

Safety Net Review – Wages

2001-2002

**Commonwealth Submission
Appendixes**

1 March 2002

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DEVELOPMENTS IN THE WAGES SYSTEM

DEVELOPMENTS IN THE WAGES SYSTEM

Introduction

A.1 This appendix outlines developments in pay setting arrangements and agreement making based on updated data from the Australian Bureau of Statistics (ABS), DEWR and the Office of the Employment Advocate (OEA). The appendix is intended to assist the Commission in its consideration of the ACTU's claim.¹

A.2 The appendix includes final data from the May 2000 ABS Survey of Employee Earnings and Hours (EEH Survey) showing the coverage of employees by pay setting arrangements and the characteristics of employees paid under different arrangements. The survey shows that while award reliance has declined from 67.6 per cent in May 1990 to 23.2 per cent in May 2000, some 1.8 million non-farm employees continue to rely on either federal or State awards.

A.3 The EEH Survey also revealed that award reliance was higher among part-time employees and employees in low skilled occupations, compared to full-time employees or employees in higher skilled occupations. In addition, the survey provided data on the average weekly earnings of employees under different pay setting methods. These data show that on average, lower paid employees are more likely to be paid at the award rate than employees in general. The data also confirm that the

¹ As there is no new data on award and agreement coverage since the 2000- 2001 Safety Net Review - Wages, we have included final estimates from the EEH Survey and some hitherto unpublished data. The ABS will be conducting another survey on Employee Earnings and Hours in May 2002 and preliminary data can be expected in December 2002. The ABS will be conducting another survey on Employee Earnings and Hours in May 2002 and preliminary data can be expected in December 2002.

award system is acting as a safety net that protects lower paid employees as required by the *Workplace Relations Act 1996* (WR Act).

A.4 The appendix shows that while agreement making continues to grow and mature, certain types of industries and workplaces remain where the penetration of bargaining has been limited.

The spread of agreement making – the decline in award reliance

A.5 The final estimates from the ABS May 2000 Employee Earnings and Hours (EEH) Survey indicate that award reliance has fallen dramatically since the introduction of enterprise bargaining. In 1990, 67.6 per cent of employees were paid at an award rate (the remainder were paid overaward rates or were outside the award system). By 2000, this figure had fallen to 23.2 per cent.

A.6 Despite the decline in award reliance, some 1.8 million non-farm employees continue to rely on awards and a little less than half of these employees earn the equivalent of, or less than, the C10 rate.

A.7 The proportion of employees paid at the award rate varies significantly according to the characteristics of the employees and the characteristics of where they work.

A.8 As Table A.1 shows, award reliance was higher among part-time employees (39.9 per cent) than full-time employees (15.3 per cent). Unpublished EEH Survey data also show that the proportion of casual employees paid by award rates only (46.5 per cent) was higher compared to permanent employees paid award rates only (16.6 per cent).

A.9 Not surprisingly, the proportion of employees paid at award rates was higher than average in industries where part-time or casual employment was more likely to occur than permanent or full-time employment. For example, the proportion of employees paid by award rates only was relatively high in industries such as accommodation, cafes and restaurants (64.7 per cent), health and community services (37.4 per cent) and retail trade (34.9 per cent - see Table A.1). As women are more likely than men to work part-time or on a casual basis, and because they are more likely to be employed in the industries noted above, women were almost twice as likely as men to be reliant on awards (29.9 per cent, compared to 16.8 per cent respectively).

A.10 Employees in low skilled occupations were also more likely than employees in higher skilled occupations to be paid the award rate. For example, only 3.3 per cent of managers and administrators were paid on award rates compared to 42.0 per cent of elementary clerical, sales and service workers and 36.9 per cent of labourers and related workers.

A.11 Appendix B contains further information regarding the flow-on of Safety Net Adjustments (SNAs) and an industry analysis of awards receiving the SNAs.

Average earnings by pay setting methods

A.12 The EEH Survey shows a significant difference in weekly earnings across payment systems. However, in interpreting these data it is important to remember that they do not provide a like-for-like comparison. For example, the fact that employees paid at award rates have lower than average earnings partly reflects the fact that they are over-represented in occupations with relatively low wages. It also needs to be remembered that averages do not pick up the distribution of

household earnings. As we show in Chapter 7 of this submission a significant proportion of employees paid at award wage rates cannot be described as being ‘low paid’ in any overall sense.

Table A.1: Coverage of employees by pay setting arrangement, characteristics of employees

		Awards Only (%)	Collective Agreements*(%)	Individual Agreements*(%)
All employees		23.2	36.7	40.0
<i>Gender</i>	Males	16.8	36.7	46.5
	Females	29.9	36.7	33.3
<i>Full-time and part-time status</i>	Full-time	15.3	37.8	47.0
	Part-time	39.9	34.6	25.5
<i>Sector</i>	Private	26.8	23.8	49.3
	Public	9.8	84.8	5.5
<i>Employer size</i>				
Less than 20 employees		27.5	4.0	68.5
20 to 49 employees		31.8	11.9	56.4
50 to 99 employees		31.8	23.5	44.8
100 to 499 employees		28.5	40.2	31.4
500 to 999 employees		24.9	52.6	22.4
1000 or more employees		7.7	82.9	9.4
<i>Industry</i>				
Mining		5.9	39.7	54.3
Manufacturing		11.4	37.0	51.6
Electricity, gas and water supply		1.4	76.5	22.1
Construction		15.0	23.8	61.2
Wholesale trade		12.1	10.8	77.1
Retail trade		34.9	28.7	36.5
Accommodation, cafes and restaurants		64.7	6.7	28.6
Transport and storage		18.4	40.1	41.5
Communication services		1.5	69.4	29.1
Finance and insurance		5.6	49.9	44.4
Property and business services		20.7	11.1	68.2
Government administration and defence		15.3	77.9	6.8
Education		13.6	77.1	9.3
Health and community services		37.4	43.5	19.1
Cultural and recreational services		18.9	33.3	47.8
Personal and other services		27.1	42.8	30.1
<i>Occupation</i>				
Managers and administrators		3.3	22.9	73.8
Professionals		13.2	51.4	35.4
Associate professionals		12.2	33.8	54.1
Tradespersons and related workers		23.1	32.0	44.9
Advanced clerical and service workers		14.2	20.9	64.9
Intermediate clerical, sales and service workers		29.9	31.4	38.7
Intermediate production and transport workers		19.1	48.7	32.2
Elementary clerical, sales and service workers		42.0	36.9	21.1
Labourers and related workers		36.9	34.6	28.5

Source: ABS, Survey of Employee Earnings and Hours (Final), May 2000 (Cat No 6306.0).

A.13 With these caveats in mind, Table A.2 provides estimates of average earnings by payment system. The table shows that the average weekly ordinary time earnings (AWOTE) of full-time adult non-managerial employees on award rates was \$210.87 less than that for those on federal registered collective agreements (\$585.13 compared to \$796.00 respectively).²

A.14 In its written submission the ACTU provides data which compare average hourly ordinary time earnings of award workers with that of all employees. The ACTU uses the data as evidence of what it sees as a ‘growing divergence’ in the growth in award rates from those prevailing in the overall community. Our evidence in Chapter 6 refutes this, as it shows that employees on low award rates have experienced faster wages growth than employees in general over the last three years. However, it is true that lower paid employees are more likely to be paid at award wage rates than employees in general. This is consistent with the award system acting as a safety net that protects low paid employees, as required under the WR Act.

A.15 It is also important to note that the global picture masks important differences between industries. Table A.2 also provides AWOTE for full-time adult non-managerial employees by industry. It shows that in some industries, the weekly wages of employees paid the award rate and those paid by agreements are much closer. The most prominent examples are accommodation, cafes and restaurants and retail trade where the proportions of employees still paid by the award are significant and where AWOTE, regardless of how pay is set, is low compared to the average for

² Data from the EEH Survey on the proportions of employees by pay setting method indicate that the greatest proportion are paid by federal registered collective agreements (13.7 per cent), followed by state registered collective agreements (9.0 per cent) and lastly unregistered collective agreements (0.8 per cent).

all employees. The difference between award AWOTE and federal registered collective agreement AWOTE in these industries in May 2000 was \$90.61 and \$60.95 respectively.

Table A.2: Average weekly ordinary time earnings, full-time adult non-managerial employees, by pay setting method

	Awards only \$/week	Collective agreements (\$federal registered) \$/week	Collective agreements (\$State registered) \$/week	Collective agreements (\$un-registered) \$/week	Individual agreements (\$registered) \$/week	Individual agreements (\$un-registered) \$/week	Total \$/week
Mining	920.17	1324.47	1222.99	1450.30	1258.99	1157.36	1214.11
Manufacturing	508.44	726.95	635.15	622.62	715.71	671.75	668.73
Electricity, gas and water supply	679.18	908.01	876.41	na	883.38	1115.13	920.27
Construction	563.27	869.63	752.55	809.52	697.26	725.24	737.99
Wholesale trade	514.26	680.47	579.22	605.88	641.20	703.25	672.67
Retail trade	495.87	556.82	605.87	575.03	532.31	644.06	586.36
Accommodation, cafes & restaurants	560.74	651.35	522.26	na	592.23	595.66	575.34
Transport and storage	582.05	910.54	805.05	636.89	845.81	658.26	746.38
Communication services	638.75	847.21	na	na	864.69	944.29	857.44
Finance and insurance	688.01	767.26	721.27	861.75	662.53	824.08	782.46
Property and business services	557.05	765.44	776.50	596.01	630.00	820.41	767.09
Government administration & defence	745.06	757.03	760.51	712.23	964.54	784.43	761.86
Education	799.95	918.58	865.70	775.58	916.91	800.60	875.66
Health and community services	621.82	785.03	834.42	722.54	774.00	675.43	739.49
Cultural and recreational services	545.26	749.32	751.56	768.65	684.17	750.35	720.27
Personal and other services	594.22	879.39	937.07	743.79	618.46	709.65	791.55
Total	585.13	796.00	808.65	715.61	784.15	727.40	736.90

Source: ABS, Survey of Employee Earnings and Hours (Final), May 2000 (Cat No 6306.0).

Evidence from the Workplace Agreements Database

A.16 Evidence from the WAD³ shows clearly that agreement making in the federal jurisdiction continues to grow, although the rate of growth has

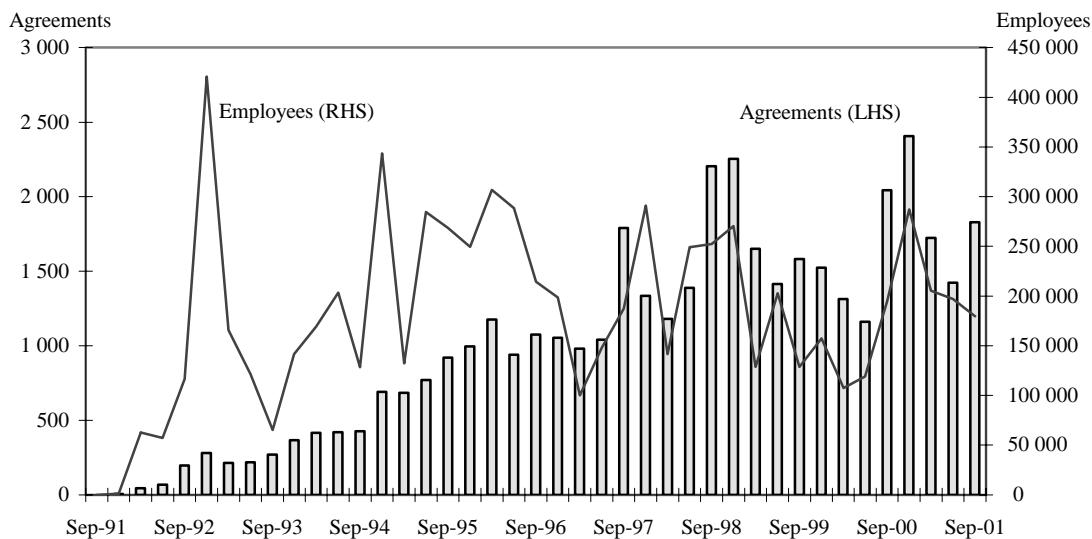
³ DEWR maintains the most comprehensive database of federal collective agreements in Australia. The WAD contains up to 300 general, wages and conditions details of around 41 500 agreements certified by the AIRC between August 1991 and September 2001 - the most recent period for which collated data is available. The AIR provides DEWR with copies of all agreements, employee statistics and certification details for agreements certified by the AIRC. This ongoing involvement from the AIR is invaluable in maintaining the WAD.

not been uniform across business types. As in previous cases, the Commonwealth continues to stress the importance of encouraging the spread of agreement making into sectors where the penetration of bargaining has, to date, been limited. There is evidence that bargaining is continuing to spread to smaller organisations. In Chapter 8 we address the Commission's role in encouraging agreement making in the context of the SNA.

Number of agreements

A.17 From 1 October 1991 to 30 September 2001, an estimated 41 463 collective agreements were certified in the federal jurisdiction. While the rate of growth slowed in 1999 and the first half of 2000, Chart A.1 reflects an increase in agreement making starting in the September quarter 2000 which has continued through to the September quarter 2001. The December quarter 2000 recorded the highest number of agreements certified in a quarter (2 406) since the introduction of enterprise bargaining in 1991. In the twelve months since 30 September 2000, a total of 7 380 agreements have been certified by the AIRC.

Chart A.1: Number of formal federal agreements certified by quarter, September 1991 to September 2001



Source: DEWR, Workplace Agreements Database.

Current agreements

A.18 Chart A.2 shows the number of wage agreements current on the last day of each quarter and the number of employees covered by these current agreements (that is, wage agreements which have not been terminated and have not yet passed their expiry date).⁴ As we have noted in previous submissions, this measure underestimates the total number of employees covered by federal agreements at a given point in time, although it does provide a useful indicator of general trends in agreement coverage.⁵

A.19 Trends in the number of employees covered by current formalised wage agreements reflect the variation in size of agreements that are

⁴ Data for Chart A.2 includes all formal federal wage agreements that were current on the last day of each quarter. Conditions only agreements are excluded from this series to avoid any overlap between the two agreement categories.

⁵ The underestimation occurs because the terms of an expired agreement continue to apply until such time as the agreement is terminated or replaced, but employees covered in this way are excluded from the current agreement employee coverage count since their agreement has passed its formal expiry date. The effect of this is only marginally offset by any double counting of employees covered by an agreement that is replaced, without termination, prior to its formal expiry date.

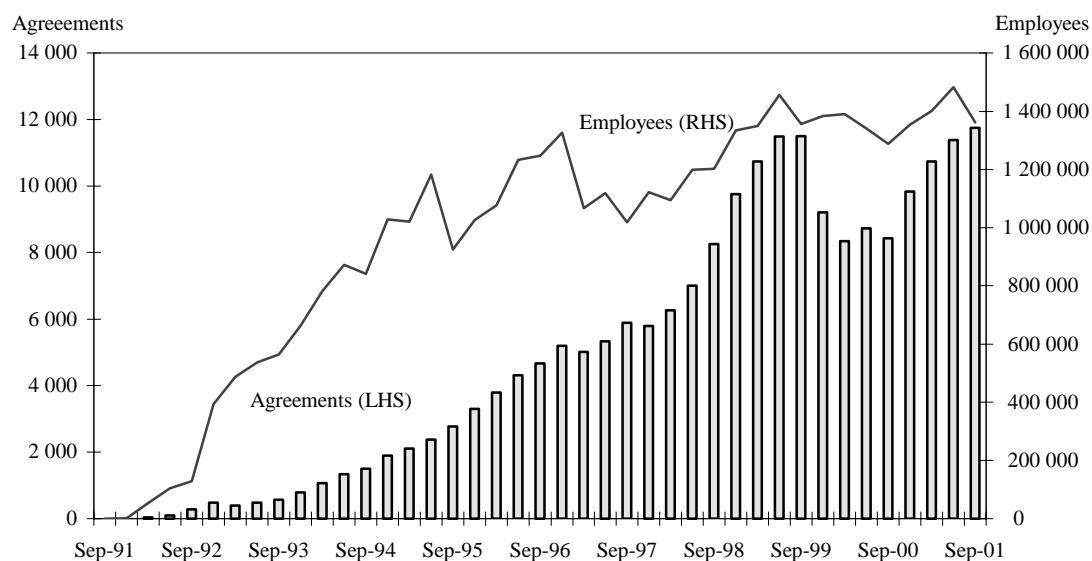
certified and expire during each quarter. The columns in Chart A.2 show the number of federal enterprise agreements current on the last day of each quarter.

A.20 Chart A.2 shows that prior to the introduction of the WR Act, collective agreements tended to cover, on average, large numbers of employees. From 1997, there was a rapid upward trend in agreement numbers in conjunction with a slower upward trend in numbers of employees covered.⁶ During the year to September 2001 the number of current agreements has further increased. Generally, the number of employees covered by current agreements has shown relatively steady growth. The few quarters where the number of employees under current agreements has declined, were for the most part reflecting the impact of the expiry of agreements with large numbers of employees.⁷

⁶ The fall in the number of current agreements in the December quarter 1999 reflected the expiry of a number of pattern bargaining agreements in the construction sector. The impact of these expiring pattern agreements on the employee series was less pronounced because construction pattern agreements, on average, cover fewer employees than other agreements.

⁷ For example, the decline in employees covered in the September quarter 2001 reflects the expiry of a large agreement in the communications sector covering around 35 800 employees and the expiry of a number of large retail and manufacturing agreements. As these agreements are renegotiated, the employee coverage figures will climb accordingly.

Chart A.2: The spread of bargaining - the number of current wage agreements and the number of employees covered, from the September quarter 1991 to the September quarter 2001



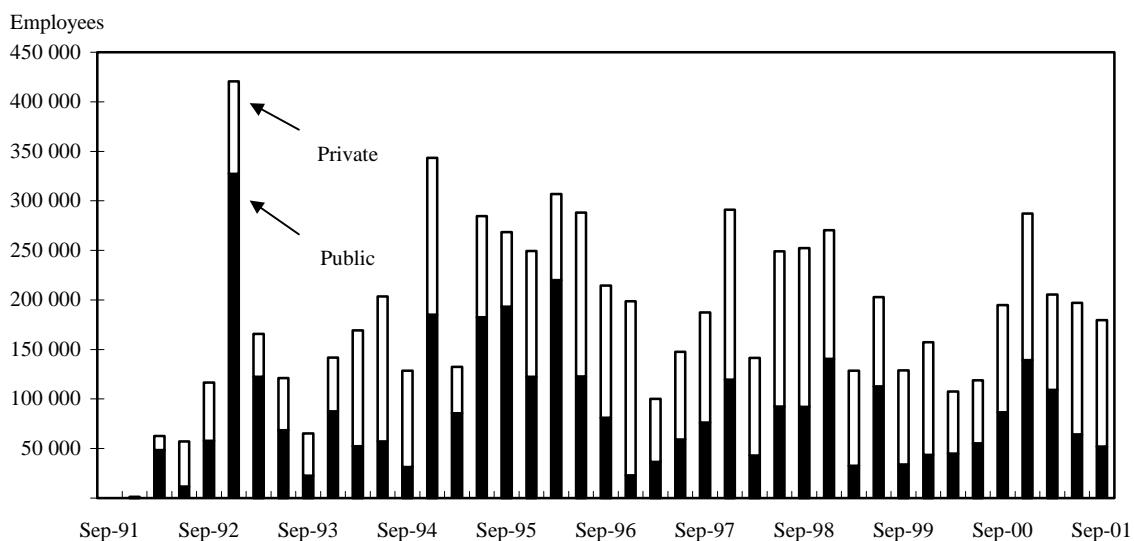
Source: DEWR, Workplace Agreements Database.

Sector

A.21 WAD data shows that private sector agreements represented 92 per cent of all agreements formalised between 1 October 2000 and 30 September 2001, and they account for an estimated 58 per cent of all employees covered by these agreements. This reflects the difference in average agreement size between the two sectors, with private sector agreements certified during this period covering an average 74 employees, compared with an average of 636⁸ employees per public sector agreement certified during the same period. Estimates of the number of employees covered by federal agreements formalised in each quarter, by sector, are shown in Chart A.3.

⁸ This figure has increased because of the certification of several government agency agreements and several public sector nursing agreements covering large numbers of employees in the September quarter 2001.

Chart A.3: Employees covered by federal agreements formalised in the quarter, September 1991 to September 2001.

