

【研究ノート】

The Bubble Economy and Industrialization in Thailand

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1. Introduction

Prior to the July 1997 baht collapse that triggered the Asian currency crisis, Thailand's economy experienced sustained and notable growth. The government and the Bank of Thailand implemented low interest rates and capital liberalization policies, which attracted substantial foreign capital inflows after 1987, including from Japanese companies facing a strong yen. Real estate prices in Bangkok surged dramatically, and stock prices reached new heights. Between 1987 and 1995, the economy exhibited clear signs of a bubble. Figure 1 illustrates the stock market trend, with the SET Index peaking in 1993. As noted by Radelet and Sachs (1998), Thailand's economic cycle also reflected periods of boom and bust.

The collapse of a bubble economy is a financial problem. Many consider improving financial market operations and institutions to be the key to solving such problems. However, the damage from a bubble bursting extends beyond financial institutions and investors.

Ordinary people face hardship as they lose jobs and see their incomes decline. This study uses a two-sector macroeconomic model to clarify the impact of the bubble's collapse on Thailand's real economy, focusing on the effects on employment and income distribution. Section 2 provides an overview of the bubble's structure, while Section 3 outlines the model's basic framework.

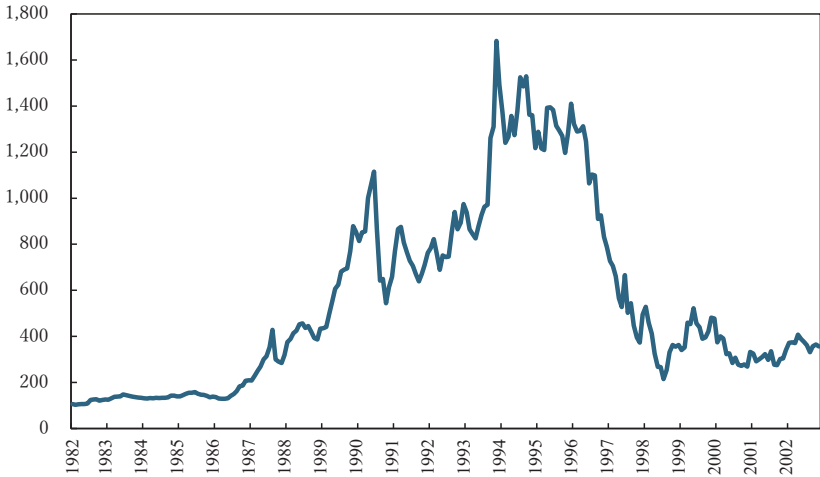


Fig.1 SET Index (1982-2002)

2. Causal Relation of the Bubble

The history of bubble economies can be traced back to the Dutch Tulip Bubble in 1637. However, bubble economies that emerged after the South Sea Bubble in 1720 share a general pattern: asset prices—such as stocks, real estate, and currencies—surge dramatically, become disconnected from the real economy, and ultimately collapse. Many of these bubbles occur in environments characterized by low interest rates and excessive liquidity, where lending and margin trading further inflate asset prices and stock values.

When we view the bubble economy as a causal loop diagram, we can illustrate the dynamics involved (as shown in Figure 2). Thailand's bubble was a typical bubble structure where excessive capital inflows fueled large increases in domestic credit, and much went into real estate, leading to rising stock prices, and further lending.

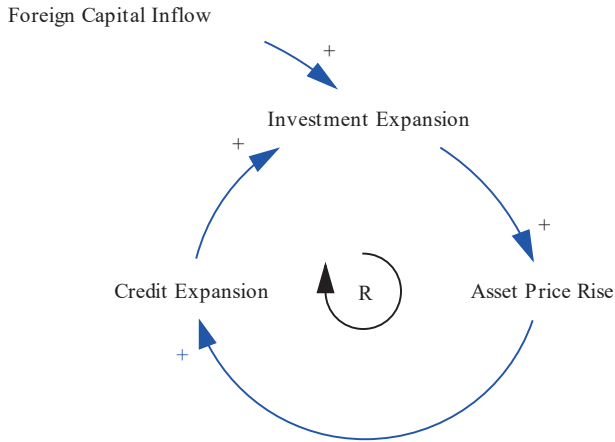


Fig.2 Positive feedback of bubble economy

During the bubble phase, a positive feedback loop operates, creating a self-reinforcing effect. Conversely, during the collapse, a negative feedback loop comes into play.

