

**APPLICATION OF A DECOMPOSITION
TECHNIQUE TO THE ANALYSIS OF POPULATION
AGEING RELATED CHANGES IN THE INDUSTRIAL
EMPLOYMENT RATES IN AUSTRALIA AND JAPAN**

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EXECUTIVE SUMMARY

Population ageing is a demographic trend, that received a significant attention of labour market analysts over the last decades in most of developed and many developing countries. The critical question they ask is: How will the shift to stagnant and declining share of supply of young, new entrants to the labour market and an unparalleled growth in the proportion of workers aged 55+ affect their employment prospects in particular industries? Another critical question is how to measure impact of ageing related age composition changes on various economic and labour market variables. .

In this paper, a decomposition technique is applied to the Australian and Japanese labor force participation and employment census data to assess the contribution of the labour force ageing to the labour force participation and industries' employment levels in Japan and Australia. A number of alternative scenarios for the industries' employment rates are developed based on the results of the decomposition.

The labour force ageing contributes differently to the employment prospects of particular industries. The most negatively affected are tertiary industries for which employment growth the ageing acts as a break. Had their been no ageing, the employment rate in tertiary industries would have been 3.4 and 1.1 percentage points higher in Japan and Australia in 2000 and 2001 respectively. Among tertiary industries, the negative contribution of ageing is the largest for Wholesale and Retail Trade and Finance, Insurance, Property and Business in both countries and Services, Transport, Storage and Communication in Japan. The magnitude of the ageing effects is directly associated with the relatively high employment share in these tertiary industries of the youngest segment of the labour force; persons aged 15-24. Primary industries, are the only industries for which the ageing has positive (in Japan) and negligible impact (in Australia). This is due to these industries employing the highest employment share of persons aged 55+.

Given the continuity of current trends in mortality, fertility, migration and age-specific industries' employment rates, the effects of ageing are projected to extrapolate in the future. If current employment demand trends continues, and unless significant labour productivity gains occur, this may lead to labour shortages in tertiary industries, especially pronounced in the Services, Wholesale and Retail Trade, Finance, Insurance, Property and Business industries in both countries.

1 INTRODUCTION

Ageing of the labour force has become recently of major importance for the sustainability of current economic growth in Australia and Japan and as such it started to attract attention of not just economist, but also policy makers. Most of currently available studies of impacts of ageing project effects on labour force ageing on labour force participation and economic growth relying on population and labour force projections (The Treasury 2002; The Treasury 2004; Productivity Commission 2005).

This study differs from the above mentioned in two major ways. Firstly, in order to evaluate the impacts of labour force ageing, it relies on historical census data of two countries at different stages of ageing and not on labour force and population projections. In this way, it provides a unique empirical evidence on effects of ageing. Secondly, it focuses on impacts of labour force ageing not just on the aggregate labour force participation but, more importantly, on employment of particular industries.

The paper is organised as follows: section 2 provides a brief discussion of the data used in the analysis; section 3 outlines the methodology used; section 4 presents the results of the analysis; and section 5 summarizes the analysis and concludes the discussion.

2 THE CENSUS DATA

The analysis presented in this paper has been conducted on the historical, population, labour force and employment census data of Japan (for 1960-2000 years) and Australia (for 1971-2001 years). The table below summarizes the data requirements and sources used in the study presented in this paper.

Table 1 Data requirements and data sources for Kitagawa's decomposition of the difference between labour force participation/industrial employment rates of two periods

Data requirements	Data sources
Population aged 15 years and over cross-classified by: labour force status, industry (for employed only), age (5-year age groups), sex (male, female),	Australia: Australian Bureau of Statistics: Population Censuses: 1971, 1981, 1991, 2001
	Japan: Statistics Bureau Management and Coordination Agency: Population Censuses: 1960,1970, 1980, 1990, 2000

The census data has been chosen above other data sources primarily for two reasons. Firstly, census captures the most detailed cross sectional picture of a number of economic and demographic changes, even in highly disaggregated data without sample errors. This was crucial for this study, as the decomposition analysis has been conducted for highly disaggregated data on particular age-sex groups employed in various industries. Secondly, census unlike survey data was relatively straightforward to compare internationally, which was crucial for the international comparison conducted in this study.

3 METHODOLOGY

Decomposition analysis applied in this study is an extension of a very old demographic technique called standardisation. Standardisation aims at eliminating compositional effects from overall rates of some phenomena in two or more populations by application of so called 'standard population'. Decomposition takes this analysis one step further by answering a closely-related question: 'How much of the difference between the overall rates is attributable to compositional changes and how much to other factors'.

There are many ways to decompose a difference of rates of two periods. On one side of the spectrum there are decompositions based on arithmetic manipulations of difference of averages (Kitagawa's decomposition, Cho and Retherford's decomposition, Das Gupta's decomposition, structural decomposition) on the other, decomposition models based on parametric representations of demographic variables (regression decomposition, the purging method, the delta method). While the first group relies on information derived from populations, the second one uses sample data and as such is accompanied by standard errors and tests of statistical significance (Romo 2003). The choice of a decomposition method, to great extent arbitrary, is naturally limited by data availability and quality.