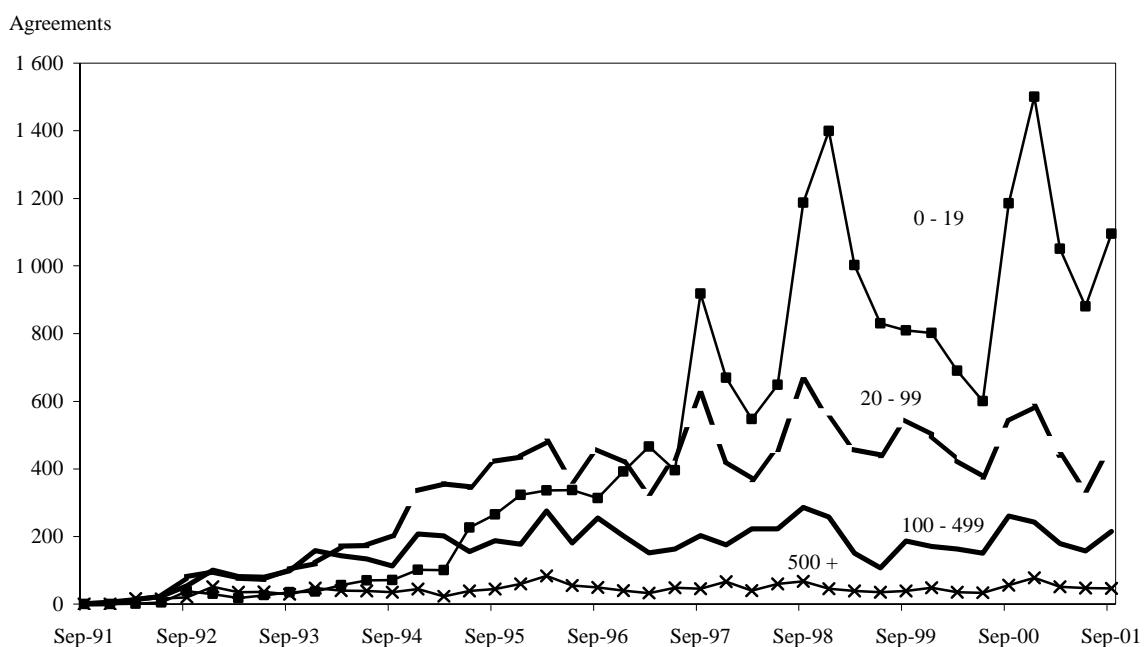


Source: DEWR, Workplace Agreements Database

Size

A.22 The comparatively small average size of private sector agreements certified in recent years reflects the increasing tendency for smaller businesses and/or smaller units within enterprises to make greater use of formal enterprise agreements. WAD data showed that of agreements certified from 1 October 2000 to 30 September 2001, 61 per cent covered less than 20 employees. This compares to agreements certified from 1 October 1999 to 30 September 2000 when 54 per cent covered less than 20 employees. The comparable figure for agreements covering less than 20 employees certified between 1 October 1996 and 30 September 1997 was only 45 per cent (see Chart A.4).

**Chart A.4: Agreements certified in the quarter by size of employer,
September 1991 to September 2001**



Source: DEWR, Workplace Agreements Database.

Industry

A.23 The industry breakdown of agreement making in the federal system has not changed dramatically over the last three years, with the largest number of agreements certified in the construction industry, followed by manufacturing. Table A.3 shows that in the year to 30 September 2001, smaller proportions of agreements were certified in health and community services (5.2 per cent of all agreements certified in the year to 30 September 2001 compared with 7.6 per cent in the year to 30 September 2000) and government administration and defence (3.8 per cent of all agreements certified in the year to 30 September 2001 compared with 5.0 per cent in the year to 30 September 2000) than in previous years.

A.24 Agreement making in agriculture, forestry and fishing continues to grow, albeit at a slower rate than some industries. At 30 September 2001 there were 58 current wage agreements covering almost 6 500

employees in agriculture, forestry and fishing, compared to 37 current wage agreements covering an estimated 5 400 employees at 30 September 2000. The most rapid growth in current agreements for this industry has occurred in agreements covering 1 to 19 employees. The slower rate of growth in agreement making may indicate that bargaining, in this industry, experiences an increased sensitivity to external factors (see Chapter 5.)

A.25 Health and community services was one industry to vary significantly, with the proportion of all agreements made in this industry decreasing from 10.7 per cent of all agreements certified in 1998–99 to 5.2 per cent in 2000–01. Despite the fact that the number of agreements certified in 1998–99 was nearly double those certified in 2000–01, the number of employees covered by agreements certified in 2000–01 was greater than the number of employees covered by agreements certified in 1998–99.

A.26 Some of these newly certified agreements consolidated groups of earlier agreements but the decline in the number of agreement certifications is mainly attributable to Victorian public sector health employees who were under agreements that expired in 2000 and are now covered by a s.170MX arbitrated award. Despite this, the level of current agreements remains healthy, with the number of new agreements increasing in the September quarter 2001.

A.27 The only other division to vary significantly was construction. The proportion of agreements certified in construction increased from 39.6 per cent in 1998–99 to 47.3 per cent in 2000–01. The rate of agreement certification in construction is especially subject to cyclic tendencies and over the next twelve months the number of current

agreements in the industry will decline with large numbers of Victorian construction agreements due to expire in November 2002. All other ANZSIC divisions have remained relatively stable, varying less than 2 percentage points in this three-year period (see Table A.3).

Table A.3: Spread of bargaining by Australian and New Zealand Standard Industrial Classification, all agreements certified in the period

	Agreements certified 1 Oct 98 – 30 Sep 99		Agreements certified 1 Oct 99 – 30 Sep 00		Agreements certified 1 Oct 00 – 30 Sep 01	
	Number	%	Number	%	Number	%
Agriculture, forestry & fishing	25	0.4	31	0.5	37	0.5
Mining	163	2.4	108	1.8	126	1.7
Manufacturing	1 562	22.6	1 438	23.8	1 618	21.9
Electricity, gas & water	157	2.3	75	1.2	62	0.8
Construction	2 735	39.6	2 479	41.0	3 487	47.3
Wholesale trade	57	0.8	60	1.0	40	0.5
Retail trade	78	1.1	120	2.0	204	2.8
Accommodation, cafes & restaurants	63	0.9	65	1.1	68	0.9
Transport & storage	503	7.3	480	7.9	522	7.1
Communication services	13	0.2	14	0.2	22	0.3
Finance & insurance	46	0.7	45	0.7	50	0.7
Property & business services	121	1.8	129	2.1	125	1.7
Government administration & defence	345	5.0	305	5.0	279	3.8
Education	122	1.8	101	1.7	169	2.3
Health & community services	736	10.7	461	7.6	383	5.2
Cultural & recreational services	119	1.7	69	1.1	128	1.7
Personal & other services	53	0.8	63	1.0	58	0.8
Total	6 898	100	6 043	100	7 378	100

Source: DEWR, Workplace Agreements Database

Note: All percentages have been rounded

Chart A.5: Growth in the spread and coverage of retail industry agreements current at 30 September 2001

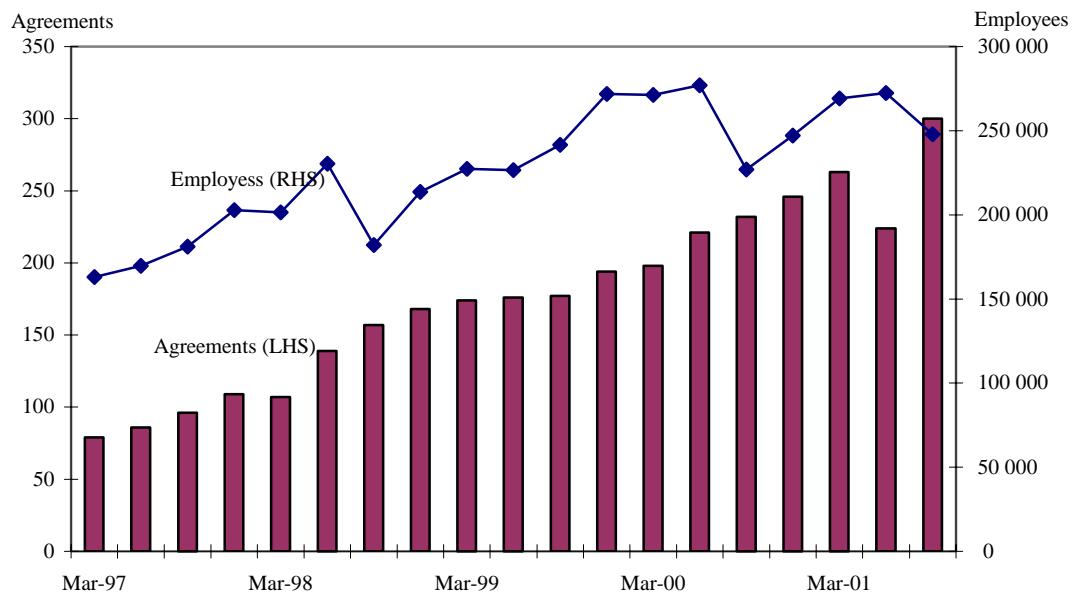


Chart A.7: Growth in the spread and coverage of accommodation, cafe and restaurant industry agreements current at 30 September 2001

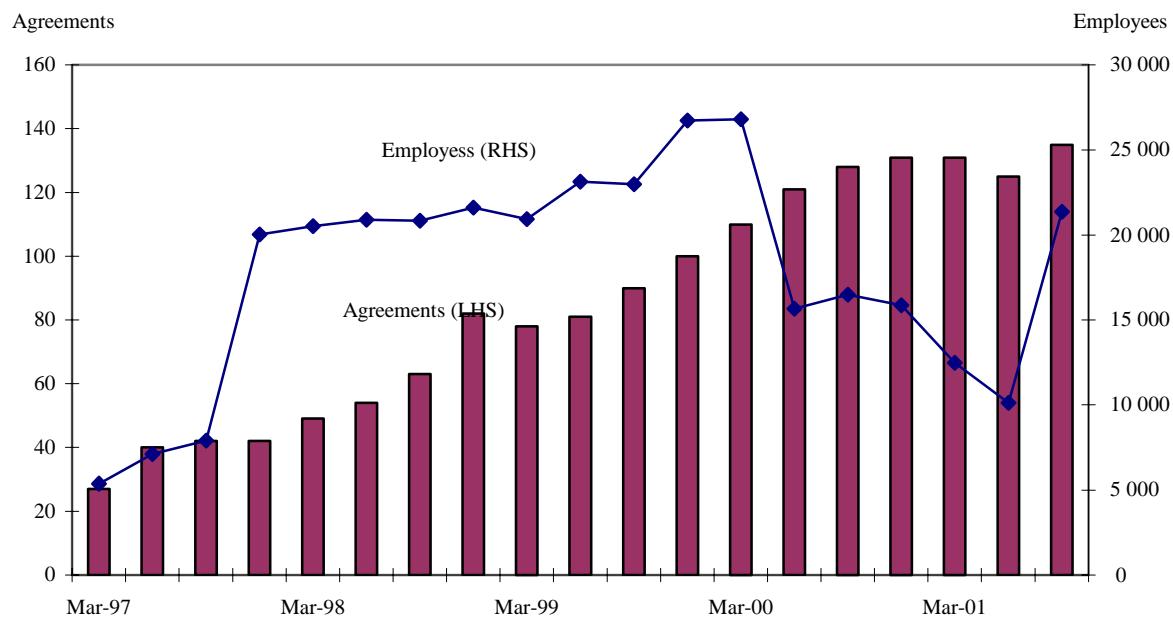
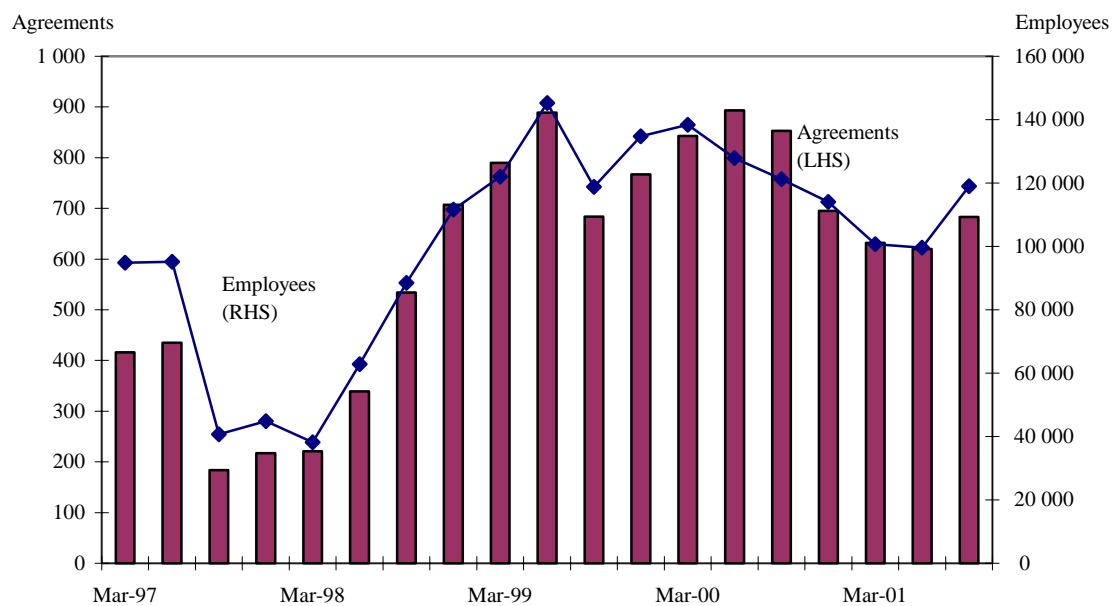
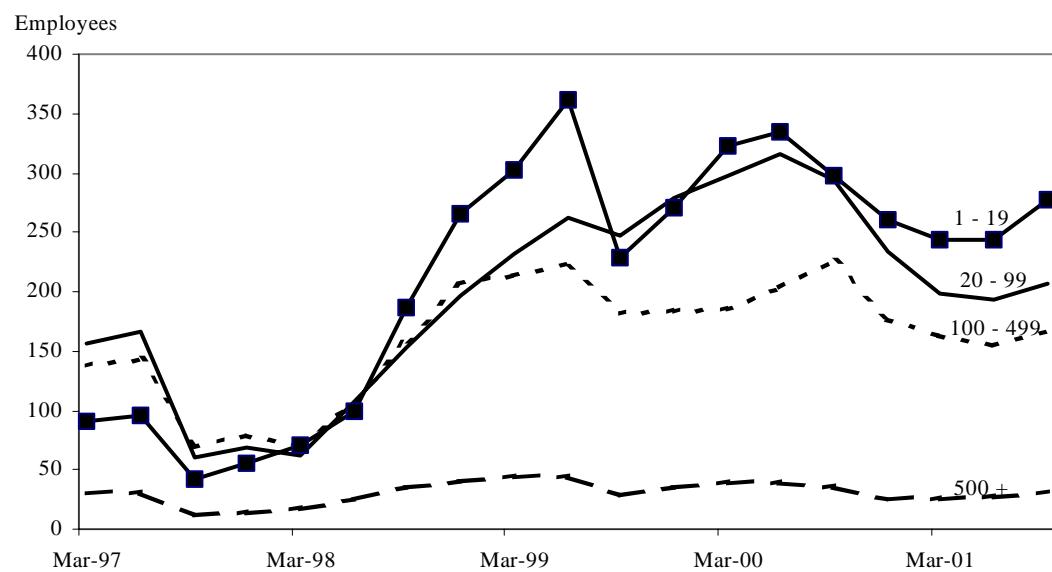


Chart A.9: Growth in the spread and coverage of health and community services industry agreements current at 30 September 2001 by size



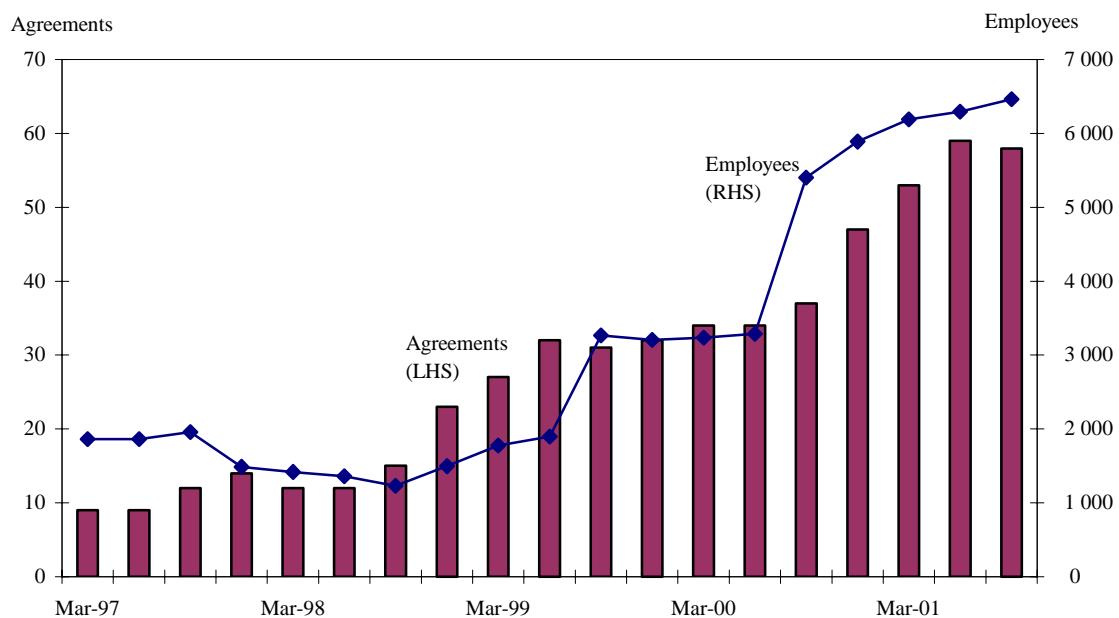
Source: DEWR, Workplace Agreements Database

Chart A.10: Growth in the spread and coverage of health and community services agreements current at 30 September 2001 by size (number of employees)



Source: DEWR, Workplace Agreements Database

Chart A.11: Growth in the spread and coverage of agriculture, forestry and fishing industry agreements current at 30 September 2001



Source: DEWR, Workplace Agreements Database

Chart A.12: Growth in the spread and coverage of agriculture, forestry and fishing industry agreements current at 30 September 2001 by size (number of employees)

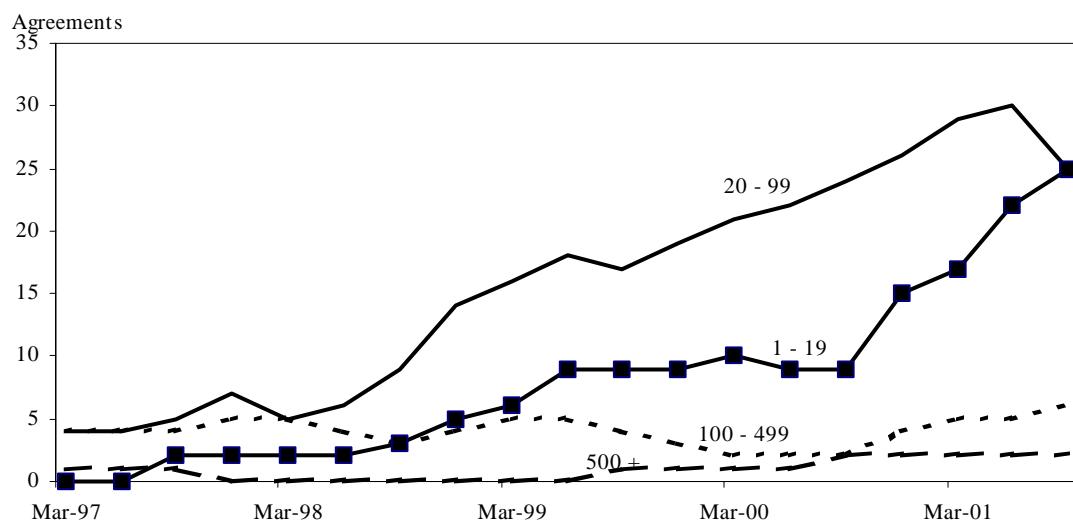
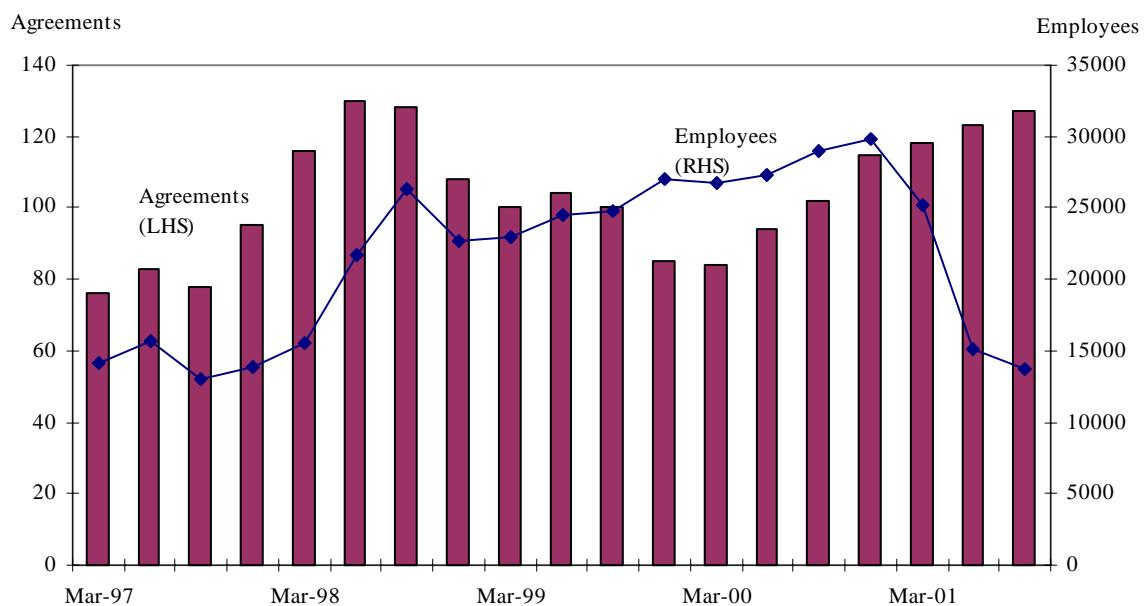
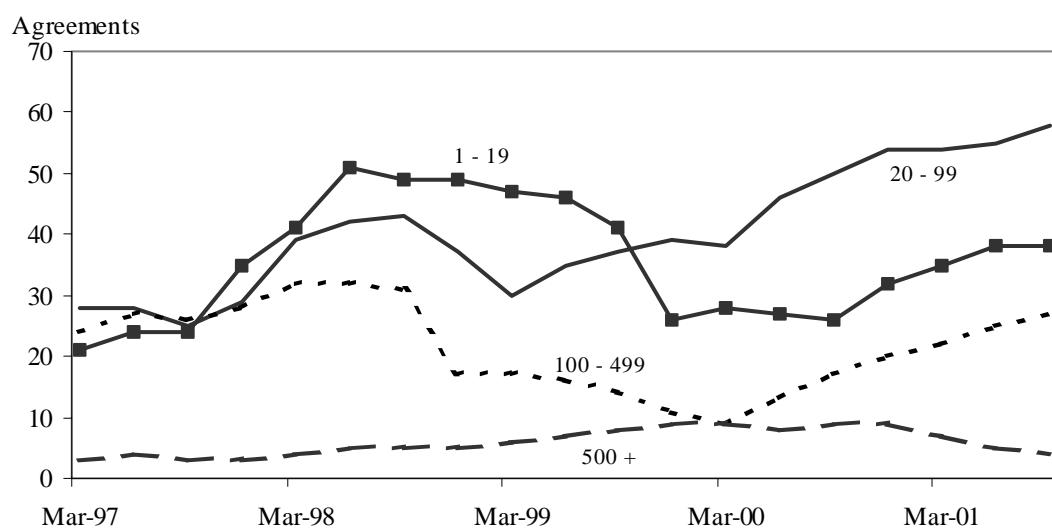


