Spend your decennial age

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AGENDA

- Australian retirement funding context
- Relevant personal circumstances
- Conceptual framework: utility of consumption & MDUF
- Previously suggested spending rules
- Better drawdown rules
- Sensitivity Analysis
- Discussion and conclusions

Australian context

- The three pillars of retirement funding
- ABPs, the Retirement Covenant and CIPRs
- Currently ABPs are the dominant retirement product
- Focus in this paper is on ABP drawdown rates (not potential new products)
- Age pension means tests
- Assets outside superannuation
- Determining optimal spending is complex and challenging
- It's TIME TO ACT!

Relevant considerations for individual retirees (1)

Parameter	Assumption
Single vs couple	Single
Gender & Age	Male 67+ (but rules are effective also for females)
Dependants	Nil
Consumption pattern	Consumption-utility function does not vary with age in real (AWE-adjusted) terms
Bequest motive	Nil (i.e. no value attributed to the residual estate)
Tax	Zero
Principal residence	ABP holder is a homeowner & intends to keep it

Relevant considerations for individual retirees (2)

Parameter	Assumption
Other earned income	Nil
Age pension eligibility	Eligible for full pension subject only to means tests
Mortality	Life table q_x ignoring individual-specific factors
Asset allocation	Balanced
Market conditions	Spending is a % of beginning of year balance without adjustment for "high" or "low" markets
Statutory minimum	Rules are always subject to statutory minimum

Assessing rules using a utility framework

- **Utility framework**
  - Mathematical functions that represent individuals' preferences
  - Used to assess decisions under uncertainty
  - Provide a basis for tradeoffs between risk and rewards
- **The Member's Default Utility Function (MDUF)**
  - Quantifiable set of preferences a super fund trustee assume on behalf of default fund members

Assessing rules using a utility framework

- **MDUF parameterization:**
  - **Risk aversion:** the choice of the consumption risk aversion parameter ρ normally falls within the range of 1 to 8 with 5 being the most common choice.
  - **Residual benefit motive:** we have decided to focus our assessment on retirement income only and set the residual benefit motive parameter to 0.

$$U_0 = E_0 \left[\sum_{t=0}^{T} {}_t p_x \frac{c_t^{1-\rho}}{1-\rho} \right]$$

Assessing rules using a utility framework

- **What does the parameterised MDUF reflect?**
  1. The member is focussed on the future income stream not the retirement lump sum;
  2. The member prefers a higher income stream;
  3. The member prefers a less volatile income stream;
  4. The member prefers not to outlive his or her retirement savings; and
  5. The member is risk averse (the pain of an adverse outcome is greater than the joy of an equivalent positive outcome).

Assessing rules using a utility framework

- **Modelling assumptions:**
  - **Investment Return:** balanced investment option

| Expected Annual Real Return	Annual Return Vol
3.5%	7.0%

  - **Mortality table:** Australian Government Actuary Life Tables (ALT 2010-12) + ALT 25-year improvement factors
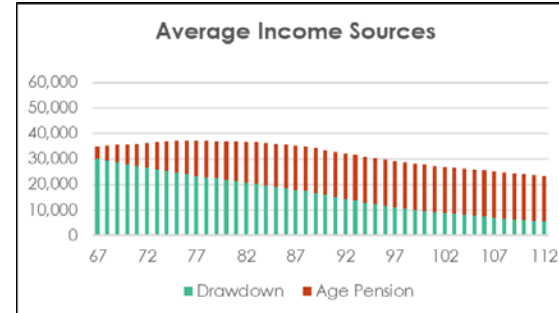
Previously suggested spending rules

- **Bengen's 4% Rule:** initial income drawdown is 4% of assets at retirement, and thereafter the income amount is indexed with inflation.

- **NZ SOA 6% Rule**: annual income drawdown is 6% of assets at retirement, no indexation with inflation.

- **NZ SOA "life expectancy" rule:** annual income drawdown is determined by the assets at the time divided by the remaining life expectancy.