This study uses the original Kitagawa's method to decompose the difference between employment rates of two periods into ageing and employment rate effects. The choice of the technique was primarily dictated by the availability of good quality census data in Australia and Japan, which narrowed significantly the choice of decomposition techniques to methods based on arithmetic manipulations of difference of averages, rather than models based on parametric representations of demographic variables. In addition, Kitagawa's decomposition had the advantage of expositional cleanness and has been applied previously to the analysis of the age structural effects on employment patterns (Martin and Ogawa 1984).

Theory

The logic of the Kitagawa's decomposition can be summarised as follows:

Let $\bar{v}(t+h)$ and $\bar{v}(t)$ be the values of the for the average under study at time t and $t+h$ as defined as in the following equation

$$\bar{v}(t) = \frac{\sum_x v_x(t) w_x(t)}{\sum_x w_x(t)}$$

where $v_x(t)$ is some demographic function, and $w_x(t)$ is some weighting function.

Kitagawa's decomposition focuses on the difference between these two measures $\bar{v}(t+h) - \bar{v}(t)$, also expressed as $\Delta\bar{v}(t)$

$$\bar{v}(t+h) - \bar{v}(t) = \Delta\bar{v}(t) = \sum_x v_x(t+h) \frac{w_x(t+h)}{w.(t+h)} - \sum_x v_x(t) \frac{w_x(t)}{w.(t)}$$

where weights $w_x(t+h)$ are normalized (i.e. weights for all ages add to one) by dividing the total value of weights $w.(t) = \sum_x w_x(t)$.

It is well visible in the above formula that the difference in the averages $\Delta\bar{v}(t)$ over the time t and $t+h$ is attributable to both differences in demographic $v_x(t)$ as well as weighting $w_x(t)$ functions. Kitagawa's decomposition enables to isolate contribution of each of these functions into two separate components that sum up to the difference in overall averages. The decomposition is written as

$$\Delta\bar{v}(t) = \sum_x \left(\frac{\frac{w_x(t+h)}{w.(t+h)} + \frac{w_x(t)}{w.(t)}}{2} \right) \left[v_x(t+h) - v_x(t) \right] + \sum_x \left(\frac{v_x(t+h) + v_x(t)}{2} \right) \left[\frac{w_x(t+h)}{w.(t+h)} - \frac{w_x(t)}{w.(t)} \right]$$

First part of the equation captures the differences in averages over the time t and $t+h$ due to changes in the demographic function $v_x(t+h) - v_x(t)$, calculated while holding weights at constant, average level. The second component of the equation accounts for the difference in weights or population structures $\frac{w_x(t+h)}{w.(t+h)} - \frac{w_x(t)}{w.(t)}$

while holding the demographic functions at the constant, average level over the time t and $t+h$.

Example

In the study presented in this paper the demographic average of interest is given industry's employment (CER) rate. This rate is an average of the age-specific employment rate $er_a(t)$, at the age a and time t weighted by the population size $N_a(t)$ age a and time t . The change over time of the CER can be decomposed according to Kitagawa's proposal as

$$\begin{aligned} \Delta er(t) &= \sum_a er_a(t+h) \frac{N_a(t+h)}{N.(t+h)} - \sum_a er_a(t) \frac{N_a(t)}{N.(t)} \\ &= \sum_a \left(\frac{\frac{N_a(t+h)}{N.(t+h)} + \frac{N_a(t)}{N.(t)}}{2} \right) [er_a(t+h) - er_a(t)] + \sum_a \left(\frac{er_a(t+h) + er_a(t)}{2} \right) \left[\frac{N_a(t+h)}{N.(t+h)} - \frac{N_a(t)}{N.(t)} \right] \end{aligned}$$

Table 2 presents tertiary industries' employment rate and Kitagawa's decomposition of their change over 1971-1981, 1981-1991 and 1991-2001 for Australia. Components of change are denoted in the table as Δer_a and $\Delta \frac{N_a}{N.}$ referring to changes attributable to changes in the age-specific labour force participation rates and in the age-structure respectively.

Table 2 Tertiary industries' employment rate $er(t)$ and Kitagawa's decomposition of its change $\Delta er(t)$ over time in 1971-1981, 1981-1991 and 1991-2001 for Australia

t	1971	1981	1991
$er(t)$	32.03	35.06	36.83
$er(t+10)$	35.06	36.83	41.27
$\Delta er(t)$	2.76	1.77	4.44
Δer_a	3.21	1.88	5.02
$\Delta \frac{N_a}{N.}$	-0.45	-0.11	-0.58
$\Delta er(t) = \Delta er_a + \Delta \frac{N_a}{N.}$	2.76	1.77	4.44

Source: Author's calculations based on data from: Australian Bureau of Statistics, *Population Census*, (Various Years)

The employment rate of tertiary industries was continuously increasing between 1971 and 2001. All employment rate increases over that period of times were attributable to changes in the age-specific employment rates, as the age-structural changes contributed negatively.

Assumptions underlying

The decomposition technique relies on a number of assumptions. The major assumption is that changes in the employment rates are only due to changes in the two groups of components mentioned before: the economic component associated with the changing employment demand and working preferences of workers and the demographic component associated with the changing age and sex composition of the labour force. There are no residual terms.

Another assumption is that there is no interaction between the two components identified above. In other words, the contribution of each component to the total difference between the employment rates of two periods is calculated by holding constant at the average level either the demographic or the economic component. This has important implications for interpretation of the results of the decomposition analysis, as we can talk about the contribution of particular components to the difference in the employment rates of two periods, but not their causality.

