largely been in the non-service area and in the private sector. The argument runs that inefficiencies and wasteful practices have built up over many years in non-service enterprises which can be relatively easily traded for wage increases. Of course, this points to a danger in institutionalizing the productivity trade-off exercise in that workers may see mileage in storing up inefficient practices.

There would appear to be problems for second tier negotiations in enterprises with little "fat" in the way of inefficiencies — it is discriminatory against workers employed in lean, efficient enterprises —and in the public sector. While it is clear that public sector employees can implement many changes with a view to the improvement of efficiency, because most public sector organizations do not charge market prices for their services or raise their own revenue, a wage increase can only be granted with extra government spending or a reduction in the number of employees. Either option is problematic. Thus, second tier negotiations in the public sector are likely to create some difficulties.

Notwithstanding, the overall verdict on the second tier as it has operated thus far is favourable. Labour economists have long recognized that movements in unit labour costs, rather than wages, are important. Thus wage increases offset by productivity improvements may leave unit labour costs unchanged or they may actually decline. As such, the impact of Australia's competitiveness is clearly beneficial. Moreover, the second tier has shifted the focus of attention away from wages alone to productivity; countries with a "productivity culture" (and often high real wages) such as Japan, West Germany and Sweden would appear to be the successful economies. Finally, the locus of bargaining has moved from a high centralized level to a decentralized, enterprise-level. To be sure, the parties will have had to acquire negotiating skills not previously required. Unions have needed to upgrade the organizer's function and, in some cases, employ more organizers. The end result, however, has been that management and unions/workers are "talking" at the enterprise level, which is likely to have wider beneficial consequences than a mere reading of the second tier decisions would suggest.

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Endnote

1. The authors gratefully acknowledge the assistance given to them by Professor Keith Hancock, Deputy President of the Australian Conciliation and Arbitration Commission, and Tim Harcourt in obtaining the second tier decisions.

What is the Full Employment Unemployment Rate?: Some Empirical Evidence of Structural Unemployment in Australia, 1966 to 1986

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Introduction

Australia has recently witnessed growth in employment which has compared favourably with contemporary trends in job creation in other economies and with our own historical achievements. Despite the growth, we have not seen a large decline in the national unemployment rate. Various explanations have been offered to explain this disturbing paradox. A popular account suggests that the full employment unemployment rate (FNUR) has risen from around 2 per cent in the 1960s to 8 per cent in the 1980s.

This article assesses the claim that a structural deterioration in our unemployment situation has occurred. The next section briefly reviews the concepts of structural and cyclical unemployment. The third section examines some indicators of structural changes in the labour market and calculates the effects of compositional changes in the labour force on the aggregate unemployment rate. Further, an index of structural unemployment which traces changes in the distribution of the burden of unemployment across specific labour force groups over time is calculated. The following section employs a regression framework designed to measure the possible structural (time) effects on the unemployment rate. We conclude that some unexplained structural effects have occurred in the Australian labour market since 1966 but they are not large enough to support the view that the FNUR is now around 8 per cent.

Structural and Cyclical Unemployment Hypotheses

Demand deficient unemployment occurs when the number of people wanting gainful employment exceeds the number of vacancies being offered. The composition of the unemployed relative to the skills demanded is not the binding constraint. Alternatively, the classification of unemployment as structural describes unemployment that results from imbalances in the supply of, and demand for, labour in a disaggregated context. A simple case arises which highlights the difference as to which constraint is promoting the unemployment. If at the aggregate level the number of unemployed is equal to the number of vacancies then (abstracting from seasonal and frictional influences) this unemployment would be termed structural.

Structuralists suggest that structural imbalances can originate from both the demand and supply sides of the economy. Technological changes, changes in the pattern of consumption, compositional movements in the labour force and welfare programme distortions are among the pot-pourri of influences listed as promoting the structural shifts.

The distinction between demand deficient and structural unemployment is usually considered important at the policy level. Macro policy will alleviate demand deficient unemployment, while micro policies are needed to redress the demand and supply mismatching characteristic of structural unemployment. In the latter case, macro expansion may be futile and inflationary.

Recently, some economists have argued that structural changes may be cyclical in nature (the hysteresis effect). A prolonged recession may create conditions in the labour market which mimic structural imbalance but which can be redressed through aggregate policy without fuelling inflation (see Mitchell 1987).

