Australian National University

Gender disparities in retirement

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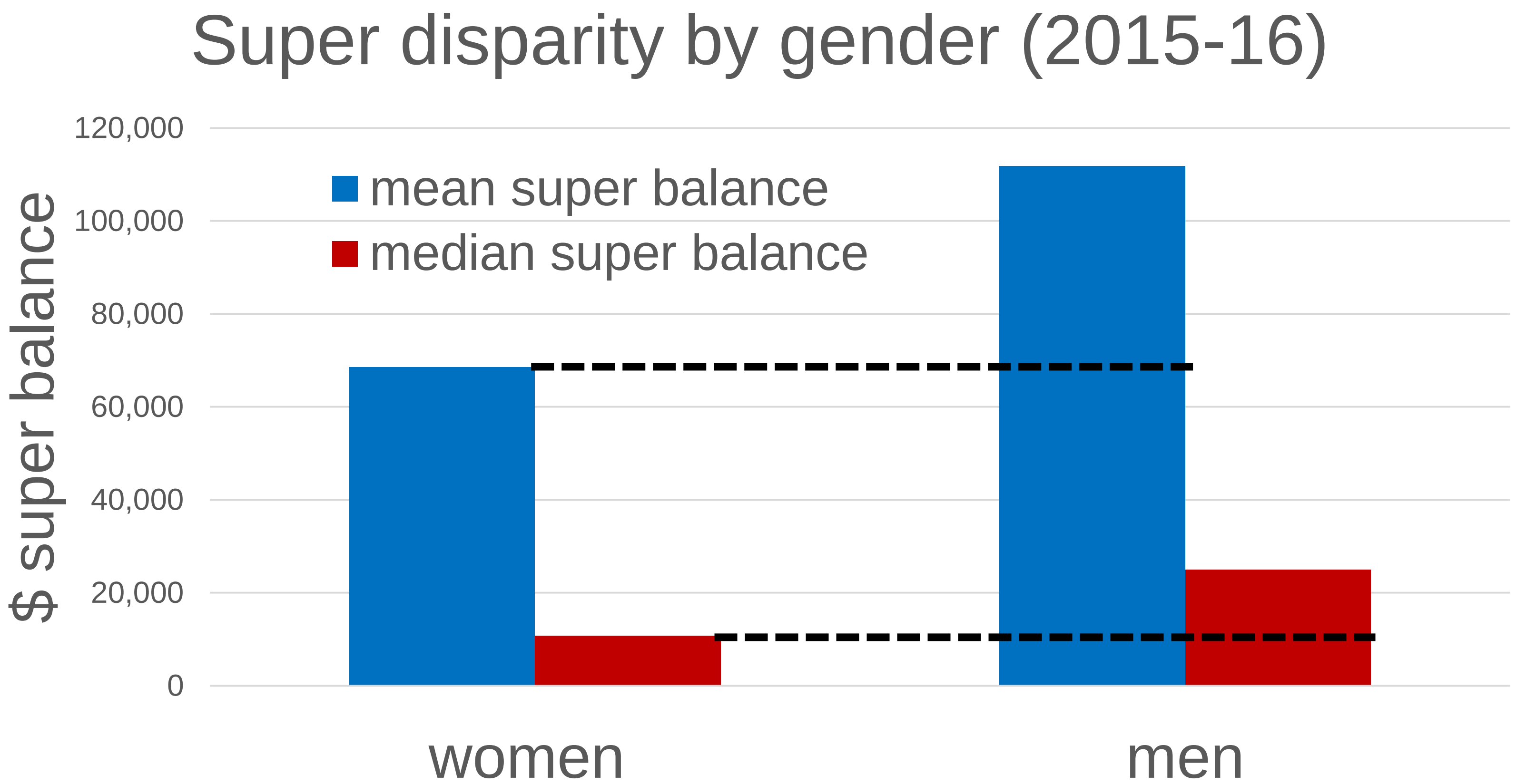
Lifetime pension liabilities using stochastic mortality assumptions and case studies illustrating policy options

Motivation: Super gap



Source: ASFA (all persons aged above 15)

Motivation: Aged pension liabilities

- The super gap is likely to lead to a higher reliance on the aged pension for women
- Interested in gender disparities of aged pension liabilities

Research questions and methods

- Aged pension liabilities
  - What is the disparity in aged pension liabilities between men and women?
  - Are women able to live comfortably in retirement?
- Methods
  - Phase 1: Pension liabilities (PwC, 2016)
  - Phase 2: Case studies using various demographics (Rice Warner, 2012)