Lastly, decomposition assumes that the changes in age/sex composition and in specific employment rates occur linearly over time. For this reason, the value of the technique is limited when applied to longer- term analysis.

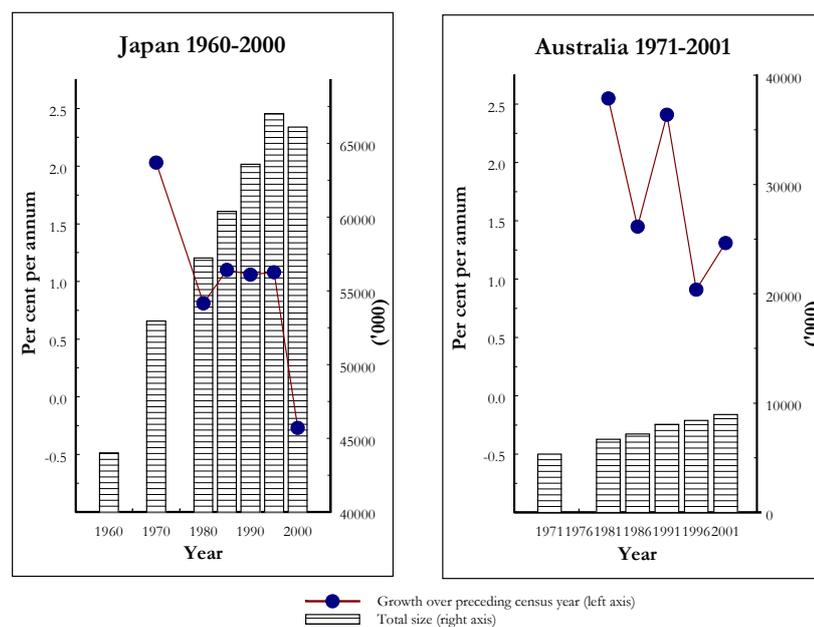
4 RESULTS

The major objective of the decomposition analysis was to isolate an independent contribution of the ageing related age compositional changes to the levels of labour force participation and industrial employment. It is therefore reasonable to start the presentation the results of the decomposition analysis, with the explanation of the dynamics and magnitude of labour force ageing both countries were undergoing throughout the period of study.

Labour force ageing in Australia and Japan

The ageing of the labour force has varied dramatically in its pace and magnitude in Australia and Japan. While in 2000, the process of labour force ageing was well-set in Japan, where the deceleration of the labour force growth has been visible since the 1960s and its size has been at decline from 1995 onwards, in Australia, the pace of ageing of the labour force has been relatively modest. Between 1971 and 2001, the Australian labour force grew by 68 percent over to nearly 9 million, with labour force ageing being visible only in the most recent decades in the form of declining rates of growth (Figure 1).

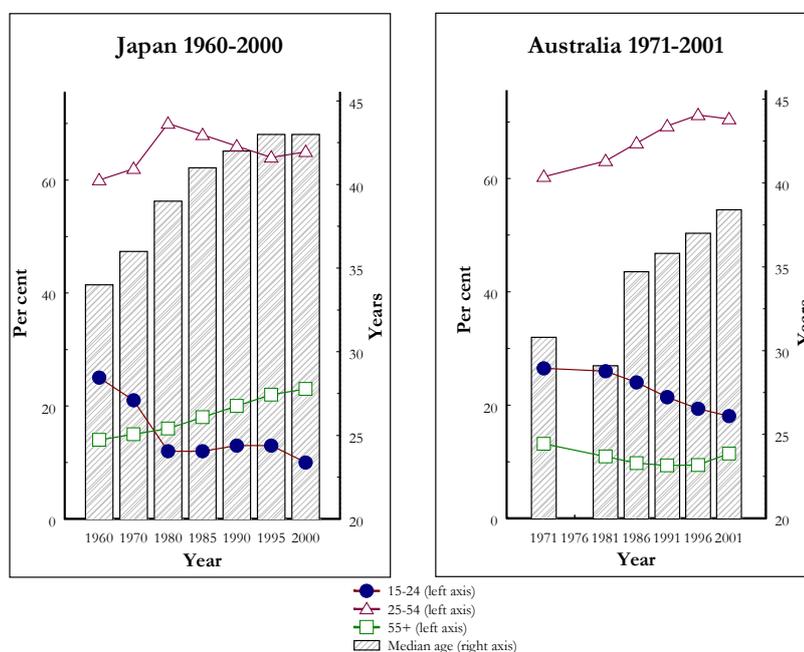
Figure 1 The size (in 000') and growth (in percent per annum) of the total labour force: Japan 1960-2000, Australia 1971-2001



Source: Author's calculations based on data from: Japan: Bureau of Statistics, Management and Coordination Agency, *Population Census of Japan* (Various years); Australia: Australian Bureau of Statistics, *Population Census*, (Various Years)

Along with changes in the total size and growth of the labour force, ageing brought about major alternation in the age compositions of labour supplies. Over the period of study both countries experienced decline of the labour force share of those aged 15-24, deceleration of the growth and decline of share of those aged 25-54 and a rapid growth of those aged 55+ and an increase in its labour force share. As a result, median age of the labour force has been rising continually over the whole period of study in Japan and since the 1980's in Australia. As depicted in Figure 2, while in 1960, 50 per cent of the Japanese labour force was aged below 34.3 years, by 2000 this number increased to 43.9 years. A similar change in the age composition of the labour force has been observed in Australia, where the median age of the labour force after having declined to 29.5 years in 1981 rose to 38.5 years in 2001 (Figure 2).