Very little econometric work has been done in Australia to determine whether the FNUR has risen to 8 per cent. A major difficulty is that proximate indicators of the structural factors must be relied upon because the underlying structural characteristics are largely unobservable. The Organisation for Economic Cooperation and Development (1986), for example, argues that wage equation studies relating the level of unemployment relative to the labour force where wage and hence price inflation is stable reveal that the non-accelerating inflation rate of unemployment (NAIRU) has risen. However, a number of articles have recently shown the possible flaws in this approach to deducing the natural rate of

unemployment from aggregate wage and price equations (see Mitchell 1987).[1]

Despite this difficulty several indicators of labour market activity can be examined to help us assess in probabilistic terms, at least, the relative strengths of the various hypotheses seeking to explain the current unemployment situation.

Some Simple Empirical Indicators of Structuralism

Compositional Changes in the Labour Force

Perry (1970), seeking a 'non-natural' explanation for the ostensible shift in the Phillip's curve during the late 1960s, popularized the idea that the FNUR had increased because the share of groups with higher than average unemployment rates in the labour force had increased.[2] Mitchell (1984 p.137) argues that " ... if demographic factors are to blame for the upward shift in Australia's unemployment rate, then the groups experiencing high unemployment rates must have grown drastically as a proportion of the work force. This has not been the case in Australia, where conflicting tendencies have been at work".

Table 1 confirms this conclusion. The unemployment rate in column 2 is the specific unemployment rate for the group in question as at November 1985 and the aggregate unemployment rate (total) is the weighted-average of these specific rates using 1985 labour force weights. Column 5 calculates the weighted-average of the specific unemployment rates as at November 1985 using the labour force weights which prevailed in November 1968. Thus, the adjusted unemployment rate shows the unemployment rate which would have existed in November 1985 if the composition of the labour force with respect to age and sex had been the same as it was in November 1968. The male unemployment rate would have been lower (by only 0.07 percentage points), while the female rate would have been slightly higher (by 0.71 percentage points). The aggregate (persons) rate is 0.3 percentage points higher when age-sex changes are allowed for.

Columns 6 and 7 show the changing percentage contributions of each specific age-sex group to the relevant aggregate 1985 unemployment rate. This change is expressed in terms of the compositional variations that have occurred since 1968. The offsetting nature of the compositional changes is clearly shown. For example, the 15-19 group (for persons) now contributes less to the aggregate unemployment rate in weighted, relative terms. Smaller contributions are also made by the above 45 years group.

Table 1: Comparison between November 1985 Unemployment Rates (UNE Rates) by Age and Sex using Current and 1968 Labour Force Weights

Age Group	November 1985 UNE Rate	LF Weight		Weighted UNE Rate		Contribution to Total 1985 UNE Rate (per cent)	
		1985	1968	1985 Weight	1968 Weight	1985 Weight	1968 Weight
Males							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
15-19	16.6	0.09	0.09	1.49	1.49	21.50	21.63
20-24	10.9	0.13	0.13	1.42	1.42	20.44	20.62
25-34	6.1	0.27	0.22	1.65	1.34	23.75	19.46
35-44	4.0	0.24	0.22	0.96	0.88	13.83	12.78
45-54	4.6	0.16	0.19	0.74	0.87	10.65	12.63
55-59	6.0	0.07	0.09	0.42	0.54	6.05	7.84
60-64	6.8	0.04	0.05	0.27	0.34	3.88	4.94
Total		1.00	1.00	6.95	6.88	100.00	100.00
Females							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
15-19	18.6	0.13	0.19	2.42	3.53	30.06	40.31
20-24	9.1	0.17	0.19	1.55	1.73	19.25	19.75
25-34	6.9	0.26	0.17	1.79	1.17	22.24	13.35
35-44	5.9	0.24	0.20	1.42	1.18	17.64	13.47
45-54	4.6	0.14	0.17	0.64	0.78	7.95	8.91
55-64	4.5	0.05	0.08	0.23	0.36	2.86	4.11
Total		1.00	1.00	8.05	8.76	100.00	100.00
Persons							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
15-19	17.6	0.10	0.13	1.76	2.29	24.02	30.00
20-24	10.1	0.15	0.15	1.52	1.52	24.74	19.92
25-34	6.4	0.27	0.21	1.73	1.34	23.61	17.56
35-44	4.7	0.24	0.21	1.13	0.99	15.42	12.98
45-54	4.6	0.15	0.19	0.69	0.87	9.42	11.40
55-59	5.6	0.06	0.07	0.34	0.39	4.64	5.11
60-64	5.7	0.03	0.04	0.17	0.23	2.32	3.00
Total		1.00	1.00	7.33	7.63	100.00	100.00

Note:
All weights are calculated with respect to the relevant total labour force total. Labour force participants in the age group >65 were deducted from each sex category.