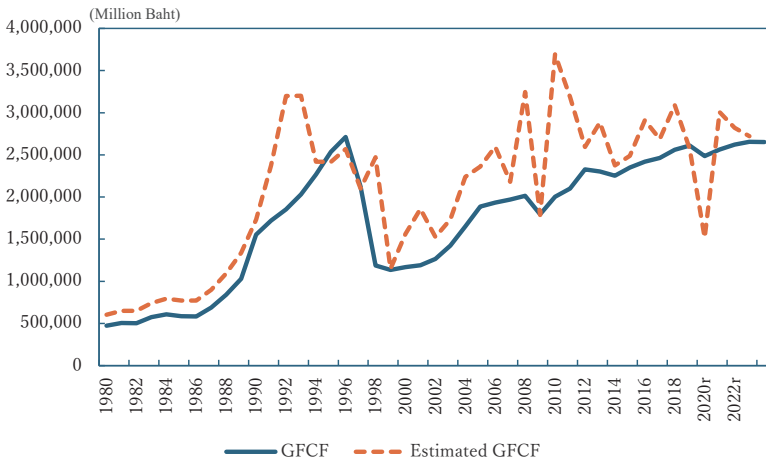
A significant characteristic of the Thai economy is its reliance on inward foreign direct investment (FDI). Thailand needs more funds than its savings to finance the capital investment needed for economic growth. After import-substitution industrialization in the 1960s and export-substitution industrialization in the 1970s, the country adopted an export-oriented industrialization strategy in the 1980s by introducing foreign capital. The country attracted further foreign capital by promoting financial liberalization in the 1990s. This promotion, in turn, attracted more foreign capital, leading to rapid growth and ultimately collapse. According to Nidhiprabha (2019: 99-101), investment was, on average, above savings by 19.3% during the boom period (1980-1996)

We can estimate the investment from capital stock data by using the perpetual inventory method (PIM) in reverse.

$$I_t = K_t - (1 - \delta)K_{t-1} \tag{1}$$

where I_t is gross fixed capital formation (investment) during period t , K_t is capital stock at time t (end of period) and δ is depreciation rate (annual). Here, gross capital stock and annual depreciation data from the National Accounts of the National Economic and Social Development Council (NESDC) were used.

Gross Fixed Capital Formation (GFCF) in Thailand’s GDP statistics has been smaller than the estimated fixed capital formation. Inward FDI, however, has compensated for this shortfall.



Note: Compiled by the author using data from NESDC (<https://www.nesdc.go.th>).

Fig. 3 Gross fixed capital formation (reference year = 2002)

The estimated investment function shows that inward FDI boosted investment until 1993, but from 1994 to 2004 did not (see Appendix).

3. Two-sector Economic Growth Model

A model can be developed to understand the impact of the bubble economy on the real economy, highlighting its novelty in capturing sectoral dynamics. To explore

its effects on industrialization, consider an economic growth model consisting of two sectors: manufacturing and non-manufacturing. It is true that macroeconomic models for the Thai economy exist, such as the Bank of Thailand (BOT) model and the National Economic and Social Development Board (NESDB) model. The former model has been developed since 1974 to simulate the effects of monetary policy (Ganjarendeek 1985, 87), while the latter has been developed for the national five-year plan. These, however, are econometric models, and to the best of the author's knowledge, this dynamic two-sector economic growth model approach is the first of its kind.

