The Relationship between Private Savings and Economic Growth in Thailand

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Abstract

One macroeconomic goal in many countries is to stimulate their economic growth rate. Savings drive economic growth based on the traditional growth theory. It facilitates capital accumulation and supports investment stability. However, the findings from previous literature are ambiguous. In addition to savings, this study also considers variables like investment and consumption since GDP growth in Thailand has exhibited non-linear characteristics due to structural breaks. Modern literature has found a nonlinear relationship among the macroeconomic variables. There is a possibility that the relationship among these variables may be nonlinear. Furthermore, no study in Thailand has investigated the non-linear relationship between savings, investment, consumption, and economic growth. Thus, this study was the first to investigate the dynamic relationship between economic growth, private savings, investment, and consumption using the Vector Autoregressive model (VAR). Further, this study examined the non-linear relationships through the two-regime Markov switching VAR model. This methodology can be used to investigate the relationship between high-growth and low-growth periods of the economy. In this study, annual data between 1981 and 2021 were employed.

For the linear relationship, it was found that changes in private savings affected GDP growth positively by around 0.907% and 1.075%. An increase in the shock of percentage change in private savings caused the GDP growth response to increase significantly in the following year. Moreover, private savings created a large positive impact on investment growth (3.459%). According to the Markov switching model, this study found only investment and consumption growth influenced GDP growth by 3.072% and 2.540%, respectively, during a high growth period. The magnitude of the coefficient of private savings is smaller than that of investment and consumption. It can be concluded that investment and consumption are effective stimulating factors for GDP growth during a high-growth period.

Keywords: *Economic Growth, Vector Autoregressive Model, Markov Switching Model, Saving, Investment, Thailand*

1. Introduction

One of the primary objectives in macroeconomics is to foster economic growth, as a higher growth rate translates to increased national income, output, living standards, and the generation of new employment opportunities. The traditional growth theory posits that savings drive economic growth by facilitating capital accumulation and bolstering investment stability. However, divergent findings from previous research complicate this narrative, leading to three potential scenarios: savings causing growth, growth causing savings, and a reciprocal relationship between savings and growth. Firstly, Alguacil and Cuatros (2004) and Oladipo (2010) found that savings caused growth by using the Granger causality test. A consistent scenario also exists in Thai studies, such as that of Saengthong and Muhamad (2011). Secondly, studies by Anoruo and Ahmad (2001), Misztal (2011), and Mesfin (2016), including case studies in Thailand like Agrawal et al. (2001), Rasmidatta (2011), and Bramahitadara (2015), found that economic growth has a positive coefficient on savings, and also that the direction of Granger causality goes from economic growth to savings. Thirdly, Tang and Chua (2011) discovered a bidirectional connection in the Malaysian economy.

In addition to savings, this study also considers variable investment and consumption. A positive relationship between investment and economic growth is found in the studies of Leta and Zemedkun (2018). However, they were insignificant in the Thai study by Raza, Aldeehani, and Alshebami (2020). For

consumption, a positive long-term relationship was found between household consumption and economic growth in Saudi Arabia in the research by Rasasi, Alzahrani, and Alassaf (2021). However, a case study in Thailand found that increased consumption had no positive impact on GDP (Kraipornsak, 2010).

The relationship among these variables is still unclear, and the author is curious as to whether the relationship between private savings, investment, consumption, and economic growth is non-linear. It is known that most economic and financial data are now widely accepted to exhibit non-linear characteristics due to structural breaks. Therefore, this study reviews the modern literature that applies non-linear models. Many studies found a non-linear relationship in macroeconomic variables, such as Parsaeian, Abtahi, and Nasrollahi (2019). They found that inflation and money supply have a positive impact on GDP in a recessionary regime but have a negative impact in an expansionary regime.

The movement of GDP growth in Thailand does not follow a linear pattern, as evidenced by sharp declines in 1997, 2008, and 2019, attributed to the Asian financial crisis, the subprime mortgage crisis, and the coronavirus pandemic, respectively. This suggests a non-linear relationship between GDP growth and associated variables, including savings, investment, and consumption, which may exert varying impacts across economic cycles. This raises questions about how it is possible to stimulate economic growth through these factors in different economic conditions. Therefore, this study will investigate linear and non-linear relationships using Vector Autoregressive (VAR) and Markov switching models.

