

Changes Over Time in Male and Female Employment Ratios in Australia

Robert Dixon*

Abstract

This paper investigates changes over time in the proportion of the male and female population aged 15 and over who are employed. It is especially aimed at studying the influence of changes in the age composition of the population on this indicator. The main findings are: (a) while the underlying trends for males and females are in the opposite direction, both male and female employment ratios fall in recession and rise in recoveries; (b) changes in the age composition of the population (ageing, per se) can explain only a very small amount of the changes in the aggregate employment ratio for both males and females over the period 1978–2001; (c) the falling aggregate male employment ratio is not primarily or even largely a result of movements out of employment by older workers, indeed, over half of the reduction in the aggregate employment ratio for males is due to falling employment ratios for prime working-age males. Policy implications are discussed in the concluding section.

Introduction

The evolution over time of the proportion of the population aged 15 and over who are employed (i.e. the 'employment ratio') is of interest for a number of reasons and not least because it forms the link between labour productivity and per capita income. In addition, variations over time in the proportion of the population who are employed, especially to the extent that it reflects population ageing, can have major implications not only for standards of living but also for taxation, social security and superannuation policies. This paper looks at changes over time in the employment ratio for males and females in Australia and is especially aimed at studying the influence of changes in the age composition of the population, on this indicator.

*Department of Economics, University of Melbourne.

Figure 1. Aggregate Employment Ratio for Males (solid line & RHS) and Females (broken line & LHS) — Australia 1978:2–2002:2

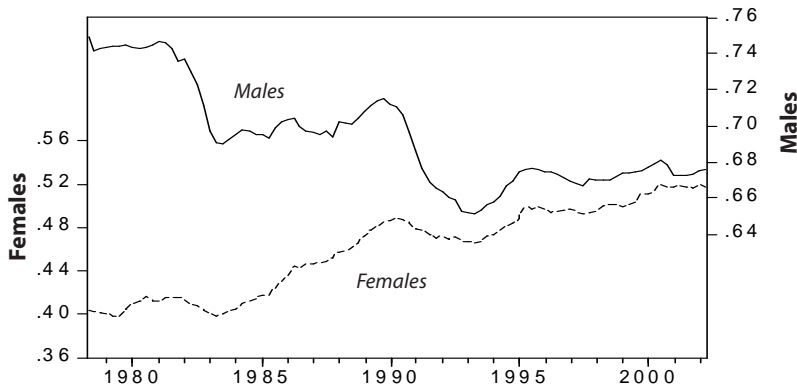


Figure 1 shows the aggregate employment ratio for males and females over the period 1978–2002.¹ While the ratio for males has fallen a good deal over the last two and a half decades, it has not fallen continuously over the period but instead has fallen in two discrete ‘steps’. In particular, it fell steeply in each recession and did not ‘bounce-back’ to its original level after each recession ended. The employment ratio for females has tended to rise strongly over the period and especially so in the years 1983–1989, that is the period between the two recessions. Comparing the time series for males and females, we see that: (a) the underlying trends for males and females are in the opposite direction; (b) both male and female employment ratios fall in recession and rise in recoveries, and; (c) the female ratio tends to ‘bounce back’ relatively quickly after each recession and the upwards-trend in the female ratio quickly reasserts itself while the male ratio, although it rises after each recession, does not tend to return to its original level — far from it.

There are many aspects of this data which can be explored further. I begin by considering the proposition that changes over time in the employment ratio for males and females (but especially the former) primarily reflects changes in the age composition of the population.

Aggregate Employment Ratios Adjusted for Changes in the Age Composition of the Population

The possibility that population ageing has led to changes in the aggregate male and female employment ratios arises because we know that different age groups have different employment ratios and also because we know that the age composition of the population has been changing.²

Tables 1 and 2 show employment ratios for various age groups for males and females for 1979, 1986, 1997 and 2001. Employment ratios for males have typically fallen for all age groups, not only the older (55+) age groups. Importantly, from the point of view of policy, we see that the ‘stepping down’ in the

Table 1. Male Employment Ratios by Age Group

Age Group	1979	1986	1997	2001
15-19	.539	.495	.460	.491
20-24	.831	.798	.743	.757
25-34	.925	.886	.856	.854
35-44	.934	.904	.867	.869
45-54	.891	.857	.824	.836
55-59	.794	.725	.659	.677
60-64	.524	.425	.428	.444
65+	.114	.086	.100	.099
Total	.744	.701	.669	.673
15-24	.679	.644	.604	.624
25-54	.918	.885	.850	.854
55-64	.675	.582	.554	.574

