

# **Safety Net Review – Wages**

**2001-2002**

## **Commonwealth Reply Submission Appendixes**

28 March 2002

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# **STATISTICAL SUMMARY AND TREASURY PRESS RELEASE**



## STATISTICAL SUMMARY AND TREASURY PRESS RELEASE

### Statistical summary (updated 22 March 2002)

(Data seasonally adjusted unless otherwise stated)

<b>NATIONAL ACCOUNTS:</b>	<p>GDP grew by 1.3% in the December quarter 2001, to be 4.1% higher through the year to the December quarter. The Quarterly National Accounts show that in 2000-01 GDP grew by 1.9%. The MYEFO forecasts GDP growth of 3% in 2001-02.</p>					
	<b>Expenditure components of GDP (chain volume)</b>					
	(per cent change)			Cont. to growth (percentage pts)		
	Sep	Dec	tty	Sep	Dec	
Private final demand	2.1	<b>1.7</b>	5.7	1.6	<b>1.3</b>	
Household consumption	0.6	<b>1.3</b>	4.2	0.4	<b>0.8</b>	
Dwelling investment	14.1	<b>4.1</b>	21.5	0.6	<b>0.2</b>	
Business investment	4.3	<b>2.9</b>	5.2	0.5	<b>0.3</b>	
Public final demand	0.0	<b>3.3</b>	3.7	0.0	<b>0.7</b>	
<i>Domestic final demand</i>	1.7	<b>2.1</b>	5.2	1.6	<b>2.1</b>	
Changes in inventories				-0.5	<b>0.6</b>	
<i>Gross national expend.</i>	1.2	<b>2.6</b>	4.2	1.2	<b>2.6</b>	
Net exports				-0.1	<b>-1.5</b>	
<i>Gross domestic product</i>	1.1	<b>1.3</b>	4.1			
	Source: ABS 5206.0 Tables 4 and 6.					

<b>BUSINESS INVESTMENT:</b>	<p>Business investment grew by 2.9% in the December quarter 2001 to be up 5.2% in tty terms, to represent 10.6% of GDP (in nominal terms). Non-residential construction investment unwound 14.5% in the December quarter after growing 14.1% (revised from a decline of 2.6%) in the September quarter. Machinery and equipment investment rose by 12.0% in the December quarter.</p> <p>Abstracting from second hand asset sales, new business investment rose 5.7%, with investment in machinery and equipment rising by 11.1% and non-residential construction fell by 2.8% in the December quarter.</p>
<b>CAPEX:</b>	<p>The December quarter 2001 CAPEX reported that new capital expenditure by private businesses rose 8.3 per cent in the December quarter, following a flat September quarter, to be 3.9 per cent lower than one year ago. The fifth estimate of expected capital expenditure for 2001-02 was 1.7 per cent higher than the fourth estimate and 4.1 per cent higher than the equivalent estimate for 2000-01. The first estimate of total expenditure for 2002-03 was 21.2 per cent higher than the first estimate for 2001-02.</p>

<b>HOUSING APPROVALS:</b>	Total private dwelling commencements rose by 11.8% in the December quarter, following a 33.6% rise in the September quarter. Private building approvals increased 3.2% in January after falling 8.1% in December. The number of housing finance commitments for new dwellings increased by 0.9% in January following a 12.7% rise in December, to be 76.8% higher than a year ago.
<b>MOTOR VEHICLE SALES:</b>	Fell by 6.0% in February after rising by 9.9% in January, to be 10.9% higher over the year to February.
<b>RETAIL TRADE:</b>	Nominal retail trade (seasonally adjusted) rose by 1.4% in the month of January, after rising 0.2 per cent in December, to be 8.7% higher than a year ago. Retail trade volumes rose by 0.5% in the December quarter.
<b>UNEMPLOYMENT RATE:</b>	6.6% in February 2002. Peak was 10.9% in December 1992. Low was 5.4% in June 1981.
<b>EMPLOYMENT:</b>	Rose by 0.2% or around 20,400 in February 2002 to be 1.8% higher than a year earlier. In trend terms, employment rose by 0.2% or around 17,400 in February 2002. Since March 1996, total employment has increased by around 950,600 persons or around 11.4%.
<b>LABOUR FORCE:</b>	Around 9.9 million people in February 2002, of whom around 652,500 were unemployed. The participation rate fell 0.2 of a percentage point to 63.9% in February 2002.
<b>ANZ JOB ADVERTISEMENTS:</b>	Job advertisements fell by 5.4% in February 2002, following a 12.5% rise in January 2002, to be 5.6% lower than a year ago. Trend job advertisements rose by 1.7% in February 2002.
<b>GROSS OPERATING SURPLUS (GOS):</b>	The GOS of private non-financial corporations grew by 5.8% to \$26.4b in the December quarter 2001, or 15.0% of GDP (in nominal terms). Gross mixed income was \$16.4b in the December quarter 2001, or 9.3% of nominal GDP.
<b>WAGES:</b>	The Wage Cost Index (WCI) grew by 0.7 per cent in the December quarter 2001 (in original terms), and 3.4 per cent through the year to December 2001.  Full-time adult average weekly ordinary time earnings (AWOTE) rose by 1.2% in the December quarter 2001 and by 5.8% over the year to December.
<b>REAL EARNINGS:</b>	Real AWOTE (AWOTE adjusted for the headline CPI) grew by 0.3 % in the December quarter and grew by 2.6% over the year to December.
<b>PRODUCTIVITY:</b>	In trend terms, real GDP per hour worked in the market sector rose by 1.0% in the December quarter 2001, to be 4.3% higher through the year. This compares with the average rise of 1.4% in the 1980s and 2.8% in the 1990s.
<b>CONSUMER PRICE INDEX:</b>	Headline CPI increased by 0.9% in the December quarter 2001, to be 3.1% higher through the year.
<b>EXTERNAL SECTOR:</b>	The balance on goods and services for the Dec quarter recorded a \$1.3b deficit. The monthly balance on goods and services in January was a deficit of \$308m (sa) (a narrowing from a \$358m surplus in December), with exports of goods and services rising 4.1% and imports of goods and services rising by 3.6%.

**BUSINESS SURVEYS:** The latest **ACCI/Westpac Survey of Industrial Trends** for the March quarter (released 11 March), indicated a rebound in business confidence, after a sharp decline in the December quarter amid concerns resulting from the terrorist attacks of September 11. All other activity measures in the survey posted continued rises in the March quarter. Manufacturing output increased in the March quarter, with over a third of respondents expecting an increase, while the proportion of respondents expecting an increase in new order also rose. Profit expectations remained firm in the March quarter, with over a third of respondents expecting an improvement. Capital expenditure plans for the next 12 months strengthened, with improvements reported in both plant and equipment, and buildings and structures in the March quarter. Employment intentions continued to improve, and the outlook for the June quarter is for further improvement. Exports rose strongly in the March quarter, and the outlook for the June quarter is firm.

The latest **ACCI National Survey of Business Expectations** (released 4 February) indicated positive business confidence as well as a solid outlook for general business conditions, being consistent with moderate economic growth in the near-term. These factors are supported by improvements in sales revenue and investment, however exports declined in the December quarter. Looking ahead expectations are for improvements in sales revenue, profits, exports as well as investment in plant and equipment. However, employment is expected to remain flat, with a significant decline expected in overtime worked for the March quarter 2002. Wages growth is expected to moderate after a robust rise in the December quarter, with growth in selling prices expected to pick up somewhat in the March quarter 2002.

The latest **ABS Business Expectations Survey** (released 21 March 2002) reported that over the medium-term the outlook for the majority of business indicators was positive. Operating income, profit and capital expenditure are expected to improve significantly, but employment is expected to be flat. Increases in expected profit were reported across the majority of sectors, with the largest increases recorded in the mining, manufacturing and transport, storage & communication sectors. The only fall in medium term profit expectations was recorded in accommodation, cafes & restaurants. In the short term, profits and capital expenditure are expected to rise while full-time employment is expected to decline.





## TREASURER

<http://www.treasurer.gov.au>

**PRESS  
RELEASE**

NO.

**EMBARGO: 11:30 AM (AEST) Thursday 7 March 2002**

### **NATIONAL ACCOUNTS: DECEMBER QUARTER 2001**

Today's National Accounts show that Australia's economy has maintained a strong growth momentum through to the end of 2001, in the face of a major global economic slowdown. Australian GDP grew by a very strong 1.3 per cent in the December quarter and by 4.1 per cent through the year to December. The National Accounts also provide further evidence that strong economic growth continues to be accompanied by low inflation and record high productivity growth.

Over the course of 2001, the Australian economy markedly outperformed most of the world's developed economies. Australia's economic growth rate of 4.1 per cent over 2001 compares with an OECD average of less than 0.5 per cent over the same period. Amongst the G7 economies, the fastest growth rate over 2001 was recorded by the UK at less than 2 per cent, with the remaining members below 1 per cent (see attached table).

Economic growth was underpinned by strong growth in household consumption of 1.3 per cent in the December quarter. This follows solid growth in the June and September quarters and household consumption was 4.2 per cent higher through the year to December. This is the first time since the December quarter of 1999 that through the year growth in household consumption has exceeded 4 per cent, and is a further sign of Australia's economic strength.

Private new business investment grew by a strong 5.7 per cent in the December quarter, with new machinery and equipment investment rising by a very strong 11.1 per cent, more than offsetting a modest fall in new investment in non-dwelling buildings and structures of 2.8 per cent. This rebound in business investment follows a period of subdued spending and probably represents a turning point. Looking forward, there are positive signs of strengthening business investment. The Australian Bureau of Statistics' first survey of capital expenditure intentions for 2002-03 implies very strong growth in investment in both equipment and buildings, and investment intentions are particularly strong in the capital-intensive mining industry.

Economic growth in the December quarter was also supported by dwelling investment, which rose by a solid 4.1 per cent. This follows the very strong growth of around 14 per cent in the September quarter. Forward indicators for housing construction have moderated in recent months, suggesting that new housing construction activity is currently at or near a peak.

Net exports subtracted 1.5 percentage points from GDP growth in the December quarter. The significant detraction from net exports in the quarter reflected both lower exports (down 3.2 per cent) – which in part was due to a decline in inbound tourism and some rural exports – and higher imports (up 4.4 per cent). The strength of the domestic economy has led to a rise in imports across most categories, including a

strong rise in capital goods reflecting higher investment expenditure. Over the year to the December quarter net exports subtracted a modest 0.7 of a percentage point from overall economic growth, despite bleak global economic conditions and a period of stalling and or declining output among Australia's major trading partners. Australia's current account deficit was 3.7 per cent of GDP in the December quarter, around its 30 year average, following the 20 year low of 1.8 per cent of GDP recorded in the September quarter.

The December quarter National Accounts also confirm that inflationary pressures remain moderate. The household consumption chain price index – a broader measure of consumer prices than the CPI – increased by 0.7 per cent in the December quarter and by 2.4 per cent through the year to December 2001. The December quarter increase in the household consumption chain price index is below the 0.9 per cent increase in the CPI, which was influenced by a range of seasonal and one-off factors. Non-farm average earnings (AENA) increased by a moderate 0.4 per cent in the December quarter and by 3.6 per cent through the year to December. Other indicators of wages growth, such as the Wage Cost Index (which increased by 3.4 per cent through the year to the December quarter) and enterprise bargaining outcomes, have also been relatively subdued in recent quarters. Productivity (measured as GDP per hour worked) grew by a very strong 1.7 per cent in the December quarter and a record 5 per cent through the year to the December quarter. Moderate wage outcomes, combined with very strong productivity growth, are consistent with inflation outcomes being comfortably within the 2 to 3 per cent target band over the period ahead.

The National Accounts measure of profits in the private non-financial corporate sector recorded strong growth in the December quarter, rising by 5.8 per cent, to be 10.8 per cent higher through the year to December.

Increases in production were recorded across most sectors of the economy in the December quarter, with the strongest increases reported in personal and other services (up 3.5 per cent), wholesale trade (up 3.3 per cent), health and community services (up 2.9 per cent), and electricity, gas and water supply (up 2.7 per cent).

Communication services, and accommodation, cafes and restaurants posted declines (down 4.4 per cent and 2.3 per cent respectively).

The global economic outlook remains the greatest concern for Australia's economy, but the signs at the halfway point in 2001-02 are positive – tentative signs are starting to emerge that the downturn in the world economy has bottomed and recovery may be underway. The latest growth figures indicate that the MYEFO forecast of 3 per cent GDP growth in Australia in 2001-02 as a whole is readily achievable. Despite some remaining risks for the Australian economy associated with uncertainties in the global economy, sound fundamentals in the Australian economy are playing a vital role in insulating the Australian economy.

**TRENDS IN ENTERPRISE  
BARGAINING – DECEMBER  
QUARTER 2001**



## TRENDS IN ENTERPRISE BARGAINING – DECEMBER QUARTER 2001



### TRENDS IN FEDERAL ENTERPRISE BARGAINING

December Quarter 2001 ISSN 1442-5432  
EMBARGO: 11:30AM (EST), 6 March 2002

## DECEMBER QUARTER 2001

### KEY FIGURES

#### AVERAGE ANNUALISED WAGE INCREASES PER EMPLOYEE

	September quarter 2001 %	December quarter 2001 %	Change Points %
<b>Wage agreements in the quarter</b>			
All sectors	3.8(r)	3.8	0.0
Private sector	3.8	3.9	0.1
Public sector	4.0	3.7	-0.3
<b>All current wage agreements</b>			
All sectors	3.7	3.7	0.0
Private sector	3.7	3.8	0.1
Public sector	3.7(r)	3.7	0.0

NOTE: (r) indicates that the figure has been revised.

### KEY POINTS

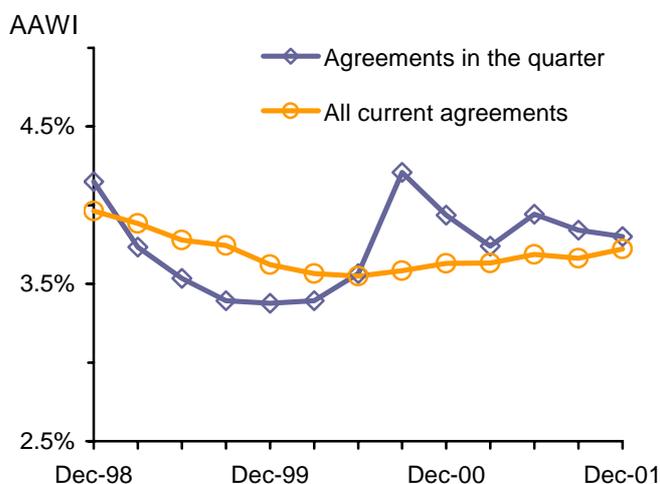
#### Agreements certified in the quarter

- Federal wage agreements certified in the December quarter 2001 allowed for an average annualised wage increase (AAWI) per employee of 3.8 per cent, unchanged from the revised September quarter AAWI.

#### All current agreements

- All current federal wage agreements, at 31 December 2001, provided an AAWI of 3.7 per cent per employee, unchanged from the September quarter.

**Chart 1: Federal certified wage agreements**  
Average annualised wage increase

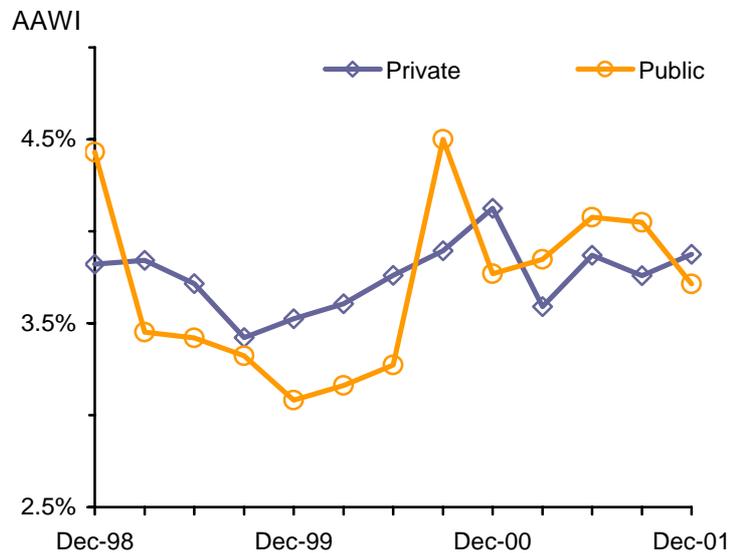


Source: DEWR Workplace Agreements Database (WAD)

### Public and private sector agreements certified in the quarter

- Private sector AAWI per employee for agreements certified in the December quarter rose slightly from the September quarter. However, public sector AAWI per employee fell by 0.3 percentage points from the September quarter owing to several large public sector agreements which granted lower than average AAWIs.
- Of wage agreements certified in the December quarter, 6.8 per cent were in the public sector covering 42 per cent of employees under wage agreements. This compares to the September quarter when 5.3 per cent (r) were in the public sector covering 25 per cent of employees.

**Chart 2: Federal wage agreements by sector**  
Average annualised wage increase  
(Agreements certified in the quarter)



Source: DEWR Workplace Agreements Database (WAD)

NOTES: This report summarises the latest estimates from the Department of Employment and Workplace Relations' Workplace Agreements Database (WAD). The Australian Industrial Registry provides DEWR with copies of agreements, employee statistics and certification details for agreements certified by the AIRC. All estimates are rounded to one decimal place, and are subject to revision.

ENQUIRIES: Liz Forman (02 6121 7340) and Phil Crotty (02 6121 7625)

- NEXT RELEASE:** The March quarter 2002 *Trends in Federal Enterprise Bargaining* report is scheduled for release in late May.
- SPECIAL FEATURE:** The December quarter 2001 *Trends in Federal Enterprise Bargaining* includes information on the effect of major agreements on wage outcomes by sector and by industry group. A special feature provides more detailed information on agreement making in the finance and insurance industry.

