Medical savings accounts in Singapore: how much is adequate?

Chia and Tsui (2005, J of Health Economics)

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Summary

- Research question
  - Is the government-decreed minimum saving adequate?
- Methodology
  - Estimation of the present value of lifetime healthcare expenses (PVHE) upon retirement at age 62.
  - Various scenarios: discounting rates and medical cost growth rates
- Results
  1. Under the benchmark scenario, the decreed minimum value of $25,000 would be adequate for both less well-off male and female elderly.
  2. To keep the decreed amount unchanged, the interested rate earned on medical savings accounts (MSAs) ought to increase more than the medical growth rates do.

Healthcare financing system in Singapore

- Healthcare financing system: Individual responsibility / no free lunch
- Medisave: compulsory savings
  1. A proportion of the monthly wage (6 - 8.5%).
  2. Used for the relatively inelastic medical demands such as hospitalization and surgery.
  3. The minimum sum decreed at $25,000.
- Medishield: insurance for catastrophic illnesses, high deductibles, negotiated fee schedules
- Medifund: medical expense assistance, equity consideration

Present Value of Healthcare Expenditure

- Question: How much the MSAs would be needed for the representative Singaporean male and female elderly to meet the post-retirement healthcare costs?
- Estimate the minimum sum that would support the stream of future healthcare expenditures for the elderly at retirement.
- Assuming a max lifespan of 105 years,

$$PVHE = \sum_{j=1}^{528} c_j v_j {}_j\mathrm{P}_{62}$$

where c_j is the calibrated healthcare expenditure for month j; v_j is the discount factor at time j; ${}_j\mathrm{P}_{62}$ is the probablity of survival of the elderly starting at age 62 up to time (62+j).

Present Value of Healthcare Expenditure

- Calibration of healthcare expenditure:
  1. Housing types $\approx$ the relative economic status among households.
  2. Chan (2001)'s longitudinal study provides detailed breakdowns of medical expenditure by gender, by age and by socio-economic status identified by different dwelling types.
  3. 50% of the elderly: the smaller one-, two- or three-room public housing. 43% of the elderly: bigger four- and five-room public housing.
- Discount rates (yield curves):
  1. CIR (Cox-Ingersoll-Ross model), CYC (costant yield curve), and FYC (fixed yield curve) models.
  2. The 4% flat rate: the average of nominal rates historically paid on the MSA (benchmark rate).
- Survival probabilities: predicting the future morality rates of the elderly using published life tables.

Results: Monte Carlo simulations

Table 7: PVHE for the elderly in three-room

(b) 4% medical growth rate			
$r_a = 2\%$	FYC	24744	24170
	CIR	36110	33365
	CYC	35175	32438
$r_a = 3\%$	CIR	28600	27484
	CYC	29295	27915
$r_a = 4\%$	CIR	24557	24110
	CYC	24676	24198
$r_a = 5\%$	CIR	20272	20460
	CYC	21013	21122
(c) 5% medical growth rate			
$r_a = 2\%$	FYC	29334	27849
	CIR	43626	38903
	CYC	42486	37805
$r_a = 3\%$	CIR	34151	31822
	CYC	35049	32343
$r_a = 4\%$	CIR	29093	27765
	CYC	29246	27876
$r_a = 5\%$	CIR	23757	23406
	CYC	24676	24198

Results: Monte Carlo simulations

Table 8: PVHE for the elderly in five-room

(b) 4% medical growth rate			
$r_a = 2\%$	FYC	38641	24667
	CIR	53183	33823
	CYC	51723	32906
$r_a = 3\%$	CIR	45095	28906
	CYC	44385	28404
$r_a = 4\%$	CIR	38245	24614
	CYC	38523	24727
$r_a = 5\%$	CIR	33505	21489
	CYC	33795	21700
(c) 5% medical growth rate			
$r_a = 2\%$	FYC	44461	28301
	CIR	62509	39403
	CYC	60709	38291
$r_a = 3\%$	CIR	52410	33399
	CYC	51568	32811
$r_a = 4\%$	CIR	43942	28209
	CYC	44323	28365
$r_a = 5\%$	CIR	38179	24482
	CYC	38522	24727

Results and discussions

- By comparing PVHE with the decreed minimum sum,
  1. The decreed sum is adequate for both female and male elderly in the smaller three-room and for the male elderly in the bigger five-room under the benchmark scenario.
  2. The decreed sum is inadequate for the female elderly in five-room.
- For a given level of PVHE, the following should hold

$$\theta_i = \frac{\eta_{h,g}}{\eta_{h,i}} \times \theta_g$$

  where θ_k is a percentage change in k; $\eta_{h,k}$ is the elasticity of PVHE w.r.t. k; $k \in \{i, g\}$ where i stands for the interest rate to MSA and g stands for the healthcare growth rate.
- A 1% increase in the medical growth rate $\rightarrow$ the interest rate to MSA should be increased by 1.06%, 1.0%, 1.20% and 1.16% by gender and by wealth.

Critiques: other aspects to consider for the adequacy of the MSAs

- *Myopia and imperfect foresight*
  1. *Impatient individual? → Might spend all of the MSA in the near future*
  2. *Liquidity constrained person after running out of the MSA? → Depend on Medifund heavily.*
- *Heterogeneity across individuals/households*
  - A fixed proportion of the income with upper limit to the deposit
  - *Individuals with a chronic illness? Households with multiple patients?*

Critiques

- *Why female elderly's PVHE are so different by dwelling types compared to male elderly's PVHE by dwelling types?*
  - *Possibly loss aversion is different by dwelling types at least for females?*
  - *Female elderly in the bigger five-room puts higher weights on their health being severely ill and go to see doctors more often compared to male elderly in the bigger five-room? Or are they just on average in worse health?*