หนี้สิน ณ เริ่มต้นและหายนะ ณ บั้นปลายชีวิตของคนไทย

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บทคัดย่อ

การเริ่มต้นด้วยการเป็นหนี้มีผลกระทบอย่างยิ่งในทางลบต่อการครองชีวิตในอนาคต การศึกษาวิเคราะห์ความสัมพันธ์ระหว่างระดับหนี้สิน ณ เริ่มต้นกับหายนะ ณ บั้นปลายชีวิต มรดกหนี้ และช่วงเวลาของชีวิตที่ต้องแบกรับภาระหนี้สินของคนไทย สำหรับคนไทยที่มีหนี้สิน ณ เริ่มต้นระดับเท่ากับค่าเฉลี่ยหนี้สินภาคครัวเรือนหรือหนี้สินบุคคล หายนะ ณ บั้นปลายชีวิตมีโอกาสเกิดขึ้นได้สูงมาก จนอาจถึงระดับที่จะเกิดขึ้นแน่นอนในเวลาเดียวกัน มรดกหนี้ที่เกิดขึ้นจะเป็นจำนวนเงินที่สูงมาก และระยะเวลาที่เป็นหนี้อาจยาวนานชั่วชีวิตจากผลการศึกษา คนไทยสามารถหลีกเลี่ยงหรือบรรเทาเหตุการณ์ซึ่งไม่พึงประสงค์เหล่านี้ได้ด้วยการพยายามไม่เป็นหนี้ตั้งแต่แรก และด้วยการยึดมั่นในวินัยการออมให้มากและอย่างเคร่งครัด

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Initial Debt Positions and Terminal Ruins of the Thai

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ABSTRACT

Initial debt positions adversely affect the Thai later on in lives in significant ways. The study performs Monte Carlo analyses of the relationship of initial debt with terminal ruins, negative bequests and indebtedness years. For the initial debt positions at the current household and personal averages, terminal ruins are likely, almost certain or even certain for most Thai. The corresponding bequests are negative and very large. And the indebtedness duration can be as long as the remaining life expectancy. To avoid or mitigate these unwanted circumstances, based on its findings the study recommends the Thai to try not to get into debt in the first place and to adopt high and strict self-discipline saving.

Key Words: Ruin Probability, Personal Debt, Monte Carlo Analysis

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I. INTRODUCTION

Debts of the Thai are high and rising fast. The National Statistical Office reports that in 2013 the average debt was 163,087 baht per household, 6.5 times the household income and rising 20.9% from the previous year. This sum translated to a 50,768-baht debt per person.

In Thailand, people of all generations rank family security—i.e., being able to take care of loved ones, first or second in their generational value system (Murphy et al., 2010). Khanthavit (2015a) points out that taking care of loved ones may as well mean being less taken care of by loved ones. But it is very difficult for those Thai to achieve the desired goal if they have large debt and no saving. Alarmingly, previous studies suggest the relationship of personal debt with mental and physical disorder (Channuwong and Kantatian, 2012 & Richardson et al., 2013) and even with suicidal ideation (Lotrakul, 2006 & Meltzer et al., 2011). The strength of the relationship depends largely on the amount of debt and the years of indebtedness. Because debt adversely affects a person's life in significant ways and the current personal debt is high, it is interesting and important to ask how the initial debt positions affect a person later on in life.

This study examines the relationship of initial debt positions with ruin probabilities, bequests and indebtedness years. The study focuses on terminal ruin—i.e., the state in which a person leaves negative bequest or debt at death to the children. Terminal ruins and bequests suggest how likely a person is able to achieve the desired family-security goal, whereas bequests and indebtedness years suggest the risk of mental and physical disorder and suicidal ideation.

The study is retirement planning in nature, which incorporates stochastic life-time incomes, expenses, savings and investment returns together with mortality data and measures how much the ruin probabilities, bequests and indebtedness years are affected by the positions of initial debt. Based on Monte Carlo analyses of Thailand's survey income, mortality and inflation data, the study finds for both female and male of all ages with an initial 100,000-baht debt or over that (1) terminal ruin is certain or almost certain, (2) bequests are negative and extremely large and (3) indebtedness years can be as long as the remaining life expectancy. However, these unwanted circumstances can be avoided or mitigated. The study recommends the Thai to try not to get into debt in the first place and to adopt high and strict self-discipline saving.