Sources:
ABS, *The Labour Force*, Cat. No. 6203.
ABS, *The Labour Force, 1964 to 1968, Historical Supplement*, Ref. No. 6.22.

On the other hand, the 20-44 prime-age group is now relatively more important in weighted terms as a consequence of the labour force changes.

Consequently, we reject the view that compositional changes in the labour force have been responsible for anything but the smallest increase in the aggregate unemployment rate (based on age-sex participation adjustments).

The Structure of Unemployment

How has aggregate unemployment been distributed across the labour force? At any point in time a number of distributions of unemployment rates among the various labour force groups can be consistent with any one aggregate unemployment rate. The more disproportionate the dispersion in unemployment relative to the labour force distribution, the greater will be the proportion of unemployment accounted for by structural unemployment.

The structure of unemployment has been defined as the distribution of the unemployed among different groups of workers relative to the distribution of the labour force (Kleiman 1968, p.146). The structure of unemployment therefore changes whenever the unemployment rates of specific labour force groups exhibit non-equiproportionate movements. These changes could be due to structural variations in the composition of final consumer demand, to frictional factors whereby some workers (in specific labour force cohorts) move between jobs more quickly than others, or to aggregate demand fluctuations impacting unevenly across the labour market groups.[3]

A useful ratio can be constructed which measures the relative variation of the unemployment rate of the unemployed to the unemployment rate of the labour force in general. From the point of view of the person unemployed, the probability of leaving unemployment is inversely related to the unemployment rate of the specific labour force group to which that worker belongs. The *average* unemployed worker's probability of resuming employment, therefore is related to the unemployment rate of the sector to which the *average* unemployed worker belongs. This rate (u^*) is defined as the average of the individual group unemployment rates weighted by the composition of unemployment.

If ur_i is the specific unemployment rate of the i^{th} group, u_i is the total unemployed belonging to the ith group, and u is total unemployment, then:

$$u^* = \Sigma\ ur_i\ \frac{u_i}{u}$$

The aggregate unemployment rate (**urt**) is the labour force weighted average of the specific unemployment and represents the probability that the average worker in the labour force will become unemployed. Thus if L_i is the labour force of the ith group and L is the total labour force, then:

$$urt = \Sigma\ ur_i\ \frac{L_i}{L}$$

If the specific group unemployment is proportional to the labour force distribution, u^* will equal **urt**. The ratio u^*/urt, which we term the Structural Unemployment Index (SUI), indicated the extent to which unemployment is distributed disproportionately with respect to labour force composition across specific groups.

The SUI will only change if changes in the aggregate unemployment rate for the group in question are associated with changes in the dispersion of unemployment rates for the groups comprising the aggregate (see Hirschman 1964). Thus if large variations in the SUI occur when the overall unemployment rate fluctuates it is indicative of the changing fortunes of the various groups. Figure 1 shows the male and female SUI's plotted against time.

The male index (SUIM) is above the female index (SUIF) for most years although the overall unemployment level was higher among females over the sample period. A plausible explanation for this could relate to a lower degree of relative specialization among females and greater relative homogeneity of skills within female occupations. Both indices clearly rise as the overall level of unemployment rises.

Figures 2 and 3 plot the SUIM and SUIF against the aggregate unemployment rate respectively. In terms of the structural hypothesis there appears to be a distinct change in the relationship between SUIF and **urt** since 1975. For males, the change is similar but less intense. Of note is the fact that both indices rose during the mid-70s as **urt** increased, but have fallen again despite the persistence of high aggregate unemployment rates. This means that the unemployment burden has become more evenly distributed across labour force groups over time, which is a result more consistent with a demand deficient economy rather than an economy stricken by structural imbalance.