Table 2. Female Employment Ratios by Age Group

Age Group	1979	1986	1997	2001
15-19	.465	.484	.472	.505
20-24	.630	.678	.679	.712
25-34	.475	.561	.636	.669
35-44	.546	.607	.667	.681
45-54	.453	.518	.647	.675
55-59	.270	.289	.398	.475
60-64	.126	.124	.186	.218
65+	.024	.024	.028	.031
Total	.400	.442	.494	.517
15-24	.546	.580	.579	.609
25-54	.491	.567	.650	.675
55-64	.204	.207	.299	.360

employment ratio is a characteristic of all prime working-age groups (i.e. males aged 25–54) as well. In contrast, inspection of Table 2 shows that female employment ratios have risen for all age groups, with the ratio for prime working-age females (i.e. females aged 25–54) showing by far the largest increase. However, inspection of the raw data in time-series form shows that virtually all of this increase occurred between 1983 and 1989.

Clearly there are age-related differences in the employment ratios. The question to be considered now is: To what extent can changes in the age composition of the population explain the trends we have observed in aggregate employment ratios? It is a truism to say that the aggregate employment ratio for males or females is the weighted sum of the employment ratios across age groups, where the weights are the proportion of the total (male or female) population in that age group. Given this, there are two proximate sources of change in the aggregate employment ratio. First, the aggregate employment ratio will change if there is a change in the employment ratio for any of the individual age groups. Second, the aggregate employment ratio will change if there is a change in the age profile of the population. Over time both factors are likely to be changing, so that both elements will be contributing to any recorded change in the aggregate employment ratio. In order to identify the contribution of population ageing we need a procedure which will enable us to 'decompose' changes in the aggregate employment ratio into two components: (i) that part which reflects the effect on the aggregate employment ratio of changes in the employment ratio in the individual age groups (*cet par*), and (ii) that part which reflects the effect on the aggregate employment ratio of changes in the age structure of the population (*cet par*). There exist in principle a variety (indeed, an infinite variety) of procedures by which we might decompose the movement of a composite index into the movements of its constituent parts (these methods are often called *shift-share analysis*).³ The method adopted here (and described in detail in Harris (1966) and in Dixon (2003)) for decomposing a weighted aggregate into 'composition' and 'rate' components involves using the arithmetic mean of current and base year values of one variable as the weight to be applied to the change in the other variable. Applying this philosophy to our problem allows us to decompose the observed change in the aggregate employment ratio into two components, one 'the rate component', measures the effect of 'micro' changes in the employment ratios of individual age groups as they respond to changing social and financial circumstances and the second, the 'composition component', measures the effect of changes in the age composition of the population.⁴ The results of this decomposition are reported in Tables 3 and 4.⁵

Table 3 shows rate and composition components for males. The main features are: (a) the rate component is negative for all of the age groups;⁶ (b) at the aggregate level, both the rate and composition components are negative, and; (c) the aggregate 'composition effect' is small compared with the aggregate 'rate effect'. So 'population ageing' per se cannot explain much of the fall in the male employment ratio.

Table 4 shows rate and composition components for females. The main features are: (a) the rate component is positive for all of the age groups; (b) at the aggregate level, the rate component is positive while the composition component is negative, and; (c) the 'composition effect' is very small compared with the 'rate effect'. So 'population ageing' per se cannot explain much of the movement in the female employment ratio, although (as with males) it was acting to lower the employment ratio (slightly) below what it would otherwise be.

Table 3. Contributions to the Observed Change in the Male Employment Ratio over the Period 1978 – 2001

Age Group	Rate	Composition	Row sum
15-19	-0.005	-0.017	-0.022
20-24	-0.008	-0.019	-0.027
25-34	-0.015	-0.026	-0.040
35-44	-0.012	0.026	0.015
45-54	-0.009	0.023	0.014
55-59	-0.008	-0.001	-0.009
60-64	-0.004	0.000	-0.004
65+	-0.002	0.003	0.001
Column sum	-0.062	-0.010	-0.072

Table 4. Contributions to the Observed Change in the Female Employment Ratio over the Period 1978 – 2001

Age Group	Rate	Composition	Row sum
15-19	0.004	-0.016	-0.012
20-24	0.008	-0.017	-0.009
25-34	0.039	-0.015	0.023
35-44	0.023	0.023	0.046
45-54	0.034	0.017	0.051
55-59	0.013	-0.001	0.012
60-64	0.005	-0.001	0.004
65+	0.001	0.001	0.002
Column sum	0.127	-0.009	0.117

