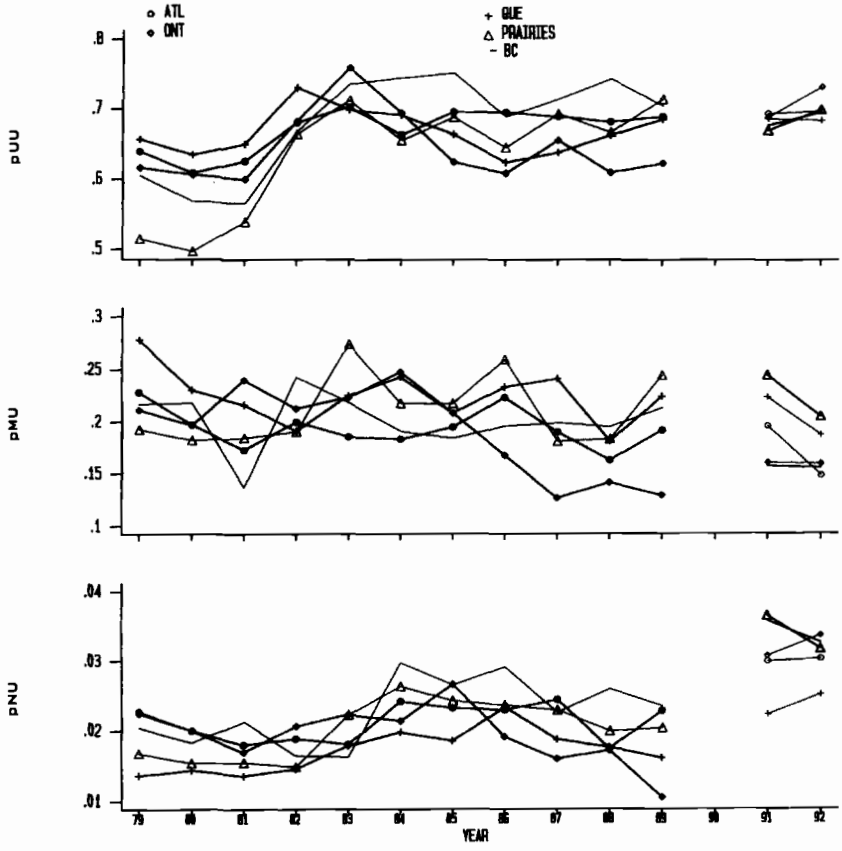

Fig. 4.8 Transitions into unemployment by region

gory look very similar to unemployed men in terms of their future labor market transitions, there is somewhat more difference between the two states for women.

4.4 Econometric Results

Although the properties of the unconditional transition rates from various origin states are informative, each transition rate summarizes the average behavior of a heterogeneous group of individuals. To assess whether there is equivalence of two origin states conditional on observable characteristics such as sex, age, marital status, region, and education level, we must estimate a model of the determinants of transitions among various states and test whether the same model holds from the two origin states under consideration. This

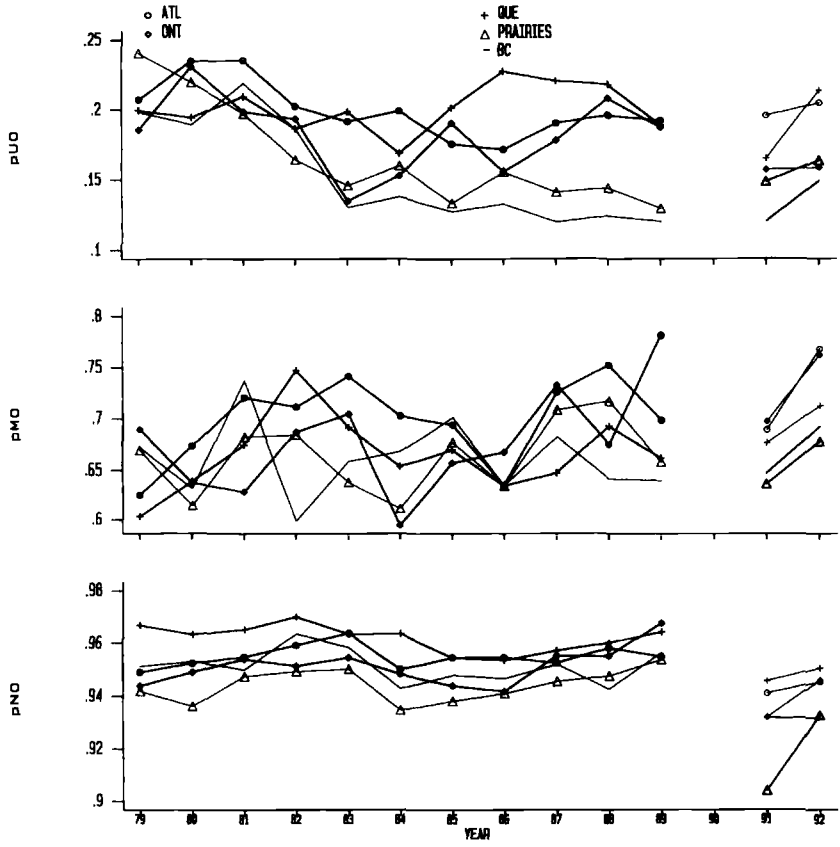

Fig. 4.9 Transitions out of the labor force by region

amounts to estimation of the conditional versions of equations (2) and (3) above.