2. Objectives

1) To investigate the relationship between savings, investment, consumption, and economic growth in both linear and nonlinear models
2) To compare the effectiveness of savings, investment, and consumption in stimulating the Thai economy under different economic conditions during high-growth and low-growth periods by examining different economic regimes

3. Methods

This study utilized annual data from Thailand between 1981 and 2021. All variables are expressed in percentage terms. GDP growth data were acquired from the World Bank and the OECD national accounts data. Investment growth and private consumption growth data were obtained from CEIC. Private savings and gross domestic product (GDP) data came from the National Economic and Social Development Council (NESDC) and the National Statistical Office data (NSO). This study calculated private savings per GDP and transformed it into a percentage change format. Private savings were used because they account for a large proportion of total savings, reflecting both household and business sectors.

All variables were tested for stationary using the Augmented Dickey-Fuller test (ADF). Subsequently, the vector autoregressive model (VAR) was performed. This model is used for multivariate time series, in which all variables are estimated simultaneously as a system of equations. Each variable is a linear function of past lags of itself and past lags of others. The VAR(p) model can be described as follows:

$Y_t = \nu + A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + u_t$,

(1)

where $Y_t = (y_{1t}, \ldots, y_{Kt})$is the $(K \times 1)$ vector of endogenous variables, $\nu = (\nu_1, \nu_2, \ldots, \nu_K)'$ is the $(K \times 1)$ constant vector, A_j is the $(K \times K)$ matrix of autoregressive coefficients of Y_{t-j}, and $u_t = (u_{1t}, u_{2t}, \ldots, u_{Kt})'$

is ($K \times 1$) vector of random disturbances. Two sets of endogenous variables are considered, including (1) percentage change of savings to GDP, GDP growth, and consumption growth, and (2) change of savings to GDP, GDP growth, and investment growth. The number of optimal lags (p) is chosen among those that minimize the Bayesian information criteria. Moreover, the impulse response function is investigated to study the direction and size of the impact.

The Markov-switching VAR model (MS-VAR) developed by Krolzig (1997) was also used to examine asymmetric relationships between variables. The initial concept of the MS-VAR model defines parameters that include an intercept term, coefficients, and variance that can be varied with the state variables (s_t). The state variable is an unobserved variable governed by a random Markov process in a discrete state determined by the transition probabilities.

$$p_{ij} = P_r(s_{t+1} = j | s_t = i), \sum_{j=1}^{M} \quad p_{ij} = 1 \; \forall i, j \in \{1, \ldots, M\} \tag{2}$$

The following is the intercept form of the Markov-switching VAR model:

$$Y_t = \nu(s_t) + A_1(s_t)Y_{t-1} + \ldots + A_p(s_t)Y_{t-p} + u_t \tag{3}$$

where $\nu(s_t), A_1(s_t), \ldots, A_p(s_t)$ are parameter shift functions that depend on state variables.

Estimating the model is unnecessary to determine all parameter changes. The MS(M)-VAR(p) have different structural characteristics. This study employs the likelihood ratio test to compare the Markov switching and VAR models to identify the appropriate model, and then specify whether the Markov switching should vary the autoregressive parameter. The Bayesian Information Criterion (BIC) determines the appropriate lag length. This study defines GDP growth as a probability regressor and limits the number of regimes to two in order to examine the link between these variables during the high and low growth periods of the Thai economy. Dividing the regime period will enable the selection of economic stimulation initiatives at the appropriate time.

The study assumes that savings and investment promote GDP growth through the production channel, as predicted by the traditional growth theory. Saving increases capital accumulation to support sustainable investment, which boosts economic growth. Consumption is expected to have a positive impact on GDP growth through the demand channel, based on Keynes' theory of aggregate demand. Spending money on goods and services could boost business, national income, and GDP growth. Finally, the different subsets of data before and after the financial crisis of 1997 were explored for robustness to check that the conclusions are consistent across different subsets of data.

4. Results and Discussion

This study tested the stationary and found that all variables in percentage change are stationary. To save space, we discuss the result focusing on private savings. Table 1 shows the estimation from the VAR model; only private saving per GDP impacts GDP growth significantly. It interprets that one percentage change in private savings per GDP in the previous period positively impacted current GDP growth of 0.907% and 1.075%. Moreover, it was found that private savings to GDP greatly impacted investment growth (3.485%).

