Should We Replace the Universal Health Coverage with the Co-Payment Scheme?: A Theory for a Small Open Economy like Thailand

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ABSTRACT

This paper aims to theoretically analyze pros and cons between implementing the Universal Health Coverage (UHC) and the Co-Payment Scheme (CPS) in a small open economy with the focus on Thailand by using two-period Overlapping Generations Model (OLG). The result is that as long as the public debt level is still manageable, the UHC is recommended over the CPS to countries like Thailand where people have low intertemporal elasticity of substitution as it promotes good health, GDP, consumptions, savings, and even economic stability.

Keywords: Household Savings, Overlapping Generations Model, Co-Payment, Universal Health Coverage, Impulse Response Function

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Background and Significance of the Research Problem

Thailand is one of many countries that implements the Universal Health Coverage policy (UHC). Simply speaking, it is the policy aiming to raise the social welfare by (nearly) perfectly subsidizing the expenditure of the citizen over healthcare. Although such a policy helps all people to equally access the medical services and keep themselves healthy, it comes with the cost of increasing government spending, public debts, and perhaps other economic downfalls. This paper theoretically explores various aspects of replacing UHC with the Co-Payment Scheme (CPS) in a small open economy with the focus of Thailand.

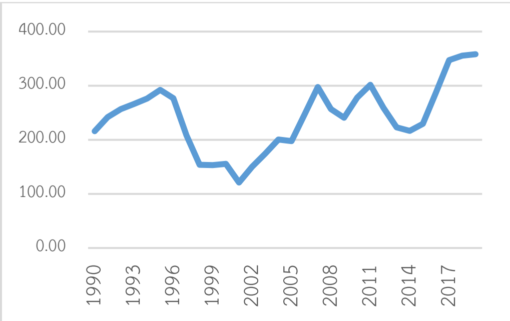


Figure 1 Real net savings per capita (baht)

Source: Bank of Thailand

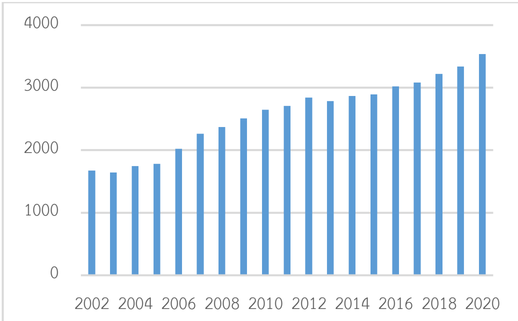


Figure 2 Real UHC subsidy per capita (baht)

Source: National Health Security Office

In 2002, the UHC was firstly introduced in Thailand by the prime minister Thaksin Shinawatra which was known as 30-baht health scheme. Anyone can choose to receive the medical service at the cost of only 30 baht. After that, the program has been slightly transformed in both name and detailed process but we can safely say that Thailand have always been under the UHC program since then (the present year is 2021). This generous social security scheme definitely improves the health quality of Thai people especially the poor as it allows them to reach the medical service. Moreover, one should expect that the program helps Thai households financially over the healthcare and hence this should allow them to accumulate more savings. This is the case as we can see from Figure 1. Starting from the year 2002 onwards, the real net savings per capita of Thailand exhibits a positive trend with around 65 percent growth over 18 years. This observation gives us the impression that the UHC program takes the big part of such a trend's turnaround.

However, the UHC also enables the rich to participate which causes the congestion in healthcare provision and creates the huge amount of medical cost that the government needs to subsidize. Figure 2 shows the government's real subsidy on UHC per one Thai citizen from 2002-

2020.[3] We can see that the real cost of the program has grown by 111 percent over 19 years. This fast-growing cost inevitably has put the great burden to the government budget and partly resulted in great pressure on public debt as shown in Figure 3. Particularly, the Thailand's real government debt per capita rises at the rapid growth of 193 percent from 2002 to 2020.

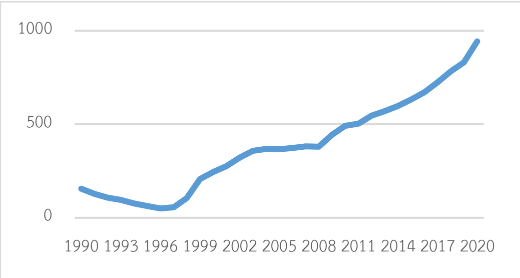


Figure 3 Government debt per capita (baht)

Source: Bank of Thailand

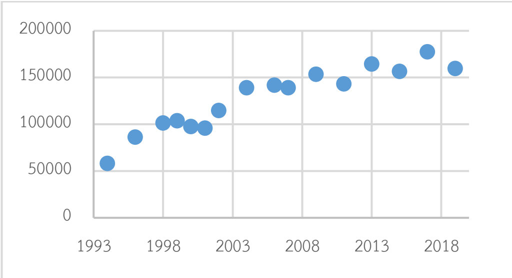


Figure 4 Real average household debt (baht)