In practice, as noted above, we are able to conduct the full test of equivalence of origin states only between M and N. We adopt a multinomial logit specification of the movement from an origin state into employment, unemployment, or out of the labor force, and since this model requires a normalization, we treat O as the omitted group.[23] Hence, we estimate three multinomial logit models, one from the marginal attachment state M, one from the not

23. Note that the multinomial logit model implicitly imposes the independence of irrelevant alternatives; in this case, the relative probabilities of transits into E and U, e.g., would be left unaltered by the removal of the (irrelevant) alternative of transiting into O. Below, we report estimates from both multinomial and binary logits—models that make the polar opposite assumptions of independence and perfect correlation, respectively—and we find results that seem fairly robust across these opposite specifications. We thank Tom Lemieux for this interpretation of our results.

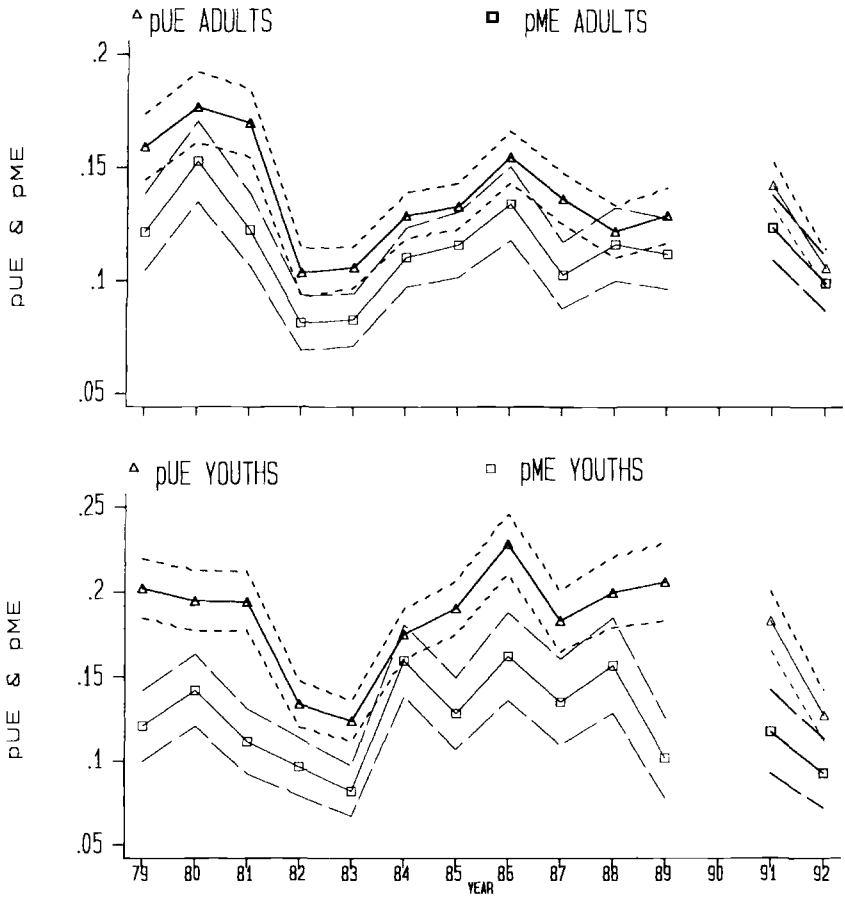

Fig. 4.10 Comparing *pUE* and *pME* by age

attached state N, and one from the two states pooled, and we employ a likelihood ratio test to determine whether we can reject the pooling.[24]

For the other two tests of interest, (i) the equivalence of U and M and (ii) the equivalence of U and N, we do not observe the necessary destination states in the SJO-LFS data. In each case, we observe destination states E and O, although our tests would respectively require that we observe (i) E and N and (ii) E and M. Since O is made up of M and N, we can only estimate part of condition (2) (or the analogous condition for testing U = N). Accordingly, we have estimated a binary logit model of the determinants of the transition into

24. Our data are weighted, so in order to attain the correct likelihood overall and in each subcase, we actually estimate the (equivalent) fully interacted model in which each explanatory variable is interacted with the origin state dummy.