Chart A.13: Growth in the spread and coverage of personal and other services agreements current at 30 September 2001



Source: DEWR, Workplace Agreements Database

Chart A.14: Growth in the spread and coverage of personal and other services agreements current at 30 September 2001 by size (number of employees)



Source: DEWR, Workplace Agreements Database

Chart A.15: Growth in the spread and coverage of construction industry agreements current at 30 September 2001

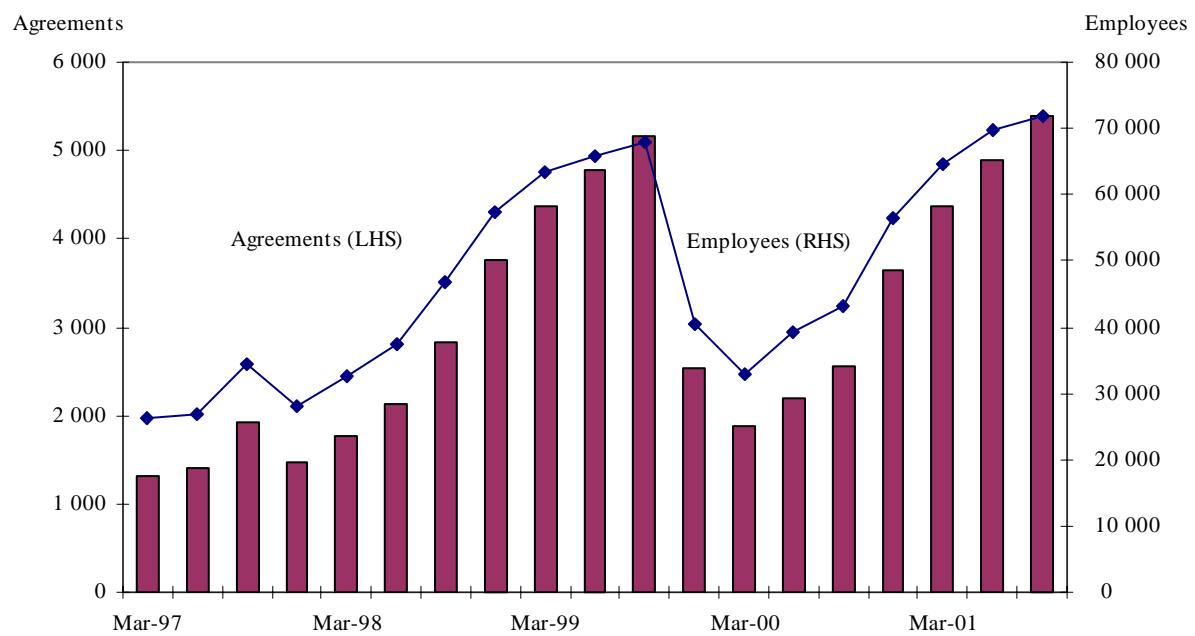
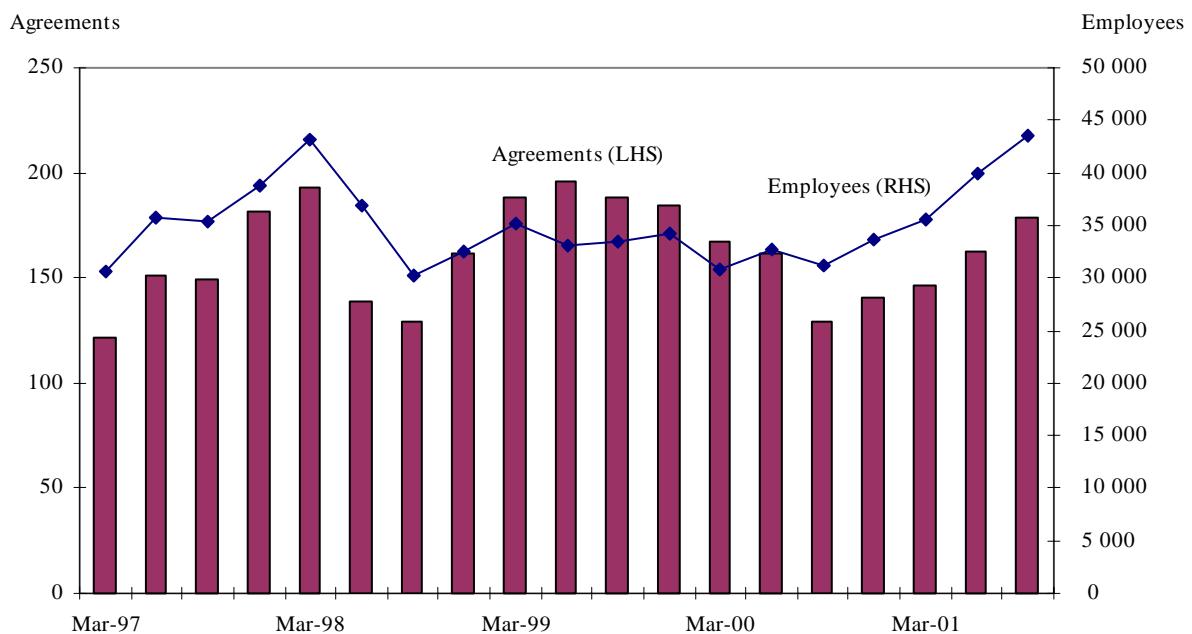
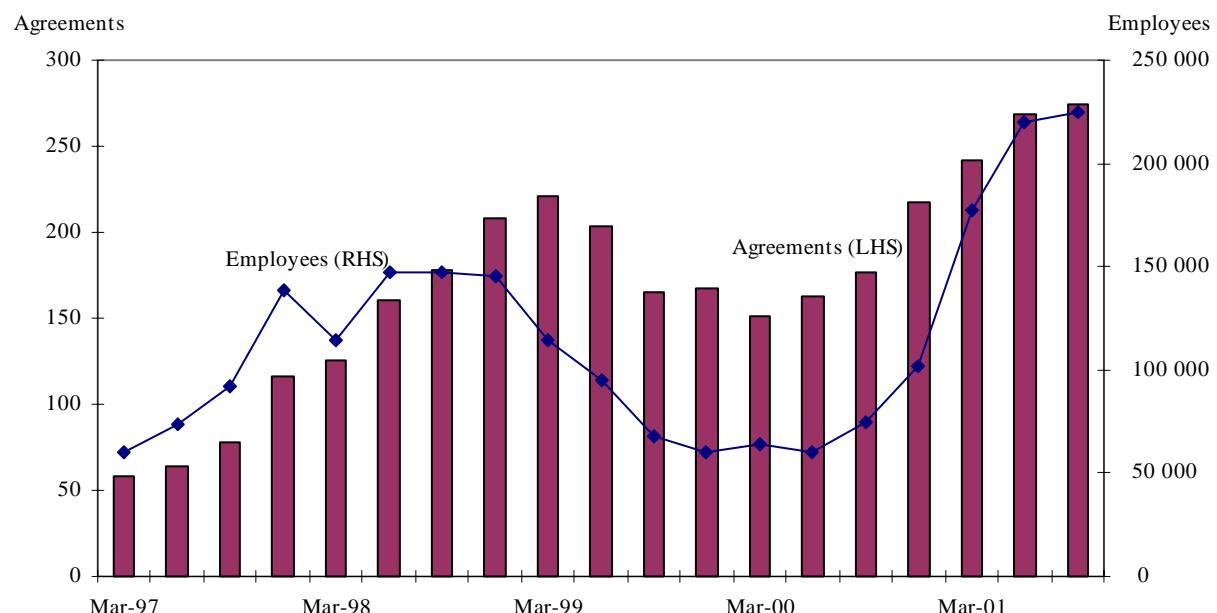


Chart A.17: Growth in the spread and coverage of cultural and recreational services industry agreements current at 30 September 2001



Source: DEWR, Workplace Agreements Database

Chart A.18: Growth in the spread and coverage of education industry agreements current at 30 September 2001



Source: DEWR, Workplace Agreements Database

Chart A.19: Growth in the spread and coverage of manufacturing agreements current at 30 September 2001

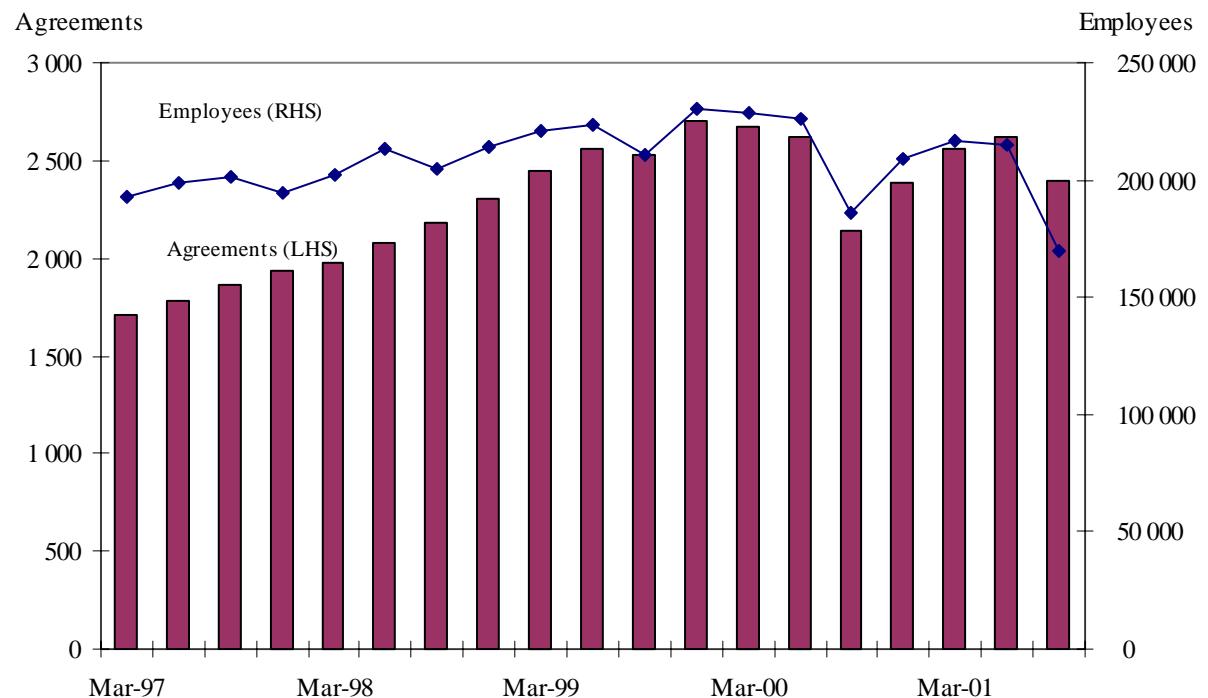
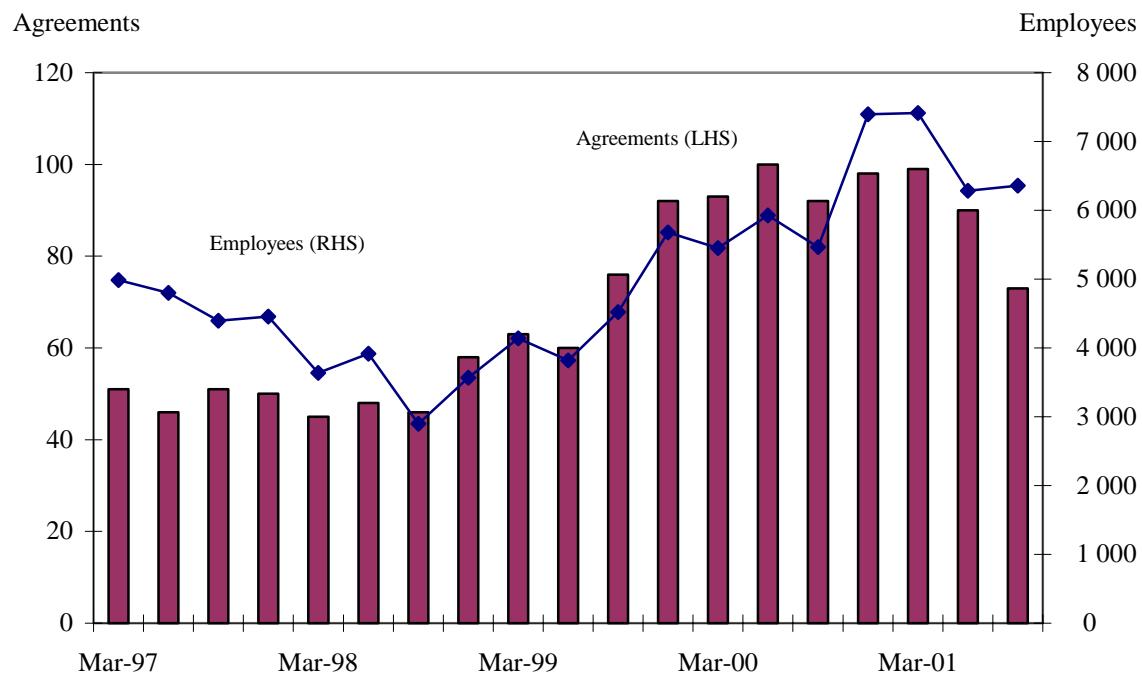
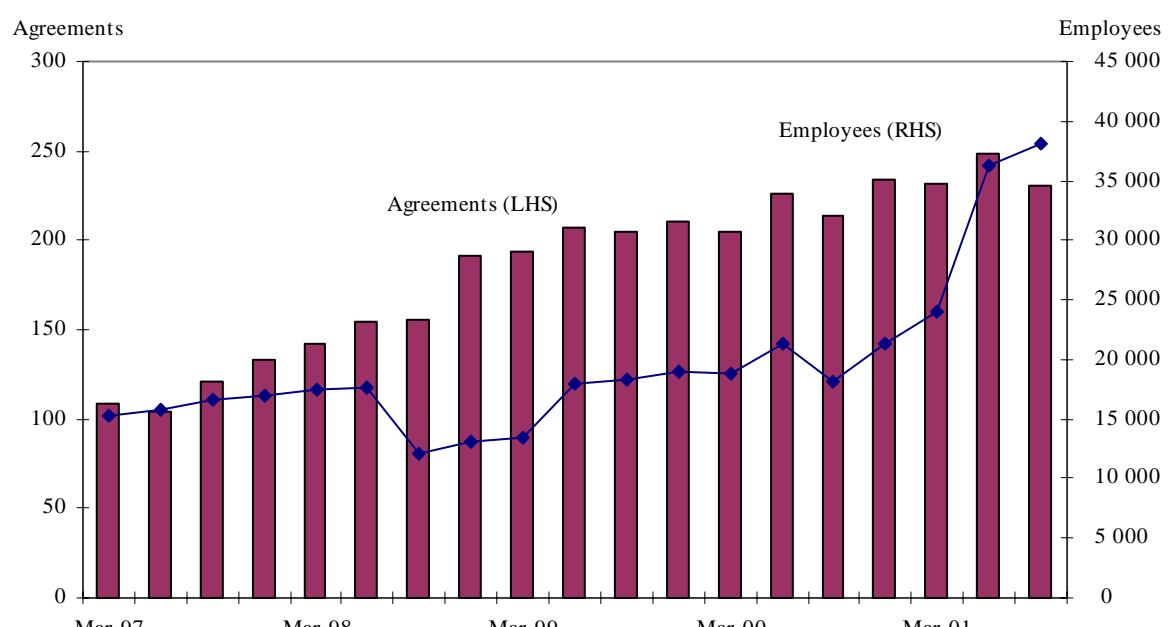


Chart A.21: Growth in the spread and coverage of wholesale trade industry agreements current at 30 September 2001



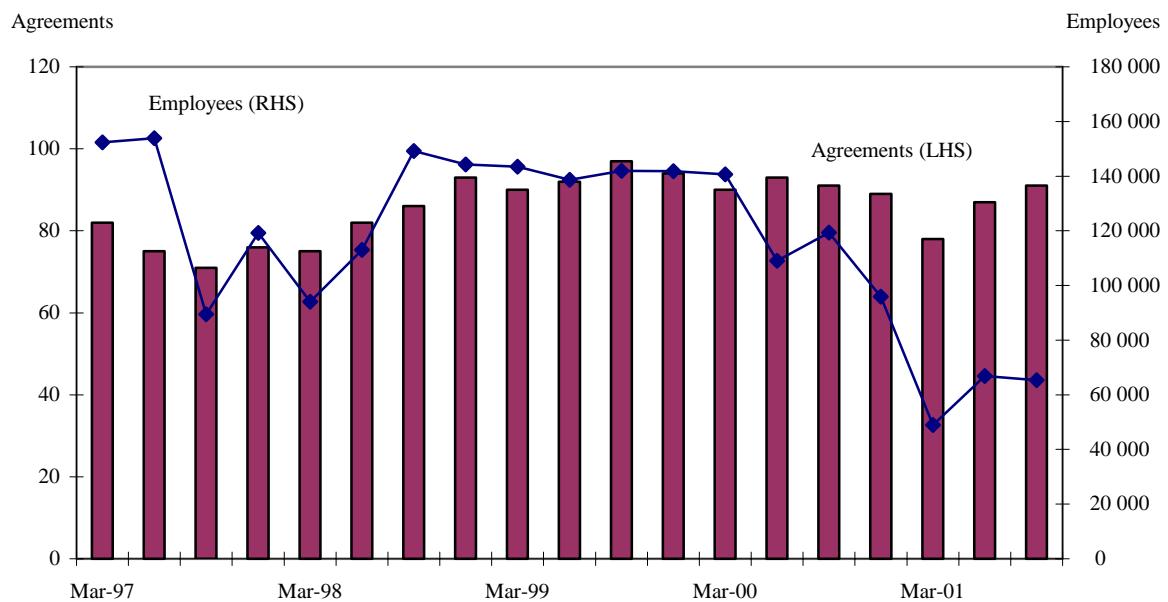
Source: DEWR, Workplace Agreements Database

Chart A.22: Growth in the spread and coverage of property and business industry agreements current at 30 September 2001



