

**Setting Self-Discipline Saving Rates
for Thai Income Earners
in a Risk-Management Framework**

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Motivation

- It is important for an income earner to set a **self-discipline saving rate** in her financial plan so that the **long-term objective is not compromised by myopic consumption and immediate utility**.
- A **realistic and practical model** for setting a self-discipline saving rate needs to be developed.

Existing Recommended Rates

- **The RATES**
 - Berger (2013) >> a 10-percent rule-of-thumb rate
 - Siritewankun (2013) >> a 30-Percent Rate
 - Bank of Thailand (2014) >> a 25-percent rate
 - “Practitioners” >> the rate that enables savers to “smoothen” their consumption after retirement.
- **Important Question**
 - How are these RATES justified?

Literature

- **Fan & Chang (1995)**
- **Scholz, Seshadri & Khitatrakun (2006)**
- **Bayraktar & Young (2007)**

In this study, I propose ...

- **A realistic and practical model** for setting a self-discipline saving rate in a risk-management framework.
- The model is **financial planning** in nature, which incorporates stochastic life-time incomes, expenses, savings and investment returns together with mortality and morbidity data.
- It sets the self-discipline saving rate such that **the probability of the bequest being less than funeral expenses is at a pre-determined, acceptable level.**

Important Notes

- I do not consider the minimization problem of ruin probability as in Bayraktar & Young (2007) because **ruin is not the absorbing state**.
- The earner continues to live whether she experiences financial ruin or not. Instead, I consider the **probability of meeting a bequest target** because a person anticipates it (Hurd & Smith, 2001). A zero bequest net of funeral expenses is chosen as the target. This target **ensures** that a person is **not in financial ruin at death and has enough saving to pay her terminal, funeral expenses**.
- It is important to note that most people die at old age in their retirement years during which their income is low or none. So **if they do not leave negative bequest, it is not likely these people are in financial ruin during their retirement years either**.

Two Primary Contributions

- The **model is new** and able to address weaknesses of those previous models in the literature.
- The model is applied to estimate **the self-discipline saving rates** for Thai income earners. These estimates **are Thailand's first** from a rigorous model and the actual data set.

The Model (1)

- The Dynamic of Stochastic Savings**

$$\tilde{S}_{t_0+j} = \tilde{S}_{t_0+j-1} e^{\{\tilde{r}_{t_0+j}\}} + \tilde{I}_{t_0+j} - \tilde{P}_{t_0+j}.$$

- The Stochastic Income << This is where Morbidity and its effect comes in.**

$$\tilde{I}_{t_0+j} = I_{t_0}^* e^{\{\sum_{h=1}^j \tilde{\pi}_h^I\}} \times \left(1 - \frac{\sum_{d=1}^4 L_d \tilde{Y}_{d,t_0+j}}{252}\right) \times (1 - \tilde{F}_{t_0+j}),$$

- The Stochastic Inflation << This equation drives stochastic incomes and expenses.**

$$\tilde{\pi}_h^I = \theta(\bar{\pi} - \pi_{h-1}^I) + \tilde{\varepsilon}_h^I.$$

The Model (2)

- The Stochastic Expenses << must ensure (1) subsistence level and (2) stochastic behavior.

$$\tilde{P}_{t_0+j} = \text{Max} \left[P_{t_0}^* e^{\left\{ \sum_{h=1}^j \tilde{\pi}_h^P \right\}}, (1 - \Omega) \tilde{I}_{t_0+j+1} \right],$$

Disciplined Saving

$$\tilde{\pi}_h^P = \theta (\bar{\pi} - \pi_{h-1}^P) + \tilde{\varepsilon}_h^P.$$

Inflated Subsistence Level

- Inflated Funeral Costs

$$\tilde{C}_{\tilde{T}} = C_{t_0}^* e^{\left\{ \sum_{h=1}^{\tilde{T}-t_0} \tilde{\pi}_h^C \right\}},$$

The Model (3)

- The Disciplined Saving Rate Ω^* in the Risk Management Framework

$$Pb\{\tilde{S}_{\tilde{T}}(\Omega^*) - \tilde{C}_{\tilde{T}} < 0\} = \alpha$$

Method and Data (1)

- **Method: Monte Carlo Simulation for 5,000 Scenarios**
- **Data: Income, Mortality and Morbidity Rates, and Investment Returns**
 (See the MALE data in the PAPER.)