Source: Bank of Thailand

On top of this expected considerable cost, there is also a puzzle regarding the real household debt as shown in Figure 4. Despite the increase of real net savings per capita, the real average household debt of Thailand has risen continuously. One would have thought that the UHC subsidy should have alleviate the financial problem of all households and hence have lowered or at least slowed down the debt accumulation of the household. Whether this puzzling trend is due to the UHC program calls for the better theoretical understanding about how the healthcare subsidy program like the UHC works under the context of a small open economy like Thailand. This will allow us to further analyze whether the UHC is an optimal policy in theory or the alternative CPS should be implemented. Notably, the CPS lowers the subsidy rate from the UHC so that in every medical service taken people have to proportionally share the cost. We all expect the CPS to help lessen the public debt problem but whether it can lower the household debt problem too is still a big question.

Our paper constructs the simple overlapping generations small open economy model embedded with the healthcare subsidy from the government. Our results shed light on the effects of lowering the healthcare subsidy rate to reflect the change from the UHC to the CPS. Although the public debt is lowered for all cases, we conclude that the effects on other variables depends on the preference of household, namely the Intertemporal Elasticity of Substitution (IES). If the IES is high, the substitution effect dominates. The lower subsidy rate on healthcare

[3] All the real data in this paper is calculated by using the headline CPI with 2015 as the base year for adjustment.

will cause the household to switch their spending to other goods and services including future consumptions. Hence, the household urges to save more. More savings leads to more investment and less borrowing as well. The medical service provided to the household is less but the resulting spending is higher which makes the household supply more labor. As the capital and labor rises, lowering the healthcare subsidy rate promotes GDP.

On the other hand, Chakravarty, Chattopadhyay, Silber, & Wan (2016) suggests that Asian countries including Thailand have low IES implying that the income effect actually dominates. The lower subsidy rate will cause the household to feel relatively poor and hence reduce demands for all goods and services. Thus, the household will save less for the future consumption. Specifically, the investment decreases and the household debt increases which suggests that the CPS would make the household debt problem in Figure 4 even more severe. Furthermore, the household will take less medical service and the healthcare spending also decreases which causes the household to work less. With the fall in capital and labor, lowering the healthcare subsidy rate suppresses GDP. Interestingly, it also makes the economy less stable against any health technology shock since the household. One important remark is that if we slightly lower the subsidy from the UHC rate, the healthiness of the household declines at the slower rate than the amount of medical services taken which helps the public debt decrease very sharply. To sum up, our theoretical result supports the UHC over the CPS for the case of Thailand as long as the debt problem is still manageable. For high IES, the rise in health subsidy raises the public debt, therefore the CPS is more suitable for controlling of public debt than the UHC. On the other hand, the UHC is more suitable for low IES.

The literature on health economics is vast. According to McCANE (2010), there are four basic models of the health system. Firstly, the Beveridge Model or a single player is a system in which the government uses tax income to subsidize most of the healthcare providers. This model has been used in the United Kingdom since 1948 and it is similar to the UHC. Presently, the saving rate in the UK is continuously decreasing (Giles, 2019). Secondly, the Bismarck Model or the social insurance model requires all employees to approach the healthcare through insurance financed by government, employers, and their own funding altogether. This model is used in Germany, France, Belgium, the Netherlands, Japan, and Latin America. Thirdly, the National Health Insurance Model has multiple health providers and statutory health insurance, but the insurance is run by the government as a single player. This model is used in Canada, Taiwan, and South Korea. Lastly, the Out-of-Pocket Model is characterized by people paying the provider directly. This model is used in the United States, where people have no private insurance.

Regarding how good health affects the economy, Alhowaish (2014) and Bedir (2016) find that health expenditure has a positive impact on GDP growth. De Freitas & Da Silva (2013) explain such the positive effect is due to people having the longer life expectancy.

For the comparison of healthcare security systems, Akaho, Coffin, Kusano, Locke, & Okamoto (1998) points out that the CPS has better cost control over health expenditure than the UHC. Most of developing countries require external budget when they increase health expenditure or pooled funding because revenue from tax is not adequate and raising income tax rates would cause an economic recession: see Heller (2006), Duran, Kutzin, & Menabde (2014) Savedoff, D Ferranti, Smith, & Fan (2012), and Arnold et al. (2011).

Kirdruang & Glewwe (2018) shows that the UHC raises the consumption, especially over the durable goods, in the long run. Additionally, Awawda and Abu-Zaineh (2019) construct the general equilibrium model with the health as a function of medical spending and leisure to investigate the healthcare social security scheme. They find that lowering the healthcare subsidy does not affect consumption and labor supply. This finding may result from the application of logarithmic utility function. Our paper follows Awawda and Abu-Zaineh with three modifications: more general utility function, the overlapping generations structure, and the small open economy environment.