Proportionality or Structural Shifts? — A Regression Framework

The analysis in the previous section, albeit simple and selective, does not suggest that large scale structural deterioration in the labour market has

Figure 1: Structural Unemployment Indices

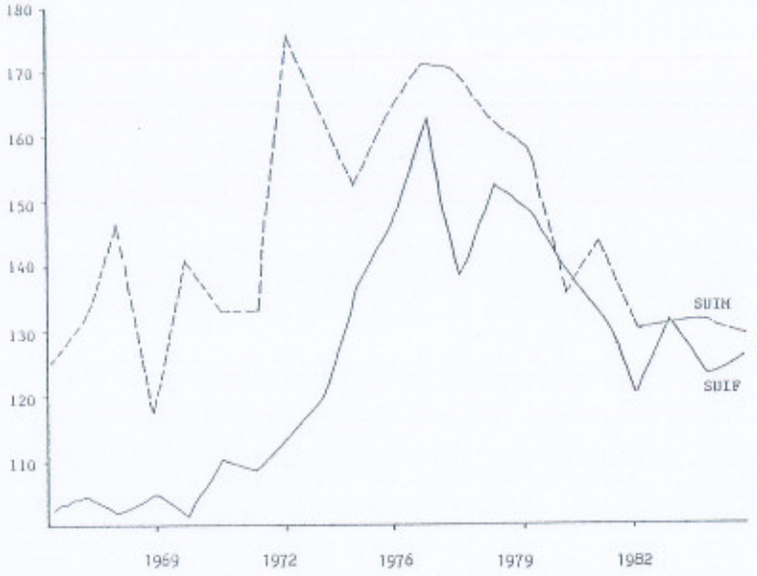


Figure 2: SUIM and the aggregate Unemployment Rate

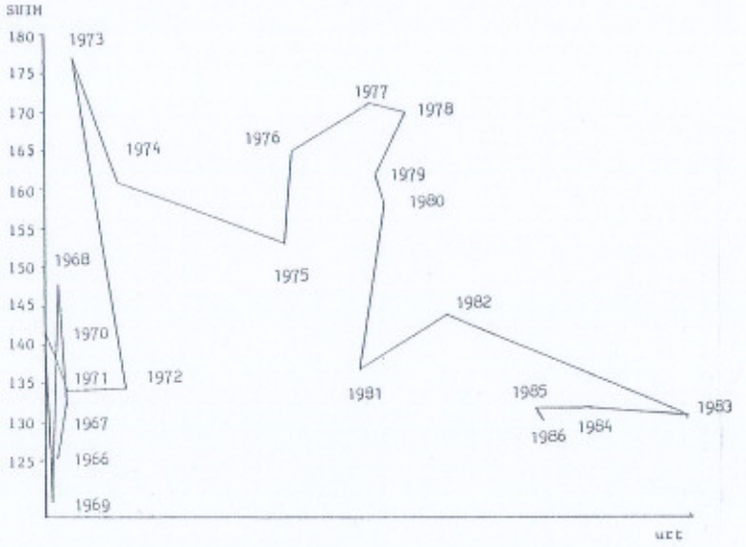


Figure 3: SUIF and the aggregate Unemployment Rate

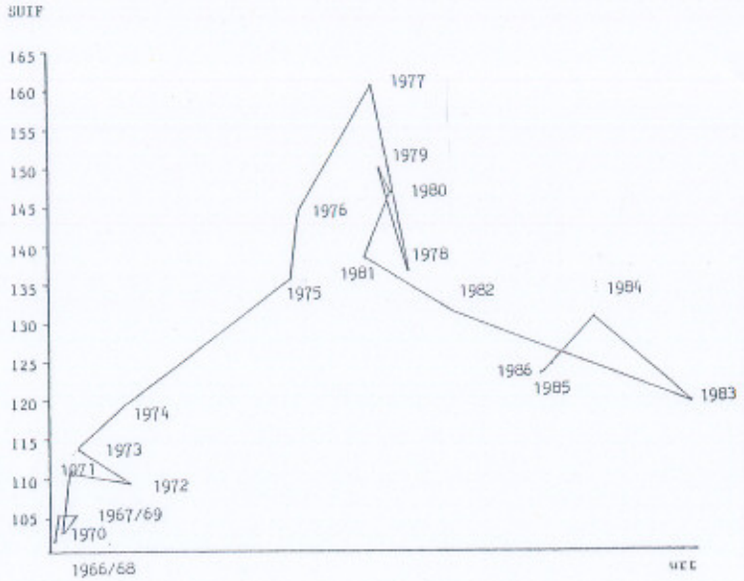
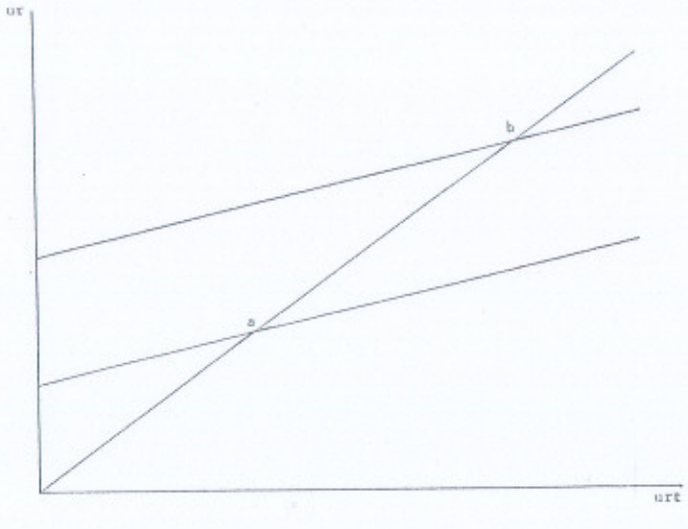


