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Keywords
worker, australia, structural, change, male, older

Disciplines
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Structural Change and the Older Male Worker in Australia

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Abstract
Unfavourable changes in the industry composition of employment over the last two decades has been suggested as a reason for structural unemployment and declining labour force participation of older males in Australia. In this paper, the author explores this proposition by analysing employment data for older males over the 1984 to 1999 period. Standard shift-share analysis findings suggest that, although older males are over-represented in stagnant or declining industries and under-represented in growth sectors, the net aggregate effects of structural change for older males' employment trends are minimal. However, alternative methodologies presented reveal a number of interesting insights into the role of industry structure for older male employment trends.

Introduction

Labour force participation rates for older males (aged 55-64) have fallen since the mid 1960's. Explanations for these trends are divided between those emphasising labour supply or labour demand forces. The former predicts that workers leave the labour force early in response to financial incentives, be they greater accumulation of wealth over the career, or from private pension and social security eligibility and value (eg Merrilees 1982, Hughes 1984, Miller 1983). The latter explanation suggests that employment separation and a dearth of available employment will force workers to leave the labour force as a pool of hidden unemployed, that is, the discouraged worker effect (eg. Stricker and Sheehan, 1981). The author has made a contribution to this debate by estimating that the majority of older worker since 1966 have left because of cyclical and structural discouragement (O'Brien 2001).

However, what remains unresolved is the exact nature of changes in the labour market conditions that may have brought about this result. For example, has it come about as a result of industrial restructuring, changes to employment practices, or some other change in aggregate labour demand conditions. In this paper, two major aspects of older male worker employment changes are explored. Specifically, the role of industry representation and changing industry composition.

A brief review of empirical literature is presented in section 2. Section 3 establishes the segregated nature of labour markets with respect to age and industry. It is shown that older males are represented differently from prime age across industries. Section 4 addresses the role of changes to industry structure, and age composition within industries, from 1984 to 1999 for older male employment with shift-share type analyses. Results suggest that a very different industry composition of employment for older males would have existed had past employment structures held. However, the combined effects of these hypothetical scenarios produces only a small net aggregate effect. An extension to this methodology, incorporating female employment trends is presented in section 5. An alternative, in the form of pseudo age cohort analysis, is presented in section 6, followed by econometric analysis in section 7.

A Brief Review of Literature

Most empirical literature relating to older workers employment and labour force participation emphasises the characteristics of the individual unit of analysis and their reaction to relative prices, reflecting neoclassical labour supply theory. Relatively few explore the role of industry employment characteristics or more aggregate labour market conditions (eg Quinn 1977).

Taylor and Walker (1994) note that operation of the internal labour market for older males is restricted to certain industries in the UK. They draw a line between production/construction and services industries. The former are likely to have higher levels of training and operate with internal labour markets. Older workers will be employed in these industries but not hired. The lower levels of training for services industry jobs mean that older workers are more likely to be hired in these latter industries, albeit under lower conditions. In contrast, Standing (1986) suggests that older workers are likely to be removed from employment within the internal labour market because of their relative cost, and replaced by cheaper forms of 'flexible labour'.

Johnson (1989) analysed the net retirement rates across industries in the UK. He suggests that economic, not structural labour market, explanations are responsible for early retirement trends across industries (ie. wages and access to pensions). Johnson (1994) established segmentation of older worker labour markets with their under/over representation amongst industries. A negative correlation between older worker representation and sectoral (industry) growth implies that younger age groups join growing industries, older remain in stagnant industries, with little mobility suggested.

The main body of Australian literature addressing the quantitative role of industry changes for older workers' employment was Moir (1982). Her findings suggest that older males were represented disproportionately throughout industries over the period 1966 to 1980, thus supporting the proposition that labour markets are segmented by age. However, the author dismisses a role for changes in industry structure substantially influencing the number of older men (55+) in employment over the same period. Of note is that McCormack (1996), applying Moir's methodology, suggested a large influence for changes in age composition *and* industry structure for older males' employment 1991-95. That is, both intra- and inter-industry influences.

