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### **Abstract**

The analysis of regional markets has surfaced as an important emerging area of economic research in recent years. In particular, economists have attempted to explain the factors behind divergent trends in different regions' growth, migration, structural change and employment. With this in mind, the focus of this paper is to explore the trends in regional labour force participation for mature females over the period 1992 to present. The labour force participation of this group is particularly relevant in the context of Australia's ageing population. To analyse mature age participation we utilise ANOVA to determine the differences between various Australian regions and unit root testing incorporating structural breaks to investigate the time series dynamics. Our findings will have significant implications for Australia's regional and ageing policy platforms.

### **Keywords**

era2015, south, aged, markets, mature, labour, participation, analysis, female, regional, wales

### **Disciplines**

Business

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# **An Analysis of Mature Aged Female Participation in New South Wales Regional Labour Markets**

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*The analysis of regional markets has surfaced as an important emerging area of economic research in recent years. In particular, economists have attempted to explain the factors behind divergent trends in different regions' growth, migration, structural change and employment. With this in mind, the focus of this paper is to explore the trends in regional labour force participation for mature females over the period 1992 to present. The labour force participation of this group is particularly relevant in the context of Australia's ageing population. To analyse mature age participation we utilise ANOVA to determine the differences between various Australian regions and unit root testing incorporating structural breaks to investigate the time series dynamics. Our findings will have significant implications for Australia's regional and ageing policy platforms.*

## **Introduction**

This paper represents preliminary research into female labour force participation trends within Australia. It is the first stage in a proposed long term study of mature aged women's contribution to the labour market and issues affecting their retirement. There have been a considerable number of studies conducted over the years on analysing factors affecting mature male labour force participation (for example Blöndal and Scarpetta 1998; O'Brien 2001; Duval 2003; O'Brien 2010; Duval, Eris et al. 2011; O'Brien 2011), however relatively little research has been conducted on mature female labour force participation (see Jaumotte 2003; Austen and Seymour 2006). This is surprising, given the significant changes in female labour force participation trends over the past few decades and substantial representation in the labour market. For example, female labour force participation rates have grown from 36.3 per cent in 1966 to 58 per cent in 2012 while male participation has decreased from 84 per cent 70.9 per cent for the same time period (ABS 2012). With Australia experiencing an ageing population, it would appear pertinent to be examining the influences on mature females' labour force participation.

The present paper explores the observed patterns in mature aged (45-59 years of age) female labour force participation rates, with a particular focus on New South Wales (NSW) major statistical regions. This paper differs from previous studies of female labour force participation in two key aspects. First, little has been done in the area of labour force participation at a regional level. Some studies have been focused on Sydney as one statistical region (see Ross 1986). However this paper will break Sydney down into eleven statistical regions, as well as the other statistical regions that make up the state of NSW. Second, we utilise sophisticated unit root tests incorporating endogenously determined structural breaks that have not previously been applied to female labour force participation rates. The findings from these tests will have important implications for the nature of the econometric modelling of female labour force participation rates that will occur at a later date.

### **Historical Background**

Over the past 50 years female labour force participation has been shaped by many social, economic and environmental factors. These factors have contributed to the participation or non-participation of mature aged women throughout their life cycle.

The 1960s was a time of strong economic growth, low inflation, low interest rates and high levels of protection for local industry (Brown 2002). Male employment levels were close to full employment, with only 0.9 per cent unemployment in November 1966 (ABS 2012). Female labour force participation rates were affected by the social and cultural beliefs that young women were expected to become full-time home makers or enter only a narrow range of occupations for which they were thought to be naturally suited. This was also reflected in educational attainment. For example, the median at which females left school was 15.6 years old for those born in the 1940's (Daly 1990). Women married young, on average at 19-20 years of age, and the fertility rate was 3.6 babies born per women (Berrell 2011). The introduction of the contraceptive pill in 1961 allowed some women greater control in decisions about motherhood and the fertility rate subsequently declined (Strachan 2010).

Gender segregation was a key feature of the labour market and employment opportunities for women were also formally restricted by legislation. For example The Commonwealth Public Service did not allow married women to be appointed or remain as public service officers (Berrell 2011). In 1966 changes to legislation not only allowed married women to work in

the Public Service, but also allowed mothers to return to work after childbirth (Brown 2002). Then in 1969 the Commonwealth Conciliation and Arbitration Commission formulated the principle of 'equal pay for equal work'. This ruling outlined that in male dominated industries, men and women employees must be paid the same wage for the same work. However the extent of gender segregation in the workforce at the time meant the ruling only affected 18 per cent of female employees (Strachan 2010).

