New Issue

Occasional Paper

A Risk Index Approach to Unemployment

An Application Using the Survey of Employment and Unemployment Patterns

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INQUIRIES

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PREFACE ....

This occasional paper has been written by Paul Miller and Anh Tram Le of the Department of Economics, University of Western Australia, under the auspices of the Survey of Employment and Unemployment Patterns Research Fellowship scheme. This scheme has been established to facilitate high quality analysis of the survey data by researchers who have experience in the analysis of longitudinal data and an in-depth understanding of labour market issues and operations.

The paper identifies a number of determinants of the probability of being unemployed and describes a model which is used to categorise individuals according to their risk of unemployment. The validity of this categorisation is evaluated using information on the amount of time individuals subsequently spent looking for work. The model is then further refined to predict individuals' labour market outcomes more accurately.

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LIST OF ABBREVIATIONS AND OTHER USAGES ....

ABS	Australian Bureau of Statistics
CES	Commonwealth Employment Service
DEETYA	Department of Employment, Education, Training, and Youth Affairs
DSS	Department of Social Security
PRI	Practical risk index
RSE	Relative standard error
SE	Standard error
SEUP	Survey of Employment and Unemployment Patterns
YOA	Year of arrival

SYMBOLS

*	subject to sampling variability too high for most practical purposes
T^*	used to denote a threshold level according to which an individual's risk of unemployment is determined
U^*	used to denote the index of unemployment
. .	not applicable

ROUNDING

Because estimates have been rounded, discrepancies may occur between sums of the component items and totals.

SYNOPSIS ....

Unemployment is a major economic and social issue in Australia that has attracted a considerable volume of applied research. A large part of this research has examined the way that productivity, discrimination and labour market history impact on the distribution of the burden of the unemployment. In the current study the Survey of Employment and Unemployment Patterns (SEUP) is used to generate a new, improved set of estimates of the determinants of the probability that a person will be unemployed. A critical assessment of the role that the estimates can play in policy formulation is provided.

The SEUP is a longitudinal survey of individuals aged 15–59 years at May 1995. The survey was undertaken over a three-year period, and the data were collected in three waves, in 1995, 1996 and 1997. Information was collected for three groups, namely Jobseekers, Labour Market Program participants and a Population Reference group. The current analyses focus on the Population Reference group and use only the first two waves of the data. The Population Reference group is a random sample of the population, and the initial data collection contained 2,311 persons.

The first wave of the SEUP collected in 1995 is used to estimate a model of the probability of unemployment that represents a consensus view of the applied Australian literature. The results from this model show that age, educational attainment, English proficiency, disabilities and marital status are important determinants of the probability of being unemployed. With regard to educational attainment, the tertiary educated and those who attended the highest level of secondary school are shown to have unemployment rates between 6 and 10 percentage points lower than those who did not attend the highest level of secondary school. To the extent that skills learned at school can also be taught in external training courses, the results imply there may be a key role for labour market programs that have a substantial training component. The impact of age on the probability of being unemployed is relatively weak, however. To the extent that the age effects can be linked to the learning-by-doing that characterises many types of employment, the relative magnitudes of the unemployment rate effects associated with educational attainment and age suggests that programs aimed at providing the unemployed with skills/training should contain a substantial component of skill acquisition through formal training classes rather than relying on the accumulation of skills on-the-job to enhance the employability of the least skilled members of the labour market. The findings linking disabilities to labour market disadvantage are suggestive of a role for a strengthening of equal opportunity laws as they apply to the workplace.

Estimates from the consensus model of unemployment are used to categorise individuals according to their risk (very high, high, medium and low) of unemployment. The categorisation of individuals in this manner is undertaken using two types of risk index. The first of these uses all the estimated coefficients from the logit model to predict the risk of unemployment. In the second, an approximation of the first, sets of points are assigned to individual characteristics, in the same way that the immigration points system works. It is found that the individuals who are identified as having the highest risk of unemployment are the low skilled, those that have limited English proficiency, disabilities and are young. The employment experience of individuals during

the second wave (1995–96) is used to assess the accuracy of the model. Those suggested as being at risk of unemployment in 1995 are shown to have inferior labour market performance during the second wave. They spent, on average, more time looking for work and they were also absent from the labour market for greater periods. These results suggest that the risk index approach has merit. Moreover, examination of the performance of a risk index computed using a points system shows that this is a usable approach.

Despite the apparent success of the model, there are considerable prediction errors. That is, many individuals (58%) predicted to be at high risk of unemployment experienced only minor spells of unemployment. There is also a reasonable number of individuals predicted to be at moderate (9%) or low (2%) risk of unemployment who spent considerable time looking for work in the subsequent period.

To improve the predictive capability of the unemployment model, a detailed analysis that links the prediction errors to a set of possible causal factors (e.g. labour market history, family background, mobility status and socioeconomic status of the area of residence) is undertaken. An aggregate-level examination of the data shows that labour market outcomes are inherently stable over time. Moreover, there is evidence of a degree of commonality of unemployment experiences of family members and a regional concentration of unemployment. Inclusion of these influences in the model of unemployment is argued to be a way of enhancing the forecasting capability of the model.

The results from the model of unemployment that was revised to encompass variables for the individual's labour market history, family background, mobility status and the socioeconomic status of the region of residence show that there is a positive relationship between the number of days the individual looked for work in the year prior to the survey and the unemployment outcome at the time of the survey. The individual is also more likely to be unemployed if he/she has family members who were unemployed.

Overall, the modified unemployment model that includes consideration of a wider set of determinants of unemployment is able to predict more accurately the labour market performance of individuals. Only a small proportion (17%) of those predicted to have a high risk of unemployment appear to have been incorrectly categorised as such, in the sense that they engaged in only limited job-seeking activities in the period following the predictions. In comparison, over one-half of those predicted to have a high risk of unemployment in the more parsimonious model of unemployment were incorrectly categorised given their subsequent labour market outcomes. In addition, those predicted to have a moderate or low risk of being unemployed on the basis of the revised model generally spent limited time job seeking in the subsequent period.

Several important implications can be noted from the empirical results of this study. First, the positive and highly significant relationship between previous job-search activities and current unemployment status suggests that either a 'scar' effect or inertia in labour market outcomes is very important in the Australian labour market. To the extent that the relationship has its origin in a 'scar' phenomenon, then there is a tendency towards cumulative disadvantage in the labour market. Being unemployed today increases the likelihood of the person being unemployed tomorrow, leading to a concentration of the burden of unemployment. Where the link between past and present labour market outcomes is due to the inertia associated with the 'unobservable'

factors embedded in the lagged labour market performance variables, then there should still be a focus on those with a history of unemployment, as this is one of the more accurate indicators of potential disadvantage available to the researcher. There is also a need to attempt to better understand the factors that influence labour market outcomes and yet are not included in conventional economic models. The incorporation of non-survey information into the analysis (e.g. contactability, transport, personal factors), such as in DEETYA (1998), is one approach that appears to have much to recommend it. Widening the scope of the conventional economic analysis to include consideration of factors such as the usual type of work (Australian Institute of Multicultural Affairs 1985; Dex & McCulloch 1997) might also assist.

Second, the risk index approach to unemployment assessment is viable. This means that disadvantaged workers can be identified with a high degree of success, hence enabling targetting of skill enhancement assistance if this is considered desirable. In this regard, to the extent that the evaluations conducted in this paper for a model of the probability of unemployment carry across to a model of the probability of long-term unemployment, the findings reported in this study suggest that the Job Seeker Classification Instrument outlined in DEETYA (1998) will be a valid instrument. The remarkable stability that characterises labour market outcomes in the intermediate term suggests that the findings from models of the probability of unemployment should carry across to models of the probability of long-term unemployment.

Third, longitudinal data allow us to observe the dynamics of labour market behaviour. Because they permit consideration of the influence of lagged labour market activities on current labour market outcomes, longitudinal data allow for a far more encompassing approach to the study of unemployment outcomes than is possible with many of the data sets generally used in this type of research. The evaluation of the forecasting capability of the unemployment models that can be undertaken using the longitudinal data available in the SEUP has added a new dimension to the study of unemployment in Australia. This is a major strength of the SEUP database, and has demonstrated the value that can be added to research where longitudinal data are available.

S E C T I O N **1**   I N T R O D U C T I O N ....

In January and February 1993 and again in February 1994 the number unemployed in Australia exceeded one million. Since then the number unemployed has not fallen below 700,000. In July 1998, for example, 766,700 persons were unemployed, giving an unemployment rate of 8.2%. Unemployment is one of Australia's major social and economic problems: it has obvious and well-documented links to economic disadvantage, and has also been linked in some discussion to higher crime rates, especially among the young, and to ill health (see, for example, Graetz 1992).

UNEMPLOYMENT RESEARCH

How can Australia's unemployment problem be addressed? The majority of Australian research, particularly that undertaken in more recent times, has adopted a microeconomic approach. In these studies, the incidence of unemployment in various groups has been studied, and potential causal factors identified. Factors such as age, educational attainment, language skills, birthplace and region of residence have been advanced as possible contributors to relative unemployment outcomes. Some research has extended the scope of the inquiry through examination of the relationship between unemployment outcomes and the person's labour market history. A strong scarring effect of unemployment has been reported in these studies.

A CONSENSUS MODEL OF UNEMPLOYMENT

It would be safe to say that the various attempts at quantifying the links between the probability of unemployment and various personal, regional and job market characteristics have reached a consensus view of the factors that are important in this regard. In other words, we now have a reasonably good description of the unemployed. While such a statistical portrait is useful, and indeed should be an essential input into policy analysis, it is not clear that much progress has been made in applying the research results in analysis of the unemployment problem.

USING THE RESULTS

There appear to be two main ways the empirical findings can be used. First, by quantifying relationships between various factors and the incidence of unemployment, the researchers identify possible policy instruments. For example, as it has been established that there is a strong inverse relationship between educational attainment and the incidence of unemployment, then additional education might be proposed as a way of increasing an individual's probability of job success.

Second, there is an opinion that the findings can be used in case management. In this application of the research findings, knowledge that early school leavers with poor English skills have relatively high rates of unemployment might lead to the conclusion that individuals having this combination of characteristics, or any other combination of characteristics known to be associated with relatively high rates of unemployment, should be case-managed.

A RISK OF UNEMPLOYMENT INDEX

This theme is prevalent in the research of Miller and Volker (1987). They build upon work undertaken by the Australian Institute of Multicultural Affairs (1985) by using models of unemployment to identify individuals who were relatively more prone to prolonged periods of unemployment. A model of unemployment was estimated and the estimated coefficients used to compute for each individual an index that measured the risk of being unemployed. Using this approach, a group categorised as being at risk of, or prone to, unemployment could be isolated. Miller and Volker (1987, p. 28) report that 'Many of the groups distinguished under the risk index approach, therefore, are characterised by well-defined intervening factors'. This implies that the risk index approach, and the associated study of unit-record data, have direct policy applications.

In this study we provide a critical evaluation of applied research on unemployment in Australia and use the Survey of Employment and Unemployment Patterns (SEUP) to generate a new set of estimates of the contribution that various factors (e.g. age, educational attainment) make to the probability that a person will be unemployed. Consistent with previous research, it is reported that youth, the less well educated, residents of rural areas, individuals with limited English skills and persons born outside the main English-speaking countries experience relatively high unemployment rates. These results are used to construct a risk of unemployment index. Values of this index are calculated for each person in the sample, thereby permitting the categorisation of all respondents to 'low', 'moderate' and 'high' risk of unemployment groups. Examination of the subsequent labour market performance of these individuals reveals a remarkable consistency of labour market outcomes over time, and a considerable number of prediction or forecast errors. These forecast errors are shown to be related to a number of measures of labour market history, the unemployment status of members of the individual's family, the person's mobility status and the socioeconomic status of the region in which the person lives. Modification of the model of the incidence of unemployment to incorporate representation of these influences results in a marked improvement in the predictive capability of the model. Subsequent evaluation of the risk index approach to unemployment suggests that it is viable.

OUTLINE OF THE STUDY

We begin in section 2 with a review of the unemployment problem in Australia and of the work undertaken to date that has attempted to document the way unemployment impacts upon the different sectors of Australian society. This review allows us to specify an encompassing model of the incidence of unemployment in the Australian labour market. Section 3 presents an overview of the SEUP conducted by the Australian Bureau of Statistics over the period 1995 to 1997. These data are used to construct a series of cross-tabulations that permit a preliminary examination of the relationships between labour market outcomes and a number of key characteristics, such as age and educational attainment. In section 4 the SEUP data are used to obtain estimates of a conventional model of unemployment. The initial set of estimates is obtained using information from the first wave of data collected for the period September 1994 to September 1995. In section 5 the estimates of the model of unemployment are used to construct an index of the risk of becoming unemployed. Values of this risk index are computed for each individual in the sample. Then the labour market performance in 1995–96 of individuals assessed at risk of being unemployed in 1995 is reviewed. A

OUTLINE OF THE STUDY *continued*

similar investigation is undertaken for the group of individuals assessed, on the basis of the study of the 1995 data, as not being at risk of becoming unemployed. The comparisons of actual labour market outcomes with the outcomes predicted are used to evaluate the relevance of this type of research to policy formulation.

In section 6 the merits of the model of unemployment are further evaluated through examination of measures of job-seeking activity over the period from September 1995 to September 1996. In particular, the extent of job search by individuals predicted to be 'at risk' of unemployment and also those predicted not to be at risk of unemployment is reviewed. Divergences between actual and predicted labour market outcomes are examined in depth with a view to finding reasons for the prediction errors. The information gained from this critical assessment is used to specify a more encompassing model that provides a better description of the unemployment process. Section 7 employs this augmented model of unemployment in a risk assessment exercise, and evaluates the merit of the extended model in such an application. Section 8 provides a conclusion.

AUSTRALIA'S UNEMPLOYMENT PROBLEM

Unemployment is a major social and economic issue in Australia. Graphs 2.1 and 2.2 provide information on the changing dimensions of Australia's unemployment problem. Graph 2.1 plots the number unemployed between February 1978 and February 1998. These data relate to individuals aged 15 or more years. Separate data are presented for males, females and all persons. Graph 2.2 plots the unemployment rates for these groups.

These graphs demonstrate the sharp deterioration in the level of unemployment in 1983, the gradual improvement in the unemployment position between 1983 and 1990, the extended deterioration between 1990 and 1993, and the improvements since 1993. Between 450,000 and 500,000 persons were unemployed in Australia in the late 1980s. But by the 1990s the numbers unemployed were often more than double these levels. Unemployment clearly affects a large number of people, and this stresses the importance of understanding how the problem can be alleviated. A number of research studies have offered useful contributions in this regard. A brief review follows. This review will serve as a guide for the detailed analysis of the Survey of Employment and Unemploment Patterns data, both in terms of the formulation of the basic and extended models that are estimated, and, importantly, in terms of the interpretation and use of the estimated coefficients.

Three types of determinants of unemployment have been analysed in previous studies: those that affect unemployment outcomes through their impact on an individual's labour market productivity; those that affect unemployment and employment outcomes primarily through the labour market/social practice of discrimination; and the past labour market experiences that affect current labour market outcomes. Within this broad framework, individual studies differ in their approach, and these differences are usually associated with features or limitations of the data set being used.

2.1 NUMBER OF UNEMPLOYED PERSONS AGED 15 YEARS AND OVER
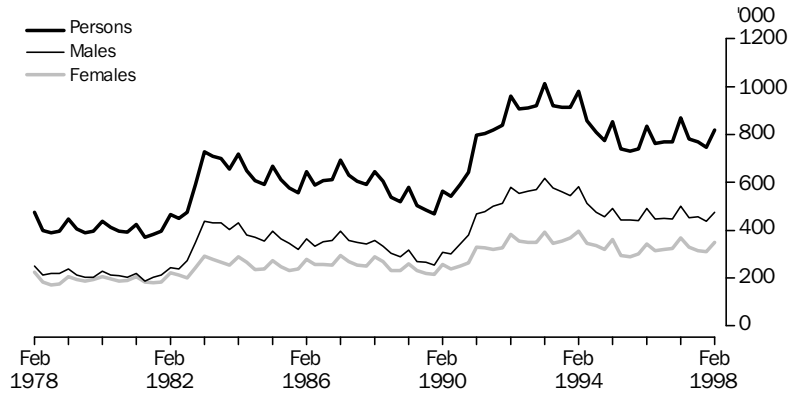
Source: ABS, unpublished data, Labour Force Survey.

2.2 UNEMPLOYMENT RATES OF PERSONS AGED 15 YEARS AND OVER
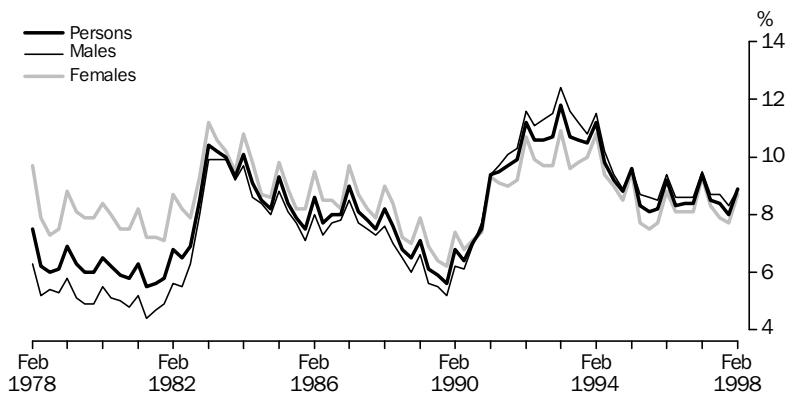
Source: ABS, unpublished data, Labour Force Survey.

PRODUCTIVITY

Productivity and unemployment

Labour market productivity can be augmented in a number of ways, including the acquisition of human capital through formal education, qualifications, English language skills and the accumulation of knowledge of the labour market (best practice with respect to job search processes, information networks) that occurs through labour market activity. Indices of labour market productivity may be more important in determining labour market outcomes in Australia than in most other countries because of the relatively greater prevalence of binding award rates of pay and conditions of employment in Australia. Where these awards are determined with an average rate of productivity in mind, there will be mismatch of those with above-average and below-average labour market productivity. For those with below-average levels of productivity, this mismatch may manifest itself in high rates of unemployment.

Educational attainment

Educational attainment is arguably the most important indicator of labour market productivity, and it has been a key variable in most studies of unemployment outcomes in the Australian labour market. Brooks and Volker (1985), Inglis and Stromback (1986), Miller (1986a, 1986b, 1998), Beggs and Chapman (1988), Jones (1992), Harris (1996) and Miller and Neo (1997), for example, all report a strong, inverse relationship between the incidence of unemployment and educational attainment.[1] An additional year of education is reported to be associated with up to a two percentage point reduction in the predicted incidence of unemployment in some studies (see, for example, Miller & Neo 1997). The studies also report that the impact on the unemployment rate of educational attainment varies across demographic groups, being relatively large for the Australian born and quite minor for immigrants from non-English-speaking countries (see in particular the study by Beggs & Chapman 1988). Substantial reductions in the chances of being unemployed are also associated with possession of a qualification.

Human capital and screening

These findings can be interpreted from human capital and screening perspectives. The human capital model argues that education represents value added, that is, it enhances (adds to) the set of factors that are linked to the individual's productivity in the labour market. Additional years of education therefore are associated with higher productivity and hence lower rates of unemployment. In comparison, the screening explanation of the role of education is that education does not directly affect an individual's productivity. Instead, the education system simply provides a mechanism through which an individual's innate ability or productivity can be determined. That is, individuals are screened through the education system, with years of schooling being used to label individuals according to their innate ability. The outcome again is that additional years of education are associated with higher productivity and hence lower rates of unemployment.

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[1] The education data generally comprise years of schooling and post-secondary qualifications. Some studies construct a continuous measure of the 'years of full-time equivalent schooling' from these data (e.g. Beggs & Chapman 1988) while others use a set of categorical variables to represent the highest level of educational attainment (e.g. Inglis & Stromback 1986).

Human capital and screening *continued*

Both explanations therefore rely upon there being a link between the level of education and the individual's productivity. However, the policy conclusions differ appreciably. Under the human capital interpretation, encouraging the less well educated to undertake additional schooling would be expected to lead to lower rates of unemployment among the targeted group. From the screening perspective, however, promoting education among the less well educated will not directly affect the level of their productivity, and there will consequently be little impact on rates of unemployment among the targeted group. Attempts to attach relative weights to screening and human capital interpretations of labour market phenomena have not met with much success (see Miller & Volker 1985; Weiss 1995).

Age

Age (or labour market experience) is another factor that has been shown to be an important determinant of unemployment outcomes. The incidence of unemployment is relatively high among youth. This is to be expected, however, as this age bracket will comprise a disproportionate number of labour market entrants. Labour market entrants, and re-entrants, typically engage in a considerable amount of job experimentation which results in a high rate of turnover. With additional years of experience individuals acquire knowledge of the way the job market functions and are able to move between jobs much more rapidly. This will be associated with lower rates of unemployment among prime-age workers.

Among the older age groups, unemployment rates tend to be relatively high, a phenomenon that is often associated with discrimination on the basis of age. However, obsolescence and depreciation are features of all types of capital, and the unemployment rate effects among the older age groups may be due to these factors. In other words, labour market skills accumulated early in the work career, through formal education or on-the-job, may simply not be relevant in the current labour market, and this rather than discrimination may be the fundamental reason for the relatively high rates of unemployment.

Some studies use an age variable to capture these effects (e.g. Wooden 1991) while others use a measure of labour force experience (e.g. Beggs & Chapman 1988). Various functional forms have been used, including continuous variables (e.g. Miller & Neo 1997; Beggs & Chapman 1988), linear splines (e.g. Inglis & Stromback 1986) and a set of dummy variables (e.g. Ross 1993). These studies report that, among the early age groups, unemployment rates decline with age or labour market experience. The unemployment rate reductions are most pronounced in the 15–24 age bracket. In the older (i.e. post-45 years) age groups, however, there is a tendency for unemployment rates to increase with additional years of experience.

While the U-shaped pattern between unemployment rates and age typically found in applied research has been rationalised using arguments based on the accumulation and depreciation/obsolescence of human capital, there is rarely any discussion of the meaning of these results. Knowledge that unemployment rates fall with age might be used to argue for non-intervention in the labour market. According to this line of thought, the youth unemployment problem does not require intervention as it solves

Age *continued*

itself as youth mature. Miller (1998) argues, however, that as the decline in unemployment with age is not neutral across levels of educational attainment, this may not be tenable as a policy stance. In particular, the unemployment rates of early school leavers do not decrease with age at rates comparable to the reductions experienced by the better educated. Among older age groups, there might be speculation that the higher rates of unemployment are associated with age discrimination. Unfortunately, there is no generally accepted way of distinguishing discrimination effects from the depreciation effects.

English proficiency

Among the other human capital variables included in many models are variables for English language skills. Inglis and Stromback (1986), for example, distinguish individuals who speak a language other than English at home and self-report their English skills as 'Good', those who speak a language other than English at home and self-report their English skills as 'Poor' and monolingual English speakers. They find that the unemployment rates of monolingual English speakers and individuals who speak a language other than English at home and have 'Good' English skills do not differ from each other. However, the unemployment rates of individuals who have only 'Poor' English skills are significantly greater than the unemployment rates of the other groups. Using more recent data, Miller and Neo (1997) report that both groups who speak a language other than English at home have higher unemployment rates than monolingual English speakers, though the group with the lowest level of English language skills experiences the highest rate of unemployment.

Disabilities

Several studies have analysed the impact of disabilities on the unemployment outcome (e.g. Junankar & Wood 1992; Harris 1996). Harris (1996), for example, includes in his analysis a variable for whether respondents suffered from any disability or health problem that limited either the amount or type of work they could do. This was a highly significant determinant of unemployment. Harris (1996, p. 127) indicates that the unemployment disadvantage of this group should be addressed.