Source: DEWR, Workplace Agreements Database

Chart A.23: Growth in the spread and coverage of finance and insurance industry agreements current at 30 September 2001



Source: DEWR, Workplace Agreements Database

Chart A.24: Growth in the spread and coverage of mining industry agreements current at 30 September 2001

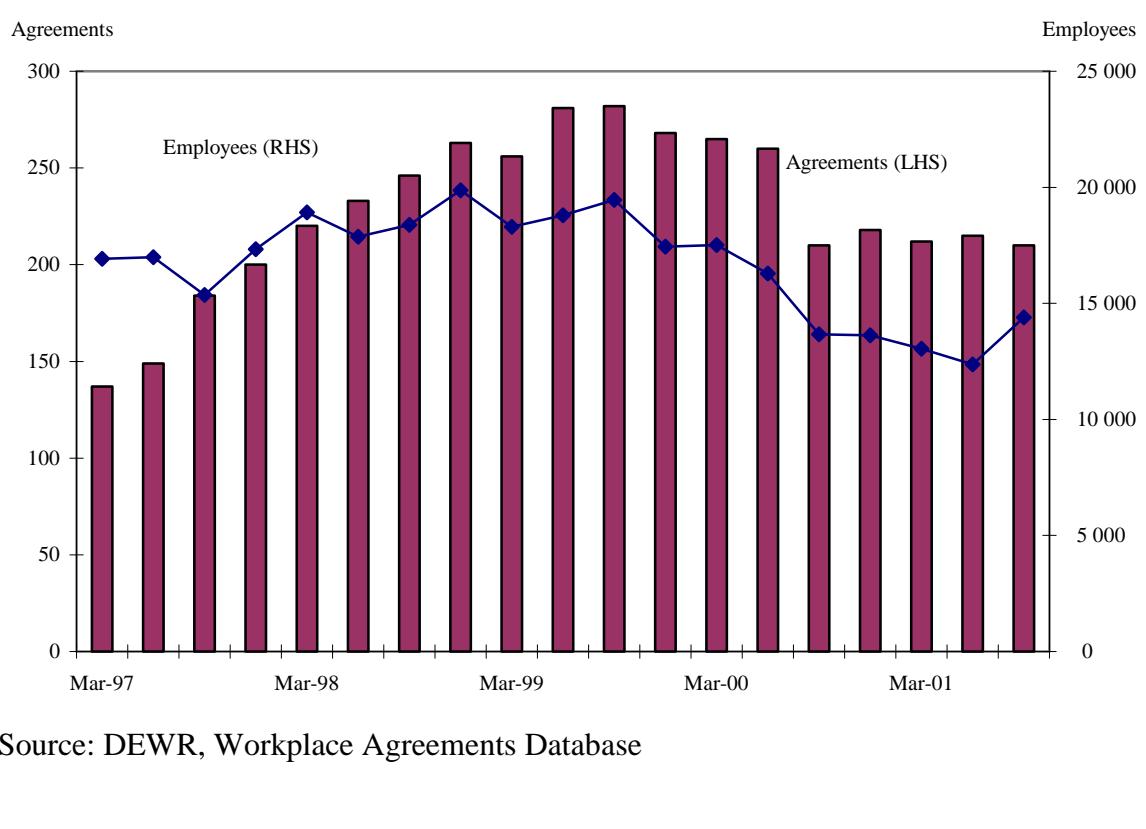
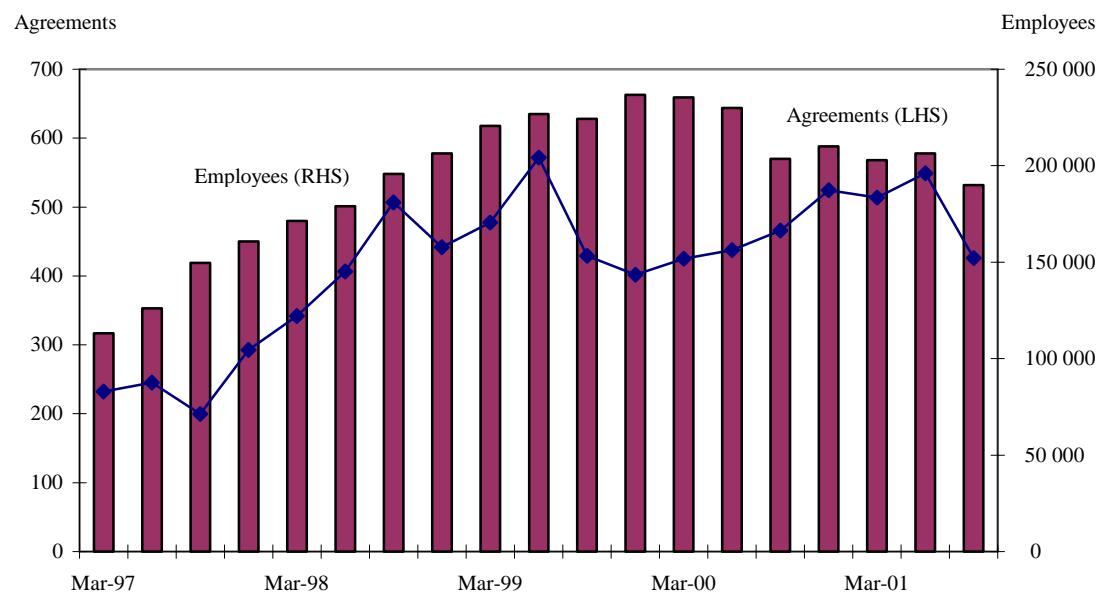


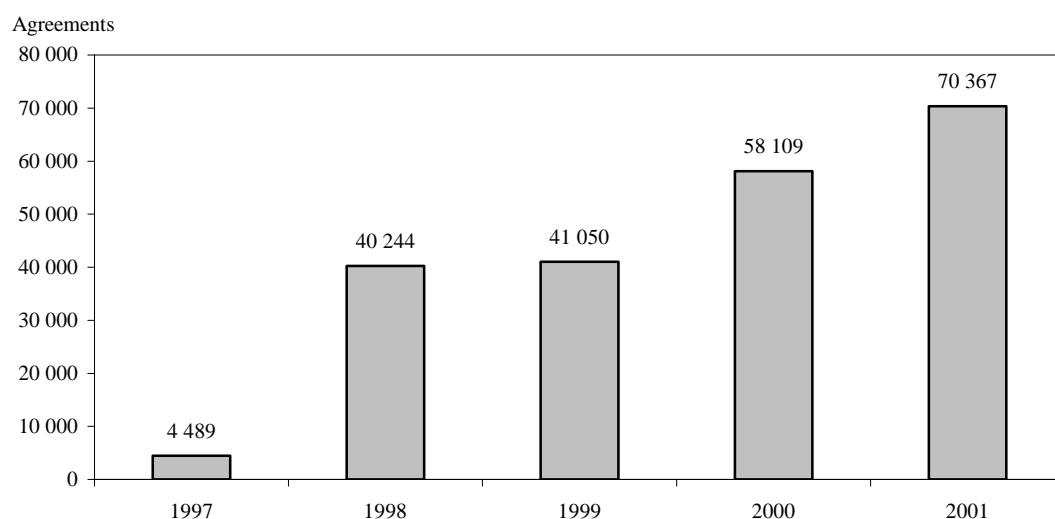
Chart A.25: Growth in the spread and coverage of government administration and defence industry agreements current at 30 September 2001



Data from the Office of the Employment Advocate

A.28 AWAs are now an established agreement making option for employers and employees under the WR Act and they continue to grow in popularity. Over 70 000 AWAs were approved by the Office of the Employment Advocate (OEA) during 2001 – the highest number approved in a single year since their introduction in 1997 (see Chart A.27). As Tables A.4 - A.7 demonstrate, AWAs have spread across all industry groups and to all sizes of organisation. Since 1997, an average of 21.2 per cent of AWAs have come from the public sector, although this proportion has declined over 2001 to an average of 11.8 per cent (the proportion of employers with AWAs in the public sector has increased by 1.0 percentage point over the same period).

Chart A.27: Australian Workplace Agreements (AWAs) approved by year



Source: OEA, Australian Workplace Agreements Management System and Workdesk Reports Module.

Table A.4: Percentage of AWAs and employers with approved AWAs by industry sector

	EMPLOYEES				
	1998 %	1999 %	2000 %	2001 %	Total (Mar 97 – Dec 01) %
Private	58	76	90	86	78.8
Public	42	24	10	14	21.2
Total	100	100	100	100	100.0

	EMPLOYERS				
	1998 %	1999 %	2000 %	2001 %	Total (Mar 97 – Dec 01) %
Private	86	84	89	84	88.0
Public	14	16	11	16	12.0
Total	100	100	100	100	100.0

Source: OEA, Australian Workplace Agreements Management System and Workdesk Reports Module.

Table A.5: Proportion of employees with approved AWAs by ANZSIC Division

ANZSIC	1998 %	1999 %	2000 %	2001 %	Total (Mar 97 – Dec 01) %
Accommodation, cafes and restaurants	4	7	8	6	6.8
Agriculture, forestry and fishing	1	1	1	2	1.2
Communication services	7	11	11	11	11.2
Construction	2	2	2	4	2.8
Cultural and recreational services	2	10	4	4	4.2
Education	1	1	1	1	1.0
Electricity, gas and water supply	2	2	1	3	1.2
Finance and insurance	6	4	6	6	5.7
Government, administration and defence	29	13	12	6	12.8
Health and community services	5	6	4	7	4.5
Manufacturing	8	9	9	10	9.5
Mining	4	3	3	5	4.5
Personal and other services	4	11	4	3	4.5
Property and business services	3	6	15	11	10.5
Retail trade	11	9	13	13	12.3
Transport and storage	8	3	5	5	5.5
Wholesale trade	3	2	2	2	1.8
Total	100	100	100	100	100

Source: OEA, Australian Workplace Agreements Management System and Workdesk Reports Module.

Table A.6: Proportion of employers with approved AWAs by ANZSIC Division

ANZSIC	1998 %	1999 %	2000 %	2001 %	Total (Mar 97 – Dec 01) %
Accommodation, cafes and restaurants	3	4	3	9	3.5
Agriculture, forestry and fishing	2	1	1	2	0.6
Communication services	1	1	<1	2	0.6
Construction	4	3	3	7	3.1
Cultural and recreational services	4	8	5	5	4.8
Education	1	2	1	3	1.2
Electricity, gas and water supply	2	2	<1	1	0.8
Finance and insurance	1	2	1	2	1.5
Government, administration and defence	9	9	8	10	9.9
Health and community services	13	9	7	5	7.3
Manufacturing	10	9	7	13	7.0
Mining	4	4	5	5	4.6
Personal and other services	5	6	4	4	3.9
Property and business services	7	10	18	10	16.5
Retail trade	11	16	19	14	17.0
Transport and storage	16	9	9	6	10.4
Wholesale trade	7	5	8	2	7.4
Total	100	100	100	100	100

Source: OEA, Australian Workplace Agreements Management System and Workdesk Reports Module.

Table A.7: AWAs and employers with approved AWAs by size of employer

Size of Employer	AWAs				
	1998 %	1999 %	2000 %	2001 %	Total (Mar 97 – Dec 01) %
Less than 20	4	6	7	7	6.0
20 – 99	12	17	19	19	17.2
100 – 499	45	39	37	29	36.1
500+	38	38	37	46	40.6
Total	100	100	100	100	100

Size of Employer	EMPLOYERS				
	1998 %	1999 %	2000 %	2001 %	Total (Mar 97 – Dec 01) %
Less than 20	40	32	27	19	37.0
20 – 99	26	29	32	31	30.4
100 – 499	26	27	27	27	21.6
500+	8	10	14	24	11.7
Total	100	100	100	100	100

Source: OEA, Australian Workplace Agreements Management System and Workdesk Reports Module.

Developments in Commonwealth Government employment

A.29 Virtually all Australian Public Service (APS) and Parliamentary Service Staff and most Government Business Enterprises (GBEs) are covered by agency level or workplace agreements covering pay and conditions of employment. There are 103 current APS agreements, covering 114 000 staff employed under the *Public Service Act 1999* and the *Parliamentary Service Act 1999*. In addition, at the end of January 2002, there were about 6 700 operational AWAs in the APS covering almost all Senior Executive Service (SES) staff and an increasing number of staff below the SES level. The following contains more detail on agreement making in the APS, GBES, non-APS Statutory Authorities and the Australian Defence Force.

Australian Public Service (APS)

A.30 Almost all APS staff are now covered by agency level agreements on pay and conditions of employment (the exception being some staff

employed in the Australian Protective Services who are covered by an award arbitrated under s.170MX of the WR Act). There are 103 current agreements covering over 99 per cent of staff employed under the *Public Service Act 1999* and the *Parliamentary Service Act 1999*. Ninety-four of the agreements are comprehensive, stand-alone documents (that is, they do not operate in conjunction with awards). Thirty-eight of the agreements have been made directly with staff under s.170LK of the WR Act, 64 under s.170LJ of the Act and one under s.170LL.

A.31 The Australian Bureau of Statistics Certified Agreement covering staff employed at the Data Processing Centre for the 2001 Census of Population, was the first ‘Greenfields’ agreement (certified under s.170LL of the WR Act) in the APS.

A.32 Pay rises negotiated under these agreements vary with duration and the package of productivity changes negotiated. Increases range from 2.0 per cent to 6.7 per cent per annum. The overall Average Annualised Wage Increase (AAWI)⁹ for APS employees is currently 4.2 per cent. The AAWI for agreements certified in 2001 was 3.3 per cent. A number of agreements also provide one-off bonuses, typically paid on certification.

A.33 APS certified agreements provide for a range of productivity initiatives to fund increases in salaries over varying periods of 12 months to three years. They continue to include initiatives tailored to the culture of the agency and the needs of the agency and its employees. Features include a focus on more flexible hours to improve client service and balance work and family demands. Agreements also include initiatives

⁹ For quantifiable wage agreements, the *average annualised wage increase (AAWI) per employee* is calculated by (1) summing the percentage wage increases to give a total percentage wage increase for each agreement (flat dollar increases are converted to a percentage using average weekly ordinary time earnings (AWOTE) for the relevant ANZSIC industry division and quarter); (2) annualising the total percentage wage increase by dividing it by the effective duration and multiplying it by 12; and (3) weighting the result by the number of employees covered.

such as the provision to ‘cash out’ limited amounts of recreation leave, streamlining leave arrangements, streamlining and increasing accountability in the payment of allowances and increasing the standard working day from 7 hours and 21 minutes per day to 7 hours and 30 minutes per day, sometimes accompanied by a Christmas shutdown.

A.34 Agencies are consistently implementing/enhancing comprehensive performance management arrangements as a key objective of agreements. Individual performance-based pay is a feature of agreements in 57 per cent of agencies and includes accelerated salary advancement (42 per cent of agencies), additional bonus payments (29 per cent) and higher percentage pay increases (17 per cent).

A.35 All Australian Government certified agreements provide scope for agencies to develop comprehensive AWAs. As at the end of January 2002, there were about 6 700 operational AWAs in the APS covering almost all SES staff (1 600 people) and an increasing number of staff below the SES level (5 100).

Government Business Enterprises, non-APS Statutory Authorities and the Australian Defence Force

A.36 Government Business Enterprises (GBEs) and Commonwealth authorities not staffed under the *Public Service Act 1999* employ approximately 120 000 staff. Of those, a large proportion is employed by either Telstra (approximately 50 000) or Australia Post (38 000).

A.37 Australia Post’s employees are covered by an agreement delivering an 8 per cent increase over 26 months: 2.5 per cent from December 2001, 3 per cent from April 2003 and 2.5 per cent from December 2003. The expiry date of the agreement is February 2004.

A.38 Commonwealth authorities not staffed under the *Public Service Act 1999* (excluding GBEs) employ around 30 000 staff. A recent survey indicated that approximately 66 per cent of these authorities have certified agreements or enterprise agreements in place. Of these, around 16 per cent were certified under s. 170LK of the WR Act. In addition, nine per cent of agencies surveyed used AWAs at the senior executive level and 26 per cent below the senior executive level. The survey results also indicated that common law contracts were used by 60 per cent of these Commonwealth authorities at the senior executive level and 43 per cent below the senior executive level.

A.39 Current Commonwealth authority agreements include the CSIRO Enterprise Agreement 2001 which covers 6 370 staff and provides a pay increase of 4 per cent over 12 months in recognition of productivity and efficiency improvements. The agreement provides for one off cash rewards that may be applied to teams as well as individuals as a method of rewarding performance and simplified administrative arrangements relating to leave and overtime.

A.40 The Health Insurance Commission (Business Improvement) Certified Agreement 2001–2003 covers 4 270 staff and has a duration of 27 months. The agreement provides an initial pay increase of 4.5 per cent and a second increase of 5.5 per cent, conditional on whole of organisation achievements against stated objectives, including the implementation of a performance management program.

A.41 The Australian Defence Force Enterprise Productivity Arrangement: 1999–2002 provides the framework for delivering productivity based pay increases and other conditions of service to around 50 000 service personnel. In November 1999, the Defence Force

Remuneration Tribunal approved aspects of the arrangement. The ADF (Star Ranks) Remuneration Arrangement: 1999–2002, a separate but similar arrangement covering around 120 officers in the ranks of Brigadier (and equivalent in Navy and Air Force) and Major General (and equivalent), was approved by the Tribunal in December 1999.

Agreement making in the State jurisdictions¹⁰

A.42 Table A.8, based on the ABS May 2000 EEH Survey, shows the proportion of employees in each State that are covered by registered State collective agreements. The levels of coverage of State and federal collective agreements vary substantially between the States. Overall, registered collective agreements are dominated by the federal system. According to the survey, 21.7 per cent of all employees were covered by a federal registered collective agreement compared to 13.5 per cent of employees covered by a State registered collective agreement. While the survey did not collect data on the proportion of employees paid at award rates by jurisdiction and therefore could not report on the overall size of the federal and State systems, the data suggests that agreement coverage is considerably higher in the federal jurisdiction than it is across the State systems. These results also suggest that the proportion of employees paid at award rates is likely to be higher in the State systems.

¹⁰ In previous years, the Commonwealth has used State agreement data received from the relevant State departments and agencies to describe the extent of agreement making in the State jurisdictions. Unfortunately more recently, some States have been unable to provide this information.

Table A.8: Methods of setting pay disaggregated by jurisdiction, as at May 2000

Pay Setting Method	Proportion of Employees (%)						
	NSW	WA	TAS	SA	VIC	QLD	AUST
Individual agreements (not registered)	40.9	39.4	24.2	30.3	43.0	32.6	38.2
Individual agreements (registered)	0.7	6.9	1.4	0.5	2.0	1.0	1.8
Collective agreements (not registered)	1.4	2.1	0.9	1.8	1.2	1.8	1.5
Collective agreements (registered) – Federal	17.6	15.8	19.4	17.4	32.7	13.0	21.7
Collective agreements (registered) – State	15.4	17.4	21.9	19.5	0.0	27.0	13.5
Awards only	23.9	18.3	32.2	30.5	21.1	24.6	23.2
Total	100.0	99.9	100.0	100.0	99.9	100.0	100.0

Source: ABS, unpublished data, Employee Earnings and Hours Survey (Cat No 6306.0)

Notes: Data on the proportion of employees whose pay is set by awards only is not disaggregated by jurisdiction. The totals for each State represent the combined total of employees under State or federal awards in that State. The last column shows the Australia wide average for employees paid by awards.

A.43 Previous reporting on State agreement coverage showed that agreement making had continued to expand gradually in the State jurisdictions. Data from future EEH Surveys may allow a time series to be developed that shows trends in State and federal agreement coverage.

FLOW-ON OF 2000–2001 SAFETY NET REVIEW DECISION

FLOW-ON OF THE 2000–2001 SAFETY NET REVIEW DECISION

Flow of 2000–2001 decision to federal awards

B.1 This appendix reports on the flow-on of SNAs into federal awards and through State wage cases for State awards. The majority of current federal awards varied for the 2001 SNA were varied in the first three months following the decision. The 2001 SNA was flowed-on into all State jurisdictions through State wage cases.

Safety net adjustments in federal awards¹

B.2 As of 31 December 2001, DEWR recorded 624 awards (602 of which were still in operation at that date) which had been varied for the May 2001 SNA decision. As of 31 December 2000, 626 awards (611 of which were still in operation at that date) had been varied for the May 2000 decision. Current awards varied for the May 2001 decision by the end of December 2001 represent 28 per cent of all current relevant awards (that is, all awards excluding single issue and enterprise bargaining awards).

B.3 Table B.1 shows which of the three adjustment quantums were applied to the 602 awards that had received the May 2001 SNA and were current as at 31 December 2001. Almost 80 per cent of these awards received the \$13 increase, which was granted to award rates up to and including \$490 per week. Of the 80 per cent of current awards receiving the \$13 increase, 13 per cent received no other wage increase, 51 per cent

¹ Information on the SNAs and Federal Minimum Wage is drawn from the Safety Net Adjustment and Paid Rates Awards Database maintained by DEWR which utilises the orders of the Commission as its primary data source.

also received the \$15 increase only and 36 per cent received all wage increases.