Figure 2 The share (in per cent) of persons aged 15-24, 25-54, 55+ in the labour force and the median age (in years) of the labour force: Japan 1960-2000, Australia 1971-2001



Source: As for Figure 1

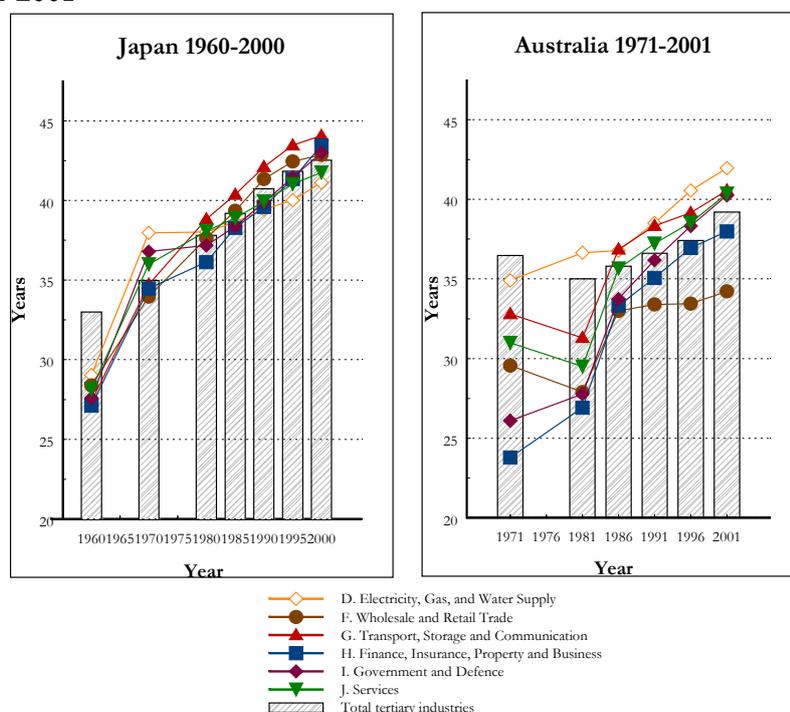
Not surprisingly, the median age at the end of research period was higher in Japan than in Australia. This is due to the more rapid pace of age compositional changes in Japan. Although a decline of the labour force share of those aged 15-24 has occurred in both countries, at the end of the research period their proportion was much lower in Japan (10.8 per cent in 2000), than in Australia (18 per cent in 2001). Similarly, the proportion aged 25-54 started to decline in both countries, but at different dates. In Japan, the declining trend was noticeable from 1980 onwards, in Australia, it started only in 1991. As a result, the proportion aged 25-54 was at the end of research period lower in Japan (65.2 per cent in 2000), than in Australia (70.5 in 2001). Analogously, while the share of those aged 55+ in the labour force started to increase in Japan from 1960 onwards, this was the case for Australia only since 1996. Consequently, while in Japan in 2000, the proportion aged 55+ (24 per cent) was more than double the share of those aged 15-24 (10.8 per cent), in Australia, it consisted of only 64 per cent of the younger group.

Over the period of study, along with ageing its labour forces of both countries experienced a significant structural change of their industrial employment, visible in the decline of employment shares of primary and secondary industries and the increasing proportion of tertiary industries*. Interestingly, the ageing of labour forces affected unevenly employment of particular industries.

* In this study tertiary industries refer to Electricity, Gas and Water Supply; Wholesale and Retail Trade; Transport, Storage and Communication; Finance, Insurance, Property and Business; Government and Defence; Services. Secondary industries consist of Mining, Manufacturing and Construction. Primary industries include Agriculture, Forestry, Fisheries and Hunting.

In general, employed in tertiary industries were ageing at the least rapid pace and their age structure remained the youngest. As shown in Figure 3, the median age of employed in tertiary industries increased from 33 years in 1960 to 42.5 years in 2000 in Japan. The lowest median age were found in the Electricity, Gas and Water Supply (41.1 years in 2000) and Services (41.8 years in 2000) industries. In Australia, these increases were substantially smaller. The median age of employed in tertiary industries has increased from 34.6 years in 1971 to 38.5 in 2001. Unlike in Japan, the lowest median ages applied in Wholesale and Retail Trade (34.2 years in 2001) and Finance Insurance, Property and Business (38 years in 2001).