Similarly, a number of descriptive or exploratory studies have emphasised a role of structural changes in employment, and the segmented nature of the labour market, for employment outcomes of older workers in Australia over recent decades. However, there appears to have been no advance in the methodology, or empirical analysis of the role of industry representation and structural changes for older males in Australia since Moir's work.

Pickersgill et al (1996) provided an Australian literature review of attitudes of employers to older workers, productivity and human resource practices. They criticise the aggregate nature of much research and instead emphasise the influence of different markets, organisations and employment strategies for older workers in the Australian labour market (such as in Taylor and Walker 1994). Case studies are used to show the different experiences of older workers in different industries and occupations.

Gregory (1990) takes a 'structural interpretation' of the Australian labour market and notes segmentation by sex and part-time/full-time employment (although not by age). A changing job mix away from males and towards females, and from full-time toward part-time work is noted. Structural unemployment was analysed in

Hogue and Inder (1991). The findings emphasise the segmented nature of the labour market with respect to age, sex, industry, occupation, industry and duration of unemployment. Findings suggest a low unemployment rate for older workers implies low structural unemployment. However, case studies of post-retrenchment behaviour available elsewhere indicate that older workers are more likely to display a low attachment to the labour force post-retrenchment after controlling for other factors. For example, studies of BHP retrenchees from the early 1980's (Gordon et al 1989, 1991) suggest that age is the primary determinant of the likelihood of labour force withdrawal following retrenchment.

In summary, recent literature suggests that industry structural changes may have influenced older male employment trends in Australia, but little formal quantitative analysis exists since Moir (1982). Thus, Moir's methodology is used as a starting point in sections 3 and 4, with a number of extensions and alternatives to this methodology subsequently suggested and analysed in sections 5 to 7. ABS Labour Force Survey employment data disaggregated by industry, age and sex, from 1984 to 1999 is utilised for most analyses, thereby isolating labour demand forces. Unemployment rates analysis has not been conducted to analyse structural changes (as in Hogue and Inder) because of the prevalence for discouraged worker effects and hidden unemployment, rendering this measure misleading for the older male worker labour market position (O'Brien 2001). Ideally, aspects of this analysis lend itself to longitudinal analysis of gross flows data, however, no suitable dataset exists for this purpose.

Industrial Representation of Older Males

An examination of the representation of prime aged (aged 25-44) and older (aged 55-59 and 60-64) male workers across industries is presented in table 1. An industry representation coefficient above (below) 100 indicates that workers in an age group are over(under)-represented in that industry (see Technical Appendix A.1). A relatively 'lumpy' dispersion, implying industrial segmentation by age, is measured by the standard deviation of the representation coefficients across industries.

Table 1 shows that older males are over-represented in the industries of Agriculture, Transport and Storage, Government Administration and Defence, Education, and Health and Community Services but under-represented in Mining, Retail Trade, Accommodation, Cafes and Restaurants, Communication Services, and Cultural and Recreational Services. Although not directly comparable because of changing industry classification and slightly different age group category, these results are broadly consistent with the 1966-80 distribution calculated by Moir (1982).

Of note is that the industry representation of older males would appear to be concentrated in relatively fewer industries than that for prime age males, as captured by the standard deviation of representation scores. Therefore, it appears that older male workers are segregated differently from prime age males across industries. The influence of changes in industry structure and age composition within industries over time for older male employment is now addressed.