Table B.1: May 2001 SNA outcomes in federal awards as at 31 December 2001

Outcome	Number of federal awards varied	Percentage of all awards varied
\$13 only	63	10
\$13 and \$15	241	40
\$15 only	13	2
\$15 and \$17	56	9
\$17 only	29	5
\$13, \$15 and \$17	172	29
Unclear	28	5
Total	602	100

Source: DEWR, Safety Net Adjustment and Paid Rates Awards Database.

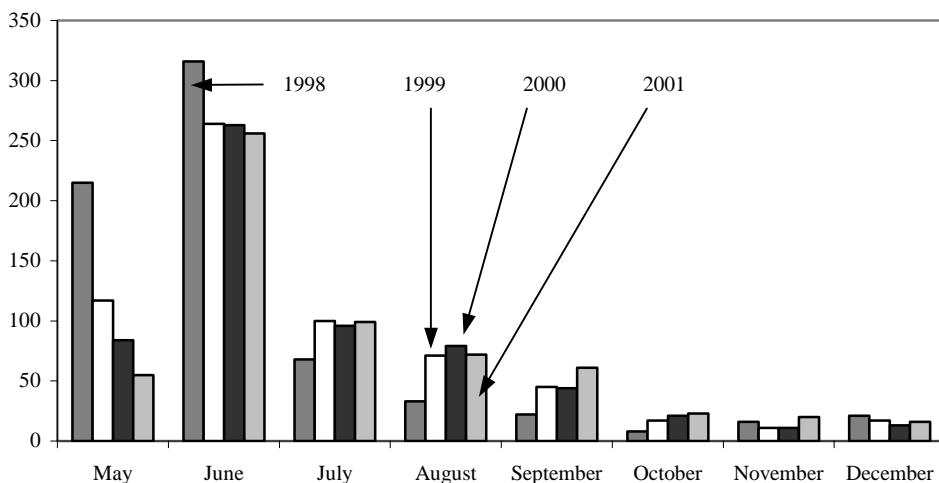
Notes:

- (a) The information presented has been drawn from published Commission decisions and does not reflect the impact of orders yet to be published, but relevant to the time period covered by the analysis.
- (b) All percentages have been rounded.

B.4 The majority of the 602 awards were varied in the first three months following the decision. However, Charts B.1 and B.2 indicate that there has been an easing in the rate of flow-on in the first two months following the last three SNA decisions. There are several reasons for this easing which have been identified in previous submissions. It may have, in part, reflected the delay of award parties in having their awards varied for the last increase. A number of awards exist whose parties use agreement making for wage determination and therefore are not dependent on award adjustments for increases. The changed pattern is also consistent with the Commission's ruling in the last three Safety Net Review decisions that awards would not be eligible for a SNA until at least twelve months had elapsed since the award received the previous year's adjustment.²

² While in the most recent of these, increases were allowed earlier than twelve months after the previous adjustment, this was only in the situation where variation was by consent and at no additional cost. This does not appear to have altered the pattern substantially.

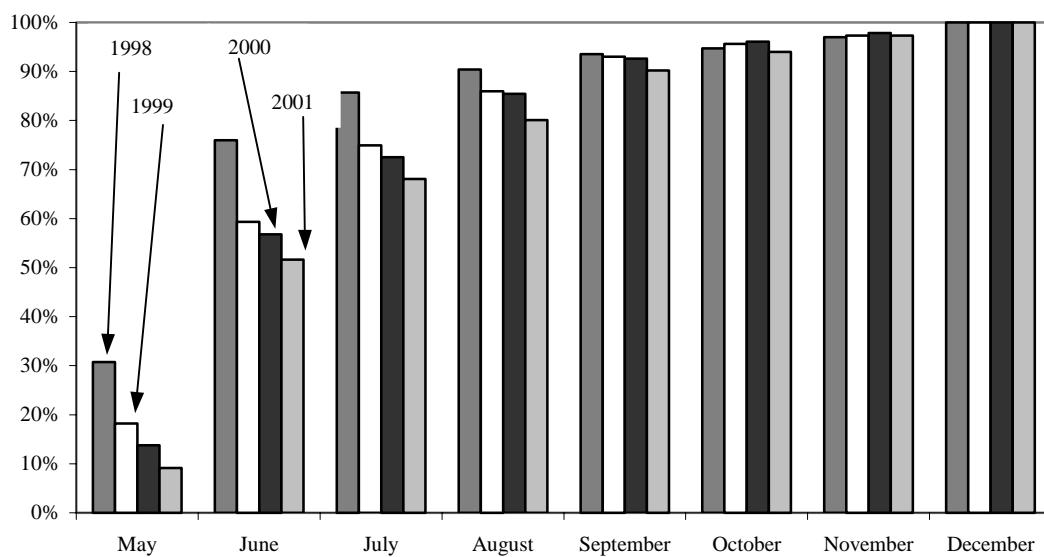
Chart B.1: Comparison of monthly flow of April 1998, April 1999, May 2000 and May 2001 SNAs, May to December of their respective first year of operation



Source: DEWR, Safety Net Adjustment and Paid Rates Awards Database.

Note: The information presented has been drawn from published Commission decisions and does not reflect the impact of orders yet to be published, but relevant to the time period covered by the analysis.

Chart B.2: Comparison of the cumulative flow of April 1998, April 1999, May 2000 and May 2001 SNAs, May to December of their respective first year of operation



Source: DEWR, Safety Net Adjustment and Paid Rates Awards Database.

Note: The information presented has been drawn from published Commission decisions and does not reflect the impact of orders yet to be published, but relevant to the time period covered by the analysis.

How to read: Of all awards which had been varied for the May 2001 SNA by 31 December 2001, 52 per cent were varied by the end of June 2001.

B.5 For a longer term perspective of the flow-on of SNAs to awards, Table B.2 shows the number of federal awards which have received SNAs resulting from wage case decisions since 1993, as at the end of 2000 and the end of 2001. The table shows that as at 31 December 2001, there were 662 current awards that had been varied for the May 2000 decision. Of these, 548 had also been varied for the May 2001 decision. A further 46 awards had received the May 2000 SNA less than twelve months prior to 31 December 2001 and would not, therefore, have been eligible for the May 2001 adjustment unless it was by consent and at no additional cost. A further 21 awards that did not receive the 2001 SNA were involved in the Award Simplification process during 2001.

B.6 Evidence suggests that the changed timetable for the Safety Net Review – Wages 2001–2002 due to other major cases being heard by the AIRC may not necessarily obstruct the adjustment of the relevant Safety Net Review awards 12 months after the incorporation of the previous increase. The earliest adjustments made to these awards for the Safety Net Review – Wages 2000–2001 were granted from the first pay period to commence on or after 22 May 2001.

Table B.2: Number of federal awards varied for SNAs

Variation Type	As at 31 Dec 2000		As at 31 Dec 2001	
	Current Awards	All Awards	Current Awards	All Awards
Varied for first \$8 SNA under October 1993 and September 1994 decisions	581	835	514	838
Varied for second \$8 SNA (Award level) from 22 March 1995	545	738	480	740
Varied for third \$8 SNA (Award level) from 22 March 1996	497	629	444	632
Varied for SNA under April 1997 decision	642	754	573	764
Varied for SNA under April 1998 decision	734	842	655	858
Varied for SNA under April 1999 decision	702	754	675	802
Varied for SNA under May 2000 decision	611	626	662	750
Varied for SNA under May 2001 decision	N/A	N/A	602	624

Source: DEWR, Safety Net Adjustment and Paid Rates Awards Database.

Note: the information presented has been drawn from published Commission decisions and does not reflect the impact of orders yet to be published, but relevant to the time period covered by the analysis.

Federal Minimum Wage

B.7 The Commission established the Federal Minimum Wage (FMW) in its April 1997 decision. In doing so, it provided protection for the low paid by ensuring that all adult employees (with the exception of trainees, apprentices and supported wage recipients) employed under a federal award containing the FMW clause could not receive less than the FMW rate. The FMW was set at a level equivalent to the C14 classification rate of the Metal Industries Award (at that time, \$359.40 per week for full-time adult employees). In the four subsequent Safety Net Review decisions, the Commission maintained the FMW and increased its rate in line with the increase to the C14 rate, that is, by \$14, \$12, \$15 and \$13.

B.8 As at 31 December 2001, 94 current awards had been varied for the May 2001 FMW of \$413.40, representing 15 per cent of the 602 current awards varied for the May 2001 SNA. As at 31 December 2000, 109 current awards had been varied for the FMW of \$400.40 (18 per cent of awards varied for the May 2000 SNA).

B.9 An industry breakdown of the awards varied for the SNA and the FMW resulting from the Commission's May 2001 decision is provided in Table B.3. No discernable change is evident in the industry make-up from previous years, with other services accounting for just fewer than 60 per cent of current awards varied for FMW and just under 50 per cent of awards for the SNA.

B.10 State minimum award wages exist in the Queensland, New South Wales (the Award Review Classification Rate), Western Australia and South Australia State jurisdictions. All of these have been consistently adjusted in line with increases to the FMW. In Western Australia, employees are entitled to a statutory minimum rate of pay whether covered by awards or not. The Victorian Minimum Wage Orders provide minimum rates of pay for employees in Victorian industry sectors who are not covered by federal awards or agreements. These have been adjusted in line with Safety Net Review decisions and have therefore remained consistent with the FMW. In Queensland, the State award minimum wage has been extended to employees not covered by an award through amendments made to legislation late last year.

Table B.3: Comparison of the incidence of May 2001 FMW and May 2001 SNA variations by industry sector, as at 31 December 2001

Industry	May 2001 FMW		May 2001 SNA	
	No of current awards varied	Percentage of all current awards varied	No of current awards varied	Percentage of all current awards varied
Mining and agriculture	4	4	27	4
Metals manufacturing	2	2	16	3
Non-metals manufacturing	17	18	102	17
Infrastructure services	5	5	114	19
Other services	54	58	291	48
Public administration and defence	12	13	52	9
Total	94	100	602	100

Source: DEWR, Safety Net Adjustment and Paid Rates Awards Database.

Notes:

- (a) The information presented has been drawn from published Commission decisions and does not reflect the impact of orders yet to be published, but relevant to the time period covered by the analysis.
- (b) These industry sectors are based on an aggregation of ANZSIC Division categories. Awards are coded in the database at the two digit ANZSIC level according to the industry in which they primarily operate. The 'Other Services' industry consists of wholesale and retail trades, education, finance and business services and hospitality.
- (c) All percentage figures have been rounded.

Paid Rates Awards Review progress

B.11 The review of paid rates awards continues at a slow pace. There are 261 awards still current from the 497 originally identified as paid rates awards in 1998³ and a small number of awards have been set aside and superseded but are still in the review process. As at 31 December 2001, there are 176 awards still under review and a further 13 awards have been simplified but have not had their wage rates fully adjusted.

³ A list of 497 paid rates awards was compiled by the Commonwealth and distributed to all parties for consultation during the 1998 Paid Rates Review. The modified list was handed up to the Full Bench during the review proceedings. Awards are identified as paid rates awards by reference to this list.

B.12 At 31 December 2001, 69 currently operating paid rates awards have been varied for the May 2001 SNA; 18 of these have properly adjusted minimum rates and 51 are under review.

B.13 The size of the residual identified in the conversion process is highly variable and the absorption requirement of any SNA will impact differently both within and between awards. With the handing down of the supplementary decision in the Paid Rates Review by the Full Bench on 14 October 1999,⁴ access to the original pay rate comprising minimum rate plus any identified residual was limited to existing employees, while employees employed after the date of conversion of the rates in their award are paid at the minimum rate and have access to the arbitrated SNA. This increases the variability of the impact of SNAs on pay rates but will hasten the conversion of former paid rates awards to a true award safety net.

Flow of 2000–2001 decision to State jurisdictions

B.14 As has occurred in previous years, the wage increases and other key elements of the May 2001 decision in the Safety Net Review – Wages have flowed on to all State jurisdictions. Also, the AIRC has handed down a decision to adjust the Victorian Minimum Wage Orders in line with the federal SNA. Details of these decisions are provided below.

B.15 Consistent with the federal decision, the increases in all State awards are to be fully absorbable against above award payments and are available only after twelve months had elapsed since the previous increase (apart from some specific exceptions made for awards that lagged in receiving previous increases). The increases were made

⁴ [Print S0105](#).

available by general order in Queensland, Tasmania and Western Australia and by application in New South Wales and South Australia. In Tasmania, increases were only awarded to private sector award employees due to the operation of contiguous State Services Wages Arrangements Agreements, the quantum of which exceeds the adjustment. The AIRC granted increases in the Victorian Minimum Wage Orders by general order approximately 11 months after the 2000 adjustment was provided.

Queensland

B.16 The Queensland Industrial Relations Commission handed down its State wage case decision on 1 August 2001. The decision flowed-on the federal SNA. The increases were made available by general order with an operative date of 1 September 2001, which is twelve months after the previous increase. The decision increased the Queensland minimum wage to \$413.40 per week.

Tasmania

B.17 The Tasmanian Industrial Commission handed down its State wage case decision on 13 July 2001. The decision flowed-on the federal SNA to private sector awards by general order with an operative date of 1 August 2001, which is twelve months after the previous increase. Public sector awards were excluded from the decision due to the operation of contiguous State Service Wages Arrangements Agreements, the quantum of which exceeds the safety net increases.

Western Australia

B.18 The Western Australian Industrial Relations Commission stated its intention to give effect to flow-on the federal SNA by general order on

15 May 2001. The Commission provided parties with the opportunity to submit reasons why it should not take such action. After the parties had been heard, the Full Bench handed down its final decision on 25 June 2001. The decision flowed-on the federal SNA with increases available by general order with an operative date of 1 August 2001, which is twelve months after the previous increase. The decision increased the minimum adult award wage of Western Australia to \$413.40.

New South Wales

B.19 The New South Wales Industrial Relations Commission handed down its State wage case decision on 31 May 2001. The decision flowed-on the federal SNA. The increases were made available by application on an award-by-award basis provided there has been at least a 12 month gap since the implementation of last year's decision. The decision increased the Award Review Classification Rate (the New South Wales equivalent of the federal minimum wage) to \$413.40 per week.

South Australia

B.20 The South Australian Industrial Relations Commission handed down its State wage case decision on 18 June 2001. The decision flowed-on the federal SNA. The increases were made available by application on an award-by-award basis provided there has been at least a 12 month gap since the implementation of last year's decision. The decision increased the minimum adult award wage for South Australia to \$413.40 per week.

Victoria

B.21 The Australian Industrial Relations Commission handed down its decision on 16 August 2001 granting increases in the Victorian Minimum Wage Orders in line with the federal SNAs. The increases were made

available by general order with an operative date of 16 August, just over eleven months after the previous increase. The Full Bench decided that there was justification for a ‘special case’ under the wage fixing principles and therefore allowed some relief from the required twelve month interval between SNAs.

WAGES GROWTH

WAGES GROWTH

	WCI (a)	AWOTE (b)	Real AWOTE (c)	Senior Management (d)		Current Federal Agreements (e)	AENA (f)
				BS	TR		
(per cent change on a year earlier)							
Dec-01	3.4	5.9	2.6	5.0	4.9	nya	nya
Sep-01	3.6	5.1	2.5	4.7	4.8	3.7	4.5
Jun-01	3.7	5.3	-0.7	4.5	4.4	3.7	4.5
Mar-01	3.7	4.6	-1.3	4.8	4.7	3.6	4.1
Dec-00	3.4	5.1	-0.6	4.8	4.9	3.6	3.4
Sep-00	3.1	6.1	0.1	4.6	4.9	3.6	2.8
Jun-00	2.8	4.3	1.0	4.5	4.8	3.5	2.8
Mar-00	2.8	4.1	1.2	4.6	5.0	3.6	3.0
Dec-99	3.0	3.0	1.1	4.6	5.2	3.6	3.4
Sep-99	3.0	2.1	0.4	4.7	5.1	3.7	3.7
Jun-99	3.2	3.4	2.3	4.7	5.1	3.8	3.8
Mar-99	3.0	3.1	1.8	4.7	4.9	3.9	4.1
Dec-98	3.1	4.2	2.6	4.8	4.8	4.0	3.9
Sep-98	3.3	4.1	2.7	5.0	4.9	4.0	3.4
Jun-98	na	4.4	3.8	5.7	5.6	4.0	2.9

Source: ABS Cat Nos 6345.0, 6302.0, 6401.0 and 5206.0, Mercer Cullen Egan Dell, *Quarterly Salary Review*, DEWR's Workplace Agreements Database.

Notes: na – data not available; nya – data not yet available.

(a) Wage Cost Index series.

(b) Average Weekly Ordinary Time Earnings for full-time adult employees.

(c) Using the headline CPI as the price deflator and seasonally adjusted AWOTE data.

(d) Compiled from Mercer Cullen Egan Dell's *Quarterly Salary Review*. Senior management is a broad category encompassing chief executives, managers, company secretaries and other executives.

BS – Base Salary; TR – Total Remuneration.

(e) These AAWIs are calculated from all federal wage agreements current on the last day of each quarter. Each agreement is weighted according to employee coverage producing an AAWI per employee.

(f) Trend Average Earnings on a National Accounts basis.

NEW RESEARCH CITED IN CHAPTER 3

NEW RESEARCH CITED IN CHAPTER 3

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Applied Economics, Feb 20, 2001 v33 i3 p285

The minimum wage and teenage employment: evidence from time series.
(Statistical Data Included) NICOLAS WILLIAMS, JEFFREY A. MILLS.

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This study reconsiders the evidence from time-series data concerning the relationship between the minimum wage and teenage employment rates. The results suggest that the previous literature failed to adequately address issues of stationarity, dynamic specification and endogeneity. The data are reanalysed in light of recent developments in time-series methods and evidence is found of a negative relationship between the minimum wage and teenage employment. The results are robust across variations in the sample period, the control variables, and the measure of the minimum wage.

I. INTRODUCTION

Investigations of the impact of the minimum wage on teenage employment using national time-series data have a long and influential history. As Card and Krueger (1995, p. 178) state: 'The main evidence usually cited to support the claim of adverse employment effects of the minimum wage is based on time-series analysis.' There are two main reasons for this. First, increases in the minimum wage may cause employment shifts between geographical regions or between covered and uncovered sectors without any reduction in total employment. This problem is avoided with the use of aggregate data. Second, since the minimum wage is legislatively determined, variation in the minimum wage measure must come from periodic increases in the federal or state minimums. Prior to the 1980s few states had minimums above the federal level, and state-level data were scarce. Researchers naturally turned to time series data.

Recently, time-series analyses seeking to measure the impact of the minimum wage have fallen out of favour. The increasing availability of individual, firm, industry and state level data sets has allowed researchers to approach this issue from new directions and to ask new questions.(1) In addition, as demonstrated by Card and Krueger (1995), the results from time-series analyses seem to have been getting weaker as more years of data become available. They critically examine the methodology of the time-series approach and question whether it provides the best means of estimating the impact of the minimum wage on teenage employment.

This study reconsiders this issue. Using the data of Card and Krueger, a time-series analysis is conducted to determine if there is a stable relationship between the federal minimum wage and teenage employment. The starting point is to recognize that the previous time-series literature failed to address three important specification issues: the stationarity of the variables; the dynamic specification; and the potential endogeneity of some of the variables. The data are then reanalysed in light of recent developments in time-series methods, paying careful attention to the need to investigate and report a variety of dynamic specifications. Evidence from autoregressions suggests that, while not necessarily permanent, there is considerable persistence in the impact of the minimum wage on teenage employment. Dynamic regression models provide further evidence of a significant negative effect of the minimum wage on teenage employment. This result holds for several different measures of the minimum wage. We conclude that the estimated effect of the minimum wage lies within a 3-5% range, and hence has a significant negative effect on the employment of young workers.

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The next section briefly reviews the time-series literature on the minimum wage and also highlights the criticisms of Card and Krueger. In Section III the instability of the estimates when the standard specification in the literature is used is demonstrated, stationarity is tested for, and some additional specification issues are discussed. Section IV provides evidence from vector autoregressions (VARs). Section V presents results from regression analyses that take into account the time-series nature of the data and addresses the dynamic specification of the model. A summary and conclusions are given in Section VI.