Marital status

There are a number of other individual characteristics that are generally included in models of unemployment, including marital status, location and mobility status. While these may represent, to some extent, productivity factors, they are also likely to reflect a wider range of influences. Marital status variables, for example, are thought to capture both demand-side and supply-side influences. From the supply-side perspective, the greater family responsibilities of married males are expected to increase their incentive to work, while from the demand perspective, employers may be more likely to employ married males because they are held to have greater work commitment, be more reliable and potentially more productive. Among females, married women's lower degree of labour force attachment, relative to single women, may result in a lower measured unemployment rate. In some studies (e.g. Inglis & Stromback 1986; Harris 1996), more elaborate specifications which distinguish the married according to the labour force status of the spouse are considered.

Marital status *continued*

It has been reported that marital status has an important impact on the probability of being unemployed. Among males, the lowest rates of unemployment are experienced by the married. Among females, the married also have the lowest rate of unemployment, but usually only if the spouse is employed. The reasons for these marital status effects are, however, not clear. Disaggregation of the marital status effect by the employment status of the spouse suggests that the design of the social security system may have a role to play (see Miller & Neo 1997).

Residential location

The final 'personal characteristic' variable that will be considered here is location. Variables for location have been included in studies such as Inglis and Stromback (1986), Bradbury, Garde and Vipond (1986), Ross (1993), Harris (1996) and Miller and Neo (1997). Specification differences limit the extent to which comparisons can be made across studies. Generally, the rates of unemployment are higher in rural areas than elsewhere (e.g. Bradbury, Garde & Vipond 1986), though the differences in this regard are not always statistically significant (e.g. Inglis & Stromback 1986).

Mobility

Internal migration variables are also included in the studies by Inglis and Stromback (1986) and Bradbury, Garde and Vipond (1986). Both studies show that the chances of being unemployed are much higher if the individual had moved in the past five years, and particularly so if the move had taken place within the previous year. This association could be due to the unemployed moving in search of work or due to the geographical mobility resulting in unemployment. The latter association might arise where a person who has moved lacks the detailed knowledge of the labour market in the new region of residence that is essential to a smooth transition into employment. Both Bradbury, Garde and Vipond (1986) and Miller (1998) argue that the patterns observed when the unemployment-mobility association is analysed across various subgroups suggests that the direction of causation is most likely from moving place of residence to unemployment.

Miller (1998) extends this type of analysis by examining variations in labour market outcomes among members of particular families. On the basis of this alternative within-family approach, it is argued that regional factors may be far more important than has generally been recognised in the literature. Hence, regional employment initiatives might be more appropriate than policies such as job training aimed simply at improving the employability of individuals. Miller concludes that 'Linking detailed aggregated local-level data to microdata files is one avenue that could be explored' (Miller 1998, p. 273). This matter is addressed below.

DISCRIMINATION

Indigenous Australians

Studies that address discrimination in employment outcomes in Australia have typically focused on one of three groups: women, immigrants or Indigenous Australians. Miller (1989), and Jones (1990), for example, analyse the unemployment position of Indigenous Australians relative to that of non-Indigenous Australians. These studies show that Indigenous Australians experience a serious employment disadvantage in the

Indigenous Australians *continued*

labour market. In Miller (1989) the analysis is based on the inclusion of a variable for racial background in a model of unemployment. Harris (1996) adopted a similar modelling strategy. In other studies, however, separate analyses are conducted for Indigenous Australians and non-Indigenous Australians (e.g. Miller 1990). More detailed analysis of the unemployment position of Indigenous Australians has been provided by Ross (1990, 1993).

Overseas born

Approaches similar to those used in the study of the unemployment rate disadvantage of Indigenous Australians have been used in the study of the unemployment situation of the overseas born. Hence, dummy variables for a number of birthplace groups have been included in some analyses (e.g. Inglis & Stromback 1986) while models of unemployment have been estimated for separate samples of the overseas born and Australian born in other studies (e.g. Miller & Neo 1997). The studies show that most groups of immigrants in Australia experience a substantial employment disadvantage in the labour market. The studies also report that immigrants' unemployment rates improve rapidly with duration of residence in Australia, and are adversely affected by immigrants' limited English skills. Immigrants also appear to be at an employment disadvantage due to the less-than-perfect international transferability of human capital (see in particular Beggs & Chapman 1988). The skills that immigrants possess may not be readily transferable to the Australian labour market if, for example, the labour market practices in foreign countries are different from those in Australia. Such differences in labour market practices will make it harder for immigrants to adapt to the Australian labour market. Consequently, the process of looking for work will be more arduous, and the immigrants may be perceived by Australian employers as less productive and hence less employable.

Sex

There have been some studies that examine differences on the basis of sex in rates of unemployment, though these are relatively few in number. The reason for this is concern over whether the unemployment rate provides a relevant measure of the labour market prospects for women, given their lower degree of attachment to the labour market and the greater sensitivity of their unemployment rate to the so-called discouraged worker and added worker effects.[2] The Australian Institute of Multicultural Affairs (1985), for example, shows that being female is generally associated with disadvantage in the labour market. Bradbury, Garde and Vipond (1986) report a similar finding in their study of the youth labour market. There is a diverse range of possible sources of the female employment disadvantage, for example, discrimination and family responsibilities that limit job choice, and fewer market-oriented skills at each level of education or experience due to different subjects studied at school or different career paths followed in the labour market.

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[2] The discouraged worker effect occurs where a person wants to work but does not actively search for work due to a perception of low employment opportunities. The added worker effect is where a person with an otherwise low attachment to the labour market actively searches for work in response to the unemployment of his or her spouse.

EMPLOYMENT HISTORY

The scar of unemployment

Relatively few studies in Australia have examined the influence of the individual's employment history on current labour market activity. One attempt in this regard was by the Australian Institute of Multicultural Affairs (1985). They conclude (p. 61) that '...young people who suffer long initial periods of unemployment (and thus have limited work experience) tend to have more difficulty in obtaining employment when older—a finding supporting the existence of what has been called the "scar effect"....' Similarly, Miller and Volker (1987) find that the scarring effect of previous periods of unemployment on subsequent chances of being employed is very important in the youth labour market. Junankar and Wood (1992) also report evidence of scarring in the youth labour market.

Policy implications

Evidence that a period of unemployment may have adverse consequences on a person's future labour market success may seem to have important implications. The Australian Institute of Multicultural Affairs (1985, p. 61) notes 'It is important, therefore, that young people in their early years in the labour force do not experience extended periods of unemployment'. However, this can only be done through action on other intervening variables (possibly educational attainment, language skills, equal employment opportunity legislation). Previous labour market experience appears to be interpretable as an intervening variable only in a limited set of circumstances. One is where the optimal timing of any intervention is being considered. That is, to avoid the problems associated with spreading a program budget over a large number of people, many of whom would normally leave the unemployment state after a short period of time, it may be cost-effective to assist the unemployed after they have been unemployed for a certain period of time. Another situation where previous labour market history may be useful as an intervening variable is, as it will be argued later in this study, when it can be used as a proxy for the individual's attributes and circumstances that are unobserved or difficult to measure by the researcher (or case manager).

If these 'unobservables' affect labour market outcomes then they can be thought of as being embedded in the person's labour market history. Labour market history is then a characteristic that can, and should, be used in models of unemployment to enhance their forecasting capability.

USING THE RESULTS

Predicting unemployment

Statistical analyses of unemployment have been used in various ways in the literature. The study by Inglis and Stromback (1986), for example, uses the estimates to predict the frequency of unemployment of migrants and to assign weights to various factors that contribute to migrant unemployment. Miller and Neo (1997) use the estimates to partition the unemployment rate differential between immigrants and the Australian born into components that are due to differences in the marketable characteristics of the two birthplace groups and due to differences in the way these characteristics are linked to unemployment outcomes in the Australian labour market (a component often labelled discrimination in the literature). Most studies, however, simply quantify the relationship between various characteristics and the unemployment outcome and use these empirical relationships in commentary on the causes of unemployment and possible policy solutions (e.g. Harris 1996; Ross 1993).

A risk of unemployment index

A more ambitious approach is undertaken by the Australian Institute of Multicultural Affairs (1985). In their model a measure of the individual's unemployment experience, given by the number of months unemployed per year of labour market activity, was related to the age, sex, educational attainment, labour market experience, type of work, birthplace and, among the overseas born, length of residence in Australia of a sample of labour market participants. The results from this analysis were then used to predict a value for the measure of unemployment experience for each respondent. On this basis four risk groups were identified: no, low, medium and high risk of unemployment. It was suggested that a point system could be constructed from the regression analysis (see, in particular, Australian Institute of Multicultural Affairs 1985, p. 211), with 'risk' then being assessed through comparison of the point score and a threshold.

Australian Institute of Multicultural Affairs (1985, p. 188) correctly note that 'Identification of risk is based on probability. Some individuals initially identified as unlikely to experience significant periods out of employment will, nevertheless, endure prolonged and recurrent periods of unemployment'.

Miller and Volker (1987) also pursue a risk index approach. They also use their model of unemployment to create an index of risk for each person. They then divide the population into groups 'at risk' and 'not at risk' of unemployment on the basis of a threshold that will generate a fraction of the sample 'at risk' that is the same as the sample unemployment rate. Early school leavers, individuals with a history of joblessness and persons with an unemployed spouse were disproportionately represented in the 'at-risk' group and hence suggested as groups that could be targeted in labour market programs. Assessment of the usefulness of the index in this regard appears not to have been undertaken.

SECTION **3**   THE SURVEY OF EMPLOYMENT AND
UNEMPLOYMENT PATTERNS ....

The Survey of Employment and Unemployment Patterns (SEUP) in Australia is a longitudinal survey of individuals aged 15–59 years at May 1995. It ran over a three-year period, and the data were collected in three waves. The first wave covered the period from 5 September 1994 to 3 September 1995. The second wave was from 4 September 1995 to 1 September 1996 and the third wave was from 2 September 1996 to 31 August 1997. This study is based on the first two waves of the survey.

STRUCTURE OF THE SURVEY

Information was collected for three groups, namely samples of Jobseekers, a Population Reference group and Labour Market Program participants.

Jobseekers

The Jobseeker group is the focus of the survey and initially contained 5,488 persons. It comprises individuals who were considered to be potential candidates for a labour market program at the time of recruitment (between April and July 1995). The Jobseeker group is dominated by unemployed persons (around 80% of the total sample), but also contains a number of underemployed persons (e.g. part-time workers looking for a job involving a greater number of hours of work) and persons not in the labour market who were likely to enter the labour market in the near future (e.g. discouraged jobseekers, individuals studying who wanted to work). Individuals who were stood down without pay for less than four weeks, full-time students aged 15–24 years who were looking for part-time work and individuals who were not actively looking for work were not eligible for inclusion in this group of the survey.

Population Reference group

The Population Reference group is a random sample of the population. The initial data collection contained 2,311 persons. Reflecting the limited longitudinal labour market data available in Australia, the Population Reference group was included in the survey in order to provide a benchmark sample against which the labour market transitions of specific groups of Jobseekers or Labour Market Program participants could be compared.

Labour Market Program participants group

The Labour Market Program participants group comprises individuals who had started a subsidised employment placement and/or started a labour market training program between July 1994 and February 1995. This group was sampled to ensure that the survey contained a sufficient number of persons who had participated in a labour market program to enable detailed analysis of the effectiveness of these interventions in the labour market (ABS 1997b). Data on 1,019 Labour Market Program participants were collected for the first wave of the survey.

CONTENT OF THE SURVEY

Fixed variables

Information is available in the survey on five types of variables, namely fixed, dynamic, episodal, occurrence and summary. Fixed variables are those which do not change over time (e.g. date of birth, sex, birthplace, year of arrival in Australia, language first spoken). This information was therefore collected only once, in wave one. The fixed variables provide comprehensive information on the respondent's background and are comparable to those available in the data sets widely used for analysis of the labour market in Australia. Studies using the SEUP are thus able to standardise their analyses for the influence of conventional determinants of labour market outcomes.

Dynamic variables

Dynamic variables are those which are likely to vary across waves (e.g. marital status, educational attainment, labour force status, geographical location). Information on these characteristics was therefore re-collected at the time of each interview. These data provide a basis for study of skill acquisition and of labour market transitions as well as a continuously updated set of standardising variables for use in statistical analysis of labour market phenomena.

Episodal variables

Episodal variables are collected with respect to a particular episode (i.e. a particular activity within one or more reference periods). There are three types of episodes, namely labour market activity (periods of working, looking for work, absence from the labour market); Department of Employment, Education, Training and Youth Affairs (DEETYA) labour market support (Commonwealth Employment Service (CES) registration, case management, Labour Market Program participation); and Department of Social Security (DSS) income support (respondent receiving income support). For each of the episodes, the start and finish (if completed, the last date of the survey period if interrupted) dates are available, as is detailed information on the type of episode, and, where appropriate, the type of program, type of income support, occupation and industry of employment, active steps taken to find work, and the main activity while absent from the labour market. This type of information is useful for analysis of the employment patterns of various groups and for evaluation of the effectiveness of different methods of job search.

Occurrences and summary variables

Information on occurrences includes periods of training (both in-house and external) and receipt of job offers (employment offers received, offers declined and the reasons for this). Summary variables are those that summarise one or more episodal variables and include the number of episodes of working and the total duration of looking for work (ABS 1997a).

Other family members

In addition to the variables collected for the respondent, details on demographics, educational attainment and labour force status were also collected for the respondent's spouse, mother and father. These permit study of the importance of socioeconomic status and would provide a database for an analysis of inter-generational mobility.

Administrative data

A further feature of the SEUP data set is that some information on the individuals from the administrative records of DEETYA and the DSS is available.[1] DEETYA supplied details concerning the individual's registration with the CES, labour market programs (e.g. start and finish date of labour market program), case management (e.g. start and finish date of case management, case management outcome), and English skills (e.g. proficiency in reading, speaking and writing). Information on income support (e.g. type of income support, total payment of income support) was provided by DSS.

Definition of job seeking

Most of the variables collected in the SEUP follow standard definitions and therefore do not require detailed discussion. There are, however, several variables to which attention needs to be drawn. The SEUP concept of looking for work is not the same as the conventional definition of unemployment that is the basis of the dynamic labour force status variable in the SEUP or the definition of unemployment used in other data collections such as the Labour Force Survey. The conventional definition of an unemployed person is one who is not employed but who is actively looking for work and is available to start work, or waiting to start a new job, or waiting to be called back to work in a job from which he/she has been stood down without pay (ABS 1997c). In the SEUP, individuals can be categorised as 'looking for work' even though they might be simultaneously working. If individuals who look for work while working are excluded from the 'look for work' count, a measure that is closer to, but not the same as, the conventional definition of unemployment is obtained. The major difference is the absence of an 'availability to start work' test for categorisation as being unemployed in the SEUP episodal data. To minimise the scope for confusion in this paper, the term 'unemployment' is used for measures based on the dynamic labour force status variable, and 'looking for work' is used to reference the episodal variable of that name.

DESCRIPTIVE STATISTICS ON LABOUR FORCE STATUS

In this section the focus is on the Population Reference group, with the links between labour force status and selected individual characteristics (e.g. educational attainment) being examined using data from the first two waves of this component of the survey. Labour force status is defined with reference to three broad categories, namely employed persons (those who are working full-time or part-time), unemployed persons (those who are available for work and are actively seeking work) and those who are not in the labour force. Individuals who are not in the labour force may be discouraged jobseekers in that they do not seek work because of a perception that their job search will not be successful owing to limited job opportunities in their locality or line of work. Alternatively, the individuals may simply be absent from the labour market because they value their time more highly in leisure or home-based activities.

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[1] The consent of the respondents was required before DEETYA and the DSS could make this information available. It is an interesting feature of the data set that expands considerably the range of research issues that may be explored.

Age and labour force status

The first association to be considered is the link between the individual's age and their labour force status. Table 3.1 shows the distributions across labour force status for nine age groups in 1995. In total, 74% of 15–59 year-olds were employed at the time of the 1995 survey, while those who were unemployed and not in the labour force comprised 7% and 20% respectively. Several interesting patterns can be observed. First, there appears to be a direct link between age and employment, with younger age groups being less likely to be employed than individuals from older age groups. For example, the incidence of employment among individuals in the 20–24 age group (72%) is 11 percentage points lower than for individuals in the 25–29 year age group. [2] This feature of the data is most likely due to the younger age group's involvement in study activities.

Age and unemployment

Second, there appears to be an inverse association between age and unemployment. Thus, individuals in younger age groups (e.g. 15–19 years, 20–24 years), with an incidence of unemployment of 10% or higher, are twice as likely to be unemployed as the older age groups. As discussed earlier, the high incidence of unemployment among the younger age groups may reflect the greater number of labour force entrants in this group and the general lack of labour market experience that limits the effectiveness of job search among youth. Note that the relationships between age and employment (direct) and between age and unemployment (inverse) combine to give a pronounced inverse relationship between age and the unemployment rate (see the final column of table 3.1). Hence, the unemployment rate, defined as the number unemployed as a percentage of the sum of the employed and unemployed, is almost 20% among teenagers but only around 4% for 40–44 year-olds.

Age and absence from the labour market

Third, there is a high incidence of non-participation in the labour market among the older age groups. This may reflect their belief that they may be too old to be competitive in the dynamic labour market of the 1990s. It may also be associated with the voluntary early retirement that has resulted from the restructuring that has characterised the labour market this decade.[3] This considerable variation in the incidence of unemployment across age groups suggests that empirical analysis of unemployment outcomes should include consideration of the individual's age.

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[2] In this study the term 'incidence' is used when dealing with percentages of the total population. The term 'rate' is used in context-specific instances, such as when dealing with percentages of a subgroup of the total population. Hence, the incidence of unemployment will be the percentage of the total population that is unemployed, while the rate of unemployment will be the conventional definition of the percentage of labour force participants who are unemployed.

[3] Information on the main reason that individuals who were absent from the labour market gave for their status was examined for individuals absent from the labour market during a one-month period up to 3 September 1995. Up to one-fifth of individuals aged 50 years and over who were absent from the labour market indicated that they were retired or voluntarily inactive.

3.1 LABOUR FORCE STATUS, Age—1995

LABOUR FORCE STATUS.......

Age group (years)	Employed	Unemployed	Not in the labour force	Total	Proportion of total	Unemployment rate
	%	%	%	'000	%	%
15–19	59.8	14.1	26.1	1 328.9	12.0	19.1
20–24	71.9	10.0	18.1	1 283.3	11.6	12.2
25–29	82.9	*5.0	12.1	1 220.3	11.0	*5.7
30–34	72.4	7.6	20.0	1 527.7	13.8	9.5
35–39	82.4	*3.8	13.8	1 398.8	12.7	*4.4
40–44	82.9	*3.7	13.4	1 323.7	12.0	*4.2
45–49	81.4	*4.9	13.7	1 100.4	10.0	*5.7
50–54	71.8	*2.6	25.5	1 106.7	10.0	*3.5
55–59	53.1	*5.0	41.9	760.6	6.9	*8.7
All persons	**74.0**	**6.5**	**19.5**	**11 050.5**	**100.0**	**8.1**

3.2 LABOUR FORCE STATUS, Educational Attainment—1995

LABOUR FORCE STATUS..................

Educational attainment	Employed	Unem-ployed	Not in the labour force	Total(a)	Proportion of total	Unemployment rate
	%	%	%	'000	%	%
Bachelor degree or higher	90.0	*3.4	*6.6	1 448.8	13.9	*3.6
Undergraduate or associate diploma	89.1	*3.1	*7.7	876.6	8.4	*3.4
Skilled vocational qualification	87.0	*4.5	8.5	1 944.2	18.7	*4.9
Basic vocational qualification	66.2	*4.1	27.7	620.5	6.0	*5.7
Attended highest level of secondary school	71.5	7.4	21.1	1 875.7	18.0	9.4
Left school aged 16 years and over	71.3	10.2	18.5	1 682.1	16.1	12.5
Left school aged 15 years and under	58.0	9.0	33.0	1 976.1	19.0	13.4
All persons	**75.7**	**6.5**	**17.8**	**10 424.0**	**100.0**	**7.9**

(a) The total figure differs from table 3.1 due to the exclusion of observations in the 'Not applicable' (still at school) category.

Differences in labour force status by sex

A comparison between males and females (tables not reported here) shows that the incidence of unemployment is higher among males than females. Thus, within the male population, 8% are unemployed compared to 5% among females. However, within the female sample there is a higher percentage who are not in the labour market (30%) than is the case among males (10%). This may reflect a choice by women associated with a commitment to the home (e.g. child rearing) or it could be a reflection of stereotyping of household tasks which constrains women in the type of work they seek.[4] It is noted that 15–19 year-olds is the group with the highest incidence of unemployment for both males and females (15% among males and 13% among females). Unemployment is least prevalent among males aged 35–39 or 50–54 years and among females within the 40–44 and 45–49 year age groups.

Educational attainment and labour force status

Important links can also be established between educational attainment and labour force status. For the purpose of this study, the detailed data on educational attainment are aggregated into seven categories, namely bachelor degrees or higher (those who possess a higher degree, postgraduate diploma, bachelor degree), diplomas (those who possess an undergraduate diploma or an associate diploma), skilled vocational qualifications, basic vocational qualifications, those who have attended the highest level of secondary school, those who did not attend the highest level of secondary school, and those who either left school at 15 years or under or who did not attend school. A cross-tabulation of labour force status by educational attainment is presented in table 3.2.

Educational attainment and unemployment

The incidence of unemployment is most noticeable among the two lowest levels of educational achievement, namely those who did not complete the highest level of secondary schooling, and those who left school at 15 years or younger. Thus, around 10% of those who did not complete secondary schooling and 9% of those who left school at 15 years or younger were unemployed in 1995 compared to 3% of those who possessed a diploma, postgraduate diploma, bachelor or higher degrees. There is also a strong positive association between the incidence of employment and educational attainment, and a strong negative association between educational attainment and the extent of non-participation in the labour market. As a result of these underlying patterns, there is a clear pattern to the links between the unemployment rate and the highest level of educational attainment. For example, individuals who possess a higher degree, postgraduate diploma, or bachelor degree have an unemployment rate of 4%. In comparison, those who left secondary school without completing the highest level and those who left school at 15 years or younger experience a very high unemployment rate of 13%.

Educational attainment appears to be an important determinant of labour market outcomes for both males and females. For example, male workers with low levels of education (e.g. those who left school at 15 years or younger and those who did not complete secondary school) and female workers whose highest educational attainment

[4] One-third of the women who were absent from the labour market at least some time in the month up to 3 September 1995 gave 'childcare' as the main reason why they were not looking for work.

Educational attainment and unemployment *continued*

is secondary schooling are relatively more likely to be unemployed. There is also a high incidence of non-participation among both males and females who left school at 15 years or younger. Overall, the individual's educational attainment appears to contain information useful to an appraisal of the employment success of both males and females.

Proficiency in English

Proficiency in English and birthplace are two further factors that may have a bearing on employment success. This may arise through the various channels discussed earlier (including proficiency in English increasing labour market productivity and being associated with a higher degree of transferability of skills). For the purpose of this analysis, English proficiency is defined with reference to three groups. The first group contains those who speak only English at home. The second group comprises those who speak a language other than English at home and whose command of English is self-reported as 'Well' or 'Very well'. The final group consists of individuals who speak a language other than English at home and report their ability to speak English as 'Fairly well' or 'Not well', or report that they do not speak English at all.

