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THE CONTRIBUTION OF EMPLOYMENT SEPARATION
TO TEENAGE UNEMPLOYMENT

R.G. Gregory and W. Foster

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THE CONTRIBUTION OF EMPLOYMENT SEPARATION
TO TEENAGE UNEMPLOYMENT*

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The views presented are our own.

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Extracts from:

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1. Our major conclusion is that the higher rate of teenage unemployment compared to prime age males is associated principally with the higher rate of employment separation of teenagers rather than any special difficulty of teenagers as a group finding jobs. The problem of higher relative rates of teenage unemployment is more a problem of finding jobs in which once employed teenagers want to stay employed or in which they are able to stay employed.
2. There is not a great deal of evidence that can be brought to bear on the fundamental question as to the relative importance of teenagers leaving jobs to "shop around" and whether teenagers fill a disproportionate share of bad jobs.
3. ...the principal source of the effect of employment separation upon unemployment is the high propensity of teenagers to be separated from full-time jobs. If teenagers left full-time employment to enter unemployment at the same rate as prime age males then the unemployment rate differences between teenagers and prime age males would fall by nearly fifty per cent for teenage males and by nearly forty per cent for teenage females.
4. Labour market flows involving part-time employment accounts for little of the unemployment rate differences between teenagers and prime age males.
5. ...the overwhelming importance of employment separation suggests that school leaving and finding the first job is not an important factor leading to the high rate of teenage unemployment relative to the unemployment of other labour market groups.
6. The higher rate of employment separation is the major determinant of the high inflow rate of teenagers to unemployment. The high entry rate of teenagers into the labour force is not an important factor leading to their unemployment rate.
7. ...it is differences in the rate of inflow to unemployment, rather than in the length of the unemployment spell, that is associated with the higher unemployment rate of teenagers compared to adults.

TABLE OF CONTENTS

DISCUSSION PAPER NO. 31

	<u>Page</u>
I. Introduction	1
II. The Gross Flow Data for Teenagers and Prime Age Males: An Overview	4
Flows from Employment	7
Flows from Unemployment	9
Flows from outside the Labour Force	10
III. Transition Probabilities and Unemployment	11
Transition Probabilities affecting both Unemployment Duration and the Rate of Inflows to Unemployment	17
Transition Probabilities affecting only the Rate of Inflows to Unemployment	18
IV. The Nature of Employment Separation	21
Part-time Employment	22
Seasonal Factors and School Leavers	28
Quits and Fires	30
V. Concluding Remarks	31
References	35
Appendix	36

Tables and Figures

Figure 1:	Gross Flow and Transition Probability Matrix	5
Table 1:	Average Monthly Transition Probabilities: Teenage Males, Females and Males 25-54 Years	8
Table 2:	Differences in Unemployment Rates, Completed Duration, and Inflows to Unemployment, Attributable to Differences in Transition Probabilities: Teenagers Relative to Males 25-54 Years - 1979-80	15
Table 3:	Part Time Employment Flows as a Proportion of Employment Flows, 1979-80	23
Table 4:	Monthly Average Labour Market Flows, 1979-80	23
Table 5:	Differences in Unemployment Rates Attributable to Differences in Transition Probabilities: Teenagers Compared to Males 25-54 Years, 1979-80	26

THE CONTRIBUTION OF EMPLOYMENT SEPARATION
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R.G. Gregory and W. Foster

I. Introduction

Most analysis of employment and unemployment in Australia has been conducted in terms of the stocks of people in each labour market state. Recently, however, there have been a number of papers analysing unemployment in terms of labour market flows.⁽¹⁾ These papers, which focus on inflows into unemployment and the length of the unemployment spell, have added considerably to our understanding of the dynamics of the labour market. They show, for example, that teenage inflow rates to unemployment are approximately four to five times those of adults, and it is differences in the rate of inflow to unemployment, rather than in the length of the unemployment spell, that is associated with the higher unemployment rate of teenagers compared to adults.

A limitation of these new studies of labour market flows, however, is that they focus on the inflow and the duration of the spell in only one of the three labour market states, i.e. unemployment. It is impossible to analyse the origins of the inflow to unemployment or the destination of the unemployment outflows.

Since February 1980, however, the Australian Bureau of Statistics (ABS) has published estimates of the gross flows each month of persons moving between employment, unemployment and not in the labour force. These data provide the basis for a more

1. See Khoo (1976), Paterson (1979, 1980), Gregory and Paterson (1980).

complete analysis of labour market flows and unemployment, and can be used to overcome the major limitation of the previous studies. It is now possible to apportion the inflows into unemployment between inflows from employment and inflows from outside the labour force. Similarly, outflows from unemployment can be apportioned between outflows to employment and outflows from the labour force. The data provide a wealth of new information and reveal the presence of extensive labour market flows.

The main purpose of this paper is to use these new data to isolate the reasons why the unemployment rate of teenagers was about five times the unemployment rate rate of prime age males during the year 1979-80.(2)

Our major conclusion is that the higher rate of teenage unemployment compared to prime age males is associated principally with the higher rate of employment separation of teenagers rather than any special difficulty of teenagers as a group finding jobs. The problem of high relative rates of teenage unemployment is more a problem of finding jobs which once employed teenagers want or in which they are able to stay employed.

2. The analysis of gross flow data is very much in its infancy although there have recently appeared a number of excellent papers based on US data, including Marston (1976), Clark and Summers (1978, 1979), Ehrenberg (1979) and Smith (1977). The only paper so far based on the Australian gross flow data is Foster (1981).