## PACE OF AGREEMENT MAKING

A total of 1675 agreements were certified in the December quarter 2001. These agreements covered an estimated 194 400 employees. This brings the total number of federal agreements formalised by the AIRC from August 1991 to the end of 2001 to 43 174.

### *Conditions only agreements certified during the quarter*

Of agreements certified this quarter, 46 contained conditions of employment provisions only, representing 2.7 per cent of agreements and covering 2.4 per cent of employees.

### *Wage agreements certified during the quarter*

There were 1629 federal wage agreements certified in the December quarter, covering an estimated 189 700 employees compared to 1792(r) covering an estimated 158 700(r) employees in the September quarter. The average size of wage agreements in the December quarter 2001 was 116 employees – up from 89 in the September quarter 2001. This rise is largely due to the certification of two very large agreements that covered a combined total of more than 29 000 employees.

Wage agreements with quantifiable wage increases (see Technical Notes) accounted for 74 per cent of agreements and 88 per cent of employees covered by agreements certified in the December quarter 2001.

- Non-quantified wage agreements accounted for 23 per cent of all agreements in the December quarter 2001 and covered 10 per cent of employees. In the September quarter 2001 non-quantified wage agreements accounted for 22 per cent of agreements covering 19 per cent of employees.

### *Current wage agreements*

There were 12 709 federal wage agreements current at 31 December 2001, covering an estimated 1 439 500 employees. At 30 September 2001 there were 11 783(r) federal wage agreements current covering an estimated 1 351 700(r) employees.

## AAWI PER EMPLOYEE

Chart 1 compares trends over the past three years in the two key wage measures. These are:

- an estimate of the average annualised wage increase (AAWI) per employee for federal wage agreements formalised by the AIRC in a particular quarter, and
- the AAWI per employee for all federal wage agreements current at the last day of each quarter.

The calculation of these wage measures is explained in the Technical Notes.

As noted in this quarter's Key Points, AAWIs for agreements certified in the quarter and for all current wage agreements, have remained stable for 2001.

While the quarterly AAWI series is a useful forward indicator of the wage outcomes for new federal agreements, only an estimated 2.5 per cent of employees in Australia are covered by agreements certified in the December quarter.

- However, the 'all current' AAWI estimate covers a much larger group – approximately 18.6 per cent of all employees at the end of December 2001.

## MAJOR AGREEMENTS

There were 54 large agreements (each covering 500 or more employees) certified in the December quarter 2001 compared to 48 (r) large agreements in the previous quarter. These agreements accounted for just over 3.2 per cent of all agreements certified in the December quarter 2001 and covered 63.6 per cent of employees. This compares to the September quarter when large agreements accounted for around 2.6 per cent of all agreements and 58.8 per cent employees (See Tables 1 and 2).

### Public sector major agreements

Employees covered by large public sector agreements accounted for 36.7 per cent of all employees under agreements certified in the December quarter. These employees were granted an AAWI of 3.7 per cent per employee for large public sector wage agreements, down from 4.1 per cent per employee in the September quarter.

- The remaining public sector employees, covered by smaller agreements (under 500 employees), were granted an AAWI of 3.9 per cent per employee in the December quarter 2001.

#### *Contributions to public sector wage outcomes*

Three major public sector agreements, each covering over 10 000 employees, contributed significantly to the AAWI for all large agreements certified in the December quarter 2001.

Two Australian Tax Office (ATO) agreements certified in the December quarter 2001 (one covering around 19 000 employees alone and the largest agreement for the quarter) granted an AAWI of 3.2 per cent per employee to a combined total of around 20 200 employees. This contributed to the lower overall AAWI for all public sector large agreements for the quarter. However, the actual duration for these ATO agreements is 8 months in length. The WAD assumes an effective duration of 12 months where the actual duration is less than a year in length to calculate the AAWI.

The Victorian Government Schools – School Services Officers agreement also provided a lower than average AAWI of 2.9 per cent per employee to around 11 000 employees.

The Victorian Police Force certified agreement provided for a higher than average AAWI of 4.7 per cent per employee and covered around 10 600 employees.

**Table 1: Large federal agreements certified in December quarter 2001 – private sector**

	Title	Duration	Total Wage	AAWI	Emps	Notes
	<b>Private sector large agreements</b>	(yrs)	(%)	(%)		
Non-metals manuf	AMCOR Fibre Packaging National Enterprise Agreement	3.3	15.0	4.6	1 409	1
	CSL Enterprise Agreement 2001	3.0	15.0	5.0	1 415	1
	Inghams Enterprises (Victoria) Processing Agreement 2001	2.0	8.0	4.0	531	
	Oakey Abattoir and AMIEU Certified Agreement 2001	2.3	4.5	1.9	609	
	South Pacific Tyres - National Union of Workers Certified Agreement 2001	1.3	0.6	0.5	1 026	
Metals manuf	Holden Ltd Enterprise Agreement (2001-2004)	3.3	16.6	5.1	6 827	
	Mitsubishi Motors Australia Ltd Enterprise Agreement 2001	2.8	14.5	5.2	2 847	
Mining & Agriculture	2001 Certified Agt Annualised Salaries for Award Employees at QLD Alumina Ltd	3.0	*	*	507	6
	GrainCorp Operations Limited (National Bulk Handling) Enterprise Agreement 2001	2.2	8.0	3.6	1 510	
Infrastructure services	Aurora Energy Redundancy Agreement 2001	2.9	*	*	771	2
	Cuevalley Pty Ltd Program Master Builders MBAV/CFMEU Enterprise Agreement 1999/2002	3.0	15.0	5.0	898	
	Patrick Stevedoring Certified Agreement 2001	3.0	11.2	3.7	1 321	
Other services	Australian Catholic University Limited Academic Staff Enterprise Agreement 2000	3.0	13.0	4.3	560	
	Australian Home Care Services Pty Ltd Enterprise Agreement 2001	3.0	9.0	3.0	1 314	
	Birch Carroll & Coyle Agreement 2001	3.0	5.4	1.8	912	
	Calvary Health Care Tasmania Nursing Staff Enterprise Bargaining Agreement 2001	2.9	12.5	4.3	520	
	Colonial Employees (TOP) Enterprise Agreement 2001	1.0	4.0	4.0	1 262	3
	Harris Scarfe Limited National Employees Enterprise Agreement 2001	1.0	0.0	0.0	1 800	5
	Hastings Deering (Australia) Ltd Certified Agreement 2001	2.0	10.0	5.0	706	
	Health Services Union of Australia/ Spastic Society of Victoria Remuneration Packaging Agreement 2001	2.0	*	*	1 400	2
	Hollywood Private Hospital Registered Nurses Agreement 2001	3.0	14.5	4.8	560	
	Hungry Jacks Employees, SDA Enterprise Agreement 2001	2.6	*	*	1 831	7
	Leave Entitlement for Australian Health Care (Latrobe) Pty Ltd Agreement 2001	3.0	*	*	1 152	2
	Mayne Health Dorevitch Pathology Certified Agreement 2001	3.2	13.0	4.0	1 270	
	McDonald's (SA & NT) Certified Agreement 2001	3.0	8.6	2.9	2 666	
	Melbourne Cricket Club Event Employees Certified Agreement 2001	2.6	6.0	2.3	800	
	Paraquad Victoria Attendant Care Services Enterprise Agreement 2001	1.9	*	*	555	7
	PowerHouse National Certified Agreement 2001	3.0	10.5	3.5	582	
	Priceline Retail Employees Enterprise Agreement 2001	3.0	9.5	3.2	1 957	
	Rainbow Connection Agreement 2001	1.0	*	*	893	3, 4
	SDA - Dominos Pizza Agreement 2001	3.0	8.4	2.8	4 290	
	St Frances Xavier Cabrini Hospital and HSUA Vic No. 1 Branch Cabrini Health and Allied Services Staff Agreement 2001	3.4	12.5	3.6	697	
St Vincents and Mercy Private Hospital and the HSUA (Vic) No 1 Branch EBA 2001	3.3	13.0	3.9	518		
Woolworths Supermarkets (WA) Agreement 2001	1.3	7.0	5.3	6 409		
	<b>Total large non-quantifiable, unclear or conditions only private sector agreements</b>				<b>7 109</b>	
	<b>Total large quantifiable private sector agreements</b>				<b>45 216</b>	
	<b>Total large private sector agreements</b>	<b>2.6</b>		<b>3.9</b>	<b>52 325</b>	
Source:	Workplace Agreements Database, DEWR					
Notes:	* Agreement cannot be quantified – The numerical note will indicate the reason the agreement cannot be quantified					
	1. Conditional Bonus					
	2. No wages details – conditions of employment only agreement					
	3. Performance pay scheme					
	4. Any increase during the life of the agreement are to be negotiated with clients					
	5. Wage rates provided for in this agreement are identical to those from the previous agreement. Duration for this agreement however is 6 months					
	6. Annualised salary introduced					
	7. Inconsistent increases across classification levels					

**Table 2: Large federal agreements certified in December quarter 2001 – public sector**

	Title	Duration	Total Wage	AAWI	Emps	Notes
	<b>Public sector large agreements</b>	(yrs)	(%)	(%)		
Infrastructure services	Freight Rail Corporation Enterprise Agreement 3 - 2001	1.0	4.0	4.0	2 076	
Other services	HIC (Business Improvement) Certified Agreement 2001 - 2003	2.3	8.7	3.8	4 270	1, 2
	HSUA Department of Human Services Intellectual Disability Services Agreement 2001	3.0	9.0	3.0	4 993	
	Northern Territory Public Sector Nurses 2001 - 2003 Certified Agreement	1.9	11.0	5.7	1 507	
	Northern Territory Public Sector Teachers and Educators Certified Agreement 2001	1.5	6.0	4.0	2 848	
	Rural Ambulance Victoria Certified Agreement 2001	3.5	12.0	3.4	1 159	
	University of Tasmania Academic Staff Agreement 2000-2003	3.0	12.0	4.0	694	3
	University of Western Sydney Academic Staff Enterprise Agreement 2001-2003	2.4	10.2	4.2	1 454	
	Victorian Government Schools – School Services Officers Agreement 2001	3.1	9.0	2.9	11 000	
Victoria Police Force Certified Agreement 2001	3.4	16.0	4.7	10 597		
Government administration & defence	ATO (Executive Level 2) Agreement 2001	1.0	3.2	3.2	1 108	3
	ATO (General Employees) Agreement 2001	1.0	3.2	3.2	19 059	3
	Brisbane City Council Enterprise Bargaining Agreement 2001	2.0	9.0	4.5	4 928	
	City of Yarra Enterprise Agreement No.3 2001	3.0	12.0	4.0	708	
	Glen Eira City Council Enterprise Agreement 2001-2003	2.5	14.0	5.6	736	
	Hobart City Council Enterprise Agreement 2001	2.0	7.0	3.5	608	
	Hobsons Bay City Council Enterprise Agreement 2001	3.4	13.0	3.9	650	
	Melbourne City Council Enterprise Agreement 2001	1.0	5.0	5.0	859	
	Members of Parliament Staff (Commonwealth) Certified Agreement 2001 - 2002	1.6	3.5	2.2	1 267	
	Yarra Ranges Shire Council Enterprise Agreement Number 3 - 2001	2.0	10.0	5.0	865	
	Total large non-quantifiable, unclear or conditions only public sector agreements				0	
	Total large quantifiable public sector agreements				71 386	
	<b>Total large public sector agreements</b>	<b>2.3</b>	<b>3.7</b>	<b>3.7</b>	<b>71 386</b>	
	<b>Total large private sector agreements</b>	<b>2.6</b>	<b>3.9</b>	<b>3.9</b>	<b>52 325</b>	
	<b>Total large agreements</b>	<b>2.5</b>	<b>3.8</b>	<b>3.8</b>	<b>123 711</b>	
Source:	Workplace Agreements Database, DEWR					
Notes:	* Agreement cannot be quantified – The numerical note will indicate the reason the agreement cannot be quantified 1. Conditional Bonus 2 Absorption of annual leave loading (4/52 multiplied by 17.5% = 1.3%) has been offset against the initial 4.5% increase 3. Performance Pay Scheme					

### Major private sector agreements

Employees covered by large private sector agreements accounted for 26.9 per cent of all employees under agreements certified in the December quarter, down from 34 per cent of all employees in the September quarter 2001. Due to this fall, the effect private sector large agreements had on the quarter was less than in previous quarters. These employees were granted an AAWI of 3.9 per cent per employee.

*Contributions to private sector wage outcomes*

The Holden Ltd Enterprise agreement (2001-2004) was the largest private sector agreement for the December quarter and covered just over 6800 employees. This agreement granted an AAWI per employee of 5.1 per cent.

The Woolworths Supermarkets (WA) agreement 2001 provided for an AAWI of 5.3 per cent per employee to around 6400 employees.

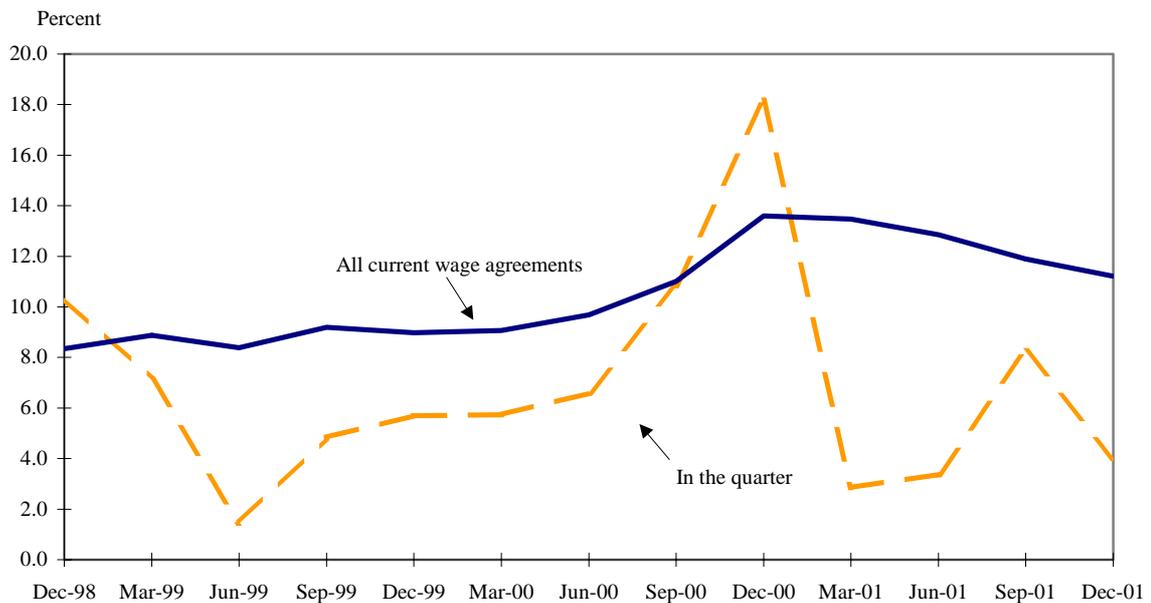
### INFLATION RELATED CLAUSES IN AGREEMENTS

The WAD contains information on whether federal workplace agreements have clauses which allow for:

- full indexation of wage increases in line with CPI increases;
- partial absorption of CPI increases depending on whether the percentage wage increase provided by the agreement is higher than the CPI increase;
- a specific GST formula or a formula to calculate the effects of net CPI; or
- the re-opening of wage negotiations if CPI increases are higher than anticipated.

The historical application of these CPI related wage clauses in certified agreements, is indicated in Chart 3.

**Chart 3: Percentage of employees covered by agreements that contain CPI related clauses**



Note: There have been slight revisions to the historical series.

Source: DEWR Workplace Agreements Database (WAD)

### Current agreements with CPI related provisions

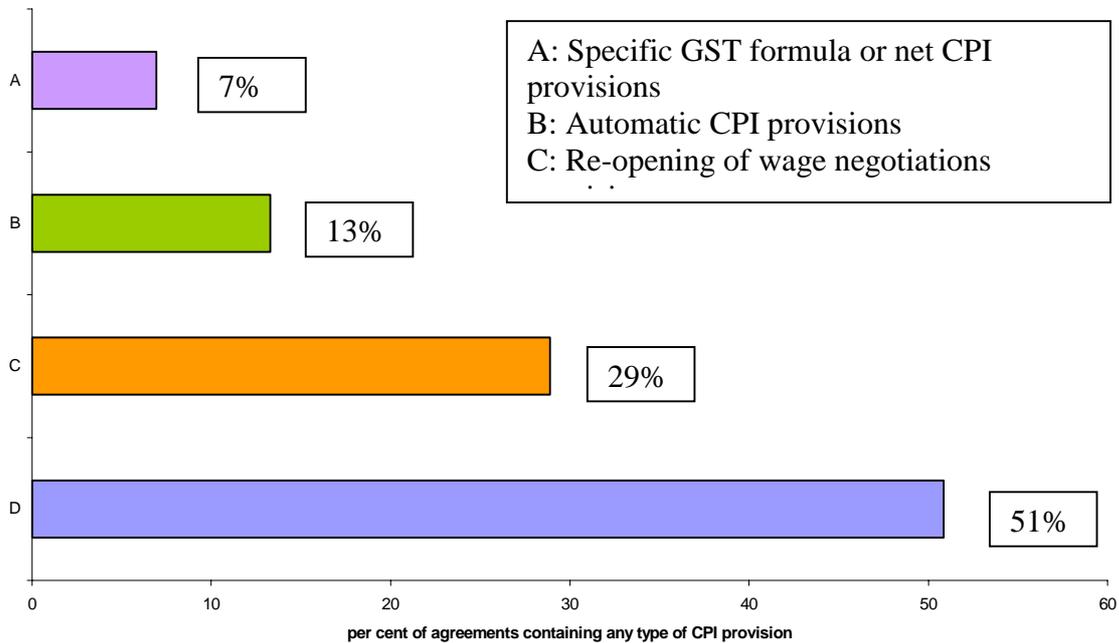
The proportion of employees covered by current federal wage agreements, whose agreements include any type of CPI related wage clause, was 11.2 per cent at the end of the December quarter 2001, down 0.7 percentage points from 11.9 per cent at the end of September 2001.

