



INFORMATION NOTE¹

FEMALE LABOUR FORCE PARTICIPATION AND RETIREMENT OUTCOMES IN MARIA

Ensuring adequate retirement incomes for all Australians is an important issue facing the nation, as emphasised in the 2015 *Intergenerational Report*.² Because superannuation contributions are based on earnings from employment, female labour force participation is potentially an important factor. While the rate of female labour force participation has risen substantially in recent decades, it is still substantially below the male level. In this note, we model the impact of different female labour force participation scenarios on retirement incomes using Treasury's newly developed long-term dynamic microsimulation model of Australia's retirement income system, MARIA (Model of Australian Retirement Incomes and Assets).

The first scenario is a substantial, but relatively plausible, 10 per cent increase in female labour force participation, phased in over 15 years. The second, less realistic, assumes instant equalisation of female participation rates to male levels, resulting in a 17 per cent increase in female labour force participation from 2020. The third assumes a convergence of both male and female participation rates to the average for both sexes, with a decrease in male participation rates offsetting the increase for females.

Higher labour force participation increases female retirement incomes, and reduces pension reliance and expenditure (except where it is offset by lower male participation). However, these results take a very long time to materialise. Pension reliance and expenditure in 2060 are affected by the labour force shocks introduced in the first year in 2020. The nature of the system means that it takes a long time for the impacts to stabilise following any change.

The impact of the scenarios on the Age Pension is small relative to the scale of the labour force change. Only the second scenario (equalisation at male participation rates) reduces pension reliance and expenditure by more than 10 per cent. The effects on women's retirement incomes are somewhat larger across the scenarios, although not dramatic, apart from the equalisation scenario. The 10 per cent increase in participation scenario, relative to the baseline, raises women's average retirement incomes by about 5 per cent. This reflects the fact that participation is only one factor impacting retirement incomes. We make no assumption about increasing female earnings or reducing the gender pay gap.

¹ The views expressed in this note are those of The Treasury and do not necessarily reflect those of the Australian Government. This note was prepared by Declan Trott, Wei Ying Soh, Martin Stevenson and Rita Scholl in Revenue Group.

² Commonwealth of Australia (2015), *2015 Intergenerational Report: Australia in 2055*, Commonwealth of Australia, Canberra.

About MARIA

MARIA is Treasury's new long-term dynamic microsimulation model of Australia's retirement system.

The Model of Australian Retirement Incomes and Assets (MARIA) is a long-term dynamic microsimulation model of Australia's retirement income system. It simulates the characteristics of each individual for every year of the model run based on their characteristics in the previous year. This method produces a lifepath for each individual and thereby seeks to capture the diversity of Australian lifetimes and how they are expected to change in the future. The dynamic aspect is crucial for modelling Australia's retirement income system as the characteristics of future retirees are likely to differ from current retirees as the superannuation system matures.

There are a whole range of circumstances that can affect the retirement incomes of individuals. These include: their family composition; how much time they spend in the workforce and how much they get paid; how much they save for their retirement; the impact of disability or illness and whether they have a partner whose wealth they can draw upon. Simulating detailed distributions of retirement income and assets in the long-term requires predicting all of these factors for each of the individuals in MARIA.

MARIA begins with base data which captures the Australian population aged 25 and over at a set point in time. The model is run on a representative sample of this complete data set. MARIA then uses Treasury analysis and projections – the 'input parameters' – to model the lifepaths (including employment status, superannuation contributions and balance) of these individual records for one year. The output from the model becomes the input for the following year, and so on, year by year, as individuals age from working life to retirement and death. Each year, new records are introduced to represent new 25 year olds in the population.³

Female labour force participation scenarios

We estimate three alternative scenarios for female labour force participation in MARIA.

In this note, we use MARIA to simulate retirement outcomes under varying scenarios for female labour force participation. The simulations are based on a 1 in 100 sample of the MARIA basefile, or approximately 160,000 individuals in 2015.

The baseline scenario uses Treasury projections (updated from the 2015 *Intergenerational Report*) out to 2060. These set the number of individuals who are employed full-time (FT), part-time (PT), and unemployed, by sex and single year of age from 25 to 100+.