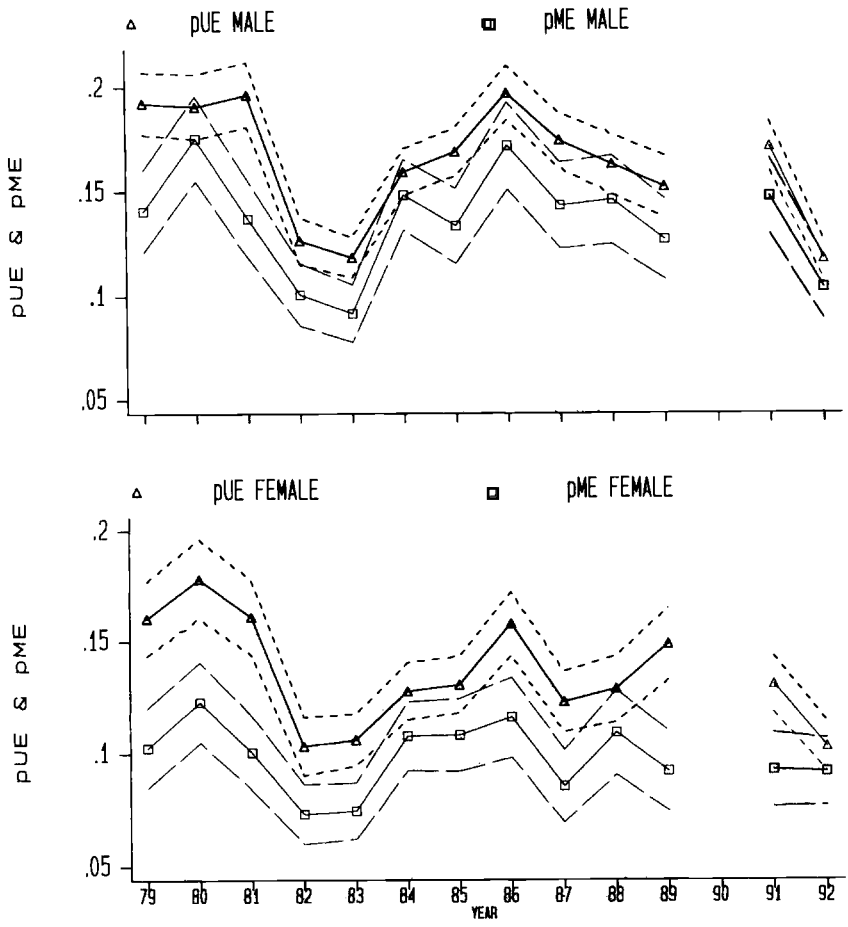

Fig. 4.11 Comparing *pUE* and *pME* by sex

employment for these two tests. Clearly, though, we could incorrectly fail to reject U = M if we have $pUE = pME$ but $pUN \neq pMN$. Thus the restrictions we test are necessary but not sufficient for the equivalence of U and M and U and N.

The results of these likelihood ratio tests for the pairwise equivalence of the U, M, and N states are given in tables 4.1, 4.2, and 4.3. In each case, we present the p-value of the test for each year of the SJO-LFS sample and for each demographic group or region in question. For both youths and adults in table 4.1, we decisively reject M = N and U = N in every year, though the equivalence of U and M is not rejected at the 5 percent level in three of the thirteen years for youths and in five of these years for adults. Similarly, the results for men

Table 4.1 **Probability Values for Binary and Multinomial Logit Tests of Equivalence of Labor Market States: By Age**

	Youth			Adult		
Year	U = M	M = N	U = N	U = M	M = N	U = N
1979	.00	.00	.00	.02	.00	.00
1980	.01	.00	.00	.00	.00	.00
1981	.00	.00	.00	.41	.00	.00
1982	.14	.00	.00	.02	.00	.00
1983	.01	.00	.00	.08	.00	.00
1984	.42	.00	.00	.10	.00	.00
1985	.00	.00	.00	.35	.00	.00
1986	.00	.00	.00	.01	.00	.00
1987	.02	.00	.00	.00	.00	.00
1988	.00	.00	.00	.08	.00	.00
1989	.00	.00	.00	.00	.00	.00
1991	.00	.00	.00	.00	.00	.00
1992	.17	.00	.00	.43	.00	.00

Notes: U is unemployed, M is marginally attached, and N is out of the labor force and not marginally attached. Likelihood ratio tests based on binary logit are used for U = M and U = N, multinomial logit for M = N. Explanatory variables are female, marital status (currently married or not), education (postsecondary certificate or higher, or not), and regions (Atlantic, Quebec, Ontario, Prairies, or British Columbia). All for no job attachment group.

Table 4.2 **Probability Values for Binary and Multinomial Logit Tests of Equivalence of Labor Market States: By Sex**

	Male			Female		
Year	U = M	M = N	U = N	U = M	M = N	U = N
1979	.01	.00	.00	.00	.00	.00
1980	.02	.00	.00	.00	.00	.00
1981	.03	.00	.00	.00	.00	.00
1982	.14	.00	.00	.00	.00	.00
1983	.04	.00	.00	.10	.00	.00
1984	.10	.00	.00	.00	.00	.00
1985	.02	.00	.00	.19	.00	.00
1986	.06	.00	.00	.00	.00	.00
1987	.00	.00	.00	.46	.00	.00
1988	.10	.00	.00	.02	.00	.00
1989	.00	.00	.00	.00	.00	.00
1991	.01	.00	.00	.01	.00	.00
1992	.20	.00	.00	.01	.00	.00

Notes: U is unemployed, M is marginally attached, and N is out of the labor force and not marginally attached. Likelihood ratio tests based on binary logit are used for U = M and U = N, multinomial logit for M = N. Explanatory variables are age groups (15–24, 25–34, 35–54, 55+), marital status (currently married or not), education (postsecondary certificate or higher, or not), and regions (Atlantic, Quebec, Ontario, Prairies, or British Columbia). All for no job attachment group.

Table 4.3 **Probability Values for Binary and Multinomial Logit Tests of Equivalence of Labor Market States: By Region**

	Atlantic			Quebec			Ontario			Prairies			British Columbia		
Year	U = M	M = N	U = N	U = M	M = N	U = N	U = M	M = N	U = N	U = M	M = N	U = N	U = M	M = N	U = N
1979	.06	.00	.00	.06	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00
1980	.36	.00	.00	.04	.00	.00	.69	.00	.00	.11	.00	.00	.05	.00	.00
1981	.05	.00	.00	.64	.00	.00	.10	.00	.00	.00	.00	.00	.10	.00	.00
1982	.00	.00	.00	.22	.00	.00	.99	.00	.00	.09	.00	.00	.77	.00	.00
1983	.01	.00	.00	.06	.00	.00	.61	.00	.00	.15	.00	.00	.25	.00	.00
1984	.08	.00	.00	.15	.00	.00	.27	.00	.00	.73	.00	.00	.86	.00	.00
1985	.02	.00	.00	.25	.00	.00	.09	.00	.00	.06	.00	.00	.03	.00	.00
1986	.32	.00	.00	.45	.00	.00	.01	.00	.00	.00	.00	.00	.59	.00	.00
1987	.03	.00	.00	.21	.00	.00	.06	.00	.00	.01	.00	.00	.26	.00	.00
1988	.04	.00	.00	.10	.00	.00	.04	.00	.00	.00	.00	.00	.41	.00	.00
1989	.03	.00	.00	.00	.00	.00	.00	.00	.00	.19	.00	.00	.00	.00	.00
1991	.09	.00	.00	.01	.00	.00	.13	.00	.00	.38	.00	.00	.07	.00	.00
1992	.14	.00	.00	.00	.00	.00	.57	.00	.00	.59	.00	.00	.13	.00	.00