Table 1. Industry Representation Coefficients (Average 1984-99)

Industry	Prime	55-59	60-64	Moir*
Agriculture	79.97	135.89	199.19	144.73
Mining	119.49	73.56	42.39	69.53
Manufacturing	100.38	103.43	99.68	98.93
Electricity, Gas and Water	106.56	124.11	86.91	
Construction	104.76	89.11	76.80	76.53
Wholesale Trade	105.41	97.20	97.77	
Retail Trade	79.90	73.35	73.28	89.93
Accommodation, Cafes and Restaurants	86.84	77.79	82.65	
Transport and Storage	106.09	122.79	106.56	105.47
Communication Services	118.14	90.98	72.91	
Finance and Insurance	112.06	65.90	55.91	
Property and Business Services	105.27	101.16	108.80	92.33
Govt Admin	108.34	120.77	110.85	
Education	107.61	117.99	103.98	
Health and Community Services	104.91	123.16	140.52	101.07
Cultural and Recreational Services	100:71	76.22	93.51	
Personal Services	107.64	93.31	99.92	137.40
All Industries	100.00	100.00	100.00	100.00
standard deviation	11.27	21.75	34.79	25.11

Data Source: Author's calculations, and Moir (1982)
* ave 1966-80 males aged 55+

Effects of Industry Structure and Age Composition Changes, 1984-1999

What is the potential role of changes to industry structure (shift) and / or age composition (share) within the industry over time for older male employment trends? Following a similar methodology to Moir (1982) comparisons are made between current (1999) employment levels for older workers, and that which would have eventuated had past (1984) industry and / or age composition within industries, remained unchanged (See Technical Appendix A.2). Industry effects capture *inter-industry* influences, while age composition effects capture *intra-industry* forces. These industry and age structure effects for 1984-99 are compared with those from Moir's analysis (1966-1980) in Tables 4 and 5 (again, noting the different industry classification). This form of analysis is analogous to the typical shift-share analyses (eg. de Ruyter 199x), except that all changes are expressed in terms of present (1999) employment levels, rather than a strict decomposition of 1984-1999 employment change.

Results suggest that total older male employment would have only have been one percent higher, had past industry or age structure remained. Similar to Moir's findings, the net aggregate effect of structural change for older males has generally been to decrease total employment, however the aggregate net magnitude suggested is extremely small. However, whereas Moir showed dramatic changes to age composition for males 60-64 in the period 1966-80, this effect is not evident over 1984-99, with similar small aggregate net changes suggested for both age groups. These results are in contrast to those from McCormack (1996), who suggested large roles for both industry and age composition changes for the period 1991-95.

In common with Moir's findings, an interesting picture is available at the industry level, indicating that large gross shifts at the disaggregate level lay beneath small net aggregate effects. The analysis suggested that employment for older males in Agriculture, Mining and Manufacturing would have been over 20% *higher* had the 1984 industry structure remained in 1999. However, this is offset by favourable industry shifts in employment primarily from Property and Business Services over time, suggesting that approximately 50% *fewer* jobs in this industry using the 1984 structure. Due to outsourcing of many business services from the former industries over recent times to Property and Business Services, it is unclear if this structural change measured represents true job creation and destruction (O'Brien 1997) or simply represents the same employment renamed under a different industry classification.

Moir's method is now extended in section 5, with an alternative methods presented in sections 6 and 7.

Table 2. Industry Structure and Age Composition Effects 1984-99* – Males 55-59

Industry	Industry effect 000's (%)		Age Composition effect	
	1966-80	1984-99	1966-80	1984-99
Agriculture	34.0 (138)	37.2 (128)	24.2 (98)	24.1 (83)
Mining	4.9 (85)	5.4 (152)	8.3 (144)	3.3 (94)
Manufacturing	94.0 (117)	67.8 (133)	63.1 (78)	53.4 (104)
Electricity, Gas and Water		6.3 (310)		4.6 (228)
Construction	29.3 (106)	30.5 (79)	31.3 (113)	33.8 (87)
Wholesale Trade	41.2 (100)	23.0 (100)	46.7 (113)	26.0 (113)
Retail Trade		25.7 (83)		33.4 (107)
Accommodation, Cafes and Restaurants		6.7 (63)		12.5 (119)
Transport and Storage	23.7 (99)	28.7 (116)	24.8 (103)	25.0 (101)
Communication Services		8.4 (123)		7.9 (117)
Finance and Insurance		9.3 (110)		6.3 (75)
Property and Business Services	14.6 (71)	21.3 (53)	14.5 (99)	33.6 (83)
Govt Admin		23.1 (138)		17.5 (105)
Education		19.1 (103)		13.1 (71)
Health and Community Services	15.8 (64)	10.3 (103)	27.6 (112)	15.2 (152)
Cultural and Recreational Services		3.7 (69)		7.8 (144)
Personal Services	8.9 (85)	5.9 (71)	14.5 (138)	13.9 (168)
Other	32.4 (87)		35.9 (98)	
All Industries	299.0 (100.8)	332.1 (101.2)	296.7 (100.0)	331.3 (101.0)

