Means-tested benefits and retirement decumulation: evidence from Australian public pensioners.

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Means-testing of benefits is one proposed solution to stressed retirement income systems.

- Generous, un-(under)funded public pensions
  - e.g. (Novy-Marx and Ruah 2008 NBER) US State Pensions underfunded by at least $1 trillion
  - Age Pension payments in Australia to rise from 2.5% to 4.4% of GDP by mid-century (Intergenerational report)

- What are some possible solutions?
  - pass the funding responsibility to individuals (individual defined contribution accounts)
  - increase eligibility ages (UK and US raising eligible ages for pensions to 68 and 67)
  - broaden means-testing of benefits
The effect of means testing on wealthier households is unclear.

- But the ‘near eligible’ poor may not be influenced (Ziliak 2003; Hurst and Ziliak 2004)
- Rich may be unaffected when welfare loss of reaching eligibility exceeds utility value of payments (Hubbard et al. 1995; Sefton et al. 2008)
- Others find ‘a large effect on the elderly’s saving behavior, including the richest ones’ (de Nardi et al. 2006).
Australia has a broad-based, means-tested public pension.

- 77% of >65yr olds (2 million people) currently receive public pension
- eligibility depends on age, income and assets but NOT past earnings
- dependence rates expected to ease, but stay high (estimated 60% of >65 yr olds by mid-century)
- eligibility conditions relaxed in 2007 ($540K assets allowed)
Contributions of this study: theoretical model and empirical evaluation

- solve the dynamic consumption and investment problem of the means-tested household, post-retirement
- create an annual wealth series for HILDA using Age Pension data
- compute estimates of annual draw-down for Age Pension households
- compute household-level portfolios
- preliminary econometric evaluation of theoretical predictions
Conclusions

- Theory: pension encourages rapid draw-down early in retirement
- Theory: risky asset exposure is optimally higher and non-constant
- Empirics: poorer households decumulate in retirement; wealthier households accumulate.
- Empirics: some evidence for faster decumulation early in retirement
- Empirics: motives for saving outweigh incentives of means-test for wealth
- Empirics: risk of portfolios is higher for wealthier households
Retirement consumption and portfolio decisions are made jointly.

The investor’s problem is to maximise utility over retirement by choosing a consumption stream and allocating wealth between assets:

\[
\max E \left[ \hat{U}(C_0, C_1, \ldots, C_{T-1}, V_T) \right] = \max E \left[ \sum_{t=0}^{T} \delta^t \log(C_t) \right]
\]

The investor knows:

- \( S_t \) = the price of the risky security at time \( t \)
- \( B_t = B_0(1 + r)^t = B_0 R^t \) the price of the risk-free security at time \( t \)
- \( V_t \) = wealth at time \( t \), excluding the family home
- \( P(V_t) \) = public pension payment between \( t \) and \( t + 1 \)
- \( T \) = date of death
- \( \delta \) = subjective discount factor
Investable wealth is:

\[ I_t := V_t + P(V_t) - C_t = \phi_t S_t + (I_t - \phi_t S_t) B_t. \]

Share allocated to the risky security:

\[ \omega_t := \frac{\phi_t S_t}{I_t}, \]

Next period’s gross return to the risky asset:

\[ z_t := \frac{S_{t+1}}{S_t}, \quad z_t \sim iid \left(\mu_z, \sigma_z^2\right) \]

Portfolio return is then the weighted sum of returns over both assets in the portfolio, defined by:

\[ Z_t := \omega_t z_t + (1 - \omega_t) R = [\omega_t (z_t - R) + R] \]

The value of wealth at \( t + 1 \) is:

\[ V_{t+1} = [V_t + P(V_t) - C_t] [\omega_t (z_t - R) + R]. \]
Solution is by backward induction.