The question may be raised as to whether similar behaviour patterns may explain the fourfold increase in teenage unemployment since 1974. The gross flow data do not extend this far back in time and we do not address this question in this paper. (3)

In Part II we discuss the nature of the new data and outline the method used by the ABS to derive them. We also present an overview of the relative magnitudes and directions of the very large flows revealed by the data for both teenagers and mature males.

Part III compares the pattern of labour market gross flows of teenagers with that of mature males to determine the source of the five times greater rate of unemployment of teenagers. As indicated above, the principal finding is that almost all of the higher rate of teenage unemployment is attributable to greater employment separation.

In Part IV an attempt is made to identify possible sources of this difference in employment separation among different demographic groups. A unique feature of the paper is the investigation of gross flows to and from part-time employment.

3. A preliminary analysis of Labour Force statistics and other data sources suggests that the 'explanation' of relative unemployment rates across demographic groups in 1979-80 is not the 'explanation' of the higher rates of unemployment prevailing currently. The increased level of teenage unemployment, relative to the past, is associated principally with an increased difficulty in job finding rather than with increased rates of inflow to unemployment.

It is found that the contribution of employment turnover to teenage unemployment occurs principally among those leaving full-time employment. The high rate of employment separation associated with part time employment does not increase teenage unemployment relative to that of prime age males. In this section we also investigate the seasonal pattern of teenage unemployment and suggest that on average there are no special unemployment problems associated with school to work transition, at least with respect to finding the first job.

We offer some concluding remarks in Part V.

II. The Gross Flow Data for Teenagers and Prime age Males:

An Overview

If the labour market distribution of the working age population at any time is compared to its distribution a month earlier the gross labour market flows over the month can be represented schematically as in Figure 1. There are three states - employment, unemployment, and not in the labour force - and the stocks of persons in these states are denoted respectively by E, U and N. Over any time period there are six possible flows of persons between different pairs of states. These flows are written as pairs of E, U and N, so that for example EU represents the flow from employment to unemployment, EN represents the flow from employment to outside the labour force, and so on.

The elements along the principal diagonal of Figure 1, (EE, UU and NN) represent persons who are in the same labour market state at the beginning and end of the period. The off diagonal elements represent those who have changed their state. To

FIGURE 1

GROSS FLOW AND TRANSITION PROBABILITY MATRIX

Origin		Destination State:		
		Employment	Unemployment	Not in the Labour Force
Employed	E	EE (ee)	EU (eu)	EN (en)
Unemployed	U	UE (ue)	UU (uu)	UN (un)
Not in the Labour Force	N	NE (ne)	NU (nu)	NN (nn)

proceed across the rows of Figure 1 is to allocate the labour market stocks at the beginning of the period to their location at the end of the period. To proceed down the columns is to derive the source of the end period stocks. There is, of course, no need for the matrix to be symmetrical. The inflows and outflows between any two labour market states need not be equal.

The gross flow data are derived by matching persons in those private dwellings that remain in the ABS population survey(4) from one month to the next. The ABS can match approximately 80 per cent of the responses to each survey with the responses of the same people in the previous month; 12.5 per cent of

4. This population survey, the Labour Force Survey, covers about two thirds of one per cent of the population of Australia. For further details, see the Explanatory Notes in the Labour Force Australia (6203.0).

households are new to the survey each month so that their occupants cannot be matched and approximately another 7.5 per cent of respondents cannot be matched for other reasons, such as non response or change of address by household occupants. We assume that the sample results are representative of the population as a whole(5) but each source of non-matching may introduce a bias. Because of this the ABS presents the gross flows as estimates applicable to 80 per cent of the population.

The published gross flow data are available from July/August 1979.(6) They were originally disaggregated only by sex, but the ABS now publishes flows disaggregated by marital status for females, and for full time and part time employment separately for both sexes. The ABS has also provided us with a more

5. This assumption may understate the true level of gross flows because those who are non respondents, may have a higher degree of labour mobility than the population as a whole. This group, however, accounts only for 7.5 per cent of the respondents to the labour force survey in the previous month so the bias is unlikely to be serious. Survey misclassifications, including rotation group bias, may also lead to errors in the gross flow data, but we do not know their effect in Australia. The ABS suggests that rotation group bias, at least, is not serious for Australia. For a fuller discussion of the possible sources of error in these gross flow data see Foster (1981). The data will also provide, in another quite different sense, an underestimate of the total labour market movements of 80 per cent of the population. For example, if a person leaves one labour market state but returns to it between survey dates one change is recorded. Direct transfers from one job to another, without an intervening period in another labour market state, are also not recorded.
6. Data for July/August to October/November 1979 were published in The Labour Force, Australia, February 1980 Preliminary (6202.0) and for subsequent periods in The Labour Force, Australia (6203.0).

detailed disaggregation by age, marital status, and full time or part time employment, for the period from July/August 1979 to June/July 1980.

A particularly useful way of presenting gross flow data is to divide each of the elements of Figure 1 by the number of persons in the relevant labour market state at the beginning of the period to derive transition probabilities. These are written in small letters and in brackets in Figure I. Thus the transition probability, e_u , is the proportion of the employment stock at the start of the period that can be found in the unemployment pool in at the end of the period. Similarly, e_n is the proportion of the employment stock that leaves the labour force over the period. The sum of the transition probabilities in each row must add to unity because the stock at the first survey date must be allocated to one of the three labour market states at the second survey date.(7)

In Table 1 we list the transition probabilities for teenage males and females and for males aged 25-54 years which we take as a reference group.