Figure 4: Structural and Cyclical Shifts



occurred. In this section, regression analysis is used to examine the structural hypothesis in more detail. At any point in time the unemployment rate of a specific age-sex group (**ur**) can be modelled as a function of the aggregate unemployment rate (**urt**) and other unspecified factors. Referring to Figure 4, let **a** and **b** represent observations of **ur** and **urt** at two points in time. We could interpret the rise in **ur** as a movement along some given function indicating a downturn in the business cycle. An alternative view could explain the movement from **a** to **b** in terms of a structural shift in the function. The shift could be gradual over time or the result of a sudden change. A related hypothesis is that the slope of the function could change.

Each of these hypotheses can be nested in a simple econometric model. We use the following equation:

$$ur_t = \alpha_0 + \alpha_1 \; urt_t + \alpha_2 \; time + e_t \qquad (1)$$

where **ur** and **urt** are as defined above, **time** is a linear time trend, and **e** is a random noise term.

Three structural hypotheses can potentially be examined in this model:

(a) that the functional relationship between **ur** and **urt** has shifted smoothly over time (evidenced by a significant time coefficient);

(b) that the relationship has shifted in a one-off or sudden way at some specific point in time (evidenced by any finding of instability in the equations); and

(c) that the function has changed its slope.[4]

We should clearly note that our model does not allow us to draw conclusions about the specific source of any detected structural changes. If the variables designed to capture (a), (b) and (c) are statistically significant then the structural hypotheses in general cannot be hastily rejected. However, in distinguishing smooth from discontinuous shifts the model may guide our thinking about the likely factors involved.

Unemployment by Sex

Equation (1) was initially estimated for males and females using quarterly data. The results for males are reported in Table 2. Some problems with autocorrelation were encountered although serious misspecification is not indicated. The signs and the magnitudes of the coefficients are plausible and the equations satisfied some more detailed diagnostic testing (reset test, parameter constancy tests and LM tests for residual variance were all satisfactory).

Table 2: Male Unemployment Rate Regressions: 1967(1) to 1986(3)

Variable	Equation			
	2.1(a)	2.2(a)	2.3(a)	2.4(b)
Constant	-0.50	1.21	1.35	0.89
	(31.41)	(1.52)	(1.76)	(0.99)
Time	0.003	0.004	0.004	0.004
	(3.78)	(4.33)	(4.35)	(4.27)
urt	1.13	1.13	1.14	1.13
	(45.78)	(46.91)	(48.38)	(43.35)
fpr		-0.47	-0.51	-0.38
		(2.16)	(2.43)	(1.57)
D704			0.12	0.11
			(2.61)	(2.59)
R^2	0.99	0.99	0.99	
S.E. (x 100)	4.56	4.43	4.23	4.05
DW	1.17	1.25	1.23	1.14

Notes:

t statistics in parentheses.

(a) Equations were estimated for 1967(1) to 1986(3) using OLS. The dependent variable in each case was the log of the male unemployment rate regressed on a constant, a linear time trend, the log of the aggregate unemployment rate (urt), the log of the female participation rate (fpr) and seasonal dummies. D704 is a dummy equal to unity in 1970(4) and zero otherwise.