* Employment assuming 1984 industry/age structure

Data Source: ABS LFS - Author's calculations, and Moir (1982).

Table 3. Industry Structure and Age Composition Effects 1984-99 – Males 60-64

Industry	Industry effect 000's (%)		Age Composition effect	
	1966-80	1984-99	1966-80	1984-99
Agriculture	19.7 (138)	26.8 (128)	19.1 (98)	19.2 (91)
Mining	0.00	1.4 (152)	0.00	0.9 (92)
Manufacturing	49.2 (117)	28.8 (133)	43.9 (104)	28.4 (131)
Electricity, Gas and Water		2.2 (310)		1.5 (208)
Construction	10.2 (106)	78.6 (79)	21.4 (223)	14.9 (72)
Wholesale Trade	18.7 (100)	14.7 (100)	32.0 (171)	8.1 (55)
Retail Trade		14.2 (83)		16.8 (98)
Accommodation, Cafes and Restaurants		3.0 (63)		7.4 (159)
Transport and Storage	9.9 (99)	15.8 (116)	17.4 (174)	9.4 (69)
Communication Services		2.0 (123)		4.1 (252)
Finance and Insurance		3.0 (110)		1.6 (59)
Property and Business Services	6.5 (71)	8.7 (53)	12.7 (140)	22.2 (135)
Govt Admin		9.3 (138)		6.9 (103)
Education		9.9 (103)		8.3 (86)
Health and Community Services	8.6 (64)	7.0 (103)	18.4 (137)	8.8 (130)
Cultural and Recreational Services		2.3 (69)		4.9 (145)
Personal Services	4.4 (85)	4.9 (71)	14.2 (273)	6.4 (92)
Other industries	11.4 (87)		22.1 (170)	
All Industries	139.2 (102.2)	170.2 (100.6)	202.9 (149.0)	169.8 (100.3)

Data Source: ABS LFS - Author's calculations, and Moir (1982)

Extension to Moir's Method - Incorporating the Female Labour Market

It is suggested that one possible reason for the small estimates for industry structure and age composition effects in Moir's method is the exclusion of the female labour market trends in calculations. This may be a significant omission with respect to Gregory's (1990) suggestions from section 2. Thus, if one were to include industry and age composition effects as a

proportion of total (male and female) employment, rather than just male employment, a greater insight into possible shifts and substitutions may be available.

Both inter and intra-industry shifts affect older male employment once the full (male and female) labour market is incorporated into the analysis. Estimates presented in Table 4 suggest that aggregate older male employment would have been around four percent higher had past industry structure held.