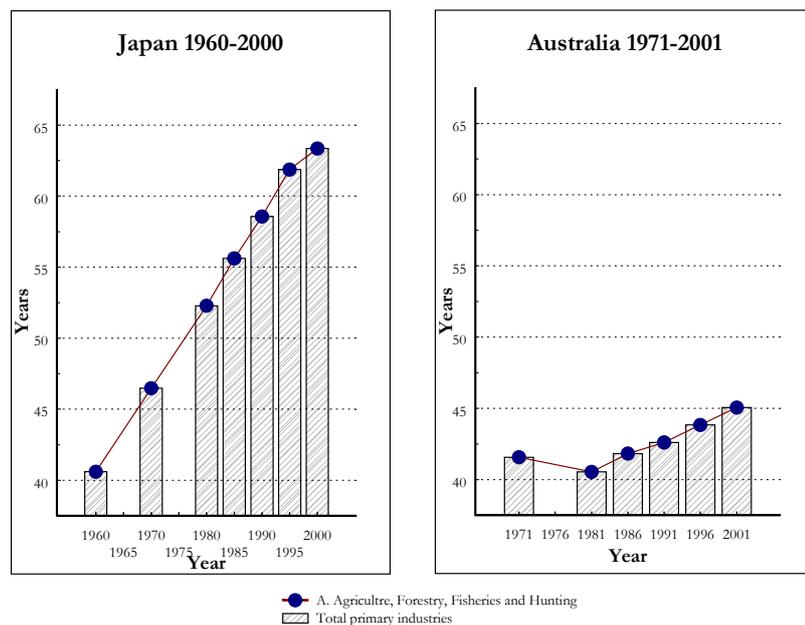
Figure 3 Median age (in years) of employed in tertiary industries: Japan 1960-2000, Australia 1971-2001



Source: As for Figure 1

In contrast to those employed in tertiary, those employed in primary industries had the highest median age and were ageing the fastest. In Japan, their median age increased from 40.6 in 1960 to 63.4 years in 2000. In Australia, the ageing of labour force in primary industries has been less rapid, as its median age rose from 41.6 in 1971 to 45.1 years in 2001 (see: Figure 4). Such a drastic increase in the median age of primary industries in both countries was due to their large share and the most rapid employment growth of those aged 55+. In Japan, over 40 years, the 55+ share in these industries increased by 44.8 percentage points, from 24 per cent in 1960 to 68.8 per cent in 2000. In Australia, the proportion of the eldest in primary industries was on a rise from 1981 onwards, increasing from 20.9 per cent to 27.3 per cent in 2001.

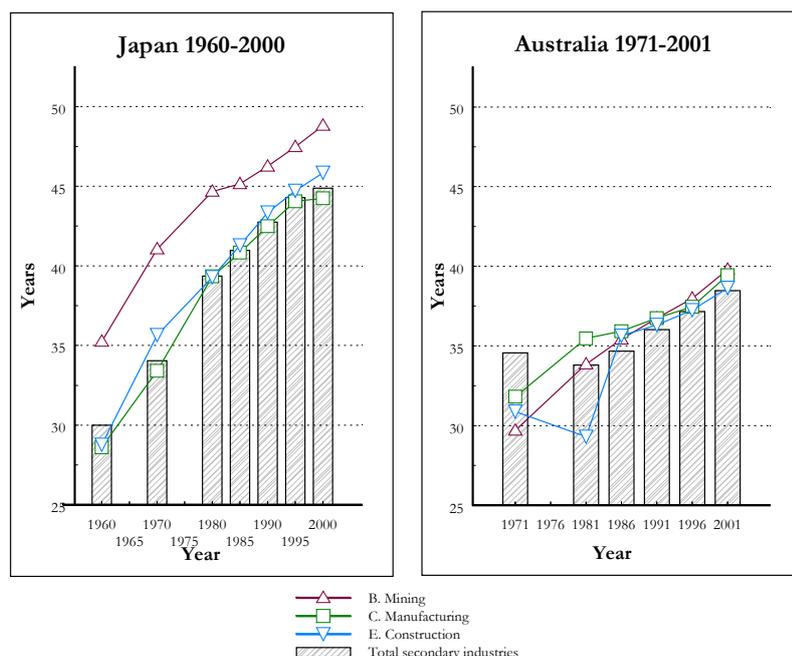
Figure 4 Median age (in years) of employed in primary industries: Japan 1960-2000, Australia 1971-2001



Source: As for Figure 1

When compared to tertiary industries, those employed in secondary industries aged at a more rapid pace. Compared to those employed in primary industries, the speed of ageing was less speedy. In Japan, the their median age increased by nearly 15 years from 30 years in 1960 to 44.9 years in 2000. In 2000, the highest median age of 48.8 years was for those employed in the Mining industry. In Australia, the median age of those employed in the secondary industries rose less rapidly than in Japan, from 36.5 years in 1971 to 39.2 years in 2001. As in Japan, the highest median age of 39.8 years was observed for those employed in Mining (2001 figure).

Figure 5 Median age (in years) of employed in secondary industries: Japan 1960-2000, Australia 1971-2001



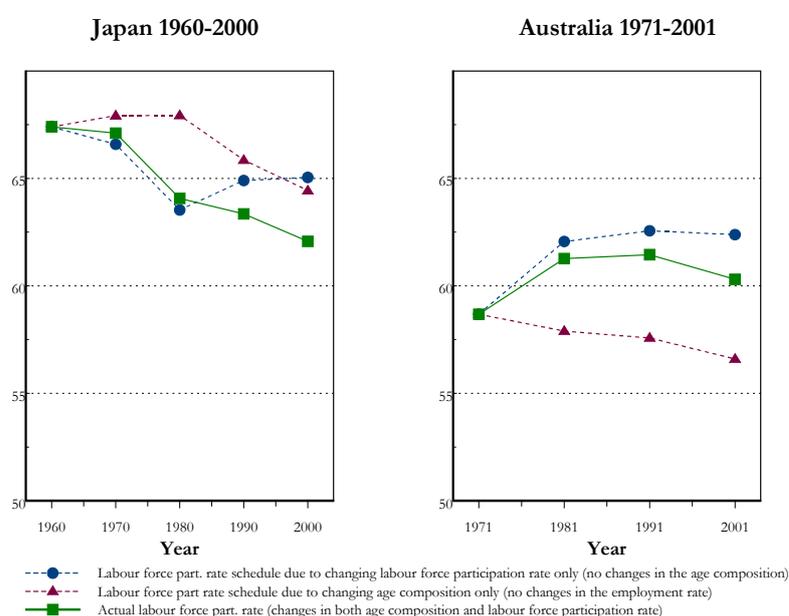
Source: As for Figure 1

Contribution of ageing-related age structural changes to the labour force participation and industries' employment levels