Flows from Employment

Teenage males and females have a high propensity to leave employment. (Column 1(a)). Over an average month 7.5 per cent of teenage males and 8.2 per cent of teenage females who were employed at the beginning of the month were no longer employed at the end of the month ($1 - e_e$). For males aged 25-54 years this

7. Obviously those who die or leave the country are not included in the set of matched records by the ABS.

TABLE I : AVERAGE MONTHLY TRANSITION PROBABILITIES : TEENAGE MALES, FEMALES AND MALES 25-54 YEARS

1979-80

Demographic Group	From Employment				From Unemployment				From Outside the Labour Force			
	1-ee 1(a)	eu 1(b)	en 1(c)	en eu + en 1(d)	1-uu 2(a)	ue 2(b)	un 2(c)	un ue + uu 2(d)	1-nn 3(a)	ne 3(b)	nu 3(c)	ne ue + nu 3(d)
Teenage males	.074	.028	.046	.62	.387	.227	.160	.41	.152	.088	.064	.58
Teenage Females	.081	.030	.051	.63	.362	.184	.173	.48	.140	.068	.072	.49
Males 25-54 years	.01	.006	.009	.60	.322	.234	.087	.27	.228	.163	.065	.71

Source : Data supplied by ABS. The gross flows are subject to sampling errors. Standard errors are given in the Labour Force, Australia (6203.0).

proportion is 1.5 per cent. Teenagers, therefore, left or quit jobs to enter unemployment, or to leave the labour force, at approximately five times the rate of prime age males. If this high employment separation was evenly spread among employed teenagers then during the twelve months all teenagers employed at the beginning of the year would have left employment once during the twelve month period.

In Column 1(d) we indicate the direction of flows after employment separation. When teenagers and adult males leave employment about 60 per cent leave the labour force (en) and 40 per cent enter the unemployment pool (eu). Consequently the major difference between these groups is the rate at which they are separated from employment rather than the direction of flows after job separation.

Flows from Unemployment

In an average month during 1979-80, 38.7 per cent of teenage males, 36.2 per cent of teenage females and 32.2 per cent of males aged 25-54 years left unemployment $[(1 - uu), \text{Column } 2(a)]$. Teenagers therefore are unemployed on average for a shorter continuous period than males aged 25-54 years. However, teenagers leave unemployment more readily not because they find jobs more quickly but because they are more likely to leave the labour force. Each month between 16 to 17 per cent of unemployed teenagers leave the labour force (un). For males aged 25-54 years the corresponding proportion is 9 per cent.

Unemployed teenage males find jobs at about the same rate as males aged 25-54 years but teenage females have a lower job finding success rate (ue). Between 22 to 24 per cent of prime age males and male teenagers unemployed at the beginning of the month find employment within four weeks. For teenage females the job finding success rate is lower at 19 per cent.

Flows from outside the Labour Force

Between 14 and 15 per cent of teenagers outside the labour force at the beginning of the month move into the labour force by the end of the month [(1 - nn), Column 3(a)]. The proportion for prime age males is even higher at 23 per cent.

When prime age males enter the labour force they are more likely to proceed directly to a job (ne) than to enter unemployment (nu). In a typical month 71 per cent of males aged 25-54 years who enter the labour force enter employment.⁽⁸⁾ For teenage males the job finding success rate is less at 58 per cent; for teenage girls it is 50 per cent.

The above descriptions of labour market flows from each of the three states can be summarized as follows. Compared to prime age males teenagers have:

- (i) a higher propensity to separate from jobs and enter unemployment (eu);

8. The term "proceed directly to a job" does not mean that there was no intervening period of unemployment but that a job was found between one survey date and another. The surveys are conducted monthly.

- (ii) a higher propensity to separate from jobs and leave the labour force (e_n);
- (iii) a lower rate of successful labour force entry (n_e/n_{e+u});
- (iv) a slightly lower rate of finding jobs when unemployed (u_e).
- (v) a higher rate of exit from unemployment to leave the labour force (u_n).

In the next section we show how these transition probabilities can be related to labour market stocks under steady state conditions of a stationary state.

III. Transition Probabilities and Unemployment

If the labour market is operating under steady state conditions then the transition probabilities are constant from month to month and the stocks in each state are also constant. Thus, if the flows into and out of employment are equal and the flows into and out of unemployment are equal, we can write:

$$(1) \quad U u_e + N n_e = E (e_u + e_n)$$

$$(2) \quad E u_e + N n_u = U (u_e + u_n)$$

and eliminating N from these equations and forming the ratio of U to $E + U$ gives

$$(3) \quad r = \frac{e_u + e_n(1-s_{ne})}{e_u + e_n(1-s_{ne}) + u_e + u_n.s_{ne}}$$

where $sne = ne/ne+nu$. The unemployment rate, r , is thus expressed in terms of the individual transition probabilities governing the behaviour of the labour market and, sne , the probability of moving straight into employment, ne , given the decision to enter the labour force ($ne + nu$). Similar expression can be derived for the employment-population ratio and the labour force participation rate.

Under steady state conditions the unemployment rate can also be written as the product of inflows into unemployment and the completed duration of an unemployment spell (Gregory and Paterson (1980)). These too can be expressed in terms of transition probabilities. Thus, if the probability of leaving unemployment is constant⁽⁹⁾ throughout the unemployment spell the average completed duration of unemployment, D can be written as

$$(4) \quad D = \frac{1}{1-uu} = \frac{1}{ue + un}$$

and inflows into unemployment, as a ratio of the labour force are

$$(5) \quad I = r \cdot \frac{1}{D}$$

or

$$(6) \quad I = \left[\frac{eu + en(1-sne)}{eu + en(1-sne) + ue + un.sne} \right] \frac{(ue + un)}{1}$$

9. In fact the average probability of leaving unemployment falls as the current spell of unemployment increases so that equation (4) is an approximation which overstates the completed duration of a unemployment spell. Equation (4) also assumes that all unemployment spells are at least as long as the unit of observation, in this instance, a month.