- **Statutory minimum drawdown rule:** use the age based minimum percentage drawdown rates required by legislation
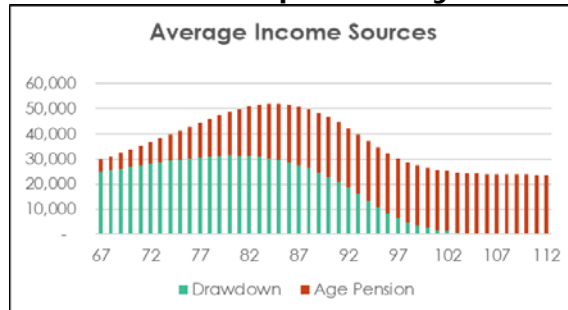
Previously suggested spending rules
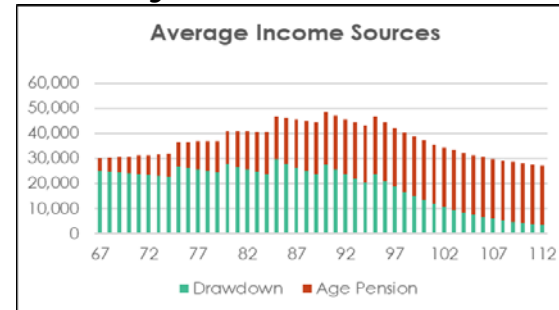
Bengen's 4% Rule ($500K)

Average Income Sources

NZ SOA 6% Rule ($500K)

Average Income Sources
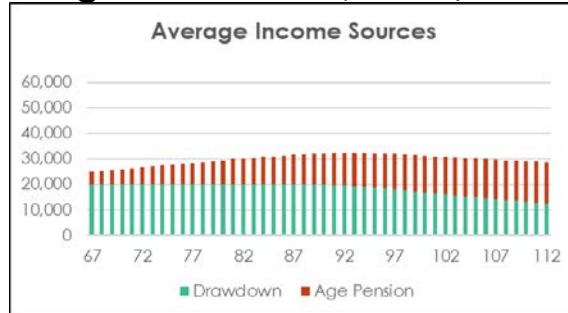
NZ SOA "life expectancy" rule ($500K)

Average Income Sources

Statutory minimum drawdown rule ($500K)

Average Income Sources

Previously suggested spending rules

Retirement Strategy	Risk-adjusted Income ($000)	Welfare Gain of Lifetime Income ($000)	APV of Age Pension ($000)
$250K			
Statutory Minimum	35	-	461
Bengen's 4% Rule	27	-164	437
NZ SOA 6% Rule	28	-133	457
NZ SOA LE Rule	36	19	466
$500K			
Statutory Minimum	35	-	250
Bengen's 4% Rule	25	-203	175
NZ SOA 6% Rule	30	-96	258
NZ SOA LE Rule	38	67	294
$750K			
Statutory Minimum	39	-	93
Bengen's 4% Rule	31	-150	51
NZ SOA 6% Rule	36	-55	113
NZ SOA LE Rule	44	106	155

*MDUF assessments (ρ = 5, ϕ = 0, male, single, homeowner)

Derive better drawdown rules

- Start with the optimal drawdown rates derived from solving a life-cycle utility-maximisation model for consumption choices
- Simplify the optimal drawdown rates to varies levels of simplicity and accuracy
  - Rule of thumb: easy to remember and communicate
  - For financially sophisticated retirees: 4 balance groups and every 5 year of ages
 - For financial planners: by every $100K of balance and every age

Optimal drawdown rates

- A life-cycle utility-maximisation model from age 67 to age 110
  - Single homeowners without bequest motives
  - Fully invested in an account-based pension with expected real return of 3.5% per year and vol 7%
  - Making annual consumption choices
  - Age Pension rules as at March 2019
  - Relative risk aversion 5, no subjective discount, real interest rate 0%
  - Mortality: ALT2010-12 with 25 year improvement factors