Women in the 1970s had wider employment options, partly due the legislation introduced in the previous decade with the equal pay case concluded by 1972 (Strachan 2010). However, equal pay was not mandatory and occurred on an ad hoc basis, with the undervaluing of women's work remaining (Strachan 2010). The Australian economy was characterised by weaker economic growth and stagflation, which could be attributed to the international oil crisis that occurred in 1973 (Berrell 2011). Many women who were leaving school in the 1970s did not complete Year 12, however entrance to higher education was made financially accessible with the abolishment of fees in 1973 for universities and colleges of advanced education (Berrell 2011).

Other changes in legislation during this period may have contributed to increased female work force participation. The *Federal Child Care Act 1972* provided funding for non-profit organisations to operate childcare centres for sick or working parents (Berrell 2011). In 1979 the right to unpaid maternity leave was established, which was available to all permanent female employees in the private sector (Brown 2002). However the Sole Parent's Pension introduced in 1973 may have assisted women to remain out of the work force (Brown 2002).

Weak economic growth continued into the 1980s, eventually leading to a recession in 1983. The Federal government floated the exchange rate, deregulated the financial sector, reduced tariffs further and partially privatised a number of public enterprises (Berrell 2011). These changes affected the labour market with demand for skilled labour increasing while the number of low-skilled jobs available to school leavers declined (Berrell 2011). However, there was increased opportunities for casual and part-time employment and rising school retention rate for females (Brown 2002).

Legislation in the 1980s was designed to promote equal employment opportunity (EEO). The *Sex Discrimination Act 1984* and the *Affirmative Action (Equal Opportunity for Women)*

*Act 1986* were aimed to remove the hidden institutional barriers to women's employment and promotion (Strachan 2010).

From the 1990s policies were focused on assisting employees to combine paid work and personal caring responsibilities. This marked the change from the 1950s model of a male being the single wage earner to a dual income earning model.

### **Determinants of Mature Female Labour Supply**

A number of factors can influence the extent of mature female labour force participation. Education is one of the main determinants and can be measured by years of education, the age at which an individual leaves school, and highest level of educational achievement or post-school qualification (Birch 2005b). Most studies have found a positive correlation between education and labour force participation. For example, Birch (2005a) found that the probability of labour force participation for women aged 40 to 49 years with degrees and diplomas were 22.6 and 14.0 percentage points higher than those women without qualifications. However, other studies in Australia found no significant differences in the labour force participation rates of mature women and their level of education (see Miller and Volker 1983).

Labour market experience is also a factor that would be expected to add to a female's work force participation when she is older. This however is an under-research area in Australia as the amount of longitudinal and career history data is limited. Of the studies that have been conducted (see Birch 2005a; Cai and Kalb 2006), both reported a positive relationship between older women's labour force participation and their labour market experience.

Health is another factor that has been linked to older women's ability to participate in the labour market. Once again this is an under-researched area (see Cai and Kalb 2006), although one that should be considered given Australia's ageing population and the effect that it is likely to have with the increase in the number of employees with age related health problems.

Studies also acknowledge the number of children a woman has should be considered an important determinant in their work force participation. Although the Australian studies have produced different results (see Miller and Volker 1983; Birch 2005b; Cai and Kalb 2006), it

is generally believed that women with a large number of children, or younger children, are typically found to have a considerably lower likelihood of participation than women with less, or older, children.

Other studies have addressed ethnicity and English skills as determinants of mature women's work force participation (see Miller and Volker 1983; Cai and Kalb 2006). Although English skills appear to be an important factor in determining mature women's ability to participate in the workforce, the research findings have been mixed and it is another area of research in need of further study.

The theory of labour market participation usually distinguishes the decision to participate being a choice between the need for income versus leisure time. It is believed that if a woman has access to non-labour forms of income they will not participate in the labour market. Thus non-labour market income is often represented by spousal wages, accumulated savings and investments (Austen and Birch 2005). Therefore, it has been common for studies of older women's participation behaviour to use data samples restricted to married women. However, the effect of spouse or partner income on mature women's work force participation is inconclusive. Some studies suggest that as access to non-labour income expands participation should be less, while other studies have found the opposite. These results may be affected by the specific cohort analysed in different time periods. For example Miller and Volker (1983) used data from 1976 using a sample of women aged 45 to 64, while Birch's (2005a) data came from 1992 using women aged 40 to 59.

### **Labour Demand Influences**

Labour force participation rates will be affected by both supply and demand influences. The demand for labour is derived from the demand for the goods and services that it produces. Therefore, the general level of economic growth is an important influence on the participation of individuals in the labour market. Furthermore, it has been established that the labour market is generally segregated by gender and age, with unequal representation of genders and age groups across industries (O'Brien 2005). Therefore, another important influence on participation comes from industry composition and structural change of industry composition over time. There has been an increase in the service oriented industries over recent decades. For example, cafes, restaurants and hospitality which are predominately feminised industries.