- However, only 1.3 per cent of employees covered by current federal wage agreements are covered by agreements that allow for automatic adjustment of wages in line with CPI movements. This proportion is the same as that recorded in the previous quarter.
- Most current agreements that contain a CPI related clause, instead allow for partial absorption of CPI movements or allow only for an agreement to be reviewed in light of CPI movements.

### Agreements certified in the quarter with CPI related provisions

Of all employees covered by wage agreements certified in the December quarter 2001, 4.0 per cent were covered by an agreement that contained a CPI related wage clause, down from 8.3 per cent in the September quarter.

**Chart 4: Proportion of federal certified wage agreements containing CPI provisions by type of provision, certified during the December quarter 2001**



*Types of CPI provisions in the quarter*

The most common types of CPI provisions in the December quarter were those providing partial absorption of CPI – which normally leaves wage increases unchanged unless CPI increases are greater than the wage increases provided by the agreement. This category accounted for 51 per cent of all agreements with CPI related provisions certified this quarter.

Around 29 per cent of agreements containing CPI related clauses certified in the quarter only contained re-opening clauses, with a further 13 per cent containing automatic clauses. The remaining 7 per cent were agreements containing provisions that included a specific formula related to CPI.

*Number of agreements*

In the December quarter, 173 agreements containing CPI related clauses were certified compared to 209 in the September quarter. As a proportion of agreements certified in the quarter, those with CPI related wage clauses accounted for 10.6 per cent of agreements in the December quarter compared to 11.7 per cent in the September quarter.

## **AAWI PER AGREEMENT**

### **Agreements certified during the quarter**

Federal wage agreements certified in the December quarter 2001 allowed for an AAWI *per agreement* of 4.1 per cent, down 0.2 percentage points from the September quarter 2001 figure.

- Private sector wage agreements allowed for an AAWI of 4.1 per cent per agreement in the December quarter 2001, while public sector wage agreements allowed for an AAWI of 3.7 per cent per agreement.

### **Current agreements**

Current federal wage agreements (agreements that had not expired or been terminated at 31 December 2001) provided for an AAWI of 4.3 per cent per agreement – unchanged from 30 September 2001.

- Private sector wage agreements current at 31 December 2001 provided an AAWI of 4.4 per cent per agreement while public sector agreements provided an AAWI of 3.4 per cent per agreement.

#### *The use of this indicator*

The AAWI *per agreement* is not the best statistical indicator of aggregate wage increases being granted to employees. This is because it assigns equal weight to each agreement, irrespective of the number of employees the agreement covers. This makes the indicator particularly prone to distortion by the large number of small, pattern agreements certified in the construction sector. This is reflected in the disparity between public and private sector AAWI per agreement.

The AAWI *per employee* weights agreements by employee coverage and so provides a much more accurate picture of average wage increases being received by employees.

## **WAGE TRENDS BY SECTOR**

### **Private sector**

#### *Private sector agreements certified during the quarter*

In the private sector, 1519 federal wage agreements, covering an estimated 110 600 employees, were certified during the December quarter 2001.

- These agreements granted an AAWI of 3.9 per cent per employee, up slightly from the September quarter 2001.

*Private sector expiring agreements*

The second half of 2002 and the first quarter of 2003 are shaping up to be periods of transition, with a significant number of private sector agreements due to expire including 3200 agreements in the December quarter 2002.

In terms of employees covered by expiring private sector agreements, the March quarter 2002 is the most significant quarter with 597 agreements covering around 96 700 employees due to expire (See Table 3).

*Private sector current agreements*

The AAWI for private sector agreements current at 31 December 2001 was 3.8 per cent per employee, up marginally from the September quarter 2001 of 3.7 per cent per employee.

**Public sector***Public sector agreements certified during the quarter*

In the December quarter 2001, 110 federal wage agreements were certified in the public sector, covering an estimated 79 100 employees.

- These agreements allowed for an AAWI of 3.7 per cent per employee, down from the previous quarter's result of 4.0 per cent per employee.

*Public sector expiring agreements*

The quarter with the highest number of expiring public sector agreements is the June quarter 2002 with over 230 covering an estimated 125 700 employees. A very large public health agreement and one of the largest federal public service department agreements are both due to expire in May 2002. These two agreements cover approximately 50 000 employees.

In terms of employees covered by expiring agreements, the June quarter 2003 is also significant with over 170 agreements covering around 101 100 employees also due to expire. The AAWI per employee granted by these agreements is 3.9 per cent.

*Public sector current agreements*

For federal wage agreements in the public sector that were current at 31 December 2001, the AAWI per employee was 3.7 per cent, unchanged from the September quarter.

## AGREEMENTS MADE DIRECTLY WITH EMPLOYEES AND AGREEMENTS MADE WITH EMPLOYEE ORGANISATIONS

### Agreements certified in the quarter

#### *Agreements made under section 170LK*

One option made available by the *Workplace Relations Act 1996* (WR Act) to parties negotiating an agreement, is to make an agreement directly between employer and employees. These agreements are provided for under section 170LK of the WR Act.

- The AAWI for employees under section 170LK agreements certified in the December quarter 2001 was 3.9 per cent per employee.
- Around 30 section 170LK fast food franchise agreements were certified this quarter. In the December quarter 2001 a very large public sector agreement was made under section 170LK, which covered over 10 000 and allowed for an AAWI of 4.7 per cent.

#### *Agreements made with employee organisations*

The AAWI per employee for agreements made with employee organisations under the WR Act, (including agreements made under section 170LL, 170LN and 170LJ) in the December quarter 2001, was 3.8 per cent per employee – unchanged from 3.8 per cent per employee (r) in the September quarter 2001.

### Current agreements

A less volatile indicator of wage outcomes under section 170LK agreements is provided by the AAWI for all those agreements current at a given point in time. Chart 5 shows how the larger size of the current agreements dataset tends to eliminate quarter-by-quarter volatility but retain any overall trends present in the data. The overall trend evident has been for AAWIs provided by the two types of agreements to converge.<sup>1</sup>

#### *Agreements made under section 170LK*

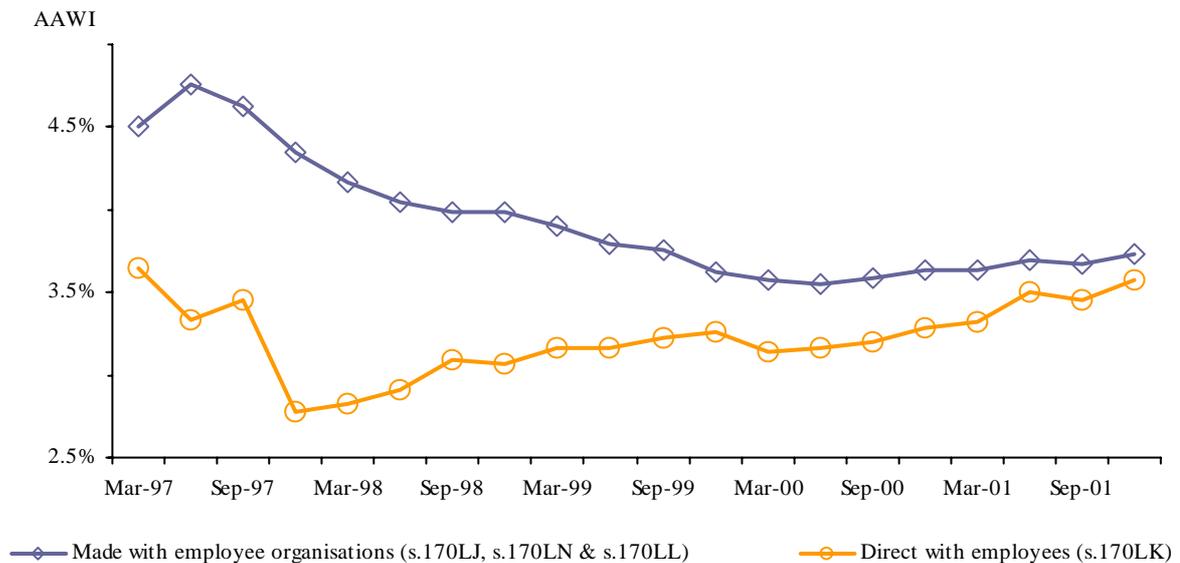
The AAWI per employee for agreements made under section 170LK and current at 31 December 2001 was 3.6 per cent per employee – up marginally from the September quarter's revised figure of 3.5 per cent per employee.

#### *Agreements made with employee organisations*

The AAWI per employee for agreements current at 31 December 2001 and made with employee organisations was 3.7 per cent per employee – unchanged from the September quarter 2001.

<sup>1</sup> Some organisations report on AAWI per agreement to measure wage outcomes including comparisons between section 170LK agreements and those made with employee organisations. See comments regarding the inadequacy of this measure under *AAWI per agreement*.

**Chart 5: Wage trends for agreements made with employee organisations and agreements made directly with employees under the WR Act and current on the last day of each quarter: 31 March 1997 to 31 December 2001**



Source: DEWR Workplace Agreements Database (WAD)

## WAGE TRENDS IN KEY INDUSTRIES

Table 4 shows quarterly movements in average annualised wage outcomes for seventeen industry ANZSIC divisions. The manufacturing category has been disaggregated into metals and non-metals industries.

Table 5 shows the expiry pattern for each quarter to 31 December 2004 for the same seventeen industry ANZSIC Divisions. It lists the number of agreements expiring, the number of employees covered by those agreements and the AAWI for the expiring agreements.

### Health and community services

A total of 88 wage agreements were certified in the health and community services industry. These agreements covered an estimated 18 300 employees and provided an AAWI of 3.7 per cent per employee.

- This result is down 0.5 percentage points from the September quarter 2001 of 4.2 per cent and 0.7 percentage points from the June quarter result of 4.4 per cent per employee. The AAWI for health and community service agreements certified during the December quarter 2001 is lower owing to three large agreements in this industry. The first two granted an AAWI of 3.0 per cent per employee to total of nearly 6300 employees combined. The third provided for an AAWI of 3.4 per cent per employee to around 1200 employees.
- This industry group includes agreements from both the public and private sector. In the December quarter 89 per cent of agreements and 45 per cent of employees

in the health and community service industry were from the private sector. The AAWIs provided for by private and public sector health and community services agreements were 3.9 per cent and 3.6 per cent per employee respectively.

- The AAWI for current health and community service agreements has continued to increase over the last 3 quarters from 3.1 per cent per employee at 31 March 2001 to 3.6 per cent per employee at 31 December 2001.

## **Manufacturing**

There were 448 manufacturing wage agreements certified during the December quarter 2001. These agreements provided an AAWI of 4.2 per cent per employee to around 43 100 employees.

### **Metals manufacturing**

In the December quarter 2001 there were 194 wage agreements certified in this industry.

- The AAWI for metals manufacturing wage agreements certified in the December quarter 2001 was 4.7 per cent, up from 4.3 per cent in the September quarter 2001.
- The number of employees covered by metals manufacturing agreements rose considerably in the December quarter 2001 from just over 9900 in the September quarter 2001 to around 20 800 in the December quarter. This is mainly attributable to the certification of two large car manufacturing agreements which together cover around 9700 employees and which grant AAWIs of 5.1 per cent per employee and 5.2 per cent per employee.

A total of 108 wage agreements covering an estimated 6700 employees expired during the December quarter 2001. These agreements granted an AAWI of 3.6 per cent per employee.

- A further 378 agreements are due to expire in the March quarter 2003. These agreements cover around 17 900 employees and provide an AAWI of 4.9 per cent per employee.

### **Non-metals manufacturing**

The AAWI for non-metals manufacturing was down from the September quarter figure of 4.1 per cent per employee to 3.7 per cent in the December quarter 2001.

- The number of agreements for the December quarter was 254, up 22 agreements from the previous quarter.

A total of 186 agreements granting an AAWI of 3.2 per cent per employee and covering an estimated 12 000 employees ceased to contribute to the all current AAWI in the December quarter 2001.

- Non-metals manufacturing agreements due to expire in the March quarter 2003 total 235. These agreements cover around 11 400 employees and grant an AAWI of 4.4 per cent per employee.

**Retail trade**

Around 22 000 employees covered by retail trade agreements certified in the December quarter 2001 were granted an AAWI of 3.5 per cent per employee, up slightly from the September quarter's figure of 3.4 per cent per employee. The Woolworths Supermarkets (WA) Agreement 2001 contributed to the rise in the December quarter AAWI by providing approximately 6400 employees an AAWI of 5.3 per cent per employee.

- The total number of retail agreements certified in the December quarter 2001 was 64, down from the September quarter's total of 105, but up significantly from the first half of 2001 during which time 32 agreements were certified. A large number of agreements from a fast-food retail franchise were certified in the December quarter.

A total of 25 retail industry agreements are due to expire in the March quarter 2002, including one of the largest retail agreements which expires on 31 January 2002. This agreement covers an estimated 43 900 employees and granted an AAWI of 3.3 per cent per employee and its expiry will effect a range of indicators including average duration and employees covered by agreements with inflation related provisions.

**Construction**

A total of 612 wage agreements were certified during the December quarter in the construction industry. These agreements covered around 6900 employees.

- These agreements provided an AAWI of 4.3 per cent per employee, down from 4.8 per cent per employee in the September quarter.

A total of 4968 construction industry agreements are due to expire between the September quarter 2002 and the March quarter 2003. These agreements cover a total of around 57 700 employees and provide an aggregate AAWI of 4.9 per cent per employee.

**Government administration**

While the number of wage agreements formalised in this industry rose only marginally from 64 in the September quarter 2001 to 66 in the December quarter the number of employees covered by such agreements tripled.

- The AAWI per employee fell 0.5 percentage points from the September quarter 2001 to 3.6 per cent per employee. The number of employees covered by government administration agreements increased from an estimated 9500 in the September quarter 2001 to around 35 700 for the December quarter.
- Two large government department agreements, one covering over 19 000 employees, as well as several other large city council agreements contributed approximately 30 000 employees to the December quarter's employee total.

A total of 73 agreements covering an estimated 31 700 employees expired in the December quarter 2001. These agreements provide an AAWI of 3.8 per cent per employee.

A further 89 agreements covering around 59 700 employees and with an AAWI of 3.3 per cent per employees are due to expire in the June quarter 2002.

**TABLE 3: FEDERAL WAGE AGREEMENTS, DECEMBER QUARTER 1998 - DECEMBER QUARTER 2001 & EXPIRING FEDERAL WAGE AGREEMENTS, DECEMBER QUARTER 2001 - DECEMBER QUARTER 2004**

<b>FOR AGREEMENTS CERTIFIED IN THE NOMINATED QUARTER</b>	Dec-98	Mar-99	Jun-99	Sep-99	Dec-99	Mar-00	Jun-00	Sep-00	Dec-00	Mar-01	Jun-01	Sep-01	Dec-01
<b>PUBLIC SECTOR</b>	295	165	146	270	180	176	131	214	194	146	94	95	110
AAWI (%)	4.4	3.5	3.4	3.3	3.1	3.2	3.3	4.5	3.8	3.8	4.1	4.0	3.7
Employees ('000)	137.4	31.2	111.9	30.0	44.8	44.4	42.9	81.7	137.6	108.4	63.8	40.0	79.1
<b>PRIVATE SECTOR</b>	1 871	1 430	1 210	1 236	1 287	1 096	1 002	1 776	2 149	1 532	1 314	1 697	1 519
AAWI (%)	3.8	3.8	3.7	3.4	3.5	3.6	3.8	3.9	4.1	3.6	3.9	3.8	3.9
Employees ('000)	119.6	92.7	87.1	89.2	109.7	59.4	62.2	94.9	143.9	91.4	130.0	118.6	110.6
<b>ALL INDUSTRIES</b>	2 166	1 595	1 356	1 506	1 467	1 272	1 133	1 990	2 343	1 678	1 408	1 792	1 629
AAWI (%)	4.1	3.7	3.5	3.4	3.4	3.4	3.6	4.2	3.9	3.7	3.9	3.8	3.8
Employees ('000)	257.1	123.8	199.1	119.2	154.5	103.8	105.1	176.6	281.6	199.8	193.7	158.7	189.7

<b>FOR ALL CURRENT AGREEMENTS</b>	Dec-98	Mar-99	Jun-99	Sep-99	Dec-99	Mar-00	Jun-00	Sep-00	Dec-00	Mar-01	Jun-01	Sep-01	Dec-01
<b>PUBLIC SECTOR</b>	1 201	1 277	1 355	1 160	1 254	1 315	1 359	1 292	1 237	1 261	1 216	1 141	1 121
AAWI (%)	3.9	3.7	3.5	3.5	3.4	3.4	3.4	3.6	3.6	3.7	3.7	3.7	3.7
Employees ('000)	481.0	471.4	547.2	444.5	441.1	466.9	453.8	475.5	496.6	567.7	597.6	532.8	586.3
<b>PRIVATE SECTOR</b>	8 563	9 465	10 143	10 350	7 951	7 028	7 364	7 133	8 601	9 484	10 185	10 642	11 588
AAWI (%)	4.0	4.0	3.9	3.9	3.7	3.7	3.6	3.6	3.6	3.6	3.7	3.7	3.8
Employees ('000)	856.3	880.3	910.6	910.2	941.0	922.7	886.1	807.7	851.9	827.5	878.3	818.9	853.2