Notes: U is unemployed, M is marginally attached, and N is out of the labor force and not marginally attached. Likelihood ratio tests based on binary logit are used for U = M and U = N, multinomial logit for M = N. Explanatory variables are female, age groups (15–24, 25–44, 45+), marital status (currently married or not), education (postsecondary certificate or higher, or not). All for no job attachment group.

and women in table 4.2 always reject M = N and U = N but fail to reject U = M five times for men and three times for women. Finally, the regional results in table 4.3, based on slightly coarser definitions of the underlying explanatory variables,[25] again reject M = N and U = N for every region and in every year. For the testing of U = M, these regional results fail to reject (at the 5 percent level) seven times in the Atlantic provinces, nine times in Quebec, nine times in Ontario, eight times in the Prairies, and ten times in British Columbia, all out of a total of thirteen tests.

These results give strong support to the idea that the marginal attachment group is behaviorally distinct from the not attached group, based on the full multinomial model, as well as rejecting the hypothesis that unemployment and out of the labor force are equivalent (which was probably much less likely on a priori grounds). The fact that these sets of results hold across our age, sex, and region groupings and hold for every year of the SJO-LFS data is a striking regularity. The results on the U = M hypothesis are less clear-cut, and the failure to reject in many cases gives greater grounds for suggesting that these two states may be "close" behaviorally, at least in some years and for some groups in the overall sample.[26]

Two issues arise from this set of results. First, while U = N might be intuitively unappealing (given our likely ranking as in eq. [4]), both U = M and M = N might seem plausible hypotheses. However, the nature of our data forces a *binary* logit partial testing of U = M but permits a *multinomial* logit testing of M = N, so we have some concern that the evident regularities in our results could derive in part from this difference in testing procedures. While we cannot apply the multinomial approach to the U = M hypothesis, we can apply the binary model to the M = N null, testing separately whether $pME = pNE$ and whether $pMO = pNO$. We have conducted these separate binary tests for each year by age, sex, and region. In every case, both binary tests reject equivalence, lending considerable support to the view that the uniform pattern of rejection found in the multinomial testing is a reflection of the true nature of these data rather than an artifact of the nature of the hypothesis testing.

Second, we are interested in understanding further the reasons why in many cases we cannot reject the equivalence of unemployment and marginal attachment. Persons who indicate that they desire work but are not searching are categorized by the SJO according to the reason(s) given for not searching, the potential reasons being as follows:

1. Own illness or disability
2. Personal or family responsibilities

25. The slight regrouping of the explanatory variables in all of the regional analyses was necessitated by some of the small cell sizes in the demographic breakdown of the regional data; the notes to the tables detail the exact variable definitions employed.

26. The equivalent tests for the full sample are broadly similar to these results by age, sex, and region. We reject the equivalence of U and M in all but three sample years and consistently reject equivalence of U and N and M and N (Jones and Riddell, in press).

3. Going to school
4. No longer interested in finding work
5. Waiting for recall (to former job)
6. Has found new job
7. Waiting for replies from employers
8. Believes no work available (in area or suited to skills)
9. No reason given
0. Other

We group these codes into two subcategories, waiting (codes 5, 6, and 7) and nonwaiting (codes 1 through 4 and codes 8, 9, and 0).[27] We investigate the transition rates out of the marginal waiting category (MW) and the marginal nonwaiting category (MNW), comparing these rates with hazards out of employment.

Figure 4.12 gives the three hazards, pUE, $p(MW)E$, and $p(MNW)E$, for the adult and youth groups in our population; figure 4.13 gives the analogous hazards for the male and female samples. The levels of these unconditional hazards are striking, with the $p(MW)E$ hazard being *higher* than that out of unemployment for every year for adults and for men and women. For youths, the hazards are equal in one year and this ordering is reversed in one year, but the same overall pattern obtains in the rest of the years. Thus persons waiting for recall, waiting for a job start, or waiting for replies from employers have higher hazards into employment than those usually counted as unemployed.[28] Note that all of these persons are currently counted as nonparticipants according to the LFS, even though they have high average transition rates into employment. We believe this to be the result of two LFS procedures: first, that persons awaiting recall to a seasonal job are counted as out of the labor force unless they engage in job search and, second, that future job starts who lack a definite date for the job start are similarly categorized as nonparticipants in the absence of job search.

We have further investigated these issues by testing for equivalence between unemployment and these two subcategories of the marginally attached. These results, all based on binary logits, are presented in the final three tables.[29] The p-values for the likelihood ratio tests by age are presented in table 4.4. For both youths and adults, we reject the hypothesis that unemployment and the *non*waiting subcategory of M are behaviorally equivalent, although the pattern

27. Discouraged workers correspond to code 8, while codes 1 through 4 are usually categorized as "personal" reasons for not searching.

28. We believe, based on aggregate work with these data (Jones and Riddell, in press), that these results for the MW group derive chiefly from the recall and found new job codes (5 and 6), rather than from the waiting for replies code (7).

29. Note, though, that the ordering of the hazards in figs. 4.12 and 4.13 might lead to a rejection of the equivalence of MW and U because the unemployed have transition rates into employment that are too low, not too high. I.e., these results violate the ordering (4) at which we speculated above.