Other areas of strong growth include construction and in recent years the mining sector, whereas manufacturing and agricultural industries have been generally stagnant. Industry composition may be a particularly relevant issue as we analyse labour markets at the regional level.

Finally, another feature of Australian labour markets over recent decades is the growth of part-time and casual employment. Such forms of employment also allow greater female labour force participation.

## **Methodology**

In order to explore the nature of regional labour market data for mature aged females we employ two main statistical methods. First, we conduct ANOVA tests as an initial step to determine if the regional labour market data is homogenous in nature. The null hypothesis is for equality of mean labour force participation rates across regions. If the null hypothesis is rejected, the Tukey-Kramer procedure will be employed to determine which regions differ from each other. This ANOVA analysis will give us a preliminary indication of the extent of any differences between labour force participation rates of various regions. The regions are split into two groups for this analysis. Namely, Sydney's major statistical regions and the other regions of NSW.

Second, the time series properties of the data are examined using unit root testing techniques. These are used to determine if the data are stationary, and if not, what procedures have to be followed to achieve stationarity. Stationarity implies that times series data has both a constant mean and variance over time. Labour force participation rates of females are unlikely to be stationary as it is well known that this variable has increased over time. However, what is unknown is what procedure needs to be used to convert this data into stationary variables. This is a crucial step before econometric modelling of this data is undertaken. Modelling nonstationary data has the potential risk of producing a spurious, or meaningless, relationship.

Nonstationary variables can be from either a difference stationary process (DSP) or a trend stationary process (TSP). DSP data require either first or second differencing to achieve stationarity while TSP data needs to be detrended. A convenient hypothesis test to determine

the time series properties of the data is the unit root test. It is important to allow for the presence of structural breaks in the data, otherwise we can easily conclude a time series is a DSP when in fact it is a TSP. We thus use the Lee and Strazicich (2003) unit root test which allows for two endogenously determined structural breaks. The null hypothesis implies a unit root and thus a DSP while the alternative hypothesis implies that the variable is a TSP.

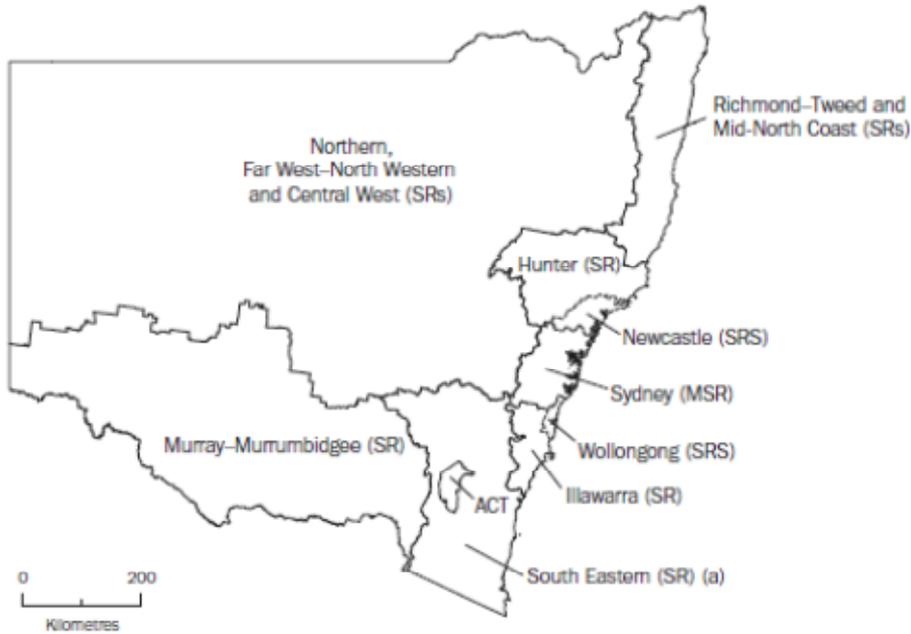
## **Data**

NSW is divided into various statistical regions (see Figure 1). These are intended to represent areas of the State which are characterised by noticeable social and/or economic links between the inhabitants and economic units within them, under the centralised influence of one or more major cities or towns. The boundaries of the divisions have consequently been defined on the basic criterion that the degree of economic and/or social contact and interaction within each division should be maximised (Bray 2002).