The results from table 3.3 show that the majority of individuals are monolingual English speakers. This has implications for the precision of the estimates for the group with limited English skills. Among those who speak a language other than English at home, most have a 'Good' command of English. A comparison of employment status across levels of proficiency reveals that individuals who speak English 'Fairly well', 'Not well' or 'Not at all' are most likely to be unemployed. Thus, 16% of individuals belonging to this category are unemployed compared to only 6% and 7% unemployment among those who speak English only and those whose command of English is 'Good', respectively. Moreover, individuals whose command of English is 'Poor' are more likely to be out of the labour force. While the standard errors associated with these estimates are large, the patterns in the data are internally consistent and accord with the research findings discussed in section 2. In relation to the internal consistency, it is noted that there is a positive monotonic relationship between the incidence of employment and English proficiency, and a negative monotonic relationship between non-participation in the labour market and English proficiency.[5]

Birthplace

Table 3.4 presents information that reveals the links between birthplace and labour force status in Australia. Three broad birthplace groups are considered, namely the Australian born, those who were born overseas in the main English-speaking countries, and those who were born overseas in other countries (i.e. other than main English-speaking countries). According to table 3.4, 24% of 15–59 year-olds in Australia were born overseas. A comparison across birthplaces shows that those born in other than main English-speaking countries have a very high incidence of unemployment (10%) compared to the Australian born (6%) and those born in main English-speaking countries (3%). As discussed above, this may reflect non-transferability of skills for immigrants from other than main English-speaking countries which makes them seem

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[5] Sex comparisons are not presented owing to the high standard errors for the estimates for the group with limited English skills that is of primary interest.

Birthplace *continued*

less qualified to Australian employers. The difficulty in finding employment among immigrants from other than main English-speaking countries also appears to be reflected in the larger proportion of these individuals being likely to leave the labour market. Thus, 26% of immigrants from other than main English-speaking countries were not actively looking for work compared to 18% among the Australian born and 22% among those born abroad in main English-speaking countries. These results indicate that there is considerable variation in labour force status across birthplace groups.

Similar patterns of employment and unemployment can be derived across birthplace groups when the data are analysed by sex. Thus, among males and females, immigrants from other than main English-speaking countries have a higher incidence of unemployment and a lower incidence of employment than immigrants from main English-speaking countries and the Australian born.

In general, the results from the wave one data suggest that personal characteristics may influence an individual's labour force status. The various relationships reported accord with intuition and are consistent with the findings reported in previous research. The wave two data are briefly reviewed to establish whether there are any changes in the links over time. In particular, the discussion will focus on changes in the unemployment rate between waves one and two.

3.3 LABOUR FORCE STATUS, Level of English Proficiency—1995

| | LABOUR FORCE STATUS.................. | | | | | |
	Employed	Unem- ployed	*Not in the labour force*	*Total*	*Proportion of total*	*Unemployment rate*
English proficiency	%	%	%	'000	%	%
Speaks English at home	75.5	5.9	18.6	9 080.8	82.2	7.2
Speaks English very well/well	72.9	7.3	19.7	1 537.4	13.9	9.1
Speaks English fairly well/ not well/not at all	46.7	*16.0	37.3	432.3	3.9	*25.5
All persons	**74.0**	**6.5**	**19.5**	**11 050.5**	**100.0**	**8.1**

3.4 LABOUR FORCE STATUS, Birthplace—1995

	LABOUR FORCE STATUS...................					
Birthplace	*Employed*	*Unem-ployed*	*Not in the labour force*	*Total*	*Proportion of total*	*Unemployment rate*
	%	%	%	'000	%	%
Born in Australia	75.8	6.4	17.8	8 297.9	75.1	7.8
Born in main English-speaking country	75.0	*2.8	22.2	1 114.6	10.1	*3.6
Born in other country	64.4	9.5	26.1	1 638.0	14.8	12.9
All persons	**74.0**	**6.5**	**19.5**	**11 050.5**	**100.0**	**8.1**

Summary data from wave two

The data collected during the second wave of the survey indicate there are only minor changes to the labour force status of individuals between 1995 and 1996 (i.e. between waves one and two). For example, in 1996, 75% of the Population Reference group were employed, a 1% increase over the comparable statistic for 1995. However, the incidence of unemployment in 1996 is similar to that in 1995 (6.6% versus 6.5%). The remainder of this section provides a brief review of the links between labour market outcomes and age, educational attainment, proficiency in English and birthplace to establish whether the relationships previously described for 1995 carry over to the later data.

In each instance the reference point for the dynamic variables (age, educational attainment, and English proficiency) is wave two. This will mean that the constituents of the various age, educational attainment and English proficiency categories will differ from those in the earlier tables (as individuals age, acquire extra education or English skills over time). However, while this means that comparisons between 1995 and 1996 are being based on different groups, the comparisons will be based on like categories (e.g. similar educational attainments). This approach is appropriate given that characteristics rather than the person provide the focus of this preliminary assessment.

Age

With regard to the association between age and labour force status, the wave two data exhibit patterns similar to those that characterise the wave one data (compare tables 3.1 and 3.5). Thus, there tends to be an inverse association between age and the incidence of unemployment, and a high rate of non-participation in the labour market among the older age groups (e.g. 50–54 and 55–60 year-olds). It should also be noted that while the rate of unemployment among teenagers is higher than that observed for older age groups, the unemployment disadvantage of teenagers in 1996 is less than in 1995. This will reflect, in part, the different compositions of the 15–19 year age groups (the minimum age of the sample in 1996 is 16 years).

3.5 LABOUR FORCE STATUS, Age—1996

LABOUR FORCE STATUS.......

Age group (years)	Employed %	Unemployed %	Not in the labour force %	Total '000	Proportion of total %	Unemployment rate %
16–19	62.0	12.9	21.1	1 084.7	9.8	17.2
20–24	76.0	8.9	15.2	1 269.1	11.5	10.5
25–29	78.9	8.5	12.6	1 177.1	10.6	9.7
30–34	73.7	*6.0	20.3	1 505.0	13.6	*7.5
35–39	83.0	*5.3	11.7	1 447.4	13.1	*5.9
40–44	84.0	*5.7	10.3	1 374.0	12.4	*6.3
45–49	84.0	*3.3	12.7	1 179.1	10.7	*3.8
50–54	71.0	*3.4	25.6	1 036.0	9.4	*4.6
55–60	53.4	*6.5	40.1	978.0	8.9	*10.8
All persons	**74.9**	**6.6**	**18.4**	**11 050.5**	**100.0**	**8.1**

Educational attainment

Table 3.6 reveals that the links between educational attainment and labour market outcomes established in the data for 1995 also carry over to the 1996 data. Hence, there are inverse links between the unemployment rate and the highest level of educational attainment, and direct links between the incidence of employment and the rate of labour market participation and the individual's level of education. Again, the data show clearly that individuals who did not complete the highest level of secondary schooling or those who left school at 15 years of age or younger have the highest unemployment rate (around 13%). There are some fluctuations in employment status between 1995 and 1996 at specific levels of education, though most of these occur among holders of skilled vocational qualifications, basic qualifications and those who have completed the highest level of secondary school. For holders of skilled vocational qualifications, there is a two percentage points increase in the rate of unemployment, whereas individuals in the other two educational categories experience a two percentage points fall in the rate of unemployment.

English proficiency

English proficiency and birthplace are two variables that are associated with differences in employment outcomes between 1995 and 1996 (see tables 3.7 and 3.8). With regard to the association between English proficiency and the rate of unemployment, most of the changes can be observed among those who speak English 'Fairly well', 'Not well' or 'Not at all'.[6] Thus, this group is characterised by an increase in labour market participation of 12 percentage points between 1995 and 1996. This change is the net result of an increase in employment (17 percentage points) and a decrease in the unemployment rate (11 percentage points) over the period under review. This may reflect an increase in confidence among individuals from this group which may encourage them to enter the labour market. Their improved confidence could be the

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[6] While the changes observed may, given the small sample of individuals with limited English skills, simply be due to sampling variability, the pattern observed is consistent with patterns of adjustment expected among groups with relatively few labour market skills.

English proficiency *continued*

result of some improvements in their English skills. For example, those who did not speak English at all in the first wave may have learned to speak English 'Fairly well' by the second wave and this enhances their employment prospects.[7] These results suggest that the acquisition of relevant skills are important to the individual's employment opportunities.

Birthplace and labour force status

An analysis of the change in the employment states of the various birthplace groups provides some insights into the adjustment process of immigrants. Comparisons between tables 3.4 and 3.8 show that most of the variations in the unemployment rate occur among immigrants born in other than main English-speaking countries.[8] Thus, immigrants from this group experienced a sharp fall in the unemployment rate (five percentage points) and an increase in labour market participation (two percentage points). These changes are consistent with those documented for English skills above. This pattern is also observed when separate analyses are undertaken for males and females.

The more noticeable variations in labour market activities among immigrants from other than main English-speaking countries compared to immigrants from the main English-speaking countries may reflect the rapid rate of adjustment in the Australian labour market among the former. Immigrants from the main English-speaking countries are able to adjust easily to the Australian labour market. In contrast, immigrants from other than main English-speaking countries may be disadvantaged when they first enter the Australian labour market due to the skill transferability and language difficulties reasons mentioned earlier. As these immigrants adjust and acquire relevant skills, their employment prospects will improve. Therefore, the change in the labour force states between 1995 and 1996 among immigrants from other than main English-speaking countries is in accord with the pattern expected on the basis of conventional models of immigrant adjustment (e.g. Chiswick 1978). It therefore indicates that the acquisition of country-specific skills and the 'catch-up' effect may be important to the study of labour market outcomes.

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[7] The results from cross-tabulations show that English skills data in Australia are subject to both the improvement and deterioration over time that was noted by Chiswick and Miller (1998) in their study of the United States labour market. However, the data show that among those who did not speak English in wave one, 86% spoke English 'Fairly well' by wave two.

[8] Sample attrition means that the population sampled in wave two differs from that in wave one. As outlined in Le and Miller (1998), the weights in the SEUP account for this attrition, with the weights being determined to ensure that the population estimates always relate to the initial point of recruitment. However, depending on the stratification used for the computation of the weights, differences can be expected in estimates for particular categories, and this accounts for the differences in the population estimates in tables 3.4 and 3.8.

3.6 LABOUR FORCE STATUS, Educational Attainment—1996

| | LABOUR FORCE STATUS................. | | | | | |
| | Employed | Unem-ployed | Not in the labour force | Total(a) | Proportion of total | Unemployment rate |
Educational attainment	%	%	%	'000	%	%
Bachelor degree or higher	86.7	*4.3	9.0	1 440.3	13.4	*4.7
Undergraduate or associate diploma	89.3	*1.3	*9.5	897.6	8.4	*1.4
Skilled vocational qualification	84.3	6.6	9.1	2 055.7	19.2	7.3
Basic vocational qualification	70.6	*2.4	27.0	632.5	5.9	*3.3
Attended highest level of secondary school	74.5	5.6	19.9	1 901.7	17.7	6.9
Left school aged 16 years and over	72.9	10.4	16.7	1 597.2	14.9	12.5
Left school aged 15 years and under	61.4	9.6	28.9	2 206.8	20.6	13.6
All persons	**76.1**	**6.6**	**17.3**	**10 731.8**	**100.0**	**8.0**

(a) The total figure differs from table 3.5 due to the exclusion of observations in the 'Not applicable' (still at school) category.

3.7 LABOUR FORCE STATUS, Level of English Proficiency—1996

| | LABOUR FORCE STATUS................. | | | | | |
| | Employed | Unem-ployed | Not in the labour force | Total | Proportion of total | Unemployment rate |
English proficiency	%	%	%	'000	%	%
Speaks English at home	76.1	6.4	17.5	9 102.8	82.4	7.8
Speaks English very well/well	70.8	6.8	22.4	1 547.3	14.0	8.8
Speaks English fairly well/ not well/not at all	64.1	*10.8	25.2	400.4	3.6	*14.4
All persons	**74.9**	**6.6**	**18.4**	**11 050.5**	**100.0**	**8.1**

3.8 LABOUR FORCE STATUS, Birthplace—1996

	LABOUR FORCE STATUS...............					
	Employed	Unem- ployed	Not in the labour force	Total	Proportion of total	Unemployment rate
Birthplace	%	%	%	'000	%	%
Born in Australia	75.9	6.8	17.2	8 267.8	74.8	8.3
Born in main English-speaking country	74.6	*5.8	19.7	1 142.2	10.3	*7.2
Born in other country	70.1	6.2	23.7	1 640.5	14.9	8.2
All persons	**74.9**	**6.6**	**18.4**	**11 050.5**	**100.0**	**8.1**

AN OVERVIEW

Thus far the associations between personal traits and employment and unemployment outcomes have been examined over a two-year period for the Population Reference group. While this examination has provided useful insights into the SEUP and has identified possible factors that may contribute to the unemployment patterns in the Australian labour market, it does not identify the contributions that each factor actually makes to the chances of an individual becoming unemployed. For example, the inverse links between educational attainment and the unemployment rate could be due to a factor other than education. To illustrate this point, consider a situation where there is a strong complementarity between educational attainment and English skills, and a strong inverse relationship between English skills and the chances of being unemployed. In this situation, study of the educational attainment-unemployment rate relationship in isolation may attribute to the educational attainment-unemployment rate relationship effects that are more correctly attributable to limited English skills. An assessment of the *ceteris paribus* contribution that each characteristic makes to the unemployment outcome requires a multivariate analysis. This is the subject of the next section.

RESULTS FROM A MODEL OF UNEMPLOYMENT ....

The review of the unemployment literature in section 2 shows that Australian studies generally agree that educational attainment, age or labour market experience, birthplace, English proficiency, disability status and marital status influence the unemployment outcome at specific points in time. The extent to which such empirical findings can be used in the policy framework, however, is not clear. The reductions in unemployment rates associated with various characteristics (e.g. educational attainment) are not discussed in the context of the cost of changing the characteristics of the population (e.g. provision of extra education). And the ability of the models to predict employment outcomes within the sample receives limited discussion. Moreover, the policy relevance of within-sample prediction is questionable. In any particular sample those that are unemployed or employed at the particular point in time are known. Hence, a more relevant use of the empirical results is out-of-sample prediction. That is, can the model be used to predict whether members of some other sample will be employed or unemployed? Alternatively, can the model be used to predict the employment outcomes at some time in the future of members of the sample on which the estimates are based? This amounts to both a test of the robustness of the unemployment model across time periods, and of the policy relevance of the research findings.

The remainder of this section is organised into three subsections. In the first subsection the unemployment model is presented. The second subsection reviews the characteristics of labour market participants from the Population Reference group. The final subsection discusses the empirical results, and in so doing, the main factors affecting the individual's probability of being unemployed in 1995 are identified. These factors will then be used in various exercises aimed at establishing whether empirical results from study of the incidence of unemployment can be used in the design of labour market policy.

THE UNEMPLOYMENT MODEL

The model of unemployment used in this study is based on previous research (e.g. Miller & Neo 1997). Hence, the model of unemployment can be expressed as:

$$U_j^* = X_j\beta + \varepsilon_j \qquad \text{(equation A)}$$

where U_j^* is a latent variable that captures the propensity towards unemployment of individual j, X is a vector of observed factors (i.e. educational attainment, age, birthplace, etc.), β is a vector of coefficients to be estimated and ε is a stochastic error term. In the first instance the explanatory variables are restricted to those which have been used on a regular basis in previous research (see section 2).[1] This provides an appropriate basis for comparison across studies. Hence, the probability that a person will be unemployed is related to educational attainment (six dummy variables),

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[1] Alternative specifications that augment the model of unemployment with variables from the Survey of Employment and Unemployment Patterns (SEUP) that are not usually available in other data sets are examined later.

THE UNEMPLOYMENT MODEL *continued*

age (a quadratic function), sex (a dummy variable), marital status (three dummy variables), section of State (three dummy variables), birthplace (two dummy variables), level of English proficiency (two dummy variables), disability (a dummy variable), Indigenous status (a dummy variable) and period of residence (a continuous variable). Table 4.1 contains a brief description of the variables included in this model, while Appendix 1 presents comprehensive definitions of all variables constructed for use in this study.

Age versus labour market experience

The specification adopted in this section is viewed as a consensus specification based on the review of the literature presented in section 2. Two comments are in order. First, age is used as a regressor rather than labour market experience. Information on labour market experience is, however, contained in the SEUP. There are theoretical reasons for suggesting that both age (e.g. age discrimination, minimum rates of pay that vary with age among youth) and experience (which provides an index of human capital skills learned on the job and labour market information acquired through working) matter when labour market outcomes are being determined. Following Blinder (1976), the choice in this regard should be viewed as an empirical or practical matter.[2]

Indigenous status and disability

Second, on the basis of the previous research, a number of regressors are included in the model even though there are concerns over the quality of the data. For example, a variable for Indigenous status is included even though the sample size is very small. Similarly, a variable for disability is used despite the number reporting a disability being very high (see table 4.2). While these variables need to be included in the model if links with past research are to be established,[3] the reservations over the quality of the data mean that the empirical results will need to be interpreted with caution, and greater weight should be placed on the relationship between the research findings from the SEUP and the earlier studies than on the research findings from the SEUP *per se*.[4]

The logit model

Two outcomes are derived from U^* with reference to an arbitrary threshold of zero. Thus, the individual is held to be unemployed ($U = 1$) where U^* exceeds zero, and is employed ($U = 0$) otherwise.

The dependent variable in this analysis is the observed binary indicator of the respondent's labour force status that corresponds to U in this model. Given this, a logit or probit model is appropriate.

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[2] Appendix 2 presents estimates from a model of unemployment where the age variable is replaced by the measure of labour market experience available in the SEUP. The χ^2 measure and the prediction success provide ambiguous evidence on whether labour market experience or age is the superior variable. From a practical perspective, age is likely to be more useful in the risk index approach developed in section 5 and hence is included in the benchmark specification of the model.

[3] It is often suggested that it is better to include in the estimating equation a variable that is measured with errors (if the measurement error is random the estimated coefficient is biased towards zero) than to exclude the variable (which sets the estimated coefficient equal to zero).

[4] These comparisons can offer valuable insights into the reliability of the SEUP data.

The logit model *continued*

These models constrain the predicted values from the estimation to be in the unit interval (i.e. 0 to 1). The logit model is used in this study.

With the logit model, the natural logarithm of the odds ratio of the probability of unemployment (U) to the probability of employment ($1-U$), $\log\left[\dfrac{U}{1-U}\right]$, is expressed as a linear combination of the explanatory variables, namely

$$\log\left[\frac{U}{1-U}\right] = X_j\beta \qquad\qquad \text{(equation B)}$$

Interpreting the parameters

The parameter estimates in the logit model therefore record the impact on the logarithm of the odds ratio of a small change in the explanatory variables. Of greater interest in most cases, however, are the partial effects of explanatory variables on the probability of being unemployed. These can be computed as

$$\frac{\partial U}{\partial X_k} = U(1-U)\hat{\beta}_k \qquad\qquad \text{(equation C)}$$

where X_k is the k^{tp} explanatory variable and $\hat{\beta}_k$ is its associated estimated coefficient. It is conventional to evaluate these partial effects at the sample mean unemployment rate. Recently, a preference has been expressed for computing the partial effects for each person in the sample and using the average of these in place of equation C (see Greene 1997). As the variables in this study are mostly categorical, the partial effect can only be considered an approximation, as it applies a concept that is relevant to an infinitesimally small change to a variable that can only have discrete changes. In such circumstances, it may be better to compute predicted values for different groups (e.g. the Australian born, immigrants from non-English-speaking countries) and use the difference in predicted unemployment rates for these groups as a measure of the partial impact of the specific characteristic (e.g. born in a non-English-speaking country).[5] These predicted differences, however, will vary according to the unemployment rate of the benchmark group used in the calculations. As the focus of the current analysis is on issues other than the absolute size of the partial effects, a broad approximation to the partial effects is sufficient, and the algorithm outlined in equation C will be used. This approach will also assist with the comparisons with previous Australian research which has tended to use the method described in equation C.

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[5] Table 7.2 contains examples of such predictions.

4.1 LIST OF VARIABLES USED AND THE BENCHMARK GROUPS IN THE EMPIRICAL ANALYSIS

Variable	Brief description and measure
Dependent	
Unemployment	A binary variable (U).
Explanatory	
Age and its square (years)	A continuous variable.
Marital status	Mutually exclusive dichotomous variables, set equal to unity if the respondent is in the following marital states, zero otherwise: Separated; Divorced; Widowed; Never married. Benchmark group: respondents who are married.
Disability	A dichotomous variable, set equal to unity if the respondent has a disability, zero otherwise. Benchmark group: respondents who have no disability.
Section of State	Mutually exclusive dichotomous variables, set equal to unity if the respondent resides in the following areas, zero otherwise: Major urban areas; Other urban areas; Rural areas. Benchmark group: residents of a capital city.
Educational attainment	Mutually exclusive dichotomous variables, set equal to unity if the respondent acquired the following education, zero otherwise: Higher degrees, Postgraduate degree or diploma, Bachelor degree; Undergraduate or Associate diploma; Skilled vocational qualification; Basic vocational qualification; Attended the highest level of secondary school available; Did not attend the highest level of secondary school available. Benchmark group: respondents who left school at 15 years of age or under or those who never attended school.
Birthplace	Mutually exclusive dichotomous variables, set equal to unity if the respondent was born outside Australia in the following countries, zero otherwise: Main English-speaking country; Other country. Benchmark group: Born in Australia.
Indigenous status	A dichotomous variable, set equal to unity if the respondent is of Aboriginal or Torres Strait Islander origin, zero otherwise. Benchmark group: non-Indigenous respondents.
English proficiency	Dichotomous variables, set equal to unity if the respondent speaks a language other than English at home and possesses the following levels of proficiency in English, zero otherwise: Good English (speak English very well/well); Poor English (speak English fairly well/not well/not at all). Benchmark group: respondents who speak English at home.
Period of residence	Years since migration for the overseas born is a continuous variable, and is computed from the year of arrival in Australia (YOA). If YOA > 0 then period of residence = 95.5 − YOA, else period of residence = 0.

THE SAMPLE

Characteristics of the sample

The sample used in this analysis is from the Population Reference group of the SEUP, as described in section 3. The observations used in the estimations are restricted to individuals who had left school and who were labour market participants (employed or unemployed) in 1995. Table 4.2 presents the means and standard deviations of the variables included in the unemployment model. These data refer only to labour market participants aged 15–59 in 1995.

4.2 MEANS AND STANDARD DEVIATIONS OF VARIABLES—1995

Variable	Mean	Standard deviation
Unemployed (%)	7.9	26.9
Age (years)	36.2	11.2
Married (%)	63.2	48.2
Separated/divorced/widowed (%)	7.1	25.7
Never married (%)	29.6	45.7
Disability (%)	22.1	41.5
Capital city (%)	59.1	49.2
Major urban (%)	7.0	25.5
Other urban (%)	18.1	38.5
Rural (%)	15.9	36.5
Bachelor degree or higher (%)	16.0	36.7
Undergraduate or associate diploma (%)	9.6	29.4
Skilled vocational qualification (%)	21.1	40.8
Basic vocational qualification (%)	5.3	22.4
Attended highest level of secondary school (%)	16.2	36.8
Left school aged 16 years and over (%)	16.2	36.9
Left school aged 15 years and under (%)	15.7	36.4
Born in Australia (%)	75.8	42.8
Born in main English-speaking country (%)	10.2	30.2
Born in other country (%)	14.0	34.7
Indigenous status (%)	1.0	9.8
Speaks English very well/well (%)	14.0	34.7
Speaks English fairly well/not well/not at all (%)	3.2	17.6
Period of residence (years)	5.1	10.9

	no.
Sample size	1 782
Weighted estimate	8 451 300

From the table 4.2 data, the unemployment rate for this purged sample is 8%. A typical participant in the labour market would be 36 years of age. About two-thirds of the sample are married, 7% are separated, divorced or widowed and 30% have never been married. Surprisingly, over one-fifth of the sample reported that they had a disability. The sample is concentrated in major regional centres, with 59% residing in a capital city.