II. THE PREVIOUS LITERATURE

Until recently, if you asked an economist about the magnitude of the disemployment effect of the minimum wage, he or she almost invariably cited results either from the time-series research of Brown et al. (1983) or from Wellington's (1991) extension. These papers, among many others, specified a relatively simple time-series relationship between teenage employment and the minimum wage:

$$(1) [E_{\text{sub},t}] = [[\text{Beta}]]_{\text{sub},1} [\text{MW}_{\text{sub},t}] + [\text{X}_{\text{sub},t}] [[\text{Beta}]]_{\text{sub},2} + [\epsilon_{\text{sub},t}]$$

$$(2) [\epsilon_{\text{sub},t}] = [\text{Rho}][\epsilon_{\text{sub},t-1}] + [\text{u}_{\text{sub},t}], [\text{u}_{\text{sub},t}] \sim N(0, [[\Sigma]]_{\text{sup},2})$$

where $[E_{\text{sub},t}]$ is the teenage employment rate at date t , $[\text{MW}_{\text{sub},t}]$ is a measure of the minimum wage, and $[\text{X}_{\text{sub},t}]$ are control variables including a constant, time trends and seasonal dummies. To correct for serial correlation, the error term was modelled as an AR(1) process, and since Solon (1985) the model was augmented to include the interaction of the time trends with the seasonal dummies.

In their influential book, Card and Krueger (1995) express scepticism that time-series data and equations like (1) can estimate the employment elasticity with respect to the minimum wage. They argue that there are numerous methodological problems in estimating the reduced form in Equation 1. As with most reduced form specifications, the choice of control variables is often unclear and considerable specification checking is required to ensure robustness. There is also considerable ambiguity about how the minimum wage should be measured. Most previous research has used the Kaitz index, which is essentially a relative wage (see Card and Krueger, 1995, pp. 179-80 and below), while some research has used a real minimum wage rate. The choice of the minimum wage measure has implications for which other wage measures and controls must be included in Equation 1 to obtain consistent results. Card and Krueger are also concerned about the potential endogeneity of the minimum wage measure and some of the controls, especially supply side variables like the school enrolment rate. These are serious concerns that we discuss further below.

Second, Card and Krueger (1995, p. 15) observe that, 'The historical time-series relationship between minimum wages and teenage employment has become much weaker. If we use more recent data to estimate the same models that found negative effects of the minimum wage in the past, we no longer find statistically reliable evidence that the minimum wage reduces employment.' This is apparent from a sequential reading of the minimum wage time-series research. Brown et al. (1982), synthesizing results from the numerous studies that used data through the early 1970s, conclude that a 10% increase in the minimum wage lowers teenage employment by between 1% and 3%. Brown et al. (1983) extended the data through 1979 and conclude that a 10% increase in the minimum wage lowers teenage employment by 1%. Wellington (1991) extended Brown et al.'s data through 1986 and concludes that a 10% increase in the minimum wage lowers teenage employment by only 0.6%. When Card and Krueger (1995) extended Wellington's data through 1993 they fail to find a significant relationship between the minimum wage and teenage employment.

Card and Krueger have raised valid concerns about the existing time series results. However, their conclusion (p. 205) that time-series methods do not provide the best means of estimating the employment effects of minimum-wage increases may not be justified. In particular, the time-series methods used in all of the previous literature is rudimentary.

III. SPECIFICATION ISSUES

This section discusses some specification issues either overlooked or underemphasized by previous time-series analyses, and suggests how modern time-series methods can be used to more fully understand the relationship between the minimum wage and teenage employment. As a framework for this discussion first results are presented from standard regressions of Equations 1 and 2 over ever lengthening time periods. The data were graciously provided by Card and Krueger, and the sample covers the period 1954:1 to 1993:4.(2)

Following the previous literature, the minimum wage is measured using the Kaitz index and the adult male unemployment rate, the fraction of teenagers aged 16-17, the fraction of teenagers in the armed forces, the population share of teenagers, a linear and quadratic time trend, three seasonal dummies and the interaction of the time trends and the seasonal dummies (Brown et al., 1983; Wellington, 1991; Card and Krueger, 1995) are included. See Appendix Table A1 for variable definitions and sample means.

The Kaitz index is defined as:

(3) [MATHEMATICAL EXPRESSION NOT REPRODUCIBLE IN ASCII]

where $[W_{\text{sub},t}]$ is the nominal minimum wage at time t , $[A_{\text{sub},it}]$ is the average hourly earnings in industry i at t , $[E_{\text{sub},it}]$ is teenage employment (not the teenage-employment ratio), and $[C_{\text{sub},it}]$ is the coverage of the minimum wage in industry i .(3)

In Table 1, estimates of Equation 1 are presented that use quarterly data with ever lengthening sample periods.(4) Brown et al. (1983) used data through 1979, Wellington (1991) used data through 1986, and Card and Krueger used data through 1993. Column 1 contains the coefficients and standard errors for the minimum wage variable when Equation 1 is estimated using OLS, columns 2 and 3 contain estimates when the AR(1) error process given in Equation 2 is adopted and when the Beach-MacKinnon maximum likelihood procedure is used, columns 4 and 5 contain estimates of the AR(1) error specification using the Cochrane-Orcutt procedure.(5)

[TABULAR DATA 1 NOT REPRODUCIBLE IN ASCII]

The OLS estimates in Table 1 suggest that the disemployment effect of the minimum wage declines dramatically as additional years of data are added. The OLS estimates in column 1 that use data up to 1974 imply that a 10% increase in the minimum wage decreases teenage employment by 1.14%, but estimates using data up to 1990 imply a similar increase in the minimum wage would lead to a 0.44% increase in teenage employment. Correcting for AR(1) errors, the Beach-MacKinnon estimates in column 2 show a less pronounced pattern; the effect of a 10% increase in the minimum wage leads to a 0.81% decrease in teenage employment with data up to 1974, which drops to a 0.68% decrease when data up to 1990 are included. However, as additional years of data are added the estimated AR(1) coefficient, $[Rho]$, approaches one, increasing from 0.56 to 0.93, and its standard error falls, suggesting the possibility of a unit root in the error term. The Cochrane-Orcutt estimates remain stable and statistically significant at or near the 5% level, indicating that teenage employment drops by around 0.9% when the minimum wage is increased by 10%. As with the Beach-MacKinnon estimates however, the AR(1) coefficient is close to unity suggesting the presence of a unit root in the error.

These estimates exhibit several other disturbing features. First, if Equation 1 is properly specified, the OLS, Beach-MacKinnon and Cochrane-Orcutt specifications should all produce consistent estimates. Their dramatic difference suggests specification error. Second, as additional years of data are added the OLS standard errors rise and significance falls. A similar pattern holds for the Beach-MacKinnon AR(1) estimates. Third, Breusch-Godfrey LM tests for 1st and 4th order serial correlation in the residuals (which for the sake of brevity are not reported) are significant at the 1% level for all specifications (even after supposedly 'correcting for' 1st order serial correlation), providing a clear indication that these models are dynamically misspecified.

An explanation is offered for these results based on recent advances in knowledge regarding the properties of time series.(6) Specifically, the first step in any time-series examination must be to consider the stationarity of the variables. Failure to ensure stationarity may result in biased estimation and faulty inference. After this discussion, we examine the dynamic specification implied by Equations 1 and 2 and argue that it is too restrictive to accurately model the teenage employment and minimum wage relationship.

Stationarity

Seminal work by Granger and Newbold (1974) and Phillips (1986), and subsequent research on cointegration, give reason to seriously question empirical evidence based on regression analysis of time-series data if any of the variables in the regression are nonstationary. Therefore, the first step in attempting to explain the results in Table 1 should be to examine the stationarity of the series. This issue has been widely overlooked in the existing minimum wage literature.(7)

Enders (1995) provides a convenient framework for the discussion by outlining the following four possibilities. Let $[y_{\text{sub},t}]$ indicate the dependent variable time series and $[x_{\text{sub},t}]$ represent a vector time series of independent variables.(8) If both $[y_{\text{sub},t}]$ and $[x_{\text{sub},t}]$ are stationary, then OLS regressions like Equation 1 will yield consistent estimates. If $[y_{\text{sub},t}]$ and $[x_{\text{sub},t}]$ are integrated of different orders, then OLS estimates based on Equation 1 are meaningless. The error term from such a regression is nonstationary, and the OLS coefficient will approach zero asymptotically. If both $[y_{\text{sub},t}]$ and $[x_{\text{sub},t}]$ are nonstationary, integrated of the same order and the residuals from the regression are also integrated of the same order then the regression results are meaningless and highly misleading. This is the spurious regression problem studied by Granger and Newbold (1974) and explained by Phillips (1986). Finally, if $[y_{\text{sub},t}]$ and $[x_{\text{sub},t}]$ are nonstationary, integrated of the same order, and the residuals are stationary then $[y_{\text{sub},t}]$ and $[x_{\text{sub},t}]$ are cointegrated (and the regression in Equation 1 estimates the cointegration relationship).

The second possibility, where the variables are integrated of different orders provides a possible explanation for the puzzling results in Table 1. As more years of data are added, the time-series relationship between teenage employment and the Kaitz index diminishes in absolute value and becomes less significant, and the estimate of [Rho] approaches unity, indicating that the error process contains a unit root. This suggests that the teenage employment rate and the Kaitz index series may be integrated of different orders.

Figure 1 contains the time plot of the teenage employment rate. While highly seasonal, it appears stationary as it tends to fluctuate around a constant mean (0.43) with a constant variance. Figure 2 contains the time plot of the Kaitz index, the nominal minimum wage, and the coverage rate of the minimum, and appendix Table A2 lists the dates and sizes of the increases in the nominal minimum wage. The Kaitz index increased significantly over the sample period, and its variability also appears to have increased. As revealed by the plots of the nominal minimum and the coverage rate, this pattern came both from a rising nominal minimum wage and increases in coverage, with the coverage rate appearing to be more important early in the sample.(9)

[Figures 1-2 ILLUSTRATIONS OMITTED]

The stationarity of the series is tested using the Augmented Dickey-Fuller (ADF) test suggested by Dickey and Fuller (1979, 1981) both with and without a linear deterministic trend, and the Phillips-Perron (PP) test (1988). Both tests are based on a null hypothesis of a unit root (nonstationarity) and we use the form of the tests recommended by Hamilton (1994). Results are reported when the lag length is chosen according to the BIC model selection criterion.(10) The results in the first two rows of Table 2 provide strong evidence that the teenage employment rate E is I(0) and the Kaitz index (YK) is I(1) using the Dickey-Fuller critical values.(11) As a further check, we examined the sample autocorrelation function and variance for both variables in log-differences. This evidence confirms the results of the unit root tests.

[TABULAR DATA 2 NOT REPRODUCIBLE IN ASCII]

There is also the possibility that YK may be trend stationary, i.e. when YK is detrended using a quadratic trend we obtain an I(0) variable. However, since the nominal minimum wage is only changed sporadically it is unlikely that a deterministic trend is a more appropriate model than a stochastic trend. Therefore, since this study is concerned only with whether or not the real minimum wage rate variable is nonstationary (and not with the nature of the nonstationarity if it is), not much emphasis will be put on this finding, especially since these tests often have low power when comparing trend vs. difference stationarity.

In the remaining rows of Table 2 the stationarity of the other variables in the analyses is tested.(12) The proportion of teenagers enrolled in school (ENP), and the average hourly wage in manufacturing (WMANR) both contain a unit root. The tests suggest that the adult male unemployment rate (UPR) and the share of teenagers aged 16-17 are likely trend stationary, and do not contain unit roots. While the tests indicate that the share of teenagers in the armed forces (AFP) contain a unit root, examination of its time-plot and sample autocorrelation function suggests this series is best modelled by detrending. The population share of teenagers (POP) and young adults (POPA), appear to contain a unit root, but after examining their time plots it is apparent that these series very likely follow a quadratic time trend. Finally, the tests for the adult male employment rate (EMPAM) are mixed, though it is believed that this series is likely to be trend stationary. All of the analysis below has been repeated after differencing EMPAM, and similar results obtained.

Since the dependent variable, E, is stationary, it cannot be cointegrated with any other variable, which implies that there is no long run relationship between E and either YK or MINR. For the sake of completeness however, cointegration between the variables that were integrated of order one were checked for. Engle and Granger (1987) showed that two or more series are cointegrated if a linear combination of the nonstationary series results in a stationary series. Using the Johansen (1988) cointegration test, as well as the Engle-Granger (1987) and the Phillips-Ouliaris (1990) tests, no evidence could be found of cointegration between YK, WMANR and ENP, or between MINR, COVER, WMANR and ENP.(13)

In sum, there is considerable evidence that while the teenage employment rate is stationary, the Kaitz index is nonstationary and most likely contains a unit root. This result partially confirms the supposition that the declining effect of the minimum wage demonstrated in Table 1 can be explained by $[y_{\text{sub}t}]$ and $[x_{\text{sub}t}]$ being integrated of different orders, and calls into question the previous time-series results based on Equation 1 that have ignored the time-series properties of the series. Many of the independent variables used when Equation 1 is estimated are also nonstationary. Therefore, estimation of Equation 1 in levels will not produce a consistent estimate of the employment elasticity with respect to the minimum wage. Given this conclusion it is not surprising that previous time-series studies have produced a wide range of estimates, nor that the

employment elasticity with respect to the minimum wage appears to have declined.

It can be further concluded from these results that since the teenage employment rate and the Kaitz index are integrated of different orders, they cannot be cointegrated. Indeed, since the teenage employment rate is I(0), there are no other variables that permanently affect its long-run level. This is intuitively pleasing since one would not expect increases in the Kaitz index (which are caused by increases in the nominal minimum wage) to permanently affect teenage employment. On the contrary, one would expect the effect of such an increase to eventually dampen due to economic growth and inflation.

Additional specification issues

Two main specification issues still need to be addressed. The first is how the dynamic relationship between teenage employment, the minimum wage and the control variables should be modelled, and whether Equations 1 and 2 are consistent with the desired dynamic specification. Static labour demand models lead to estimating Equation 1 without any control for serial correlation.(14) More realistically, the employment-minimum wage relationship is probably dynamic. Hamermesh (1993) presents several dynamic models which reveal how labour demand will respond to shocks in factor prices, such as an increase in the minimum wage. This response will depend upon the structure of adjustment costs and employer forecasts of the path of these shocks. Empirically, these dynamic labour demand models suggest the need for a specification that includes lags of employment, as well as current and lagged values of the controls.(15) Alternatively, since changes in the minimum wage and its coverage are statutory, employers likely know when a minimum wage increase is due to be enacted, and may take steps to adjust their employee pool before the new higher minimum takes effect.

While Equation 1 is inherently static, when combined with Equation 2 it does imply a dynamic process -- albeit a relatively simple and restrictive one. Substituting Equation 2 into Equation 1 gives:

$$(4) [E_{\text{sub},t}] = [\rho][E_{\text{sub},t-1}] + [[\beta]_{\text{sub},1}][Mw_{\text{sub},t}] - [[\beta]_{\text{sub},1}][\rho][Mw_{\text{sub},t-1}] + [\beta]_{\text{sub},2}[X_{\text{sub},t}] - [\rho][\beta]_{\text{sub},2}[X_{\text{sub},t-1}] + [u_{\text{sub},t}]$$

While this specification could be generated by dynamic labour demand models, there seems to be little justification for concentrating on such a restrictive model, as additional lags of $[E_{\text{sub},t}]$ and $[Mw_{\text{sub},t}]$ may be empirically important. While several other studies(16) have estimated somewhat more general specifications than Equation 4, as yet there has not been a thorough investigation of this issue. None of these previous studies have first checked for stationarity. Further, given the results of the preceding section, the quasidifference in Equation 4 would likely underdifference the minimum wage measure and some of the controls, and overdifference the remainder of the controls.(17) Lastly, there is little or no theoretical basis for the nonlinear restrictions in Equation 4.

The second specification issue concerns the potential endogeneity of the minimum wage and controls. One might, for example, expect that legislators would be most willing to raise the minimum wage when the economy is strong, overall unemployment is low, and teenage employment is relatively high. Neumark and Wascher (1992, 1995) and Card et al. (1994) have expressed concern that teenage employment and school enrolment might be simultaneously determined. Failure to account for these and potentially other simultaneous relationships will lead to biased estimates in a single equation like Equation 4 and suggests the need for either an instrumental procedure or system estimation.

IV. EVIDENCE FROM VECTOR AUTOREGRESSIONS

The problems with the specification adopted in the previous literature suggest that we should estimate a simultaneous equations model with a more general autoregressive specification to capture the effects of endogeneity, simultaneity, and dynamics (including the possibility of unit roots, etc.). Evidence from such a model can be obtained by considering an 'atheoretical' time series vector autoregression (VAR), as suggested by Sims (1980). In particular, the main motivation for development of the VAR methodology was an unwillingness to impose arbitrary restrictions on the lag specification, and to allow for endogeneity of the variables and hence feedback in the system.

A VAR is a simultaneous system of dynamic equations representing the relationship between $[E_{\text{sub},t}]$, $[MW_{\text{sub},t}]$, and a vector of other covariates $[X_{\text{sub},t}]$. If we let $[y_{\text{sub},t}] = [[E_{\text{sub},t}], [MW_{\text{sub},t}], [X_{\text{sub},t}]]$ then the VAR system can be written as

$$(5) [y_{\text{sub},t}] = c + [[\Phi_1]_{\text{sub},1}][y_{\text{sub},t-1}] + [[\Phi_2]_{\text{sub},2}][y_{\text{sub},t-2}] \dots + [[\Phi_p]_{\text{sub},p}][y_{\text{sub},t-p}] + [e_{\text{sub},t}]$$

Equation 5 is the VAR representation of a dynamic structural system and can be viewed as the reduced form of such a system (and hence allows for contemporaneous effects of the variables upon one another). (18) In this case, this means that there will be separate equations for $[E_{\text{sub},t}]$, $[MW_{\text{sub},t}]$, and each of the controls. Each of these equations will contain lags of all of the variables in the system.

Interpreting VARs can be difficult given the number of coefficients being estimated and the potential contemporaneous correlation of the errors across equations. The results are discussed in three ways. First, F-tests are presented for exogeneity (i.e. Granger causality) between teenage employment and the minimum wage. Roughly speaking, series x is said to Granger-cause series y if movements in x help to predict movements in y. This allows one to test whether there is any statistically significant relationship between teenage employment and the minimum wage. The next step is to assess the quantitative importance of changes in the minimum wage. This is done by first looking at variance decompositions of the estimated VAR models, and then by assessing the impact of a 10% increase in the minimum wage on teenage employment using impulse response functions.

Since all the equations in Equation 5 have the same variables on the RHS, estimation by OLS is efficient. However, since the elements of the error vector $[e_{\text{sub},t}]$ are contemporaneously correlated, to calculate the variance components and dynamic multipliers it is necessary to orthogonalize these errors. Let $B([e_{\text{sub},t}][e_{\text{sub},t}^T]) = [\Omega]$, a positive definite symmetric matrix. One can define $ADA' = [\Omega]$, where D is a diagonal matrix and A is lower triangular, and then let $[u_{\text{sub},t}] = [Ae_{\text{sub},t}]$, which implies that the elements of $[u_{\text{sub},t}]$ are contemporaneously uncorrelated.

One can then decompose the total variation in a future value of y, say $[y_{\text{sub},t+s}]$, by considering the MSE of the estimate $[y_{\text{sub},t+s}]$. As $s \rightarrow \infty$ for a covariance stationary VAR, the MSE $[y_{\text{sub},t+s}]$ approaches the unconditional variance of $[y_{\text{sub},t}]$. Hence this variance decomposition allows one to determine the proportion of the variation $[y_{\text{sub},t+s}]$ due to the disturbance $[u_{\text{sub},t}]$. In addition, substituting $[e_{\text{sub},t}] = [A_{\text{sup},-1}][u_{\text{sub},t}]$ into Equation 5 allows one to simulate the effect of a unit change in an element of $[u_{\text{sub},t}]$, on $[y_{\text{sub},t}]$. The simulated values for $[y_{\text{sub},t}]$, obtained by this process are estimates of the dynamic multipliers for the effect of a one-time exogenous change in one variable on the time path of another variable. These are known as the (orthogonalized) impulse response function (IRF). (19)

The main drawback of this approach is that since the matrix A is lower triangular, the ordering of the variables in the system imposes a recursive structure on the contemporaneous correlation in $[e_{\text{sub},t}]$. Therefore, it is important to investigate the sensitivity of the results obtained to this

'ordering', particularly if there appears to be contemporaneous correlation among the estimates of [e.sub.t]. Below we investigate the sensitivity of our results to the ordering of the variables in the VAR.

Because the evidence indicates that the teenage employment rate (E) does not contain a unit root, it was chosen to concentrate on specifications which use E untransformed as the dependent variable, and the mixed set of transformations of the right-hand side variables as indicated by the results in Section III. Similar results were obtained when all of the variables were differenced. VAR systems were also estimated without differencing the variables, since sufficient lags are theoretically capable of capturing the integrated nature of the variables so that the error term will be stationary. The VAR systems with nonstationary variables did not provide stable results, though they were qualitatively similar.