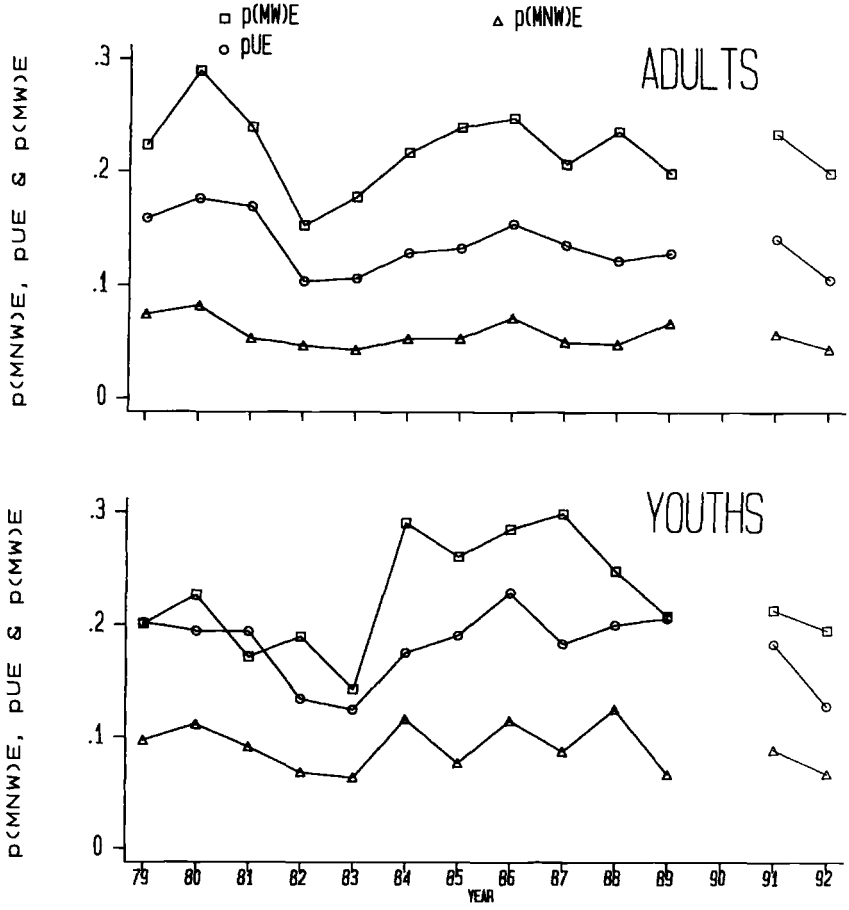

Fig. 4.12 Transitions into employment by initial state and age

for the waiting group varies more by age. For youths, results for four out of thirteen years fail to reject equivalence of unemployment and the waiting subcategory of the marginal attachment group, though this failure to reject only occurs in the first year of our sample for adults. By sex, the table 4.5 results are more clear-cut, with equivalence between unemployment and either the waiting or the nonwaiting marginal attachment category being rejected in almost every case; the one exception is a failure to reject U = MW for women in 1979. Finally, the regional test statistics in table 4.6 are rather more mixed, perhaps as a reflection of sample sizes. The hypothesis that the waiting subcategory of the marginal attachment group is behaviorally equivalent to the unemployed is not rejected three to six times (out of thirteen years), depending on the region, with the most frequent rejections being in the Atlantic provinces.

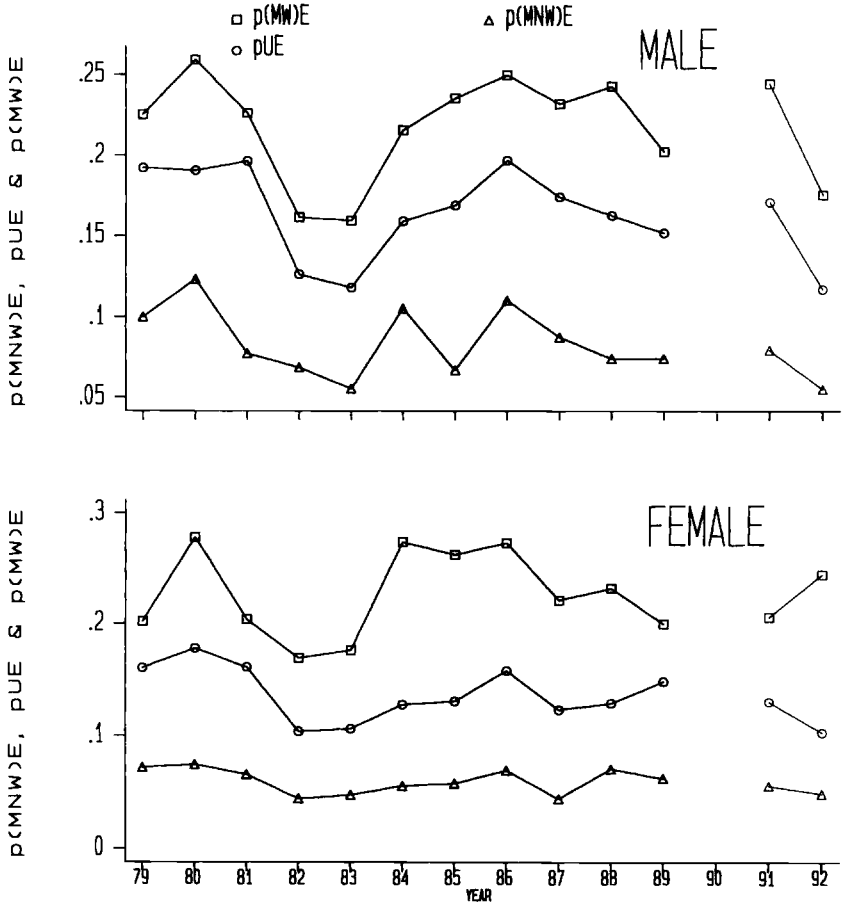

Fig. 4.13 Transitions into employment by initial state and sex

The test of U = MNW is rejected more commonly than that of U = MW, and again the pattern is one with the strongest rejections being in the Atlantic provinces.