(b) Instrumental variable estimation for 1968(2) to 1986(3) with urt and fpr being instrumented. Instruments used were urt (-1), urt (-2), fpr (-1), fpr (-2) and other exogenous regressors in the model. A Durbin-Hausman test for the endogeneity of urt and frp was performed. The null hypothesis (of no endogeneity) was accepted and thus it is not surprising that the instrumental variables estimates reported in equation 2.4 are very similar to the OLS counterpart in equation 2.3.

The aggregate unemployment rate dominates the level of the male unemployment rate and the results indicate that males suffer disproportionately in a recession. All equations reveal that a significant upward trend has occurred, increasing the male unemployment rate for any given aggregate unemployment rate by approximately 1.25 per cent over the entire sample.

No structural breaks in the basic model were detected despite some instability in the early 1970s. An examination of the residuals from equation 2.2 (in Table 2) reveals that some instability occurred in 1970(4). In equation 2.3, a dummy (**D704**) was included and an examination of the latter indicated that a significant shock to the relations occurred in this quarter.

Table 3: Female Unemployment Rate Regressions: 1967(1) to 1986(3)

Variable	Equation 3.1[(a)]	3.2[(a)]	3.3[(c)]	3.4[(d)]	3.5[(d)]
Constant	-1.03	-2.92	-2.58	-0.21	-1.68
	(1.23)	(2.95)	(2.26)	(0.18)	(1.13)
Time	-0.005	-0.009	-0.01	-0.005	-0.007
	(5.91)	(6.31)	(6.51)	(3.03)	(4.21)
urt	0.88	0.91	0.95	0.91	0.71
	(34.87)	(35.75)	(33.13)	(30.09)	(15.75)
fpr	0.45	0.98	0.89	0.27	0.75
	(1.97)	(3.57)	(2.82)	(0.67)	(1.87)
D7986		0.08	0.09		
		(3.13)	(3.85)		
R^2	0.99	0.99		0.99	0.98
S.E. (x 100)	4.65	4.38	4.11	4.27	2.39
DW	0.77	0.87	0.79	1.10	1.82

Notes:

t statistics in parentheses.

(a) See note (a), Table 2.

(b) D7986 is a dummy variable equal to zero until 1979(3) and unity thereafter.

(c) See note (b), Table 2.

(d) Equation 3.4 was estimated over 1967(1) to 1979(2) whereas equation 3.5 was estimated over 1979(3) to 1986(3). The F[7,65] statistic for parameter constancy in equation 3.1 was equal to 6.599 indicating that the split in the sample at 1979(2) is significant.

One possible influence on unemployment rates is the level of labour force participation. The male participation rate however was found to exert no influence. Following Wachter (1976), the female participation rate (**fpr**) was included to pick up possible substitution effects. Equation 2.2 indicates that the male unemployment rate is favourably affected by the increased fpr over the sample period.[5]

In contrast to the male results, equation 3.1 in Table 3 shows that the relative position of females improved over time. Time factors account for a 1.5 per cent decrease in the level of the female unemployment rate for any given **urt**. Time factors appear to be a more important part of the explanation for females compared to males.[6] Another difference is that females do not suffer as much as males when **urt** increases.

The **fpr** variable was significant and reveals that increases in the female participation rate has exerted upward pressure on the female unemployment rate. This could suggest that the increased female participation

observed over the sample period was not induced by an increased demand for female labour but was more likely to be the result of supply side changes (attitude to women, etc.).

Equation 3.2 includes a dummy variable (**D7986**) because evidence of instability in the behaviour of the residuals was detected in equation 3.1 for the post 1979 period. The significance of this term indicates that after 1979(3) the female unemployment rate was a level higher than it was in the earlier period. Estimation of the female equations was plagued by serial correlation problems and other evidence of misspecification (appropriate reset and LM tests were not favourable). These problems would be consistent with a structural break in the model. An F-test for within-sample parameter constancy (sample split at 1979(3)) did not support the null and this confirms the conclusion drawn from equation 3.2 (significance of **D7986**) that a structural break occurred in the model in the late 1970s. It is clear that problems of misspecification are reduced when the model is estimated for the later period.