Phase 1: Pension liabilities

- Project lifetime aged pension liabilities
  - Use a recent cohort (2015) of aged pensioners from ABS data (5% sample)
  - Use traditional actuarial approach to value aged pension liabilities (PwC)
  - Used stochastic mortality models to understand uncertainty in estimates

Stochastic mortality models

Model	Model Name	Death distribution	Link function	Model Structure
M1	Lee-Carter (LC)model	Poisson	log	$\log m(t,x) = \beta_x^{(1)} + \beta_x^{(2)}\kappa_t^{(2)}$
M2	Renshaw and Haberman (RH)model	Poisson	log	$\log m(t,x) = \beta_x^{(1)} + \beta_x^{(2)}\kappa_t^{(2)} + \beta_x^{(3)}\gamma_{t-x}^{(3)}$
M3	APC model	Poisson	log	$\log m(t,x) = \beta_x^{(1)} + \kappa_t^{(2)} + \gamma_{t-x}^{(3)}$
M4	B-spline and P-splines	Poisson	log	$\log m(t,x) = \sum_{i,j} \theta_{ij} B_{ij}^{ay}(x,t)$
M5	CBD model	Binomial	logit	$\text{logit}\, q(t,x) = \beta_x^{(1)}\kappa_t^{(1)} + \beta_x^{(2)}\kappa_t^{(2)}$
M6	CBD model with cohort effects	Binomial	logit	$\text{logit}\, q(t,x) = \beta_x^{(1)}\kappa_t^{(1)} + \beta_x^{(2)}\kappa_t^{(2)} + \beta_x^{(3)}\gamma_{t-x}^{(3)}$
M7	Quadratic CBD model with cohort effects	Binomial	logit	$\text{logit}\, q(t,x) = \kappa_t^{(1)} + \kappa_t^{(2)}(x-\bar{x}) + \kappa_t^{(3)}((x-\bar{x})^2 - \hat{\sigma}_x^2) + \gamma_{t-x}^{(4)}$
M8	CBD model with diminishing cohort effect	Binomial	logit	$\text{logit}\, q(t,x) = \beta_x^{(1)}\kappa_t^{(1)} + \beta_x^{(2)}\kappa_t^{(2)} + \beta_x^{(3)}\gamma_{t-x}^{(3)}$

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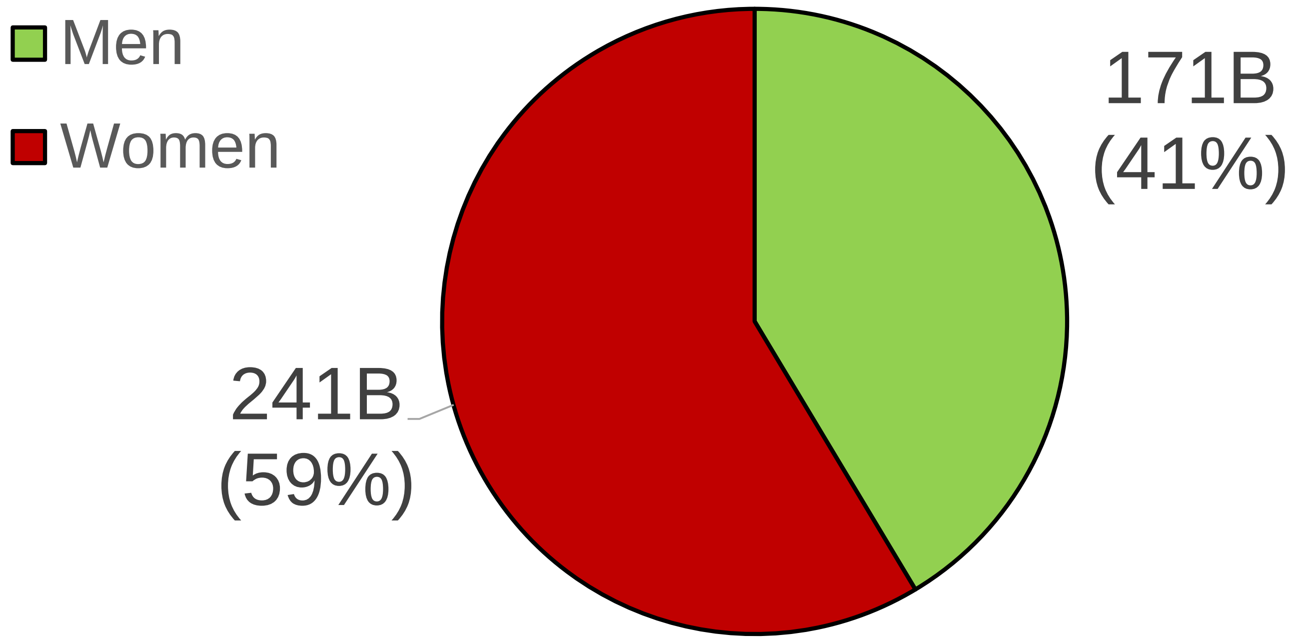
Phase 1: Key assumptions