Summary and Policy Implications

This paper has examined employment-to-population ratios for males and females in Australia over the period 1978–2002. Comparing the evolution of the time series for males and females over the period, we see that: (a) the underlying trends for males and females are in the opposite direction; (b) both male and female employment ratios fall in recession and rise in recoveries but male ratios fall far further in recessions than the female ratio does, and; (c) the female ratio tends to ‘bounce back’ relatively quickly after each recession and the upwards-trend quickly reasserts itself while the male ratio, although it rises after each recession, does not tend to return to its original level. Statistical calculations suggest that changes in the age composition of the population (ageing per se) can explain only a very small amount of the changes in the aggre-

gate employment ratio for both males and females over the period 1979–2001.⁷ Importantly, the evidence also suggests that it would be wrong to focus on the behaviour of older workers to explain the marked fall we have observed in the aggregate male employment ratio as it would appear that over half of the reduction in the aggregate employment ratio for males is due to falling employment ratios for prime working-age males (i.e. those aged 25–54). Table 1 shows that the ‘stepping down’ we observed in the aggregate employment ratio for males (see Figure 1) is plainly evident in the employment ratio for Males in the age groups 25–34, 35–44 and 45–54. For each of these prime working-age groups we see the sharp fall in the employment ratio in the two recessions and its failure to recover after the recession. This has considerable social, economic and ‘fiscal’ implications.

Since the reductions in the male employment ratio in the past appear to have been ‘recession induced’ the most significant policy implication is that in order to maintain (and encourage people back into) employment it follows that government (and institutions such as the Reserve Bank of Australia whose statutory responsibility it is to ensure — *inter alia* — the maintenance of full employment and economic growth) use macroeconomic policy instruments to ensure that we avoid another deep recession and especially that we avoid the ‘sharp’ and large increases in unemployment we saw in the early eighties and again in the early nineties.⁸ More generally, if possible social security, superannuation and other policies designed to induce an increase in the employment ratio were to be evaluated in terms of their likely impact on employment and thus on production and future tax revenues, it may be wiser to design policies to retain prime age workers (and especially younger prime-age workers) in employment than to design policies whose impact is exclusively on the older workers and the older population.

Notes

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¹ All of the data used in this paper has been obtained from the Australian Labour Force Statistics module of DX. Data for employment and (civilian) population 15 and over for Australia by age group copied over as original quarterly data (average of 3 months in the quarter) and employment ratios for each aggregate and each individual age group derived as the ratio of the seasonally adjusted employment to the seasonally adjusted population. (Adjusting for average hours worked makes very little difference to the evolution of these ratios over time.)

² The proportion of the (male and the female) population in the prime age group (25–54) was rising until 1997 but has been falling since then. Also, there has been a persistent fall in the proportion of the population in the age group 15–24 over the whole of the period (although the rate of decline has lessened in recent years) while the proportions of the population in the age groups 55–64 and 65 plus have been rising (the former since 1994, the latter throughout the whole of the period).

- ³ For a discussion of various weighting schemes used in shift-share decompositions see Dixon and Thirlwall (1975) and the references cited therein.
- ⁴ All of the calculations are undertaken over the eight age groups for which the ABS reports data on labour force characteristics of the population: 15–19, 20–24, 25–34, 35–44, 45–54, 55–59, 60–64 and 65 plus.
- ⁵ The two tables simply involve comparisons between the beginning and end dates. However it is possible to compute rate and composition effects for each quarter in between these two dates. With knowledge of these two terms for each successive period we can generate a series for the aggregate employment ratio with the effects of compositional change removed thus arriving at a series which will show us the effects on the aggregate employment ratio of changes in the ‘rates’ alone. Since the results of these calculations are consistent with the information given in the tables (and summarised below) I have not presented these results here. The information is available from the author upon request.
- ⁶ This is consistent with studies that focus on Census data and which conclude that, even in the presence of some ‘birth cohort’ effects, “economy-wide changes — for example to the structure of labour demand, welfare replacement rates and income taxes — are the principle drivers of the reduction in male employment” (Black et al., 2004, p 27).
- ⁷ Of course, the fact that ageing has not been important in the past does not mean that it may not be more important in the future.
- ⁸ The negative impacts of the two recessions is quite evident in the data for females, not only that for males and so I think that my suggestion regarding the importance of avoiding future catastrophic recessions is as applicable to female employment ratios as it is to those for males.

References

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