<b>ALL INDUSTRIES</b>	9 764	10 742	11 498	11 510	9 205	8 343	8 723	8 425	9 838	10 745	11 401	11 783	12 709
AAWI (%)	4.0	3.9	3.8	3.7	3.6	3.6	3.5	3.6	3.6	3.6	3.7	3.7	3.7
Employees ('000)	1 337.3	1 351.7	1 457.9	1 354.8	1 382.1	1 389.6	1 339.9	1 283.2	1 348.5	1 395.3	1 476.0	1 351.7	1 439.5

<b>FOR ALL EXPIRING AGREEMENTS</b>	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04	Dec-04
<b>PUBLIC SECTOR</b>	166	134	236	114	114	96	171	67	49	21	37	8	25
AAWI (%)	3.6	2.9	3.3	3.3	3.7	4.1	3.9	4.5	3.9	3.4	3.7	3.5	4.6
Employees ('000)	55.1	17.4	125.7	35.0	60.6	47.1	101.1	52.7	6.6	63.3	18.9	1.4	12.9
<b>PRIVATE SECTOR</b>	700	597	759	1 510	3 200	2 205	976	509	427	229	414	254	274
AAWI (%)	3.2	3.4	3.8	4.2	3.7	4.0	3.8	3.7	3.7	3.8	3.7	3.3	3.6
Employees ('000)	73.3	96.7	92.8	88.3	86.4	93.1	82.7	77.6	43.5	32.5	62.3	45.1	33.4
<b>ALL INDUSTRIES</b>	866	731	995	1 624	3 314	2 301	1 147	576	476	250	451	262	299
AAWI (%)	3.4	3.3	3.5	3.9	3.7	4.1	3.9	4.1	3.7	3.5	3.7	3.3	3.9
Employees ('000)	128.4	114.1	218.5	123.3	147.0	140.2	183.8	130.3	50.1	95.8	81.2	46.5	46.3

**TABLE 4: FEDERAL WAGE AGREEMENTS, BY ANZSIC DIVISION, DECEMBER QUARTER 1998 - DECEMBER QUARTER 2001 - (Part One)**

<b>FOR AGREEMENTS CERTIFIED IN THE NOMINATED QUARTER</b>	Dec-98	Mar-99	Jun-99	Sep-99	Dec-99	Mar-00	Jun-00	Sep-00	Dec-00	Mar-01	Jun-01	Sep-01	Dec-01
<b>Agriculture, forestry and fishing</b>	11	5	5	4	6	5	3	11	16	7	6	8	22
AAWI (%)	2.4	3.8	4.0	3.1	3.4	3.6	3.5	3.4	4.1	3.3	2.0	4.4	3.3
Employees	429	357	123	1800	414	219	175	2575	742	369	101	638	2340
<b>Mining</b>	38	26	43	43	23	36	26	22	42	21	27	33	36
AAWI (%)	3.0	3.7	3.7	3.1	4.3	2.8	2.8	4.2	3.2	2.4	3.6	3.3	2.7
Employees	3160	1325	1927	3362	1212	1841	961	1528	2010	1139	1918	4298	2815
<b>Manufacturing</b>	359	397	364	402	403	312	280	399	501	406	307	387	448
AAWI (%)	4.2	4.0	3.9	3.7	3.7	3.6	3.5	3.9	4.4	4.1	3.9	4.2	4.2
Employees	28088	31607	23540	30767	38640	22316	19774	25730	44768	28127	18281	28231	43100
<i>Non-metals manufacturing</i>	155	152	170	224	221	171	150	216	258	203	174	232	254
AAWI (%)	3.8	3.7	4.0	3.4	3.5	3.5	3.4	3.7	3.9	3.9	3.8	4.1	3.7
Employees	9351	14809	12206	14508	20562	14470	11544	13393	20235	18006	12721	18327	22342
<i>Metals manufacturing</i>	204	245	194	178	182	141	130	183	243	203	133	155	194
AAWI (%)	4.4	4.2	3.8	3.9	4.0	3.9	3.7	4.1	4.8	4.4	4.1	4.3	4.7
Employees	18737	16798	11334	16259	18078	7846	8230	12337	24533	10121	5560	9904	20758
<b>Electricity, gas and water supply</b>	34	44	46	19	38	14	9	14	20	11	17	14	16
AAWI (%)	3.7	6.0	3.4	3.5	3.7	3.6	4.2	4.2	3.8	3.9	4.2	4.7	4.6
Employees	947	1820	634	6596	1551	4862	474	2135	1149	2549	1360	1278	2228
<b>Construction</b>	1063	677	504	482	529	498	445	981	1253	833	606	761	612
AAWI (%)	6.3	6.2	6.1	5.4	5.2	4.8	4.4	4.8	4.9	4.8	4.8	4.8	4.3
Employees	13008	7666	5655	4918	7695	8640	8694	13349	16659	10162	6008	7247	6876
<b>Wholesale trade</b>	18	8	6	19	26	10	10	12	13	7	5	12	9
AAWI (%)	3.8	3.2	2.9	3.9	2.9	2.5	4.1	4.5	3.9	5.6	4.3	3.8	3.2
Employees	1085	683	274	789	1639	617	635	624	2367	167	72	1260	497
<b>Retail trade</b>	19	13	15	22	30	16	35	36	30	32	32	105	64
AAWI (%)	3.3	3.3	4.0	2.7	3.1	2.3	3.6	3.2	3.6	2.4	3.2	3.4	3.5
Employees	34167	25126	3491	18455	34851	2203	16366	11832	34824	28584	31909	28089	22217
<b>ALL INDUSTRIES</b>	2166	1595	1356	1506	1467	1272	1133	1990	2343	1678	1408	1792	1629
AAWI (%)	4.1	3.7	3.5	3.4	3.4	3.4	3.6	4.2	3.9	3.7	3.9	3.8	3.8
Employees	257050	123820	199063	119197	154508	103794	105102	176624	281581	199767	193733	158655	189675

**TABLE 4: FEDERAL WAGE AGREEMENTS, BY ANZSIC DIVISION, DECEMBER QUARTER 1998 - DECEMBER QUARTER 2001 - (Final Part)**

<b>FOR AGREEMENTS CERTIFIED IN THE NOMINATED QUARTER</b>	Dec-98	Mar-99	Jun-99	Sep-99	Dec-99	Mar-00	Jun-00	Sep-00	Dec-00	Mar-01	Jun-01	Sep-01	Dec-01
<b>ANZSIC DIVISION</b>													
<b>Accommodation, cafes and restaurants</b>	24	6	12	16	15	15	15	15	13	12	15	27	12
AAWI (%)	2.4	4.5	1.8	2.6	2.4	4.7	3.7	3.8	2.7	4.1	1.1	2.6	2.3
Employees	2510	660	2758	746	4278	671	2229	1622	1311	1079	1321	12340	846
<b>Transport and storage</b>	164	113	104	111	114	93	82	180	160	126	102	134	123
AAWI (%)	3.2	3.0	3.0	2.9	4.1	3.0	4.1	3.8	3.3	3.4	3.3	3.9	3.8
Employees	22373	9140	31770	7192	5741	11353	4066	12283	24149	6550	7032	9778	9964
<b>Communication services</b>	4	3	4	2	5	0	4	5	9	3	4	6	4
AAWI (%)	4.0	2.4	3.9	5.0	4.4	*	4.1	3.5	3.8	*	4.1	3.7	4.0
Employees	73007	1517	35822	962	187	0	164	1511	43694	156	1787	998	365
<b>Finance and insurance</b>	14	5	11	12	11	8	11	12	12	11	14	13	9
AAWI (%)	4.3	4.0	3.3	2.9	3.6	3.2	4.1	4.8	5.1	4.8	4.5	4.1	3.7
Employees	4026	969	8835	4231	8631	3731	3305	12523	9334	4062	26877	6064	5186
<b>Property and business services</b>	44	20	22	24	26	27	32	32	38	21	35	25	45
AAWI (%)	4.4	2.0	4.8	5.4	3.6	4.1	3.8	3.1	3.3	3.3	3.8	3.2	4.1
Employees	1846	1998	5277	1506	2064	2241	3769	2262	3834	2736	13716	3509	6040
<b>Government administration and defence</b>	85	85	51	82	82	65	50	91	84	55	58	64	66
AAWI (%)	5.7	3.9	3.1	2.9	2.8	3.2	3.6	5.0	3.8	4.0	4.5	4.1	3.6
Employees	39128	17185	36550	9883	17208	20361	11697	50568	35899	9582	17556	9455	35650
<b>Education</b>	36	37	16	27	21	18	23	33	56	51	34	26	28
AAWI (%)	3.7	6.9	4.0	4.1	3.2	3.3	3.8	3.6	4.5	3.9	3.9	3.9	3.3
Employees	2505	3789	13935	8100	10324	9340	13342	18288	29066	91475	43133	8282	17904
<b>Health and community services</b>	193	111	123	207	110	123	82	106	53	52	107	127	88
AAWI (%)	3.5	3.2	3.5	3.0	3.0	2.9	2.8	3.3	3.0	3.6	4.4	4.2	3.7
Employees	26210	14286	24627	10199	13800	7157	12857	10552	27702	8205	14597	30643	18341
<b>Cultural and recreational services</b>	45	37	21	14	14	21	11	21	27	18	28	33	21
AAWI (%)	3.1	2.6	2.6	3.9	3.7	3.2	2.7	3.7	3.8	4.8	3.6	3.7	2.6
Employees	3795	4833	1552	7936	2672	7161	5415	7195	3231	3916	7626	5499	3527
<b>Personal and other services</b>	15	8	9	20	14	11	15	20	16	12	11	17	26
AAWI (%)	3.3	4.0	2.8	3.7	3.9	2.8	3.1	3.5	3.0	3.4	2.6	4.1	4.7

Employees	766	859	2293	1755	3601	1081	1179	2047	842	909	439	1046	11779
<b>ALL INDUSTRIES</b>	2166	1595	1356	1506	1467	1272	1133	1990	2343	1678	1408	1792	1629
AAWI (%)	4.1	3.7	3.5	3.4	3.4	3.4	3.6	4.2	3.9	3.7	3.9	3.8	3.8
Employees	257050	123820	199063	119197	154508	103794	105102	176624	281581	199767	193733	158655	189675

**Notes:** 1. AAWI = Average Annual Wage Increase per employee

2. Agreement and employee estimates are for all federal wage agreements in the period, while estimates of AAWI per employee are based on quantifiable wage agreements.

3. \* No quantifiable agreements were certified this quarter so that no AAWI is calculable.

4. The manufacturing category has been disaggregated into metals and non-metals industries. Other industry groupings can be derived as follows:

'Infrastructure services' - ANZSIC Divisions D, E, I and J (Electricity, gas and water supply; Construction; Transport and storage; Communication services).

'Other services' - ANZSIC Divisions F, G, H, K, L, N, O, P, Q (Wholesale trade; Retail trade; Accommodation, cafes and restaurants; Finance and insurance; Property and business; services; Education; Health and community services; Cultural and recreational services; Personal and other services).

'Government administration' ANZSIC - Division M (Govt admin and defence).

**Source:** Workplace Agreements Database, DEWR, 27 February 2002. All estimates are rounded and are subject to revision. Revisions have been made to historical series.

TABLE 5: EXPIRING FEDERAL WAGE AGREEMENTS, BY ANZSIC DIVISION, DECEMBER QUARTER 2001 - DECEMBER QUARTER 2004 - (Part One)

<b>FOR AGREEMENTS CERTIFIED IN THE NOMINATED QUARTER</b>	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04	Dec-04
<b>Agriculture, forestry and fishing</b>	14	5	6	7	6	5	2	6	7	3	4	2	12
AAWI (%)	3.1	3.6	3.0	2.5	4.4	4.0	3.3	3.6	3.6	5.0	4.3	*	1.0
Employees	2183	193	242	311	94	218	2179	326	1669	69	408	191	359
<b>Mining</b>	12	21	12	33	43	17	23	22	18	8	9	17	12
AAWI (%)	2.2	2.7	4.0	3.0	3.4	2.8	2.9	3.4	1.4	2.0	2.8	3.6	2.5
Employees	855	1088	972	1614	2008	935	1808	1311	796	523	536	3928	938
<b>Manufacturing</b>	294	219	308	198	216	613	350	209	127	57	118	65	34
AAWI (%)	3.4	3.8	3.7	3.5	3.4	4.7	3.9	4.1	3.8	4.2	4.6	3.7	4.8
Employees	18726	18501	17660	14807	14243	29344	29011	21548	10174	5252	15762	4392	9440
<i>Non-metals manufacturing</i>	186	127	181	126	134	235	209	138	72	35	71	48	19
AAWI (%)	3.2	3.5	3.7	3.5	3.3	4.4	3.7	3.7	3.7	4.1	4.3	3.7	3.7
Employees	12015	8542	10869	10701	9453	11448	19574	11931	7565	3731	6897	3222	2333
<i>Metals manufacturing</i>	108	92	127	72	82	378	141	71	55	22	47	17	15
AAWI (%)	3.6	4.1	3.8	3.6	3.7	4.9	4.2	4.6	4.1	4.3	4.7	3.8	5.1
Employees	6711	9959	6791	4106	4790	17896	9437	9617	2609	1521	8865	1170	7107
<b>Electricity, gas and water supply</b>	20	11	10	20	10	9	9	10	11	2	4	3	8
AAWI (%)	4.0	4.2	4.5	3.3	4.2	3.6	4.1	3.7	4.0	*	4.0	4.8	4.6
Employees	5646	1725	492	5235	342	484	1137	1174	1496	11	319	620	1391
<b>Construction</b>	89	147	116	1014	2660	1294	212	91	118	49	42	56	111
AAWI (%)	3.8	4.1	3.5	4.8	4.9	5.0	4.1	4.0	3.9	3.9	4.0	3.9	3.6
Employees	2187	2224	2891	15271	27287	15150	4287	2186	2011	813	554	1002	1526
<b>Wholesale trade</b>	10	4	13	10	6	14	7	5	2	3	2	2	2
AAWI (%)	4.2	3.9	2.3	4.0	4.6	4.0	3.5	2.8	3.8	3.4	4.4	2.0	2.5
Employees	533	120	930	816	662	909	301	216	1062	714	69	124	88
<b>Retail trade</b>	22	25	20	20	20	24	24	31	15	12	104	17	27
AAWI (%)	2.4	3.3	2.6	4.1	2.4	3.1	3.7	3.4	3.7	3.1	3.3	3.0	1.6
Employees	10566	57660	6996	25584	22338	21555	13495	36095	7683	3039	28267	11756	655
<b>ALL INDUSTRIES</b>	866	731	995	1624	3314	2301	1147	576	476	250	451	262	299
AAWI (%)	3.4	3.3	3.5	3.9	3.7	4.1	3.9	4.1	3.7	3.5	3.7	3.3	3.9
Employees	128391	114066	218529	123289	147009	140156	183811	130271	50140	95815	81199	46537	46252

- Notes:** 1. AAWI = Average Annual Wage Increase per employee  
 2. Agreement and employee estimates are for all federal wage agreements in the period, while estimates of AAWI per employee are based on quantifiable wage agreements.  
 3. \* No quantifiable agreements were certified this quarter so that no AAWI is calculable.  
 4. The manufacturing category has been disaggregated into metals and non-metals industries. Other industry groupings can be derived as follows:  
 'Infrastructure services' - ANZSIC Divisions D, E, I and J (Electricity, gas and water supply; Construction; Transport and storage; Communication services).  
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 'Government administration' ANZSIC - Division M (Govt admin and defence).

**Source:** Workplace Agreements Database, DEWR, 27 February 2002. All estimates are rounded and are subject to revision. Revisions have been made to historical series.