II. METHODOLOGY

Applying the methodology in Khanthavit (2015a), the study analyzes the relationship of initial debt positions with ruin probabilities, bequests and indebtedness years. Each year the Thai work and earn stochastic sums of money with respect to their ages and sexes. They will have to spend at least for a subsistence level from their earnings and savings. The steps repeat until death, which is a random event with respect to conditioned mortality rates. Upon death, ruins, bequests and indebtedness years are assessed for the persons along their life paths.

To begin, let $S^*_{t_0}$ be the starting saving level of the representative t_0-year-old person. The saving level $\widetilde{S}_{t_0+1}$ in the following year when she turns $t_0 +$ must equal the starting level $S^*_{t_0}$ plus $\widetilde{r}_{t_0+1}$-percent investment return plus income $\widetilde{I}_{t_0+1}$ net of personal expenses $\widetilde{P}_{t_0+1}$. That is,

$$\widetilde{S}_{t_0+1} = S^*_{t_0}\, e^{\{\widetilde{r}_{t_0+1}\}} + \widetilde{I}_{t_0+1} - \widetilde{P}_{t_0+1}, \tag{1.1}$$

so that

$$\widetilde{S}_{t_0+1} = \widetilde{S}_{t_0+j-1}\, e^{\{\widetilde{r}_{t_0+j}\}} + \widetilde{I}_{t_0+j} - \widetilde{P}_{t_0+1}, \tag{1.2}$$

Eqs. (1.1) and (1.2) are adapted from the wealth constraint in a discrete-time intertemporal portfolio selection model (Ingersoll, 1987). Symbol "~" labels stochastic variables. I assume that the investment return $\widetilde{r}_{t_0+j}$ is age-specific to reflect the fact that the person may adjust the investment strategies along her glide path (Budsaratrakul, 2014). It is a normal variable with a μ_{t_0+j} mean and a σ_{t_0+j} standard deviation when $\widetilde{S}_{t_0+j-1} \geq 0$. It is a minus lending rate when $\widetilde{S}_{t_0+j-1} < 0$.

In eq. (2), because income $\widetilde{I}_{t_0+j}$ is age-specific and rising with inflation for j years from its starting level $I^*_{t_0}$ in 2014, the income must be inflation-adjusted.

$$\widetilde{I}_{t_0+j} = I^*_{t_0}\, e^{\left\{\sum_{h=1}^{j} \widetilde{\pi}^I_h\right\}}, \tag{2.1}$$

where $\widetilde{\pi}_h^I$ is the stochastic inflation rate for income in year h. It is assumed the income inflation is mean-reverting with respect to the Bank of Thailand's inflation targeting policy (Khanthavit, 2014).

$$\widetilde{\pi}_h^I = \theta(\overline{\pi} - \pi_{h-1}^I) + \widetilde{\varepsilon}_h^I. \tag{2.2}$$

θ is the convergence rate, $\overline{\pi}$ is the long-run mean and $\widetilde{\varepsilon}_h^I$ is the normally-distributed error of $\widetilde{\pi}_h^I$.

As for the personal expense, the person will have to spend at least a subsistence level regardless of her income level. However, if she earns more, she tends to spend more with her rising income. So, I assume the personal expense $\widetilde{P}_{t_0+1}$ depends on the subsistence level and income level as in eq. (3).

$$\widetilde{P}_{t_0+j} = Max\left[P_{t_0}^* e^{\left\{\sum_{h=1}^{j} \widetilde{\pi}_h^P\right\}}, (1 - \Omega)\,\widetilde{I}_{t_0+j}\right], \tag{3.1}$$

$$\widetilde{\pi}_h^P = \theta(\overline{\pi} - \pi_{h-1}^P) + \widetilde{\varepsilon}_h^P. \tag{3.2}$$

$P_{t_0}^*$ is the subsistence personal expenses for the t_0-year-old person in year 2014. So, it must rise with the inflation, constituting a level of $P_{t_0}^* e^{\left\{\sum_{h=1}^{j} \widetilde{\pi}_h^P\right\}}$ when she turns t_0+. If she earns more, she naturally spends more. I assume she spends $(1 - \Omega)\%$ of her income. Ω is the saving rate. The actual spending is the maximum of the two amounts.