Table 4. Industry Structure and Age Composition Effects 1984-99 - Using Male and Female Industry

Industry	55-59		60-64	
	Industry	Age	Industry	Age
Agriculture	37.6 (129)	26.3 (90)	27.1 (129)	20.9 (99)
Mining	5.7 (161)	3.4 (97)	1.5 (161)	0.9 (95)
Manufacturing	72.6 (142)	55.0 (108)	30.8 (142)	29.2 (135)
Electricity, Gas and Water	6.0 (297)	5.3 (261)	2.1 (297)	1.7 (238)
Construction	33.2 (86)	34.3 (88)	17.5 (86)	15.1 (73)
Wholesale Trade	24.4 (106)	27.0 (117)	15.6 (106)	8.5 (57)
Retail Trade	28.4 (91)	33.3 (107)	15.7 (91)	16.8 (97)
Accommodation, Cafes and Restaurants	7.2 (69)	12.7 (121)	3.2 (69)	7.7 (162)
Transport and Storage	28.6 (116)	27.6 (112)	15.8 (116)	10.4 (76)
Communication Services	8.0 (118)	9.2 (135)	1.9 (118)	4.8 (291)
Finance and Insurance	9.3 (110)	7.0 (83)	3.0 (110)	1.8 (65)
Property and Business Services	22.5 (56)	35.1 (87)	9.1 (56)	23.2 (141)
Govt Admin	20.8 (125)	21.3 (128)	8.4 (125)	8.4 (125)
Education	18.2 (98)	15.2 (82)	9.5 (98)	9.6 (99)
Health and Community Services	8.9 (89)	19.4 (195)	6.1 (89)	11.3 (166)
Cultural and Recreational Services	3.9 (73)	8.1 (150)	2.5 (73)	5.1 (151)
Personal Services	7.0 (85)	12.8 (155)	5.9 (85)	5.9 (85)
All Industries	342.2 (104.3)	352.8 (107.5)	175.7 (103.8)	180.9 (106.9)

Data Source: ABS LFS - Author's calculations

Even more dramatic is the shift in age composition, suggesting that approximately seven percent more older males would have been employed had past age composition in industries held, suggesting that women have substituted for older males *within* industries.

An Alternative to Moir's Method - Pseudo Age Cohort Analysis

An alternative insight into older male industry employment dynamics is available if one analyses an industry age-group cohort's experience over time. This information is not directly available, however, use can be made of age group employment data from the labour force survey spanning ten years (Johnson 1989). For example, the 55-64 age group employment in Mining in 1994 as a percentage of the 45-54 age in Mining from 1984 gives a reflection of cohort progression to older worker age group, revealing different employment and retrenchment / retirement practices within each industry. These *pseudo age cohort progression* estimates are presented in Table 5 (see Appendix A.3). The results show that over all industries, workers progressing from the 25-34 to 35-44 age group increased by 4 %. In contrast, only 93% of workers progressed from 35-44 to 45-54, and only 62% from 45-54 to 55-64 age groups.

While the estimates suggest that little over a half of workers progress to the older age group, they also reveal clear differences in industry employment patterns for older males. Older male employment in Property and Business Services grew by 1% from its 45-54 age group base ten years prior, suggesting that some workers migrate here from other industries. Over 80% of workers in Agriculture, Accommodation, Cafes and Restaurants, and Personal Services remained from their base year. In contrast, less than half of the age cohort progressed in Mining, Electricity, Water and Gas Supply, Finance and Insurance, and Communication Services. This latter finding helps explain the finding in table 1

that these industries' workers are over represented at prime age but under represented at older worker age groups.

Table 5. Pseudo Age Cohort Progression – (Average 1984-94 – 1989-99)

Industry	25-34 to 35-44	35-44 to 45-54	45-54 to 55-64
Agriculture	97.35	90.81	83.23
Mining	80.59	64.63	30.51
Manufacturing	92.57	81.45	51.62
Electricity, Gas and Water	60.19	55.10	23.78
Construction	106.28	89.99	60.97
Wholesale Trade	102.68	83.90	63.78
Retail Trade	100.05	99.31	67.20
Accommodation, Cafes and Restaurants	110.50	115.95	90.56
Transport and Storage	102.61	95.32	57.98
Communication Services	94.24	82.99	43.10
Finance and Insurance	84.01	75.62	39.29
Property and Business Services	159.76	138.64	101.89
Govt Admin	103.91	94.49	55.59
Education	120.21	99.66	60.41
Health and Community Services	118.68	105.92	71.60
Cultural and Recreational Services	111.55	98.14	73.29
Personal Services	139.77	121.36	89.36
All Industries	104.29	93.10	62.36
Standard Deviation	21.84	19.65	20.78