4.5 Conclusions

There are four significant conclusions that follow from this analysis. First, the demographics do matter. Both the unconditional hazards and the econometric results suggest that there are important differences by age, sex, and region in the level and the determinants of many labor force transitions. Second, members of the marginal attachment group are behaviorally distinct from the not attached (the remainder of those classified as not in the labor force) across

Table 4.4 **Probability Values for Binary Logit Tests of Equivalence of Labor Market States: Waiting Subgroups by Age**

	Youth		Adult	
Year	U = MW	U = MNW	U = MW	U = MNW
1979	.46	.00	.12	.00
1980	.04	.00	.00	.00
1981	.02	.00	.00	.00
1982	.04	.00	.00	.00
1983	.56	.00	.00	.00
1984	.00	.00	.00	.00
1985	.00	.00	.00	.00
1986	.00	.00	.00	.00
1987	.00	.00	.00	.00
1988	.42	.00	.00	.00
1989	.05	.00	.00	.01
1991	.58	.00	.00	.00
1992	.01	.00	.00	.00

Notes: U is unemployed, MW is the waiting subcategory of marginal attachment, and MNW is the nonwaiting subcategory of marginal attachment. Likelihood ratio tests are based on binary logits. Explanatory variables are female, marital status (currently married or not), education (postsecondary certificate or higher, or not), and regions (Atlantic, Quebec, Ontario, Prairies, or British Columbia). All for no job attachment group.

Table 4.5 **Probability Values for Binary Logit Tests of Equivalence of Labor Market States: Waiting Subgroups by Sex**

	Male		Female	
Year	U = MW	U = MNW	U = MW	U = MNW
1979	.03	.00	.27	.00
1980	.00	.00	.00	.00
1981	.00	.00	.07	.00
1982	.00	.00	.00	.00
1983	.00	.00	.04	.00
1984	.00	.00	.00	.00
1985	.00	.00	.00	.00
1986	.00	.00	.00	.00
1987	.00	.00	.00	.00
1988	.00	.00	.00	.00
1989	.00	.00	.00	.00
1991	.00	.00	.00	.00
1992	.00	.00	.00	.00

Notes: U is unemployed, MW is the waiting subcategory of marginal attachment, and MNW is the nonwaiting subcategory of marginal attachment. Likelihood ratio tests are based on binary logits. Explanatory variables are age groups (15–24, 25–34, 35–54, 55+), marital status (currently married or not), education (postsecondary certificate or higher, or not), and regions (Atlantic, Quebec, Ontario, Prairies, or British Columbia). All for no job attachment group.

Table 4.6 **Probability Values for Binary Logit Tests of Equivalence of Labor Market States: Waiting Subgroups by Region**

	Atlantic		Quebec		Ontario		Prairies		British Columbia	
Year	U = MW	U = MNW	U = MW	U = MNW	U = MW	U = MNW	U = MW	U = MNW	U = MW	U = MNW
1979	.00	.00	.16	.02	.15	.00	.04	.00	.12	.00
1980	.10	.00	.04	.29	.00	.10	.59	.05	.52	.00
1981	.02	.00	.14	.00	.05	.00	.02	.00	.59	.02
1982	.02	.00	.71	.02	.12	.30	.01	.00	.29	.53
1983	.16	.00	.02	.01	.77	.11	.01	.00	.02	.00
1984	.00	.00	.04	.00	.00	.07	.24	.50	.00	.09
1985	.00	.00	.00	.00	.04	.00	.45	.01	.00	.01
1986	.00	.00	.05	.11	.00	.00	.55	.00	.02	.41
1987	.02	.00	.00	.00	.11	.06	.00	.00	.08	.09
1988	.08	.00	.01	.00	.00	.33	.13	.00	.01	.41
1989	.00	.06	.00	.00	.01	.00	.02	.02	.00	.01
1991	.00	.00	.08	.00	.00	.01	.65	.04	.03	.20
1992	.00	.00	.00	.00	.00	.00	.00	.00	.12	.18

Notes: U is unemployed, MW is the waiting subcategory of marginal attachment, and MNW is the nonwaiting subcategory of marginal attachment. Likelihood ratio tests based on binary logits. Explanatory variables are female, age groups (15–24, 25–44, 45+), marital status (currently married or not), education (postsecondary certificate or higher, or not). All for no job attachment group.

almost all demographic groups and regions. This gives justification for the collection and publication of information on "persons on the margin of the labor force" or the "marginally attached"—those who desire work but are not searching for work. Third, the marginally attached are typically closer in behavioral terms to the unemployed, especially for men and for those aged 25 or over, although the data do sometimes reject the hypothesis that marginal attachment and unemployment are equivalent. Finally, both the unconditional hazards and the tests of behavioral equivalence suggest that there is a significant degree of heterogeneity within the marginal attachment group itself, most notably according to whether the individual is "waiting" or not. Our results suggest that existing criteria for counting temporary layoffs and future job starts as unemployed—which exclude those in the waiting group of the marginally attached—may be too stringent on behavioral grounds.

Appendix

Table 4A.1 **Assignment of Labor Force States**

Category	Status Assigned by Labour Force Survey	Survey of Job Opportunities Response	Desire Work?	Available for Work?	Status Assigned in This Paper
Employed	E	None	n.a.	n.a.	E
Permanently unable to work	O	None	n.a.	n.a.	N
Temporary layoff	U	None	n.a.	Yes	U
	O	None	n.a.	No	N
Short-term future start, seeking work	U	Part	n.a.	Yes	U
	O	Part	n.a.	No	N
Short-term future start, not seeking work	U	Full	n.a.	Yes	U
	O	Full	Yes	No	M
	O	Full	No	No	N
Long-term future start, seeking work	U	Part	n.a.	Yes	U
	O	Part	n.a.	No	N
Long-term future start, not seeking work	O	Full	Yes		M
	O	Full	No		N
No job attachment, seeking work	U	Part	n.a.	Yes	U
	O	Part	n.a.	No	N
No job attachment, not seeking work	O	Full	Yes		M
	O	Full	No		N

References

Abowd, John M., and Arnold Zellner. 1985. Estimating gross labor force flows. *Journal of Business and Economic Statistics* 3:254–83.