We are now in a position to 'explain' the differences in the unemployment rate, (equation (3)), duration of unemployment, (equation (4)), and inflows into unemployment, (equation (6)), between pairs of labour market groups in terms of the differences between their transition probabilities. We will describe the application of the technique to the unemployment rate difference between teenage males and prime age males.

First the implied unemployment rate for teenage males is calculated from equation (3). Then one of the transition probabilities for the teenage male labour market is removed from equation (3) and the equivalent transition probability for males aged 25-54 years is inserted. A new unemployment rate is calculated. The difference between the original implied unemployment rate and the unemployment rate thus calculated is attributed to the difference in that particular transition probability between prime age males and teenage males. Then the analysis begins again. The transition probability originally removed from the teenage equation is returned and then another removed to be replaced by the appropriate prime age male transition probability. The new unemployment rate is calculated, and so on. At the same time we can calculate the change in unemployment inflows and duration as transition probabilities are changed.

When a transition probability is changed it is implicit in this technique that the labour market adjustment is brought about by a change in all labour market stocks and not by offsetting

changes in other transition probabilities, except for the relevant transition probability along the principal diagonal of Figure 1 - this adjustment preserves the identity that the sum of the transition probabilities along a row of Figure 1 must add to unity. Consequently, a change in the unemployment rate, in response to a change in a transition probability, is accompanied by a change in the labour force participation rate and the employment-population ratio.

This characteristic of the analysis restricts its application for policy purposes. If a transition probability is changed by policy it is very unlikely that all the adjustment would be borne by the labour market stocks and the transition probability on the principal diagonal. Some of the other transition probabilities are likely to change. This does not pose a problem, in principle, - any set of transition probabilities can be changed in this technique - but in practice there is a problem because very little is known of the changing interrelationships among transition probabilities and labour market stocks in response to policy initiatives. Policy should not be thought of in terms of attempting to directly change particular transition probabilities alone, but rather as attempting to modify the socio-economic environment so that stocks and probabilities move in desired directions. The application of the technique therefore is best thought of as a beginning to the study of the interrelationship of stocks and flows.

The results of various applications of this technique are listed in Table 2. The actual unemployment rate and that implied by the steady state assumption are quite close (Columnn 1) and

TABLE 2

DIFFERENCES IN UNEMPLOYMENT RATES, COMPLETED DURATION, AND INFLOWS TO UNEMPLOYMENT, ATTRIBUTABLE TO DIFFERENCES IN TRANSITION PROBABILITIES:
TEENAGERS RELATIVE TO MALES 25-54 YEARS - 1979-80

DEMOGRAPHIC GROUP	IMPLIED DIFFERENCE FROM MALES 25-54 YEARS	CONTRIBUTION FROM DIFFERENCE IN:						EMPLOYMENT TURNOVER (eu,en)	DIFFICULTY OF FINDING WORK (ue,sne)	LABOUR FORCE ATTACHMENT 1 (eu/en,ue/un)	UNEMPLOYMENT TURNOVER (ue,un)
		eu	en	ue	un	sne					
<u>UNEMPLOYMENT RATE</u>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Per cent of Labour Force											
Teenage Males	12.9 (15.2)	10.1	5.5	3.9	0.2	-1.7	2.2	9.9	2.3	0.5	-1.4
Teenage Females	17.1 (20.1)	14.3	6.5	5.8	2.1	-2.5	4.6	13.4	6.0	1.6	0.2
Males aged 25-54 Years	2.8 (3.1)										
<u>COMPLETED DURATION OF UNEMPLOYMENT</u>											
Months											
Teenage Males	2.58	-0.54	-	-	0.04	-0.61	-	-	0.04	-	-0.54
Teenage Females	2.76	-0.36	-	-	0.30	-0.86	-	-	0.30	-	-0.36
Males aged 25-54 Years	3.12										
<u>INFLOWS TO UNEMPLOYMENT</u>											
Per cent of Labour Force Per Month											
Teenage Males	5.00	4.10	2.13	1.51	-	0.42	0.85	3.84	0.73	0.19	0.42
Teenage Females	6.20	5.30	2.36	2.11	0.10	0.79	1.67	4.86	1.69	0.58	0.70
Males aged 25-54 Years	0.90										

¹ Given the rate at which teenagers leave employment, and unemployment, assume that their relative propensity to enter each other state is the same as for males aged 25-54 years.

lend support to the steady state assumption that is needed for the analysis.(10) However, as a steady state did not prevail during this period the calculations can only be regarded as approximations to the effects of the differences in transition probabilities.

For the year 1979-80 the steady state male and female teenage unemployment rates were respectively 10.1 and 14.3 percentage points greater than that of males aged 25-54 years. Looking down Column 1 to the duration and inflow calculations, it is clear that the major sources of these differences is the rate of inflow to unemployment. For teenagers the rate of inflow to unemployment, as a fraction of the labour force, is between six and seven times that of prime age males. By comparison the teenage and prime age male durations of unemployment are similar so that the duration of an unemployment spell is not an important source of the differences in unemployment rates.