The decomposition has revealed that between 1960 and 1980, the changes in the age-specific labour participation were the major contributing factor to the overall labour force participation rate decline (the shape of the actual participation rate curve follows closely the shape of participation rate given no changes in the age composition) in Japan. In this period, the age compositional changes displayed only a minor positive effect, contributing positively 0.5 percentage points to the total participation rate decline of 3.3 percentage points. This situation has changed in the last two decades in Japan. From 1980 on, the decline of the total labour force participation rate in Japan is driven largely by age compositional changes. As shown in the Figure 6, given no age compositional change, the total participation rate in 2000 would have been 3.5 percentage points higher.

Similarly to Japan, in Australia, the significance and direction of the contribution of the age compositional changes to the overall labour force participation rate have varied over the research period. While between 1971 and 1991, the rise of 2.8 percentage point in the total labour force participation was due to 3.9 percentage points attributable to rising labour participation (the age compositional changes accounted for -1.1 percentage points), the last decade's drop of 1.1 percentage points was the result of the age compositional changes which contributed negatively 1 percentage point.

Figure 6 Actual and hypothesised labour force participation rate schedule (in per cent): Japan 1960-2000, Australia 1971-2001



Source: As for Figure 1

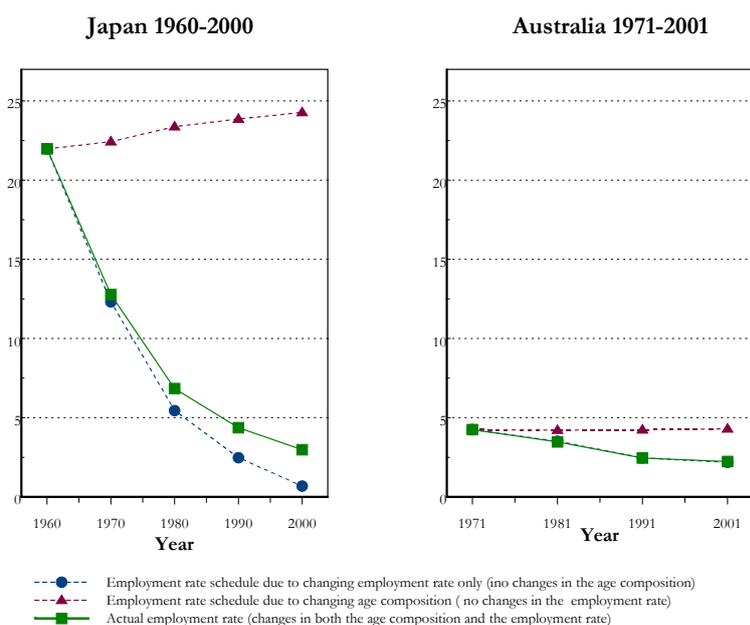
Why has the contribution of the age structural changes varied in its significance and direction in Japan and in Australia? The major reason for this was the advanced stage and very rapid pace of ageing in Japan, and its relatively moderate progress in Australia. Variations in the significance and direction of the effect of the age compositional changes at different stages of ageing of the labour force corresponded directly to changing shares of particular age groups within the age composition component. The period 1960-80 in Japan was characterised by only mild ageing of the population aged 15+. That is, a decline of the share of those aged 15-24 and a continuously growing population of prime working ages accompanied increases in the proportion of those aged 55+. These two increasing age groups made such a large contribution to the total age composition component that they were able to compensate for the decline of the young population aged 15-24. Hence, the age composition component took positive values. This situation has changed in the last two decades when the share of those aged 25-54 in the population aged 15+ started to decline rapidly. This rapid decline has translated into a strongly negative age composition component prevalent in Japan from 1980 onwards.

In Australia, in contrast to Japan, the significance of the age compositional changes has remained limited over the 1971-2001 period. This was because ageing of the population aged 15+ has been displayed only in decline of the share of those aged 15-24 and from 1991 onwards in small increases in those aged 55+. Over the whole 1971-2001, the negative contribution of the 15-24 age group has been partially offset by moderately growing population in prime working ages. As a result, the magnitude of the age composition component remained comparatively limited in Australia.

As the magnitude and pace of ageing varied for particular industries, so did the significance and the direction of the age composition component, directly depending on the age-structure of their employees. While some industries benefited from the changes in age composition, for most, the age compositional changes in ageing economies tended to be unfavourable. For a number of industries, the age compositional and employment demand changes acted in opposite directions. This may have been the reason for labour mismatches and structural unemployment present in both countries in that period.