$\widetilde{\pi}_h^I$ and $\widetilde{\pi}_h^P$ share the same θ and $\overline{\pi}$ parameters because they track the country's general inflation. But their errors $\widetilde{\varepsilon}_h^I$ and $\widetilde{\varepsilon}_h^P$ are uncorrelated because incomes and expenses of Thai households have low correlation (Kinnan, 2014).

That $\widetilde{S}_{t_0+j} < 0$ can be interpreted as the person being in debt when she is t_0+. In order to estimate the indebtedness duration, I define indicator variable $\widetilde{\varphi}_{t_0+j} = \begin{cases} 1 & \text{if } \widetilde{S}_{t_0+j} < 0 \\ 0 & \text{if } \widetilde{S}_{t_0+j} \geq 0 \end{cases}$ so that indebtedness duration $\widetilde{\tau} = \dfrac{\sum}{t_0+j \leq 100} \widetilde{\varphi}_{t_0+j}$. The condition $t_0+j \leq 100$ is imposed with respect to the 100-year maximum age in the Office of Insurance Commission's 2008 mortality table.

Bequest is the saving $\widetilde{S}_{\widetilde{T}}$ at age $\widetilde{T}$ at death. Let indicator variable $\widetilde{\beta} = \begin{cases} 1 & \text{if } \widetilde{S}_{\widetilde{T}} < 0 \\ 0 & \text{if } \widetilde{S}_{\widetilde{T}} \geq 0 \end{cases}$.

The probability of leaving negative bequest then equals expected $\widetilde{\beta}$. I will define age-at-death variable $\widetilde{T}$ as follows. Recall that death is an absorbing state and a person may die at age t_{0+} with probability of the age-and-sex specific mortality rate. Next, consider a (1, 0) Bernoulli $\widetilde{X}_{t_0+j}$ with probability of the mortality rate. Given realized $\widetilde{X}_{t_0+j}$'s, I can identify age $\widetilde{T}$ at death by $Min\{t_0 + j \leq 100 | \widetilde{X}_{t_0+j} > 0\}$. I assume Bernoulli distributions for $\widetilde{X}_{t_0+j}$ variable because it is discrete and can take on only 0.00 and 1.00 values (Law and Kelton, 2000). Finally, let δ be the discount factor. The present value of bequest is $\delta^{(\widetilde{T} - t_0)}\widetilde{S}_{\widetilde{T}}$.

I use the Monte Carlo approach, as in Khanthavit (2015a), to simulate the interesting variables based on the specification described above for each representative Thai in 5,000 scenarios. These variables are age $\widetilde{T}$ at death, debt level $\widetilde{S}_{t_0+j} < 0$, indebtedness duration $\widetilde{\tau}$, bequest $\widetilde{S}_{\widetilde{T}}$ and negative-bequest status $\widetilde{\beta}$.

III. THE DATA

Table 1 reports the age- and sex-specific data. It is an extract. Readers may obtain the full table from the author upon request. The annual incomes are from the National Statistical Office's labor force survey data for quarter 1, 2013. I examine the income data and realize that two points needed be adjusted. One, the annual incomes for 68-year-old female and male are extremely high of 931,358.64 and 1,115,739.72 baht, compared to the incomes of [67 and 69]-year-old female and male of [121,509.12 and 41,348.82] and [86,352.13 and 79,685.65]. Moreover, the second highest incomes are 298,809.48 and 246,088.32 baht of 56-year-old female and 57-year-old male. This fact suggests outliners. Two, the survey incomes of certain ages, for example 90-year-old female and male, are lower than 6,000 baht. This is not possible because the government pays at least 500-baht, monthly senior allowance to those over 60 years old. To adjust for the possible outliners, I substitute the annual income of the 68-year old by the average incomes of the 67- and 69-year old. And, as for the understated incomes of those over 60 years old, I adjust them to the maximum of 6,000 baht and their survey incomes.