With respect to the data on the highest level of educational attainment, there are two main features. First, the most frequently reported highest level of education is 'skilled vocational qualification'. Second, both the most skilled education category of 'bachelor degree or higher' and the least skilled of having left school at age 15 years or younger have sizeable representation, with each having around 16% of the labour force. Among the remaining characteristics listed in the table, attention can be drawn to the 14% of the

Characteristics of the sample *continued*

sample who speak a language other than English at home and who are proficient in English, and the 3% who speak a language other than English at home and who have limited English proficiency.

Motivation for a multivariate model

As discussed in previous sections, some of the characteristics listed in table 4.2 are associated with a relatively high rate of unemployment. Many of these characteristics, however, are interrelated due to complementaries that exist in the production of human capital, due to 'accidents' of birth (e.g. a person is born overseas in a non-English-speaking country), or due to circumstances associated with the social environment. For example, English language skills are interrelated with both birthplace and educational attainment. The separate influences of these characteristics on the rate of unemployment can be quantified using the multivariate logit model outlined above. A detailed analysis of the relationships between personal and other characteristics on the probability of being unemployed is presented below.

EMPIRICAL RESULTS

Results from a multivariate logit model

The results from the general model of unemployment are presented in table 4.3. These results have been derived using a sample pooled across male and female labour market participants. A test of whether it was valid to pool the data in this manner was conducted, and support for the methodology was obtained.[6] In computing the maximum likelihood estimates of the unemployment model, the data have been weighted by the population weights available in the SEUP sample file. These weights are scaled, so that the weighted sample size equals the actual number of respondents to the survey included in the purged sample. That is, if there are 2,000 respondents to the survey representing a weighted population count of 10 million, the weights are scaled so that the weighted count is 2,000 rather than 10 million. This approach enables any gains in efficiency from taking into account aspects of the sampling frame to be achieved while avoiding artificial inflation of the 't' statistics.

The goodness of fit

The findings presented in table 4.3 generally accord with *a priori* expectations and are consistent with the previous studies reviewed in section 2. The χ^2 statistic indicates that these variables are jointly significant in influencing the variations in the unemployment probability.[7]

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[6] The relevant chi-square statistic was 26.35, which compares with the critical value of $\chi^2(20)=31.41$. Note that this finding differs from that reported in previous research (e.g. Miller 1998). The source of this difference is likely to be the relatively small sample size in the current analysis. However, whether the apparent statistical precision gained from the use of very large samples, which results in economically small unemployment rate differentials being statistically significant, is a virtue or simply false precision is a matter for debate.

[7] The χ^2 test reported here is a test of whether all the model terms simultaneously have no impact on the rate of unemployment. If the test is significant then it indicates that some, or all, of the variables in the model are significant, in a statistical sense, determinants of the probability of unemployment. If the χ^2 statistic is insignificant then it would mean that the best prediction of each person's probability of unemployment is the average unemployment rate.

4.3 LOGISTIC ANALYSIS OF THE PROBABILITY OF BEING UNEMPLOYED—1995

Variable	Coefficient	t-ratio	$\partial U/\partial X_k(a)$
Constant	0.532	0.52	. .
Female	–0.147	–0.76	–1.07
Age	–0.168	–3.00	–1.21
Age^2/100	0.188	2.52	1.36
Separated/divorced/widowed	0.803	2.22	5.82
Never married	0.837	3.20	6.06
Disability	0.767	3.65	5.55
Major urban	0.485	1.44	3.51
Other urban	0.437	1.79	3.16
Rural	0.107	0.36	0.77
Bachelor degree or higher	–1.348	–3.44	–9.76
Undergraduate or associate diploma	–1.180	–2.46	–8.54
Skilled vocational qualification	–0.906	–2.86	–6.56
Basic vocational qualification	–0.796	–1.60	–5.77
Attended highest level of secondary school	–0.810	–2.66	–5.87
Left school aged 16 years and over	–0.243	–0.87	–1.76
Born in main English-speaking country	–0.109	–0.19	–0.79
Born in other country	0.580	1.03	4.20
Indigenous status	0.471	0.72	3.41
Speaks English very well/well	0.380	0.96	2.75
Speaks English fairly well/not well/not at all	1.437	2.59	10.40
Period of residence	–0.006	–0.32	–0.04
χ^2 (21)	131.12	. .	. .
McFadden R^2(b)	0.13	. .	. .
Prediction success	90.50	. .	. .

	no.
Sample size	1 782
Weighted estimate	8 451 300

(a) This column lists the partial effect of an exogenous variable on the probability of being unemployed.

(b) The McFadden R^2 is calculated as $1 - (l_m/l_o)$, where l_m = the maximised log-likelihood value of the model and l_o = the log-likelihood value if the non-intercept coefficients are restricted to zero (see Veall & Zimmermann 1996).

The McFadden R^2 of 0.13 is standard for this type of estimation.[8] Around 91% of cases are correctly predicted. However, this high rate of prediction success can be shown to be due to the fact that the employment outcome dominates the sample. A random assignment of individuals to the employment and unemployment outcomes using the sample ratios for these labour market states of 0.921:0.079 would have a prediction success of 86%. Hence, a better way of viewing the prediction success of the model is as the improvement upon a random assignment. This improvement is five percentage points, or one-third of the gap between the prediction success under random assignment and perfect prediction.

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[8] The McFadden R^2 is one of a number of measures that can be constructed to indicate the goodness of fit of the estimated equation. It is analogous to the conventional R^2 in simple regression. It ranges in value from zero to one, and the higher the value the better the fit of the model.

The goodness of fit *continued*

Viewed in this context, the prediction success is more modest, but still impressive. The impact of each of the significant coefficients on the unemployment probability is discussed below.[9]

Educational attainment

As reviewed in section 2, educational attainment is one of the most important indicators of labour market productivity, and hence unemployment outcomes. Consistent with previous findings (e.g. Inglis & Stromback 1986; Miller & Neo 1997), the results from this study show that there is a strong inverse relationship between educational attainment and the probability of being unemployed. Thus, compared to the benchmark group of those who left school at 15 years of age or younger, individuals who attended the highest level of secondary school (or equivalent), or hold a post-school qualification, are less likely to be unemployed. For example, holders of higher degrees (higher degree, postgraduate degree or diploma, bachelor degree), and holders of a diploma are at least nine percentage points less likely to be unemployed than labour market participants from the benchmark group. In comparison, individuals who have only attended the highest level of secondary school are six percentage points less likely to be unemployed than those from the benchmark group of early school leavers. These results reflect the importance of human capital skills to employment success, and accord with the primary role afforded educational attainment in labour market policy.

Age

In addition to the skills acquired in educational institutions, on-the-job skills are also important determinants of employment prospects. As in the approach used in some previous research, age is entered into the unemployment model as a quadratic function. The impact of age on the probability of being unemployed is shown to be non-linear and significant. That is, the probability of being unemployed initially decreases with age but will eventually increase as the individual becomes older (see also Wooden 1991). Thus, evaluated at 20 years, for each extra year of age, other things being the same, the probability of being unemployed decreases by 0.7 of a percentage point. At 40 years it decreases by 0.1 of a percentage point, and at 45 years the unemployment probability starts to increase by a small amount with age. As previously mentioned, the higher probability of being unemployed among older age groups may reflect depreciation/obsolescence of human capital skills as the individual ages.

The age effects can be viewed in two ways. First, the age variable can be interpreted literally, and the findings discussed in a purely descriptive way, as in much of the previous research.[10] Second, the age effects can be interpreted as work experience effects. The results presented in Appendix 2 support this interpretation. In this case the findings suggest that it is important that individuals do not have prolonged periods in

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[9] The 't'-ratios reported are statistical tests of the null hypothesis that the true population parameter associated with the variable listed in the left-hand column of table 4.3 is zero. That is, it is a test of whether the variable affects the unemployment outcome. If the 't'-ratio is sufficiently large (1.96 at the conventional 5% level) then the estimated impact of the variable is said to be significantly different from zero, or the variable or coefficient is 'significant'.

[10] An examination of teenage unemployment rates by age may, however, be informative where it is thought that junior rates of pay (or training wages) improve the chances of employment for younger age groups, *ceteris paribus*.

Age *continued*

unemployment or have lengthy absences from the labour market if employment success is an objective. However, it should be noted that while significant, the impact of age on the probability of unemployment is relatively small, being less than one percentage point. This suggests that compared to the skills acquired in educational institutions, those acquired solely on the job may be less effective in helping an unemployed person to find work. This emphasises the importance of skill acquisition through formal training classes rather than relying on the accumulation of skills on the job.

English proficiency

The level of English proficiency is another variable that has been shown in previous studies (e.g. Inglis & Stromback 1986; Miller & Neo 1997) to significantly affect the unemployment outcome of individuals. Individuals with limited English skills are also shown in this study to have inferior job market prospects. Thus, individuals who do not speak English at home and whose command of English is 'Poor' are 10 percentage points more likely to be unemployed compared to monolingual English speakers. However, there is no significant difference in the unemployment outcome between monolingual English speakers and those who do not speak English at home but whose command of English is 'Good'. The emphasis on limited English skills in recent debate (e.g. Miller & Chiswick 1997) seems warranted on the basis of these findings.

Disabilities

The table 4.3 results also show that individuals with disabilities have a higher chance of being unemployed compared to a person with no disability. In particular, a person with a disability is six percentage points more likely to be unemployed compared to labour market participants with no disability. This finding sits comfortably with those reported previously in the literature.

Marital status

As discussed in section 2, marital status may provide a proxy for a labour market participant's stability and motivation (see, e.g. Inglis & Stromback 1986). In this study, marital status has a positive and significant impact on the unemployment outcome. Hence, compared to a married person, those who are separated, divorced or widowed, or those who have never married, are six percentage points more likely to be unemployed. This marital status effect appears therefore to be a robust empirical finding in the Australian research.

Section of State

With regard to the impact of the variables for section of State on the unemployment outcome, the finding in this study, though insignificant, is consistent with that found in the study by Inglis and Stromback (1986). However, other studies have found that place of residence is an important factor in the determination of labour market status in Australia. Bradbury, Garde and Vipond (1986) and Miller and Neo (1997), for example, both report that region of residence is a significant determinant of the probability of unemployment. This range of findings suggests that regional unemployment effects require further investigation (see also Miller 1998). Further analysis is presented in section 7 of this paper.

Comparison with previous research

Most of the variables in this study yield findings similar to those obtained from previous research. However, there are some results that differ from previous studies. Thus, unlike previous research (see, e.g. Miller 1989; Jones 1990), this research shows no significant impacts (at the 5% level) of place of birth and Indigenous (Aboriginal or Torres Strait Islander) origin on the unemployment outcome. The latter finding is consistent with work by Harris (1996) and may be attributable to the small number of Indigenous individuals in both this sample and that used by Harris (1996). As a general methodological issue, detailed study of specific groups is best undertaken with specialised data sets. For example, the Labour Force Status and Other Characteristics of Migrants, Australia Survey is restricted to the overseas born and affords an excellent opportunity to study the labour market performance of migrants (see, e.g. Chiswick & Miller 1992).

Summary of findings

In summary, several implications can be derived from the above results. First, the similarities of the findings from this study to those from previous Australian studies suggest that the unemployment model is robust across estimating samples and that the model is adequate in explaining the determinants of unemployment at a specific point in time. The findings suggest that educational attainment, marital status and disability status are the most important determinants of unemployment. Second, given the similarities that have emerged in the applied research, it would seem that the estimates obtained from the model can be used to compute a risk index value that will enable individuals who are at risk of becoming unemployed to be identified. This will be important for policy makers whose aim is to target policies on the unemployed in a cost-effective way. The following section examines the 'risk index' approach in detail.

A RISK INDEX APPROACH TO THE UNEMPLOYMENT PROBLEM

In this section the empirical relationships between various personal characteristics and the probability of being unemployed are used to create an index of the risk of becoming unemployed for each individual in the sample. The merits of this approach are examined by documenting the subsequent labour market outcomes of individuals categorised as having a high risk of becoming unemployed. A similar assessment is offered for individuals at a low level of risk of becoming unemployed.

THE RISK INDEX

Following the development of the logit model of unemployment in the previous section, the index of unemployment ($\hat{U}^*$) is given as

$$\hat{U}_j^* = X_j \hat{\beta}$$

where X is the vector of personal characteristics identified in the statistical analyses as affecting the unemployment outcome, and $\hat{\beta}$ is the set of weights (coefficients) that link these characteristics to the index of unemployment. These weights were estimated in the previous section. A large value of $\hat{\beta}$ is associated with a greater value of the index of unemployment and hence with greater risk of becoming unemployed.

A value of the index $\hat{U}^*$ is created for each person in the sample. To categorise individuals as 'at risk' or 'not at risk' of unemployment, the index $\hat{U}^*$ needs to be compared to a threshold level (T^*). That is, if

$\hat{U}_j^* \geq T^*$ then the person is regarded as being at risk of unemployment,

and if

$\hat{U}_j^* < T^*$ then the person is felt to be not at risk of unemployment.

The threshold T^* can be established in various ways. In the first instance a value of T^* that generates a fraction of the sample at risk of unemployment that is the same as the actual sample unemployment rate is used. A value of $T^* = -1.36$ gives 8%[1] of the sample being categorised as at risk of being unemployed.

Characteristics of the at-risk group

The groups categorised as at risk and not at risk of being unemployed in this manner can be analysed in various ways to enable the approach to be evaluated. What is of primary interest in the first instance is the characteristics of the at-risk group. Table 5.1 lists relevant descriptive statistics. Similar information is also provided for the not-at-risk group.

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[1] The sample unemployment rate is 8%.

5.1 GROUPS CATEGORISED AT RISK AND NOT AT RISK
OF UNEMPLOYMENT—1995

Characteristics	At risk....................		Not at risk..................	
	%	Standard deviation	%	Standard deviation
15–19 years	41.9	49.5	3.5	18.3
20–24 years	20.0	40.1	11.3	31.7
25–29 years	6.9	25.4	13.2	33.9
30–34 years	11.9	32.5	14.7	35.4
35–39 years	3.1	17.5	15.3	36.0
40–44 years	6.4	24.6	14.2	34.9
45–49 years	1.5	12.4	12.2	32.7
50–54 years	2.9	16.7	10.4	30.5
55–59 years	5.3	22.6	5.2	22.2
Bachelor degree or higher	3.7	18.8	17.2	37.7
Undergraduate or associate diploma	0.9	9.4	10.4	30.5
Skilled vocational qualification	1.2	11.0	22.9	42.0
Basic vocational qualification	2.0	14.1	5.6	23.0
Attended highest level of secondary school	14.4	35.3	16.3	37.0
Left school aged 16 years and over	38.0	48.7	14.2	34.9
Left school aged 15 years and under	39.8	49.1	13.4	34.1
Speaks English very well/well	10.3	30.4	14.4	35.1
Speaks English fairly well/not well/not at all	23.6	42.6	1.3	11.3
	no.		no.	
Sample size	140	..	1 642	..
Weighted estimate	724 400	..	7 726 900	..

Table 5.1 reveals some interesting differences between those who are at risk and those who are not at risk of being unemployed. First, labour market participants in the at-risk group are mainly from younger age groups (e.g. 42% are 15–19 years of age and a further 20% are 20–24 years of age, while only 3% are 35–39 years of age) while those not at risk of being unemployed tend to be older (e.g. only 4% are 15–19 years of age while 15% are 35–39 years of age). Second, labour market participants who are assessed as likely to be unemployed possess low levels of education. Thus, 38% left school aged 16 years and over but did not attend the highest level of secondary school and a further 40% left school at 15 years of age or younger. Only 4% have a post-graduate diploma, bachelor or higher degree. In comparison, those belonging to the low-risk group are more educated, with 23% possessing skilled vocational qualifications and 17% possessing a higher degree, post-graduate diploma or bachelor degree. Of this group, 28% are in the two lowest educational categories in table 5.1. Third, the level of proficiency in English among many of those at risk of unemployment is quite poor. For example, 24% of the sample identified to be at risk of unemployment have limited English skills, whereas those with similar English skills only account for 1% of the not-at-risk group.

Characteristics of the at-risk group *continued*

> Hence, it is quite apparent that the model of unemployment identifies a group with well-defined characteristics as being at risk of being unemployed. The proponents of this approach argue that these groups could be the focus of unemployment policy. In other words, policy targeted on individuals with a high risk of being unemployed could provide a cost-effective way of managing the unemployment problem. Before considering this proposition, however, one needs to know whether the individuals categorised as being at risk of unemployment actually end up being unemployed, or whether they are able to respond to the individual circumstances they face and increase their employability.

Evaluation of the risk index

> To examine this issue the labour market activities of individuals between 1995 and 1996 are reviewed. Table 5.2 describes the labour market patterns of the at-risk and not-at-risk groups over the year. It is to be noted that not all of the respondents included in table 5.1 were included in the second wave of the survey conducted in 1996. Thus, using the same threshold level (T^*) as before results in an at-risk group of 118 (7% of the available data) and a not-at-risk group numbering 1,527.[2]

5.2 MEANS OF MEASURES OF EMPLOYMENT SUCCESS FOR GROUPS AT RISK OF UNEMPLOYMENT AND NOT AT RISK OF UNEMPLOYMENT

Measures in 1995–96	At risk in 1995	Not at risk in 1995
	Mean	Mean
Days working	256.0	338.0
Days looking for work(a)	122.0	34.0
Days looking for work only(b)	84.0	15.0
Days absent from the labour market	24.0	11.0
Looking for work episodes	0.6	0.2
Episodes absent from the labour market	0.2	0.1
	no.	no.
Sample size	118	1 527
Weighted estimate	683 400	7 785 700

(a) The number of days looking for work while working and looking for work while not working.

(b) The number of days looking for work while not working.

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[2] The value of the risk index of the group for whom data are not available in wave two was computed. The data show that the mean index of risk of the wave one respondents who are in the wave two data (–2.9) is lower than for those wave one respondents who are not in the wave two data (–2.6). That is, sample attrition is greater for those with a higher risk of being unemployed. The differential in predicted unemployment rates for these two groups is 2.5 percentage points.

Success of the risk index

It is apparent from table 5.2 that the risk index approach categorises individuals as being at risk of being unemployed who in fact spend a lot of time looking for work in the following year. Two definitions of looking for work are listed, corresponding to the two definitions introduced in section 3. Hence, the mean number of days spent looking is 122 when both looking while working and periods of specialised job seeking are examined, and 84 days when the focus is restricted to episodes of looking while not working. Individuals who are categorised as not at risk of being unemployed under this approach in fact spend little time looking for work (34 days of the year looking, when episodes of looking while working are included; 15 days of the year when episodes of looking while working are excluded). The mean number of episodes of looking for work of the at-risk group is about three times that of the not-at-risk group (0.6 versus 0.2). In addition, members of the at-risk group are more likely to have periods where they are absent from the labour market (0.2 spells and 24 days of the year for the at-risk group compared to 0.1 spells and 11 days of the year).

Shortcomings of the risk index

Despite this apparent success, table 5.2 also points to the risk index being a fairly blunt instrument. It results in the categorisation of individuals at risk of being unemployed who in fact spend 70% of the following year working. Moreover, it would also result in a pool of at-risk persons in the population of approximately 700,000. Such a pool does not appear to be an appropriate size on which to target policy.

Alternative definition of risk groups

An alternative that may be both more practical for case management purposes, and identifies a group with subsequent labour market outcomes more consistent with the commonplace notions of the chronic unemployed, is to have the risk index focus only on those with an exceptionally high likelihood of being unemployed. This would entail, for example, categorising the 5% of the sample with the highest probabilities of unemployment as being at *high* risk of unemployment, the 5 to 10% of the sample with the next highest probabilities of unemployment as having a *moderate* risk of unemployment, and the balance of the sample as having a *low* risk of unemployment. Table 5.3 provides information on the labour market patterns for these divisions of the sample in the columns headed 'Low', 'Moderate' and 'High'. These three categories, the data for which are listed in the middle of the table, are mutually exclusive and exhaustive.

By disaggregating the total sample into the different risk levels defined above, it is possible to establish some associations between the predicted risk of unemployment in 1995 and employment success in 1995–96. From table 5.3, it can be noted that there is an inverse link between employment success and risk level. For example, labour market participants who were identified as being at a high risk of being unemployed spent less time working (253 days of the year) and more time looking for work (131 days of the year under the first, more general measure of job search and 87 days under the second, more restrictive, measure) compared to those from the low-risk group who spent 339 days of the year working and only 32 days of the year looking for work (14 days under the alternative definition that excludes periods of job search while employed). The high-risk group were also absent from the labour market for a greater number of days than the low-risk group.

5.3 MEANS OF MEASURES OF EMPLOYMENT SUCCESS FOR GROUPS
CATEGORISED AT RISK OF UNEMPLOYMENT

	RISK LEVEL IN 1995........................			
Measures in 1995–96	*Low*	*Moderate*	*High*	*Very high*
	Mean	Mean	Mean	Mean
Days working	339.0	306.0	253.0	211.0
Days looking for work(a)	32.0	70.0	131.0	130.0
Days looking for work only(b)	14.0	45.0	87.0	100.0
Days absent from the labour market	11.0	13.0	24.0	53.0
Looking for work episodes	0.2	0.4	0.6	0.6
Episodes absent from the labour market	0.1	0.1	0.2	0.3
	no.	no.	no.	no.
Sample size	1 409	160	76	30
Weighted estimate	714 900	843 200	476 900	163 100

(a) The number of days looking for work while working and looking for work while not working.

(b) The number of days looking for work while not working.

A very high risk of unemployment group

As presented above, however, the risk index approach would still not be a practical means of identifying individuals for case management in all circumstances. This arises because the high-risk group, being the 5% of the sample with the greatest risk of unemployment, represents close to one-half of one million persons, which might be an unmanageable number in a cost-conscious environment[3].

A more refined analysis might focus on the 1 or 2% of the sample with the highest probabilities of unemployment. Restricting the sample to smaller percentiles in this manner does not seem to alter greatly the number of days spent looking for work under the first definition of looking that includes episodes of looking while employed. Hence, respondents in the top 2% of the sample (very high-risk) spent 130 days of the year looking for work compared to 131 days for those who have a high risk (i.e. the top 5%) of being unemployed. It does, however, reveal differences in other measures. In particular, the mean number of days spent looking while not working, at 100, is greater in the very high-risk group than in the high-risk group (mean of 87 days). There is also a large difference in the number of days working (42 days) between the high- and very high-risk groups. Furthermore, those from the very high-risk group are more likely to be absent from the labour market for a longer period. Hence, the difference in the mean number of days absent from the labour market between the two groups is 29. In total, the group with a very high risk of being unemployed spent almost one-half of the year either looking for work or absent from the labour market. It would therefore appear from this study of the average labour market outcomes of the various risk groups that the risk index approach has some merit.

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[3] This depends on the resources available. See, for example, DEETYA (1998), p. 4.

A POINTS SYSTEM

To operationalise the risk index approach, a points system along the lines of that discussed by the Australian Institute of Multicultural Affairs is needed. This method assigns points to characteristics that are associated with higher probabilities of unemployment, with the points awarded varying with the $\hat{\beta}$s used to construct the risk index discussed above. In the approach adopted here, which is primarily for assessment purposes, βs which are small are not considered, and only points that are multiples of five will be awarded. One possible set of points is as follows:

Characteristics	*Points*
Limited English proficiency	15
Disability	10
Never married	10
Age 15–19 years	10
Left school at 15 years of age or less, or never attended school	10
Left school at 16 years or higher before completed secondary school	5
Speaks a language other than English at home; Good English skills	5
Born in a non-English-speaking country	5
Live outside major metropolitan region	5

The relativities in this point scheme are guided by the estimated coefficients in the statistical analysis.