The paper is organized as follows. Section 2 outlines the economy's setup. Section 3 provides the steady state analysis of the logarithmic utility as the benchmark case. Section 4 calibrates the model and compares the impulse responses across different rates of healthcare subsidy. Moral hazard of the healthcare subsidy from the government is beyond the scope of this paper.

Setup

We consider the overlapping generations model of a small open economy with two-lived agents. The world's interest rate is fixed at r^f and the net population growth rate of this economy is constant equal to n. This economy is decentralized and consists of the household (or the agent), the firm, and the government described as follows:

1. The household

The agent here lives for two periods. The utility function is assumed to be the constant relative risk aversion (CRRA). When young, the agent enjoys his/her consumption $c_{1,t}$ and leisure $1-l_t$:

$$\frac{c_{1,t}^{1-\theta}}{1-\theta}+\frac{\gamma_1(1-l_t)^{1-\theta}}{1-\theta}$$

Note that total amount of available hours is normalized to 1 and l_t is the fraction of hours the agent spends to work. When old, the agent earns utilities from consumption, $c_{2,t+1}$ and his/her health condition, h_{t+1}:

$$\frac{c_{2,t+1}^{1-\theta}}{1-\theta}+\frac{\gamma_2 h_{t+1}^{1-\theta}}{1-\theta}$$

Thus, the agent maximizes the following expected utility:

$$\max_{c_{1,t},c_{2,t+1},l_t,k_{t+1},b_t} E_t\left[\frac{c_{1,t}^{1-\theta}}{1-\theta}+\frac{\gamma_1(1-l_t)^{1-\theta}}{1-\theta}+\beta\left[\frac{c_{2,t+1}^{1-\theta}}{1-\theta}+\frac{\gamma_2 h_{t+1}^{1-\theta}}{1-\theta}\right]\right] \quad (1)$$

where β is a discount factor and θ is the degree of relative risk aversion. Note that the intertemporal elasticity of substitution (IES) is an inverse to the degree of relative risk aversion: IES: $1/\theta$ If θ is reduced, IES rises and the agent becomes more willing to substitute their consumptions across types of goods and time.

When young, the agent works, earns the wage, pays the income tax, consumes, spends on medical service, invests in capital for the future production, lends to the rest of the world at the world's interest rate. Note that the medical spending here is interpreted as the health investment. That is, the more the young spends on health, the healthier he/she expects to become when old. Here we assume the price of medical service to be fixed from the rest of the world which is equal to 1 unit of the consumption good. The young's budget constraint is as follows:

$$c_{1,t}= (1-\tau)w_t l_t - (1-\lambda)m_t - k_{t+1} - b_t \quad (2)$$

where w_t is wage at the time t, τ is the income tax rate at the time t, k_{t+1} is the capital investment at time t, λ is the rate of government's healthcare subsidy which means $(1-\lambda)m_t$ is the co-payment, b_t is lending to the rest of the world l_t is a fraction of hours the agent spends to work, Hence, the total savings (or the net saving per capita) s_t is denoted as follows:

$$s_t = k_{t+1} + b_t$$

When old, the agent rents out the capital to firm for production. Note that for simplicity the capital is assumed to fully depreciate. The returns of the saving from the young period are totally consumed. Therefore, the old's budget constraint is written as follows:

$$c_{2,t+1} = (1+r_{t+1})k_{t+1} + (1+r^f)b_t \quad (3)$$

where r_{t+1} is the rental price of capital at time $t+1$.

This paper assumes that the young is healthy, while the health condition of the old is determined by the medical spending when young m_t and the leisure when young in the Cobb-Douglas function[4] as follows:

$$h_{t+1} = H_{t+1} m_t^{x} (1-l_t)^{1-x} \tag{4}$$

where x is a share the medical spending for health, *(1-x)* is a share of leisure for health, H_{t+1} is a shock of the old's health which has the following stochastic process

$$\ln H_t = (1-\rho_h) \ln \overline{H} + \rho_h \ln H_{t-1} + u_t \tag{5}$$

where $|\rho_h| < 1$, $u_t \sim N(0, \sigma_h^2)$, $\overline{H}$ is its steady state value.

From (1)-(5), the constrained expected utility maximization of the household gives the following optimality conditions:

$$c_{1,t}^{-\theta} = \beta E_t \left[(1+r_{t+1}) c_{2,t+1}^{-\theta} \right] \tag{6}$$

$$c_{1,t}^{-\theta} = \beta E_t \left[(1+r^f) c_{2,t+1}^{-\theta} \right] \tag{7}$$

$$(1-\tau) w_t c_{1,t}^{-\theta} = \gamma_1 (1-l_t)^{-\theta} + \beta \gamma_2 (1-x) E_t \left[\frac{H_{t+1}^{1-\theta} m_t^{x(1-\theta)}}{(1-l_t)^{x+\theta(1-x)}} \right] \tag{8}$$

$$(1-\lambda) c_{1,t}^{-\theta} = \beta \gamma_2 x \, E_t \left[\frac{H_{t+1}^{1-\theta} (1-l_t)^{(1-\theta)(1-x)}}{m_t^{\theta x + 1 - x}} \right] \tag{9}$$