The Bellman equation is

\[ J[V_t, t] \equiv \max_{C, \omega} U(C_t, t) + E_t[J(V_{t+1}, t + 1)]. \]

with terminal condition

\[ J[V_T, T] = U(V_T, T). \]

When the pension payment is zero over all \( t \), consumption is a fraction of wealth:

\[ C^* = \frac{1 - \delta}{1 - \delta^{T-t+1}} V_t. \]

Portfolio allocation depends only on next period investment opportunities,

\[ 0 = E_t \left( \tilde{Z}^* \right)^{-1} (\tilde{z} - R) \].

and portfolio weights are increasing in the risk premium and decreasing in the variance of the risky asset, but constant in wealth.
Two means tests apply to the Age Pension.

- Income - income from financial assets is deemed to accrue at fixed rates
  - e.g. up to $41K deemed 4% p.a., then 6% per annum.
- We assume all post-retirement income is from investments, therefore wealth
- Translate wealth into income equivalents so income test becomes wealth test
- Assets - most assets, excluding family home, are assessable
- Paid least pension under both tests.
## Pension means tests

<table>
<thead>
<tr>
<th></th>
<th>$ p.a.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2006</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td><strong>Base payment</strong></td>
<td>12992</td>
<td>14217</td>
<td></td>
</tr>
<tr>
<td><strong>Income test</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cut in</em></td>
<td>3328</td>
<td>3588</td>
<td></td>
</tr>
<tr>
<td><em>Cut out</em></td>
<td>35809</td>
<td>39130</td>
<td></td>
</tr>
<tr>
<td><strong>Income test - wealth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cut in</em></td>
<td>81920</td>
<td>73467</td>
<td></td>
</tr>
<tr>
<td><em>Cut out</em></td>
<td>731530</td>
<td>665833</td>
<td></td>
</tr>
<tr>
<td><strong>Assets test</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cut in</em></td>
<td>161500</td>
<td>171750</td>
<td></td>
</tr>
<tr>
<td><em>Cut out</em></td>
<td>328066</td>
<td>540250</td>
<td></td>
</tr>
</tbody>
</table>
The assets test taper is steeper, but the income test applies to more pensioners.

Age Pension as a function of wealth under 2008 tests.
Taper rates for Age Pensioners

<table>
<thead>
<tr>
<th>Year</th>
<th>Income test</th>
<th>Assets test</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>1.6 cents</td>
<td>7.8 cents</td>
</tr>
<tr>
<td>2003</td>
<td>1.6 cents</td>
<td>7.8 cents</td>
</tr>
<tr>
<td>2004</td>
<td>2 cents</td>
<td>7.8 cents</td>
</tr>
<tr>
<td>2005</td>
<td>2 cents</td>
<td>7.8 cents</td>
</tr>
<tr>
<td>2006</td>
<td>2 cents</td>
<td>7.8 cents</td>
</tr>
<tr>
<td>2008</td>
<td>2 cents</td>
<td>3.9 cents</td>
</tr>
</tbody>
</table>

Note: Table shows reduction in basic pension payment for each dollar of additional wealth over free thresholds, years 2002-2006, using maximum payments and deeming rules current at March each year. Tapers apply equally to single and couple households. Source: Own calculations and Department of Families, Housing Community Services and Indigenous Affairs: http://www.fahcsia.gov.au.guides_acts/ssg/ssg-rn.html.
The Age Pension introduces a piece-wise linear constraint to the optimisation problem.

We can write the pension as a function of wealth:

\[
P(V_t) = \begin{cases} 
  P_0 & \text{if } V_t \leq Y_1 \\
  \frac{-P_0 Y_2}{Y_1 - Y_2} + \frac{P_0}{Y_1 - Y_2} V_t & \text{if } Y_1 < V_t \leq V_I \\
  \frac{-P_0 A_2}{A_1 - A_2} + \frac{P_0}{A_1 - A_2} V_t & \text{if } V_I < V_t \leq A_2 \\
  0 & \text{if } A_2 < V_t 
\end{cases}
\]

where \( Y_1 \) and \( Y_2 \) are the cut-in and cut-out for the income test, \( A_1 \) and \( A_2 \) are the cut-in and cut-out for the asset test and \( V_I \) is the point of intersection between the two tapers.