**Figure 1 Statistical Regions of NSW**

**STATISTICAL REGIONS OF NEW SOUTH WALES**

REGIONS OF NSW AND ACT



(a) Not published separately

REGIONS OF SYDNEY (MSR)



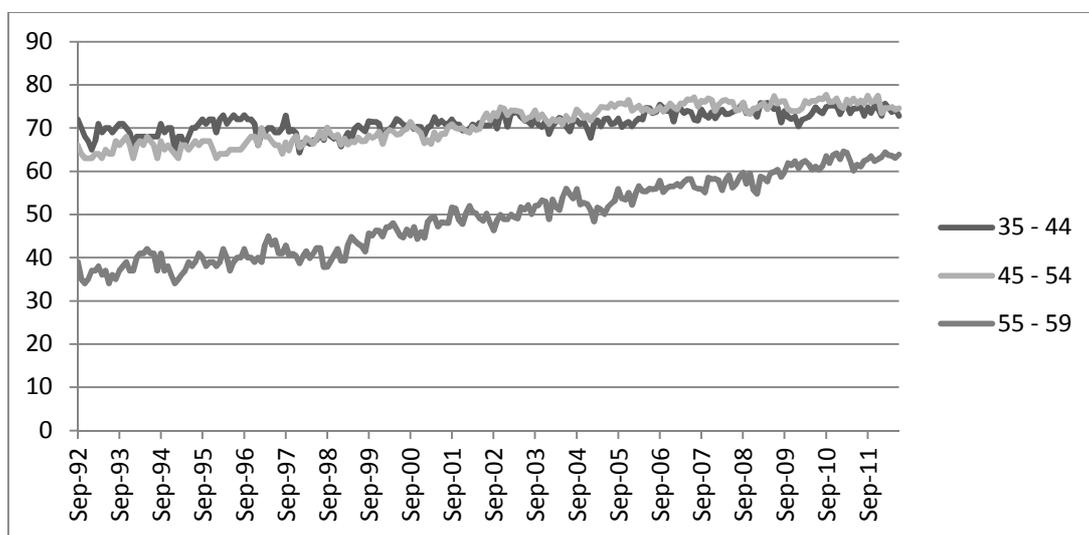
1. Inner Sydney (SR)
2. Eastern Suburbs (SR)
3. St George Sutherland (SR)
4. Canterbury Bankstown (SR)
5. Fairfield Liverpool (SR)
6. Outer South Western Sydney (SR)(a)
7. Inner Western Sydney (SR)(a)
8. Central Western Sydney (SR)
9. North Western Sydney (SR)
10. Lower Northern Sydney (SR)
11. Central Northern Sydney (SR)
12. Northern Beaches (SR)
13. Gosford Wyong (SR)

(a) Not published separately

Source: Bray 2002

Female labour force participation rates were analysed from the Australian Bureau of Statistics Labour Force data covering the years 1992 to present, for the ages of 45-54 and 55-59. Participation rates for mature aged women having been increasing over time (Figure 2). The labour force participation rate for females aged 45-54 years increased by approximately 10 percentage points, with participation of the 55-59 age group increasing substantially from 39 percent in 1992 to 63 per cent in June 2012 (ABS 2009). Participation rates for the 35-44 age cohort are relatively stagnant in comparison.

**Figure 2. Female Labour Force Participation Rates in NSW – 1992 to 2012.**



(ABS 2009)

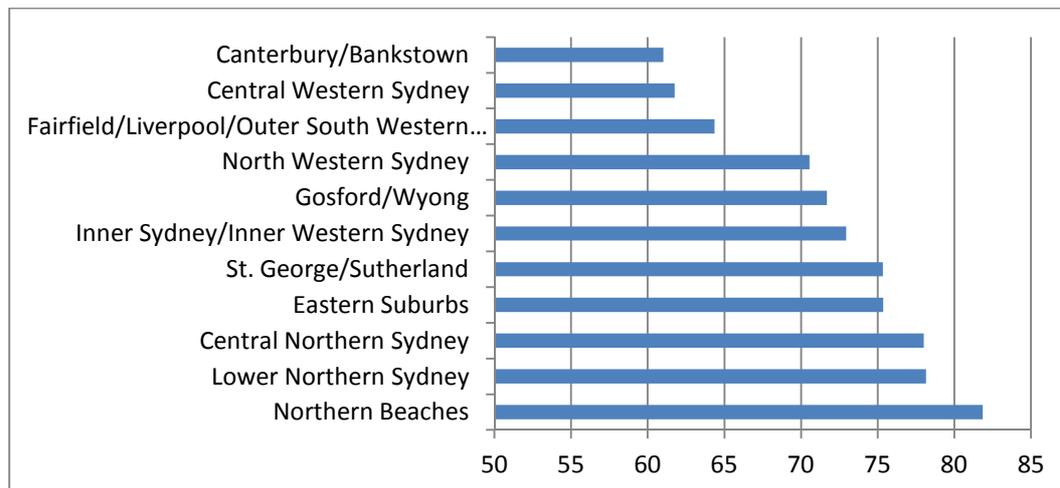
### ANOVA Results

A statistical analysis using ANOVA was conducted for NSW and Sydney's major statistical regions. Data used was the female labour force participation rates for the age groups 45-54 and 55-59 years. The results have been summarised in the below tables and figures. The tables report the statistical region's mean, with the last column indicating which region's means are statistically similar. For example, in Table 1 below Gosford/Wyong (CD) is statistically similar to both North Western Sydney (C) and Inner Sydney/Inner Western Sydney (D). However North Western Sydney (C) and Inner Sydney/Inner Western Sydney (D) are not statistically the same.