We then create three alternative scenarios, as follows:

1. *10% increase.* A 10 per cent increase in female labour force participation relative to the baseline, phased in between 2020 and 2035.⁴ In 2035, this is equivalent to an increase in female labour force participation of 5.5 percentage points. This is achieved through a uniform annual percentage increase in the number of women employed FT, PT, and unemployed, by single year of age. The female unemployment rate is unchanged, as are all male labour force outcomes.
2. *Equalisation.* Female FT, PT, and unemployment to population ratios, by single year of age, are made equal to the baseline male rates starting in 2020. The overall female and male participation rates are not exactly equalised, due to the different age distributions of females and males.
3. *Offset.* Female and male employment- and unemployment-population ratios by single year of age are again equalised in 2020, but at the baseline rates for both sexes combined rather than for males. Hence the increase in female labour force participation is offset by a decline in male participation.

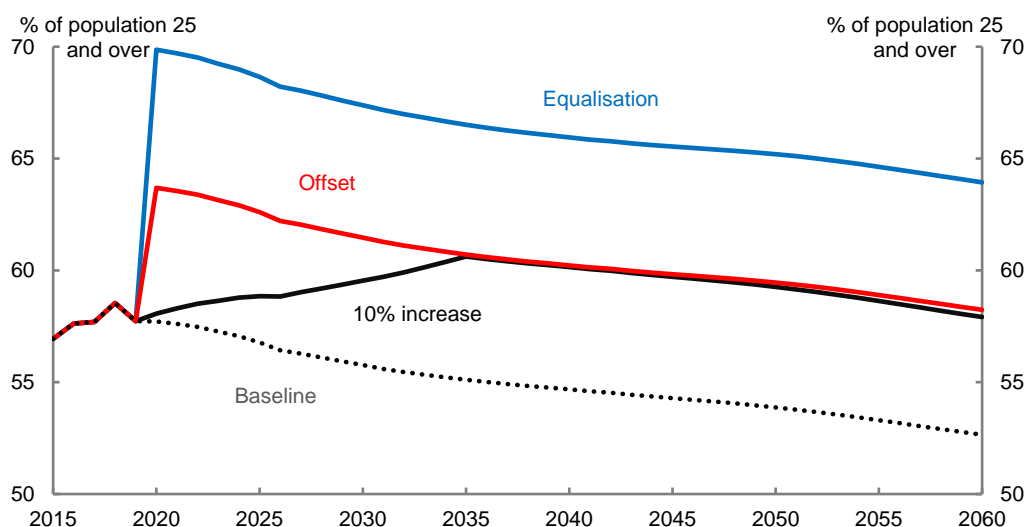
³ For more information on data sources and other aspects of MARIA, see <http://research.treasury.gov.au/treasury-working-paper/2017-02/>. All dates are financial years ending in the year stated, e.g. 2015 represents 2014-15.

⁴ This would represent a substantial acceleration in recent trends. Over the decade 2008 to 2018, the female labour force participation rate increased by around 4 per cent for the commonly cited age groups (15+, 15-64, and 20-74). This increase was, however, moderated by population ageing, which is already accounted for in our baseline.

In all scenarios, the population by sex and age (also based on Treasury projections) remains unchanged, with the number not in the labour force offsetting all changes in participation. Since MARIA is not a macroeconomic model, the labour supply shocks in our scenarios do not affect the predicted wages of workers with given characteristics.⁵

Chart 1 shows female labour force participation rates (for ages 25 and above) under the baseline and alternative scenarios. In the baseline, the participation rate tends to decline slowly over time due to population ageing, and this is reflected in the alternative scenarios after the initial shocks are imposed. The close match between the '10% increase' and 'offset' scenarios after 2035 hides the fact that the 'offset' scenario has a higher rate of female FT employment. This is even more marked in the 'equalisation' scenario, where female FT employment is nearly double the baseline, while PT employment is less than half.