Source: ABS LFS and Author's calculations

Econometric Modelling

The above analysis suggested mixed results for inter- and intra-industry shifts for explaining older male aggregate employment outcomes depending upon the method used. However, a common finding for all analyses is the clear differences across industries for older male employment statistics presented. An attempt is made to account for differences across industries with respect to older male worker representation and pseudo age cohort progression with econometric analysis. Therefore, both static and dynamic employment patterns of older male employment are analysed.

Little guide to model specification exists from any established literature source. Therefore, this analysis is very exploratory in nature and quite unique. Industry level explanatory variables are contained in 4 broad groups. 1) The influences of worker costs with earnings (AWE) and training (TRAIN); 2) internal labour market practices such as trade union membership (UNION), benefits received (BENEFIT); 3) extent and types of non-standard employment practices (SELFEMP and CASUAL); 4) structural change via industry employment change (INDCHANGE) and use of retrenchments (RETRENCH). The statistical significance of coefficients, and their sign, is of primary interest, rather than a strict interpretation of coefficient magnitude. The same set of explanatory variables is used for both equations, with results contained in table 6. Estimation results suggest reasonable model fit and high degree of explanatory power.

Results for the industry representation model suggest that older males are likely to display a higher representation amongst industries with lower earnings, but higher benefits; industries with higher casualisation, not necessarily self employment; and finally, industries with lower retrenchments but also lower employment growth. Therefore, these results suggest a mixed bag for structural change and non-standard employment explanations.

Pseudo older age group progression, which incorporates a dynamic aspect to the analysis, displays similar results to industry representation. That is, age cohort progression to the older worker age group is higher for those industries with lower average wages, higher benefits, higher casualisation, and lower retrenchment. However, there are two notable exceptions. Those industries with greater training are more likely to retain workers from 45-54 to 55-64. This finding may be related to firm

specific human capital, whereby a firm investing in training has an incentive to retain the worker post-training in order to capitalise on the returns from higher productivity; a typical internal labour market explanation. Second, whereas higher older worker industry representation was associated with slower employment growth industries, greater pseudo age cohort progression is associated with higher employment growth industries. Therefore, whereas they are more likely to be over represented amongst slower growth industries, the propensity of males to progress to the older worker age group is greater in a growing industry. Whereas industry representation provides a static snapshot, the cohort progression provides information of dynamic changes.

Generally, industries with high levels of retrenchment display lower employment representation and progression. In contrast, those industries with prevalent non-standard employment practices are more likely to show greater employment representation and progression. The role of the internal labour market for older males' employment was mixed. Results suggested no role for unions representation, and that lower wage industries were favourable for older male employment. However, the results also showed favourable effects for the level of benefits and training provided in each industry.

Table 6. Econometric Model Results

Variable	INDREP	PSEUDO
CONSTANT	-728.47 (-2.49)**	-308.04 (-3.67)***
AWE	-0.09 (-1.93)*	-0.03 (-2.22)**
TRAIN	0.61 (1.34)	0.36 (2.73)***
BENEFIT	9.67 (3.23)***	3.19 (3.71)***
UNION	0.21 (0.45)	-0.02 (-0.17)
SELFEMP	-0.89 (-1.44)	0.00 (-0.02)
CASUAL	4.58 (3.42)***	1.42 (3.69)***
RETRENCH	-4.78 (-3.78)***	-0.71 (-1.95)*
INDCHANGE	-0.65 (-2.37)**	0.48 (6.14)***
Adj Rsquared	0.59	0.94
Durbin Watson	2.08	2.83

Summary of Findings

Findings from the above analyses confirm the segmentation of industry employment for older males. However, mixed results were available from the analyses of the role of industry structural changes and changes to age composition within industries over 15 years. The use of Moir's method produced minimal aggregate net results, although large (offsetting) underlying industry shifts were evident. However, the incorporation of the full labour market into the analysis, that is male *and* female employment patterns, hinted that larger industry structure and age composition effects may have been prevalent. Pseudo age cohort progression analysis revealed further differences between industries' treatment of older male workers over this period. Further disaggregated analysis, via econometric modelling, revealed a mixture of explanations for older worker employment, including internal labour market, structural change, and non-standard employment influences.