Table 1. Results from the VAR model

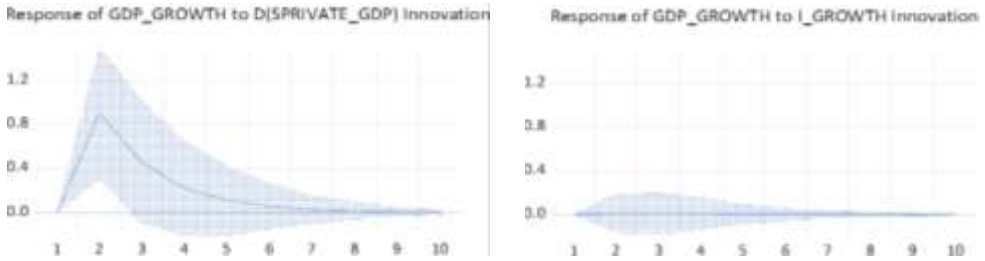
VAR Model 1: Private Savings with Investment			
	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Investment** $Growth_t$

$GDP\ Growth_{t-1}$	0.552**	-0.074	0.593
$\Delta Private\ Savings\ to\ GDP_{t-1}$	0.907***	-0.088	3.459***
Investment $Growth_{t-1}$	0.011	0.000	0.452**
C	1.957*	0.364	-0.399
VAR Model 2: Private Savings with Consumption			
	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Consumption** $Growth_t$
$GDP\ Growth_{t-1}$	0.312	0.192	0.178
$\Delta Private\ Savings\ to\ GDP_{t-1}$	1.075**	-0.263	1.258***
$Consumption\ Growth_{t-1}$	0.320	-0.317*	0.487
C	1.731**	0.507	1.319*

Note: *, **, and *** indicate significance level at 10%, 5%, and 1%, respectively.

To study the influence of a dependent variable on the remaining variables, this study applied the impulse response function (IRF) to the VAR model. How did GDP growth respond if a one-unit shock occurred in private savings to GDP, investment growth, and consumption growth? It was found that the response of GDP growth to one percentage change in private savings to GDP shock increased significantly to a maximum in the following year (0.907% and 1.075% in private savings with investment and consumption model, respectively), then decreased gradually until reaching the same level after the seventh period (see Figure 1). The IRF might not be different from zero for the impulse of investment and consumption because the band covers a horizontal axis. The responses of GDP growth to the impulse of investment growth and consumption growth are insignificant for all periods.

VAR Model 1: Private Savings with Investment



VAR Model 2: Private Savings with Consumption

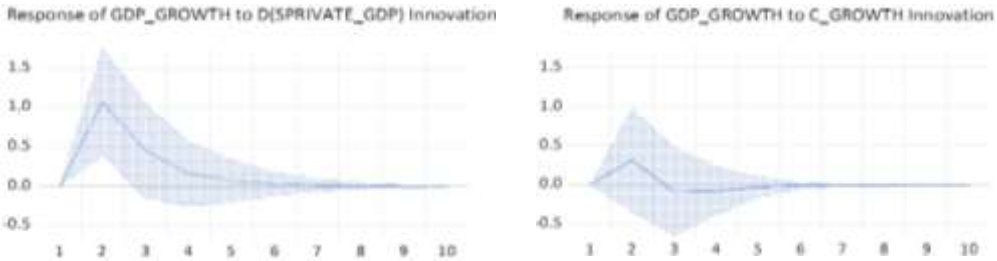


Figure 1. Response of GDP growth in the Private Savings model (Response to Nonvectorized One Unit Innovations 95% Cl using analytic asymptotic S.E.s)

The findings of this study are consistent with the Neoclassical growth theory that suggests private savings can increase capital accumulation and actual investment, stimulating economic growth through the production channel. This confirms the results of the empirical study by Saengthong and Muhamad (2011) in Thailand. The significant impact of savings on investment confirms Ahmad's (2017) analysis of South Asian economies. For investment, there is an insignificant effect on GDP growth in the linear model, consistent with the study of Raza, Aldeehani, and Alshebami (2020) in Thailand. In the same way, consumption growth has an insignificant effect on GDP growth, as in the Thai study by Kraipornsak (2010).

Next, this study performed the Markov-Switching VAR model, identifying two regimes: the high-growth regime and the low-growth regime. For linear and non-linear model testing, the Likelihood Ratio test rejects the null hypothesis of the linearity. Then, whether the Markov switching should vary the autoregressive parameter was tested. It was found that the MS-VAR model with intercept and autoregressive switching is appropriate for both private savings with investment and consumption models. The Bayesian information criteria selected lag one for all models. Figure 2 shows the smoothed regime probability. There was a state change from a high-growth regime to a low-growth regime during 1997-1998, 2009, and 2020 because of the Asian financial crisis, the subprime mortgage crisis, and the spread of coronavirus, respectively.