Chart 1: Female participation rates



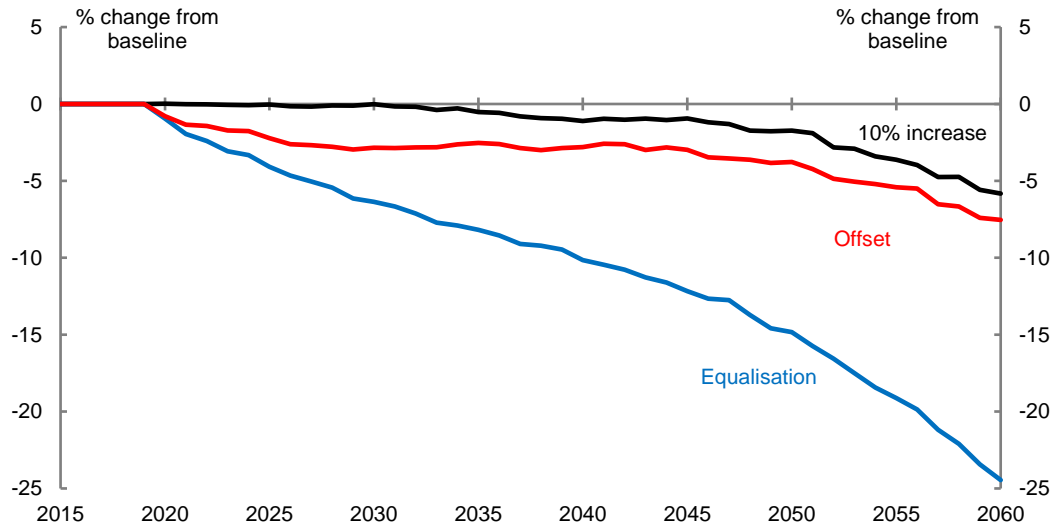
Aggregate outcomes

Higher female labour force participation reduces pension reliance and expenditure, but it takes a long time and the effects are generally modest.

As expected, higher female labour force participation reduces the number of female maximum rate Age Pension recipients relative to the baseline, illustrated in Chart 2. This is mainly because higher participation translates over time into higher super balances, which results in fewer people receiving the Age Pension due to either the income or assets tests. The longer someone spends in employment as a result of these changes to participation rates, the larger the increase in their superannuation balance. Therefore, the aggregate impact on the number of pension recipients continues to gain in significance up to 2060, even though the labour force shocks reach their maximum extent in 2020 or 2035. Higher employment among those over pension age may also reduce pension uptake more immediately through the income test on wages and salaries.

⁵ Since a level shock to labour supply is usually assumed not to affect the level of average wages in the long run, this should not be too great a problem for our results, although they do not include any transitional short-run wage effects.

Chart 2: Number of female maximum rate pensioners



The '10% increase' scenario results in a roughly 5 per cent fall in the number of full pension recipients by 2060. The 'offset' scenario has a larger and earlier impact than the '10% increase', both because the shock is more immediate, and because of the higher rate of female FT employment. 'Equalisation' is the biggest shock and has the biggest impact, cutting the number of female full rate recipients by nearly a quarter by 2060.

The situation is more complicated for the part rate pension in Chart 3. The '10% increase' scenario shows little change in the number of part rate recipients. This is because movements between the part and maximum rate pension can be offset by movements between the part pension and no pension. The 'equalisation' and 'offset' scenarios, however, increase female incomes and assets by enough to reduce the number of part rate as well as maximum rate pensioners. The percentage reduction, however, is much smaller than for maximum rate pensioners.