2. The firm

The firm produces consumption good via the constant-return-to-scale production function below:

$$Y_t = F(K_t, L_t)$$

where Y_t, K_t, and L_t are aggregate output, aggregate capital, and aggregate labor hours at time t respectively. Given the full depreciation of capital, the firm maximize profit as follows:

$$\max_{\frac{K_t}{L_t}, L_t} F(K_t, L_t) - (1+r_t)K_t - w_t L_t = L_t \left[F\left(\frac{K_t}{L_t}, 1\right) - (1-r_t)\frac{K_t}{L_t} - w_t \right]$$

As a result, the return of each input factor is equal to its marginal product:

[4] Health stock completely depreciates in one period because one period is equal to 30 years in a two-period OLG model.

$$1 + r_t = F_1(\frac{K_t}{L_t}, 1) \tag{10}$$

$$w_t = F(\frac{K_t}{L_t}, 1) - F_1(\frac{K_t}{L_t}, 1)\frac{K_t}{L_t} \tag{11}$$

3. The government

The government runs the healthcare security system by subsidizing λ percent for any medical spending of the household. The government spending is financed by tax income and public debt from abroad. The government budget constraint is given by

$$D_t = G - \tau w_t N_t l_t + \lambda N_t m_t + (1+r^f)D_{t-1} \Longrightarrow \quad d_t = g - \tau w_t l_t + \lambda m_t + (\frac{1+r^f}{1+n})d_{t-1} \tag{12}$$

where D_t is the total debt, G is the total government spending, N_t is the population of generation t, and their lower cases are their per-worker variables. Note that the restriction $r^f<n$ is required for the convergence of public debt.

4. Market-clearing conditions and equilibrium system

In this small open economy framework, we allow for the loanable fund and the medical service to freely flow in and out of the country. In other words, we assume that there are unlimited supplies of loan and medical service for this economy. Therefore, for each time period, only the capital market, labor market, and good market need to clear respectively as follows:

$$K_t = N_t k_t \tag{13}$$

$$L_t = n_t l_t \tag{14}$$

$$F(K_t, L_t) = N_{t-1}c_{2,t} + N_t c_{1,t} + N_t m_t + N_t k_{t+1} + G + (1+r_t^f)(D_{t-1}-N_{t-1}b_{t-1}) - (D_t-N_t b_t)$$

$$\Rightarrow F(\frac{k_t}{1+n}, l_t) = \frac{c_{2,t}}{1+n} + c_{1,t} + m_t + k_{t+1} + g - d_t + (\frac{1+r_t^f}{1+n})d_{t-1} + b_t - (\frac{1+r_t^f}{1+n})b_{t-1} \tag{15}$$

The competitive equilibrium includes the allocations and prices of all variables that satisfies (2)-(15) for all time period for given initial value of H_0 and d_0.

Steady state analysis: the benchmark case

Notably, our economy has no capital accumulation as we assume full depreciation. This implies that transitional dynamics of most all variables, except the public debt per worker d, are driven by the autoregressive process of health technology H. If we keep H constant at its steady state $\overline{H}$, a change in any parameter or any policy variable will result in the jump of variables to their new steady state values. This means that most of the insight can be drawn from the steady state analysis of the system, especially how the decrease in healthcare subsidy λ affects the economy.

However, even such simplification cannot give us closed-form general solution at the steady state. Therefore, in this section, we study a solvable benchmark case where θ = 1 to get a necessary intuition for the numerical simulation study in the next section.

From (6)-(7), at the steady state no-arbitrage condition suggests that the return of capital and lending abroad have to be equal:

$$\bar{r} = r^f$$

From (10), the steady state capital-labor ratio ($\overline{K/L}$) is determined. Hence, the steady state wage $\bar{w}$ is determined from (11). From (2)-(3) and (6)-(9), the steady state labor hour per worker $\bar{l}$, the steady state medical service $\bar{m}$ per worker, and the steady state young consumption $\bar{c}_1$ can be determined from two following non-linear equations:

$$\frac{(1-\tau)\bar{w}\beta\gamma_2 x}{(1-\lambda)}\left[\bar{H}^{1-\theta}(1-\bar{l})\right]=\gamma_1(1-\bar{l})^{x(1-\theta)}\bar{m}^{\theta x+1-x}+\beta\gamma_2(1-x)\bar{H}^{1-\theta}\bar{m} \tag{16}$$

$$\left[\frac{\bar{m}^{\theta x+1-x}}{\bar{H}^{1-\theta}(1-\bar{l})^{(1-\theta)(1-x)}}\right]^{\frac{1}{\theta}} = \left(\frac{\beta\gamma_2 x}{1-\lambda}\right)^{\frac{1}{\theta}}\left[\frac{(1+r^f)}{1+r^f+[\beta(1+r^f)]^{\frac{1}{\theta}}}\right]\left[(1-\tau)\bar{w}\bar{l}-(1-\lambda)\bar{m}\right] \tag{17}$$

$$\bar{c}_1 = \frac{(1+r^f)[(1-\tau)\bar{w}\bar{l} - (1-\lambda)\bar{m}]}{1+r^f+[\beta(1+r^f)]^{\frac{1}{\theta}}} \tag{18}$$