We now turn to a detailed investigation of the effects of different transition probabilities upon the unemployment rate difference between teenagers and prime age males. We group the transition probabilities into those that affect both the duration and inflow to unemployment and those that affect the inflow rate alone.

10. Other support for the steady state assumption can be derived indirectly from the results of this type of analysis applied to US data for a range of different time periods. The US results are very similar to ours. See Marston, op.cit. (1975).

Transition Probabilities affecting both Unemployment
Duration and the Rate of Inflows to Unemployment

The completed duration of an unemployment spell depends only on $(1-uu)$, i.e. the sum of the transition probabilities ue and un . A change in the transition probabilities that increases the unemployment duration will also reduce the rate of unemployment inflow, see equation (6). Consequently, an increase in unemployment duration may not always lead to an increase in the unemployment rate.

Prime age males experience a longer duration of unemployment than teenagers. When the duration of teenage unemployment is increased by substituting the sum of ue and un for males aged 25-54 years into equation (3) - the unemployment rate for teenage males increases by 1.4 percentage points (the reduced inflow into unemployment does not offset the increased duration (Table 2, Column 11). For teenage females the unemployment rate marginally falls, 0.2 percentage points (for them the reduced inflow rate dominates the increase in unemployment duration).

Now consider separately each of the transition probabilities that affects unemployment duration. Relative to males aged 25-54 years teenagers have a higher propensity to leave unemployment to leave the labour force (un). If this propensity was the same as for prime age males the unemployment rate would increase by 1.7 and 2.5 percentage points for teenage males and females respectively with the increased duration of unemployment dominating reduced rate of inflow to unemployment (Column 6).

Teenagers are also less successful at obtaining employment from the unemployment pool (ue). If their success rate was for the same as prime age males their unemployment rate would fall by .02 and 2.1 percentage points for teenage males and females respectively (column 5). The reduced duration of unemployment of teenagers dominates the resultant increased rate of inflows to unemployment.

As indicated earlier the differences between teenagers and prime age males in the transition probabilities ue and un are not particularly important as explanations of the differences in unemployment rates. The more significant of the two transition probabilities is un , the rate of which teenagers leave the unemployment pool to leave the labour force and this is the only transition probability of teenagers that reduces unemployment relative to that of prime age males. The lower rate of job finding success from the unemployment pool, ue , only marginally affects unemployment rate differences.

The Transition Probabilities affecting only the Rate of Inflows to Unemployment

The rate of inflow to the labour force ($1-nn$) does not directly affect the unemployment rate. A consideration of equation (3) shows that it is the pattern of labour force inflow that matters, i.e. the job finding success rate given the decision to enter the labour force, sne .

Teenagers are not as successful as prime age males at job finding from outside the labour force. If they were as successful their unemployment rate would reduce by .2 and 4.6

percentage points for males and females respectively. (Column 7, Table 2). These reductions represent 20 and 30 per cent of the unemployment gap.

A comparison of the transition probabilities that measure job finding success, ue and sne , indicates that the lower success rate of teenagers at finding a job from outside the labour force, sne , is a more important force increasing teenage unemployment than their job finding success rate from the unemployment pool, ue .

The difference in the transition probability, eu , the propensity to leave employment and enter unemployment, accounts for about 55 per cent and 45 per cent of the unemployment rate gap of teenage males and females respectively, (Column 3). The higher propensity of teenagers to leave employment to go outside the labour force, en , accounts for about 38 per cent of the unemployment gap for both groups of teenagers (Column 4). With respect to the effect on teenage unemployment these two transition probabilities are the most important, followed by sne , and then the transition probabilities that affect unemployment duration, ue and un .⁽¹¹⁾

11. It is apparent that there are differences between teenage males and females but the flow patterns are surprisingly similar and the ranking of the importance of transition probabilities is identical. In general, teenage females experience higher rates of unemployment than teenage males because all transition probabilities that increase teenage unemployment do so more for females than males. Teenage females have a higher rate of employment separation (en and eu) and a lower rate of job finding success (ue and sne). Their unemployment rate would be even higher relative to teenage males if they left the unemployment pool to go outside the labour force at the same rate as teenage males.

To conclude, it may be useful to substitute sets of transition probabilities into equation (3) to measure their joint contribution to the unemployment rate.

First, we substitute into equation (3), the prime age male rate of employment separation (e_n and e_u) for that of teenagers. Teenage unemployment falls to be close to that of prime age males and the difference in the rate of inflow to unemployment of teenagers and prime age males is reduced by more than 90 per cent (Column 8).

Second, we substitute the adult male values of (u_e), and (n_e/n_u+n_e) to account for the difference in the difficulty of finding work between teenagers and adults. The first term (u_e) is the difficulty of finding work from the unemployment pool and the second (s_n) is the difficulty of finding work given the decision to enter the labour force. The difficulty of finding work can account for 20 per cent of the unemployment gap for teenage males and 40 per cent for teenage females (Column 9).

Finally, we impose on teenagers - given the rate at which they leave employment and unemployment - the same propensity to leave the labour force as males aged 25-54 years. Thus the direction of movements of teenagers out of employment and unemployment is changed to coincide with that of prime age males, while the overall rate of flow out of each state for teenagers remains the same. This measures the contribution to the unemployment rate difference of the relatively weaker labour force attachment of teenagers. The weaker labour force attachment accounts for 5 and 11 per cent of the gap respectively (Column 10).