The wealth process in period \( t + 1 \) is:

\[
V_{t+1} = [V_t + P(V_t) - C_t] [\omega_t (z_t - R) + R].
\]
A general analytical solution is not possible because the form of the value function is unknown.

Solve for consumption and portfolio allocation numerically using a grid for wealth.

The new envelope condition depends on the pension-wealth space:

\[ J_{VT-1} = E_{T-1} \left( U_{VT} Z^* \right) \left( 1 + \frac{\partial P}{\partial V_{T-1}} \right) = U_C \left( 1 + \frac{\partial P}{\partial V_{T-1}} \right). \]

Consumption path depends on pension tapers and future consumption:

\[ 0 = (C^*_t)^{\gamma-1} - \delta E_t \left\{ a_{t+1}^{\gamma-1} \left[ V_{t+1} + P \left( V_{t+1} \right) \right]^{\gamma-1} \left( 1 + \frac{\partial P}{\partial V_{t+1}} \right) Z_t \right\}. \]

where \( a_{t+1} \) is next period’s optimal consumption/wealth ratio.

Portfolio depends on expected returns, pension taper and future consumption:

\[ E_t \left\{ a_{t+1}^{\gamma-1} \left[ V_{t+1} + P \left( V_{t+1} \right) \right]^{\gamma-1} \left( 1 + \frac{\partial P}{\partial V_{t+1}} \right) (z_t - R) \right\} = 0. \]
Numerical simulations confirm high consumption early in retirement.

Initial wealth = $500K, risk premium 1%, volatility 20%, horizon 20 yrs,
Consumption depends on the influence of the taper.

- Under the 2006 test, consumption increases until wealth reaches $A_2$ then declines over the steeper taper to $V_f$ then flattens over the gentler taper.
- Under 2008 test, consumption decreases smoothly from high initial levels since the steep taper applies from $t = 0$.
- Tests create incentives to maximise later consumption by reducing early-retirement wealth.
Portfolio allocations are high and decreasing in the risky asset.
Portfolio allocations are high and decreasing in the risky asset.

- optimal allocation (for these parameters) without pension is 25:75 risky to risk-free asset at all wealth levels
- pension is low-volatility asset negatively correlated with risky asset
- creates a hedge against risky asset, encourages higher exposure

Two influences

- NPV of future pension payments (risk exposure declines with age)
- Steepness of negative correlation with wealth (risk exposure higher under income taper)

- Creates a transfer of risk towards public sector
Decumulation rates are higher for those on the steeper taper.

For 2006 tests, $A_2 = 330K$, $V_I = 188K$, max pension from 82K
Theory predicts that means-tested public transfers will

- raise early-retirement consumption over the baseline path
- raise consumption of households in the steeper taper relative to those on the flatter
- induce higher exposure to risk in portfolio allocations
- create optimally non-constant portfolio allocations over retirement
Questions

- Do Australian retirees decumulate?
- Conditioning on age, health and intention to leave a bequest, do households on the steeper taper decumulate faster?
- What types of patterns are evident in portfolio allocation and is there evidence of higher risk exposure?
2006 HILDA wealth survey indicates lower levels of financial assets after retirement. But cohort effects and the superannuation guarantee may be important.
Wealthier households are more than 70% exposed to risky assets

HILDA Age Pension portfolio allocation by wealth quintile (excl home) 2006.
HILDA can also tell us about the time-path of wealth for Age Pensioners.

We select single and couple households who, for all waves in the survey, are:

- 65+ years of age
- eligible for Age Pension
- receive Age Pension
- fully retired from paid work
- live alone (as single or couple)
- own their own home

If $C_0$ is allowances and bonuses, wealth is

$$V_t = \min \left\{ (P_t - C_0) \frac{Y_1 - Y_2}{P_0} - Y_2, (P_t - C_0) \frac{A_1 - A_2}{P_0} - A_2 \right\}$$
In aggregate, there is mild evidence of decumulation.