For the benchmark case, let θ = 1 which is the logarithmic utility case. According to (16)-(17), these two steady states result:

$$\bar{l} = \frac{(1+\beta+\beta\gamma_2 x)\beta}{1+(1+\beta+\beta\gamma_2 x)\beta} \tag{19}$$

$$\bar{m} = \frac{\beta\gamma_2 x(1-\tau)\bar{w}}{(1-\lambda)[1+(1+\beta+\beta\gamma_2 x)\beta]} \tag{20}$$

These (18)-(20) are consistent with Awawda and Abu-Zaineh (2019) as the healthcare subsidy does not have any impact on other variables except the medical service. In other words, the household spares the fixed amount of medical spending $(1-\lambda)\bar{m}$ which is not affected by the healthcare subsidy λ at all. If the government decides to replace the UHC with the CPS by reducing the subsidy rate λ, the household will proportionally spend less on the medical service and accept the lower health quality when old in order to keep consumptions, leisure, and saving unchanged.

Intuitively, the decrease in healthcare subsidy makes the medical service more expensive in the eyes of the household. According to microeconomic consumer theory, the price effect is the sum of substitution effect and income effect. Since the household think other goods become cheaper, the substitution effect decreases the demand for medical services and raises the demand for consumption goods. For income effect, less subsidy makes the household feel relatively poorer. Therefore, demands for all goods and services are reduced. Consequently, although the impact of the CPS arrival is clearly negative on the demand for the medical service, the impacts on consumptions, saving, and labor hours still depend upon which effect dominates.

It is well-known that for the case of logarithmic utility substitution effect and income effect offset each other completely. This is the reason why we can see above that only the demand for medical service is affected by the change in healthcare policy and nothing else is.

Calibration

With such the intuition from the benchmark case, our conjectures for other cases are as follows. For θ<1, the household has high IES which means more willingness to substitute than the benchmark case. Thus, the substitution effect dominates and we expect more consumptions both when young and old. More demand for consumption of the old should raises the saving. More subtly, we expect an increase in labor hours due to two reasons. Firstly, higher consumptions call for higher wage income. Secondly, according to the health function (4), medical services and leisure are complementary and the significant drop in medical services leads to a sharp fall in the marginal product of leisure toward health which optimally calls for less leisure. Since the capital-labor ratio ($\overline{K/L}$) is determined from the world's interest rate, (13)-(14) suggests that the rise in labor hours raises the capital investment. However, the impact on the household's lending abroad $\overline{b}$ is ambiguous.

For θ >1, the income effect dominates. We expect less consumptions and hence less saving. The decrease in demand for medical service should be smaller than the case θ<1 resulting in the little concern on the marginal product of leisure on health. Therefore, we expect the labor hours to decrease to match the lower spending. The less labor hours lead to less capital investment. Again, the household's lending abroad is theoretically ambiguous.

To confirm our conjectures, we calibrate the model. We assume the production to be of Cobb-Douglas form:

$$Y_t = AK_t^{\alpha} L_t^{1-\alpha}$$

Then, all parameter values are given in Table 1. Note that we assume that one period in the model is equal to 30 years, we deliberately set $g=0$ to focus our analysis of government spending only on healthcare subsidy, we use the minimum income tax rate of Thailand, and some parameters of the stochastic process of health technology H_{t+1} are determined for the sake of the impulse response analysis in the next section.[5]

Table 1 the values of calibrated parameters

Parameter	value	Parameter	value	Parameter	value	Parameter	value
α	0.34	$\overline{H}$	1	X	0.69	γ_1	0.15
γ_2	0.43	β	0.4	r^f	0.015	A	1
n	0.35	τ	0.05	g	0		

The parameters including X, γ_1 and γ_2 are calibrated from the study of Awawda & Abu-Zaineh (2019). The labor share is 66% of output of Thailand between 1950 and 2019 (Feenstra, Inklaar, & Timmer, 2015), therefore the capital share is 34%. Time annually discount factor is equal to 0.97 and there are 30 years in each period, thus $= (0.97)^{30} \approx 0.4$. The effective federal funds rate is applied to proxy to the international interest rate, it is equal to 0.05% in 2020, thus $r^f = (1.0005)^{30} - 1 \approx 1.5\%$. The average population growth rate in Thailand during 1980-2019 is equal to 1.0015%, thus $n = (1.010015)^{30} - 1 \approx 35\%$.