Chart 3: Number of female part rate pensioners

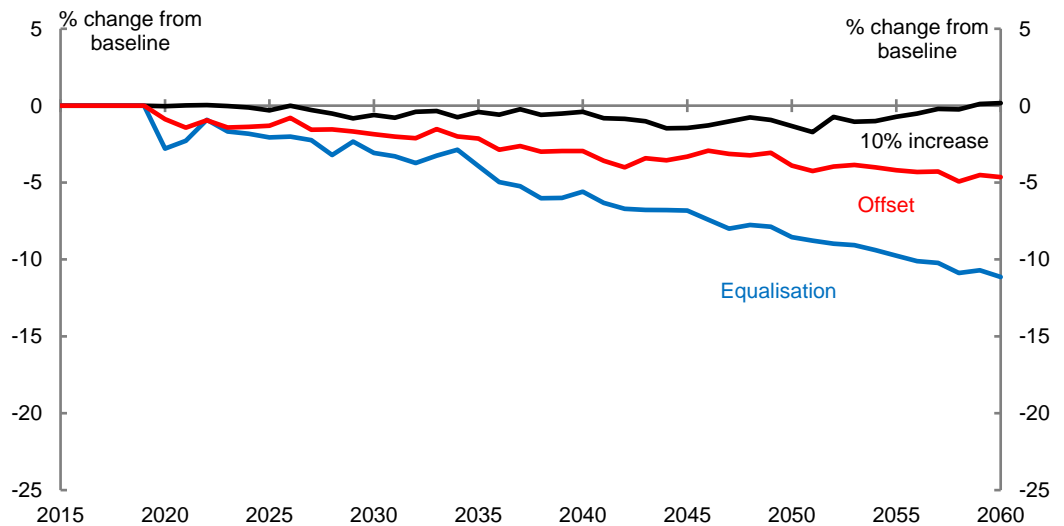
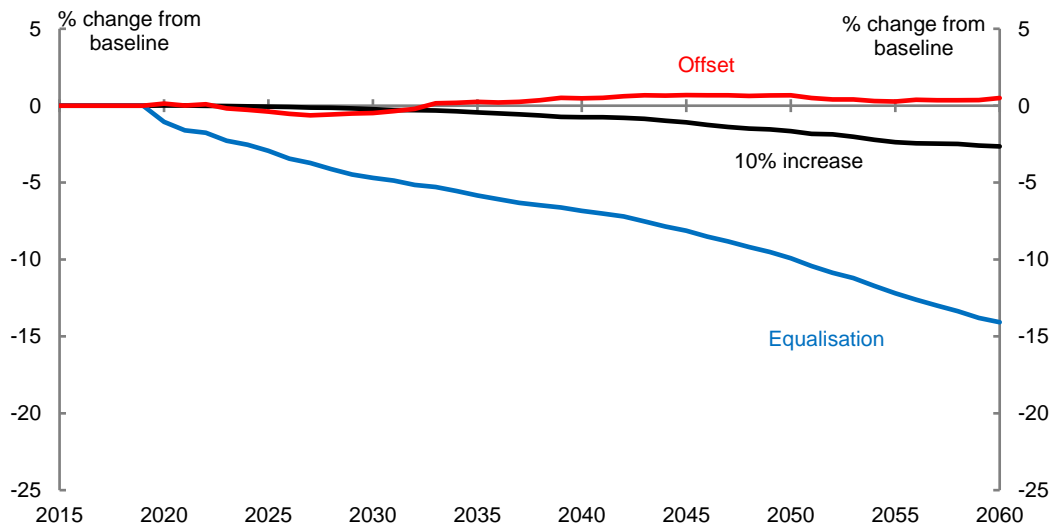


Chart 4 shows Age Pension expenditure for the Australian population. In the '10% increase' and 'equalisation' scenarios, overall expenditure responds in a similar way to the number of maximum rate pensioners in Chart 2. The percentage changes, however, are smaller, because the measure of expenditure includes males as well as females, and expenditure on pensions for males is little changed.⁶

⁶ There is a small effect from means testing at the couple level – higher female incomes and assets reduce their male partners' pensions.

In the 'offset' scenario, lower male labour force participation cancels out the benefits of higher female participation in terms of pension expenditure. Lower male incomes and asset accumulation increases the number of male pension recipients by 7 per cent by 2060.

Chart 4: Age Pension expenditure, both sexes



Cohort outcomes

Results by year of retirement are more volatile due to small samples, but female participation does affect retirement incomes.

MARIA also facilitates analysis of outcomes by year of retirement. While the samples are smaller (usually 1,000-2,000 women retire per year in our 1 in 100 simulation) and the results therefore more volatile, some interesting patterns do emerge.

Chart 5 shows mean income for females in the first year of their retirement, shown as five-year moving averages beginning in 2025 to smooth the volatility. By the later years of our sample we see increases in income of around 30 per cent under the 'equalisation' scenario, 15 per cent under 'offset', and 5 per cent under '10% increase'. Interestingly, the cohort results do seem to stabilise in the last decade or so of the simulations, unlike the aggregate results in previous charts. Since the aggregate results are an average of the previously retired cohorts who are still alive, this might imply the aggregate results would stabilise in the decades beyond 2060.

Chart 5: Female mean income at retirement (5-year moving average)