Results are reported from two specifications. The first controls for the log of the adult male unemployment rate (UPR), the share of teenagers aged 16-17 (SY), and the log of the population share of teenagers (POP). This matches the 'basic' specification of Wellington (1991), except that it excludes the fraction of those aged 16-19 in the armed forces (AFP) because it was never statistically significant in our models. The second specification adds the adult male employment rate (EMPAM), and the real wage in manufacturing (WMANR) to the basic specification, as suggested by Card and Krueger (1995). These specifications were chosen both by theory, and the fact that the AIC and BIC model selection criteria consistently chose these variables to include in the equations. UPR and SY were the only controls that were statistically significant across most specifications. Though POP was not statistically significant in most specifications, there are theoretical reasons to believe it is important and in some specifications its inclusion did lead to a stronger effect of the minimum wage on teen employment.(20) Seasonal dummies were included in all specifications due to the strong seasonal component exhibited in teenage employment.(21)

Previous research has stressed the importance of the inclusion or exclusion of the controls when estimating the effect of the minimum wage (see Brown et al., 1983; Wellington, 1991; and Card and Krueger, 1995). While it is believed that some of the variation in the results obtained was probably due to the inclusion of nonstationary variables and the restrictive dynamics, many different sets of the controls to check for robustness were experimented. In particular, all of the variations suggested by Wellington were estimated, and in all cases obtained similar results. This was true regardless of whether a teenage enrolment variable was included in the models.

Rather than take a strong stand on the number of lags to include in the VARs, below Granger causality tests and variance decompositions that use 4, 6, and 8 lags are reported. The AIC and BIC model selection criteria were also examined. The AIC model selection criterion led to a lag length choice of 5 or 6, whereas the Schwarz BIC typically selected 1 or 2 lags. Since the BIC has a tendency to underparameterize and the omitted variables bias consequence from underparameterizing is worse than the reduced efficiency from overparametrizing, it is thought that 6 lags best fit the data.(22) For parsimony in reporting the impulse response functions, only results that use 6 lags are reported. However, to ensure the robustness of the results, numerous specifications that varied the lag length, the orderings, and the controls are estimated (but not reported). Very similar results were obtained for all cases, although the shorter lag length models failed to capture the seasonality inherent in teen employment. Many of these results are available in Williams and Mills (1995).

Table 3 contains F-tests for exogeneity (i.e. Granger causality) between teenage employment and the Kaitz index for our two highlighted specifications. The coefficients on the Kaitz index variables are jointly significant at the 5% level in the teenage employment equations of both systems, suggesting that there is a statistically significant dynamic correlation between these variables. This result holds across the two sets of controls and different lag lengths. Weaker evidence is found that lagged values of teenage employment affect the Kaitz index. This feedback

effect can be explained by both policy feedback that might suggest current teenage employment rates are an important consideration when formulating future minimum wage policy, and by employers responding to legislated changes in the minimum wage before the change is actually implemented. Of the other variables included in the 'basic' VAR specification, only UPR was significant at the 5% level. In the extended model suggested by Card and Krugger, both EMPAM and WMANR were significant at the 10% level, but had no impact on the marginal significance of the minimum wage. In sum, these estimates allow one to reject the hypothesis that changes in the minimum wage have no effect on teenage employment.

[TABULAR DATA 3 NOT REPRODUCIBLE IN ASCII]

The next step is to assess the quantitative importance of changes in the minimum wage. This is done by first looking at variance decompositions of the estimated VAR models, and then by assessing the impact of a 10% increase in the minimum wage on teenage employment using impulse response functions. As discussed above, both of these may be sensitive to the ordering of the variables in the system. Two methods are used to determine the orderings used in the variance decompositions and the impulse response functions. First, it is conventional to place forcing variables, here the minimum wage, early in the ordering. Second, examination of the covariance matrix of the residuals indicated that there is significant contemporaneous correlation ($[[\text{Rho}]]$ is greater than 0.2) between the residuals for the pairs of variables (E, UPR), (YK, POP), (SY, POP) and (UPR, SY), so the ordering of these variables relative to one another could be important. Therefore we report the orderings (YK, E, UPR, SY, POP) and (POP, SY, UPR, E, YK) for the basic specification, and (YK, E, UPR, SY, POP, EMPAM, WMANR) and (EMPAM, WMANR, POP, SY, UPR, E, YK) for the extended specification. These orderings yielded results that were representative of the numerous other orderings we also estimated.

The variance decompositions are presented in Table 4. The minimum wage explains between around 3% to 12% of the total variation in teenage employment, with most models suggesting that movements in the minimum wage explain approximately 7 to 10% of the variation in teenage employment (the greatest proportion of the variation in teenage employment being explained by its own lags).

[TABULAR DATA 4 NOT REPRODUCIBLE IN ASCII]

To further understand the quantitative impact of changes in the minimum wage on teenage employment, the impact of an exogenous 10% increase in the minimum wage is simulated. Specifically, it is assumed that the Kaitz index increases by 10% in period 1, and then all of the estimated coefficients from the teenage employment equation are used in the VAR system to predict the impact on teenage employment. Because the specifications include lags of E, YK and the controls, a minimum wage increase at period t also effects employment in subsequent periods. Figures 3 through 6 present the impulse response functions (IRFs) for the response of teenage employment to a 10% exogenous change in the minimum wage. These figures are for two different VAR specifications using a lag length of 6 and varying the ordering of the variables in the recursive structure. The upper and lower bounds in the figures represent a 90% confidence interval obtained using Monte Carlo integration estimates of standard errors (see Doan (1992) for details).

[Figures 3-6 ILLUSTRATION OMITTED]

Figures 3 and 4 present the impact of a 10% increase in the Kaitz index when the basic specification is used, while Figs 5 and 6 add the adult male employment rate and the real wage in manufacturing to the specification. Figure 3, that uses the ordering (YK, E, UPR, SY, POP), suggests that the teen employment rate falls by over 4.5% over a two year period. The impulse response function in Fig. 4, that uses the ordering (POP, SY, UPR, E, YK) yields a similar affect

of a 10% increase in the minimum wage. (23) Turning to the extended specification, Fig. 5 suggests that teen employment falls by over 4% when the variables in the VAR are ordered (YK, E, UPR, SY, POP, EMPAM, WMANR). The impulse response function in Fig. 6, that uses the ordering (EMPAM, WMANR, POP, SY, UPR, E, YK), yields a similar effect. The results are remarkably similar, suggesting that the choice of control variables and the ordering of the variables in the VAR are not important. In sum, these impulse response functions imply that a 10% increase in the minimum wage has an immediate negative effect on teenage employment, and over a 2 year period the teenage employment rate is over 4% lower than it would have been otherwise, and then gradually increases towards its pre-increase level.

When the number of lags were varied in the above VARs, the estimated response of teenage employment to a 10% change in the minimum wage, though very similar, tended to be somewhat larger and have smaller standard errors in the 6 and 8 lag specifications than in models with 4 lags. This suggests that there is omitted variables bias in the 4 lag specifications, since as more variables are included, the point estimates change and smaller standard errors are obtained. Regression diagnostics also suggested that the 6 and 8 lag models were preferable to 4 lags, due in part to seasonality in the data not captured by the seasonal dummies. The 2 lag models have the smallest standard errors (as one would expect), but fail to capture the seasonality in the data. Given the large number of estimated coefficients in these models (up to 8 lags of 8 variables in 8 equations plus seasonal dummies with 160 observations), it is rather surprising to find statistically significant results.

The impulse response functions of the effect of a 10% innovation in the minimum wage on the minimum wage were also examined (which, for the sake of brevity, are not reported). Despite the explanatory power of lagged teenage employment rates on the minimum wage, these IRFs fall to zero within one or two periods, suggesting that the feedback from teenage employment rates to the minimum wage are not an important determinant of the minimum wage in the short run. A result contrary to this would be troubling because the minimum wage changes infrequently and there does not appear to be much correlation between teenage employment rates and the rate of inflation. Hence there is no theoretical underpinning for a short run feedback effect from teen employment rates to minimum wage changes.

In summary, evidence from vector autoregressions leads us to conclude that the minimum wage has a significant, negative impact on teenage employment. Impulse response functions from a variety of VAR models lead us to conclude that the response of the teenage employment rate to a 10% increase in the minimum wage is negative and between 3% and 5%, increasing in strength over the first year or so before the effect begins to decrease. These estimates are consistently significantly different from zero at or near the 5% level for a one-tailed test and are remarkably robust to variations in the lag length, variables included, and ordering of the variables in the VAR. Granger causality tests suggest that there is a significant lagged negative response of teenage employment to changes in the minimum wage, and variance decompositions indicate that changes in the minimum wage explain approximately 7 to 10% of the variation in teenage employment rates.

Evidence from other minimum wage measures

All of the results above used the Kaitz index as the measure of the minimum wage. As discussed by Brown, et al. (1982) this parsimonious measure is desirable since it incorporates both a relative minimum wage rate and an adjustment for coverage. However, it also has several disadvantages. First, since it uses teenage employment as weights, it will be correlated by construction with the teenage employment ratio. Second, it constrains the minimum wage effect and the coverage effect to be the same although a priori there is no reason to believe this restriction. While Brown, et al. (1983) and Wellington (1991) attempted to separate the effect of coverage from the minimum wage by adding an employment weighted coverage variable along with the Kaitz index directly

into the model, this is problematic since these variables are highly correlated and their joint inclusion leads to a multicollinearity problem. In log levels, the Kaitz index and the coverage variable are correlated at 0.95, while in log differences these two measures are correlated at 0.75.

Therefore, two additional measures of the minimum wage were investigated. First, the log of the ratio of the minimum wage to the average hourly earnings in manufacturing (MWDIVMFG) is used, and the log of employment-weighted coverage (COVER) is included separately. Second, the log of the real minimum wage (MINR) is used, obtained by dividing the nominal wage at time t by the CPI, and separately including COVER and the real wage in manufacturing. Both of these measures allow the effects of the minimum wage and coverage to differ and avoid the multicollinearity problem, and perhaps more importantly, provide another way to check the robustness of the earlier estimates.

The time-series properties of these series are first investigated. Briefly, both the ADF and the Phillips-Perron unit root tests which used the BIC model selection criterion to choose the lag length overwhelmingly suggest that MWDIVMFG, MINR and COVER contain a unit root. For example, the ADF value for MWDIVMFG without a time trend was -4.72, for MINR -6.18, and for COVER it was -1.93. These are substantially below the critical value of -1.63. Therefore, each of these series are differenced before including them in the analyses. Using the Engle-Granger and Phillips-Ouliaris cointegration tests, no evidence was found of cointegration between MWDIVMFG and COVER, or between MINR, COVER, and WMANR.

The results from these two alternative measures of the minimum wage are similar to, if not stronger than, those obtained using the Kaitz index. In the interests of brevity only one specification per minimum wage measure is presented, with 6 lags, and one ordering. The results were remarkably robust to variations of control variables, lag length, and ordering.

When using MWDIVMFG as the measure of the minimum wage, UPR, SY, POP, and COVER are included as additional controls. In the teenage employment equation, the F-test for exogeneity is 2.68 with marginal significance 0.018. With an ordering of (MWDIVMFG, E, UPR, SY, POP, COVER), MWDIVMFG explains 13.78% of the variance of teenage employment. Finally, in Fig. 7 the impact of a 10% increase in MWDIVMFG is simulated, and it is found that teen employment falls by almost 5% over a 2 year period. The F-test for exogeneity for the coverage variable is 2.40 with marginal significance 0.032. However, the variance decompositions indicate that COVER explains only 3.16% of the variation in E, so there is only weak evidence that expanding the coverage of the minimum wage has a significant impact on teenage employment.

[Figure 7 ILLUSTRATION OMITTED]

Similarly, when using the real minimum wage, MINR, as the measure of the minimum wage, UPR, SY, POP, COVER, and WMANR are included as additional controls. In the teenage employment equation, the F-test for exogeneity is 2.07 with marginal significance 0.062. With an ordering of (MINR, E, UPR, SY, POP, COVER, WMANR), MINR explains 8.8% of the variance of teenage employment. In Fig. 8 the impact of a 10% increase in MINR is simulated, and it is found that teen employment falls by over 4.5% over a 2-3 year period. As above, there is weak evidence of coverage being independently important; the F-test for exogeneity is 2.14 with marginal significance 0.054 and in the variance decomposition COVER explains only 3.32% of the variation in E.

[Figure 8 ILLUSTRATIONS OMITTED]

In sum, these two alternative measures of the minimum wage strengthen the conclusion that the minimum wage has a significant, negative impact on teenage employment. Indeed, for most of the specifications estimated, of the three minimum wage measures MINR often gave the least

significant and MWDIVMFG the most significant estimates of a 10% increase in the minimum wage.

V. DYNAMIC REGRESSION MODELS

Legislative changes in the minimum wage occur infrequently. Coupled with the fact that there are no long run movements in the teenage employment rate since it is stationary, suggests that endogeneity of the minimum wage may not be a significant issue when modelling the short run relationship between the minimum wage and teen employment. If changes in the minimum wage can reasonably be treated as exogenous, then single equation models can be employed, drastically reducing the number of parameters to be estimated and providing more straightforward calculation of dynamic multiplier effects (IRFs). In this section we treat changes in the minimum wage as exogenous and provide evidence from single equation models.

Specifically, we regress E on to various combinations of lags of E, YK and the controls. Table 5 presents the results from four representative specifications with one lag of the controls, and between one and four lags of both E and YK. The effect of the increase in the minimum wage on contemporaneous employment, on next periods employment, and employment after 1 year is reported. The marginal significance of an F-test of the minimum wage coefficients is also reported. For brevity, neither results from specifications that use the ratio of the nominal minimum wage to the average hourly earnings in manufacturing (MWDIVMFG) nor for the real wage (MINR) are reported. These models yielded similar, if somewhat stronger, results than those reported below. See Williams and Mills (1995) for many of these results.

Table 5. Dynamic multiplier effect of a 10% increase in the Kaitz Index. Dependent variable is the log (teenage employment rate)

Specification	(1)	(2)	(3)
Basic	-0.5712 -1.6722 -1.3002 (0.3154)	-0.6358 -1.6537 -1.2245 (0.0419)	-0.5711 -1.1788 -1.1743 (0.1575)
Basic + EMPAM + WMANR	-0.5606 -1.5494 -1.1988 (0.0261)	-0.4844 -1.5162 -1.0940 (0.0628)	-0.5016 -1.9310 -1.1278 (0.2725)
Lags of E	1	2	4
Lags of YK	1	2	4
Control Lags	1	1	1

Notes: The Basic model contains a constant, YK, UPR, S Y, POP, and three seasonal dummies. All variables, except S Y, are in logs. E was not further transformed; YK and WMANR were differenced; the remainder of the variables were detrended prior to their inclusion into the models. The top number in each cell is the contemporaneous effect of a 10% increase in the minimum wage, the second number is the effect after one quarter, the third number is the effect after one year, and the bottom number is the marginal significance of a joint test of the minimum wage coefficients. Sample period 1954:1 to 1993:4.

A quick glance at Table 5 reveals that the estimates are quite consistent across specifications and lag lengths, and imply that the minimum wage has a significant negative effect on teenage employment. In general they suggest that increasing the minimum wage by 10% leads to about a 0.6% immediate reduction in teenage employment, a 1.6% reduction after an additional quarter, and is still reducing employment 1.2% after one year.

Concentrating on the basic specification in the first row of Table 5, the estimated impact of the

minimum wage increase changes only slightly as the number of lags vary. The results when one lag of the controls, and one or two lags of E and YK are included are numerically quite similar and significant at the 5% level. Adding a third (not shown) or fourth lag of these variables reduces the minimum wage effect and its significance. Both the AIC and BIC model selection criteria indicate preferred lag lengths of 1 or 2 for these models.

Looking down any column and varying the specification by changing the included controls, the estimated impact of the minimum wage is again found to be quite robust. The inclusion of the adult male employment rate (EMPAM) and the real wage in manufacturing (WMANR) has little impact on the estimated effect of the minimum wage. Indeed, since the unemployment rate of adult males (UPR) and EMPAM are highly correlated, the inclusion of EMPAM only serves to decrease the significance of the unemployment rate variable, while the adult employment rate variable has no significant impact on teenage employment.(24)

In sum, these results reveal that an increase in the minimum wage has a significant and negative impact on teenage employment. The negative impact is not limited to the period when the minimum is raised, but persists to at least 1 year after the increase. This indicates the importance of modelling the dynamic specification when seeking to estimate the effect of the minimum wage using time-series data.

These results are similar to those obtained in the previous section in that it is again found that changes in the minimum wage have a significant negative effect on the teenage employment rate. They differ from those obtained from the vector autoregressions in two main ways however. First, while the effect of changes in the minimum wage on teenage employment is still statistically significant, it is not as large in magnitude. Second, specifications with more than 1 or 2 lags of the variables appear to be overparameterized in the single equation models, whereas the VAR models provided stronger effects with 4 or more lags and appeared to be underparameterized with less than 4 lags. Since including more variables and more lags provided more significant results (both statistically and in magnitude) in the VARs, this suggests that there are significant feedback effects among the variables under consideration (which agrees with the evidence from exogeneity tests). This leads to the conclusion that endogeneity is most likely an important issue, so that VARs are more appropriate models of the relationship under consideration, particularly given the robustness of the VAR evidence.

VI. CONCLUSION

Some labour economists (e.g. Card and Krueger (1995) and Stafford (1986)) have expressed scepticism about the value of time-series data for studying labour market behaviour. We believe however, that in trying to understand the effect of the minimum wage, time-series data are very useful. In particular, most of the variation in the minimum wage comes from federally legislated changes that occur at sporadic intervals. By providing many instances of such

changes, time-series data can help ease the difficult task of separating the effect of the minimum wage on aggregate teenage employment from the effect of other factors.

This study has revisited the issue of whether a time-series relationship exists between teenage employment and the minimum wage. The earliest and still the most cited results about this relationship come from time-series studies. It is stressed that the previous literature failed to recognize that time-series require different techniques than cross-sectional data. In order to obtain consistent and robust results, it is critically important to take into account nonstationarity and the inherent serial correlation in time-series data. It was found that the teenage employment ratio is stationary, whereas empirical measures of the real minimum wage are clearly nonstationary. Hence, simple regressions will yield misleading results and may lead to improper policy prescriptions. In addition, it was found that it was also important to properly model the dynamic

specification of the relationship.

After carefully investigating the stationarity of the series, and extensive modelling of the dynamics using vector autoregressions, a significant, negative relationship between the minimum wage and teenage employment rates have been documented. In particular, it was found that changes in the minimum wage Granger-cause teenage employment, and that minimum wage changes account for roughly 7 to 10% of the variation in teenage employment rates. Finally, impulse response functions indicate that the response of the teenage employment rate to a 10% increase in the minimum wage is negative and between 3% and 5%, increasing in strength over the first year or so before the effect begins to decrease. These estimates are consistently significantly different from zero at or near the 5% level for a one-tailed test, and are robust to legitimate variations in the model specification, lag length, and ordering of variables in the VAR.

Several recent papers have suggested that increases in the minimum wage may have additional effects on the distribution of employment across groups in the labour market (see Freeman, 1996; and Lang and Kahn, 1998). For example, increases in the minimum wage may allow firms to substitute higher quality teenage workers for lower quality older workers, or middle class workers for poor workers. Our aggregate time-series analysis cannot directly address these concerns. However, if such employment compositional effects occur, the results may suggest another negative effect of the minimum. Specifically, since a minimum wage increase decreases teenage employment, decreases in the employment of older workers and poorer workers might be expected, further compounding the problem of the widening earnings distribution in the USA.(25)

ACKNOWLEDGEMENTS

We wish to thank David Card and Alan Krueger for generously providing the data.

(1) For analyses based on individual-level data see among others Currie and Fallick (1996) and Neumark and Wascher (1995). For analyses based upon firm and industry-level data see among others Katz and Krueger (1992), Card and Kreuger (1994), and Kim and Taylor (1995). For analyses using state-level data see among others Deere et al. (1995), Neumark and Wascher (1992), Card (1992), and Williams (1993).

(2) See Card and Kreuger (1995) for further discussion of the previous time-series literature.

(3) For exposition purposes the fact that the Kaitz index includes a term adjusting for the different minimum wages paid to newly covered workers is ignored. This term is included when the Kaitz index is used empirically. See Wellington (1991) for a discussion.

(4) All estimates were obtained using RATS, version 4.2. See Doan (1992). Due to space considerations and for ease of comparison to other research, on the log transformed version of Equation 1 is concentrated on. Wellington (1991) found only slight differences between the levels and log transformed specifications. The analyses have been duplicated using the level specifications and similar results obtained.

(5) Both the Beach-MacKinnon and Cochrane-Orcutt estimates are reported because the small sample properties of these estimators can differ substantially, particularly if a unit root is present.