**TABLE 5: EXPIRING FEDERAL WAGE AGREEMENTS, BY ANZSIC DIVISION, DECEMBER QUARTER 2001 - DECEMBER QUARTER 2004 - (Final Part)**

<b>FOR AGREEMENTS CERTIFIED IN THE NOMINATED QUARTER</b>	Dec-01	Mar-02	Jun-02	Sep-02	Dec-02	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04	Dec-04
<b>ANZSIC DIVISION</b>													
<b>Accommodation, cafes and restaurants</b>	13	9	9	20	12	17	19	10	7	8	3	10	7
AAWI (%)	3.6	1.2	3.0	3.9	3.4	4.7	3.4	2.9	2.8	1.8	2.2	2.6	3.0
Employees	2242	886	372	1254	716	1073	2238	563	597	894	187	10251	482
<b>Transport and storage</b>	95	53	142	92	136	115	152	65	51	33	41	38	21
AAWI (%)	3.0	2.7	3.2	3.3	3.5	3.1	3.8	3.6	3.2	3.6	3.6	3.8	3.8
Employees	34179	5661	19850	3931	6738	6909	13498	3989	2549	3374	1345	2460	1828
<b>Communication services</b>	4	3	2	4	7	4	6	2	2	3	1	2	0
AAWI (%)	5.8	3.6	3.0	3.0	4.0	2.6	4.0	4.0	*	3.7	*	4.0	*
Employees	142	202	5995	1179	31181	227	1743	79	6647	961	54	31	0
<b>Finance and insurance</b>	9	6	16	9	12	10	8	7	10	3	4	1	3
AAWI (%)	5.8	2.6	4.3	4.8	4.2	3.5	3.4	3.6	3.2	3.5	3.6	6.5	4.2
Employees	1133	2810	29266	12073	4266	7250	2724	8202	2967	932	584	857	169
<b>Property and business services</b>	27	30	29	24	24	31	33	12	18	7	18	8	12
AAWI (%)	3.9	3.3	4.0	3.5	3.2	3.4	3.7	1.6	3.2	4.2	2.7	3.3	4.0
Employees	2541	3355	12545	2149	2861	2548	9387	820	1269	423	1535	2162	542

<b>Government administration and defence</b>	73	61	89	77	59	36	80	36	26	9	24	5	11
AAWI (%)	3.8	3.4	3.3	3.4	3.2	3.3	4.5	4.1	3.9	3.9	3.4	3.4	3.9
Employees	31652	5445	59664	24713	9078	5200	23921	9468	3661	5873	3495	522	1295
<b>Education</b>	36	30	16	13	36	62	45	23	12	9	6	3	10
AAWI (%)	1.9	2.4	2.8	3.7	3.8	4.3	3.8	4.7	4.5	3.2	2.8	3.7	2.9
Employees	1958	2334	4442	5410	12474	40300	68537	36928	1398	55130	443	593	11680
<b>Health and community services</b>	124	77	123	42	31	28	153	31	31	39	56	15	15
AAWI (%)	3.1	2.8	3.3	2.9	2.6	3.8	3.7	4.7	4.1	4.1	3.8	3.7	3.5
Employees	10653	8356	39876	3043	3636	1932	7014	5995	3074	17595	24692	3712	3639
<b>Cultural and recreational services</b>	13	23	59	17	19	9	16	10	11	0	9	6	7
AAWI (%)	5.1	3.1	3.7	3.7	2.7	3.1	3.5	2.2	4.0	*	2.7	3.0	1.7
Employees	2393	1758	13581	4307	5779	5124	2224	539	2707	0	2615	3241	1399
<b>Personal and other services</b>	11	7	25	24	17	13	8	6	10	5	6	12	7
AAWI (%)	3.0	3.0	2.9	3.2	3.8	4.0	3.2	3.5	2.7	3.0	2.8	3.6	4.7
Employees	802	1748	2755	1592	3306	998	307	832	380	212	334	695	10821
<b>ALL INDUSTRIES</b>	866	731	995	1624	3314	2301	1147	576	476	250	451	262	299
AAWI (%)	3.4	3.3	3.5	3.9	3.7	4.1	3.9	4.1	3.7	3.5	3.7	3.3	3.9
Employees	128391	114066	218529	123289	147009	140156	183811	130271	50140	95815	81199	46537	46252

**Notes:** 1. AAWI = Average Annual Wage Increase per employee

2. Agreement and employee estimates are for all federal wage agreements in the period, while estimates of AAWI per employee are based on quantifiable wage agreements.

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'Government administration' ANZSIC - Division M (Govt admin and defence).

**Source:** Workplace Agreements Database, DEWR, 27 February 2002. All estimates are rounded and are subject to revision. Revisions have been made to historical series.

## AGREEMENT MAKING IN THE FINANCE AND INSURANCE INDUSTRY

This article examines how wages are determined in the finance and insurance industry and the progress of federal collective agreement making, including the average size of agreements, whether agreements are with unions or directly with employees and the wage outcomes provided by agreements. Also included is an examination of the incidence of certain employment conditions, flexible working hours and family friendly provisions in current agreements in this industry, and draws comparisons with agreements in all industries.

### METHODS OF SETTING PAY

There has been a significant decline over the last decade in the proportion of employees whose pay was set by either a State or federal award, from 67.6 per cent of employees in May 1990 to 23.2 per cent of employees in May 2000.<sup>2</sup>

Table 6 shows that, at May 2000, the proportion of finance and insurance employees covered by State or federal awards was much lower, at 5.6 per cent, than the all industry average of 23.2 per cent. The finance and insurance industry had the third lowest proportion of award-reliant employees for the seventeen different industries.

**Table 6: Method of setting pay in the finance and insurance industry compared with the all industry average at May 2000.**

Industry	Awards only	Collective Agreements			Individual Agreements		
		Federal	State	Unregistered	Federal	State	Unregistered
Finance and Insurance	5.6	45.6	2.2	2.1	5.2	0.1	39.1
<i>All Industry Average</i>	<i>23.2</i>	<i>21.7</i>	<i>13.5</i>	<i>1.6</i>	<i>1.0</i>	<i>0.8</i>	<i>38.2</i>

SOURCE: ABS Survey of Employee Earnings and Hours, Catalogue 6306.0, May 2000.

Unpublished ABS Survey of Employee Earnings and Hours data, May 2000.

The other feature of the finance and insurance industry is the high proportion of employees whose pay is set by a registered *federal* collective agreement. After communication services (69.0 per cent) and government administration and defence (49.0 per cent), the finance and insurance industry had the third highest proportion of employees whose pay is set by federal enterprise agreements in May 2000.

<sup>2</sup> In March 2001, the Australian Bureau of Statistics published final data from its survey of Employee Earnings and Hours (ABS, EEH Survey, Catalogue 6203.0). The survey provided valuable new information about how employee's pay was set in the nearest pay period occurring on or before 19 May 2000.

The finance and insurance industry had the fifth highest proportion (49.9 per cent) of employees paid by collective agreements, including registered and unregistered bargaining, in the States or federal jurisdiction.

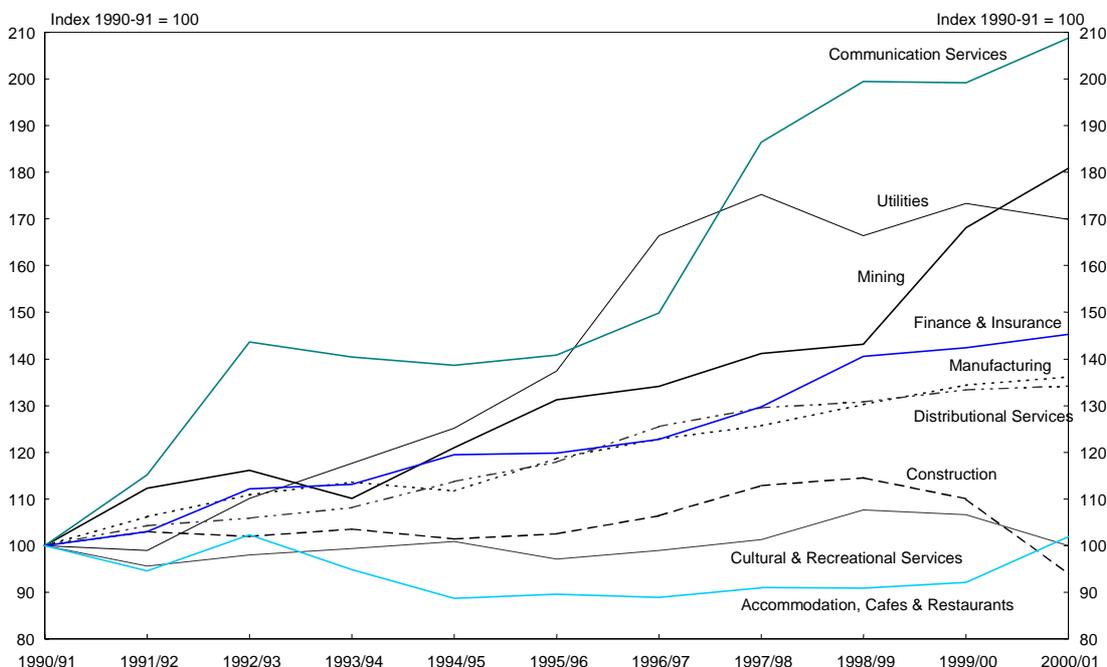
It is worth noting that a decline in the number of employees covered by current federal wage agreements occurred after the EEH Survey was conducted in May 2000. This decline was due to three major banking agreements expiring and not yet having certified replacement agreements.

## PRODUCTIVITY

The *Workplace Relations Act 1996* (WR Act) encourages all types of workplace level agreement making as it enables agreements to be tailored to the needs of each workplace and wage outcomes to be linked to increases in efficiency and/or productivity, benefiting both employers and employees.

Chart 6 indicates that the finance and insurance industry has experienced steady gains in productivity over the last decade. When compared to other industries, federal certified agreements in finance and insurance have the highest proportion of productivity related wage provisions. In addition, the four industries with the lowest levels of award reliance (ie communication services, utilities, mining and finance and insurance) had the largest increases in gross product per hour worked.

**Chart 6: Gross product per hour worked by industry, 1990-91 to 2000-01**



SOURCE: ABS, National Accounts, Catalog 5204.0-1.19.

NOTE: Distributional Services consists of wholesale trade, retail trade and transport and storage. The Utilities category includes electricity, gas and water supply.

## SPREAD AND COVERAGE OF AGREEMENT MAKING

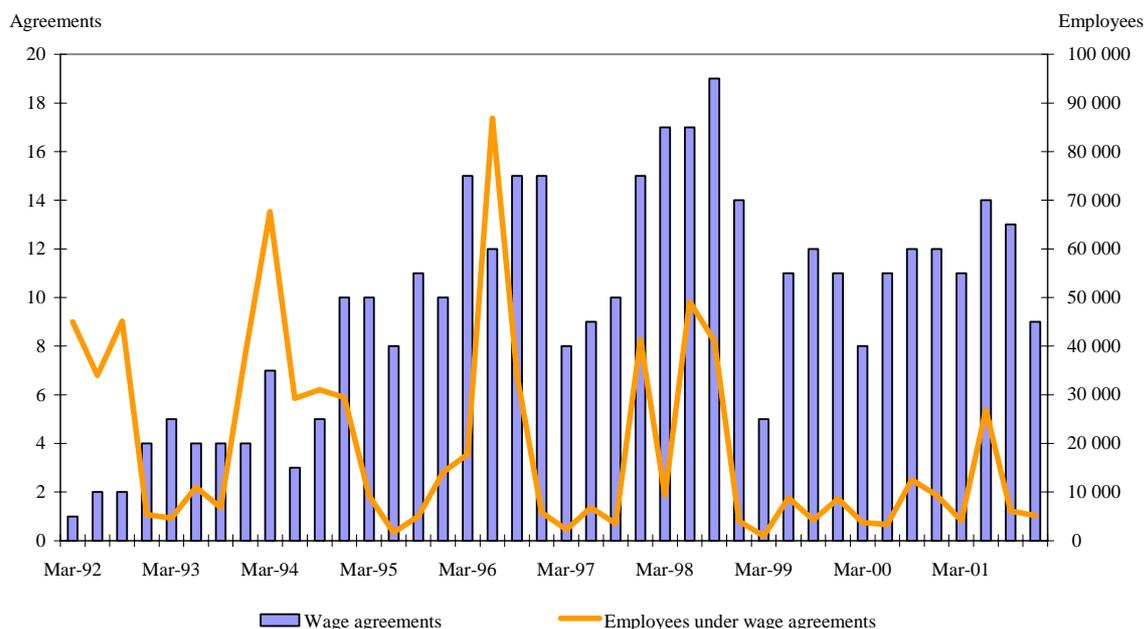
The finance and insurance industry is typified by a small number of agreements covering a large number of employees.

### Agreements certified during each quarter

Chart 7 shows the number of registered federal collective wage agreements in the finance and insurance industry, certified each quarter and the number of employees covered by those agreements.<sup>3</sup>

In the March quarter 1992 the first finance and insurance agreement was certified covering an estimated 45 000 employees. A pattern of lower than average numbers of agreements certified with higher than average employee coverage occurs in many of the subsequent quarters.

**Chart 7: Growth in the quarterly certification of finance and insurance industry agreements, March quarter 1992 – December quarter 2001**



SOURCE: Workplace Agreements Database (WAD), DEWR.

The industry experienced two key periods of agreement certifications in 1996 and 1998 followed by a period of more evenly spread certifications in 2000 and 2001. The cycle is quite pronounced in the employee series, with high levels in 1992, 1994, 1996 and 1998 followed by a smaller spike in June 2001. This pattern was caused by the renegotiation cycles of the four major banks with three of the major banks certifying in three different quarters in 1992; three of the banks making agreements in 1994; and all four of the major banks making agreements in 1996 – three in the June quarter 1996.

The December quarter 1997 recorded the next major round of agreement making with the other major banks certifying in the June and September quarters of 1998. The last of the major bank certifications occurred in the June quarter 2001.

<sup>3</sup> 'Wage agreements' are agreements that include provisions stipulating employees' wages and exclude agreements that refer to conditions only. Superannuation agreements and salary packaging agreements are common 'conditions only' agreements. These agreements are frequently made in addition to pre-existing wage agreements. To avoid double counting of employees covered by agreements, data released from the Workplace Agreements Database (WAD) is frequently expressed in terms of wage agreements.

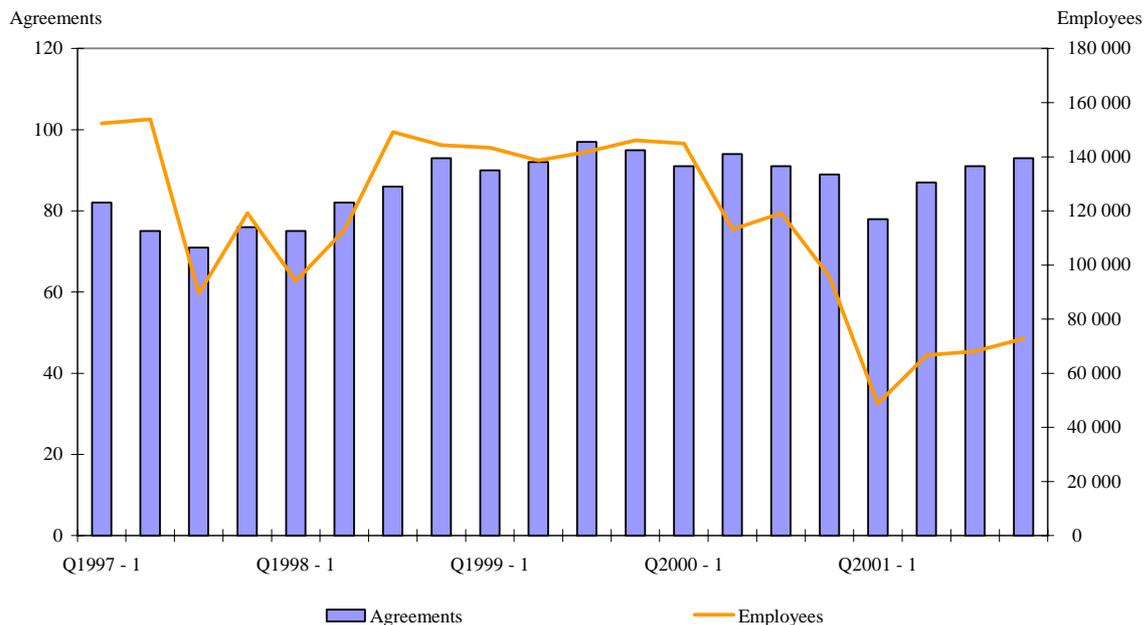
The increasing periods between renegotiations reflect the growth in average agreement durations with the average employee weighted duration for all agreements certified in the quarter increasing from 1.5 years in the September and December quarters of 1993 to 2.3 years in the December quarter 2001.

### Current agreements

A less volatile measure of agreement making than the number of agreements certified each quarter, is the number of current agreements<sup>4</sup> at any given point in time. The number of current federal wage agreements in the finance and insurance industry has remained relatively stable since 1997, ranging between 71 and 97 agreements current on the last day of each quarter. Some agreements, which were certified in 1997 and 1998, are still current, resulting in the relatively consistent agreement series.

However, the number of employees covered by current federal wage agreements has fallen since March 2000. The renegotiation cycle of the large banking agreements is evident in the employee series reflected in reduced employee coverage in the September quarter 1997 and the March quarter 1998. These reductions were attributable to the expiry of major banking agreements, which were subsequently renegotiated.

**Chart 8: Growth in wage agreements current on the last day of each quarter, March quarter 1997 – December quarter 2001**



SOURCE: Workplace Agreements Database (WAD), DEWR.

Chart 8 indicates a reduction in employee coverage beginning in the June quarter 2000. While there was a limited recovery in the June quarter 2001, by the end 2001 the number of employees covered was less than half its previous level. This again reflects the impact of the four major banks. While one of these banks negotiated a new agreement in the

<sup>4</sup> Current agreements are those which have neither passed their formal expiry date nor been terminated.

June quarter 2001, the other three banks have not yet certified replacement agreements. In the interim, all three banks have made informal agreements to provide pay increases to employees and one of the banks intends to continue with this arrangement. The two other banks continue to negotiate towards replacement certified agreements.

### **First time agreements**

The number of first time agreements in the federal system is an indicator of the continuing spread of agreement making. At 31 December 2001, 28 per cent of current finance and insurance wage agreements were first time agreements, covering 11 per cent of employees. For all current wage agreements at 31 December 2001, 42 per cent were first time agreements, covering 16 per cent of all employees covered by current wage agreements.<sup>5</sup>

When compared to other industries, the finance and insurance industry had the fourth lowest proportion of current first time agreements and the third lowest proportion of employees covered by such agreements. Together with the low levels of award reliance these two characteristics reflect a more 'mature' approach to federal agreement making than in most other industries.

#### ***Case study A : a first time greenfields finance and insurance agreement***

This case study examines a first time agreement that is also a greenfields agreement certified under section 170LL of the WR Act. Greenfields agreements are always first time agreements and are primarily intended for employers - in this case a community bank - proposing to establish a new business and yet to engage employees. The agreement has a duration of just over 12 months.

The agreement stipulates that an employee's rate of pay will be reviewed annually within two months of the anniversary date. This review will be based on performance. In any event, the rate of pay will be increased by any relevant Safety Net Decisions of the Australian Industrial Relations Commission made after the commencement of this agreement.