The mortality rates are from the 2008 Mortality Table for general population, constructed by the Office of Insurance Commission. I assume the same glide path for female and male. The expected returns and standard deviations are computed from the statistics in Budsaratrakul (2014) and the glide path of Government Pension Fund. I assume the investment returns as in Table 1 for the savings only when they are positive. When they are negative, i.e.,

the person is in debt, I assume a -20% return with respect to the fact that debt with financial institutions can cost up to 20% per year. The costs can be much higher if the debt is from informal sources.

Table 1 Age- and Sex-Specific Data

Age	Female		Male		Investment Return	
	Income	Mortality	Income	Mortality	Mean	S.D.
21	100,872.01	0.08%	124,737.84	0.23%	8.57%	12.82%
31	145,831.68	0.09%	151,328.88	0.26%	8.57%	12.82%
41	167,360.52	0.15%	165,066.84	0.37%	8.57%	12.82%
51	248,671.20	0.30%	210,959.76	0.68%	6.68%	7.40%
61	81,840.37	0.98%	180,646.68	1.66%	4.53%	2.98%
71	62,462.15	3.06%	79,634.28	4.31%	4.53%	2.98%
81	54,119.65	7.03%	6,000.00	10.18%	4.53%	2.98%
91	6,000.00	19.30%	6,000.00	20.46%	4.53%	2.98%
100	6,000.00	100.00%	6,000.00	100.00%	4.53%	2.98%

A person will have to spend at least a subsistence amount $P^*_{t_0}$ of money regardless of her annual income. I set the subsistence personal expenses equal to 108,000 baht a year or 9,000 baht a month. This level is the national minimum wage rate. I use maximum likelihood estimation to estimate the convergence rate θ, the long-run mean $\tilde{\pi}$ and the standard deviation of inflation errors from the annual headline-inflation data from 2001 to 2014. The inflation data are from the Bureau of Trade and Economic Indices, Ministry of Commerce. The resulting statistics are 0.76, 2.56% and 1.33%, respectively. Following Ahmed et al. (2012), the study sets the discount factor δ equal to 0.96. It converts all the financial variables before 2014 to their 2014 values using realized headline inflation rates. Finally, the study follows Berger (2013) to set the saving rate to a 10% rule-of-thumb level so that the spending rate $(1 - \Omega)\%$ is 90% of the annual income.

IV. EMPIRICAL RESULTS

I examine the relationship of initial debt positions with ruin probabilities, bequests and indebtedness years for female and male Thai of 20, 30, 40, 50 and 60 years old. The remaining life expectancy of these Thai is in Table 2. In the analysis, the debt positions range from (the debt of) -200,000 to (the saving of) +200,000 baht. This range covers the household and personal debts of 163,087 and 50,678 baht, respectively. The reason I refer to the household debt level is that all the household debt may be solely responsible by the head of that household.

Table 2 Remaining Life Expectancy

Age	Female	Male
20	57.62	51.71
30	47.99	43.01
40	38.64	34.13
50	29.45	25.51
60	20.41	17.58

Turn first to the relationship of the positions with terminal ruins. Figures 1.1.1 and 1.1.2 show the ruin probabilities for female and male when the spending rate is at a 90% rule-of-thumb level. In the figures, negative positions are debts, while positive positions are savings. The study finds that when the initial debt is 100,000 baht or higher, ruin is certain or almost certain for both female and male of all ages.

For a 60-year-old (60Y) female, the ruin probability hardly falls despite falling debts or rising savings. The probabilities gradually drop for 30Y to 50Y female for the debt of less than 100,000 baht. It is interesting to note that the probability for 20Y female drop precipitously once the debt reaches 50,000 baht. It converges toward zero as it turns to saving and reaches 200,000 baht.