(6) Card and Kreuger (1995) offer an alternative explanation of the less significant results obtained from more recent data by suggesting that the minimum wage time-series literature is plagued by publication bias. This might occur if the journal review process tended to publish papers that offer statistically significant results that are consistent with economists' priors. Specifically, they argue that to get published, early studies may have selected empirical specifications that demonstrated a negative and significant effect of the minimum wage on teen

employment. Further, because the statistical significance of these early results were overstated due to this specification search, when later researchers replicated these specifications they obtained weaker results. Recent research by Neumark and Wascher (1998) further investigates this issue and can find no evidence of the publication bias suggested by Card and Kreuger (1995).

(7) Though Alpert and Guerard (1988) correct for the possibility of nonstationarity by differencing all the variables, they do not appear to have checked whether or not these variables are nonstationary. In a recent paper, Park and Ratti (1998) present tests that confirm our stationarity result below.

(8) For simplicity of notation a time series will be referred to by its t th element rather than using more complete notation, such [MATHEMATICAL EXPRESSION NOT REPRODUCIBLE IN ASCII].

(9) For ease of interpretation these plots are presented in levels although all of our analyses are done in logs. The log plots are similar though with a different scale.

(10) We performed the tests using lag lengths of 2, 4, 6 and 8, as well as those suggested by the AIC model selection criterion. The results were consistent across the specifications considered.

(11) Similar conclusions are reached if the standard Student-t critical values are used as suggested by Sims and Uhlig (1991). The Bayesian unit root test recommended by Sims (1988) was also performed, which resulted in the same conclusions.

(12) Stationarity was tested for with the variables in both levels and log form. The results were substantively the same, so due to space considerations, only the results for the log form are reported.

(13) For example, for cointegration between YK, WMANR and ENP, the Johansen (1988) lambda max statistics were 13.54 (18.96), 9.41 (12.78) and 0.008 (6.69), and the lambda trace statistics were 22.96 (28.44), 9.42 (15.58) and 0.008 (6.69) (10% size critical values in parentheses).

(14) See Card and Kreuger (1995), Chapter 11 for a summary of various forms of the standard static wage taking model.

(15) Hamermesh (1993), pp. 248-52, demonstrates that the exact empirical specification will depend upon how employer expectations are modelled.

(16) See for example, Brown et al. (1983) and Neumark and Wascher (1992).

(17) See Hamilton (1994) for a discussion of the consequences of underdifferencing (nonstationarity) and overdifferencing.

(18) Since this is a reduced form and there are lags of all the variables in each equation, the VAR representation also captures any leading effects, so there is no need to include leads of variables in the reduced form equations. See Hamilton (1994) for a thorough exposition.

(19) See Hamilton (1994) for details.

(20) Due to space limitations, the results from all of the other variables included in the models are not reported. In general the impact of these variables on teenage employment was as expected.

(21) Seasonal dummy-time trend interaction terms were experimented with as recommended by Solon (1985), but it was found that they were always both statistically insignificant and small in

magnitude, and their inclusion or exclusion had no significant effect on the results.

(22) See Mills and Prasad (1992) for a thorough discussion of these model selection criteria.

(23) Placing E after YK in the ordering restricts the response because it does not allow for a contemporaneous effect of YK on E. Hence for Figs 4 and 6 the IRF is zero for the first period.

(24) The two alternative minimum wage measures yield very similar results. In general they suggest that increasing the minimum wage by 10% leads to about an immediate 1.0% reduction in teenage employment, a 2.5% reduction after an additional quarter, and is still reducing employment by about 1.8% after one year.

(25) The authors thank a referee for bringing this possibility to their attention.

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APPENDIX

Table A1. Variable descriptions, means and standard errors, 1954:1 to 1993:4

Variable description	Label	Levels (1)	Logs (2)	First difference (3)
Teenage employment-population ratio	B	0.4308 (0.0613)	-0.8492 (0.1194)	0.0001 (0.1423)
Kaits Index	YE	0.3452 (0.0916)	-1.1064 (0.3083)	0.0652 (0.0481)
Real Minimum Wage	MINR	5.1469 (0.7076)	1.6287 (0.1407)	0.0003 (0.0401)
Real Average Hourly Earnings in Manufacturing	WMANR	8.4021 (0.6907)	2.1249 (0.0855)	0.0014 (0.0083)
Coverage Rate of Minimum Wage	COVER	0.6935 (0.1785)	-0.4054 (0.2945)	0.0045 (0.0308)
Minimum Wage/AHE Manufacturing	MMDIVMPG	0.6144 (0.0820)	-0.4962 (0.1367)	-0.0011 (0.0396)
Adult Male Unemployment Rate	UPR	0.0428 (0.0169)	-3.2347 (0.4207)	0.0002 (0.2228)
Adult Male Employment Rate	EMPAM	0.9116 (0.0266)	-0.0930 (0.0294)	-0.0003 (0.0115)
Fraction of Teenagers aged 16-17	SY	0.5161 (0.0211)	-0.6623 (0.0405)	-0.0003 (0.0074)
Fraction of Teenagers in Armed Forces	APP	0.0209 (0.0159)	-3.6937 (0.5555)	-0.0130 (0.0608)
Population Share of Teenagers (16-19 year olds)	POP	0.0909 (0.0132)	-2.4088 (0.1479)	-0.0006 (0.0175)
Population Share of Young Adults				

(20-24 year olds)	POPA	0.1643 (0.0143)	-2.2696 (0.1385)	0.0006 (0.0063)
Fraction of Teenagers Enrolled in School	ENP	0.6763 (0.0648)	-0.3946 (0.0835)	0.0023 (0.0104)

Notes: Standard errors in parentheses. Column 1 contains the variables in levels, column 2 transforms all of the variables by taking logs, and column 3 contains the first difference of the log transformed variables.

Table A2. Values of the nominal federal minimum wage, 1954:1 to 1993:4

Quarter and year	Federal minimum (US\$)
1954:01	0.75
1956:01	1.00
1961:03	1.15
1963:04	1.25
1967:01	1.40
1974:02	2.00
1975:01	2.10
1976:01	2.30
1978:01	2.65
1979:01	2.90
1980:01	3.10
1981:01	3.35
1990:02	3.80
1991:02	4.25
1993:04	4.25

NICOLAS WILLIAMS and JEFFREY A. MILLS University of Cincinnati, Department of Economics, Cincinnati, OH 45221-0371 USA E-mail: Nicolas.Williams@uc.edu, Jeffrey.Mills@uc.edu

Article A70367146

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THE WAGE COST IMPACT OF THE ACTU'S CLAIM

THE WAGE COST IMPACT OF THE ACTU'S CLAIM

The direct wage cost impact of the ACTU's claim

E.1 This section details how we derived our estimate of the direct wage cost impact of the ACTU's \$25 claim.

E.2 Our estimate is derived using final data from the ABS May 2000 Employees Earnings and Hours (EEH) Survey. It is based on the same methodology we applied to cost last year's claim, a detailed explanation of which can be found at Appendix E of the joint Governments' Submission to the Safety Net Review 2000–2001. Note, however, that because this year's claim is for the same flat dollar increase across all classifications it was not necessary to work out the proportions of award paid employees who are paid at or below different classification levels such as C10. Also, the figures we used in last year's submission were based on preliminary, not final, EEH Survey data. Accordingly, we present here a brief review of the derivation of our estimate while also providing updated figures where necessary. Comments on past criticisms of our methodology are detailed in Chapter 4 of our submission.

E.3 Our estimation of the direct wage cost impact of the ACTU's claim involves two steps. The first is to calculate the proportion of all employees paid at the award rate on an hours worked basis. The adjustment for hours worked is necessary because data from the EEH Survey suggest that more part-time employees are paid an award rate than full-time employees. For example, at May 2000, 39.9 per cent of all part-time employees were paid at an award rate compared to 15.2 per cent of full-time employees. The implication is that the proportion of full and part-time employees paid at an award rate must be weighted with data on

average hours paid for full and part-time employees. Otherwise, part-time employees would be given an equal weight to their full-time counterparts and this would result in an overstatement of the cost of the claim.

E.4 Table E.1 presents the results of this analysis detailing the figures we used to adjust the proportion of all employees paid at award rates to an hours worked basis. By taking the proportion of employees paid at award rates for different employee categories and multiplying this by the average ordinary time hours paid for each of those respective categories, we obtained estimates of the proportion of employees paid at award rates, weighted by their hours worked. These figures appear in column (e). We then performed the same calculations for all employees, the resulting estimates appearing in column (f). Dividing the total of column (e) by that of column (f) suggests that 19.4 per cent of all ordinary time hours paid are paid at an award rate. This is lower than the overall proportion of all employees paid at an award rate as part-time employees are over-represented among employees paid at award rates.

E.5 The second step in our estimation is to convert the claim to a percentage contribution to aggregate wages growth. This in turn requires the determination of an appropriate wages growth measure. Given the relative importance of part-time employees the most appropriate measure is not average weekly ordinary time earnings (AWOTE) for full-time employees but rather hourly ordinary time earnings.

Table E.1: Proportions of employees and ordinary time paid hours paid at awards and all pay setting methods, by category

	Percentage of employees paid at award rates	Percentage of employees across all pay setting methods	Average time hours of award employees	Average time hours of all employees	(a)*(c)	(b)*(c)
	(a)	(b)	(c)	(d)	(e)	(f)
Ft adult non managerial employees	8.5	52.8	37.7	38.0	3.223	20.077
Ft adult managerial	0.4	12.5	39.5	39.8	0.171	4.987
Pt adult non-managerial	10.7	26.6	18.6	18.7	1.997	4.986
Part time adult managerial	0.1	1.2	18.6	18.7	0.011	0.221
Ft Junior (total managerial)	1.3	2.4	38.0	38.2	0.512	0.898
Pt Junior (total managerial)	2.1	4.5	11.8	12.1	0.251	0.549
Total	23.2	100.0	na	na	6.165	31.718

Source: ABS, Survey of Employee Earnings and Hours (Final), May 2000 (Cat No 6306.0).

E.6 Unfortunately, none of the currently available data sources provide estimates of ordinary time hourly earnings. However, it is possible to obtain an estimate by taking a measure of AWOTE and dividing it by 38, the standard number of full-time working hours per week. Data from the May 2000 Employee Earnings and Hours (EEH) survey indicate that, in original terms, ordinary time hourly earnings for full-time adult employees was equal to \$19.37. If we assume that AWOTE for full-time adult employees will grow by 5.4 per cent over the year to May 2002 (which was the annual growth rate between May 2000 and November 2001) then this suggests that average ordinary time hourly rates will be equal to \$21.50 in May 2002. Accordingly, the ACTU's \$25 claim equals a 3.1 per cent increase in ordinary time hourly earnings for full-time adult employees.

E.7 Multiplying the 3.1 per cent increase in ordinary time hourly earnings for full-time adult employees by 19.4 per cent, the percentage of all ordinary time paid hours paid at an award rate, suggests that, if granted, the ACTU's claim would directly add 0.59 percentage points to

aggregate wages growth. This is over three times higher than the ACTU's estimate of 0.17 percentage points.

REASONS FOR THE REGIONAL VARIATION IN LABOUR MARKET PERFORMANCE

REASONS FOR THE REGIONAL VARIATION IN LABOUR MARKET PERFORMANCE

F.1 Labour market outcomes vary across regions for a number of reasons. These include the industry structure, demographic factors, the quality of local infrastructure and services and access to transport and distribution networks.

- In terms of industry structure, regions that have a high concentration of growth industries are likely to enjoy higher rates of employment growth. Areas with low employment growth are characterised by a strong orientation towards agriculture or an above-average reliance on mining. Areas associated with strong employment growth typically have diverse industry structures, a high concentration of service industries or sectoral employment shares close to the national average.¹
- Regional variation in labour market outcomes is also affected by demographic factors. Australia is a highly urbanised nation with almost 80 per cent of the population located in urban settlements in excess of 5 000 people and 62 per cent living in metropolitan areas.² Net migration gains in urban areas are largely attributable to net growth in the size of the workforce in these regions.³ Indeed, over the year to November 2001 almost 90 per cent of the ABS labour force

¹ Productivity Commission, '[Report on the Impact of Competition Policy Reforms on Rural and Regional Australia](#)', *Productivity Commission Inquiry Reports*, No 8, October 1999.

² C Maher and R Stimson, Australian Housing and Urban Research Institute, *Regional Population Growth in Australia, Nature, Impacts and Regulations*, Bureau of Immigration and Population Research, AGPS, Canberra, 1994.

³ Coopers and Lybrand, *Population movements in non-metropolitan Australia*, Bureau of Immigration Research, Department of Immigration, Local Government and Ethnic Affairs, 1992.

regions that recorded employment growth also recorded population growth, while almost 60 per cent of the ABS labour force regions recording a fall in employment also recorded a fall in population.

- Metropolitan areas in particular have labour market benefits simply by being densely populated. Due to a wider range of resources, both in terms of infrastructure and labour, metropolitan areas are generally better able to react to structural and cyclical changes and achieve faster rates of economic and employment growth during upswings in the business cycle. They are also less likely to experience skill shortages as they are able to access a large pool of labour with a wide range of skills and qualifications. Industries in less populated areas, on the other hand, are more likely to be constrained by a labour force that does not have an appropriate skill base. This can often contribute to problems such as a relatively higher level of long-term unemployment in non-metropolitan areas.
- Regional differences in skill levels can also affect the labour market performance of different regions. A regional economy that does not have an appropriate mix of skills to cope with changes in the economy is more likely to experience labour market problems when these changes occur. Non-metropolitan and rural areas tend to have a relatively lower proportion of people with a degree or higher education levels when compared with capital cities.

CAPPING SAFETY NET ADJUSTMENTS

CAPPING SAFETY NET ADJUSTMENTS

Table G.1: Estimated allocation of the total dollar benefit resulting from a \$10 increase capped at various levels of the wage distribution, allowing for the operation of the tax-transfer system (disposable income, Henderson equivalence scales)

(a) Wage and salary earner income units

Decile	Level of the cap within the wage distribution:		
	Bottom 50%	Bottom 30%	Bottom 20%
1	10.16%	15.37%	20.37%
2	11.00%	12.96%	14.91%
3	12.48%	14.42%	14.63%
4	14.09%	14.98%	16.59%
5	13.21%	15.01%	15.04%
6	13.35%	12.05%	7.28%
7	12.51%	7.22%	4.66%
8	7.41%	3.35%	2.84%
9	3.91%	2.74%	1.93%
10	1.87%	1.92%	1.75%
	100.00%	100.00%	100.00%

(b) All income units

Decile	Level of the cap within the wage distribution:		
	Bottom 50%	Bottom 30%	Bottom 20%
1	2.99%	4.88%	6.87%
2	2.30%	3.64%	5.07%
3	5.09%	7.15%	8.71%
4	7.33%	9.06%	10.53%
5	12.53%	13.80%	14.50%
6	17.65%	19.39%	20.96%
7	19.14%	20.93%	19.21%
8	19.28%	12.89%	7.37%
9	10.12%	5.06%	4.29%
10	3.56%	3.20%	2.48%
	100.00%	100.00%	100.00%

Source: STINMOD (STIN01b)

THE WAGE FIXING PRINCIPLES

THE WAGE FIXING PRINCIPLES

Economic Incapacity – case history

Cases of note with regard to Economic Incapacity in the federal jurisdiction

H.1 In decisions related to claims for economic incapacity, the Commission has previously rejected applications for relief from SNAs that have relied on evidence at a regional or sectoral level.

H.2 The National Farmers Federation (NFF) launched four economic incapacity cases in the Pastoral Industry between 1986 and 1993. The Commission rejected all cases, mainly on the grounds that the industry wide pay increase should not be deferred on the basis of a small number of specific examples of hardship.

H.3 In 1998, the Australian Hotels Association (AHA) and the Motor Inn, Motel and Accommodation Association (MIMAA) applied for the phasing in of SNAs provided for in the 1998 Safety Net Review decision for all employees covered by three key awards in the industry. This case was rejected on the grounds of the diversity of experience in the sectors covered by the awards, suggesting that while some employers were experiencing very serious economic adversity, others were not. However, in this case, two individual employers were granted a seven week delay in the application of the SNA based on their incapacity to pay.

H.4 In 1998, the Federation of Australian Broadcasters (FARB) represented respondent radio stations to two awards the Media, Entertainment and Arts Alliance union sought to vary for the Safety Net Review-Wages decision of 29 April 1998. FARB sought a referral of the

matters to the President as a special case and were seeking a delay in the operation of the increases for a particular group of respondents. FARB sought the delay for medium sized and smaller sized regional radio stations that had had previous delayed adjustments (agreed to by the Union). The referral for consideration as a special case was rejected. The Commissioner made reference to a previous Full Bench decision, relating to claims for the application of a Safety Net Review decision to several awards in the hospitality industry ([Print Q2232](#)), that clearly provided that applications for the deferral of the Safety Net Review decision increases were to be dealt with under principle 12 Economic Incapacity. The Commissioner then proceeded to assess the FARB application and determine the evidence as an application under the incapacity principle and found the evidence was not sufficient to warrant deferral of the Safety Net Review increase. FARB however, believed their application met requirements set out in a 1990 Pastoral Award Incapacity decision ([Print J1671](#)) where a full bench set out four criteria to be satisfied under incapacity claims. It was a key part of the FARB submission that the impact of the increases would cause significant hardship given that the respondents were facing other wage increases in the same period. The Commissioner found that the reasons for hardship are not to be considered and that a case for economic hardship must be conclusive of itself.

Cases of note with regard to economic incapacity in State jurisdictions include;

H.5 The WAIRC rejected the delaying of the third \$8 arbitrated safety net increase into WA state awards covering private hospitals.

H.6 In 1998, the Victorian Farmers Federation considered mounting an application for economic incapacity on behalf of farmers in the East Gippsland region. No application was made but the Commission concluded that no application on a regional or industry basis would be successful unless all employers in the region were experiencing very serious or extreme economic adversity.

H.7 In 1991, the Queensland Cane Growers Association successfully applied for the postponement of centralised wage increases for field employees in the sugar industry. The Queensland Commission decided that much of the work in the field section of the industry was of a seasonal nature and that the deferred wage increase that was granted between 1 November 1991 and 1 June 1992 would affect very few employees.

H.8 The Mechanical Cane Harvesters Association sought to postpone the 2001 SNA of Division 2 of the Sugar Industry Award – State for all of their members, until at least 1 January 2002. This application was unsuccessful. The Queensland Cane Growers Association was also unsuccessful with an industry wide application for economic incapacity in 2001. After the lack of success with the industry wide approach it was indicated that claims would be mounted on behalf of individual cane growers. No cases proceeded.

Statement of Principles – Safety Net Review – Wages April 1997

H.9 Principles 1 and 2 of the 1997 decision were expressly to be read in conjunction with the provisions of the WR Act and the *Workplace Relations and Other Legislation Amendment Act 1996*.

1. Introduction

The Act provides for a workplace relations system which promotes workplace or enterprise agreements about wages and conditions of employment, upon a foundation of fair minimum standards established and maintained by the award system. In both areas the Act provides for the removal or prevention of specified forms of discrimination.

The priority in this system is on the parties at the workplace or enterprise level taking responsibility for their own industrial relations and reaching agreements in relation to matters affecting their employment relationship. Parties are able to choose the most appropriate form of agreement for their particular circumstances whether or not that form is provided for by the Act.

The award system provides a safety net of wages and conditions of employment which protects employees who may be unable to reach workplace agreements while maintaining an incentive to bargain for such agreements. It also provides the benchmark for the no-disadvantage test that the Act requires to be applied before agreements are certified by the Commission.

The Commission is responsible for ensuring that a safety net of fair minimum wages and conditions of employment contained in awards is established and maintained. Awards will generally be limited to allowable award matters and provisions that are incidental to them and necessary for the effective operation of the awards.

In exercising its powers and obligations under the Act, the Commission will continue to apply structural efficiency considerations, including minimum rates adjustment provisions consistent with the August 1988

[Print H4000], August 1989 [Print H9100] and April 1991 [Print J7400] National Wage Case decisions and the October 1993 Review of Wage Fixing Principles decision (the October 1993 Review decisions) [Prints K9700 and K9940], the August 1994 Review of Wage Fixing Principles decision [Print L4700], the September 1994 Safety Net Adjustments and Review [Print L5300], and the October 1995 Third Safety Net Adjustment and Section 150A [Print M5600] (as varied by Print P1997).

2. Agreement Making

The Commission facilitates agreement making (ss. 170L and 170LA) in a number of ways including the following:

- (a) By conciliating (s. 170NA; s. 100); where necessary, pursuant to s. 111, by making recommendations and/or issuing directions to promote the efficient conduct of negotiations; and by making recommendations by consent, under s. 111AA, to assist the parties in reaching agreement;*
- (b) By not exercising, during a bargaining period, arbitral powers under Part VI B of the Act in relation to a matter that is at issue between the negotiating parties (s. 170N);*
- (c) By generally not arbitrating about the contents of enterprise agreements except where the Commission has terminated a bargaining period pursuant to s. 170MW(3) or (7), in which case the Commission will exercise its powers pursuant to s. 170MX;*
- (d) By applying ss. 113A and 113B as appropriate.*