The ageing of the labour force favoured employment in primary industries, as they have displayed continuously high employment rates of older persons. However, due to structural change of employment, the employment rate of these industries endured a decline in both countries. Over the period 1960-2000 in Japan and 1971-2001 in Australia it declined by 19 and 2 percentage points respectively. The employment decline was driven by decline in the employment rates, as the contribution of the age compositional changes was positive in Japan, and nearly non-existent in Australia. While over the whole research period the employment rate component contributed negatively (21.3 percentage points in Japan and 2.1 percentage points in Australia), age composition made a positive contribution of 2.3 percentage points in Japan and 0.1 percentage points in Australia.

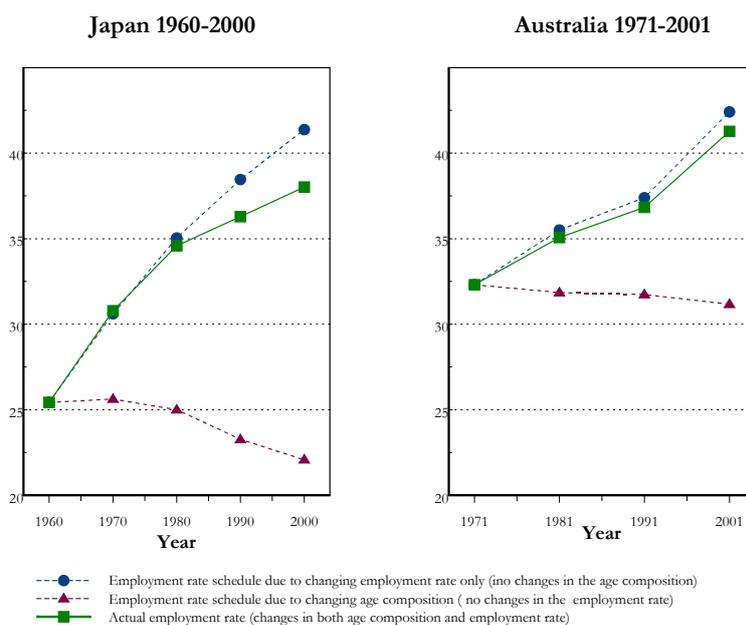
Figure 7 Actual and hypothesised employment rate in primary industries (in per cent): Japan 1960-2000, Australia 1971-2001



Source: As for Figure 1

Tertiary and secondary industries which tended to employ a young (aged 15-24) and adult (aged 25-54) labour force have been negatively affected by labour force ageing. Tertiary industries were the industries of the most rapidly growing employment in both countries. Over the whole research period, their total employment rate increased by 12.6 percentage points in Japan and by 9 percentage points in Australia. As depicted in Figure 4.3-1, increasing employment demand in these industries drove this rapid employment growth, as the age compositional changes acted as a brake on employment. Given no age compositional changes between 1960 and 2000 in Japan and 1971 and 2001 in Australia, the employment rate of tertiary industries would have increased by an extra 3.4 percentage points in Japan and 1.1 percentage points in Australia. In other words, the employment in the tertiary industries could have been higher (due to its increasing demand) given no changes in the age composition of the population aged 15+. This may have been the case for Finance, Insurance, Property, Business (Australia, Japan) Wholesale and Retail Trade (Australia) and Services (Japan).

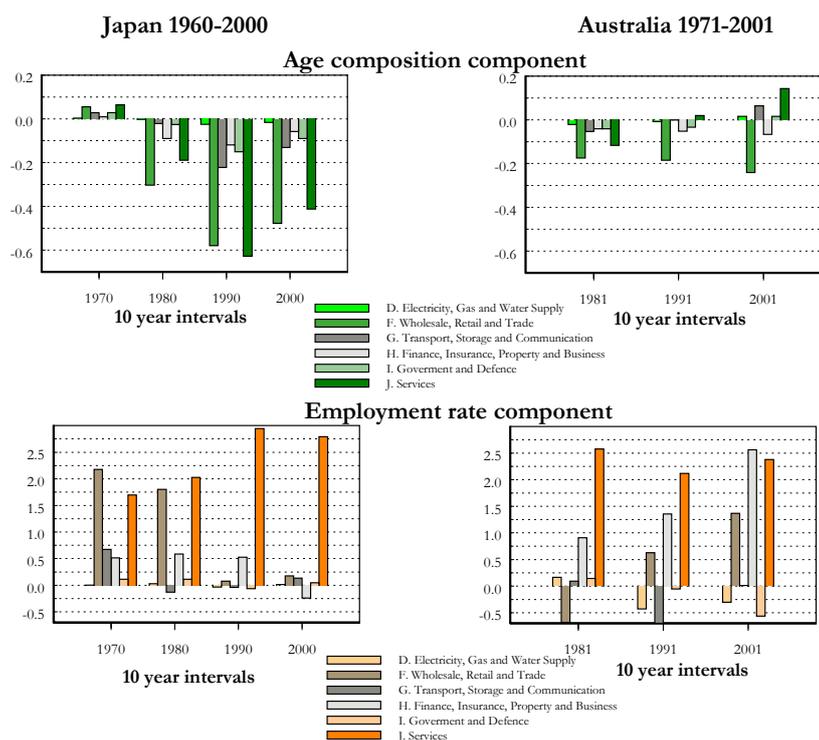
**Figure 8 Actual and hypothesised employment rate in tertiary industries (in per cent):
Japan 1960-2000, Australia 1971-2001**



Source: As for Figure 1

The age compositional changes were especially unfavourable toward employment in Services in Japan and Wholesale and Retail Trade in both countries. These were the industries with the highest employment rates, hence employment share and demand for the youngest and prime working age workers. The negative age composition component was also of significant magnitude for Transport, Storage and Communication in Japan and Finance, Insurance and Property and Business in both countries (see Figure 9).