Although all factors contribute to the higher rate of unemployment of teenagers relative to prime age males the relatively high level of teenage unemployment is primarily determined by employment separation. A higher rate of employment separation explains almost all of the extra teenage male unemployment and about 90 per cent of the extra teenage female unemployment. It is the high rate of employment separation that is the principal determinant of the high inflow rate of teenagers to unemployment and not the high entry rate of teenagers from outside the labour force.

IV. The Nature of Employment Separation

Many possible interpretations may be placed on the high rate of employment separation of teenagers. Perhaps it is normal and proper, being a part of the process whereby teenagers learn where their long term career prospects are best served. Teenagers are then thought to leave employment of their own free will or perhaps to choose jobs which are of short term duration.

Another interpretation is that there is something inherently unstable about jobs for teenagers that results in a high rate of separation. Teenagers may be hired for a disproportionate share of the short duration jobs or they may be the first fired when demand turns down. Perhaps teenage jobs are particularly unpleasant and boring. Little is known about the nature of the jobs of different demographic groups and very little of what is known has been integrated into the flow analysis of unemployment.

We now look at some factors that may be relevant to the high degree of employment separation of teenagers.

Part-time Employment

The ABS now publishes gross flow data that distinguishes between full-time and part-time employment, (12) and they have also made these data available for 1979/80 classified by age and sex. This disaggregation may be particularly important as the proportion of total employment that is part-time varies significantly between the demographic groups and the pattern of labour market flows associated with part-time employment is very different to that associated with full-time employment. Some characteristics of the labour market flows to and from full-time and part-time employment are illustrated in Tables 3 and 4.

Part-time employment (13) accounts for 20 per cent of the employment of teenagers and 3 per cent of the employment of prime age males, but Table 3 shows that flows to and from part-time employment account for approximately 60 per cent of the total employment flows of teenagers and 48 per cent of the total employment flows of prime age males.

12. At this time we are not aware of any overseas studies that include this dichotomy.
13. The ABS survey defines full-time workers as those who usually work 35 hours a week or more and others who, although usually part-time workers, worked 35 hours or more during the survey week. Part-time workers are those who usually work less than 35 hours a week and who did so during the survey week. When recording hours of work, fractions of an hour are disregarded.

TABLE 3
PART TIME EMPLOYMENT FLOWS AS A PROPORTION OF EMPLOYMENT FLOWS, 1979-80

Demographic Group	Percentage of Employment that is Part Time	Percentage of all Employment Flows that are Part Time Flows	Percentage of Flow that Involves Part Time Employment:			
			EU	EN	UE	NE
Teenage Males	17	58	34	65	26	58
Teenage Females	26	67	41	75	39	73
Males 25-54 Years	3	48	18	15	19	15

TABLE 4
MONTHLY AVERAGE LABOUR MARKET FLOWS, 1979-80

Demographic Group	Percentage of Employment that is Part Time	Monthly Percentage Leaving: FTE PTE	Destination of those who leave: FTE: (%) PTE:						Origin of those who enter:					
			FTE: (%)			PTE: (%)			FTE: (%)			PTE: (%)		
			PTE	U	N	PTE	U	N	PTE	U	N	PTE	U	N
Teenage Males	17	6	31	37	32	35	16	49	28	40	31	27	18	55
Teenage Females	26	6	35	38	28	32	16	52	35	43	22	22	24	54
Males 25-54 Years	3	2	41	24	36	80	9	11	44	26	31	77	12	11

For prime age males the share of each flow into or out of employment that involves part-time employment is similar among the different flows. Part-time employment flows account for between 15 and 20 per cent of each employment flow.

For teenagers, however, there are broad differences. Part-time employment flows for teenage males account for around 60 per cent of their employment flows to and from the labour force, while for teenage females this proportion is even higher at around 75 per cent. The contribution of part-time employment flows to movements between employment and unemployment is much smaller, particularly for teenage males.

Table 4 shows in some detail the origin and destination patterns of flows to and from full- and part-time employment. Prime age males leave full-time employment each month at a lower rate than teenagers, but they leave part-time employment at a higher rate. Around 46 per cent of prime age males in part-time employment leaves that state in a month, which implies an average duration in part-time employment for prime age males of about eight weeks.(14)

Part-time employment is clearly a very temporary phenomenon for this group.

Thirty-five per cent of teenage males and 27 per cent of teenage females move out of part-time employment each month, which also implies relatively short mean durations in part-time

14. This calculation assumes that the probability of leaving employment is independent of the time already employed, and also that spells of part-time employment last for at least a month.

employment for these groups. Teenagers move out of part time employment at about five times the rate at which they leave full-time employment.

For prime age males the part-time and full-time employment markets are closely linked. Eighty per cent of those who leave part-time employment do so to enter full-time employment and the major destination of those leaving full-time employment is part-time employment. For teenagers the link between part-time employment and full-time employment is weaker. Approximately 35 per cent of those leaving part-time employment do so to enter full-time employment.

We can now extend the analysis of Part III to a labour market of four states - full-time employment, part-time employment, unemployment, and not in the labour force. The equivalent formulae to (2) are detailed in the Appendix. A selection of results is presented in Table 5.

First, all the transition probabilities associated with part-time employment of teenagers are replaced by their prime age male equivalents. The results (Column 3) indicate the impact on teenage unemployment of their particular pattern of part-time employment flows. The unemployment rate of teenage males falls marginally by 0.6 percentage points while for teenage females the rate actually increases by 0.2 percentage points. The disproportionate share of part-time employment and large associated flows do little to explain the higher rate of unemployment of teenagers compared to prime age males.