Akyeampong, E. B. 1987. Persons on the margins of the labour force. *Labour Force* 43 (April): 85–142.

———. 1992. Discouraged workers: Where have they gone? *Perspectives on Labour and Income* 4 (autumn): 38–44.

Blau, D. M., and P. K. Robins. 1986. Labor supply response to welfare programs: A dynamic analysis. *Journal of Labor Economics* 4:82–104.

Burdett, K., N. Kiefer, D. Mortensen, and G. Neumann. 1984. Earnings, unemployment, and the allocation of time over time. *Review of Economic Studies* 51:559–78.

Cain, G. 1980. Labor force concepts and definitions in view of their purposes. In *Concepts and data needs*, appendix vol. 1, Washington, D.C.: National Commission on Employment and Unemployment Statistics.

Card, D., and W. C. Riddell. 1993. A comparative analysis of unemployment in Canada and the United States. In *Small differences that matter: Labor markets and income maintenance in Canada and the United States*, ed. D. Card and R. B. Freeman. Chicago: University of Chicago Press.

Clark, K., and L. H. Summers. 1979. Labor market dynamics and unemployment: A reconsideration. *Brookings Papers on Economic Activity*, no. 1: 13–60.

Cohen, G. L. 1991. Then and now: The changing face of unemployment. *Perspectives on Labour and Income* 3 (spring): 37–45.

Devereaux, M. S. 1992. Alternative measures of unemployment. *Perspectives on Labour and Income* 4 (winter): 35–43.

Flinn, C. J., and J. J. Heckman. 1982. Models for the analysis of labor force dynamics. In *Advances in econometrics*, vol. 1, ed. R. Basmann and G. Rhodes, 35–95. Greenwich, Conn.: JAI.

———. 1983. Are unemployment and out of the labor force behaviorally distinct labor force states? *Journal of Labor Economics* 1 (January): 28–42.

Gönül, F. 1992. New evidence on whether unemployment and out of the labor force are distinct states. *Journal of Human Resources* 27 (spring): 329–61.

Gower, D. 1990. Time lost: An alternative view of unemployment. *Perspectives on Labour and Income* 2 (spring): 73–77.

Hall, Robert E. 1983. Is unemployment a macroeconomic problem? *American Economic Review Papers and Proceedings* 73 (May): 219–22.

Jackson, G. 1987. Alternative concepts and measures of unemployment. *Labour Force* 43 (February): 85–120.

Jones, S. R. G., and W. C. Riddell. In press. The measurement of unemployment: An empirical approach. *Econometrica*.

Lemaître, Georges. n.d. The measurement and analysis of gross flows. Ottawa: Statistics Canada. Mimeograph.

Lucas, Robert E., Jr., and Leonard A. Rapping. 1969. Real wages, employment and inflation. *Journal of Political Economy* 77 (September/October): 721–54.

Meyer, Bruce D. 1988. Classification-error models and labor-market dynamics. *Journal of Business and Economic Statistics* 6:385–90.

Norwood, J. L. 1988. The measurement of unemployment. *American Economic Review* 78 (May): 284–88.

Organization for Economic Cooperation and Development (OECD). 1987. On the margin of the labour force: An analysis of discouraged workers and other non-participants. In *Employment Outlook 1987*, 142–70. Paris: Organization for Economic Cooperation and Development, September.

Poterba, James M., and Lawrence H. Summers. 1986. Reporting errors and labor market dynamics. *Econometrica* 54:1319–38.

———. 1995. Unemployment benefits and labor market transitions: A multinomial logit model with errors in classification. *Review of Economics and Statistics* 77 (May): 207–16.

Romeo, Charles J. 1992a. A longitudinal evaluation of the truth content of the CPS reinterview data. Working Paper no. 92-11. New Brunswick, N.J.: Rutgers University, Department of Economics, October.

———. 1992b. A unified framework for resolving inconsistencies in reported unemployment duration data in a panel of monthly CPS data: Theory. Working Paper no. 92-10. New Brunswick, N.J.: Rutgers University, Department of Economics, July.

Singh, A. C., and J. N. K. Rao. 1991. Classification error adjustments for gross flow estimates. Working Paper no. SSMD-91-013 E. Ottawa: Statistics Canada, Social Survey Methods Division, Methodology Branch, June.

Stasny, Elizabeth A. 1988. Modeling nonignorable nonresponse in categorical panel data with an example in estimating gross labor-force flows. *Journal of Business and Economic Statistics* 6:207–19.

Statistics Canada. 1992. *Guide to labour force survey data.* Ottawa: Statistics Canada.

Stratton, Leslie S. n.d. Identifying discouraged workers and their relative attachment to the labor market. Tucson: University of Arizona. Mimeograph.

Sunter, Deborah. 1993. Persons not in the labour force. *Labour Force* 49 (April): C2–C23.

Tano, Doki K. 1991. Are unemployment and out of the labor force behaviorally distinct labor force states? *Economics Letters* 36:113–17.

U.S. Department of Labor. Bureau of Labor Statistics. 1993. *Employment and Earnings* 40, no. 1 (January).

Van den Berg, G. J. 1990. Search behaviour, transitions to nonparticipation and the duration of unemployment. *Economic Journal* 100:842–65.