Payment Assumptions	**Per person per fortnight**
Aged pension payment full – single	$860.20 (2015 rates)
Aged pension payment full - couple	$648.40 (2015 rates)
Aged pension payment part - single	$500.00 (estimated)
Aged pension payment part - couple	$376.90 (estimated)
Financial Assumptions (from PwC)	
Aged pension payment growth	2.5% p.a.
Discount rates	6.0% p.a.
Other Assumptions	
Mortality models	AGA lifetable and Lee-Carter model
Full pension: part pension	60%:40% to 80%:20%

Phase 1: Liability estimates

Total estimate $412B ($394–430B)

Total lifetime cost by men and women
Lee-Carter model



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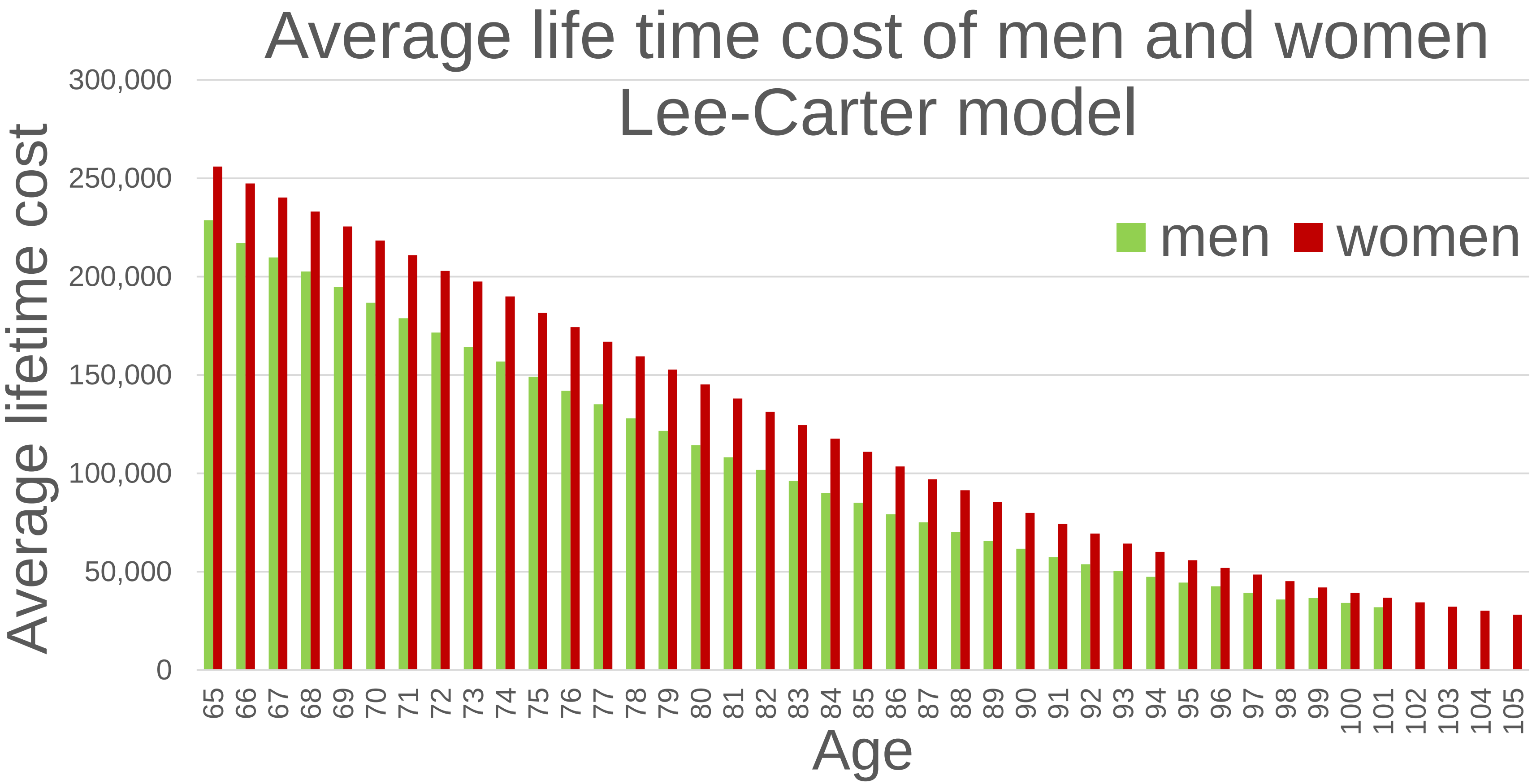