The situation for 60Y male is similar to that of 60Y female. The probability does not fall very much with lowering debt levels. But for 30Y, 40Y and 50Y male, it does very fast once the debt is falling under 100,000 baht. The probability of 20Y male also drops quickly, like that of 20Y female, when the debt is 50,000 baht or less.
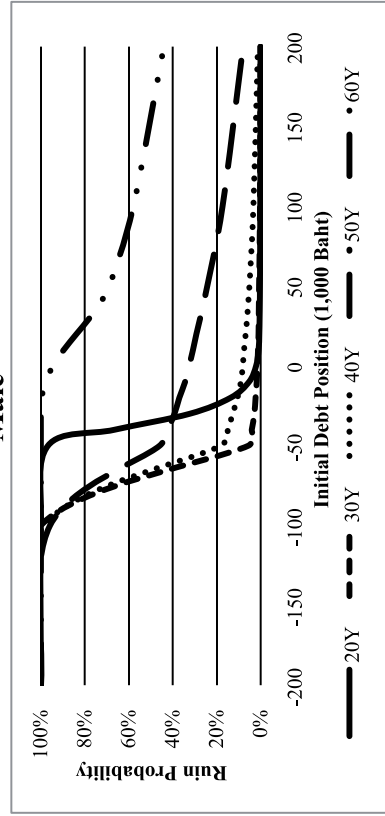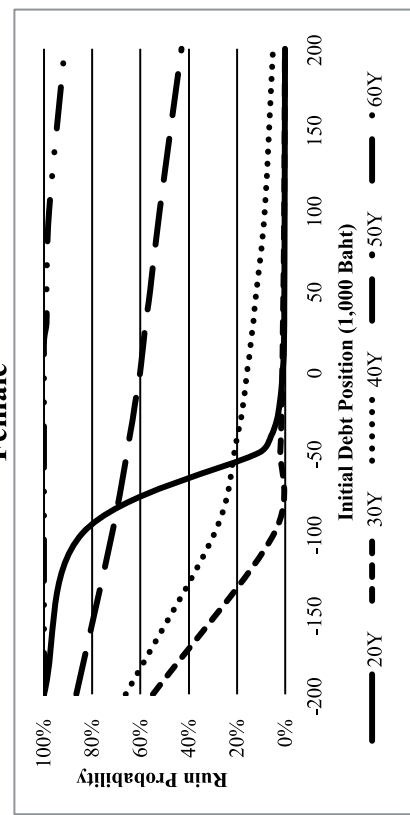
Figure 1
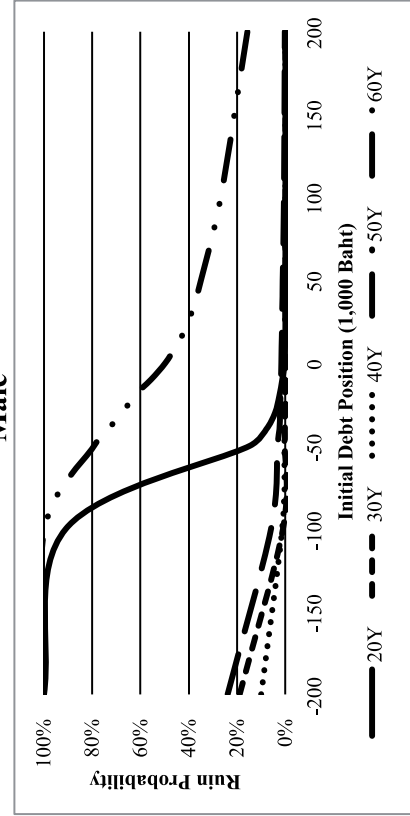**Probability of Terminal Ruin**
Figure 1.1
Spending Rate = 90%
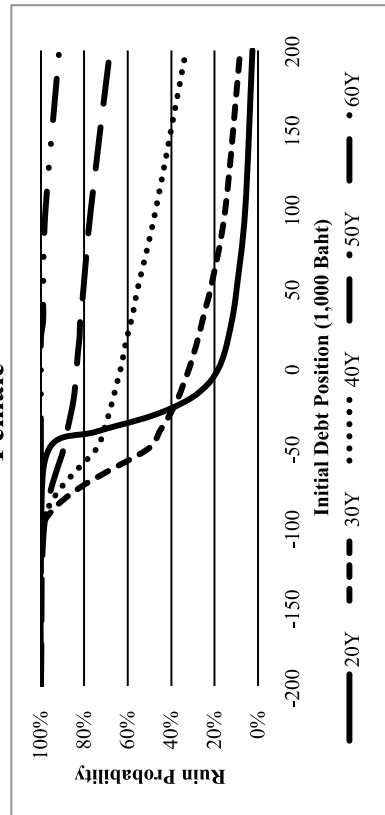
Figure 1.1.2
Male