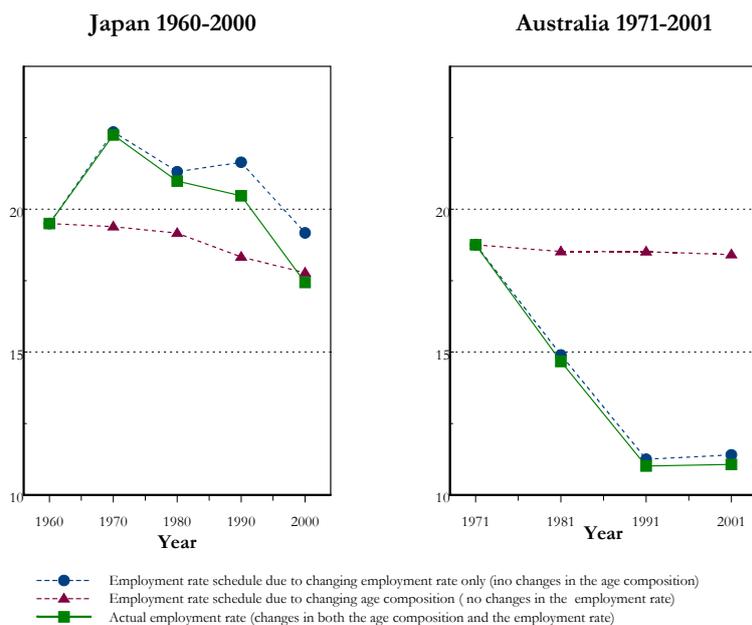
Figure 9 Age composition and employment rate components of particular tertiary industries (in percent): Japan 1960-2000, Australia 1971-2001



Source: As for Figure 1

The employment dynamics in secondary industries were unlike those of tertiary industries. The rapid decline of its employment rate between 1970 and 2000 in Japan and 1971 and 1991 in Australia was due to negative contributions from both employment and age compositional changes. As presented in Figure 4.3-4, the contribution of age compositional changes to the total decline of the employment rate was limited (the shape of the actual employment rate differs significantly from that under assumption of no employment rate changes). The total decline of 2.1 percentage points in Japan between 1960 and 2000 was attributable to 1.7 percentage points to labour demand and up to 0.4 percentage points to the age compositional component. In Australia, the age compositional component contributed only 0.3 percentage points of the total decline of 7.7 percentage points, observed between 1971 and 2001.

Figure 10 Actual and hypothesised employment rate in the secondary industries (in per cent): Japan 1960-2000, Australia 1971-2001



Source: As for Figure 1

5 CONCLUSIONS

The decomposition analysis has shown that given stable age-specific participation patterns, ageing of the labour force contributes negatively to labour participation as shown in the increasingly negative age composition component. While both decline in the 15-24 and increase in the 55+ age groups alone results in moderate changes to the significance of the age composition component, being accompanied by decline of the prime working age group (aged 25-54) strengthens its strong negative values.

It was also demonstrated that significance and the direction of the age composition component has vary for different industries, directly depending on the age-structure of their employees. While some industries benefit from the changes in age composition, for most, the age compositional changes in ageing economies tend to be unfavourable. The ageing of the labour force favours employment in primary industries, as they have displayed continuously high employment rates of older persons. Industries tending to employ a young (aged 15-24) and adult (aged 25-54) labour force are negatively affected. These are tertiary and secondary industries, in particular: Services (Japan), Wholesale and Retail Trade (Japan and Australia), Finance, Insurance, Property, Business (Japan and Australia) and Transport, Storage and Communication (Japan).

For a number of industries, the age compositional and employment demand changes act in the opposite directions. This may have been the reason for labour mismatches and structural unemployment present in both countries over the period of study. This was the case in particular for tertiary industries, for which the negative age composition components have been accompanied by positive employment rate components. In other words, the employment in the tertiary industries could have been higher (due to its increasing demand) given no changes in the age composition of the population aged 15+. This may have been the case for Finance, Insurance, Property, Business (Australia, Japan) Wholesale and Retail Trade (Australia) and Services (Japan).

The analysis presented in this paper accessed only past contribution of ageing to the labour force participation and industries' employment levels, as the usage of the census data and Kitagawa's decomposition technique did not allow for any estimates of its future projected effects. This is a considerable weakness of the above analysis, as in the face of relatively early stages of labour force ageing in Australia, the real magnitude its labour market and employment effects is only to be seen in the two coming decades, and as such is beyond the scope of this analysis.

Another limitation of the technique applied is its assumption of constant- average labour force participation industries' employment rates over the period of study. This assumption is a slight simplification of labour market reality. Although as shown in the census data, particular industries displayed over the past 3-4 decades relatively stable preferences to employ particular age-sex groups there is a certain degree of substitutability between particular age-sex groups which the decomposition technique cannot measure. It would be beneficial for policy purposes to conduct a detailed analysis of determinants of employment of particular age-sex groups in particular industries and to calculate their employment elasticity. This could be helpful in improving the employability of particular age-sex groups as the labour force ages and assessing the degree of the adaptability of employment demand of particular industries to changing labour supplies.

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