Performance of a practical risk index

The above points may be used in place of the regression coefficients to construct a 'practical' risk index (PRI).[4] A value of this index was calculated for each individual. Labour market participants are classified into low-, moderate-, high-, and very high-risk groups. Because of the discrete nature of the points assigned to various characteristics, the distribution of points is not continuous, and so a point value cannot generally be selected that partitions the sample into given percentile ranges. Hence, in place of the procedure used earlier, for those to be identified at low risk of unemployment, a threshold point value of 20 points or lower is used. For the moderate-risk group, a threshold point value of 25 or 30 is set; for the high-risk group, a threshold point value of 30 is set; and for the group at very high risk of unemployment, a threshold point value of 35 is set. Using this approach, the very high-risk group represents the top 2% of the sample; the high-risk group accounts for 6% of the total; the moderate-risk group accounts for the next 14% of the total; and the low-risk group represents the remaining 80% of the total. These sub-sample sizes are different from those used earlier, though they are the closest approximations possible to the earlier values. The characteristics of the at-risk groups defined in this manner are displayed in table 5.4, and the links between the outcome of the application of the PRI and the 1996 labour market activities are summarised in table 5.5.

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[4] There are three main differences between the two approaches. First, as noted in the text, some of the more minor influences on unemployment outcomes are ignored completely in the PRI. Second, the PRI treats the unemployment effects as being separable so that limited English skills, for example, have the same impact on the PRI for all persons regardless of their characteristics, whereas in the risk index the non-separable nature of the logit model means that the effect of any characteristic varies according to the other characteristics of that individual. Third, the use of just three bands with points of 5, 10, and 15 provides a cruder assessment than the initial risk index approach.

Characteristics of 'PRI' risk groups

The focus of table 5.4 is on three characteristics (age, educational attainment, English proficiency) that were identified in the previous sections as significant determinants of the unemployment outcome. Several features of this table can be noted. First, there is an inverse relationship between age and the risk of unemployment. For example, 36% of individuals aged 15–19 years are in the high-risk group compared to 21% in the moderate-risk group and only 2% in the low-risk group. The majority of those with moderate or low risk of being unemployed are aged 30–34 years or 35–39 years. Second, there is an inverse relationship between the risk of being unemployed and educational attainment. In the high-risk category, 51% left school at 15 years of age or younger compared to 33% and 10% in the moderate and low-risk groups, respectively. Nearly half (43%) of those who have a low risk of being unemployed possess a skilled vocational qualification (24%) or a degree (19%). Third, there is an inverse association between English proficiency and the risk of being unemployed. Thus, 15% of the high-risk group have limited English skills. In comparison, 10% of the moderate-risk group have limited English skills and only 1% of the low-risk group self-report their English skills as poor. These results suggest that the PRI approach, just like the initial risk index approach, is effective in isolating specific groups who are disadvantaged in the labour market.

5.4 GROUPS CATEGORISED AT RISK OF UNEMPLOYMENT—1995

	RISK LEVEL					
Variable	High		Moderate		Low	
	%	Standard deviation	%	Standard deviation	%	Standard deviation
15–19 years	36.0	48.2	20.9	40.8	2.0	14.0
20–24 years	7.0	25.7	12.3	33.0	12.4	32.9
25–29 years	5.0	21.9	10.1	30.1	13.8	34.5
30–34 years	15.0	35.8	14.1	34.9	14.5	35.2
35–39 years	5.4	22.7	11.7	32.2	15.4	36.1
40–44 years	14.2	35.1	10.8	31.1	14.0	34.7
45–49 years	4.1	20.0	9.3	29.2	12.1	32.7
50–54 years	4.9	21.7	6.8	25.2	10.6	30.8
55–59 years	8.3	27.7	3.9	19.4	5.2	22.2
Bachelor degree or higher	4.8	21.5	6.7	25.0	18.5	38.9
Undergraduate or associate diploma	0.0	0.0	6.4	24.6	10.9	31.1
Skilled vocational qualification	5.9	23.7	10.9	31.2	24.0	42.7
Basic vocational qualification	2.3	15.2	3.9	19.5	5.8	23.3
Attended highest level of secondary school	12.4	33.1	14.6	35.4	16.7	37.3
Left school aged 16 years and over	23.2	42.4	24.8	43.3	14.2	34.9
Left school aged 15 years and under	51.3	50.2	32.7	47.0	9.9	29.9
Speaks English very well/well	7.8	27.0	9.8	29.8	15.2	35.9
Speaks English fairly well/not well/not at all	15.3	36.2	9.6	29.5	1.1	10.7
	no.		no.		no.	
Sample size	111	..	245	..	1 426	..
Weighted estimate	532 400	..	1 170 900	..	6 748 000	..

Labour market patterns of risk groups

From table 5.5, it can be noted that the links between the predicted level of risk of being unemployed in 1995 and the employment outcomes in 1996 are similar to those established under the risk index approach for the low-, moderate-, and high-risk groups (compare tables 5.3 and 5.5). Under the PRI approach, those who are at high risk of being unemployed spent fewer days working (265 days) than those identified at moderate risk (309 days) or low risk (340 days) of being unemployed. At the same time, those who were predicted to have a high risk of being unemployed in 1995 spent more time absent from the labour market (23 days) compared to those who were predicted to have a moderate (17 days) or low risk (10 days) of unemployment. There is also a strong relationship between the computed level of risk and the number of days spent looking for work under both definitions of job seeking considered in table 5.5.

5.5 MEANS OF MEASURES OF EMPLOYMENT SUCCESS FOR GROUPS CATEGORISED AT RISK OF UNEMPLOYMENT, Points System

| | RISK LEVEL IN 1995........................ | | | |
Measures in 1995–96	Low	Moderate	High	Very high
	Mean	Mean	Mean	Mean
Days working	340.0	309.0	265.0	262.0
Days looking for work(a)	33.0	56.0	121.0	112.0
Days looking for work only(b)	14.0	38.0	76.0	63.0
Days absent from the labour market	10.0	17.0	23.0	39.0
Looking for work episodes	0.2	0.3	0.5	0.6
Episodes absent from the labour market	0.1	0.1	0.2	0.2
	no.	no.	no.	no.
Sample size	1 328	241	99	34
Weighted estimate	6 836 100	1 111 800	521 100	214 600

(a) The number of days looking for work while working and looking for work while not working.

(b) The number of days looking for work while not working.

The very high-risk group, however, displays different outcomes in 1996 under the PRI and risk index approaches. Thus, under the PRI approach, individuals from this risk category spent 51 more days working, 18 fewer days looking for work (under the more general definition) and 14 fewer days absent from the labour market compared with the outcomes under the risk index approach.

SUMMARY

In summary, the risk index approach suggests that the groups most prone to unemployment are readily identifiable in that they are low-skilled and young. When the labour market performances of the groups categorised as being 'at risk' and 'not at risk' of unemployment are compared, it is found that the at-risk group have, on average, an inferior labour market performance. They spend more time looking for work and they are also absent from the labour market for greater periods. These findings suggest that the risk index approach has merit. Moreover, examination of the performance of a risk index computed using a points system shows that this is a workable approach.

DEFICIENCIES OF THE RISK INDEX APPROACH

In the previous section a conventional model of unemployment was used to predict which labour market participants were at risk of being unemployed. It was established that those identified as at risk of unemployment in 1995 spent, on average, considerable time looking for work in 1996 (see tables 5.2 and 5.3). Similarly, those classified as not being at risk of unemployment in 1995 spent, on average, relatively little time looking for work in the subsequent year. Despite the apparent success of the model, there are considerable prediction errors. That is, many individuals predicted to be at risk of unemployment do not experience any time looking for work or experience only minor spells of looking. And some individuals who are predicted to have little risk of unemployment end up experiencing quite lengthy periods of looking for work. This suggests that there is room for improvement to the basic model used to assess the risk of unemployment.

The analyses undertaken in this section attempt to identify possible areas of improvement. The work is based on a detailed analysis of the respondents' labour market activity in the year following the time of the predictions. This time period, the 1995–96 reference period, is the same time period over which the accuracy of the predictions from the model of unemployment was assessed in the previous section. The focus of the analysis is to understand the departures from the model of unemployment (that is, individuals whose labour market status is predicted poorly). This is done through study of the factors that appear to have affected job search activity during 1995–96 that were not anticipated in the conventional model of unemployment estimated in section 4.

The remainder of this section is organised into three subsections. The first subsection briefly discusses the labour market activities of individuals between 1995 and 1996. In the second subsection, the characteristics of those who looked for work, either while working or as a specialist job search activity, and the characteristics of those who looked for work while not working, are examined. These characteristics comprise the variables included in the model of unemployment and other factors suggested by the review of the literature in section 2 or by examination of the Survey of Employment and Unemployment Patterns (SEUP) data.[1] The third subsection reviews the length of time allocated to job seeking for those who were predicted to have a high, moderate or low risk of being unemployed. In this instance, the discrepancy between predicted and actual labour market success is related to the characteristics of the labour market participants in order to provide a guide for model development. The main findings from these analyses are then used to support modifications to the model of unemployment.

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[1] The model estimated in section 4 should be viewed as a consensus model. Some studies reviewed in section 2 have considered variables that were not in the specification adopted in section 4. The analyses in the current section introduce these.

LABOUR MARKET ACTIVITIES, 1995–96

The labour market activities of those in the labour market in both waves one and two (a sample of 1,645 persons) are examined in this subsection. The focus of the examination is the length of time labour market participants looked for work during the 1995–96 reference period. The two measures of looking for work introduced in the previous section are used. The first of these records the weeks that respondents spent looking for work regardless of whether they were concurrently working. This definition of job seeking is termed 'looking' in this section. The second measure, which records the length of time that people spent looking for work while not working, is termed 'looking only'. Table 6.1 presents data on the labour market activities of participants under both measures of looking for work.

6.1 LABOUR MARKET ACTIVITIES OF LABOUR MARKET PARTICIPANTS— 1995–96

MEASURE OF LOOKING FOR WORK...

Number of weeks	Looking.................		Looking only...........	
	'000	%	'000	%
0	6 658.5	78.6	7 265.6	85.8
1–9	595.7	7.0	516.8	6.1
10–19	181.4	2.1	140.2	1.7
20–44	389.3	4.6	312.5	3.7
45–52	644.2	7.6	233.9	2.7
Total	**8 469.0**	**100.0**	**8 469.0**	**100.0**

Several features of table 6.1 can be discussed. First, under both measures of looking, there are a large number of individuals who did not look for work between 1995 and 1996. In particular, 79% of the population did not look for work at any stage during the year under review (see the first measure headed 'looking') while a higher percentage (86%) did not look for work while not working (see the second set of figures headed 'looking only'). Second, there is a sizeable proportion of the population who spent a small fraction of the period, between one and nine weeks, looking for work. For example, 7% of the population looked for work over this period under the first, more general measure of looking, and 6% of the population looked for work over the same period under the second measure that excludes periods of looking while working. Third, there is a substantial percentage of labour market participants (8%) who allocated a large amount of time (i.e. 45–52 weeks) to looking for work under the first definition of looking that includes periods of looking while working. In comparison, only 3% of the population spent 45–52 weeks looking for work while not working.

Features of the job-seeking data

Therefore, job-seeking behaviour appears to have two essential features. First, the overwhelming majority of labour market participants do not engage in job seeking, or spend only a few weeks in any given year looking for work. This 85–90% of the labour market is not the main concern of this study: it is expected that there will be a small amount of job seeking in even a full-employment labour market as workers seek out

Features of the job-seeking data *continued*

better opportunities that will maximise their wellbeing—and that of society. Second, there is a small core of the labour market that spends a large amount of time engaged in job search. This group, and particularly the (approximately) one-quarter of a million people who were not working while they looked for work for 45–52 weeks, are the main focus of this study. What is of immediate interest is to examine the characteristics of the groups with different lengths of times spent looking for work to see if there are any factors that can be readily identified as being associated with membership of particular duration categories. These factors comprise variables that were in the specification of the model of unemployment outlined in section 4 and other factors that have been revealed as important from examination of the SEUP data.

CHARACTERISTICS OF THOSE LOOKING FOR WORK

Four categories are created for each of the looking for work measures, namely those who spent 45–52 weeks, 10–44 weeks, and 1–9 weeks looking for work and those who did not look for work. Table 6.2 presents data for each of these categories using the first definition of looking for work ('looking') over the period 1995–96. In addition to personal characteristics, data on the person's labour market history, family members' employment status and characteristics of the area of residence are provided. Several features of this table will be discussed.

6.2 LABOUR MARKET PARTICIPANTS LOOKING FOR WORK(a)

LOOKING FOR WORK (WEEKS) IN 1995–96.............

Characteristics in 1995	45–52...................		10–44....................		1–9........................		Did not look...............	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	35.5	12.7	34.0	12.1	30.8	11.5	37.0	10.7
Education (years)	12.2	2.9	12.5	2.8	12.7	2.3	12.8	2.6
Never worked (%)	12.3	33.0	5.0	21.9	3.1	17.4	1.5	12.0
Looking for work (includes while working) in 1994–95 (days)	230.5	140.1	140.2	135.4	76.0	105.7	10.9	45.6
Looking for work since first left full-time education (years)	2.2	2.7	1.3	1.9	0.6	0.9	0.4	1.1
Family member unemployed (%)	12.7	33.5	16.4	37.2	5.5	22.8	5.4	22.7
Family member unemployed for 12 months or more (%)	7.1	25.8	3.2	17.5	2.5	15.5	1.4	11.9
Socioeconomic index for area of residence (deciles)(b)	5.0	2.8	5.7	3.2	6.3	2.9	6.1	2.8
Moved area (%)	12.3	33.0	9.8	29.9	14.2	35.1	6.7	25.0
	no.		no.		no.		no.	
Sample size	150	..	122	..	95	..	1 278	..
Weighted estimate	644 200	..	570 700	..	595 700	..	6 658 500	..

(a) This table contains data on those who were looking for work while working in addition to those who were looking for work while not working.

(b) The lower the mean value, the greater the disadvantage of the area of residence.

Personal characteristics

With regard to personal characteristics, table 6.2 shows that neither age nor educational attainment appear to be of major importance in determining the distribution of labour market participants across the looking for work categories. Thus, those who spent 10 or more weeks looking for work have an educational attainment less than one-half a year lower than that of those who spent 1–9 weeks looking for work, or those who did not look for work at all. Similarly, there is less than two years difference in the mean age of the two extreme looking for work categories. The failure of educational attainment to exercise a major impact in this regard may seem surprising given the results of the model of unemployment presented earlier.[2] However, it must be remembered that the definition of job search used here does not correspond to the conventional definition of unemployment. Divergence between the current set of findings and those presented earlier may simply mean that the better educated engage in more job search while working than their less well-educated counterparts. This matter is discussed further below in the context of the analysis based on the second definition of job search.

Labour market history

The individual's labour market history, however, seems to have a strong influence on the time he/she spends looking for work. A number of variables are used to represent labour market history. The first is a broad incidence measure that records whether the respondent has any employment experience at all. Here a simple dichotomy of employment experience is recognised, with respondents being categorised as either having worked in a part-time or full-time job, or not having undertaken such work prior to 1994. The 45–52 weeks category is characterised by a much higher percentage of those who have never worked before compared to the category of those who did not look for work over the 1995–96 reference period. Thus, among those who spent 45–52 weeks looking for work, 12% had never held a job compared to 2% among those who did not look for work. Previous employment experience may help individuals find work more easily because it increases their efficiency in job search, or because the employment provides them with an information base superior to that of individuals who had never worked. The latter may be of major importance where informal channels are an important means through which information on the availability of work is transmitted in the labour market.

The second set of measures that capture aspects of the person's labour market history are based on duration measures. The first variable records the number of days spent looking for work (either while working or while not working) during 1994–95, and the second is the number of years since the respondent first left full-time education spent looking for work while not working. Table 6.2 shows that there is a direct link between a respondent's history of job seeking and their current total duration of looking for work. For example, respondents who spent 45–52 weeks looking for work in 1995–96 would have spent, on average, 231 days looking for work in 1994–95 whereas those who did not look for work in 1995–96 would have spent only 11 days looking for work in 1994–95. Similarly, those belonging to the high-looking category (i.e. 45–52 weeks)

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[2] It will be noted that the age effects are weak and U-shaped in the unemployment model presented in section 4. Both factors will contribute to the small differences observed in table 6.2.

Labour market history *continued*

spent more time looking for work since they first left full-time education (two years) compared to those who did not look for work (only around one-third of one year). This link between past adverse labour market experiences and current labour market activity is generally termed a 'scar' effect. The evidence reported here, albeit preliminary, suggests that this scar effect is present in the Australian labour market and is likely to be important.

Family circumstances

A further factor that may affect labour market outcomes is the person's family circumstances. Miller (1997) has argued that this is an important consideration in the Australian labour market. For example, if the respondent belongs to a family where one or more members are unemployed, this may put pressure on him/her to find work where income needs are a primary consideration. However, where there are significant complementarities of leisure times, or where peer-group pressures are important, the presence of unemployed family members may actually reduce the pressure on an individual to find work. To examine this issue, two dichotomous variables are used to indicate whether family members are unemployed and whether one or more family members have been unemployed for more than 12 months.

Table 6.2 shows that there is a direct association between having family members who are unemployed and the duration of looking for work. That is, there is a greater chance of having a family member who is unemployed or has been unemployed for a long period of time for those who spent 45–52 weeks looking for work compared to those who did not look for work. Thus, among those who spent 45–52 weeks looking for work, 13% have family members who are unemployed and 7% have family members who have been unemployed for more than 12 months compared to 5% and 1%, respectively, for those who did not look for work. These patterns suggest that family influences may be important and should be considered in empirical analysis of job search and of unemployment.

Regional circumstances

The duration of looking for work while working and/or looking for work while not working could be affected by the socioeconomic aspects of the residential area. As noted previously, Miller (1998) speculates that regional circumstances may be more important in determining unemployment outcomes in the Australian labour market than personal characteristics. To capture this set of influences, an index of relative socioeconomic disadvantage is used. This index focuses on attributes of the residential area such as low income, low educational attainment and a high unemployment rate. A low value on this index suggests that the area may be characterised by factors such as a greater proportion of low-income families, relatively more people with little training and a disproportionate number of people employed in unskilled occupations (ABS 1993). The data in table 6.2 reveal that the value of the index varies inversely with the duration of looking for work. Hence, respondents who spend a lot of time looking for work are more likely to reside in areas with a low value of the socioeconomic index. The difference in the value of the index between those who spent 45–52 weeks looking for work and those who did not look for work is one point. As this index records the decile of the respondent's area of residence on the socioeconomic scale, this one-decile difference is of considerable importance.

Worker mobility

The individual's mobility is another factor that exhibits some variation across the job-seeking categories. A dichotomous variable is used to indicate whether the respondent has changed area of usual residence during 1995 or has moved State or Territory since the recruitment interview for the survey. The data show that there is a high percentage of individuals who have moved among those who allocated a disproportionate amount of time to looking for work. For example, among those who spent 45–52 weeks looking for work, 12% had moved compared to 7% of those who did not look for work. This may reflect the lack of knowledge of the new labour market by respondents who have moved, thus preventing a smooth transition into employment.

Summary

Overall, labour market participants who spent a disproportionate length of time (i.e. 45–52 weeks) looking for work under this general definition of job-seeking behaviour are those with a low level of education and who have not been previously employed. These individuals also tend to have spent a longer time looking for work in the previous year, and to be members of families where one or more family members are unemployed. In addition, there is a high percentage of respondents in the 45–52 weeks category who have moved area of residence, and they tend to reside in areas of low socioeconomic status.

The directions of these relationships accord with intuition. However, several of the relationships, particularly those between age and educational attainment and job-seeking activities in 1995–96, were not as strong as had been expected on the basis of the models of unemployment studied in section 4. This may arise because the definition of looking for work used in table 6.2 differs from the conventional definition of unemployment. In this regard, the second measure of looking that more closely resembles the conventional definition of unemployment may be superior. The characteristics of individuals under the second measure of looking are in table 6.3.

Job seeking while not working (specialist job seeking)

Table 6.3 shows that from the sample of 1,645 respondents, 61 persons looked for work for 45–52 weeks while not working, 108 persons looked for 10–44 weeks, 86 persons looked for 1–9 weeks and 1,390 persons did not look for work. These sample responses represent approximately 234,000, 453,000, 517,000 and 7,266,000 persons, respectively, from the general population. Compared to the respondents who looked for work (either while working or not working) in table 6.2, the number of respondents who looked for work while not working is much smaller. The characteristics of members of each of the duration categories in table 6.3 are discussed below.

Personal characteristics and specialist job seeking

With regard to personal characteristics, there are two findings that can be observed across the job search categories. First, similar to the result from the study of the first measure of looking, the individual's age is of minor importance as a determinant of the distribution of the labour force across the duration of looking for work categories. The difference in age between the two extreme-looking categories (i.e. 45–52 weeks and did not look for work) is one year. This minor impact is broadly consistent with the

Personal characteristics and specialist job seeking *continued*

data on unemployment incidence presented earlier where only youth (15–24 years of age) could be readily distinguished on the basis of their unemployment experience. Second, there is a difference of about two years in educational attainment between those who spent 45–52 weeks looking for work and those who did not look for work. This result is consistent with the importance of educational attainment in the unemployment model. The finding that education levels are comparable across the duration categories in table 6.2 (the more general definition of looking) and yet there is a two-year difference across the duration categories in table 6.3 (where the definition of looking is more consistent with the conventional definition of unemployment) shows that the better educated spend more time engaged in job search while working. As job search while not working is a costly exercise, the fact that a less costly form of job search (i.e. while working) is undertaken more by the better educated than by the less well-educated is an interesting finding.

6.3 LABOUR MARKET PARTICIPANTS LOOKING FOR WORK ONLY(a)

LOOKING FOR WORK (WEEKS) IN 1995–96.............

Characteristics in 1995	45–52....................		10–44....................		1–9.........................		Did not look...............	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	35.6	13.4	32.0	12.0	29.6	11.6	37.0	10.7
Education (years)	11.1	2.6	11.9	2.5	12.6	2.5	12.8	2.6
Never worked (%)	16.7	37.6	13.7	34.6	3.6	18.7	1.4	11.9
Looking for work (includes while working) in 1994–95 (days)	262.3	114.8	185.6	146.5	101.0	120.1	20.5	67.4
Looking for work since first left full-time education (years)	3.0	2.4	2.1	2.7	0.8	1.0	0.4	1.2
Looking for work only in 1994–95 (days)	255.5	113.8	166.8	143.7	74.6	112.5	8.3	38.1
Family member unemployed (%)	21.0	41.1	13.3	34.1	7.6	26.6	5.8	23.4
Family member unemployed for 12 months or more (%)	13.7	34.6	5.6	23.1	4.1	20.0	1.3	11.4
Socioeconomic index for area of residence (deciles)(b)	4.9	3.0	5.3	3.0	6.3	2.8	6.0	2.9
Moved area (%)	15.5	36.5	9.6	29.6	18.0	38.6	6.8	25.2
	no.		no.		no.		no.	
Sample size	61	..	108	..	86	..	1 390	..
Weighted estimate	233 900	..	452 700	..	516 800	..	7 265 600	..

(a) This table contains data on those who were looking for work while not working.

(b) The lower the mean value, the greater the disadvantage of the area of residence.

Labour market history and specialist job seeking

There is considerable variation across the duration of looking categories, particularly the two extreme groups, in the previous employment experience of the respondents. Thus, table 6.3 shows that 17% of those who allocated 45–52 weeks to looking for work had never worked before compared to 1% of those who did not look for work. This finding appears to confirm the existence of a strong 'scar' effect in the Australian labour market.

Labour market history and specialist job seeking *continued*

Table 6.3 indicates that there is a direct link between the duration of job search during the reference period and the extent of previous job search, both in the year immediately prior to the reference period and over the interval since first left full-time education. Hence, for individuals who spent 45–52 weeks looking for work in 1995–96, on average 262 days were spent looking for work in 1994–95. In comparison, those who did not look for work in 1995–96 spent only 21 days looking while working in 1994–95. The second indicator of the person's history of job search reveals that individuals who spent 45–52 weeks looking for work during the 1995–96 reference period had previously spent three years job seeking after leaving full-time education, compared to less than one-half of one year for those who did not look for work during the 1995–96 reference period.