Another current agreement in finance and insurance also automatically provides for safety net increases, provided by an almost identical clause as the case study agreement. This second agreement was also certified under section 170LL and operates in the same State as the case study agreement.

<sup>5</sup> The proportions of first time agreements are of current federal wage agreements **that have been checked for replacement data**. In the December quarter 2001 the proportion of current federal wage agreements that had been checked for replacement data was 76 per cent the finance and insurance industry (covering 98 per cent of employees in that industry) and 46 per cent for all industries (covering 87 per cent of employees in all industries).

## CHARACTERISTICS OF FEDERAL AGREEMENTS IN FINANCE AND INSURANCE

### Wage agreements under sections of the WR Act

The WR Act provides for agreements to be made with employee organisations or directly with employees. Table 2 indicates that a much higher proportion (40.9 per cent) of current finance and insurance industry agreements were made directly with employees under section 170LK than for all industries (15.4 per cent). The disparity is less apparent in the proportion of employees (17.8 per cent and 9.9 per cent respectively).

Current finance and insurance agreements certified under section 170LK cover an average of 341 employees and agreements made under sections LJ, LL, LN or MA, covered an average 1088 employees. These figures are considerably higher than for all agreements where section 170LK agreements covered an average 73 employees and section LJ, LL, LN or MA agreements covered an average 121 employees.

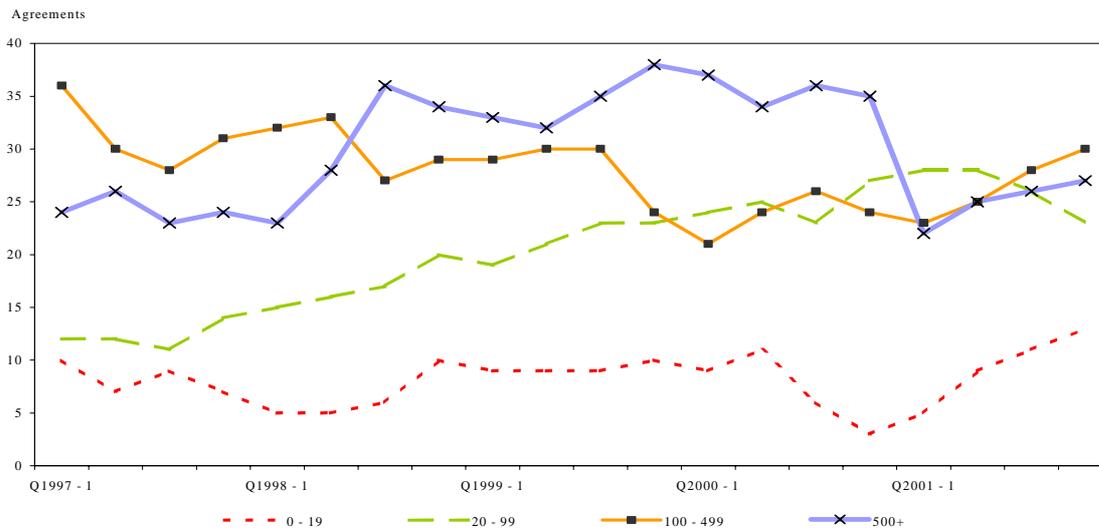
**Table 7: Federal certified wage agreements by section, current at 31 December 2001.**

Section Code	Finance and Insurance				All Current Agreements			
	Agreements (number)	Agts (%)	Employees (number)	Emps (%)	Agreements (number)	Agts (%)	Employees (number)	Emps (%)
170LJ	43	46.2	57 215	78.5	8 389	66.0	1 028 110	71.4
170LK	38	40.9	12 973	17.8	1 954	15.4	142 860	9.9
170LL	3	3.2	358	0.5	632	5.0	18 939	1.3
170LN	9	9.7	2 312	3.2	1 731	13.6	199 892	13.9
170MA	0	0.0	0	0.0	3	0.0	49 690	3.5
<i>Total</i>	<i>93</i>	<i>100.0</i>	<i>72 858</i>	<i>100.0</i>	<i>12 709</i>	<i>100.0</i>	<i>1 439 491</i>	<i>100.0</i>

SOURCE: Workplace Agreements Database (WAD), DEWR.

### Size of agreements (number of employees covered)

Chart 9 shows the distribution by size of current finance and insurance industry agreements since the introduction of the WR Act. The chart shows a steady increase in the number of current medium sized agreements (20 – 99 employees) since the introduction of the WR Act with only a small reduction in the second half of 2001. The numbers of larger agreements has been more volatile with a small overall reduction in the number of current large agreements (100 – 499 employees). The number of very large agreements (500+ employees), after maintaining a high level for two years, has returned to a much lower level. This fall follows the lengthy renegotiation lags for several very large agreements discussed under *current agreements*.

**Chart 9: Growth in current agreements in finance and insurance by size**

SOURCE: Workplace Agreements Database (WAD), DEWR.

Table 8 shows that the average number of employees covered by finance agreements current at 31 December 2001 (783 employees) is just under half the average at 31 December 1997 (1568 employees). The average number of employees for all current wage agreements has also declined over the last four years from 194 to 113. The finance and insurance industry has maintained its position relative to other industries with the third highest average number of employees under current agreements.

**Table 8: The average employee coverage of agreements current at 31 December 1997 and 31 December 2001 by industry**

	Agreements current at 31 December 1997			Agreements current at 31 December 2001		
	Agreements	Employees	Average	Agreements	Employees	Average
Agriculture, forestry & fishing	14	1 489	106	74	6 817	92
Mining	199	17 324	87	238	16 580	70
Manufacturing	1930	194 160	101	2 599	195 087	75
Electricity, gas & water supply	96	19 236	200	119	18 549	156
Construction	1479	28 110	19	5 943	76 195	13
Wholesale trade	50	4 248	85	71	6 048	85
Retail trade	109	202 805	1 861	343	235 419	686
Accommodation, cafes & restaurants	42	20 038	477	134	21 050	157
Transport & storage	597	110 233	185	981	88 259	90

Communication services	14	48 132	3 438	38	48 399	1 274
<b>Finance &amp; insurance</b>	<b>76</b>	<b>119 185</b>	<b>1 568</b>	<b>93</b>	<b>72 858</b>	<b>783</b>
Property and business services	134	17 734	132	251	41 118	164
Government administration & defence	449	104 618	233	543	178 731	329
Education	117	141 171	1 207	289	241 043	834
Health & community services	217	44 741	206	660	125 591	190
Cultural & recreational services	182	38 601	212	189	43 562	230
Personal & other services	95	13 805	145	144	24 185	168
<i>All industries</i>	<i>5 800</i>	<i>1 125 630</i>	<i>194</i>	<i>12 709</i>	<i>1 439 491</i>	<i>113</i>

SOURCE: Workplace Agreements Database (WAD), DEWR.

## WAGE OUTCOMES

### *Quantifiable and non-quantifiable wage agreements*

Estimates of average wage increases are calculated for those federal wage agreements that paid *quantifiable* increases. Wage agreements for which average percentage increases could not be quantified (eg those agreements providing increases based on future Consumer Price Index increases or those agreements providing for performance based pay) are excluded from these estimates. Table 9 shows that the proportion of wage agreements that are quantifiable is lower for the finance and insurance industry than for all industries. Very high rates of performance pay provisions in the industry have contributed to this result.

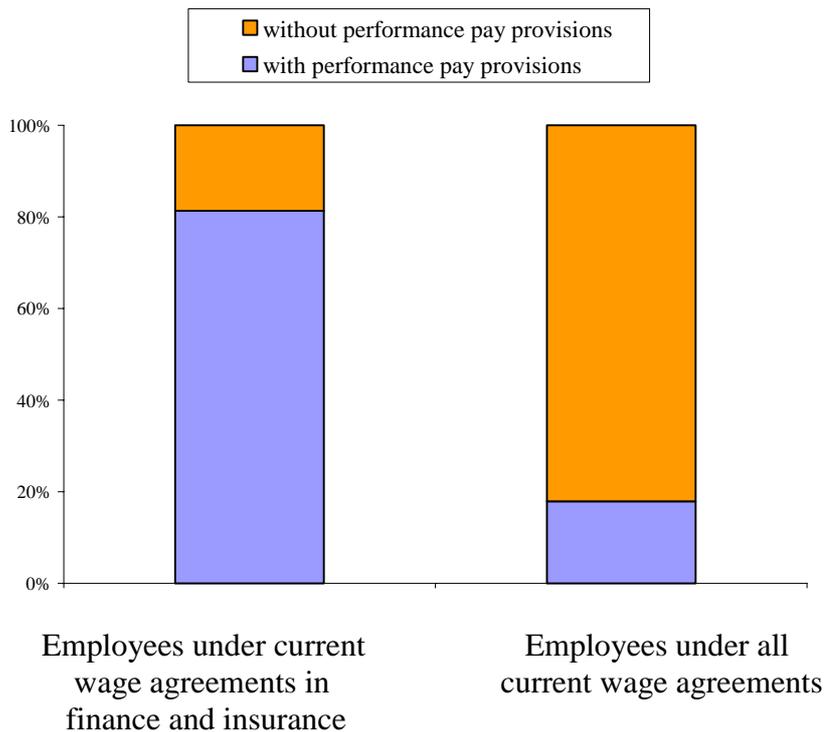
**Table 9: All current agreements quantifiable federal wage agreements**

Industry	Proportion of current agreements that are wage agreements		Proportion of current agreements that are quantifiable wage agreements	
	Agts (%)	Emps (%)	Agts (%)	Emps (%)
Finance and insurance	96.9	93.7	65.6	75.8
All industries	97.4	96.2	79.2	88.5

SOURCE: Workplace Agreements Database (WAD), DEWR.

As the June quarter 2001 *Trends in Federal Enterprise Bargaining* special feature indicated, the finance and insurance industry had the highest proportion of current wage agreements containing performance pay provisions of all industries. This remains the case for all current wage agreements in finance and insurance at 31 December 2001, with 42 per cent containing some type of performance pay provision, covering 81 per cent of employees. Only 7.8 per cent of all current wage agreements contained performance pay provisions, covering 17.9 per cent of employees. Chart 10 illustrates this comparison.

**Chart 10: Performance pay provisions in federal wage agreements current at 31 December 2001**



Source: Workplace Agreements Database, DEWR.

***Case study B: Performance pay provisions***

The following is a summary of remuneration provisions from a section 170LJ insurance agreement certified early in 2001 with a duration of just under two years. It provides an example of options that can be adopted in agreements to link productivity and performance. Wage increases granted under the agreement are not specified but are to be determined using the agreements' tiered remuneration system. This emphasis on performance linked remuneration is common in the finance and insurance industry.

The enterprise is committed to a tiered remuneration system that encompasses; individual performance reward, market adjustments, incentives; reward schemes; and a Remuneration Review Committee. In order to facilitate these objectives, remuneration is made up from four different components.

1. Salaries are adjusted annually with salary levels determined by
  - \* the employee's performance;
  - \* movement in the salary/job family range and external market data;
  - \* the employee's position within the range and external market data;
  - \* budget objectives;
  - \* time since last review;
  - \* business unit plans;
  - \* business performance
2. Bonuses play an important part in staff remuneration.
3. Employees may earn incentives to a maximum of 10% of their total salary based on a combination of organisational and/or business unit and/or team and/or individual performance.
4. The enterprise provides an individual recognition component valued at 1% of the total salary bill that will operate in addition to the above processes of reviewing total salary.

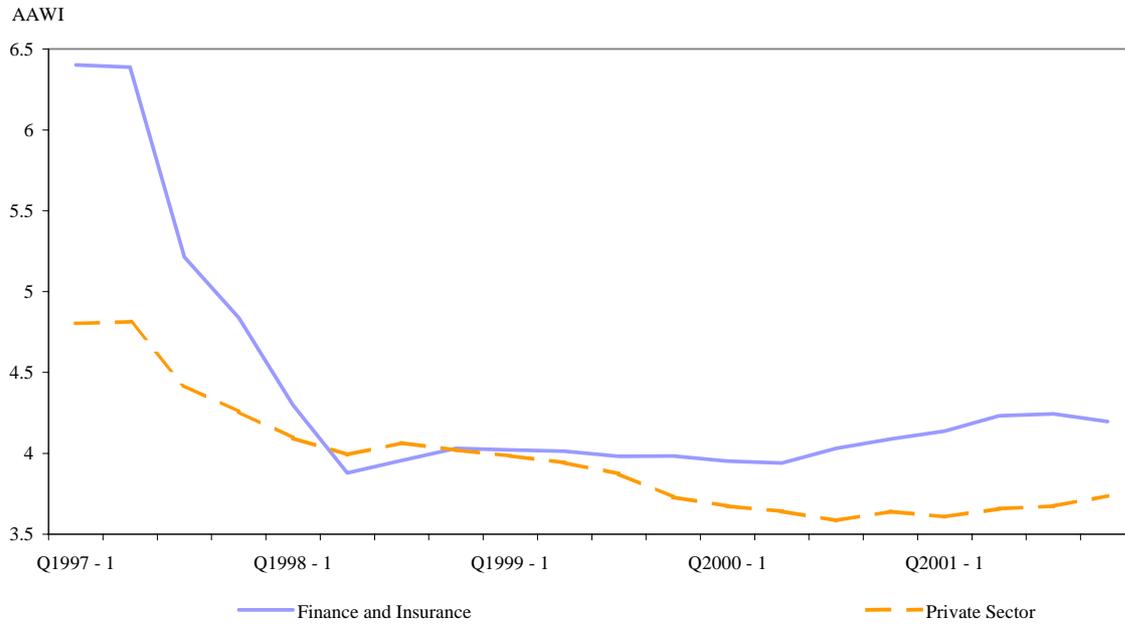
**AAWIs for current agreements**

As Chart 11 indicates, in the period since the introduction of the WR Act current agreement AAWIs per employee in finance and insurance have generally been higher than for all private sector agreements. Only in the June and September quarters of 1998 were AAWIs in finance and insurance below those for the private sector. The lower AAWI for current agreements in these two quarters was the result of the expiry of a major banking agreement that provided more than 25 000 employees an AAWI of 5.4 per cent.<sup>6</sup>

<sup>6</sup> *Trends in Federal Enterprise Bargaining* reports the AAWI **per employee**. This measure is calculated by weighting the AAWI per agreement by the number of employees covered by that agreement. While it is possible to average the AAWIs of a set of agreements to provide an AAWI **per agreement**, this measure tends to distort the AAWI by allowing agreements with a single employee to make the same contribution to the measure, as agreements covering tens of thousands of employees. The AAWI **per agreement** of finance

While both series declined in the first part of the period, the decline in finance and insurance wage outcomes was markedly steeper than the private sector overall. This reflects the wage and expiry patterns of the four major banks. In the December quarter 1997 a major banking agreement covering more than 27 000 employees expired after providing employees wage increases of 6.0 per cent per year.

**Chart 11: AAWIs per employee in the finance and insurance industry**



SOURCE: Workplace Agreements Database (WAD), DEWR.

In addition, two major banking agreements expired during the September quarter 1997.<sup>7</sup> One of these agreements covered over 25 000 employees and provided a high AAWI of 7.0 per cent. The second agreement covered more than 35 600 employees and provided an AAWI of 8.8 per cent – the third highest recorded AAWI for agreements with more than 500 employees that were current at, or certified after, 1 January 1997.

More recently, AAWIs for current finance and insurance agreements have been more consistent with those in the private sector. In the last three quarters of 2001 the AAWI for current private sector agreements has been 3.7, 3.7 and 3.8 per cent per employee while the AAWI for current finance and insurance agreements has been unchanged at 4.2 per cent per employee.

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and insurance agreements current at 31 December 2001 is 3.5 per cent per agreement down 0.1 percentage points from the September quarter AAWI of 3.6 per cent per agreement.

<sup>7</sup> An agreement that expires on a given date is deemed to be current on that date – these agreements were current on the last day of the June quarter – 30 June 1997 and not current on the last day of the September quarter 1997

**Case study C: A section 170LK finance and insurance agreement providing a high AAWI and including a 'Vision statement'.**

This large agreement was certified under Section 170LK and provides an AAWI of 7.0 per cent for just under 600 employees. The agreement is focussed on productivity and includes details of the enterprises' values.

The inclusion of vision statements, enterprise values, and agreement aims within collective agreements has become increasingly common in agreement making. Finance and insurance industry agreements may use these statements to articulate enterprise goals and focus the agreement on desired productivity outcomes.

“This agreement has been produced by a 'Core Team' of employees from throughout Australia. Their purpose was to bring forward views a[nd] recommendations from all employees to establish an Agreement that would [create a] positive and innovative working environment and position us to be the most competitive in our market place.

**LOOKING AFTER OUR PEOPLE - BEING 'THE EMPLOYER OF CHOICE'**

**Our Values**

We believe our leaders:-

- \* Are passionately focused on driving customer success
- \* Live Six Sigma Quality, ensure that the customer is always its first beneficiary and use it to accelerate growth
- \* Insist on excellence and are intolerant of bureaucracy
- \* Act in a boundaryless fashion, always search for and apply the best ideas regardless of their source
- \* Prize global intellectual capital and the people that provide it build diverse teams to maximise it
- \* See change for the growth opportunities it brings
- \* Create a clear, simple, customer-centred vision and continually renew and refresh its execution
- \* Create an environment of 'stretch', excitement, informality and trust, reward improvements and celebrate results
- \* Demonstrate always with infectious enthusiasm for the customer the 4-E's of leadership: the personal Energy to welcome and deal with the speed of change, the ability to create an atmosphere that Energizes others, the Edge to make difficult decisions and the ability to consistently Execute.”