Implied real wealth of single and couple AP households, 2002 prices.

singles

couples
Panel estimation: Define savings as the change in net real wealth.

If we treat the pension as a linear function of real wealth, from the model above we can write

\[ \tilde{V}_t = \left[ 1 + p_t - c_t \right] V_{t-1} \tilde{Z}_{t-1} \]

And the log change in real wealth (savings rate) is a function of drawdown rate and realized returns.

\[ \tilde{s}_t = \tilde{v}_t - v_{t-1} = \ln \left[ 1 + p_t - c_t \right] + \ln \tilde{Z}_{t-1} = d_t + \tilde{r}_t. \]

Are savings rates negative?
Are savings rates more negative for households subject to the steeper means test?
Preliminary estimation: savings subject to taper, health, bequests precaution and age.

Estimate

\[ \bar{\zeta}_{it} = \alpha + \beta D_{a, \text{it}} + \sum_j \delta_j D_{j, \text{it}} + \sum_j \gamma_k D_{j, \text{it}} D_{a, \text{it}} + e_{it} \]

where \( D_{a, \text{it}} \) is an indicator for asset-test taper for household \( i \) in period \( t \)

\( D_{j, \text{it}} \) are indicators for general saving intentions, precautionary motives, bequest motives, health, expected health, and newly retired (age < 70)

- Estimate as pooled least squares.
- 136 single, 110 couple decision units over four years.
Panel least squares estimation results.

<table>
<thead>
<tr>
<th>dependent variable:</th>
<th>log change in real wealth</th>
<th>p-values in italics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>single</td>
<td>couple</td>
</tr>
<tr>
<td>constant</td>
<td>-0.049</td>
<td>-0.079</td>
</tr>
<tr>
<td></td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td>asset taper</td>
<td>0.156</td>
<td>0.119</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>couple</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>newly retired</td>
<td>-0.055</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>0.069</td>
<td>0.101</td>
</tr>
<tr>
<td>newly retired × asset taper</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>bequest × asset taper</td>
<td>-</td>
<td>0.111</td>
</tr>
</tbody>
</table>
Results suggest that households on the steeper taper save, and those on the flatter taper do not.

- The coefficient on the indicator for the steeper taper is positive and significant.
- Average annual saving rate is nearly 10% p.a. for asset-taper households.
- Some evidence that early in retirement, households spend more quickly.
- Some evidence that couple households with bequest motives save more.
- Income taper households dissave around 6% p.a.
Some transitory income is saved
Short sample might be affected by transitory shocks
Use 2006 portfolio allocations for each household
Compute portfolio returns shocks for each year for each household
  - cash and bank, super and insurance, public equity and trusts (including businesses), property, consumer durables
Deflate wealth by returns shock and re-estimate
Mean return shock was lower for wealthier households.
Estimated equation is substantially unchanged.

Deduct the household /year-specific return shock from the change in wealth.

<table>
<thead>
<tr>
<th>variable</th>
<th>single</th>
<th>couple</th>
<th>combined</th>
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</thead>
<tbody>
<tr>
<td>constant</td>
<td>-0.052</td>
<td>-0.134</td>
<td>-0.057</td>
</tr>
<tr>
<td></td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>asset taper</td>
<td>0.154</td>
<td>0.123</td>
<td>0.144</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>couple</td>
<td></td>
<td>-0.063</td>
<td>-0.070</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>newly retired</td>
<td>-0.061</td>
<td></td>
<td>-0.029</td>
</tr>
<tr>
<td></td>
<td>0.048</td>
<td>0.164</td>
<td></td>
</tr>
<tr>
<td>newly retired × asset taper</td>
<td>-</td>
<td>-</td>
<td>-0.060</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.132</td>
</tr>
<tr>
<td>bequest × asset taper</td>
<td>-</td>
<td>0.116</td>
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</tr>
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</table>
Summary