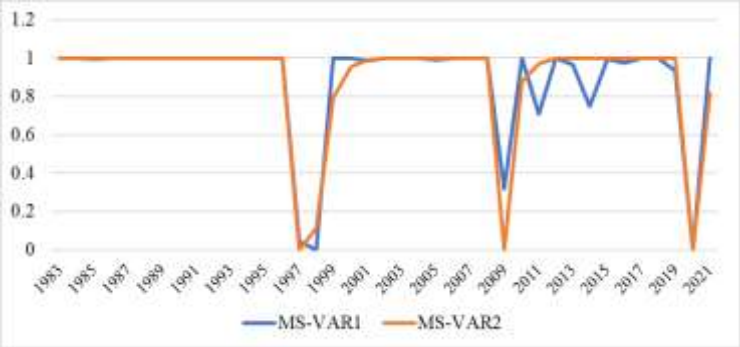


Figure 2. Smoothed Regime Probability

Table 2 shows the estimation results from the MS-VAR model. The results show a different VAR model when intercept and autoregressive variables vary across two regimes. A positive effect of private savings per GDP on GDP growth existed in linear VAR. Still, it was not statistically significant in MS-VAR for both regimes. It was found that investment growth originally had an insignificant impact on GDP growth, but it positively impacts GDP growth by 3.072% in the high regime in this model. This positive impact corresponds to classical and neoclassical growth theories: Investment causes economic growth through the production channel by creating new jobs, and income increases lead to economic growth. For consumption growth, it also positively impacts GDP growth in the high regime (2.540%). This result supports Keynes's theory of aggregate demand, which explains that people should save less and spend more on consumption and services to boost business activity, generating output and income, which leads to economic growth. However, the magnitude of investment is more significant than consumption. It can be implied that stimulating GDP growth in Thailand through investment provides more efficiency than consumption during a high growth period.

It was also found that GDP growth positively impacts private savings per GDP (5.147%). This impact can be explained by the life cycle theory of consumption. When incomes grow, total savings by

younger people will increase more than total dissaving by the elderly, leading to positive net savings since individuals tend to maintain their consumption levels throughout their lives. According to the results of this study, the prediction for the life cycle of consumption is valid during periods of low growth.

Table 2. The MSIA (2)-VAR (1) of the Private Savings model

MS-VAR Model 1: Private Savings with Investment			
Regime 1: High	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Investment** $Growth_t$
$GDP\ Growth_{t-1}$	0.301	0.000	1.611**
$\Delta Private\ Savings\ to\ GDP_{t-1}$	-0.044	0.019	0.200
Investment $Growth_{t-1}$	3.072***	0.221	1.621
C	0.562***	-0.078	0.817*
Regime 2: Low	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Investment** $Growth_t$
$GDP\ Growth_{t-1}$	1.917	5.417***	20.198***
$\Delta Private\ Savings\ to\ GDP_{t-1}$	-0.690	-1.202***	-1.808
Investment $Growth_{t-1}$	-7.694	4.355	10.329
C	2.399	1.850*	3.524
MS-VAR Model 2: Private Savings with Consumption			
Regime 1: High	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Consumption** $Growth_t$
$GDP\ Growth_{t-1}$	0.504*	-0.273	0.694***
$\Delta Private\ Savings\ to\ GDP_{t-1}$	0.381	-0.386**	0.482*
$Consumption\ Growth_{t-1}$	2.540***	0.461	1.924**
C	0.217	0.272**	0.147
Regime 2: Low	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Consumption** $Growth_t$
$GDP\ Growth_{t-1}$	1.144*	0.148	2.238***
$\Delta Private\ Savings\ to\ GDP_{t-1}$	-1.124	1.568***	-0.079
$Consumption\ Growth_{t-1}$	-1.195	0.196	0.338
C	1.192	-2.093***	0.545

Note: *, **, and *** indicate significance level at 10%, 5%, and 1%, respectively.

Table 3. VAR of the Private Savings model before and after the crisis

VAR Model 1: Private Savings with Investment			
Before 1997	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Investment** $Growth_t$