Figure 1.1.1
Female

Figure 1.2
Spending Rate = 75%

Figure 1.2.2
Male

Figure 1.2.1
Female

Table 3 Bequests

Table 3.1 Spending Rate = 90%

Initial Debt Position	Female					Male				
	20Y	30Y	40Y	50Y	60Y	20Y	30Y	40Y	50Y	60Y
-200,000 (Debt)	-2,109,919,128	-324,950,069	-64,312,621	-16,873,415	-11,222,751	-918,543,244	-148,334,250	-28,702,759	-7,025,475	-3,596,696
-100,000	-788,630,366	-43,787,530	-6,556,720	-4,162,241	-8,396,799	-354,085,841	-19,684,001	-1,621,784	-461,384	-2,016,081
-50,000	-93,994,086	-94	-514,730	-1,950,550	-6,985,183	-58,263,219	392,519	202,957	21,723	-1,209,189
-40,000	-2,451,478	52,017	-429,511	-1,786,364	-6,708,816	-3,323,146	443,546	232,292	42,859	-1,041,008
-30,000	12,226	101,014	-360,012	-1,644,667	-6,420,131	276,078	486,473	258,374	60,090	-874,427
-20,000	209,778	141,987	-307,601	-1,528,882	-6,142,886	471,979	525,749	281,345	77,003	-709,544
-10,000	336,599	180,370	-257,456	-1,440,935	-5,877,718	589,072	560,500	302,148	91,979	-557,987
0	424,866	213,386	-215,230	-1,360,113	-5,626,504	667,639	590,603	321,489	106,402	-426,536
10,000	481,080	242,914	-185,896	-1,282,021	-5,392,379	719,325	619,005	338,162	118,500	-338,225
20,000	527,526	273,463	-152,776	-1,221,275	-5,154,816	763,265	648,151	356,716	130,823	-276,196
30,000	571,022	303,486	-123,674	-1,162,060	-4,942,497	806,883	673,633	375,339	143,212	-228,289
40,000	615,666	333,120	-95,666	-1,101,878	-4,738,323	847,958	699,671	393,585	155,035	-195,125
50,000	657,497	365,606	-71,074	-1,045,590	-4,541,248	891,018	726,259	412,032	166,788	-169,686
100,000	871,863	508,326	33,582	-793,006	-3,623,566	1,099,132	865,625	499,448	226,725	-78,647
200,000 (Saving)	1,290,920	784,145	232,389	-415,581	-2,233,608	1,515,224	1,137,317	674,218	344,176	42,975

Table 3.2 Spending Rate = 75%

Initial Debt Position	Female					Male				
	20Y	30Y	40Y	50Y	60Y	20Y	30Y	40Y	50Y	60Y
-200,000 (Debt)	-1,495,306,146	-64,553	-227,605	-1,463,471	-11,168,717	-690,711,789	440,222	405,398	149,192	-2,429,361
-100,000	-99,597,730	885,365	264,261	-517,478	-8,344,601	-91,301,227	1,344,368	833,363	392,493	-755,457
-50,000	958,552	1,098,808	394,335	-319,422	-6,929,776	1,148,307	1,550,873	964,371	476,452	-158,337
-40,000	1,106,370	1,133,304	418,348	-292,950	-6,646,811	1,326,146	1,588,188	987,462	491,753	-106,338
-30,000	1,236,475	1,169,983	440,416	-265,894	-6,374,674	1,467,784	1,623,260	1,009,286	505,436	-67,576
-20,000	1,345,783	1,205,298	462,546	-239,812	-6,126,485	1,586,894	1,654,244	1,030,312	519,108	-38,201
-10,000	1,434,545	1,236,745	484,850	-216,631	-5,862,147	1,679,206	1,686,242	1,050,294	533,031	-16,426
0	1,517,896	1,266,440	506,973	-192,521	-5,582,690	1,743,907	1,719,804	1,070,819	547,145	500
10,000	1,574,755	1,295,205	526,675	-172,977	-5,348,026	1,800,580	1,747,619	1,090,004	559,222	12,500
20,000	1,622,971	1,326,048	546,872	-154,804	-5,113,672	1,841,265	1,776,215	1,108,253	571,505	24,515
30,000	1,672,617	1,352,651	567,514	-138,196	-4,903,299	1,883,058	1,804,907	1,127,066	583,858	35,640
40,000	1,723,693	1,382,150	585,073	-122,014	-4,711,130	1,929,488	1,832,481	1,145,987	595,875	46,888
50,000	1,771,664	1,409,814	602,962	-106,240	-4,507,381	1,975,393	1,860,943	1,163,669	608,008	57,399
100,000	1,993,279	1,548,142	700,542	-29,786	-3,565,556	2,196,455	1,999,170	1,255,487	668,868	110,423
200,000 (Saving)	2,428,143	1,837,554	889,517	105,373	-2,195,676	2,615,346	2,274,752	1,434,792	792,591	216,595