[5] Sources: Torres (2020), Federal Reserve of America for effective Fed fund rate, and the tax rate together with the population growth are average of Thailand's data over 30 years.

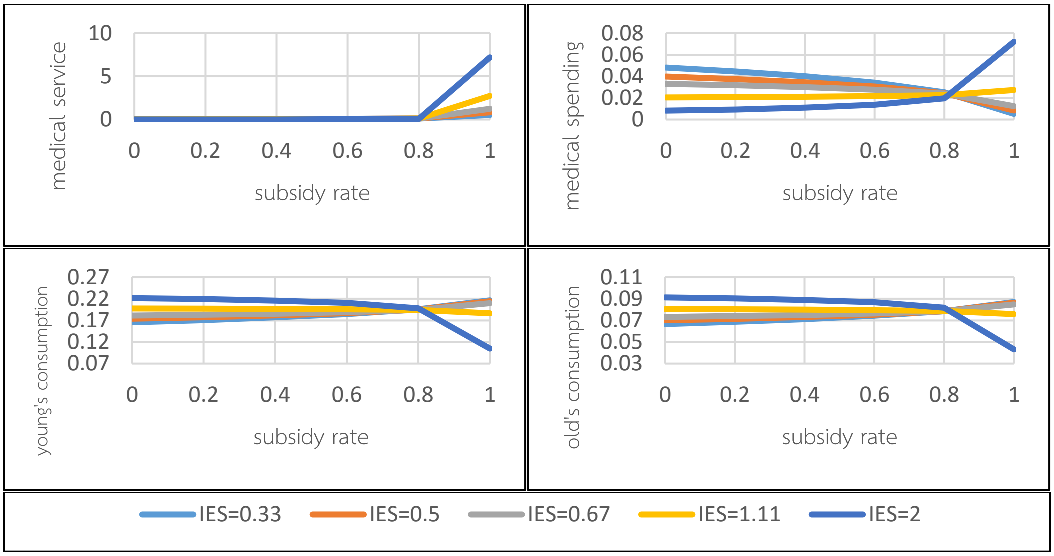


Figure 5 Calibrated healthcare and consumption steady states

With this parameter set, we calculate the steady states of all variables for different value of θ and subsidy rate λ as shown in Figure 5-7.[6]

Figure 5 confirms our conjectures on demand for medical services and consumptions. For θ<1 which is IES>1, lowering healthcare subsidy rate makes the household substitutes medical services for consumptions. In addition, we find that in spite of being more expensive, the household prepares less budget for medical services. Differently, for θ >1 which is IES<1, the household have low willingness to substitute medical services with consumption. This causes the medical spending to rise. Then, the dominating income effect lowers consumption in both young and old periods.

Figure 6 also confirms our conjectures on labor hours and capital. It also clarifies the impact of the decrease in healthcare subsidy on the household's debt. For high IES, more demand for future consumption leads to more savings both in capital investment and saving account overseas. Therefore, the household borrows less. On the other hand, the household with low IES confronts strong income effect and decreases their demand to save for the future which encourages more borrowing to cover more expensive medical expenditure.

Figure 7 points that the healthcare subsidy can either promote or suppress real GDP of the economy depending on whether IES is low or high respectively. Yet, such the subsidy always put the upward pressure on public debt regardless of the household's preferences. One remark is that in most of the variable in Figure 5-7 we observe the more radical change toward the

[6] Note that all variables in the figures are per worker.

neighborhood of full subsidy or the UHC. This suggests that a small amount of co-payment can make big differences over these variables, including the public debt.