Given the definition of job seeking that is being examined here, a more relevant measure of the individual's recent history of job search might be the number of days spent looking for work while not working. The data show that the time allocated to job search while not working in the previous year varies considerably across the current looking categories. Thus, those who are in the high-looking categories (i.e. 10 weeks or more) spent more time looking for work in the previous year compared to those who are in the low-looking categories (i.e. 1–9 weeks, did not look for work). For example, for those who spent 45–52 weeks looking for work during 1995–96, 256 days were spent looking for work while not working during the previous year. In comparison, those who did not look for work during 1995–96 spent only eight days looking for work during 1994–95. These patterns show that individuals who spent a lot of time looking for work in the previous year also spent a long time looking for work while not working during 1995–1996. In other words, knowledge of a person's labour market history seems to be fundamental to an appreciation of their current labour market performance.

Family circumstances and specialist job seeking

There is quite considerable variation in the employment circumstances of members of the individual's family across the duration of job search categories. Individuals who engage in long periods of job search are more likely to have family members who are unemployed or who have been unemployed for more than 12 months compared to those who engage only in short periods of job search or those who did not look for work. For example, among those who spent 45–52 weeks looking for work, 21% have family members who are unemployed compared to 6% for those who did not look for work.

Regional characteristics and specialist job seeking

There are also differences in the value of the socioeconomic index across the duration of looking for work categories. Hence, those who spent a disproportionate amount of time looking for work (i.e. 45–52 weeks) are more likely to reside in areas with a low value of the socioeconomic index compared to those who did not look for work. Again, the magnitude of this difference (one point) is substantial given that the index records deciles.

Mobility and specialist job seeking

Finally, the data in table 6.3 also indicate that those who spent more time looking for work are those who are more likely to have moved area or State or Territory of residence. Thus, 16% of those who spent 45–52 weeks looking for work had moved compared to 7% of those who did not look for work.

Summary

In summary, those with the most intense level of job seeking (i.e. 45–52 weeks) under this definition of job search are characterised by a relatively low mean level of education. With regard to their labour market history, a disproportionate number of the individuals in this category had never worked before, had spent considerable time looking for work in the previous year and had a greater chance of being unemployed just prior to the period under review. Furthermore, individuals who spent 45–52 weeks looking for work in 1995–96 are more likely to have had family members who were unemployed, or had been unemployed for a long period of time. There is also a high percentage of respondents in this category who had moved area of residence, and they are more likely to reside in areas characterised by factors such as a greater proportion of low income families and relatively more people with little training.

General patterns in the data on job seeking

It is also to be noted that the general patterns across the looking for work categories are broadly similar for the two measures of job search. However, a comparison of the data listed in tables 6.2 and 6.3 shows that there are some differences in the magnitudes of the variables across the two measures, and these occur mainly among those who spent 10 weeks or more looking for work. For example, consider the percentage of the sample that had never worked. This is higher among those who had looked for work while not working than for the alternative job-seeking definition that includes job seeking while working. Furthermore, among those who spent 45–52 weeks or 10–44 weeks looking for work only, there is a higher percentage with family members who are unemployed compared to those who looked for work under the 'looking' definition. In other words, the relationship between the various labour market history or 'scar' variables and current labour market disadvantage, and the relationship between the presence of unemployed family members and current labour market disadvantage, are both more intense when job seeking undertaken while working is excluded from the study. This suggests that job seeking while working is a different activity to job search undertaken while not working. The apparent direct links between job seeking while working and educational attainment discussed above contrasts rather sharply with the inverse links between educational attainment and the conventional definition of unemployment reported in the literature. As the focus of this study is on unemployment or job seeking as an indicator of disadvantage in the labour market, much of the subsequent analysis will focus on the measure of job search that excludes job seeking undertaken while working.[3]

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[3] A study of job search that aimed to identify the more productive or cost-effective means of looking for work would, however, need to focus on job seeking undertaken while working.

DURATION OF LOOKING FOR WORK OF INDIVIDUALS CATEGORISED AT RISK OF UNEMPLOYMENT

A further evaluation of the risk index approach

In section 5 the mean duration of job search during 1995–96 was used as a measure of the accuracy of the predictions from the model of unemployment in a risk-assessment framework. It was shown that there was a positive association between the predicted rate of unemployment and the respondent's job search activity. However, there is also a significant number of discrepancies between predicted and actual labour market outcomes, and these discrepancies suggest that factors other than those included in the model of unemployment estimated in section 4 play a major role in determining labour market success in Australia. The examination above of the characteristics of those in the various looking for work categories has identified a number of potential candidates for consideration, in particular the person's labour market history, family circumstances and a socioeconomic index of the area of residence. In this subsection the links between these factors and the prediction errors from the risk-assessment approach to unemployment are examined. This examination also encompasses a number of other variables.

The study of prediction errors is based on separate analyses of the 76 respondents classified as having a high risk of unemployment, the 160 respondents classified as having a moderate risk of unemployment and the 1,409 respondents classified at low risk of unemployment in table 5.3. The distribution of these individuals across the duration of looking for work categories is presented in table 6.4.

6.4 LABOUR MARKET PARTICIPANTS, Duration of Looking for Work Only and Risk Levels

| | LOOKING FOR WORK ONLY (WEEKS) IN 1995–96.............. | | | | |
Risk level in 1995	45–52	10–44	1–9	Did not look	Total
	no.	no.	no.	no.	no.
High	14	18	7	37	76
Moderate	15	23	16	106	160
Low	32	67	63	1 247	1 409
Total	**61**	**108**	**86**	**1 390**	**1 645**
	'000	'000	'000	'000	'000
Weighted estimate	233.9	452.7	516.8	7 265.6	8 469.0

Nature of the prediction errors

Several features of the information listed in table 6.4 can be observed. First, the dominance of the low-risk group in the 'did not look' category is probably the most prominent feature of the table. This finding will provide the basis for the positive association between the risk of unemployment and the mean number of weeks spent looking for work discussed in relation to table 5.3. Second, there are major positive and negative discrepancies between predicted and actual labour market outcomes. In terms of the negative (favourable) prediction errors, there is a large percentage (58%)

Nature of the prediction errors *continued*

of those predicted to be at high risk of unemployment in 1995 who only allocated a small proportion of their time (i.e. 1–9 weeks, did not look for work) to job search activities during 1995–96. Conversely, in terms of the positive (unfavourable) prediction errors, there is a large number of individuals who were predicted to be at moderate (9%) or at low (2%) risk of being unemployed in 1995 who allocated a disproportionate amount of time (i.e. 45–52 weeks) looking for work during 1995–96. The remainder of this subsection examines the characteristics of individuals in these prediction error categories, namely the negative and positive prediction error groups as defined above.

Prediction success and failure for the high-risk group

The characteristics for those who were classed at high risk of being unemployed in 1995 but spent little time looking for work (i.e. 1–9 weeks, did not look for work) during 1995–96, and those who were predicted to be at moderate or low risk of unemployment but spent a long time looking for work (i.e. 45–52 weeks) over the same period are presented in tables 6.5 and 6.6, respectively. In each case data for the balance of the respondents in the particular risk level or levels are presented for comparative purposes.

6.5 LABOUR MARKET PARTICIPANTS AT HIGH RISK OF UNEMPLOYMENT(a)

	LOOKING FOR WORK (WEEKS) IN 1995–96.........................	
Characteristics in 1995	*1–9 and did not look*	*10–44 and 45–52*
	Mean	Mean
Age (years)	26.7	27.9
Education (years)	10.3	10.0
Never worked (%)	6.4	29.6
Looking for work (includes while working) in 1994–95 (days)	69.9	249.6
Looking for work since first left full-time education (years)	0.9	2.7
Looking for work only in 1994–95 (days)	54.2	239.2
Family member unemployed (%)	11.4	30.8
Family member unemployed for 12 months or more (%)	3.6	23.4
Socioeconomic index for area or residence (deciles)(b)	4.6	4.4
Moved area (%)	22.1	18.5
	no.	no.
Sample size	44	32
Weighted estimate	313 900	163 000

(a) The sample sizes in this table are small and the standard errors associated with the estimated means are large. The focus should be restricted to the basic patterns across each row. The definition of looking for work used in this table is 'looking only'.

(b) The lower the mean value, the greater the disadvantage of the area of residence.

Age, educational attainment and prediction errors

The discussion will first focus on those who were predicted to have a high risk of unemployment in 1995 and their labour market performance in the subsequent period. From table 6.5, there appears to be very little difference in age and educational attainment between those who allocated little time and those who allocated a large amount of time to job search activities.[4] In contrast, factors relating to the respondent's labour market history and family circumstances vary considerably across the duration of looking for work categories.

Labour market history and prediction errors

With regard to the respondent's labour market history, several patterns can be observed. First, there is a direct association between previous employment experience and duration of looking for work among this group predicted to be at high risk of unemployment. Hence, there is a much higher percentage of those who spent a large amount of time looking for work who had no previous employment experience (30%) compared to those who allocated only a small proportion of their time to job search activities (6%). Second, individuals predicted to be at high risk of unemployment who spent only 1–9 weeks looking for work or who did not look for work during 1995–96 allocated 70 days to job search in the previous year. In comparison, those in the high-looking category (i.e. 10–44, 45–52 weeks) spent more than two-thirds of the previous year (250 days) looking for work. Most of this job-seeking activity was undertaken while the individuals were without work. Hence, high-risk individuals in the high-looking category spent 239 days in the previous year looking for work compared to 54 days for those in the low-looking category (i.e. 1–9 weeks, did not look for work). These results suggest that any deficiencies in the risk-assessment approach rest with the failure to predict accurately the employment status at the time of the 1995 survey rather than with some inherent instability in labour market experiences that renders a deterministic approach to the study of unemployment unworkable. The 'scar' effect of unemployment, or alternatively the inertia in worker behaviour, appears to make the risk index approach tractable. All that is needed is a better model with which the probability of being unemployed can be predicted, and the incorporation of information on the person's labour market history into the model of unemployment seems to be a way forward.

Family circumstances and prediction errors

With regard to family circumstances, table 6.5 shows that there is a direct association between having family members unemployed and the duration of looking for work. Hence, 31% of high-risk individuals who spent a disproportionate amount of time job seeking had family members who were unemployed. Moreover, 23% of these respondents had family members who had been unemployed for over 12 months. In comparison, among those who spent 1–9 weeks looking for work or those who did not look for work, only 11% were in a family with members who were unemployed and 4% were in a family with members who had been unemployed for more than 12 months.

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[4] This outcome is to be expected, given that both age and educational attainment are used in the construction of the index of the risk of unemployment. The data for these variables are presented in tables 6.5 and 6.6 for the purpose of illustration only.

Regional characteristics, worker mobility and prediction errors

Table 6.5 reveals that individuals predicted to be at high risk of unemployment who allocated little time to job search are more likely to have moved area or State or Territory of residence and tend to reside in high socioeconomic status areas. However, the link between socioeconomic aspects and worker mobility, and the duration of looking for work is relatively weak.

Summary

In summary, individuals who were predicted to have a high risk of being unemployed and yet spent little time looking for work in the following period are those who are more likely to have worked before. Moreover, they tend to have favourable labour market history in that they have spent little time job seeking in previous years. These individuals are less likely to have family members who are unemployed. Worker mobility and the socioeconomic status of the area of residence do not appear to have much bearing on the negative (favourable) prediction errors in the model of unemployment.

6.6 LABOUR MARKET PARTICIPANTS AT MODERATE OR LOW RISK OF UNEMPLOYMENT(a)

	LOOKING FOR WORK (WEEKS) IN 1995–96	
Characteristics in 1995	*45–52*	*1–44 and did not look*
	Mean	Mean
Age (years)	37.5	36.8
Education (years)	11.4	12.9
Never worked (%)	7.5	1.8
Looking for work in 1994–95 (includes while working) (days)	263.9	30.5
Looking for work since first left full-time education (years)	3.2	0.5
Looking for work only in 1994–95 (days)	255.4	17.3
Family member unemployed (%)	16.6	5.8
Family member unemployed 12 months or more (%)	6.4	1.5
Socioeconomic index for area of residence (deciles)(b)	4.8	6.1
Moved area (%)	17.2	6.9
	no.	no.
Sample size	47	1 522
Weighted estimate	169 700	7 822 500

(a) The sample sizes in the first column of this table are small and the standard errors associated with the estimated means are large. The focus should be restricted to the basic patterns across each row. The definition of looking for work used in this table is 'looking only'.

(b) The lower the mean value, the greater the disadvantage of the area of residence.

Prediction success and failure for the moderate and low-risk groups

The second part of this subsection focuses on individuals who were predicted to have moderate or low risk of being unemployed and spent a considerable time (i.e. 45–52 weeks) looking for work in the subsequent period. Data for this group (of positive or unfavourable prediction errors) and for the balance of the moderate and low-risk categories are presented in table 6.6. The first point to note about table 6.6 is that the mean values for the age and educational attainment characteristics are greater than in table 6.5 (for the high-risk group). This is a reflection of the negative association between these characteristics and the risk of unemployment. The second point to be noted is that there is little difference in the respondent's age between the two groups distinguished in table 6.6, but individuals who spent 45–52 weeks job seeking have 11 years of education compared to 13 years for those who spent less time in job search or those who did not look for work. Again, this finding is associated with the way the index of risk has been constructed, and the mix of 'low' and 'medium' risk individuals in the extreme job search category. Consequently, the differential in educational attainments observed in table 6.6 has no implications for refining the model of unemployment.[5]

Labour market history and prediction errors

The third, and most important, aspect of table 6.6 is that for those classified as having a moderate or low risk of being unemployed there is a strong link between the employment history, the history of job seeking and the duration of job search. With regard to the individual's employment experience, for those in the high-looking category, 8% have never worked before compared to 2% of those in the low-looking category. The duration of job search measures show that individuals predicted to be at moderate or low risk of unemployment who allocated 45–52 weeks to job seeking during 1995–96 actually had also spent most of the previous year looking for work (264 days looking for work under the first measure that includes job search while working and 255 days looking for work while not working). In comparison, those who spent less time engaged in job search or who did not look for work only spent 31 days in the previous period looking for work under the more encompassing measure of job search that includes looking for work while working, and 17 days job seeking while not working. In addition, the duration of job search over the interval since the individual first left full-time education varies directly with current job-seeking activities. In this instance, those who engaged in long spells of job search spent more years (three years) looking for work after they completed full-time education than those who did not engage in lengthy periods of job search (less than one-half of a year). These data therefore suggest that those who were predicted to be at moderate or low risk of being unemployed and who spent a large amount of time looking for work during the 1995–96 reference period must actually possess characteristics that could be used to classify them as at a high risk of unemployment. Whether these are observed (measurable) or unobserved (unmeasurable) is another matter. The important point is that, as argued previously, the deficiencies identified thus far in the risk index approach rest with the failure to predict accurately the employment status at the time of the 1995 survey. They do not appear to be due to some inherent instability in labour market experiences. Indeed, so far as labour market experiences are concerned, the contrary

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[5] The data are presented simply to illustrate the workings of the risk-assessment approach.

Labour market history and prediction errors *continued*

is the case: these seem to be remarkably stable across time. Accordingly, a deterministic approach that uses information on past labour market experience seems to have much to recommend it. This information can be used as a proxy for the host of influences (e.g. attitude, appearance, ability) that are unobserved by the researcher and which influence labour market outcomes.

Family circumstances and prediction errors

The discrepancy between predicted and actual labour market outcomes can also be explained by family circumstances. Of the individuals predicted to be at a low or moderate risk of unemployment who ended up spending 45–52 weeks job seeking, 17% and 6% had family members who were unemployed and had been unemployed for more than 12 months, respectively. In comparison, among those who spent less time in job search, 6% and 2%, respectively, had family members who were unemployed and who had been unemployed for more than 12 months.

Regional characteristics, worker mobility and prediction errors

Finally, there appears to be a strong association between the area of residence and duration of job search among the low and moderate risk of unemployment groups. Individuals who allocated a large amount of time to job search tend to reside in areas with a value of the socioeconomic index that is much lower than that of those who spent only little time in job search. In addition, the former are more likely to have moved area or State or Territory of residence (17% had moved compared to 7% of those from the low-looking category). These characteristics of the 'prediction errors' among the lower risk of unemployment groups contrast with the findings reported earlier in relation to the 'prediction errors' among the high-risk groups. The implication of this is that people with characteristics that would usually ensure job success who live in 'poor' neighbourhoods are likely to take on the characteristics of their neighbourhood. In contrast, people with characteristics that would usually trap them in unemployment cannot escape this predicament through residence in a higher socioeconomic status neighbourhood. This apparent asymmetry is interesting, and worthy of further research.

Summary

Overall, respondents who were predicted to have a moderate or low risk of being unemployed and who engaged in extensive job search activities have low levels of education. They are more likely to have no previous employment experience, and to have spent more time job seeking in the previous period as well as over the interval since they first left full-time education. These individuals are more likely to have family members who are unemployed, and they are also more likely to have moved area of residence and to reside in low socioeconomic areas.

Lessons from the study of prediction errors

Several major implications can be derived from this study of positive (unfavourable) and negative (favourable) prediction errors. First, there are quite powerful links between labour market history and subsequent unemployment experience (in this study job search activity over a one-year period during 1995–96). Hence, the investigation in this section shows that the risk index approach has merit, in that if one could predict unemployment status at one point in time with a high degree of

Lessons from the study of prediction errors *continued*

confidence then this would be a useful forecast of subsequent unemployment experience. Attention needs, however, to be devoted to enhancing the predictive capability of the model of unemployment, as the study of prediction errors has shown that it is deficiencies in the underlying model of unemployment rather than inherent instability in the processes governing labour market outcomes that is the main contributor to shortfalls in the risk-assessment approach to unemployment. In this regard, the study of prediction errors is a useful way to proceed.

Second, the detailed comparison of the correct and incorrect predictions for the group assessed to be at a high risk of unemployment has indicated that there are strong positive links between the respondent's history of job search activities and the current duration of job search. There are also obvious associations between family circumstances and the duration of job seeking. These findings indicate that these variables should be included in the analysis of unemployment. Third, similar patterns can be observed from analysis of the correct and incorrect predictions for those who were assessed as having a moderate or low risk of being unemployed. In addition, the characteristics of the region as well as the respondent's mobility were shown to be important to the explanation of the prediction errors in this instance. Therefore, inclusion of these factors in the conventional model of unemployment would improve the model and make the risk index approach more viable.

In summary, the examination of the ability of the model of unemployment reported in section 4 to predict subsequent unemployment status revealed that individuals predicted to be at risk of unemployment in 1995 spent more time looking for work in 1995–96 than individuals suggested to be at little risk of unemployment. However, a sizeable number of those who were assessed to be at a high risk of being unemployed in fact enjoyed considerable employment success in the year following the risk assessment, as measured by the limited length of time they spent looking for work. Similarly, among those who were assessed as at moderate or low risk of being unemployed, there was a disconcerting number who spent a long time looking for work during 1995–96.

Potential improvements to the risk index approach

Are there any factors that are associated with those who were predicted to be at high risk of unemployment and yet experienced a good labour market outcome in 1995–96 that can be used to improve the model of unemployment (and its predictive ability)? Conversely, are there factors associated with those who were predicted to have little risk of unemployment who engaged in considerable job search in the subsequent period that can be usefully incorporated into the model of unemployment? The analyses reported above suggest that variables for labour market history, characteristics of the family and region of residence are quite useful candidates for consideration for inclusion in a model of unemployment.

NEED FOR AN IMPROVED MODEL OF UNEMPLOYMENT

The analyses in the preceding section have established two important facts. First, there is considerable stability over time in labour market patterns. Individuals unemployed at one point in time are likely to also be unemployed in subsequent time periods. This suggests that a deterministic approach to modelling and forecasting unemployment in the Australian labour market should be possible. In particular, if one can accurately predict unemployment at one point in time, then it should be possible to use the same model to predict reasonably accurately unemployment in adjacent time periods. Second, the analysis of the differences between actual and predicted labour market outcomes reveals a large number of cases where the model of unemployment was deficient. In other words, the underlying unemployment model needs to be improved if the risk index approach proposed is to be viable. The analyses identified the respondent's labour market history, family circumstances and regional characteristics as important factors that need to be considered for inclusion in a modified unemployment model. Of these, the preliminary examination of labour market patterns suggests that the respondent's labour market history is the more important factor. This importance is reflected in the emphasis given to labour market history variables in the modifications to the model of unemployment presented in this section.

This section is organised into three subsections. In the first subsection, given the apparent importance of information on labour market history to current labour market outcomes, some introductory comments are provided on inertia models. These models provide a theoretical basis for the specification of the estimating equation proposed in this section. In the second subsection, an augmented model of unemployment is estimated and the results are compared to those from the conventional model of unemployment. The third subsection repeats the application of the estimates of the model of unemployment to the risk index approach to identify those at risk and not at risk of being unemployed. The results from this analysis are compared with previous findings (from section 5) in order to determine the contribution made by the model augmentations.

INERTIA MODELS

Many of the models used by economists to explain individuals' work behaviour (e.g. labour market participation, unemployment) focus on factors that pertain at a point in time. Hence, in standard models of labour market participation, the individual's decision to work could depend on the difference between the offered wage (i.e. the going rate of pay for the person's set of skills) and the asking or reservation wage (i.e. the minimum wage at which the individual would be prepared to work). The offered wage reflects the individual's productivity as perceived by potential employers. The reservation wage reflects the individual's tastes and preferences concerning work, and family and personal constraints that would make working costly. Similarly, in models of unemployment, a person who has entered the labour market is argued to be unemployed where the reservation wage exceeds the offered wage. In each case, the standard model is best thought of as an explanation of the labour market outcome at one point in time.

INERTIA MODELS *continued*

However, it has been observed in some empirical research (e.g. Nakamura & Nakamura 1985) that the work behaviour of individuals is characterised by inertia. That is, individuals normally remain in the same labour market activity over time unless there are major changes (e.g. child status, health status, wage rates) that would cause them to revise their work behaviour. Hence, individuals' current labour market activity is partly influenced by their activity in the previous year. This continuity is taken into account in inertia models of labour market behaviour.

Specification of inertia models

Inertia models can be thought of as a variant of the first-difference model that has been used to eliminate fixed effects in some of the literature (see, e.g. Ashenfelter & Krueger 1994). The variation considered is that in the inertia model of labour market behaviour, a lagged dependent variable is included as an explanatory variable. For example, the respondent's offered wage can be expressed as a function of the wage earned in the previous period, among other variables. Likewise, the number of hours worked in the current year can be expressed as a function of the number of hours worked in the previous year as well as of the variables for educational attainment, age, marital status etc. that are generally used to explain variation in hours of work. In a similar manner, the person's unemployment experience in the current period can be related to the person's duration of unemployment in the previous period in addition to the usual set of determinants of unemployment. Inertia models can be viewed as allowing researchers to determine whether the individual's current work activity differs from what was observed in the previous period.

The inclusion of a lagged dependent variable in the inertia model is also important from another perspective. It permits the researcher to control for any fixed or person-specific effects that are embedded in that variable. This is a major advantage given that it was argued previously that there were strong correlations in labour market patterns over time and yet the conventional model of unemployment leaves a considerable portion of the variation in the incidence of unemployment in the Australian labour market unexplained.