**AAWIs for agreements certified during the quarter**

The AAWI provided by finance and insurance wage agreements certified in the December quarter 2001 was 3.7 per cent per employee, down 0.4 percentage points from the September quarter AAWI of 4.1 per cent per employee. The AAWI for all private sector wage agreements certified in the December quarter was unchanged from the September quarter AAWI of 3.8 per cent per employee.

These data are based on only nine wage agreements that were certified in the finance and insurance industry during the December quarter 2001, covering just 5 100 employees. The renegotiation of a single expired major banking agreement would effect five times

that number of employees and impact on AAWIs for agreements certified in the quarter and current agreements for this industry.

## EMPLOYMENT CONDITIONS

### Main provisions

Table 10 compares the incidence of main provisions in agreements in the finance and insurance industry with the incidence across all industries. Hours of work provisions and training provisions are the most popular included in certified agreements, and this is also the case in the finance and insurance industry agreements. However, the outcomes are different for several provisions, notably long service leave, equity provisions, parental leave, consultative arrangements and occupational health and safety. The generally higher incidence of core conditions such as hours and leave provisions may in part be due to the larger proportion of comprehensive agreements<sup>8</sup> in the finance and insurance industry (seventeen per cent) compared to total agreements (seven per cent).

**Table 10: General provisions in current certified agreements at 31 December 2001**

	Finance and insurance	All industries
<i>General provisions</i>	<i>% of agreements</i>	<i>% of agreements</i>
Long service leave	79	45
Annual leave	84	68
Personal/careers leave	84	81
Overtime	93	72
Salary provisions	47	40
Public holidays	79	68
Trade union	60	71
TCR	85	82
OHS	61	85
Labour relations equity	64	38
Consultative arrangements	44	70
Superannuation	76	83
Parental leave	35	8
Contract labour	86	85
Hours of work	95	90
Shift work	60	50
Work/performance indicators	83	92
Training	95	93
<b>Total agreements (number)</b>	<b>96</b>	<b>12994</b>

Source: Workplace Agreements Database, DEWR

Table 10 shows that parental leave is the least common provision in agreements, both across all industries and the finance and insurance industry. This outcome may arise through organisations relying on other mechanisms to provide the entitlement such as the WR Act, which provides unpaid leave after 12 months continuous service, and public

<sup>8</sup> The agreement is all inclusive of the terms and conditions of employment. The agreement will operate to the exclusion of all previous agreements or awards.

sector employees generally having an entitlement to paid parental leave from legislation. That said, parental leave was four times more likely to be included in finance and insurance agreements, (35 per cent compared to eight per cent), which may in part reflect the greater concentration of female employees covered by federal certified agreements in this industry (69 per cent compared to 47 per cent across all industries).<sup>9</sup>

Table 10 shows that consultative arrangements were the second least common provisions in finance and insurance agreements at 44 per cent. This is much lower than for all industries (70 per cent), which may reflect the greater incidence of non-unionised agreements in the finance and insurance industry where formal consultation procedures and representation are less common. (See Table 11).

**Table 11 - Section type distribution of current agreements at 31 December 2001**

	Finance and insurance		All industries	
	<i>% of agreements</i>	<i>% of employees</i>	<i>% of agreements</i>	<i>% of employees</i>
170LJ	46	75	65	73
170LK	41	17	16	10
170LL	3	*	5	1
170LN	10	8	13	15

Source: Workplace Agreements Database, DEWR

\* less than 0.5 per cent

### **Flexible hours**

Hours of work are one of the most common groups of provisions in collective agreements. Table 11 examines the incidence of a range of working hour provisions that have the potential to provide flexibility for employees. A number of these flexible working hour provisions were included in agreements in the finance and insurance industry to a greater extent than all agreements, for example, provisions enabling negotiation of hours are twice as likely to be included in finance and insurance agreements as in all industry agreements.

<sup>9</sup> This dataset of agreements is limited to those agreements where the number of female employees in collective agreements is known. (53 per cent of all agreements that expire after the 31/12/01)

**Table 12: Flexible working hour provisions in current certified agreements at 31 December 2001**

<i>Flexible working hour provisions</i>	Finance and insurance	Total agreements
	<i>% of agreements</i>	<i>% of agreements</i>
Make up time	14	7
TOIL at ordinary rates	49	11
TOIL at penalty rates	21	6
Hours of work averaged over extended period	8	4
Compressed working week	1	2
Start and finish times flexible	8	3
Flexitime system	15	3
Hours of work may be negotiated	29	13
Hours decided by a majority of employees	2	9
Banking/accrual of RDO's	9	41

Source: Workplace Agreements Database, DEWR

### Family friendly provisions

Table 13 shows that finance and insurance industry agreements were more likely to contain a number of family-friendly provisions compared to the total of all industries. Provisions such as family carers leave, regular days/hours rostered for part-time workers, access to other leave for family caring purposes, paid maternity leave and job sharing were among the provisions that were much more prominent in the finance and insurance industry agreements.

**Table 13: Family friendly provisions in current certified agreements at 31 December 2001**

<i>Family friendly provisions</i>	Finance and insurance	Total agreements
	<i>% of agreements</i>	<i>% of agreements</i>
Flexible/facilitative annual leave	10	6
Access to single days annual leave	19	13
48/52 career break/purchased leave	14	3
Sick leave unlimited	2	1
Family carers leave	76	27
Extended unpaid parental leave	17	2
Regular hours/days rostered for part-time work	30	7
Home based work	14	1
Family responsibility provisions	17	3
Child care provisions	8	1
Access to other leave for family caring purposes	52	18
Paid family leave	16	3
Paid maternity leave	29	7
Paid paternity leave	19	4
Paid adoption leave	14	2
Job sharing	35	3

Source: Workplace Agreements Database, DEWR

Table 14 shows that finance and insurance industry agreements were also twice as likely as all agreements to contain at least one family friendly with two agreements containing twelve family provisions (“HIC (Business Improvement) Certified Agreement 2001-2003” and “VicSuper Pty Ltd Certified Agreement 2001”).

Table 14 also shows that organisations in the finance and insurance industry are including family friendly provisions in agreements regardless of their size (88 per cent of agreements covering 89 per cent of employees). In contrast, for all agreements, these provisions are far more likely in larger organisations (44 per cent of agreements covering 80 per cent of employees).

**Table 14: Multiple family friendly provisions in current certified agreements at 31 December 2001**

<i>Number of Provisions</i>	Finance and insurance		All Industries	
	<i>% of agreements</i>	<i>% of employees</i>	<i>% of agreements</i>	<i>% of employees</i>
12	2	6	#	#
11	2	7	*	1
10	1	9	*	1
9	#	#	*	1
8	4	12	*	4
7	7	5	1	4
6	5	3	1	9
5	14	33	2	14
4	17	5	4	10
3	14	4	8	8
2	13	3	10	12
1	9	3	13	14
<b>TOTAL</b>	<b>88</b>	<b>89</b>	<b>41</b>	<b>80</b>

Source: Workplace Agreements Database, DEWR

# no agreements recorded

\* less than 0.5 per cent

Table 15 shows a number of provisions in agreements in the finance and insurance industry are evenly distributed according to organisational size, for example, paid maternity leave, access to other leave for family caring purposes, and flexible/facilitative annual leave.

**Table 15 - Family friendly provisions in finance and insurance in current agreements, by organisational size at 31 December 2001**

	<b>1-19 employees</b>	<b>20-99 employees</b>	<b>100-499 employees</b>	<b>500+ employees</b>
<i>Family Friendly Provision</i>	<i>% of agreements</i>	<i>% of agreements</i>	<i>% of agreements</i>	<i>% of agreements</i>
Flexible/facilitative annual leave	15	9	10	10
Access to single days annual leave	15	13	13	31
48/52 career break/purchased leave	#	#	6	38
Sick leave unlimited	#	#	3	3
Family carers leave	62	78	74	83
Extended unpaid parental leave	8	22	10	24
Regular hours/days rostered for part-time work	15	22	29	45
Home based work	#	9	13	24
Family responsibility provisions	8	22	13	21
Child care provisions	8	9	3	14
Access to other leave of family caring purposes	54	48	52	55
Paid family leave	15	13	10	24
Paid maternity leave	31	26	26	34
Paid paternity leave	15	17	16	24
Paid adoption leave	8	4	16	21
Job sharing	8	26	39	52
<b>Total</b>	<b>14</b>	<b>24</b>	<b>32</b>	<b>30</b>

Source: Workplace Agreements Database, DEWR

# no agreements recorded

***Case study D: Provisions designed to assist in the work/life balance***

A recently certified agreement in finance and insurance incorporates numerous working life factors. This agreement covers over 4000 employees and contains a combination of 12 family friendly provisions from Table 8 and five flexible working hour provisions from Table 7.

Part F of the agreement “Achieving a Better Work/Life Balance” contains initiatives such as a healthy lifestyle subsidy and a vacation childcare subsidy. The healthy lifestyle subsidy permits the managing director to subsidise an eligible permanent employee up to \$100 per calendar year to assist in meeting health program costs and/or membership. Programs include gymnasium and swimming pool fees, quit smoking fees, dietary memberships and swimming lesson fees.

The employer will subsidise school holiday care during December/January school holidays for children of employees who have applied for leave during operational requirements. The maximum payment that may be made is \$100 per week per employee.

Enterprise bargaining encourages tailoring of agreements to suit the needs of an organisation within an industry. The finance and insurance industry agreements differ

significantly in their coverage of issues to overall industry agreements and show less variation across different size agreements than is generally the case. Factors for such differences may include the comprehensiveness of finance and insurance agreements and the higher concentration of females within the industry. Finance and insurance agreements are more likely to include a range of flexible hours provisions and family friendly provisions.

**ARTICLE CONTACT DETAILS:** Phil Crotty (02)61217625 or Chris D'Souza (02)61216217.

**TECHNICAL NOTES****The Workplace Agreements Database**

The Workplace Agreements Database (WAD) is maintained by the Workplace Relations Policy & Legal Group of the Department of Employment and Workplace Relations (DEWR). The WAD contains information on all known federal enterprise agreements which have been certified or approved by the Australian Industrial Relations Commission (AIRC) since the introduction of enterprise bargaining in August 1991. The WAD covers general details (such as sector, ANZSIC, duration, employees covered), wage details (quantum and timing of increases), and employment conditions. Information entered on the WAD is derived from copies of federal agreements lodged with the Australian Industrial Registry.

**Employee coverage**

Information on the number of employees covered by an agreement is drawn from the statutory declarations provided to the AIRC by the parties, along with AIRC transcripts and decisions, and employer contacts.

Actual employee numbers are known for 90 per cent of all new agreements certified in the December quarter 2001. Where an agreement's employee coverage is not known and the agreement replaces an earlier agreement where employee coverage is known, the employee coverage of the earlier agreement is used. For those agreements still lacking employee coverage a 'modified mean' is used to estimate employee coverage. The modified mean is generated for each industry group for the preceding year removing the largest 5 per cent and smallest 5 per cent of agreements, and then calculating the mean of the remainder.

**Duration of agreements**

The WAD uses the 'effective duration' of each agreement rather than formal duration (that is, the period from certification to expiry) to measure agreement duration. The effective duration of a wage agreement is the difference in months between: (1) certification and expiry date, (2) commencement and expiry date, or (3) the date of the first wage increase and expiry date, whichever period is the greatest. Those few agreements with a formal duration of less than one year are deemed to have an effective duration of 12 months.

**Average annualised wage increases**

Estimates of average wage increases are calculated for those federal wage agreements that paid *quantifiable* increases. Wage agreements whose average percentage increase could not be quantified (eg, those introducing a new salary structure) are excluded from these estimates.

For quantifiable wage agreements, the *average annualised wage increase (AAWI) per agreement* 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) and (2) annualising the total percentage wage increase by dividing it by the effective duration and multiplying it by 12.

AAWI per agreement provides only a simple unweighted average and tends to overstate the average wage increase received by employees. For this reason *Trends in Federal Enterprise Bargaining* reports the *average annualised wage increase (AAWI) per employee*, which is calculated by weighting AAWI per agreement by the number of employees covered by that agreement.

The *all current* wage estimates are the AAWI per employee for all quantifiable federal wage agreements that are current on the last day of the quarter. Current agreements are those agreements that have been certified but have neither been terminated nor expired at a given point in time. An agreement that expires on a given date is deemed to be current on that date.

Estimates of AAWI generally exclude increases paid in the form of conditional performance pay, one-off bonuses, profit sharing or share acquisition, as these data cannot readily be either quantified or annualised. This, along with the use of a simple rather than compound percentage wage increase, may result in a small under-estimation of average wage increases.

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## **NEW RESEARCH CITED IN CH.3 OF SUBMISSION**



## NEW RESEARCH CITED IN CH.3 OF SUBMISSION

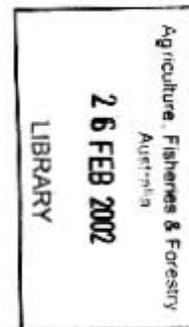
*Applied Economics*, 2001, 33, 285–300



## *The minimum wage and teenage employment: evidence from time series*

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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.<sup>1</sup> 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.

<sup>1</sup> 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 Krueger (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).

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 unemployment 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:

$$E_t = \beta_1 MW_t + X_t \beta_2 + \varepsilon_t \quad (1)$$

$$\varepsilon_t = \rho \varepsilon_{t-1} + u_t, u_t \sim N(0, \sigma^2) \quad (2)$$

where  $E_t$  is the teenage employment rate at date  $t$ ,  $MW_t$  is a measure of the minimum wage, and  $X_t$  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 Kaiz 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.<sup>2</sup>

Following the previous literature, the minimum wage is measured using the Kaiz 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,

<sup>2</sup> See Card and Krueger (1995) for further discussion of the previous time-series literature.

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1991; Card and Krueger, 1995) are included. See Appendix Table A1 for variable definitions and sample means.

The Kaitz index is defined as:

$$YK_t = \sum_i \frac{E_{it}}{\sum_i E_{it}} \frac{W_t}{A_{it}} C_{it} \quad (3)$$

where  $W_t$  is the nominal minimum wage at time  $t$ ,  $A_{it}$  is the average hourly earnings in industry  $i$  at  $t$ ,  $E_{it}$  is teenage employment (not the teenage-employment ratio), and  $C_{it}$  is the coverage of the minimum wage in industry  $i$ .<sup>3</sup>

In Table 1, estimates of Equation 1 are presented that use quarterly data with ever lengthening sample periods.<sup>4</sup> 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.<sup>5</sup>

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

Table 1. *Minimum wage coefficients from different sample periods*

Sample period	OLS	Beach-MacKinnon		Cochrane-Orcutt	
	$\beta_1$ (1)	$\beta_1$ (2)	$\rho$ (3)	$\beta_1$ (4)	$\rho$ (5)
1954-1974	-0.1144 (0.0242)	-0.0809 (0.0351)	0.5585 (0.1049)	-0.0928 (0.0349)	0.5343 (0.1054)
1954-1979	-0.1104 (0.0299)	-0.0856 (0.0400)	0.7243 (0.0805)	-0.0987 (0.0426)	0.7231 (0.0709)
1954-1982	-0.0936 (0.0478)	-0.0672 (0.0457)	0.8989 (0.0537)	-0.0907 (0.0458)	0.9395 (0.0432)
1954-1986	-0.0247 (0.0488)	-0.0637 (0.0460)	0.8956 (0.0442)	-0.0876 (0.0464)	0.9089 (0.0354)
1954-1990	0.0435 (0.0468)	-0.0686 (0.0436)	0.9261 (0.0367)	-0.0896 (0.0435)	0.9087 (0.0336)
1954-1993	-0.0497 (0.0477)	-0.0723 (0.0421)	0.9325 (0.0319)	-0.0870 (0.0415)	0.9023 (0.0327)

Notes: Standard errors in parentheses. The dependent variable in the above regressions is the log of the teenage employment rate. Independent variables included are a constant,  $YK$ ,  $UPR$ ,  $SY$ ,  $AFP$ ,  $POP$ , a linear and quadratic time trend, three seasonal dummies and the interaction of the time trends and the seasonal dummies. All variables, except  $SY$  and  $AFP$ , are in logs. Column 1 contains OLS estimates of the coefficient on the Kaitz index, columns 2 and 3 contain Beach-MacKinnon estimates which correct for AR(1) serially correlated errors, and columns 4 and 5 contain Cochrane-Orcutt estimates which correct for AR(1) serially correlated errors.

<sup>3</sup> 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.

<sup>4</sup> 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.

<sup>5</sup> 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.

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.<sup>6</sup> 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.<sup>7</sup>

Enders (1995) provides a convenient framework for the discussion by outlining the following four possibilities. Let  $y_t$  indicate the dependent variable time series and  $x_t$  represent a vector time series of independent variables.<sup>8</sup> If both  $y_t$  and  $x_t$  are stationary, then OLS regressions like Equation 1 will yield consistent estimates. If  $y_t$  and  $x_t$  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  $y_t$  and  $x_t$  are non-

stationary, 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  $y_t$  and  $x_t$  are nonstationary, integrated of the same order, and the residuals are stationary then  $y_t$  and  $x_t$  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.<sup>9</sup>

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.<sup>10</sup> The results in the first two

<sup>6</sup> 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).

<sup>7</sup> 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.

<sup>8</sup> For simplicity of notation a time series will be referred to by its  $t$ th element rather than using more complete notation, such as  $\{x_t\}_{t=-\infty}^{+\infty}$ .

<sup>9</sup> 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.

<sup>10</sup> 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.

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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.<sup>11</sup> 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.