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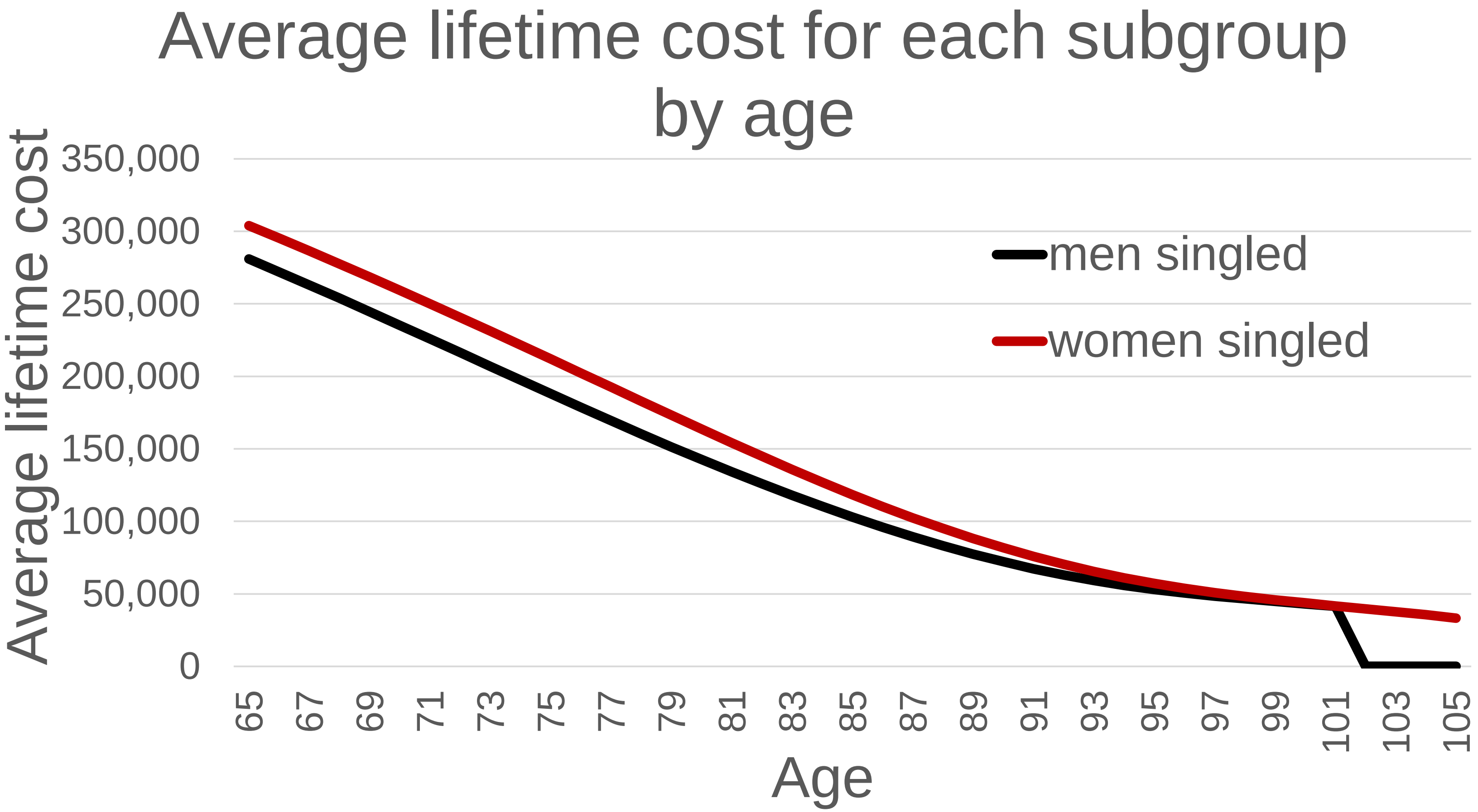