Inertia models in the literature

The limited labour market literature that has employed inertia models has shown that they have the capacity to enhance considerably the predictability of labour market outcomes. For example, Nakamura and Nakamura (1985) used inertia models in a study of the labour market supply of men and women. They conclude (p. 368) 'One of the main findings to emerge from this study is that observable factors such as age, education and child status explain relatively little of the variation in the current work behaviour … after controlling for work behaviour in the previous year'. Moreover, the unobservables captured via the inclusion of the lagged information (p. 369) 'persist over periods of years'. The models of youth unemployment estimated by Miller and Volker (1987) and Junankar and Wood (1992) that have a focus on the 'scar' effect of unemployment also fall into the category of inertia models, though they have not been interpreted from this perspective. Reinterpreting the result that past periods of unemployment affect the current probability of being unemployed from the perspective of the inertia model of Nakamura and Nakamura (1985) suggests that the unobserved factors that influence

Inertia models in the literature *continued*

labour market behaviour are quite important in the Australian labour market. Moreover, the pattern of effects reported in Junankar and Wood (1992) indicates that more recent labour market experience is more important in this regard than more distant labour market experience. This is consistent with the finding reported by Nakamura and Nakamura (1985) that only recent labour market history is important in forecasting current labour market activity.

Application of the inertia model to the Survey of Employment and Unemployment Patterns data

The inertia model will be used in this study in an attempt to develop our understanding of the determinants of the probability of being unemployed. In the modified unemployment model, the probability of being unemployed in the current period is expressed as a function of human capital and regional characteristics and a set of variables that record the individual's labour market history. These variables include previous employment experience, the number of years the individual has looked for work since he/she first left full-time education, and the number of days during the wave one reference period the individual looked for work while not working. The statistical significance or otherwise of these three new model terms will show whether the 'scar' effect that was reported as a key feature of the youth labour market in the 1980s by Miller and Volker (1987) and Junankar and Wood (1992) is also an important aspect of the adult labour market during the 1990s. Equivalently, the statistical significance of these variables can be interpreted as showing whether the person-specific unobservables that are embedded in the labour market history variables are important. And finally, statistical significance of the new terms in the model will indicate the need for adopting inertia models in the study of unemployment. To the extent that the results show that dynamic models are needed for a successful study of the basic patterns evident in the unemployment data reviewed above, the study will demonstrate the importance of empirical researchers having access to longitudinal data.

The specification of the model of unemployment adopted here also includes variables for the unemployment status of the person's family and the socioeconomic index for the region of residence. The inclusion of variables for the unemployment status of the person's family will enable an assessment of the extent to which unemployment is concentrated in particular family units. Miller (1997, 1998) argues that a feature of the unemployment problem in Australia in the 1990s is that there has been a growth in the number of families where multiple members are unemployed. This inequality in the way the burden of any given rate of unemployment is shared is argued to create a greater social problem than in situations where unemployment is spread more widely throughout society. The greater intensity of the unemployment problem can arise where there are reinforcing tendencies created where more than one family member is unemployed. Such tendencies would lead to ghettos of social and economic disadvantage.

Differences across regions in general social and economic standing are accounted for in the modified model through the inclusion of a variable for the socioeconomic index of the region of residence. Higher values on this index represent higher socioeconomic status neighbourhoods. Hence the coefficient on this variable is expected to be negative.

Application of the inertia model to the Survey of Employment and Unemployment Patterns data *continued*

A final variable that is included in the model is a variable for the individual's mobility status. This variable has a value of one where the respondent has moved area, State or Territory of residence during the period under review. As noted in Miller (1998), there is a question of causation to be addressed with respect to this variable. That is, does mobility lead to differences in unemployment outcomes? Or do differences in unemployment outcomes lead to mobility, as defined here? It is quite possible that people who are prepared to move experience relatively low unemployment compared to those who do not move. Hence, while the mobility variable is an interesting addition to the model of unemployment, for both statistical (the issue of endogeneity) and economic reasons, the variable is not expected to have a major influence on the probability of being unemployed.

EMPIRICAL RESULTS

Findings from an augmented model of unemployment

The results from an augmented model of unemployment are presented in this section. In the first instance the estimates of the logit model that reflects the larger set of variables are listed and discussed. These results are compared to those from the conventional model of unemployment estimated in section 4. Following this, the new set of estimates is used to classify individuals into those at risk and not at risk of being unemployed. The extent to which the modified model of unemployment represents a genuine improvement is ascertained through a detailed examination of the actual labour market performance in the year following the predictions for respondents in each risk category.

Goodness of fit of the augmented model

The empirical results from the augmented model of unemployment are presented in table 7.1. The diagnostic tests indicate that the augmented model of unemployment performs reasonably well. Thus, the χ^2 statistic indicates the variables are jointly significant in explaining changes in the unemployment probability. The McFadden R^2 value of 0.49 shows that a relatively high proportion of the unemployment probability is explained by the variables in the model. This value is relatively large compared to that of the conventional model of unemployment (see table 4.3 where the value computed was 0.13) and other models of this nature. With regard to the prediction success, this model can correctly predict 94% of the cases. This is an improvement of three percentage points on the unemployment model estimated in section 4. Recall that a random assignment to the categories of employed and unemployed using the sample unemployment rate to guide the relative proportions in each group would have a prediction success of 86%. Hence, the augmented model has a reasonably satisfactory performance.

Departures from earlier findings

With regard to the impacts of the coefficients on the unemployment probability, several outcomes can be noted. First, educational attainment and English proficiency, two variables that had an important influence on unemployment outcomes in the initial specification of the unemployment model, are insignificant determinants of the unemployment probability in the dynamic specification of the model adopted here.

Departures from earlier findings *continued*

This is similar to the finding of Nakamura and Nakamura (1985) that a number of observable factors that are usually linked to labour market outcomes were insignificant once the factors embedded in the person's lagged labour market behaviour were held constant.

7.1 LOGISTIC ANALYSIS OF THE PROBABILITY OF BEING UNEMPLOYED, The Augmented Model of Unemployment—1995

Variable	Coefficient	t-ratio	$\partial U/\partial X_k$(a)
Intercept	–0.218	–0.14	..
Female	0.221	0.82	1.60
Age	–0.241	–2.79	–1.74
Age^2/100	0.263	2.31	1.91
Separated/divorced/widowed	1.062	2.17	7.69
Never married	0.117	0.32	0.85
Disability	0.654	2.25	4.74
Major urban	–0.637	–1.14	–4.62
Other urban	0.254	0.74	1.84
Rural	0.521	1.40	3.77
Bachelor degree or higher	0.136	0.27	0.98
Undergraduate or associate diploma	–0.672	–1.02	–4.86
Skilled vocational qualification	0.054	0.13	0.39
Basic vocational qualification	–0.292	–0.44	–2.11
Attended highest level of secondary school	–0.437	–1.02	–3.17
Left school aged 16 years and over	–0.124	–0.3	–0.90
Born in main English-speaking country	–0.639	–0.84	–4.63
Born in other country	0.774	1.00	5.61
Indigenous status	–0.208	–0.22	–1.50
Speaks English very well/well	–0.017	–0.03	–0.12
Speaks English fairly well/not well/not at all	–0.534	–0.64	–3.87
Period of residence	0.005	0.20	0.03
Never worked	0.579	1.21	4.19
Looking for work only 1994–95	0.015	12.69	0.11
Looking for work since first left full-time education	0.149	2.01	1.08
Family member unemployed	0.894	1.94	6.48
Family member unemployed 12 months or more	–0.611	–0.79	–4.42
Socioeconomic index for area of residence	0.071	1.52	0.51
Moved area	0.455	1.30	3.30
χ^2(28)	482.93	..	..
McFadden R^2 (b)	0.49	..	..
Prediction success	93.80	..	..

			no.
Sample size			1 782
Weighted estimate			8 451 300

(a) This column lists the partial effect of an exogenous variable on the probability of being unemployed.

(b) The McFadden R^2 is calculated as $1 - (l_m/l_o)$, where l_m = the maximised log-likelihood value of the model and l_o = the log-likelihood value if the non-intercept coefficients are restricted to zero (see Veall & Zimmermann 1996).

Similarities to earlier findings

Second, the variables that remain statistically significant across model specifications include age, disability and marital status. With regard to the age variable, there is a non-linear relationship between age and the probability of being unemployed. Thus, evaluated at 20 years, for each extra year of age, *ceteris paribus*, the probability of unemployment decreases by one percentage point. At 40 years it decreases by 0.2 of a percentage point, and at 46 years the unemployment probability increases by 0.01 of a percentage point per year of age. This is consistent with the results obtained from the conventional model of unemployment (compare tables 4.3 and 7.1).

The effect of disability on the individual's unemployment probability is positive. Thus, compared to individuals with no disability, those with a disability are five percentage points more likely to be unemployed. The direction of impact and magnitude are both similar to those in the conventional unemployment model.

The table 7.1 results show that the impact of marital status on the unemployment outcome varies considerably across the marital states. Compared to married persons, those who are separated, divorced or widowed are eight percentage points more likely to be unemployed. In comparison, there is no statistical difference between the unemployment outcome of those who have never married and married persons. Note, however, that the discussion of the implications of marital status for the unemployment outcome in section 2 did not provide any evidence that would lead one to expect a strong relationship.

Third, only three of the seven model terms introduced in this section are significant at the 10% level or better. Of these, two are labour market history variables and the third is the variable for whether a family member is unemployed. The other new variables, namely whether the individual had worked previously, whether a family member has been unemployed for more than 12 months, socioeconomic status of the area of residence and whether the individual has moved area of residence, are not significant influences on the unemployment outcome.

Labour market history in the augmented model

With respect to the labour market history variables, the two variables measuring the duration of job seeking significantly affect the unemployment outcome. With regard to the first measure of job search, the table 7.1 results show that the probability of being unemployed increases by 0.1 of a percentage point with each extra day the individual looked for work in the reference period. This is in fact a quite powerful influence. The extent to which the job-seeking activity in the previous reference period affects the probability of being unemployed can be easily seen if the probabilities of being unemployed are predicted for various levels of job seeking. Table 7.2 contains relevant predictions. For example, individuals who spent 50 days looking for work in the reference period have a predicted rate of unemployment of 15%. In comparison, those who spent about four-fifths of the year (300 days) job seeking in the reference period have a predicted unemployment rate of 89%.

7.2 PREDICTED UNEMPLOYMENT RATE AT THE TIME OF THE 1995 SURVEY, Duration of Job Seeking

Days looking for work in 1994–95	*Predicted unemployment rate(a)* %
0	7.9
50	15.4
100	27.9
150	45.1
200	63.6
250	78.8
300	88.8

(a) The predictions have been normalised so that a person who did not look for work in 1994–95 has the mean unemployment rate.

Source: Authors' calculations from estimates presented in table 7.1.

The second measure of job seeking is the number of years the individuals have looked for work since they first left full-time education. Thus, an extra year of job seeking since the individual first left full-time education increases the probability of being unemployed by one percentage point. These results indicate that unemployment is characterised by inertia. That is, the current unemployment outcome is directly linked with the lack of success in finding employment in the previous period. Hence, this inertia or 'scar' effect is quite dominant in the Australian labour market.[1] Moreover, the results reinforce another of the findings reported by Nakamura and Nakamura (1985), namely that it is the individual's more recent labour market history that is the more important influence on current labour market outcomes. Thus, whereas the variable for the individual's labour market performance in the previous year has a 't' value of 12.69, that summarising the labour market performance since the person first left full-time education is at the margin of significance. It is also noted that the variable for whether the individual had ever worked is insignificant ('t'=1.21). This variable is defined to equal one where the individual had held a part-time or full-time job since 1994 and is set to zero otherwise. Hence, it provides only a crude indication of the extent of labour market involvement, and its low information content relative to the two labour market history variables that are measured on a continuous scale is presumably what is being reflected in the different statistical significance of the variables.

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[1] As discussed previously, the labour market history variables can capture the influence on labour market outcomes of a range of factors (e.g. motivation, attitude, dress) as well as the 'scar' effects that are conventionally associated with the link between current unemployment and previous spells of unemployment.

Family circumstances in the augmented model

The impact of family circumstances on the probability of an individual being unemployed is significant at the 10% level. Thus, compared to individuals with no family members who were unemployed, those with family members who were unemployed are six percentage points more likely to be unemployed. Therefore, the individual's current unemployment outcome is influenced by the reinforcing effect of unemployment within the family unit.[2]

In summary, the modified model of unemployment is dominated by the statistical significance of the lagged 'looked for work' variable. This finding is similar to that reported by Miller and Volker (1987). It suggests that dynamic models of labour market processes may be important to an understanding of unemployment outcomes in the Australian labour market. However, the extent to which the dynamic model dominates the static model that does not include information on the person's labour market history may perhaps be best assessed through applying the risk index approach outlined previously.

A revised risk index

Using the risk index approach, the estimates from table 7.1 can be used to categorise individuals into those at risk and those not at risk of being unemployed. A threshold value of $T^* = -0.46$ gives the same percentage (8%) of the sample categorised as being unemployed as in section 5. The selected characteristics of those at risk and not at risk of being unemployed are presented in table 7.3.

Main characteristics of the risk groups

The data in table 7.3 show clear trends across the risk categories. First, the at-risk group is dominated by individuals aged 15–24 years. In contrast, the not-at-risk group comprises mainly those aged 30–39 years. Second, among those at risk of being unemployed, 31% left school before their sixteenth birthday while another 27% left school at age 16 years or higher but did not attend the highest level of secondary school. The most frequent educational attainment among those not at risk of unemployment is skilled vocational, with 22% of the group possessing this level of educational attainment. Third, both risk groups have similar representations of individuals who do not speak English at home but have a 'Good' command of English (14%). However, there is a higher percentage of those at risk of being unemployed whose English proficiency is self-reported as 'Poor' (12%) compared to those not at risk of being unemployed (3%). While these data reveal a strong association between human capital characteristics and labour market success, the difference in the levels of educational attainment and English proficiency across risk categories are less pronounced in this table compared to that reported in table 5.1. This is consistent with the relatively weak influence of these factors on the unemployment outcome reported in table 7.1.

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[2] An alternative model was estimated where the individual's labour market history variables were omitted. The impact on the individual's unemployment outcome of having family members who were unemployed is positive and significant at the 5% level in this alternative specification. In contrast, the impact on the individual's unemployment outcome of having family members who were unemployed for more than 12 months remains insignificant. These results suggest that family circumstances may play a secondary role in the determination of unemployment outcome of individuals.

7.3 GROUPS CATEGORISED AT RISK OF UNEMPLOYMENT AND NOT AT RISK OF UNEMPLOYMENT USING THE AUGMENTED MODEL—1995

Characteristic	At risk....................		Not at risk................	
	Mean	Standard deviation	Mean	Standard deviation
15–19 (years)	18.9	39.2	5.8	23.5
20–24 (years)	22.0	41.6	11.3	31.6
25–29 (years)	15.0	35.8	12.5	33.1
30–34 (years)	10.0	30.1	14.8	35.5
35–39 (years)	6.2	24.1	14.9	35.6
40–44 (years)	11.0	31.4	13.8	34.5
45–49 (years)	5.2	22.2	11.7	32.2
50–54 (years)	5.6	23.1	10.1	30.1
55–59 (years)	6.1	24.1	5.2	22.1
Bachelor degree or higher (%)	4.3	20.3	16.9	37.5
Undergraduate or associate diploma (%)	4.9	21.7	9.9	29.9
Skilled vocational qualification (%)	8.0	27.2	22.1	41.5
Basic vocational qualification (%)	4.2	20.1	5.4	22.6
Attended highest level of secondary school (%)	20.6	40.6	15.8	36.5
Left school aged 16 years and over (%)	26.7	44.4	15.4	36.1
Left school aged 15 years and under (%)	31.4	46.6	14.4	35.2
Speaks English very well/well (%)	13.5	34.3	14.0	34.8
Speaks English fairly well/not well/not at all (%)	12.0	32.6	2.5	15.7
Days working in 1995–96 (no.)	166.5	142.8	342.8	68.9
Days looking for work in 1995–96 (no.)(a)	212.6	153.9	28.9	86.2
Days looking for work only in 1995–96 (no.)(b)	174.6	141.1	10.0	47.3
Days absent from the labour market in 1995–96 (no.)	22.9	63.1	11.2	47.8
Looking for work episodes in 1995–96 (no.)	0.9	0.5	0.2	0.5
Episodes of labour market absence in 1995–96 (no.)	0.2	0.4	0.1	0.4
	no.		no.	
Sample size	140	. .	1 642	. .
Weighted estimate	605 200	. .	7 846 100	. .

(a) The number of days looking for work while working and looking for work while not working, 1996

(b) The number of days looking for work while not working, 1996.

Given the consistency of the trends in the data across model specifications (compare tables 5.1 and 7.3), it can be concluded that individuals predicted to be at risk of being unemployed are those in their teens or early 20s, who possess a low level of education and have poor English skills. In this regard, there may be a major role for labour market programs that enhance the skills of these individuals.

Labour market patterns of the risk groups

Information on the individuals' labour market patterns in the year following the predictions is also presented in table 7.3. The data in this table show that those who were classified as at risk of unemployment in 1995 spent considerable time looking for work in the following year. Thus, those at risk of being unemployed spent 213 days looking for work while working compared to only 29 days for those not at risk of unemployment. This is much higher than that predicted under the conventional model of unemployment (see table 5.2 which records a value of 122 days looking for work for those in the at-risk group). Moreover, the number of days spent looking for work while not working in the period following the predictions is much higher (175 days) for those at risk than for those not at risk (10 days) of unemployment. The duration of job search for those at risk is much longer than previously predicted (84 days), while the duration of job search for those not at risk of being unemployed is shorter than previously predicted (15 days). It is also apparent from the table 7.3 data that those classified as at risk of being unemployed are more likely to be absent from the labour market (23 days) compared to those not at risk (11 days). These estimates are similar to those from table 5.2.

The revised predictions in table 7.3 indicate that the labour market outcomes of those at risk of unemployment are, on average, less favourable than those reported in table 5.2. In this instance, individuals who are at risk of being unemployed spent 46% of the following year working, an estimate that is markedly lower than the 70% reported earlier. Therefore, the augmented model of unemployment has adjusted for some of the misleading forecasting. The labour market performance of those not at risk of being unemployed is, on average, similar to that predicted using the conventional model of unemployment. These individuals worked for 94% (343 days) of the following year.

Prediction errors from the revised risk index

A comparison of the performance of the augmented and benchmark models of unemployment can be undertaken by comparing their positive (unfavourable) and negative (favourable) prediction errors. Table 7.4 presents the distribution of those predicted to have a high, moderate and low risk of unemployment across the duration of looking for work categories for the augmented model of unemployment. The data in this table show that the modified unemployment model is able to predict more accurately the labour market performance of individuals. For example, only a small proportion (17%) of those predicted to have a high risk of unemployment engaged in only limited job-seeking activities (i.e. 1–9 weeks, did not look) in the period following the predictions, compared to over one-half of the sample reported in table 6.4. Conversely, most of those predicted to have a moderate or low risk of being unemployed spent limited time job seeking in the period after the predictions. Thus, only 2% of those predicted to have a moderate or low risk of being unemployed spent 45–52 weeks job seeking in the subsequent year, compared to 3% reported in table 6.4.

7.4 LABOUR MARKET PARTICIPANTS, Duration of Looking for Work Categories Using the Augmented Model

Risk level in 1995	LOOKING FOR WORK (WEEKS) IN 1995–96				
	45–52	10–44	1–9	Did not look	Total
	no.	no.	no.	no.	no.
High	34	29	6	7	76
Moderate	23	39	20	74	156
Low	4	40	60	1 309	1 413
Total	**61**	**108**	**86**	**1 390**	**1 645**
	'000	'000	'000	'000	'000
Weighted estimate(a)	233.9	452.7	516.8	7 265.6	8 469.0

(a) The estimates differ from table 6.4 due to the rounding of the risk index value.

Conclusion

In conclusion, the inclusion of additional variables (i.e. individual's employment history, family circumstances, regional characteristics) has improved the forecasting performance of the underlying unemployment model. In particular, the individual's labour market history and family circumstances are important to employment success. Since the prediction success of the unemployment model has improved, the risk index approach becomes more viable. This may be important to policy makers who wish to target labour market programs to enhance the skills of disadvantaged workers in a cost-effective manner.

SECTION **8** CONCLUSION ....

Studies of unemployment in Australia have generally identified human capital characteristics (e.g. age, educational attainment) and other personal and regional characteristics (e.g. area of residence, marital status) as major determinants of unemployment status. The empirical results from a consensus model of unemployment in the current study confirm the importance of these factors. Thus, age, educational attainment, English proficiency, marital status and disability status are reported to be significant determinants of unemployment outcomes in the Survey of Employment and Unemployment Patterns (SEUP). For example, there is a strong inverse relationship between educational attainment and the probability of being unemployed. Similarly, individuals who are proficient in English have lower predicted probabilities of unemployment than individuals with limited English skills. In contrast, the changes in the predicted rates of unemployment associated with age are quite moderate. These findings emphasise the importance of the acquisition of skills through formal training programs compared to the informal types of skills that age (or its broad equivalent, labour market experience) might represent.

The results from an empirical investigation of labour market outcomes can be used to identify individuals at risk of being unemployed. Two main approaches to computing a measure of risk are available. In the first approach the risk index can be calculated by applying all the coefficients from the model of unemployment to the characteristics of each individual. Under the second approach, termed a practical risk index, a set of points is determined for a limited set of characteristics, in much the same way as the immigration points system works. Regardless of the risk measure used, the findings of the current study show that the at-risk of unemployment group predominantly comprises individuals aged 15–24 years, who possess low levels of education (e.g. respondents who left school at 15 years or younger) and who are not proficient in English. The similarity of the categorisations under the alternative methods shows that the practical risk index approach, based on a set of points for a restricted set of characteristics, is viable.

One refinement to the risk index approach that can be considered is to vary the way that individuals are classified into risk categories. Hence, rather than base the categorisation on a simple dichotomy of 'at risk' and 'not at risk', the respondents can be further classified into very high, high, moderate and low risk of unemployment categories. Each of the successively higher risk groups have been shown in this study to comprise a greater proportion of the least skilled members of the workforce (defined as being less well-educated, not proficient in English, being young and having disabilities). It has also been shown that those who were predicted to be at a high risk of unemployment engaged, on average, in considerable job search activity in the subsequent year, while those predicted to be at a low risk of unemployment spent, on average, relatively little time in job search activity in the subsequent year. Moreover, individuals in the high-risk group spent less time working and more time out of the labour force than those classified at low risk of being unemployed.

It has also been shown that those who spent a large amount of time looking for work during the 1995–96 reference period are more likely to have had no previous work experience and to have spent a greater amount of time looking for work in the previous year than individuals who did not engage in job search. They are also more likely to have had family members who were unemployed, or who had been unemployed for a long period of time. In addition, there is a high percentage of such individuals who have moved area of residence, and they tend to reside in areas of low socioeconomic status. This aggregate-level examination of the data thus revealed an inherent stability of unemployment experiences over time, a degree of commonality of unemployment experiences of family members, and a regional concentration of unemployment.

At the individual level, it has been reported that a large number of individuals who were predicted to have a high risk of being unemployed actually spent little time job seeking in the period after the predictions. Moreover, a number of individuals who were predicted to have a moderate or low risk of unemployment engaged in considerable job search activity in the year following the predictions. Study of the positive (unfavourable) and negative (favourable) prediction errors revealed that they are linked to the regional, family circumstances and, especially, labour market history factors discussed above.

Estimation of a model of unemployment that takes account of the individual's labour market history, family circumstances, mobility and socioeconomic status of the area of residence reveals that current unemployment outcomes are determined, in large part, by previous employment experience and job search activities. In other words, labour market outcomes are characterised by a considerable degree of inertia. The risk index approach based on this more encompassing model shows that the difference between actual and predicted labour market outcomes is relatively small. Hence, the risk index approach to the management of unemployment can be regarded as viable.