- Households with less wealth dissave more rapidly
- Wealthier households generally save
- Means-test tapers encourage faster draw-down early in retirement
- Couples appear to draw-down faster but care about bequests
Lorenz dominance tests of wealth do not demonstrate increasing equality
Barrett, Bhattacharya and Donald (2008)

\[ H_0^1 : L_2(p) \leq L_1(p) \]
\[ H_0^2 : L_1(p) \leq L_2(p) \]

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>(H_0^1)</th>
<th>(H_0^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(F_1)</td>
<td>(F_2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>2003</td>
<td>0.803</td>
<td>0.030</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>2004</td>
<td>0.000</td>
<td>0.754</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>2005</td>
<td>0.059</td>
<td>0.897</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>2006</td>
<td>0.290</td>
<td>0.210</td>
<td></td>
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<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th>(H_0^1)</th>
<th>(H_0^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>2006</td>
<td>0.000</td>
<td>0.974</td>
<td></td>
</tr>
</tbody>
</table>

- couple household wealth scaled by \(\sqrt{2}\)
Wealth inequality may be related to portfolio allocations.

- Least inequality in 2003 which is a year of large negative returns on risky assets.
- Strong positive returns in 2005-2006 when risky asset returns were strong.
- Results consistent with estimated savings patterns.
Conclusions, future work

Do Australian Age Pensioners decumulate?
- yes, if less wealthy, but no, if more wealthy

Do the means-tests tapers create incentives to decumulate faster?
- difficult to show in the small sample, but some evidence for faster decumulation in early-retirement

Little evidence for increasing equality over time in wealth distribution.
## Payments and allowances for Single Age Pensioners

<table>
<thead>
<tr>
<th>Age Pension and Related Benefits</th>
<th>Regular Payment</th>
<th>Annual value</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age pension payment</td>
<td>$547 fortnightly</td>
<td>$14217</td>
<td>max(CPI, 0.25MTAWE)</td>
</tr>
<tr>
<td>Pharmaceuticals allowance</td>
<td>$6 fortnightly</td>
<td>$151</td>
<td>CPI</td>
</tr>
<tr>
<td>Rent assistance</td>
<td>$107 fortnightly</td>
<td>$2782</td>
<td>CPI</td>
</tr>
<tr>
<td>Telephone allowance</td>
<td>$22 quarterly</td>
<td>$88</td>
<td>CPI</td>
</tr>
<tr>
<td>Utilities allowance</td>
<td>$125 semi-annually</td>
<td>$500</td>
<td>CPI</td>
</tr>
<tr>
<td>Remote area allowance</td>
<td>$18 fortnightly</td>
<td>$473</td>
<td>by legislation</td>
</tr>
<tr>
<td>Senior Bonus payments</td>
<td></td>
<td>$500</td>
<td>one-off payment</td>
</tr>
<tr>
<td>Pensioner Concession Card</td>
<td>Access to Pharmaceutical Benefits Scheme plus state and local government charges e.g. water rates, energy bills, public transport fares, motor vehicle registration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Table shows basic payment and allowance schedules for a single Age Pensioner as at 1 July 2008. Source: Harmer (2008).
Indicator variables.

`hhhealth_b = 1` if at least one household member reports general health as **fair** or **poor** and is zero if **good**, **very good**, **excellent** or **declined to comment**.

`hhhealth_eb = 1` if at least one household member answers true to ‘**I expect my health to get worse**’.

`hhsave = 1` if household answers the question ‘Which of the following statements comes closest to describing your (and your family’s) savings habits?’ as

- Save whatever is leftover - no regular plan
- Spend regular income save other income
- Save regularly by putting money aside each month; and zero if they reported that they do not save or did not answer.

`hhprecaution_2(6) = 1` if the household answers yes to at least one of the following questions in the 2002(6) wave: ‘Which of the following comes closest to describing your (and your family’s) current reason for saving? 1. For emergencies/in case of unemployment or illness and/or 2. Medical/dental expenses.

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