Optimal drawdown rates for males

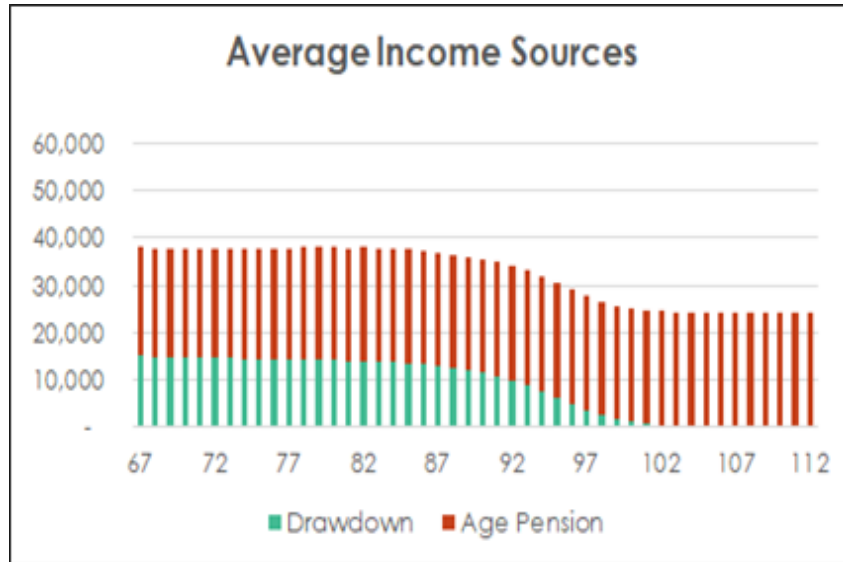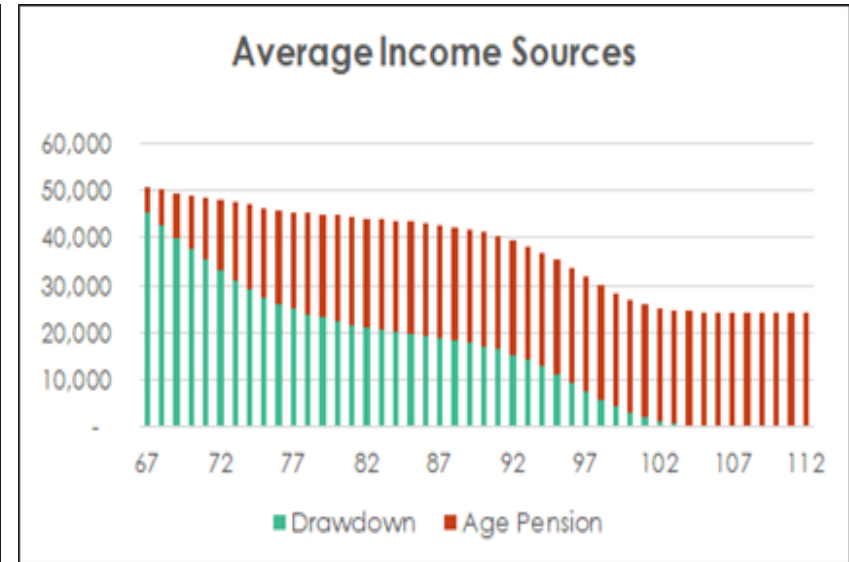|	67	68	69	70	71	72	73	74	75	76	77	78	79	80
500,000	9.08	9.19	9.31	9.44	9.58	9.73	9.89	10.06	10.24	10.44	10.65	10.87	11.11	11.37
480,000	8.98	9.09	9.22	9.35	9.49	9.64	9.80	9.97	10.15	10.35	10.56	10.79	11.03	11.30
460,000	8.86	8.98	9.10	9.23	9.38	9.53	9.69	9.86	10.05	10.25	10.46	10.69	10.94	11.21
440,000	8.73	8.85	8.97	9.11	9.25	9.40	9.57	9.74	9.93	10.13	10.35	10.58	10.83	11.10
420,000	8.58	8.70	8.82	8.96	9.10	9.26	9.42	9.60	9.79	10.00	10.21	10.45	10.70	10.97
400,000	8.40	8.52	8.65	8.78	8.93	9.09	9.25	9.43	9.63	9.83	10.06	10.29	10.55	10.83
380,000	8.19	8.31	8.44	8.58	8.73	8.89	9.06	9.24	9.43	9.64	9.87	10.11	10.37	10.65
360,000	7.95	8.07	8.20	8.34	8.49	8.65	8.82	9.00	9.20	9.42	9.64	9.89	10.15	10.44
340,000	7.65	7.77	7.91	8.05	8.20	8.36	8.54	8.73	8.93	9.14	9.38	9.62	9.89	10.18
320,000	7.29	7.41	7.55	7.69	7.85	8.02	8.19	8.38	8.59	8.81	9.05	9.30	9.57	9.87
300,000	6.84	6.97	7.11	7.25	7.41	7.58	7.77	7.96	8.17	8.40	8.64	8.90	9.18	9.48
280,000	6.36	6.49	6.64	6.79	6.95	7.13	7.32	7.52	7.73	7.97	8.22	8.48	8.77	9.08
260,000	6.12	6.26	6.41	6.57	6.74	6.92	7.11	7.32	7.55	7.79	8.05	8.33	8.63	8.95
240,000	5.84	5.99	6.15	6.32	6.51	6.70	6.91	7.14	7.38	7.63	7.91	8.20	8.52	8.86
220,000	5.68	5.84	6.01	6.19	6.38	6.59	6.81	7.05	7.30	7.57	7.86	8.17	8.50	8.85
200,000	5.54	5.71	5.89	6.08	6.29	6.50	6.74	6.98	7.25	7.53	7.83	8.15	8.49	8.86
180,000	5.40	5.58	5.77	5.97	6.18	6.41	6.65	6.91	7.18	7.48	7.79	8.12	8.48	8.86
160,000	5.24	5.43	5.63	5.84	6.06	6.30	6.55	6.82	7.11	7.41	7.74	8.09	8.46	8.86
140,000	5.23	5.43	5.64	5.86	6.10	6.35	6.62	6.90	7.20	7.52	7.86	8.23	8.62	9.04
120,000	5.21	5.43	5.65	5.89	6.14	6.40	6.69	6.99	7.31	7.65	8.01	8.40	8.81	9.25
100,000	5.17	5.40	5.64	5.90	6.17	6.45	6.76	7.08	7.43	7.79	8.18	8.60	9.04	9.52
80,000	5.08	5.34	5.60	5.88	6.18	6.50	6.83	7.19	7.57	7.97	8.40	8.85	9.34	9.85
60,000	5.00	5.18	5.49	5.81	6.16	6.52	6.90	7.30	7.73	8.18	8.67	9.18	9.73	10.31
40,000	5.00	5.00	5.17	5.57	5.99	6.43	6.89	7.38	7.90	8.45	9.03	9.64	10.29	10.98
20,000	5.00	5.00	5.00	5.00	5.11	5.76	6.43	7.14	7.88	8.65	9.46	10.30	11.19	12.13
10,000	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.86	6.94	8.05	9.19	10.37	11.59	12.85