**Table 1 ANOVA Results for Females Aged 45-54 (Sydney Statistical Regions)**

Region	Mean	Same
Canterbury/Bankstown	61.01302521	A
Central Western Sydney	61.76260504	A
Fairfield-Liverpool/Outer South Western Sydney	64.35882353	B
North Western Sydney	70.54411765	C
Gosford/Wyong	71.68445378	CD
Inner Sydney/Inner Western Sydney	72.95714286	D
St. George/Sutherland	75.34621849	E
Eastern Suburbs	75.35546218	E
Central Northern Sydney	78.01848739	F
Lower Northern Sydney	78.15252101	F
Northern Beaches	81.85462185	G

**Figure 3 Mean Labour Force Participation Rates for Females aged 45-54 (Sydney Statistical Regions)**



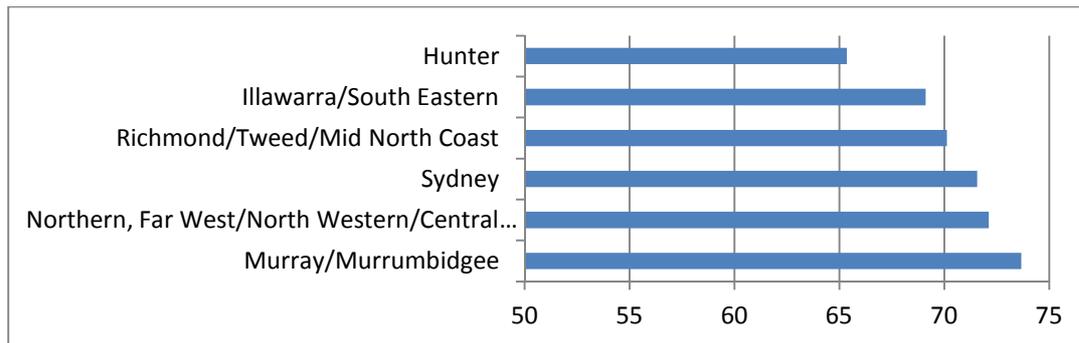
The results for the 45-54 age cohort based on Sydney’s statistical regions shows a wide range of means with few regions sharing similar means. The lowest participation rate is Canterbury/Bankstown with a mean of 61% while Northern Beaches is over 20 percentage points higher at 81.8%. Canterbury/Bankstown is comparable to that of its neighbouring region Central Western Sydney at 61.7%. Fairfield/Liverpool/Outer South Western Sydney is statistically different, although it is closest to the two lowest regions both in location and means. Gosford/Wyong is similar to both North Western Sydney and Inner Sydney/Inner Western Sydney, however as previously mentioned these two regions are not statistically the same. These regions are not located near each other so further research into their demographics may be required to account for the similarities. St George/Sutherland and Eastern Suburbs are statistically very similar with means of 75.34 percent and 75.35 percent

respectively. Although these two regions are not neighbours they are in close proximity to each other which may explain the closeness of means. The last regions of Central Northern Sydney and Lower Northern Sydney are not only statistically similar but are also neighbouring regions.

**Table 2. ANOVA Results for Females Aged 45-54 (NSW Statistical Regions)**

Name	Mean	Same
Hunter	65.36428571	A
Illawarra/South Eastern	69.10882353	B
Richmond/Tweed/Mid North Coast	70.12142857	BC
Sydney	71.56680672	CD
Northern, Far West/North Western/Central West	72.1197479	DE
Murray/Murrumbidgee	73.66932773	E