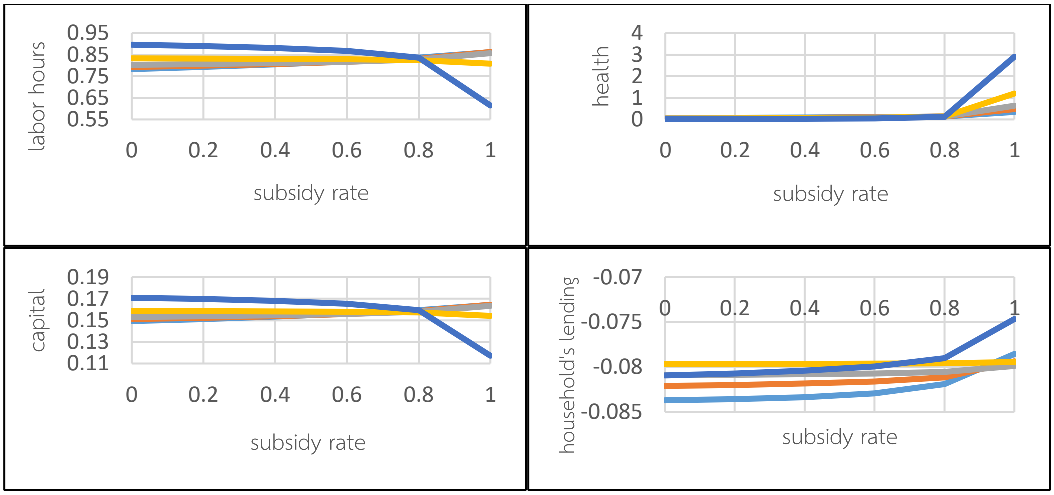


Figure 6 Calibrated labor, health, saving steady states

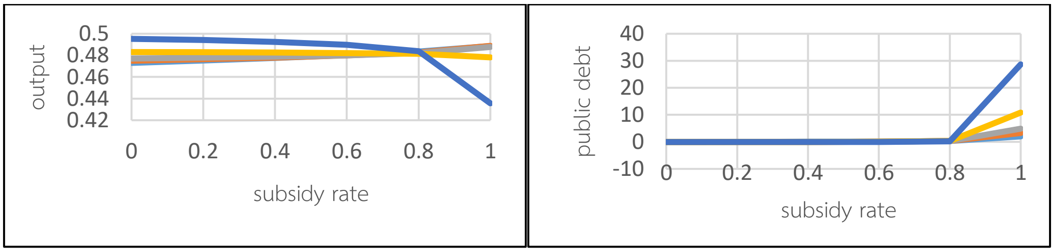
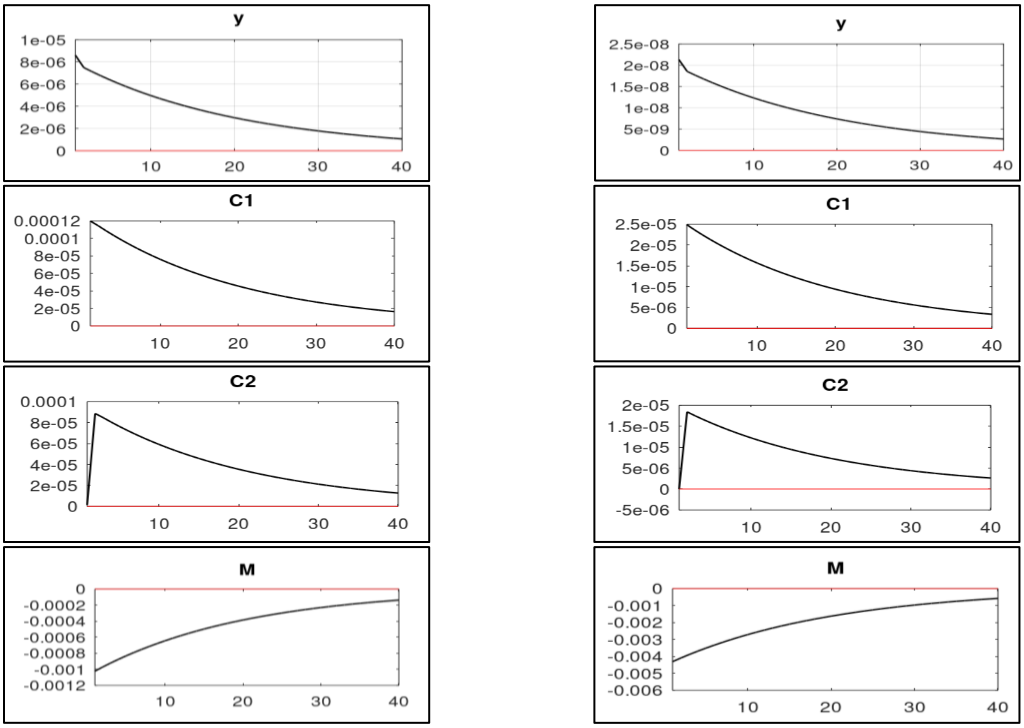


Figure 7 Calibrated output and public debt steady states

Impulse response

This section investigates the possibility of the healthcare subsidy scheme being the economic stabilizer. We conduct the impulse response over the shock on health technology H under different levels of IES and healthcare subsidy: λ = 0.8, 0.99 and IES = 0.33, 2. Note that this is a temporary shock that affects health given medical services and leisure such as change in air quality, disease outbreak, etc.