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.<sup>12</sup> 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-

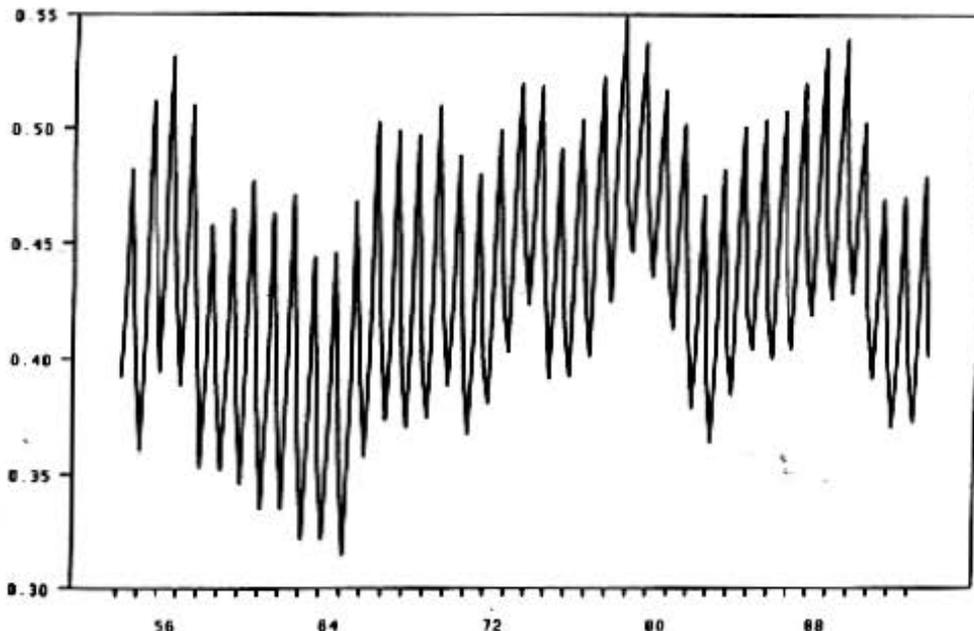


Fig. 1. Teenage employment rate

<sup>11</sup> 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.

<sup>12</sup> 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.

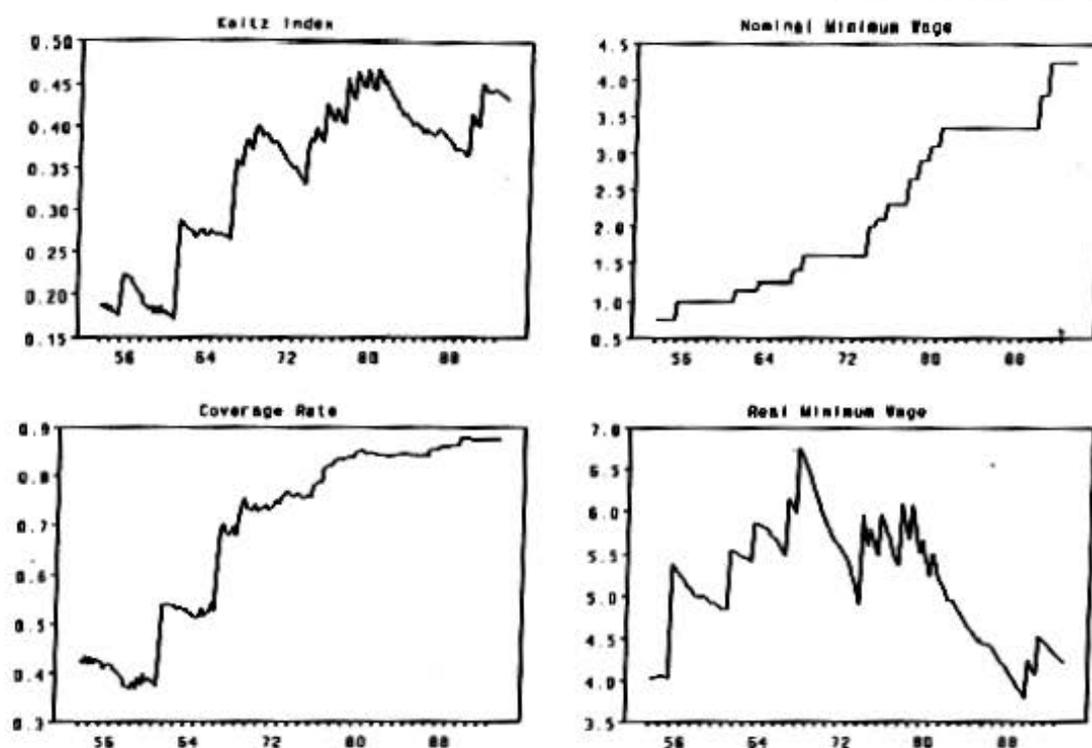


Fig. 2. Time plots of the minimum wage and coverage

Table 2. Unit-root tests for stationarity of variables

Variable	ADF without trend (1)	ADF with trend (2)	PP without trend (3)	PP with trend (4)	Lags (5)	Order of integration (6)
<i>E</i>	-19.441	-29.798	-128.073	-131.742	5	$I(0)$
<i>YK</i>	-4.123	-9.028	-3.472	-7.298	1	$I(1)$
<i>WMANR</i>	-5.706	-3.396	-9.949	-2.217	4	$I(1)$
<i>UPR</i>	-8.973	-14.153	-22.245	-31.048	9	$I(0)$ with trend
<i>SY</i>	-4.701	-154.636	-9.420	-21.994	9	$I(0)$ with trend
<i>AFP</i>	-1.962	-20.686	-2.679	-14.137	1	$I(0)$ with trend
<i>POP</i>	-1.281	-1.421	0.561	-0.481	1	$I(0)$ with trend
<i>POPA</i>	-3.434	0.477	-1.262	1.505	2	$I(0)$ with trend
<i>ENP</i>	-3.215	-7.478	-3.089	-7.283	1	$I(1)$
<i>EMPAM</i>	-3.395	-16.084	-8.229	-36.031	5	$I(0)$ with trend
5% Critical values						
<i>T</i> = 100	-13.7	-20.7	-13.7	-20.7		
<i>T</i> = 250	-14.0	-21.3	-14.0	-21.3		

Notes: This table tests the order of integration for each individual variable using the Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test with lag length chosen by the BIC model selection procedure. An intercept is included in all of the tests and all variables, except *SY* and *AFP*, are in logs. Columns 1 and 3 do not include a deterministic trend in the test; columns 2 and 4 include a deterministic trend. Column 5 indicates the number of lags included in the tests, and column 6 includes our belief about the true process generating each of the series. The 5% critical values are taken from Fuller (1976).

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Ouliaris (1990) tests, no evidence could be found of cointegration between  $YK$ ,  $WMANR$  and  $ENP$ , or between  $MINR$ ,  $COVER$ ,  $WMANR$  and  $ENP$ .<sup>13</sup>

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  $y_t$  and  $x_t$  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.<sup>14</sup> 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.<sup>15</sup> 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:

$$E_t = \rho E_{t-1} + \beta_1 MW_t - \beta_1 \rho MW_{t-1} + \beta X_t - \rho \beta X_{t-1} + u_t \quad (4)$$

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  $E_t$  and  $MW_t$  may be empirically important. While several other studies<sup>16</sup> 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 underdifferencing the minimum wage measure and some of the controls, and overdifferencing the remainder of the controls.<sup>17</sup> 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.

<sup>13</sup> 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).

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

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

<sup>16</sup> See for example, Brown *et al.* (1983) and Neumark and Wascher (1992).

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

#### 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  $E_t$ ,  $MW_t$  and a vector of other covariates  $X_t$ . If we let  $y_t' = [E_t, MW_t, X_t]$  then the VAR system can be written as

$$y_t = c + \Phi_1 y_{t-1} + \Phi_2 y_{t-2} \dots + \Phi_p y_{t-p} + e_t \quad (5)$$

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).<sup>18</sup> In this case, this means that there will be separate equations for  $E_t$ ,  $MW_t$ , and each of the controls. Each of these equations will contain  $p$  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  $e_t$  are contemporaneously correlated, to calculate the variance components and dynamic multipliers it is necessary to

orthogonalize these errors. Let  $E(e_t e_t') = \Omega$ , a positive definite symmetric matrix. One can define  $ADA' = \Omega$ , where  $D$  is a diagonal matrix and  $A$  is lower triangular, and then let  $u_t = Ae_t$ , which implies that the elements of  $u_t$  are contemporaneously uncorrelated.

One can then decompose the total variation in a future value of  $y$ , say  $y_{t+s}$ , by considering the MSE of the estimate  $\hat{y}_{t+s}$ . As  $s \rightarrow \infty$  for a covariance stationary VAR, the MSE of  $\hat{y}_{t+s}$  approaches the unconditional variance of  $y_t$ . Hence this variance decomposition allows one to determine the proportion of the variation  $y_{t+s}$  due to the disturbance  $u_{it}$ . In addition, substituting  $e_t = A^{-1}u_t$  into Equation 5 allows one to simulate the effect of a unit change in an element of  $u_t$  on  $y_t$ . The simulated values for  $y_t$  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).<sup>19</sup>

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  $e_t$ . 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  $e_t$ . 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

<sup>18</sup> 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.

<sup>19</sup> See Hamilton (1994) for details.

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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.<sup>20</sup> Seasonal dummies were included in all specifications due to the strong seasonal component exhibited in teenage employment.<sup>21</sup>

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 typi-

cally 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 overparameterizing, it is thought that 6 lags best fit the data.<sup>22</sup> 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.

Table 3. Exogeneity tests for teenage employment and Kaitz Index

Specification	RHS Variable	LHS Variables							
		2 Lags		4 Lags		6 Lags		8 Lags	
		<i>E</i>	<i>YK</i>	<i>E</i>	<i>YK</i>	<i>E</i>	<i>YK</i>	<i>E</i>	<i>YK</i>
Basic	<i>E</i>	215.1339 (0.0000)	1.3195 (0.2705)	175.7216 (0.0000)	1.9066 (0.1132)	135.2474 (0.0000)	1.6558 (0.1379)	92.9689 (0.0000)	1.6482 (0.1199)
	<i>YK</i>	3.2726 (0.0408)	3.2786 (0.0406)	3.5644 (0.0086)	2.2312 (0.0691)	2.4546 (0.0284)	2.2935 (0.0395)	2.1273 (0.0393)	1.4970 (0.1669)
Basic + <i>EMPAM</i> + <i>WMANR</i>	<i>E</i>	218.4233 (0.0000)	1.1796 (0.3105)	180.9826 (0.0000)	3.1531 (0.0166)	133.7875 (0.0000)	2.5028 (0.0264)	90.8607 (0.0000)	1.5364 (0.1558)
	<i>YK</i>	3.3217 (0.0390)	2.3308 (0.1010)	2.9893 (0.0215)	1.7595 (0.1414)	2.5237 (0.0253)	1.8019 (0.1056)	2.5358 (0.0155)	1.1397 (0.3449)

Notes: The upper number in each cell is the value of the *F*-statistic and the number in parentheses is its marginal significance. The Basic system includes *E*, *YK*, *UPR*, *SY*, and *POP*. Each system includes a constant, a linear trend, and three seasonal dummies. All variables were first log transformed, except *SY*. *E* was not further transformed; *YK* and *WMANR* were differenced; the remainder of the variables were detrended prior to their inclusion into the models.

<sup>20</sup> 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.

<sup>21</sup> 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.

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

In the extended model suggested by Card and Krueger, 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.

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 ( $|\rho| > 0.2$ ) 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).

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 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,

Table 4. Variance decompositions for the teenage employment rate

Specification	RHS Variable	Ordering one			Ordering two		
		4 Lags	6 Lags	8 Lags	4 Lags	6 Lags	8 Lags
Basic	<i>E</i>	44.20	53.37	56.39	31.52	45.96	46.07
	<i>YK</i>	4.79	12.10	9.64	3.02	9.04	9.29
	<i>UPR</i>	16.10	12.72	14.14	33.39	24.67	27.40
	<i>SY</i>	13.50	7.79	15.13	9.05	2.59	7.39
	<i>POP</i>	21.41	14.01	4.70	23.01	17.73	9.84
Basic + <i>EMPAM</i> + <i>WMANR</i>	<i>E</i>	31.18	31.99	42.00	20.11	25.46	31.43
	<i>YK</i>	3.12	9.62	7.99	4.07	10.23	10.54
	<i>UPR</i>	12.13	13.21	15.30	5.48	4.95	6.09
	<i>SY</i>	14.61	7.98	15.79	9.97	2.65	7.30
	<i>POP</i>	25.69	19.24	8.70	26.57	21.45	10.98
	<i>EMPAM</i>	2.69	1.17	1.81	12.92	12.70	17.05
	<i>WMANR</i>	10.57	16.78	8.41	20.87	22.55	16.62

Notes: The numbers in the table are the proportion of the variance of the teenage employment rate that can be attributed to the right hand side variables. The Basic system includes *E, YK, UPR, SY*, and *POP*. Each system includes a constant, a linear trend, and three seasonal dummies. All of were first log transformed, except *SY*. *E* was not further transformed; *YK* and *WMANR* were differenced; the remainder of the variables were detrended prior to their inclusion into the models. Ordering one for the Basic system is (*YK, E, UPR, SY, POP*), and ordering two is (*POP, SY, UPR, E, YK*). When *EMPAM* and *WMANR* are added, ordering one is (*YK, E, UPR, SY, POP, EMPAM, WMANR*), and ordering two is (*WMANR, EMPAM, POP, SY, UPR, E, YK*).

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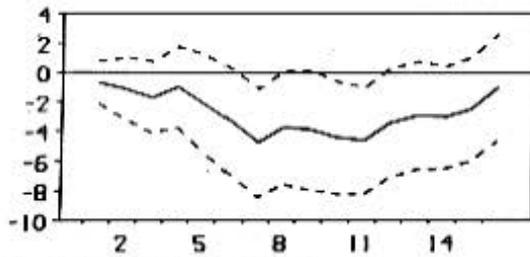


Fig. 3. Basic specification, ordering 1

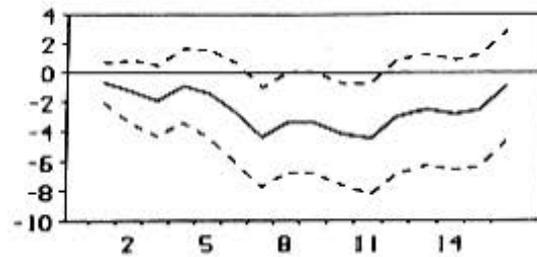


Fig. 5. Extended specification, ordering 1

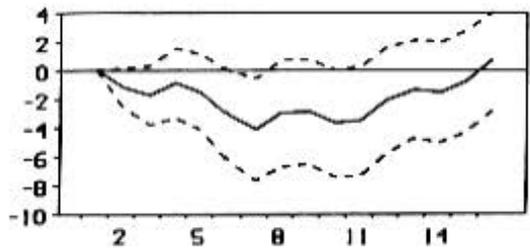


Fig. 4. Basic specification, ordering 2

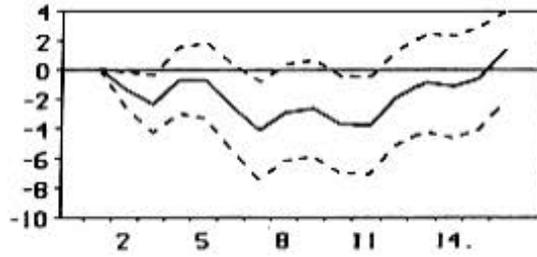


Fig. 6. Extended specification, ordering 2

that uses the ordering (*POP, SY, UPR, E, YK*) yields a similar affect of a 10% increase in the minimum wage.<sup>23</sup> 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

<sup>23</sup> 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.

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 -16.3. 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.

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*.

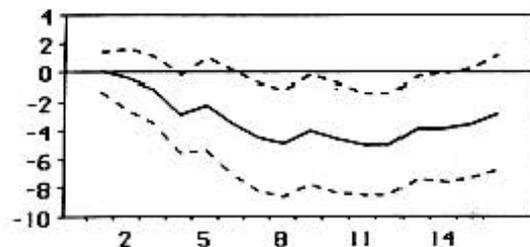


Fig. 7. Response to change in *MWDIVMFG*

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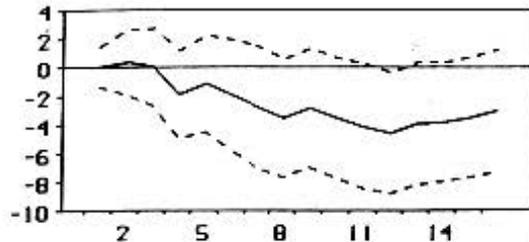


Fig. 8. Response to change in MINR

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.

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

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

Specification	(1)	(2)	(3)
Basic	-0.6712	-0.6358	-0.5711
	-1.6722	-1.6537	-1.1788
	-1.3002	-1.2245	-1.1743
	(0.0154)	(0.0419)	(0.1575)
Basic + <i>EMPAM</i> + <i>WMANR</i>	-0.5606	-0.4844	-0.5016
	-1.5494	-1.5162	-1.9310
	-1.1988	-1.0940	-1.1278
	(0.0261)	(0.0628)	(0.2725)
Lags of <i>E</i>	1	2	4
Lags of <i>YK</i>	1	2	4
Control Lags	1	1	1

Notes: The Basic model contains a constant, *YK*, *UPR*, *SY*, *POP*, and three seasonal dummies. All variables, except *SY*, 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.

rate variable has no significant impact on teenage employment.<sup>24</sup>

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.<sup>25</sup>

## ACKNOWLEDGEMENTS

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

<sup>24</sup> 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.

<sup>25</sup> The authors thank a referee for bringing this possibility to their attention.

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