TABLE 5
DIFFERENCES IN UNEMPLOYMENT RATES ATTRIBUTABLE TO DIFFERENCES IN TRANSITION PROBABILITIES:
TEENAGERS COMPARED TO MALES 25-54 YEARS, 1979-80

DEMOGRAPHIC GROUP	IMPLIED UNEMPLOYMENT RATE	IMPLIED DIFFERENCES FROM MALES 25-54 YEARS	CONTRIBUTION TO DIFFERENCE IN:												Employment Turnover		
			ALL PART TIME	PART TIME						FULL TIME							
				fp	pf	pu	pn	up	np	fu	fn	uf	nf	un	nu	Full Time fu, fn	Part time pu, pn
	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Teenage Males	Per Cent of labour force 11.8	9.0	0.6	0.8	1.5	0.4	1.2	-0.3	-0.7	4.4	1.5	0.7	2.9	-1.4	-	6.1	1.7
Teenage Females	16.0	13.2	-0.2	1.2	2.8	0.1	2.3	-1.2	-1.5	5.1	1.6	3.4	5.5	-2.1	0.5	7.2	2.5
Males aged 25-54 years	2.8																

NOTES: f = full time employment
p = part time employment
u = unemployment
n = not in the labour force

All part time = pu, pn, up, np
All full time = fu, fn, uf, nf

Next, all the transition probabilities associated with the full-time employment of teenagers are replaced by their prime age male equivalents (Column 4). The unemployment rate of teenagers falls considerably, by 8.2 percentage points for teenage males and by 12.2 percentage points for teenage females. It is the set of transition probabilities associated with the full-time employment market that is associated with the large unemployment differences between the groups.

When the part-time transition probabilities are considered individually, the substitution of two probabilities of prime age males - for the flow from unemployment to part-time employment and for the flow from outside the labour force to part-time employment - increases teenage unemployment marginally with respect to prime age males. The other four transition probabilities associated with part-time employment when substituted into the teenage unemployment equation act to reduce the unemployment rate gap.

The most important transition probability associated with full-time employment is the flow from employment to unemployment (Column 11). If teenagers left full-time employment to enter unemployment at the same rate as prime age males then the unemployment rate difference between teenagers and prime age males would fall by nearly 50 per cent for teenage males and by nearly 40 per cent for teenage females.

Finally, a grouping of the transition probabilities into those associated with full-time employment turnover (Column 17) and part-time employment turnover (Column 18) clearly establishes that the major contribution of employment turnover to teenage

unemployment is from the labour market for full-time workers. Employment separation and higher rates of teenage unemployment cannot be explained by the greater involvement of teenagers in part-time employment.

Seasonal Factors and School Leavers

Teenage unemployment in December, January and February is typically 20 per cent higher than its average over the rest of the year. This raises the question of the contribution of school leavers to the seasonal pattern of unemployment and to the high rate of teenage unemployment.

The available gross flow data do not distinguish between school leavers and others. However, the overwhelming importance of employment separation suggests that school leaving and finding the first job is not an important factor leading to high teenage unemployment.

Recalculating Table 2, once using transition probabilities based on the nine months of gross flow data which exclude the flows between the months November/ December, December/January and January/February, and again using transition probabilities for just these three pairs of summer months, leaves our earlier conclusions unchanged. Compared to the rate for prime age males, employment turnover is the major factor associated with the high rate of teenage unemployment in both periods. Consequently, the higher rates of teenage unemployment associated with the summer months and the influx of school leavers into the labour force at this time, is not significantly affecting the pattern of labour flows over the twelve months of our results.

The main differences between the transition probabilities in the summer and non-summer periods for both teenagers and prime age males are for movements into and out of the labour force, and for movements out of employment. The proportion of teenagers outside the labour force which enters it during a summer month is 25.7 per cent for teenage males and 20.7 per cent for teenage females, compared to around 12 per cent for both groups in a non-summer month. For prime age males, too, a larger proportion, around 26 per cent, of those outside the labour force enter in a summer month. In a non-summer month, the proportion is just under 22 per cent. However, it is the duration of these flows, sne , that affects the steady state unemployment rate and the direction of labour force entry hardly changes for any group. The summer and non-summer values for sne are 58 per cent for teenage males in each period, 47 per cent and 50 per cent respectively for teenage females, and 74 per cent and 71 per cent for prime age males. The hiring rate of teenagers thus seems to adjust to the seasonal influx of school leavers. There is also virtually no difference in ue , the probability for movements between unemployment and employment, between the summer months and the non-summer period. Consequently there is no deterioration in job finding success either upon entry to the labour force, sne , or from the unemployment pool, ue . Jobs do not appear to be more difficult to find in the summer months and changes in job finding success are not the source of seasonal unemployment.

An analysis of steady states shows that an increase in employment instability, particularly the transition probability, en , causes the seasonal increase in unemployment but this

technique is not entirely appropriate for such a short period. It is probably more accurate to say that the seasonal and transitory increase in unemployment arises from the combination of an increased rate of inflow to the labour force and a transition probability, *sne*, which is greater than the unemployment rate. In the short run an increased rate of inflow adds proportionately more people to the unemployment pool than to employment. In the long run, the increased rate of inflow does not affect unemployment and it is employment separation that matters.

Quits and Fires

In the US it is commonly argued that a significant fraction of the employment turnover of teenagers arises from the nature of their jobs and from the fact that the young tend to be the first fired and the last hired.⁽¹⁵⁾ In Australia there is little direct evidence on the quality of jobs filled by teenagers but the ABS has collected data for a number of years on the reasons why unemployed persons who had a full-time job during the previous 18 months left that job.⁽¹⁶⁾ The reasons are classified as: (a) lost last job, retrenched, or job temporary or seasonal, and (b) left last job for other reasons.