Comment

Thomas Lemieux

This paper uses a series of supplements to the Canadian Labour Force Survey (LFS) to present evidence on transition probabilities among detailed labor market states. These labor market states are based on the usual questions about employment status and search behavior, as well as on questions about willingness to accept employment. The set of labor market states is broader than the usual classification into employment, unemployment, and out of the labor force. This enables the authors to determine whether the transition probabilities of workers are homogeneous within the three usual categories or whether a different aggregation scheme would be more appropriate. This bears directly on the issue of how labor market states such as unemployment should be defined in practice and which questions should be asked to determine these la-

Thomas Lemieux is associate professor of economics at the Université de Montréal, a faculty research fellow of the National Bureau of Economic Research, and a research associate of CIRANO and CRDE.

bor market states in surveys like the Current Population Survey and the Canadian LFS.

The authors find that the transition probabilities into employment of several groups usually classified as out of the labor force are closer to those of the unemployed than other out of the labor force. This is particularly true for discouraged workers who have stopped searching but would like to work and for workers who will start a job in the near future, want to work, but are not currently available for work. One interpretation the authors draw from this finding is that the definition of unemployment should be broadened to include people who are marginally attached to the labor force.

The data used in this paper are unique, and the basic findings about transition probabilities are robust to the estimation procedure used. These findings are quite believable, and the estimation procedure is generally appropriate. My only comment about the estimation procedure is a technical point about the use of multinomial logit models to test whether marginal attachment (M) and not in the labor force (N) are similar states. These multinomial logits rely on a strong assumption of independence between the three possible outcomes (remain in the same state, transit into unemployment, and transit into employment). One implication of this assumption is that relative transition rates into employment and unemployment would remain the same even if the possibility of going back to the original state was eliminated (independence of irrelevant alternatives). This seems unrealistic since unemployment is in one sense closer to being out of the labor force than employment is. An ordered logit would probably be more appropriate for this particular application.

The authors argue for a definition of unemployment based on behavior (do people get jobs or not) instead of a priori criteria like search behavior on which the traditional definition of unemployment is based. My remaining comments focus on the distinction between this behavioral measure of unemployment and the traditional measure of unemployment and on the reasons why one measure should be preferred to the other. In one sense, the way the term "behavior" is used in this paper is a bit confusing. After all, the traditional measure of unemployment is also behavioral since it is based on search behavior. When the authors talk of a behavioral measure of unemployment, what they really mean is an outcome-based measure of unemployment (do people get jobs or not?). Whether the outcome-based measure is preferable to the standard search-based measure is intimately related to what the unemployment rate is supposed to measure. The outcome-based measure is of course appropriate when the unemployment rate is meant to measure how many people are likely to get jobs in the next time period. By contrast, the search-based measure is well suited for measuring how much "mismatch" there is in the labor market and how much time people must allocate to finding a good match. The search-based measure may also be useful for forecasting future economic activity since search behavior likely depends on expectations people have about the

future. What matters here is the phenomenon we want to assess with the unemployment rate and not whether this measure of unemployment is or is not based on behavior.

Leaving aside the true meaning of the word "behavior," one important advantage of an outcome-based measure of unemployment is that it relies on what people actually do (find a job or not) instead of what they say they do (look for a job or not). This approach to the measurement of unemployment is very much in the tradition of positive economics, where the usefulness of economic models depends on how well they predict what agents actually do, irrespective of what they say they do. Viewed from this angle, the outcome-based measure of unemployment may be more stable in a structural sense than the traditional search-based measure. For instance, unemployment insurance may induce people to engage in some search activities just to receive benefits even if they know it will not affect their chances of getting a job. This would artificially increase the search-based measure of unemployment with no effects on underlying economic variables such as employment and output. The authors point to the well-known U.S.-Canada divergence in unemployment rates as a case in which an outcome-based measure could depict a very different picture of the divergence than the standard search-based measure does. This is potentially the strongest case for using an outcome-based instead of a search-based measure of unemployment. Note that, under these circumstances, the search-based measure would even be problematic for measuring mismatch or predicting future economic conditions.

The distinction between outcome-based and search-based measures of unemployment can finally be analyzed from a program evaluation perspective. A variety of programs can be implemented to change the behavior of people out of work to increase their chances of finding a job. The relevant question here is whether it is possible to increase the chances of getting a job by moving people from nonemployment to unemployment. This is a causal interpretation of the behavioral definition of unemployment in which a change in labor market state "causes" a change in transition probabilities. This causal interpretation would not hold if labor market states and transition probabilities were jointly determined by some other (omitted) factors, in which case the labor market state would be endogenous. Viewed from this angle, if the outcome-based measure was an exogenous determinant of transition probabilities while the search-based measure was endogenous, the former measure should be preferred to the latter.

However, neither the outcome-based nor the search-based measure of unemployment are likely to be exogenous. The basic problem is that, in presence of duration dependence, neither of these measures take account of the elapsed duration of the unemployment spell. If, as indicated in several empirical studies, there was some duration dependence in the conditional probability of exiting nonemployment, duration would likely affect both the labor market state and transition probabilities. In the most extreme case, labor market states (un-

employment, marginally attached, or out of the labor force) would be simple proxies for duration and would have no independent effect on transition probabilities. In this case, neither the outcome-based nor the search-based measure of unemployment would be meaningful behavioral concepts from a causal inference perspective.

This issue could be analyzed in more detail by going beyond the simple binary logits presented in this paper and estimating hazard models. These models would indicate the independent effect of being in a particular state on the transition probability into employment once duration is controlled for. Estimating these models would strengthen the behavioral content of the distinction between unemployment and out of the labor force.

These comments aside, the paper makes an important contribution by showing the importance of disaggregating the relatively heterogeneous group of people out of the labor force on the basis of whether they are willing to work. Although it remains to be seen whether this group should be included in the official definition of unemployment, the paper makes a convincing case for reporting statistics on this group on a regular basis.