Panel 1.1 Female

Age	Annual Income (Baht) ¹	Mortality Rates (%) ³					Incidence Rates (%)				Investment Returns (%) ^{7,b}	
		General ²	Diabetes ³	Heart ³	Stroke ³	Cancer ⁴	Diabetes ⁵	Heart ⁵	Stroke ⁵	Cancer ⁶	Mean	S.D.
21	100,872.01	0.08	1.96	3.89	6.20	4.43	0.10	0.01	0.01	0.02	8.57	12.82
31	145,831.68	0.09	1.96	3.89	6.20	4.45	0.10	0.01	0.01	0.06	8.57	12.82
41	167,360.52	0.15	1.82	4.55	7.70	4.50	0.63	0.03	0.03	0.18	8.57	12.82
51	248,671.20	0.30	2.85	5.09	8.90	4.64	1.43	0.10	0.08	0.29	6.68	7.40
61	81,840.37	0.98	9.89	13.05	18.73	5.29	2.12	0.36	0.27	0.40	4.53	2.98
71	62,462.15	3.06	9.89	13.05	18.73	7.28	2.12	0.36	0.27	0.52	4.53	2.98
81	54,119.65	7.03	9.89	13.05	18.73	11.08	2.12	0.36	0.27	0.52	4.53	2.98
91	12,000.00	19.30	19.30	19.30	19.30	22.82	2.12	0.36	0.27	0.52	4.53	2.98
100	12,000.00	100.00	100.00	100.00	100.00	100.00	2.12	0.36	0.27	0.52	4.53	2.98

Method and Data (2)

- Data: Disease-Specific Data**

Table 2 Disease-Specific Data

Disease	Lost Work Days ¹		Productivity Loss (%) ²
	Female	Male	
Diabetes	10.82	11.75	
Heart	6.23	5.90	11.00
Stroke	10.96	10.66	
Cancer	8.85	9.37	

- Assumptions and Specifications**

- Inflation Rates and Behaviors: All are Same as Thailand's Headline Inflation.
- Subsistence Level: 9,000 baht and Inflating.
- Funeral Costs: 40,000 baht and Inflating
- Alpha: 10 percent.

Results (1)

Table 3 Self-Discipline Saving Rates and Median Bequests net of Funeral Expenses
(Initial Debt = 0 Baht)

Age	Female		Male	
	Saving Rate (%)	Net Bequest (Baht)	Saving Rate (%)	Net Bequest (Baht)
20	12.19	4,285,753	8.35	2,753,193
30	14.29	2,775,305	8.65	1,627,226
40	24.77	1,965,488	15.57	1,239,644
50	57.85	1,534,042	29.18	925,886

Results (2)

Table 4 Self-Discipline Saving Rates and Median Bequests net of Funeral Expenses
(Initial Debt = 50,768 Baht)

Age	Female		Male	
	Saving Rate (%)	Net Bequest (Baht)	Saving Rate (%)	Net Bequest (Baht)
20	29.36	8,827,631	N.A.	N.A.
30	16.94	2,820,208	11.73	1,752,645
40	27.54	2,002,983	17.18	1,253,002
50	N.A.	N.A.	33.58	985,545

Some Practical Advises

- It is **NOT TOO LATE** for **MOST** Thais to start to save for their futures, even for those debt-ridden earners.
- **FEMALE** should be **more careful** (because, on average, they **earn less but live longer**).
- **MOST** Thais can be **MILLIONAIRES** if they start to save NOW.