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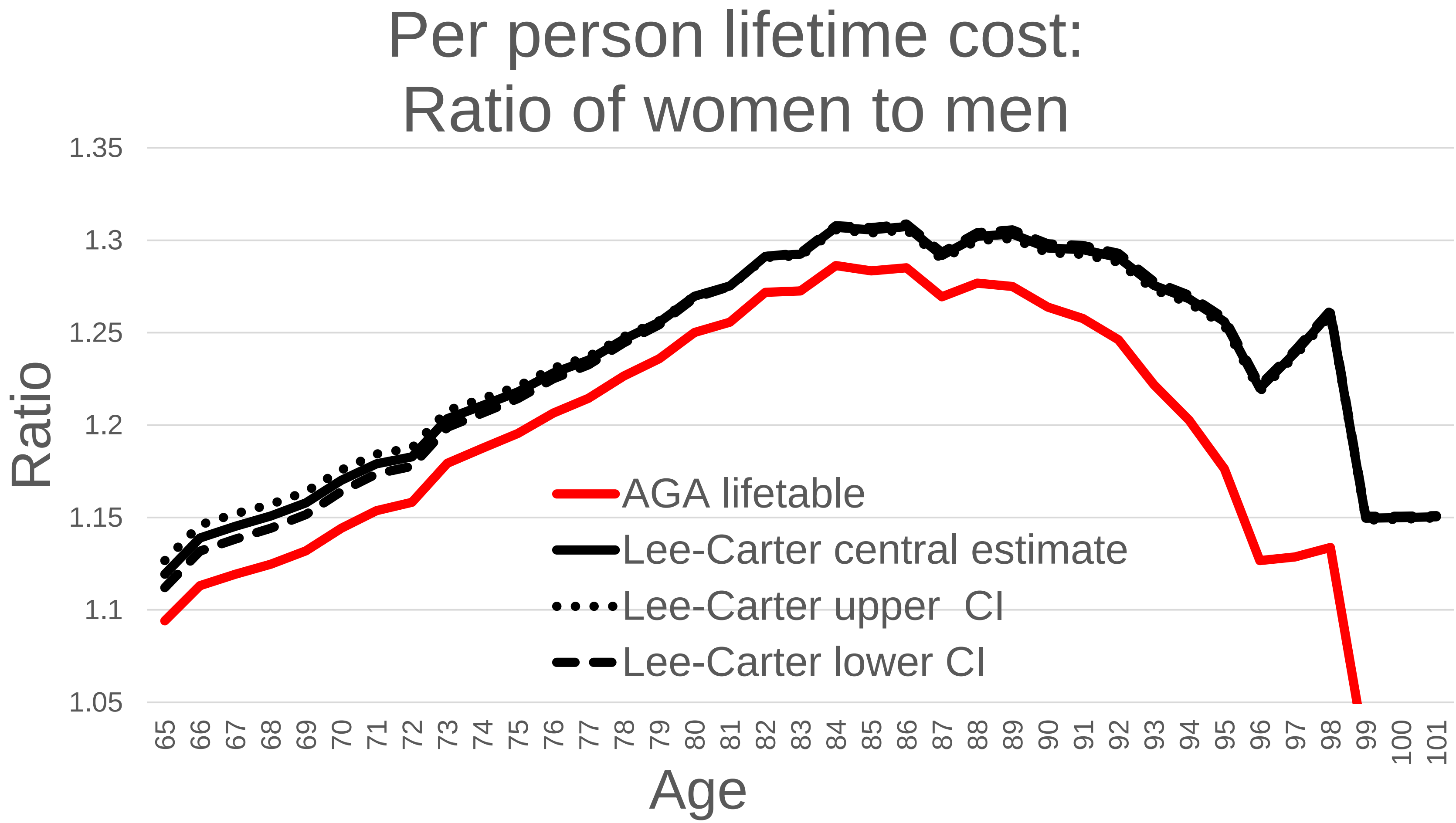