The equations were also estimated in difference form with the constant term indicating the significance of time factors. Simple quarterly changes (assuming rho=1) were unsatisfactory but a four quarter change specification appeared to overcome the severe autocorrelation and confirmed the results in equation 3.3 with respect to the significance, signs and magnitudes of the regressors used.[7]

Unemployment by Age and Sex

The highly aggregated male and female regressions only measure broad labour market changes. The model for males and females was disaggregated into age groups and re-estimated to explore age effects. A popular *a priori* expectation is that significant time effects should be found for the young (both sexes) and less so for the prime-age groups. The disaggregation was not without a cost. Annual data (August quarter) was only available and this reduces the degrees of freedom considerably. Caution must therefore be exercised in interpreting the results.

Table 4 reports the results for males from 1966 to 1986. Equations 4.1 and 4.2 focus on the 15-19 age group. As expected this group suffers disproportionately in a cyclical downturn (a 1.15 per cent increase in their unemployment rate for every 1.00 per cent increase in the national unemployment rate in equation 4.2). This result can be explained by the use of last-in-first-out hiring practices (especially in the relatively unskilled occupations) and the lack of experience and training among the youth.

The hypothesis of a smooth structural deterioration in the relative position of this group is not rejected by the results. Over the sample period

Table 4: Male Unemployment Regressions by Age Groups, 1966 - 1986[a]

Variable	Age Group 15-19		20-24	35-44	45-54
	Equation 4.1	4.2	4.3	4.4	4.5
Constant	0.24[b]	0.19[b]	-0.20	-0.73	-0.74
	(2.74)	(2.55)	(5.84)	(20.80)	(13.75)
Time	0.04	0.02	0.03	0.00	-0.03
	(2.21)	(1.37)	(3.21)	(0.21)	(2.40)
urt	1.02	1.15	1.15	1.05	1.44
	(8.73)	(10.13)	(15.19)	(14.66)	(10.02)
Pop15[c]	3.38	2.80			
	(2.81)	(2.62)			
D73[d]		0.28			
		(2.55)			
D7881[d]				0.25	
				(6.64)	
D7580[d]					-0.29
					(3.98)
R^2	0.98	0.99	0.99	0.99	0.98
S.E. (x 100)	10.92	9.48	7.31	7.38	11.38
DW	1.90	2.20	1.82	2.25	1.96

Notes:

t statistics in parentheses.

(a) OLS regressions with the log of the specific unemployment rate regressed on a constant, the log of the aggregate unemployment rate (urt), a linear time trend, a population variable, and dummy variables where appropriate.

(b) Constant times 100.

(c) Pop15 represents the total number of working age 15-19 year olds relative to the total working age population.

(d) D73 = 1 in 1973, zero otherwise; D7881 = 1 for 1978 to 1981 (inclusive) and zero otherwise; D7580 = 1 for 1975 to 1980 (inclusive) and zero otherwise.

gradual increases in the 15-19 year old male unemployment rate for any given aggregate unemployment rate is estimated to be approximately 2.50 per cent, a significant though small change. Equation 4.2 shows that some instability was detected in 1973, when a one-off increase in the group's unemployment rate occurred. Evidence of significant supply effects (independent of cyclical participation changes) was found.

Equation 4.3 for 20-24 year olds shows that recession impacts disproportionately. Statistically significant structural shifts are detected, and over

Table 5: Female Unemployment by Age Groups, 1966 - 1986[a]

Variable	Age Group 15-19			20-24	35-44
	Equation 5.1	5.2	5.3	5.4	5.5
Constant	0.13	0.11	0.13	0.57	-0.70
	(6.78)	(5.38)	(8.03)	(14.47)	(3.19)
Time	0.05	0.04	0.05	-0.02	-0.02
	(3.34)	(3.25)	(4.77)	(1.81)	(2.44)
urt	0.97	0.78	0.84	0.98	0.30
	(10.20)	(5.33)	(7.79)	(11.92)	(5.35)
Pop15[b]	6.20	5.03	6.26		
	(6.32)	(4.84)	(7.37)		
D75[c]		0.30	0.22		
		(2.28)	(2.08)		
D78[c]			-0.25		
			(3.65)		
D7881[c]				0.12	
				(2.35)	
Pop24[b]					-8.17
					(3.59)
D71[c]					-0.19
					(3.19)
R^2	0.98	0.99	0.99	0.98	0.95
S.E. (x 100)	8.89	8.04	6.04	8.00	5.45
DW	1.72	1.81	1.22	2.51	1.93

Notes:

t statistics in parentheses.