- Full heat map no rounding
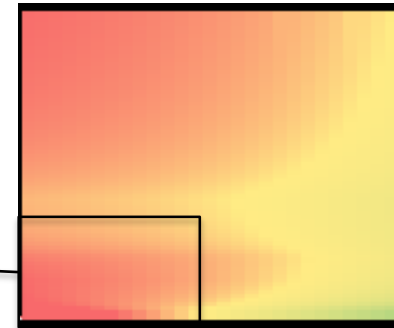
- Age (horizontal): 67 to 95
- Balance (vertical): $10K to $1.5m
- Reddest: 5%
- Orange: 8-11%
- Yellow: above 11%
- Green: above 20%

16

Optimal retirement income for males

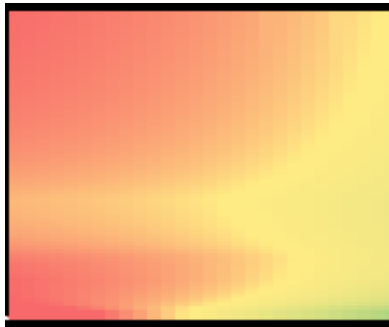$250K at retirement (age 67) $500K at retirement (age 67)
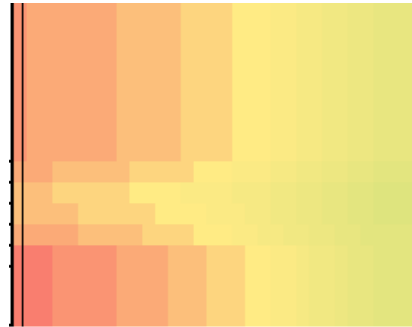
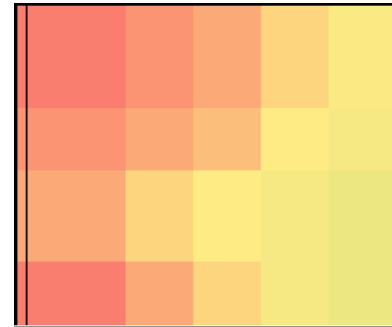# Simplifying the optimal drawdown rates

Optimal   Financial planner   Sophisticated retirees   A rule of thumb
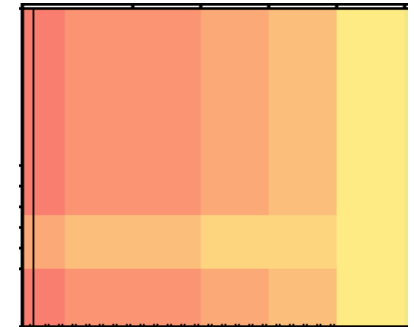
For financial planners