**Figure 4. Mean Labour Force Participation Rates for Females aged 45-54 (NSW Statistical Regions)**

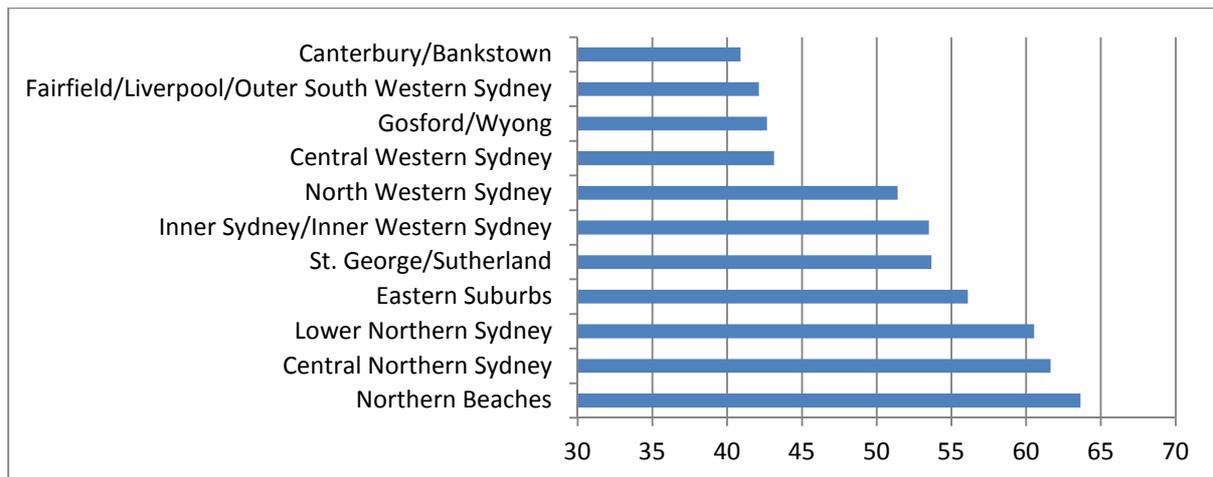


The results for the NSW statistical regions (Table 2 and Figure 4) in the same age cohort of 45-55 show the same diverse results as the Sydney statistical regions. Referring to the last column, it is evident that there is little overlap between the regions. Hunter has a mean participation rate of 65.3 percent while Murray/Murrumbidgee is significantly higher at 73.6 percent. Illawarra/South Eastern is statistically similar to Richmond/Tweed/Mid North Coast which may be explained by their coastal locations and corresponding industries. Sydney is similar to both Richmond/Tweed/Mid North Coast and Northern, Far West/North Western/Central West, which is surprising given their diversely different geographic locations and industry composition. Finally Northern, Far West/North Western/Central West is statistically similar to Murray/Murrumbidgee which given their rural locations is not unexpected.

**Table 3. ANOVA Results for Females Aged 55-59 (Sydney Statistical Regions)**

Region	Mean	Same
Canterbury/Bankstown	40.88613445	A
Fairfield-Liverpool/Outer South Western Sydney	42.1210084	A
Gosford/Wyong	42.66638655	A
Central Western Sydney	43.13529412	A
North Western Sydney	51.41176471	B
Inner Sydney/Inner Western Sydney	53.48361345	BC
St. George/Sutherland	53.66848739	BC
Eastern Suburbs	56.10756303	C
Lower Northern Sydney	60.54159664	D
Central Northern Sydney	61.63907563	D
Northern Beaches	63.62436975	D

**Figure 5. Mean Labour Force Participation Rates for Females aged 55-59 (Sydney Statistical Regions)**



The 55-59 cohort produced quite different results from the younger 45-54 age cohort. The means for the older cohort are significantly lower than the younger age group for example Northern Beaches for the 45-54 cohort has a mean of 81.8 percent whereas the 55-59 age group it has a mean of 63.6 percent. This is indicating the drop in female workforce participation as women age (also refer to Figure 2).

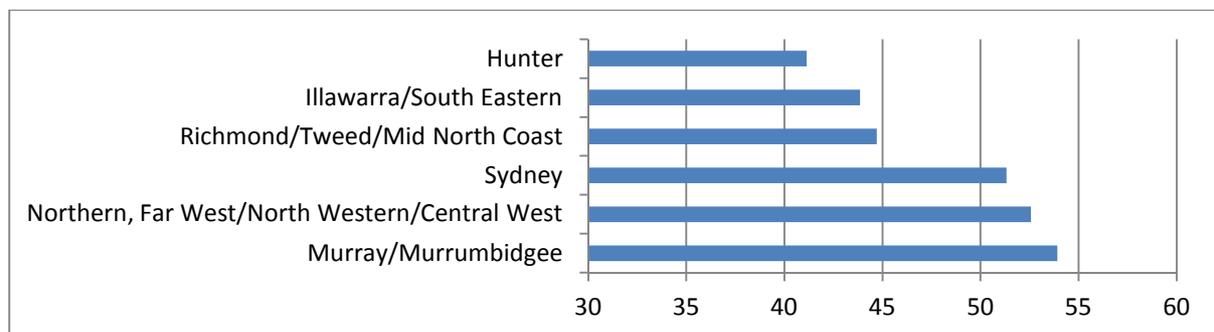
Referring to Table 3, Sydney’s statistical regions for this older age group still shows the wide gap between Canterbury/Bankstown at 40.8 percent and Northern Beaches (once again over 20 percentage points higher at 63.6 percent). However, in general the regions are more bunched together than for the 45-54 group. The first four regions on Table 3 are all statistically comparable, as are the last three regions. Inner Sydney/Inner Western Sydney

and St George/Sutherland are both statistically related with North Western Sydney and Eastern Suburbs, however these two latter regions are not connected to each other.