Of the unemployed in July 1980 who had left their last full-time job during the previous 18 months, around 60 per cent had done so for reasons falling into category (a). For teenagers

15. See Clark and Summers (1978, 1979).

16. Persons Looking For Work (ABS 6222.0).

this proportion was 65.6 per cent, and for adults of 25 years and over it was 58.6 per cent. This suggests that unemployed teenagers may be more likely to have left their last job involuntarily than of their own accord, and that this element of involuntariness may be more significant for them than for adults, but the difference appears marginal.

In this section we have made some progress towards determining the nature of the higher rate of employment separation for teenagers. Its effect on unemployment originates primarily among those who have been employed full time. The higher incidence of part time employment among teenagers and a higher associated rate of labour market flows does not appear to lead to higher unemployment. Nor does the effect of a high rate of inflow of school leavers in the summer months appear to be an important reason for higher rates of teenage unemployment.

However, on the more fundamental question as to the relative importance of teenagers "shopping around" for jobs and whether teenagers fill a disproportionate share of bad jobs we are yet to make much progress.

V. Concluding Remarks

Our major points can be grouped into two sets. One set of points is purely descriptive of the ratios that can be calculated from the gross flow data. It includes comments such as:

- the probability of finding a job from the unemployment pool is the same for male teenagers and males aged 25-54 years. It is marginally lower for teenage

females. Higher rates of teenage unemployment therefore do not appear to relate to particular disadvantages of teenagers at job finding;

- on average, teenagers spend less time in a continuous spell of unemployment than prime age males. The reason for the shorter duration of teenage unemployment, however, is that one-third of the teenage unemployed leave unemployment and the labour force within a month;
- on average, teenagers leave employment at about five times the rate of prime age males;
- for all groups the probability of finding a job within four weeks is higher upon entry to the labour force than the probability of finding a job from the unemployment pool.

These averages naturally conceal wide ranges of personal labour market experience within each group but they do serve to summarise the labour market dynamics of the groups. The accuracy of the statements depends upon the quality and the nature of the gross flow data and the period of analysis. It is noteworthy that most of these descriptions of the Australian labour market are very similar to descriptions of the US labour market. They suggest that the principal difference between labour market flows of teenagers and prime age males is that teenagers separate from employment at a much faster rate. The higher rate of teenage unemployment appears to stem not from a greater difficulty of finding a job, or a longer spell of unemployment, but from a

higher rate of inflow to unemployment particularly from employment.

Our second set of points arises from the application of a steady state assumption to the gross flow data. The steady state assumption enables us to derive explicit relationships between labour market stock ratios and the probabilities of labour market flows. We can use these relationships to estimate the effect of different flow patterns upon unemployment. On the basis of these relationships we conclude that:

- the higher level of employment separation 'explains' at least 90 per cent of the higher rate of teenage unemployment relative to males aged 25-54 years;
- the principal source of the effect of employment separation upon unemployment is the high propensity of teenagers to be separated from full-time jobs. Labour market flows involving part-time employment account for little of the unemployment rate differences between teenagers and prime age males;
- the weaker labour force attachment of teenagers relative to prime age males does not affect the relative unemployment rates to any significant degree;
- differences in job finding ability do not contribute significantly to differences in the unemployment experience of the groups.

The accuracy of these estimates depends upon the nature of the technique used and usefulness of the steady state assumption over the period 1979-80. Experience from US research suggests that the major results are unlikely to be very sensitive to the approximation involved in the steady state assumption.

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APPENDIX 1

The four states in this system are full time employment, F, part time employment, P, unemployment, U, and not in the labour force, N. Transition probabilities are denoted by pairs of the lower case letters, f, p, u and n.

Under steady state conditions, the stock ratios are calculated in essentially the same way as for the three state system. Flows into and out of the states are equated in the following expressions:

$$pf.P + uf.U + nf.N = (fp + fu + fn).F$$

$$fp.F + up.U + np.N = (pf + pu + pn).P \quad (1)$$

$$\text{and } fu.F + pu.P + nu.N = (uf + up + un).U$$

Eliminating pairs of stock variables from these equations enables expressions to be derived for the ratios F/U, P/U and N/U in terms of the transition probabilities.

The unemployment rate can then be expressed in terms of these ratios, and hence in terms of the probabilities of movements between the four states, as $U/(F + P + U)$, or $1/(1 + F/U + P/U)$, and the participation rate as $(1 + F/U + P/U)/(1 + F/U + P/U + N/U)$.

The ratio expressions are in fact very much more complicated algebraically than for the three state system, but a suitable system of notation does enable them to be presented in reasonably concise terms, as follows:

$$F/U = \frac{uf + ssupn.snf + ssunp.spf}{fu + ssfpn.snu + ssfnp.spu} \quad (2)$$

$$P/U = \frac{up + ssufn.snp + ssunf.sfp}{pu + ssfpn.snu + ssnpf.sfu} \quad (3)$$

$$\text{and } N/U = \frac{un + ssufp.spn + ssupf.sfn}{nu + ssnfp.spu + ssnpf.sfu} \quad (4)$$

where terms of the form "snf" are defined as

$$snf = nf/(nf + np + nu)$$

$$\text{and } spn = pn/(pf + pn + pu),$$

and terms of the form "ssupn" are defined as

$$ssupn = (un + up.spn)/(1 - spn.snp)$$

$$\text{and } ssufp = (up + uf.sfp)/(1 - sfp.spf).$$