(a) See note (a) Table 4.

(b) See note (c), Table 4. Pop24 is the corresponding ratio for the 24-65 years old group.

(c) D73 = 1 after 1975, zero before; D78 = 1 in 1978, zero otherwise; and D71 = 1 in 1971 and zero otherwise.

the sample period account for an autonomous increase in the 20-24 year olds unemployment rate of approximately 1.9 per cent. No sudden shocks or supply effects were detected.

Equation 4.4 shows the prime-age male unemployment experience is dominated by near proportional cyclical effects (the 95 per cent confidence interval on **urt** is 0.91 to 1.19). When dummy variables were used in equation 4.5 to correct for instability in the late 1970s, the time effects were found to be negligible. The results for the older male prime-age group

did not mirror the 35-44 year olds' group. This group clearly suffer disproportionately in the downturn, possibly due to redundancy and skill obsolescence. Significant favourable time effects are also revealed.

Table 5 reports similar regressions for female age groups. While the time effects replicate the results for the male (15-19 group), equations 5.1 and 5.2 suggest that the cyclical impact on the females is lower. Supply effects were found to be a significant influence in explaining the upward rise in this cohort's unemployment rate. Equation 5.1 was not stable and a dummy variable **D75** in equation 5.2 indicates that a significant structural break in the model occurs after 1975.

Equation 5.5 shows that the severity of the cycle decreases as age increases, a result which is explained by the idea that firms and workers form long-term attachments which go beyond the cycle. Prime-age females appear to be even more insulated from cyclical downturns than their male counterparts. Gradual time effects, while detrimental to the 15-19 year old age group, appear to be favourable for older females. Unfortunately, data restrictions did not allow regressions for older females to be estimated.

Conclusion

The basic findings of this research can be summarized by the following points:

- Unemployment rates in Australia since 1967 for a variety of age groups (both males and females) are predominantly a function of cyclical factors.
- Structural changes have influenced unemployment rates. The position of certain demographic groups has deteriorated while for others the relative change has been favourable. The SUI for males and females suggest that some dislocation (that is, increased severity in the structure of unemployment) occurred in the labour market during the mid-1970s but that unemployment is now more evenly distributed with respect to labour force composition.
- Participation rate changes only appear to influence the unemployment rate of young males and females.
- The overriding evidence derived from an array of indicators consistently point to a 'structural rise' in the unemployment rate of approximately 2 to 3 per cent. The FNUR may, therefore, realistically be considered to be around 4 to 4.5 per cent of the labour force. A figure of 8 per cent is unsupported and would appear to be imaginative.

Unfortunately, the type of questions we would like to ask are difficult to translate into concepts which can be meaningfully tested against the available data. This article has used a range of proximate indicators to provide some limited insight into the questions which labour economists find bedevilling. The author recognises the problems which are associated with most of the results reported and prefers them to be seen as part of an on-going attempt to paint a more finely detailed picture. Clearly, the study has exposed a range of interesting statistical facts which require more empirical analysis, guided by carefully formulated theory.

Endnotes

1. The NAIRU and the FNUR are not equivalent although they are usually considered to be. The former relates some specific unemployment rate to a steady rate of inflation, whereas the latter is more generally a description of quantity relations (demand and supply) in the labour market.
2. Other decompositions could be studied, like changing educational or industrial composition, which would tend to lower the aggregate unemployment rate over time.
3. The structure of unemployment can be distinguished from the conventional notion of structural unemployment which is usually defined in terms of non-cyclical causes.
4. Attempts to distinguish between shift and slope changes in the empirical analysis were hampered by collinearity problems (largely data based) and the results are not reported.
5. The population variable was the working age population in the relevant age-sex group as a proportion of the total population of working age. A relative labour force variable was also used but due to the obvious endogeneity of the latter the more general population variable was considered superior (see Wachter 1976).
6. The partial correlation coefficients for the time variable in male and female equations were 0.16 in equation 2.1, 0.21 in equation 2.2, 0.21 in equation 2.3, 0.33 in equation 3.1 and 0.35 in equation 3.2.
7. The regressions were re-estimated after a maximum likelihood correction for first order serial correlation was made. The results were not significantly different from the uncorrected estimates. The full range of results are available from the author.

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