Technical Appendix

A.1 – Industry Representation Coefficients

$$\frac{E_{age,industry}*100}{E_{industry}} / \frac{E_{age}}{E_{tot}}$$

A.2 - Moir's Structural change and age composition effect method

Total Employment

$E_{ikt} = a_{ikt}.p_{it}E_t$

where E_{ikt} = the number of male workers in age group k and industry i at time t.

a_{ikt} = the proportion of male workers in industry i aged k at time t $= E_{ikt} / E_{it}$

p_{it} = the proportion of employed men in industry i at time $t = E_{it} / E_t$

Industry Structure Effects

$E^*_{ikt} = a_{ikt}.p_{it-1}.E_t$

where E^*_{ikt} = the hypothetical number of male workers in age group k had the industrial structure remained at *t-1* level

a_{ikt} = the proportion of male workers in industry i aged k at time t $= E_{ikt} / E_{it}$

p_{it-1} = the proportion of employed men in industry i at time $t = E_{it-1} / E_{t-1}$

Age Composition Effect

$E'_{ikt} = a_{ikt-1}.p_{it}.E_t$

where E'_{ikt} = the hypothetical number of male workers in age group k had the age structure remained at *t-1* level

a_{ikt-1} = the proportion of male workers in industry i aged k at time $t = E_{ikt-1} / E_{it-1}$

p_{it} = the proportion of employed men in industry i at time $t = E_{it} / E_t$

For the analyses presented in section 4, E_t and E_{it} are based upon total male employment, whereas in section 5 E_t and E_{it} are based upon total male and female employment.

A3. – Pseudo Age Cohort Progression

$$\frac{E_{age,industry,t}*100}{E_{age-10,industryt,t-10}}$$

Data Appendix

Variable	Construction	Explanation (Source)
INDREP	$\frac{E_{age,industry}*100}{E_{industry}} / \frac{E_{age}}{E_{tot}}$	Industry representation. – dependent variable (LFS – austats)
PSEUDO	$\frac{E_{i55-64t}*100}{E_{i45-54t-10}}$	Pseudo age cohort progression to 55-64 age group -dependent variable (LFS austats)
SELF	$\frac{SE_{i55-64t}*100}{E_{i55-64t}}$	Percentage self employed (LFS austats)
TRAIN	$T_{i1997} * 100 / E_{i1997}$	Percentage in industry received training (T) 1997 (ABS 6356.0 1997 and LFS austats)
AWE	AWE_{i1999}	Average weekly earnings (AWE) of workers in industry (ABS Cat No 6310.0)
BENEFIT	$B_{i1999} * 100 / E_{i1999}$	Percentage in each industry receiving employment benefits (B) 1999 (ABS Cat No 6310.0 and LFS austats)
UNION	$U_{i1999} * 100 / E_{i1999}$	Percentage in Industry member of a trade union (U) 1999 (ABS Cat No 6310.0 and LFS austats)
CASUAL	$C_{i1999} * 100 / E_{i1999}$	Percentage in industry in casual employment (C) (ABS Cat No 6310.0 and LFS austats)
RETRENCH	$R_{i1997} * 100 / E_{i1997}$	Percentage retrenched in industry (R) 1997 (ABS Cat No 6266.0 and LFS austats)
INDCHANGE	$E_{it} * 100 / E_{it-10}$	Percentage of industry employed 10 years later

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