**Table 4 ANOVA Results for Females Aged 45-54 (NSW Statistical Regions)**

Name	Mean	Same
Hunter	41.13277311	A
Illawarra/South Eastern	43.85462185	AB
Richmond-Tweed/Mid-North Coast	44.71386555	B
Sydney	51.32478992	C
Northern, Far West-North Western/Central West	52.5697479	C
Murray/Murrumbidgee	53.92352941	C

**Figure 6 Mean Labour Force Participation Rates for Females aged 55-59 (NSW Statistical Regions)**



The results for the NSW statistical regions in the 54-59 cohort confirm the same regions at the extremes with over 10 percentage points gap between Hunter and Murray/Murrumbidgee, a slightly larger gap than in the 45-54 age group. Unlike the younger age group, Hunter is statistically similar to another region, that of the Illawarra/South Eastern. This latter region is also comparable to Richmond-Tweed/Mid-North Coast. The remaining three regions are all statistically similar.

### Unit Root tests

The results of the unit root tests in the presence of endogenously determined structural breaks are presented in Tables 5 and 6. Two tests are presented, which allow for structural breaks in the level (intercept) of the variable, and level and trend (slope), respectively. All labour force participation rate times series are found to be trend stationary. This is an important finding for our planned econometric modelling, as it means that our dependent variables simply have to

be detrended to achieve stationarity. However, this detrending process will be complicated somewhat by the presence of structural breaks in both level and slope.

Furthermore, it is evident that there is a lack of synchronisation across the regions' labour force participation rates as shown by the varied time periods identified for the structural breaks. The structural breaks are not consistently positive or negative for the different regions at similar points in time. For example, a number of regions experienced a structural break in 2000 or 2001 in either the level or slope of the trend. However, for some regions this was a positive shift and others it was negative.

Finally, the breaks do not necessarily coincide with significant economic events affecting labour demand, such as recessions or crises, nor do they appear to reflect major demographic shifts on the supply side, such as the arrival of the baby boomer generation in the older age groups.

**Table 5. Unit Root Tests for Females Aged 45-54**

	Level			Trend		
	Test Statistic	1 <sup>st</sup> Break	2 <sup>nd</sup> Break	Test Statistic	1 <sup>st</sup> Break	2 <sup>nd</sup> Break
Canterbury/Bankstown	-5.70***	Aug 95	Feb 05	-6.72***	Jan 00	Apr 04
		-ve	+ve		+ve	+ve
Central Northern Sydney	-7.15***	Apr 01	Oct 05	-7.34***	Dec 03	May 07
		+ve	+ve		+ve	-ve
Central Western Sydney	-4.27**	Nov 00	Mar 10	-4.83	Aug 96	Oct 00
		-ve	-ve		+ve	-ve
Eastern Sydney	-3.74*	Sep 94	Mar 07	-5.35**	Jun 03	Jun 07
		-ve	-ve		+ve	+ve
Fairfield/Liverpool	-6.30***	Apr 98	Dec 07	-7.38***	Sep 95	Sep 04
		-ve	-ve		+ve	-ve
Gosford-Wyong	-4.81***	Oct 94	Jun 07	-6.02***	Sep 98	Nov 02
		+ve	-ve		-ve	+ve
Hunter	-4.34**	Feb 00	Feb 04	-6.11***	Jul 00	Jul 05
		+ve	+ve		+ve	+ve
Illawarra/South Eastern	-5.78***	May 01	Feb 08	-6.78***	Jul 01	Nov 08
		+ve	+ve		-ve	-ve
Inner Sydney	-4.92***	Jul 02	Jun 08	-6.72***	Aug 94	Nov 08
		-ve	-ve		-ve	-ve
Lower Northern Sydney	-4.08**	Nov 00	Feb 02	-6.71***	Feb 01	Dec 01
		-ve	+ve		-ve	+ve
Murray/Murrumbidgee	-3.88**	Aug 00	Jul 05	-6.14***	Aug 94	Nov 01
		+ve	+ve		+ve	+ve
North Western Sydney	-6.37***	Apr 98	Jun 99	-7.16***	May 96	Nov 03
		-ve	+ve		+ve	-ve
Northern Beaches	-4.93***	Jul 01	Nov 03	-5.72**	Mar 02	Feb 04
		+ve	+ve		-ve	+ve
Northern, Far West/North Western	-4.28**	May 02	Jul 06	-6.19***	Feb 98	Aug 09
		+ve	+ve		+ve	-ve
Richmond/Tweed/Mid North Coast	-6.84***	Jun 98	Aug 02	-7.32***	Aug 05	Apr 10
		+ve	-ve		-ve	+ve
St George/Sutherland	-5.35***	Aug 00	Jan 10	-7.00***	Dec 98	Dec 06
		+ve	+ve		+ve	-ve