Phase 1: Liability estimates

- Single women are the most dependent on the aged pension
  - Longer life expectancy
  - Higher age pension payment for single person
- Lee-Carter model gives consistently lower liability estimates than AGA but has a higher gender disparity for liabilities
  - LC model has higher mortality overall

Phase 2: Case studies

- Estimated the probability of sufficiency of *comfortable* retirement (ASFA)
  - Run 1000 simulations for time of death and determine whether retirement incomes are sufficient for comfortable living expenses for each simulation
- Looked at case studies for single and couple scenario's
- Many assumptions used for projections

Phase 2: Key assumptions

Assumptions	Same as Rice Warner Report
Initial earning men	35,000 (ABS / RW)
Initial earning women	34,300 (ABS / RW)
Gender pay gap	2% (RW)
Wage inflation	4.1% p.a. (RW)
Price inflation	2.5% p.a. (RW)
Investment return after tax	5.9% p.a. (RW)
Promotion assumptions	Refer to Rice Warner Report
Career break assumptions	Refer to Rice Warner Report

Phase 2: Key assumptions

Assumptions	Current policy
Retirement age	67
Employer contribution	9.5% p.a. in 2018- 12% p.a. 2025
Aged pension payment	March 2018 rates (907.60 for singles and $684.10 for couple)
Concessional tax rate	15%
Retirement living expenditure	ASFA comfortable standards
Mortality	Lee- Carter model
Asset splits on divorce	50% for each partner
Home ownership	Yes (for all case studies)

Phase 2: Case studies (singles)

No.	Scenario	Probability (%)*
1	Ordinary man retire at 67	98.7 (97.5-99.3)
2	Ordinary woman retire at 67	96.5 (94.3-98.1)
3	Ordinary women retire 67 with 5 year gap	68.8 (59.7-80.8)
4	Women less promotion retire at 67	80.3 (72.0-87.5)
5	Women less promotion retire at 67 & 5 year career gap	58.3 (46.2-70.7)
6	Women less promotion retire at 67 & 10 year career gap	25.3 (17.5-40.2)
7	Ordinary men retire at 62	26.6 (18.3-41.9)
8	Ordinary women retire at 60	5.3 (3.3-9.7)

* Probability of sufficiency of comfortable retirement (central estimate, lower 95^{th} CI, upper 95^{th} CI)

Phase 2: Case studies (couples)

No.	Scenario	Probability (%)
1	Ordinary couple retire at 67	100 (100,100)
2	Woman with less promotion & 10 year gap, couple retire 67	100 (100,100)
3	Partner shares the career gap in case 2	100 (100,100)
4	Woman retires at 60, partner retires at 67	98.2 (96.9, 99.2)
5	Divorce at age 43, with no gap, retire 67 (male)	98.7 (97.5, 99.3)
6	Divorce at age 43, with no gap, retire 67 (female)	96.5 (94.3, 98.1)
7	Case 5 with woman less promotion & 10 year gap (male)	92.4 (87.5, 96.7)
8	Case 6 with woman less promotion & 10 year gap (female)	46.2 (33.8, 60.5)
9	Case 6 with woman less promotion & 5 year gap (female)	63.1 (53.6, 76.7)

Phase 2: Impact on retirement incomes

Factors	Retirement incomes (gap)
Mortality rate differences	Low negative impact
Lower super balance due to initial gender pay gap	Low negative impact
Lower super balance due to less promotional salary increase	Medium negative impact
Lower super balance due to long working gaps	High negative impact
Early retirement	Very high negative impact
Retiring as couples	High **positive** impact
Divorce	Negative impact, extent differs for men and women

Impact ranges: 0%-10% : low; 10%-20% : medium; 20%+ : high

Policy recommendations

Policy	Impact on gap
Higher employer contribution	None
Higher voluntary contribution	Depends
Government support: $695 per week up to 18 weeks before tax	Minimal impact
26 weeks of full salary on parental leave	Minimal impact
Men share half of women's working gap	Depends
Supporting families	Positive
Financial capability	Positive

Conclusions

- The longer the career gap, the lower the probability of comfortable retirement
- Early retirement has a big impact on super balance and retirement incomes
- Couples are ok (under these assumptions)
- High risk scenarios are:
  - single women, career gaps, retire early
  - coupled women who divorce with career gaps

Further work

- Refine assumptions and include more stochastic assumptions / scenarios
- Policy options to model:
  - Parental leave
    - Model different types of parental leave structures
    - Gender neutral policies and higher take-up by men
- Financial capability for women