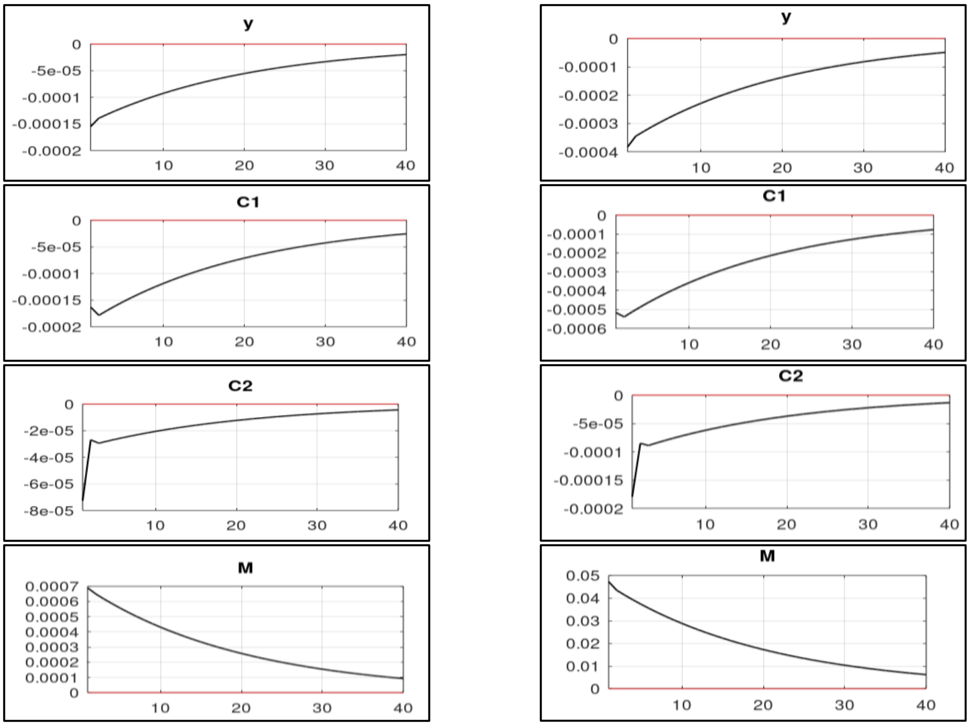
When the household has low IES. Figure 8 suggests that the economy is more stabilized with the higher rate of healthcare subsidy. The rationale is that low IES is where the income effect dominates. With the positive shock on health technology, the household feels relatively richer and wants to raise their consumptions and their leisure as well. When the healthcare subsidy is high, lowering the medical services just give back few resources. Therefore, the labor hours cannot be reduced substantially to help raise consumptions. This results in output being less volatile than the economy with low healthcare subsidy.



(a) λ = 0.8 (b) λ = 0.99

Figure 8 Impulse response for IES=0.33

Figure 9 shows that the high healthcare subsidy destabilize the economy. The high IES implies that the substitution effect dominates. The positive shock on health technology makes good health relatively cheaper. Thus, the household tries to move all resources from consumptions towards medical services and adjusts leisure optimally. Given high healthcare subsidy, the medical services are cheap and so the household greatly raises the demand. The huge increase in marginal product of leisure on health induces the huge drop-in labor hours. As a consequence, the output becomes relatively more volatile.



(a) λ = 0.8 (b) λ = 0.99

Figure 9 Impulse response for IES=2

Universal Health Coverage vs. Co-Payment Scheme

Our theoretical investigation supports the highest possible level of healthcare subsidy for the economy with *IES<1* as it promotes real GDP, consumptions, health, and economic stability. But the government has to take a careful look on debt issues, especially public debts not to reach the maximum debt ceiling. That is, the UHC is preferred. For high IES, there is a trade-off between good health and low output/consumptions. Therefore, the CPS can be more suitable.[7]

For the case of Thailand, Chakravarty, Chattopadhyay, Silber, & Wan (2016) finds that θ=3 which results in low IES. The increasing net saving since 2002 in Figure 1 supports our findings. However, the rising household's debt in Figure 4 does not. More empirical studies are required on this issue to control other possible factors involved which is out of the scope of this paper.

Since Thai people have less willingness to substitute medical services with consumptions. Introducing the CPS would create higher cost for health and the expensive healthcare would absorb great resources from household. The consumptions and output would be lower.

[7] With the fixed tax rate in our analysis, the healthcare subsidy is the household's free lunch and hence the utility level is trivially increasing with healthcare subsidy.

Moreover, Figure 7 predicts that the output would be more volatile which is not desirable. As the debt-to-GDP ratio of Thailand is currently at 49.6 percent (in 2020) which is still considered relatively low worldwide, our theory thereby supports the current UHC in Thailand. In the future if the debt problem becomes more severe, the small amount of co-payment from the household is recommended as it can sharply reduce the fiscal burden and hence public debt.

Conclusion

This paper shows that there is no such thing as best health security system for any given economy. We construct the theoretical general equilibrium model of a small open economy to analyze the effect of healthcare subsidy in various aspects. Our findings support the high subsidy scheme like Universal Health Coverage (UHC) in the economy where the household has the low Intertemporal Elasticity of Substitution (IES) such as Thailand. Not only does it foster good health, it helps promote GDP, consumptions, savings, and even the economic stability. As long as the public debt level is still manageable, the UHC is recommended. On the contrary, our theory pinpoints that the Co-Payment Scheme (CPS) is more suitable if the household has high IES. Therefore, the public debt level is the key indicator whether the UHC or the CPS should be implemented.

Notably, our theoretical model is simple and certainly has many limitations. The next step is to test these results empirically. The more empirical evidences will help develop the model and our understanding towards optimal healthcare security system. This is pathway for the future research.

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