Authors' calculations using Lee and Strazicich (2003) method  
 \*\*\* significant at 1%, \*\* significant at 5%, \* significant at 10%

**Table 6. Unit Root Tests for Females Aged 55-59**

	Level			Trend		
	Test Statistic	1 <sup>st</sup> Break	2 <sup>nd</sup> Break	Test Statistic	1 <sup>st</sup> Break	2 <sup>nd</sup> Break
Canterbury/Bankstown	-3.67*	Jan 07	Mar 09	-7.89***	Nov 01	Jun 06
		-ve	+ve		+ve	-ve
Central Northern Sydney	-4.60***	May 02	Sep 07	-5.64**	Apr 07	Jul 09
		-ve	-ve		-ve	+ve
Central Western Sydney	-6.89***	May 98	Sep 01	-7.36***	Aug 97	Jan 02
		-ve	+ve		-ve	+ve
Eastern Sydney	-4.77***	Nov 00	Sep 04	-5.64**	Aug 05	Nov 08
		-ve	-ve		-ve	+ve
Fairfield/Liverpool	-5.87***	Sep 94	Dec 08	-7.00***	Aug 05	Nov 08
		-ve	-ve		-ve	+ve
Gosford-Wyong	-5.64***	Aug 06	Jul 09	-6.13***	Mar 03	Feb 10
		+ve	-ve		-ve	-ve
Hunter	-5.36***	Nov 94	May 06	-5.92***	Jun 97	May 06
		+ve	+ve		+ve	+ve
Illawarra/South Eastern	-5.49***	Feb 06	Jan 08	-5.72***	Aug 01	Mar 05
		+ve	-ve		-ve	+ve
Inner Sydney	-2.31	Nov 94	Feb 95	-6.97***	Nov 94	Jun 06
		-ve	-ve		+ve	-ve
Lower Northern Sydney	-6.93***	Sep 97	Sep 05	-6.95***	Jun 96	May 05
		+ve	-ve		+ve	-ve
Murray/Murrumbidgee	-5.81***	Jul 97	Mar 00	-6.57***	Feb 98	Dec 03
		-ve	+ve		-ve	+ve
North Western Sydney	-6.54***	May 00	Nov 05	-7.18***	Nov 94	Feb 97
		+ve	+ve		+ve	+ve
Northern Beaches	-5.83***	Nov 97	Mar 04	-6.43***	Nov 94	Feb 97
		+ve	+ve		+ve	+ve
Northern, Far West/North Western	-4.28**	Oct 02	Mar 07	-6.45***	Sep 99	Mar 09
		+ve	+ve		-ve	+ve
Richmond/Tweed/Mid North Coast	-5.04***	Dec 94	Jun 04	-6.11***	Feb 99	Sep 04
		-ve	-ve		+ve	-ve
St George/Sutherland	-6.27***	Apr 99	Oct 04	-7.26***	Feb 99	Jan 08
		-ve	-ve		-ve	-ve

## **Summary and conclusion**

This paper attempted to offer a preliminary analysis of mature female labour force participation rates over recent decades. We found that average labour force participation is heterogeneous across regions of NSW, within Sydney as well as across age cohorts. Secondly, although participation trends were all found to be trend stationary processes, there was a lack of synchronisation in the time series dynamics of the regions. A number of structural breaks were identified, however, these were generally particular to each region, with no clear pattern or underlying cause.

The findings imply that further in depth analysis of regional labour force participation rates will have its challenges. In order to capture the diversity across regions we will model the effects each regions' supply and demand characteristics. First, we must account for the variation in the composition of individuals' characteristics within each region with respect to education, fertility, family characteristics, and income. Secondly, we need to examine the role of regions' industry composition and the role of structural change over time.

The diversity of trends found in regions' labour force participation rates and econometric modelling results will also have important policy implications. Policies to increase older worker labour force participation rates will face greater challenges in areas with lower participation. It will also be important to explore the relative contribution of supply and demand factors to explaining the prevailing trends as this will affect the recommended mix of policies. Some regions may be stimulated more from welfare reform and tax incentives while others may benefit more from industry assistance and retraining, depending upon the modelling outcomes.

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