	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	>= 95
>700K	6	6	6	7	7	7	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	11	11	12	12	13	13	14	14
601 - 700K	8	9	9	9	9	9	9	9	10	10	10	10	10	11	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17
501 - 600K	9	9	9	10	10	10	10	10	10	11	11	11	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18
401 - 500K	9	9	9	9	9	9	10	10	10	10	10	11	11	11	11	12	12	12	13	13	14	14	15	15	16	16	17	17	18
301 - 400K	8	8	8	8	8	8	8	9	9	9	9	10	10	10	10	11	11	12	12	12	13	13	14	14	15	16	16	17	17
201 - 300K	6	6	6	6	7	7	7	7	7	8	8	8	9	9	9	10	10	11	11	12	12	13	13	14	15	15	16	16	17
<= 200K	5	5	5	6	6	6	7	7	7	8	8	9	10	10	11	11	12	13	14	15	16	17	18	19	20	21	22	24	24

- Age progresses in single years
- Assets are grouped in $100K rather than 10K

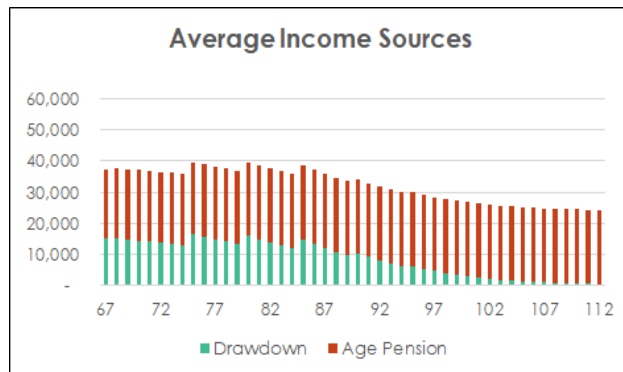$250K at retirement (age 67)

$500K at retirement (age 67)
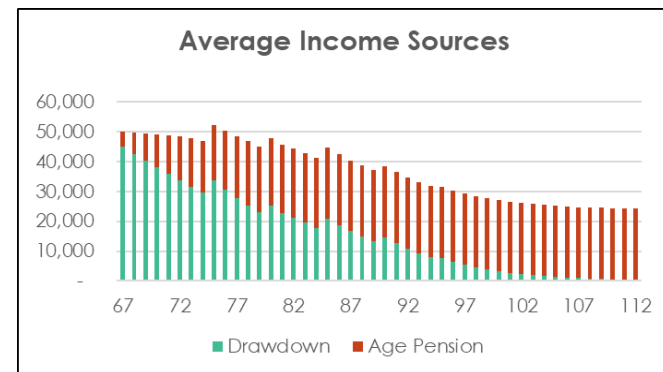

19
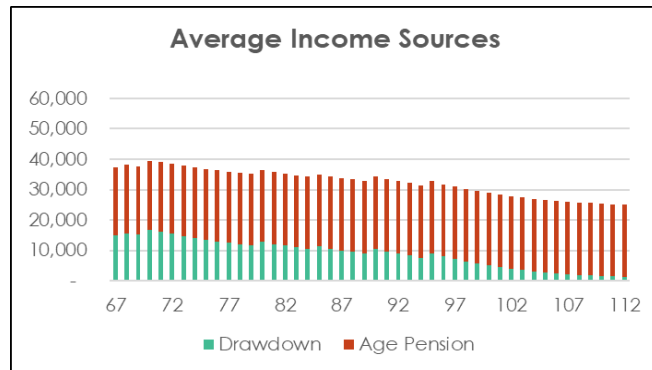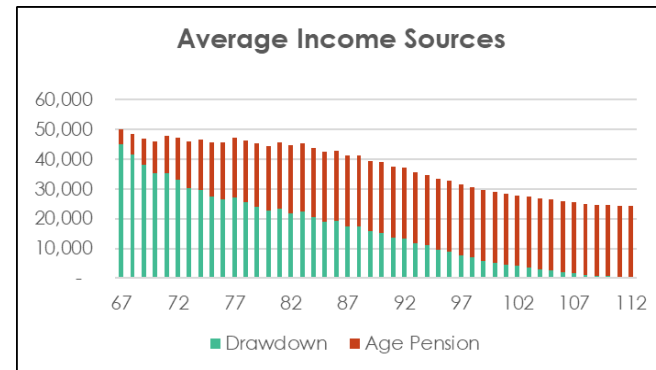
For financially sophisticated retirees