Ruins are serious only if negative bequests are large. Table 3.1 reports the median bequests vis-à-vis initial debt positions for female and male, when the spending rate is 90%. The bequests are adjusted to their present values by a 0.96 discount rate. The median bequests are chosen over the averages because the distributions are extremely skewed. From the table, if a person must be responsible for all the household debt at its average level of 163,087 baht, which is between -200,000 and -100,000 baht, the resulting median bequests are negative and extremely large. These large negative bequests can be explained by the 20% interest rate on debts being cumulative from their initial positions.

At the 50,000-baht initial debt which is about the average personal debt, all female still experience negative bequests, while the bequests of 30Y to 50Y male turn positive. The situation improves satisfactorily if a person has zero debt. 30Y and 40Y female and 20Y to 50Y male will have positive bequests. It is best if a person starts out with some savings.

In addition to debt levels, indebtedness duration can induce mental and physical disorder and suicidal ideation. Table 4.1 reports the duration of indebtedness when the spending rate is 90%. The reported statistics are medians because the resulting indebtedness years are highly skewed. For initial debts of 100,000 and 200,000 baht, a person is expected to live in debt for all the remaining years of her life. At the 50,000-baht initial debt, only 20Y and 60Y male and female have this problem. The indebtedness duration of the remainders are low, compared to the remaining life expectancies. Even if a person has a zero initial debt, she may have to borrow in some years. The median indebtedness duration is not very long, however, except for the 60Y. The 60Y female and male will have to spend for the living but earn little. Without saving, they will have to borrow to maintain the subsistence level.

Table 4 Duration of Indebtedness

Table 4.1 Spending Rate = 90%

Initial Debt Position	Female					Male				
	20Y	30Y	40Y	50Y	60Y	20Y	30Y	40Y	50Y	60Y
-200,000 (Debt)	59	50	40	30	21	54	45	35	26	17
-100,000	59	50	40	29	21	54	45	35	25	17
-50,000	58	6	12	18	21	54	5	4	3	17
-40,000	40	4	10	16	21	41	4	3	2	17
-30,000	15	2	8	15	21	14	2	2	1	17
-20,000	9	1	7	13	21	9	1	1	1	17
-10,000	5	0	5	13	21	4	0	0	0	16
0	3	0	5	12	21	2	0	0	0	15
10,000	0	0	4	12	21	0	0	0	0	13
20,000	0	0	4	11	21	0	0	0	0	11
30,000	0	0	3	11	20	0	0	0	0	9
40,000	0	0	3	11	20	0	0	0	0	7
50,000	0	0	2	11	20	0	0	0	0	6
100,000	0	0	0	9	19	0	0	0	0	3
200,000 (Saving)	0	0	0	6	15	0	0	0	0	0

Table 4.2 Spending Rate = 75%

Initial Debt Position	Female					Male				
	20Y	30Y	40Y	50Y	60Y	20Y	30Y	40Y	50Y	60Y
-200,000 (Debt)	59	20	16	18	21	54	17	10	6	17
-100,000	55	3	3	9	21	53	4	3	2	17
-50,000	10	1	1	5	21	12	1	1	1	11
-40,000	8	1	1	5	21	10	1	1	0	10
-30,000	7	0	0	5	21	8	0	0	0	8
-20,000	5	0	0	4	21	6	0	0	0	6
-10,000	5	0	0	4	21	3	0	0	0	5
0	3	0	0	4	21	0	0	0	0	4
10,000	0	0	0	3	21	0	0	0	0	2
20,000	0	0	0	3	21	0	0	0	0	1
30,000	0	0	0	3	20	0	0	0	0	1
40,000	0	0	0	3	20	0	0	0	0	0
50,000	0	0	0	2	20	0	0	0	0	0
100,000	0	0	0	1	19	0	0	0	0	0
200,000 (Saving)	0	0	0	0	15	0	0	0	0	0