$GDP\ Growth_{t-1}$	0.667	-0.134	1.897
$\Delta Private\ Savings\ to\ GDP_{t-1}$	0.910	0.209	3.287
Investment $Growth_{t-1}$	0.069	0.074	0.259
C	1.364	-0.226	-8.248
After 1997	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Investment** $Growth_t$
$GDP\ Growth_{t-1}$	0.170	-0.074	0.005
$\Delta Private\ Savings\ to\ GDP_{t-1}$	0.949**	-0.082	3.589***
Investment $Growth_{t-1}$	0.031	-0.011	0.511*
C	2.234*	0.354	0.183
VAR Model 2: Private Savings with Consumption			
Before 1997	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Consumption** $Growth_t$
$GDP\ Growth_{t-1}$	0.481	0.442	0.545
$\Delta Private\ Savings\ to\ GDP_{t-1}$	1.075	-0.225	1.180*
$Consumption\ Growth_{t-1}$	0.390	-0.325	0.273
C	0.903	-1.735	0.495
After 1997	$GDP\ Growth_t$	$\Delta Private\ Savings\ to\ GDP_t$	**Consumption** $Growth_t$
$GDP\ Growth_{t-1}$	-0.026	0.155	-0.142
$\Delta Private\ Savings\ to\ GDP_{t-1}$	1.093**	-0.217	1.273***
$Consumption\ Growth_{t-1}$	0.337	-0.314	0.626
C	1.835*	0.604	1.328

Note: *, **, and *** indicate significance level at 10%, 5%, and 1%, respectively.

In addition to examining the VAR model for the entire period, this study aimed to reassess the VAR estimation to determine whether the financial crisis had impacted the relationship between savings, investment, consumption, and economic growth in Thailand. The financial crisis had significant economic repercussions, inflicting substantial damage on Thailand. The GDP growth of Thailand dropped sharply to -7.6% in 1997, marking a considerable breakpoint. The crisis originated in Thailand with the announcement of a shift in the baht exchange rate system from a fixed to a floating rate. To explore the effects of this crisis, the sample was divided into two distinct subperiods: 1981–1997 and 1997–2021. The results encompass both pre- and post-crisis periods. Table 3 presents the estimation of the VAR model before and after the crisis.

This study found that the relationships between variables before and after crises are different. Private savings per GDP had an insignificant impact on GDP growth before the crisis. Still, it significantly impacted the private savings model with investment and consumption after 1997 (0.949% and 1.093%, respectively). In the same way, the significant positive impact of private savings per GDP on investment growth was also important during the 1997–2021 period. It can be implied that the Asian financial crisis affected the structural relationships in the model of this study.

5. Conclusion

This paper investigates the relationship between private savings, investment, consumption, and economic growth in Thailand using both linear and non-linear models. The findings reveal distinct relationships among these variables depending on the modeling approach employed.

In the linear model, private savings significantly impacted GDP growth, particularly following the Asian financial crisis. The response of GDP growth to a one percentage change in private savings per GDP shock increases significantly to a maximum of approximately 0.907% to 1.075% in the subsequent year. The finding in this study diverges from the existing literature of Mesfin (2016), which found a negative and insignificant effect on economic growth in Ethiopia, likely due to the different economic and methodological approaches used.

In the Markov-Switching VAR model, this study found that the private savings model with both investment and consumption better fits the Markov-switching model based on the log-likelihood test result. Transition probability shows that most of the study period is in the high regime; a low growth period existed during the crisis, spanning the years 1997–1998, 2009, and 2020.

Investment and consumption were initially insignificant in the linear model, but they were found to have a significant impact on GDP growth. In the high regime, investment growth positively affected GDP growth (3.072%). For consumption growth, it also positively impacted GDP growth in the high regime (2.540%). As a result, private savings, investment, and consumption positively affected GDP growth. However, the magnitude of the coefficient for private savings was smaller than that of investment and consumption. It can be implied that investment and consumption effectively stimulate GDP growth during a high-growth period. The reason behind this situation can be explained in the context of society. During the high growth period, Thailand's middle class and urbanization expanded, resulting in increasing disposable income and consumption levels. The middle class needs homes, vehicles, consumer goods, and services and has purchasing power. Investing during this period will result in strong business performance. Therefore, growing investment and consumption will result in significant economic growth.

Policymakers can promote investment or consumption during high growth periods to stimulate GDP growth. They can encourage investment and consumption by providing benefits, reducing taxes, and providing subsidies for investment or consumption in Thailand. For private savings, it had no impact on GDP growth in a non-linear model, but it did impact GDP growth in a linear model. Moreover, private savings can indirectly impact GDP growth through investment growth. Private savings are still crucial to economic growth in Thailand.

Since the information used in this study comprises annual data between 1981 and 2021, which is a relatively small amount, there are limitations in choosing the lag in the model. The classification of the variable in this study is single, and the impact is aggregated. Investigating the components of these variables may provide beneficial insight. Therefore, it is suggested that more detailed information be used in future studies and that variables data be divided into 2-3 components. Since the data in this study is informed of percentage change, it complicates interpretation. Therefore, various models will be used and compared in the next study to find a clearer relationship.

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