Several important implications can be noted from the empirical results of this study. First, the positive and highly significant relationship between previous job search activities and current unemployment suggests that the 'scar' effect or inertia in labour market outcomes is very important in the Australian labour market. To the extent that the relationship has its origin in a 'scar' phenomenon, then there is a tendency towards cumulative disadvantage in the labour market. Being unemployed today increases the likelihood of the person being unemployed tomorrow, leading to a concentration of the burden of unemployment. Where the link between past and present labour market outcomes is due to the 'unobservable' factors embedded in the lagged labour market performance variables, then there should still be a focus on those with a history of unemployment, as this is one of the more accurate indicators of potential disadvantage available to the researcher. There is also a need to attempt to better understand the factors that influence labour market outcomes and yet are not included in conventional economic models. The incorporation of non-survey information into the analysis (e.g. contactability, transport, personal factors), such as in DEETYA (1998), is one approach that appears to have much to recommend it. Widening the scope of the conventional economic analysis to include consideration of factors such as the usual type of work (Australian Institute of Multicultural Affairs 1985; Dex & McCulloch 1997) and the type of training and possession of a driver's licence (Dex & McCulloch 1997) might also assist.

Second, the risk index approach to unemployment assessment is viable. This means that disadvantaged workers can be identified with a high degree of success, hence enabling targetting of skill enhancement assistance if this is considered desirable. In this regard, to the extent that the evaluations conducted in this paper for a model of the probability of unemployment carry across to a model of the probability of long-term unemployment, the findings reported in this study suggest that the Job Seeker Classification Instrument outlined in DEETYA (1998) will be a valid instrument.[1]

Third, longitudinal data allow us to observe the dynamics of labour market behaviour. Because they permit consideration of the influence of lagged labour market activities on current labour market outcomes, longitudinal data allow for a far more encompassing approach to the study of unemployment outcomes than is possible with many of the data sets generally used in this type of research. The evaluation of the forecasting capability of the unemployment models that can be undertaken using the longitudinal data available in the SEUP has added a new dimension to the study of unemployment in Australia. This is a major strength of the SEUP database, and has demonstrated the value that can be added to research where longitudinal data are available.

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[1] The remarkable stability that characterises labour market outcomes in the intermediate term suggests that the findings from models of the probability of unemployment should carry across to models of the probabilities of long-term unemployment.

APPENDIX **1**   DEFINITION OF VARIABLES ....

Unemployment   This is a binary variable and has a value equal to one if the individual is not employed but is actively looking for work and is available to start work. In all other cases the variable is set equal to zero.

Age and its square   This is a continuous variable that measures the individual's age.

15–19

This is a dichotomous variable and is set equal to unity if the individual is 15–19 years of age. The variable is set equal to zero for all other individuals.

20–24

This is a dichotomous variable and is set equal to unity if the individual is 20–24 years of age. The variable is set equal to zero for all other individuals.

25–29

This is a dichotomous variable and is set equal to unity if the individual is 25–29 years of age. The variable is set equal to zero for all other individuals.

30–34

This is a dichotomous variable and is set equal to unity if the individual is 30–34 years of age. The variable is set equal to zero for all other individuals.

35–39

This is a dichotomous variable and is set equal to unity if the individual is 35–39 years of age. The variable is set equal to zero for all other individuals.

40–44

This is a dichotomous variable and is set equal to unity if the individual is 40–44 years of age. The variable is set equal to zero for all other individuals.

45–49

This is a dichotomous variable and is set equal to unity if the individual is 45–49 years of age. The variable is set equal to zero for all other individuals.

50–54

This is a dichotomous variable and is set equal to unity if the individual is 50–54 years of age. The variable is set equal to zero for all other individuals.

55–59

This is a dichotomous variable and is set equal to unity if the individual is 55–59 years of age. The variable is set equal to zero for all other individuals.

Education	This variable measures the years of educational attainment.
Bachelor degree or higher	This is a dichotomous variable and is set equal to unity if the individual possesses a higher degree, post-graduate diploma, or a bachelor degree. For individuals who do not hold these qualifications the variable is set equal to zero.
Undergraduate or associate diploma	This is a dichotomous variable and is set equal to unity if the individual possesses an undergraduate diploma or an associate diploma. For individuals who do not hold these qualifications the variable is set equal to zero.
Skilled vocational qualification	This is a dichotomous variable and is set equal to unity if the individual possesses a skilled vocational qualification. For individuals who do not hold these qualifications the variable is set equal to zero.
Basic vocational qualification	This is a dichotomous variable and is set equal to unity if the individual possesses a basic vocational qualification. For individuals who do not hold these qualifications the variable is set equal to zero.
Attended highest level of secondary school	This is a dichotomous variable and is set equal to unity if the individual has attended the highest level of secondary school and does not possess a post-secondary qualification. For individuals not meeting these criteria the variable is set equal to zero.
Left school at 16 years and over	This is a dichotomous variable and is set equal to unity if the individual left school at 16, 17 or 18 years of age and does not possess a post-secondary qualification. For individuals not meeting these criteria the variable is set equal to zero.
Left school aged 15 years and under	This is a dichotomous variable and is set equal to unity if the individual left school at 15 years of age or younger, or never attended school, and does not possess a post-secondary qualification. For individuals not meeting these criteria the variable is set equal to zero.
Never worked	This is a dichotomous variable and is set equal to unity if the individual has worked part time, full time or both prior to 5 September 1994. For individuals not meeting these criteria the variable is set equal to zero.
Number of days looking for for work only	This is a continuous variable that measures the number of days the individual spent looking for work while not working during the reference period. In some presentations the units of measurement are weeks.
Number of days of looking for work (includes while working)	This is a continuous variable that measures the number of days the individual looked for work either while working or as a specialist activity during the reference period. In some presentations the units of measurement are weeks.
Looking for work since first left full-time education	This is a continuous variable that measures the number of years the individual looked for work while not working since he/she left full-time education.
Number of days working	This is a continuous variable that measures the number of days the individual worked during the reference period. In some presentations the units of measurement are weeks.
Number of days absent from the labour market	This is a continuous variable that measures the number of days the individual was absent from the labour market during the reference period. In some presentations the units of measurement are weeks.

Looking for work episodes	This is a continuous variable that measures the number of times the individual looked for work during the reference period.
Episodes absent from the labour market	This is a continuous variable that measures the number of times the individual was absent from the labour market during the reference period.
Labour market experience	This is a continuous variable that measures the number of years in paid work since the individual first left full-time education. If the number of years in paid work is less than one year, it is assigned a value of one-half year.
Speaks English very well/well	This is a dichotomous variable and is set equal to unity if the individual speaks a language other than English at home and speaks English well or very well. Individuals not meeting these criteria are assigned a value of zero.
Speaks English fairly well/not well/not at all	This is a dichotomous variable and is set equal to unity if the individual speaks a language other than English at home and speaks English fairly well, not well, or does not speak English at all. Individuals not meeting these criteria are assigned a value of zero.
Married	This is a dichotomous variable and is set equal to unity if the individual is married or living in a de facto relationship. Individuals not meeting these criteria are assigned a value of zero.
Separated, divorced, widowed	This is a dichotomous variable and is set equal to unity if the individual is separated, divorced or widowed. Individuals not meeting these criteria are assigned a value of zero.
Never married	This is a dichotomous variable and is set equal to unity if the individual has never married. Individuals not meeting these criteria are assigned a value of zero.
Born in main English-speaking country	This is a dichotomous variable and is set equal to unity if the individual was born outside Australia in a main English-speaking country. Individuals not meeting these criteria are assigned a value of zero.
Born in other country	This is a dichotomous variable and is set equal to unity if the individual was born outside Australia in a non-English-speaking country. Individuals not meeting these criteria are assigned a value of zero.
Born in Australia	This is a dichotomous variable and is set equal to unity if the individual was born in Australia. Individuals who were born outside Australia are assigned a value of zero.
Indigenous status	This is a dichotomous variable and is set equal to unity if the individual is of Aboriginal or Torres Strait Islander origin. Non-Indigenous people are assigned a value of zero.
Disability	This is a dichotomous variable and is set equal to unity if the individual has a disability. The variable is set equal to zero for individuals without a disability.
Period of residence	This is a continuous variable that measures the years foreign-born individuals have resided in Australia. It is computed from the year of arrival in Australia. If the year of arrival is greater than zero then period of residence for the first wave is equal to 95.5 minus the year of arrival.
City	This is a dichotomous variable and is set equal to unity if the individual resides in a capital city. Individuals residing in other regions are assigned a value of zero for this variable.

Major urban	This is a dichotomous variable and is set equal to unity if the individual resides in a major urban area. Individuals residing in other regions are assigned a value of zero for this variable.
Other urban	This is a dichotomous variable and is set equal to unity if the individual resides in other urban areas. Individuals residing in other regions are assigned a value of zero for this variable.
Rural	This is a dichotomous variable and is set equal to unity if the individual resides in a rural area. Individuals residing in other regions are assigned a value of zero for this variable.
Socioeconomic index for area of residence	This is a continuous variable and measures the relative socioeconomic disadvantage in the region of residence in Australia. It is measured in deciles and so ranges from one to ten.
Family member unemployed	This is a dichotomous variable and is set equal to unity if the individual has one or more family member(s) who is (are) unemployed. Individuals who do not have any family members who are unemployed, those who do not have family members living with them who are 15 years of age or over, those who live by themselves and those living with non-family members have a value of zero for this variable.
Family member unemployed 12 months or more	This is a dichotomous variable and is set equal to unity if the individual has one or more family member(s) who is (are) unemployed for 12 months or more. Individuals who do not have any family members who are unemployed for 12 months or more, those who do not have family members living with them who are 15 years of age or over, those who live by themselves and those living with non-family members have a value of zero for this variable.
Moved area	This is a dichotomous variable and is set equal to unity if the individual has moved area of usual residence between 6 March 1995 and 3 September 1995 or changed State or Territory of usual residence since the recruitment interview (between 24 April 1995 and 7 July 1995). In the case of individuals not meeting these criteria the 'moved area' variable is set equal to zero.

APPENDIX **2**   **THE ROLE OF LABOUR MARKET EXPERIENCE**

Table A2.1 presents the results for the benchmark and augmented models of unemployment where a labour market experience variable is used in place of the age variable. Labour market experience is the number of years in paid work since first leaving full-time education. Several features of these models can be noted. First, the relationship between labour market experience and the probability of being unemployed is non-linear and significant. Second, as was the case with the model reported in the text, the inclusion of the individual's employment history, family circumstances, social and economic characteristics of the region, and the individual's mobility variables have reduced the impact of educational attainment on the probability of being unemployed. Thus, in the augmented model of unemployment, the impact of education on the unemployment outcome is insignificant.

A comparison of the results from the augmented models of unemployment (table 7.1) with those from the augmented model of unemployment in table A2.1 shows that they are very similar in terms of significance and magnitude. Thus, the individual's previous job search activities, having family members who were unemployed, marital status and disability status are significant in both models. In particular, the duration of prior job search remains highly significant across model specifications. The similarities of the results across model specifications suggest that using labour market experience in place of the individual's age makes little difference either to the overall performance of the model or to the impact of each of the variables on the unemployment outcome.

It is interesting to assess if the change in model specification affects the forecasting performance of the augmented unemployment model (table A2.1). Table A2.2 presents the distribution of individuals predicted to be at high, moderate and low risk of unemployment in 1994–95 across the duration of looking for work categories in 1995–96. A comparison between tables A2.2 and 7.4 (where the risk groups are formed using the model with age as a regressor) results shows that they are very similar. For example, the data in table A2.2 show that 17% of those who were predicted to have a high risk of being unemployed spent limited time job seeking (i.e. 1–9 weeks, did not look) in the year following the prediction. Likewise, the table A2.2 data show that around 2% of those predicted to have a moderate or low risk of being unemployed spent a disproportionate amount of time job seeking (i.e. 45–52 weeks) in the subsequent period. These results indicate that the change in the model specification considered in this Appendix makes little difference to the forecasting performance of the augmented model of unemployment.

A2.1 RESULTS FROM THE BENCHMARK AND AUGMENTED MODELS OF UNEMPLOYMENT, Using Labour Market Experience—1995

Variable	Benchmark Unemployment Model..........................		Augmented Unemployment Model..........................	
	Coefficient	t-ratio	Coefficient	t-ratio
Intercept	−1.054	−2.57	−3.849	5.80
Female	−0.328	−1.60	0.101	0.37
Experience	−0.176	−5.68	−0.116	−2.67
Experience^2/100	0.312	4.38	0.201	1.94
Separated/divorced/widowed	0.881	2.41	1.043	2.16
Never married	0.487	1.88	0.327	0.94
Disability	0.787	3.67	0.621	2.14
Major urban	0.524	1.53	−0.609	−1.09
Other urban	0.457	1.84	0.306	0.89
Rural	0.113	0.38	0.535	1.44
Bachelor degree or higher	−1.595	−4.04	−0.187	−0.38
Undergraduate or associate diploma	−1.248	−2.58	−0.845	−1.30
Skilled vocational qualification	−0.809	−2.53	0.007	0.02
Basic vocational qualification	−0.780	−1.55	−0.286	−0.43
Attended highest level of secondary school	−0.987	−3.15	−0.501	−1.16
Left school aged 16 years and over	−0.321	−1.13	−0.122	−0.30
Born in main English-speaking country	−0.246	−0.42	−0.701	−0.91
Born in other country	0.444	0.79	0.777	0.99
Indigenous status	0.173	0.26	−0.264	−0.29
Speaks English very well/well	0.248	0.62	−0.193	−0.33
Speaks English fairly well/not well/not at all	1.323	2.37	−0.663	−0.80
Period of residence	0.006	0.32	0.008	0.32
Never worked	(a)	(a)	0.618	1.27
Looking for work only 1994–95	(a)	(a)	0.015	12.71
Looking for work since first left full-time education	(a)	(a)	0.075	1.06
Family member unemployed	(a)	(a)	0.894	1.97
Family member unemployed 12 months or more	(a)	(a)	−0.627	−0.82
Socioeconomic index for area of residence	(a)	(a)	0.069	1.48
Moved area	(a)	(a)	0.506	1.44
	no.		no.	
Sample size	1 782	. .	1 782	. .
Weighted estimate	8 451 300	. .	8 451 300	. .

(a) The variables are not included in the benchmark unemployment model.

A2.2 DISTRIBUTION OF INDIVIDUALS BY RISK LEVEL(a),
Across Duration of Looking for Work Categories

Risk level in 1995	LOOKING FOR WORK (WEEKS) IN 1995–96......				
	45–52	*10–44*	*1–9*	*Did not look*	*Total*
	no.	no.	no.	no.	no.
High	33	32	6	7	78
Moderate	25	42	21	68	156
Low	3	34	59	1 315	1 411
Total	**61**	**108**	**86**	**1 390**	**1 645**
	'000	'000	'000	'000	'000
Weighted estimate	233.9	452.7	516.8	7 265.6	8 469.0

(a) Predictions based on the augmented model with labour market experience.

RELIABILITY OF ESTIMATES

Two types of error are possible in an estimate based on a sample survey; sampling error and non-sampling error. The *sampling error* is a measure of the variability that occurs by chance because a sample, rather than the entire population, is surveyed. Since estimates from the Survey of Employment and Unemployment Patterns (SEUP) data are based on information obtained from a sample of persons, they are subject to sampling variability; that is, they may differ from the estimates that would have been produced if all in-scope persons had been included in the survey. One measure of the likely difference is given by the *standard error* (SE), which indicates the extent to which an estimate might have varied by chance because only a sample of persons was included. Another measure of sampling variability is the *relative standard error* (RSE) which is obtained by expressing the SE as a percentage of the estimate to which it refers. The RSE is a useful measure in that it provides an immediate indication of the percentage errors likely to have occurred due to sampling, and thus avoids the need to refer also to the size of the estimate.

The imprecision due to sampling variability, which is measured by the SE, should not be confused with inaccuracies that may occur because of imperfections in reporting by respondents, errors made in collection such as in recording and coding data, and errors made in processing the data. Inaccuracies of this kind are referred to as the *non-sampling error* and they may occur in any enumeration, whether it be a full count or a sample. It is not possible to quantify non-sampling error, but every effort is made to reduce it to a minimum, as discussed in paragraph 35 of the Explanatory Notes of ABS (1997a).

Weighted estimates

Only weighted estimates with RSEs of 25% or less, and percentages based on such estimates, are considered sufficiently reliable for most purposes. However, estimates and percentages with larger RSEs have been included and are preceded by an asterisk (e.g. *3.4). For wave one of the SEUP, estimates from the Population Reference group which are below 75,200 have an RSE of more than 25%. For wave two, estimates from the Population Reference group which are below 83,200 have an RSE of more than 25%.

SEs associated with weighted estimates in this publication are available on request.

LIST OF REFERENCES ....

ABS   Australian Bureau of Statistics
DEETYA   Department of Employment, Education, Training, and Youth Affairs

Ashenfelter, O. & Krueger, A. 1994, 'Estimates of the Economic Return to
    Schooling From a New Sample of Twins', *American Economic Review,*
    vol. 84, no. 5, pp. 1,157–1,173.

Australian Bureau of Statistics 1993, *1991 Census—Socio-economic Indexes for*
    Areas, *Australia,* Cat. no. 1355.0, ABS, Canberra.

Australian Bureau of Statistics 1997a, *Australians' Employment and*
    Unemployment Patterns, 1994 to 1996, Cat. no. 6286.0, ABS, Canberra.

Australian Bureau of Statistics 1997b, *Australians' Employment and*
    Unemployment Patterns, Jobseekers, 1995, Cat. no. 6286.0, ABS, Canberra.

Australian Bureau of Statistics 1997c, *Labour Force, Australia, November,*
    Cat.no. 6203.0, ABS, Canberra.

Australian Institute of Multicultural Affairs 1985, *Reducing the Risk: Unemployed*
    Migrant Youth and Labour Market Programs, Australian Institute of
    Multicultural Affairs, Melbourne.

Beggs, J. J. & Chapman, B. J. 1988, 'The International Transferability of Human
    Capital: Immigrant Labour Market Outcomes in Australia', in *The Economics*
    of Immigration: Proceedings of a Conference, eds P. Miller & L. Baker,
    Australian Government Publishing Service, Canberra, pp. 143–157.

Blinder, A. S. 1976, 'On Dogmatism in Human Capital Theory', *The Journal of*
    Human Resources, vol. 11, no. 1, pp. 8–22.

Bradbury, B., Garde, P. & Vipond, J. 1986, 'Youth Unemployment and
    Intergenerational Immobility', *Journal of Industrial Relations,* vol. 28, no. 2,
    pp. 191–210.

Brooks, C. & Volker, P.A. 1985, 'Labour Market Success and Failure: An Analysis of
    the Factors Leading to the Workforce Destinations of the Australian
    Population', in *The Structure and Duration of Unemployment in Australia,*
    ed. P. A. Volker, Australian Government Publishing Service, Canberra,
    pp. 43–71.

Chiswick, B. R. 1978, 'The Effects of Americanization on the Earnings of
    Foreign-Born Men', *Journal of Political Economy,* October 1978,
    pp. 897–922.

Chiswick, B. R. & Miller, P.W. (1998), 'Language Skill Definition: A Study of
    Legalized Aliens', *International Migration Review*, vol. 32, no. 4, pp. 877-900.

Chiswick, B. R. & Miller, P.W. 1992, *Post-Immigration Qualifications in Australia: Determinants and Consequences,* Australian Government Publishing Service, Canberra.

Department of Employment, Education, Training and Youth Affairs 1998, *Job Seeker Classification Instrument,* Department of Employment, Education, Training and Youth Affairs, Canberra.

Dex, S. & McCulloch, A. 1997, *Characteristics of the Unemployed: Secondary Analysis of the Family and Working Lives Survey*, Department for Education and Employment, Research Report no. 32.

Graetz, B. 1992, 'Health Consequences of Employment and Unemployment', in *Youth in the Eighties: Papers from the Australian Longitudinal Survey Research Project,* eds R. G. Gregory & T. Karmel, Department of Employment, Education and Training, Canberra, pp. 352–371.

Greene, W. H. 1997, *Econometric Analysis,* third edition, Prentice Hall, New Jersey.

Harris, M. N. 1996, 'Modelling the Probability of Youth Unemployment in Australia', *Economic Record,* vol. 72, no. 217, pp. 118–129.

Inglis, P. A. & Stromback, T. 1986, 'Migrants' Unemployment: The Determinants of Employment Success', *Economic Record,* vol. 62, no. 178, pp. 310–324.

Jones, F. L. 1990, 'Economic Status of Aboriginal and Other Australians: A Comparison', in *Aboriginal Employment Equity by the Year 2000,* ed. J. C. Altman, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra, pp. 27–46.

Jones, F.L. 1992, *Occasional Paper: Sex and Ethnicity in the Australian Labour Market: The Immigrant Experience,* Cat. no. 6252.0, ABS, Canberra.

Junankar, P. N. & Wood, M. 1992, 'The Dynamics of Youth Unemployment: A Preliminary Analysis of Recurrent Unemployment', in *Youth in the Eighties: Papers from the Australian Longitudinal Survey Research Project,* eds R. G. Gregory & T. Karmel, Department of Employment, Education and Training, Canberra, pp. 282–304.

Le, A.T. & Miller, P.W. (1998), 'The ABS Survey of Employment and Unemployment Patterns', *Australian Economic Review,* vol. 31, no. 3, pp. 290–297.

Miller, P.W. 1986a, 'Unemployment Patterns in the Youth Labour Market', *Australian Economic Papers,* vol. 25, no. 47, pp. 222–235.

Miller, P.W. 1986b, 'Immigrant Unemployment in the First Year of Australian Labour Market Activity', *Economic Record,* vol. 62, no. 176, pp. 82–87.

Miller, P.W. 1989, 'The Structure of Aboriginal and Non-Aboriginal Youth Unemployment', *Australian Economic Papers,* vol. 28, no. 52, pp. 39–56.

Miller, P.W. 1990, 'Aboriginal Youth Unemployment', in *Aboriginal Employment Equity by the Year 2000,* ed. J. C. Altman, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra, pp. 79–90.

Miller, P.W. 1997, 'The Burden of Unemployment on Family Units: An Overview', *Australian Economic Review,* vol. 30, no.1, pp. 16–30.

Miller, P.W. 1998, 'Youth Unemployment: Does the Family Matter', *Journal of Industrial Relations,* vol. 40, no. 2, pp. 247–276.

Miller, P.W. & Chiswick, B. R. 1997, 'Literacy, Numeracy and the Labour Market', in *Aspects of Literacy: Assessed Skill Levels, Australia, May 1996,* Cat. no. 6286.0, ABS, Canberra, pp. 73–79.

Miller, P.W. & Neo, L. M. 1997, 'Immigrant Unemployment: The Australian Experience', *International Migration,* vol. 35, no. 2, pp. 155–183.

Miller, P.W. & Volker, P. A. 1985, 'The Screening Hypothesis: An Application of the Wiles Test', *Economic Inquiry,* vol. 20, pp. 121–127.

Miller, P.W. & Volker, P. A. 1987, *The Youth Labour Market in Australia: A Survey of Issues and Evidence*, Centre for Economic Policy Research, Discussion Paper no. 171, Australian National University, Canberra.

Nakamura, A. & Nakamura, M. 1985, *The Second Paycheck: A Socioeconomic Analysis of Earnings,* Academic Press, Florida.

Ross, R. T. 1990, 'Employment Prospects for Aboriginals in New South Wales', in *Aboriginal Employment Equity by the Year 2000,* ed. J.C. Altman, Centre for Aboriginal Economic Policy Research, Australian National University, Canberra, pp. 121–132.

Ross, R. T. 1993, 'A Probit Analysis of Aboriginal Employment Prospects in New South Wales', *Economic Record,* vol. 69, no. 206, pp. 253–258.

Veall, M. R. & Zimmermann, K. F. 1996, 'Pseudo-R^2 Measures for Some Common Limited Dependent Variable Models', *Journal of Economic Surveys,* vol. 10, no. 3, pp. 241–259.

Weiss, A. 1995, 'Human Capital vs Signalling Explanations of Wages', *Journal of Economic Perspectives,* vol. 9, pp. 28–55.

Wooden, M. 1991, 'The Experience of Refugees in the Australian Labour Market', *International Migration Review,* vol. 25, no. 3, pp. 514–535.

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