V. DISCUSSION

The Monte Carlo results show that initial debts at the household or personal averages lead to high ruin probabilities, large negative bequests and long indebtedness durations, when the Thai are spending at a 90% rule-of-thumb rate out of their annual income. These circumstances are unwanted. If the Thai follow these lifestyles, they can hardly achieve their generational value goal. Moreover, with long years in large debts, these Thai risk mental and physical disorder and suicidal ideation. So, it is important to address how the Thai can avoid or mitigate these unwanted circumstances.

This study proposes discipline. Except for basic necessity or emergency, it is the person's choice to initiate debts and lead herself into unwanted circumstances later on in life. So, it is quite straightforward for a person to avoid those circumstances in the future by adhering to the discipline—not getting into debt in the first place especially for luxury goods, fancy meals or expensive vacations. With this discipline, the person will have at least a zero, initial debt position. The results in Figure 1.1 and Tables 3.1 and 4.1 show that, except for 60Y female and male, the ruin probabilities fall by half or more, the large negative bequests can turn positive, and the indebtedness duration is shortened to only a few years or even zero for, for example, 30Y female and male.

In 2013, 10.80 million out of 26.17 Thai households were already in debt, implying many Thai had been already in non-zero, initial debt positions. Hence, the discipline of not getting into debt in the first place is not applicable. Recently, Khanthavit (2015b) shows by Monte Carlo analyses for the Thai that, with zero, initial debt positions, a 25% self-discipline saving rate prescribed by the Bank of Thailand (2014)--implying a 75% spending rate, is able to manage ruin probabilities for most Thai. So, for those Thai who are already in debt, this study would recommend high and strict self-discipline saving rates. To see the impact of adopting higher saving and lower spending rates, the study re-estimates the relationship under the 25%-saving rate, 75%-spending rate specification.

The new discipline works satisfactorily. From Figure 1.2.1, except for the 60Y at the initial debt positions of 100,000 baht, Thai female can lessen the ruin probabilities so much from certainty or almost certainty to the highest of about 80%. Moreover for younger female of 20Y to 40Y with a 50,000 baht, initial debt position, the maximum probability is only 20%, as opposed to that of more than 90% when they follow the 10%-saving discipline. With the new 25%-saving discipline, the ruin probabilities improve significantly for 20Y to 50Y male and fairly for 60Y male.

The high and strict 25%-saving discipline also leads to significant improvement in bequests and indebtedness years. Except for the cases of 200,000 baht initial debts, 50Y and 60Y female and 60Y male, the median bequests are positive and large. Moreover, the numbers of indebtedness years are zero or small for most initial debt positions and ages.

VI. CONCLUSION

Debt lessens the chance of a person to achieve her family-security goal in the generational value system. In addition, having large debt for a long time risks a person to develop mental and physical disorder as well as suicidal ideation. This study uses a Monte Carlo approach to analyze and understand the relationship of initial debt positions with terminal-ruin probabilities, negative bequests and indebtedness durations for the Thai. The study finds that the severity and likelihood of the unwanted circumstances rise with the level of initial debts. At the current, average household and personal debt, terminal ruins are likely, almost certain, or even certain for most Thai. The resulting bequests are negative and very large. And, they will have to be in debt over the rest of their remaining lives. These results are alarming because in the model even when they start out with certain levels of debt, these Thai lead their lives adhering to disciplined 10% saving and 90% spending of the income.

Because debt adversely affects the Thai later on in lives in significant ways, they must avoid or mitigate these unwanted circumstances. Based on the Monte Carlo results, the study recommends the Thai to try not to get into debt in the first place and to adopt high and strict self-discipline saving.

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