	<=74	75-79	80-84	85-89	90-94	>=95
>1M	6%	7%	8%	10%	12%	15%
701k-1M	7%	8%	9%	11%	13%	15%
261K-700K	8%	10%	11%	13%	15%	17%
<=260K	6%	8%	10%	13%	15%	17%

- 5-year age group between 75 and 95.
- Four asset groups

$250K at retirement (age 67)


$500K at retirement (age 67)

20

A Rule of thumb

- **Baseline drawdown rate % = the first digit of your age**
  - E.g., Age 67 then 6%; Age 70s then 7% etc.
- **Add 2% to the baseline drawdown rate if your account balance is between $250K and $500K**
  - or precisely if you are subject to the asset test
- Subject to minimum drawdown rule, kicking in after age 85 at 9%.

$250K at retirement (age 67)
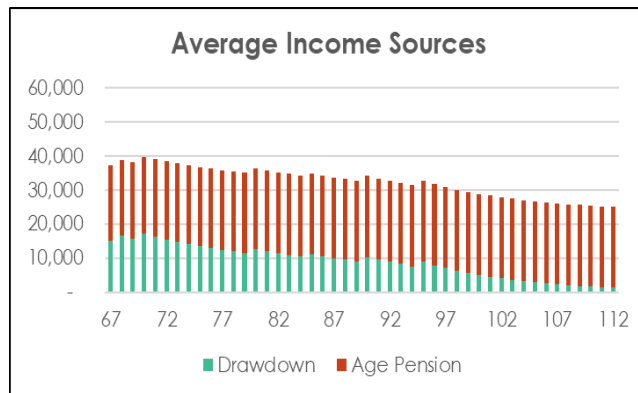
$500K at retirement (age 67)
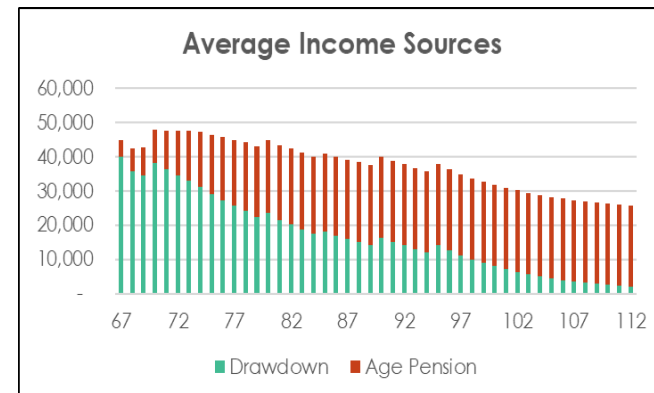
MDUF assessment

Retirement Strategy	Risk-adjusted Income ($000)	Welfare Gain of Lifetime Income ($000)	APV of Age Pension ($000)
$250K			
Statutory Minimum	35	-	464
Rule of Thumb	35	7	472
Sophisticated Retiree Rule	36	16	471
Financial Adviser Rule	36	16	472
Optimal Drawdown	36	22	471
$500K			
Statutory Minimum	35	-	252
Rule of Thumb	42	134	352
Sophisticated Retiree Rule	42	151	354
Financial Adviser Rule	43	156	361
Optimal Drawdown	43	165	368

Better retirement outcomes than the minimum drawdown rate

Sensitivity analysis

- Risk aversion levels
    - CRRA 2
    - CRRA 8
- Investment return and volatility for the account based pension
    - Expected return 2.5%
    - Volatility of 10%
- Our developed drawdown rules are still preferable to the statutory minimum drawdown rule

Discussion

- Our utility framework does not capture some potentially relevant issues:
    - ABP holder's desire for flexibility
    - Variation in spending needs as a function of state of health
    - Funding for possible aged care needs
    - Goal-dependent utility approaches (prospect theory, habit persistence)
- We have made assumptions about the retiree's personal circumstances
    - Incorporate variables into financial calculators for advised retirees?
- Scope for further work (drawdown rates for couples; drawdown rates for retirees aged <67; assessing ρ; drawdown rates for ABP when structured with longevity solutions)

Conclusions

1. Our rules are better than drawing down at statutory minimum
2. All our rules respond significantly to the AP means tests
3. The simplest rules involve discontinuities
4. Drawdowns pro rata to asset balance could be smoothed
5. Advice is valuable but costly: is robo the solution?
6. A financial calculator "app" could produce smoother drawdowns (across age and asset bands) & higher utility scores
7. Real spending will not be totally stable but the impact of poor ABP returns is limited for our target group (age pensioners)

Questions & Discussion