Consider a macroeconomic model consisting of two sectors: a manufacturing sector (M) and a non-manufacturing sector (N). In each sector, we assume a Cobb-Douglas production function:

$$Y_t^M = A_0 e^{\gamma_m t} K_t^{M\alpha} L_t^{M(1-\alpha)} \quad (2a)$$

$$Y_t^N = B_0 e^{\gamma_n t} K_t^{N\beta} L_t^{N(1-\beta)} \quad (2b)$$

where Y^M is total output, K^M is capital stock and L^M is labor force for a manufacturing sector. Y^N is total output, K^N is capital stock, and L^N is labor force for a low productivity sector. A_0 and B_0 are total factor productivities in 1980, γ_m and γ_n are technological progress, and α and β are the output elasticities of capital in each sector. As Baumol discovered, technological progress is higher in manufacturing than in non-manufacturing sectors in developed countries, but in the Thai economy, the difference is not as pronounced (see Appendix).

In a competitive market, the marginal product of labor is equal to the real wage.

$$w^M = MP_L^M = \frac{\partial Y^M}{\partial L^M} = \frac{(1-\alpha)Y^M}{L^M} \quad (3a)$$

$$w^N = MP_L^N = \frac{\partial Y^N}{\partial L^N} = \frac{(1-\beta)Y^N}{L^N} \quad (3b)$$

Change in capital stock equals investment minus depreciation with the depreciation rate δ_i ($i = m, n$).

$$\frac{dK^M}{dt} = I_t^M - \delta_m K_{t-1}^M \quad (4a)$$

$$\frac{dK^N}{dt} = I_t^N - \delta_n K_{t-1}^N \quad (4b)$$

Theoretically, investment (gross fixed capital formation) depends on the output of each sector. However, since data on investment amounts by industry is unavailable, gross fixed capital formation was allocated proportionally based on capital stock.

$$I_t^M = s_m I_t + \varphi_m FDI_t \quad (5a)$$

$$I_t^N = s_n I_t + \varphi_n FDI_t \quad (5b)$$

where s_m and s_n are average allocations of estimated GFCF to each sector, φ_m and φ_n are estimated allocation of FDI by regression analysis.

Total investment was assumed using the following equation.

$$I_t = I(DC_t, FDI_t) \quad (6)$$

where DC is a domestic credit and FDI is an inward FDI in Thailand.

Domestic credit is assumed to be created by economic activities and SET index.

$$DC_t = DC(Y_t^M, Y_t^N, SET_t) \quad (7)$$

Allocation of labor force changes in accordance with economic growth. Labor can migrate between sectors based on wage differentials.

$$\frac{dL^M}{dt} = L_t^{NM} - L_t^{MN} \quad (8a)$$

$$\frac{dL^N}{dt} = L_t^{MN} - L_t^{NM} \quad (8b)$$

$$L^{MN} = m_m \times (w^L - w^H) \times L^M \quad (9a)$$

$$L^{NM} = m_n \times (w^H - w^L) \times L^N \quad (9b)$$

where m_m and m_n are migration rates.

The simulations are set as follows: $\delta_m = 0.065$, $\delta_n = 0.059$, $s_m = 0.185$, $s_n = 0.815$, $\varphi_m = 0.008064$, $\varphi_n = 0.020081$, $m_m = m_n = 0.00002$.

Finally, the bubble was modeled as follows:

$$SP_t = SP(I_t) \times (1 + BUBBLE) \quad (10)$$

where SP is a stock price, and $BUBBLE$ is 1.5 for the bubble period (1988-1996) or

-1.5 for the non-bubble period (1988-1996).

4. Simulation

Following the bursting of its own bubble economy, Japan's manufacturing employment share declined significantly, highlighting the potential effects on industrial structure. In Thailand, which had been pursuing industrialization, what impact did the bubble economy leave behind? The model explains how asset bubbles affect the distribution of wealth among workers.

Figure 1 illustrates w^M and w^N within the model, demonstrating how estimated values align with observed data. The higher w^M value indicates that manufacturing productivity and wage exceeds non-manufacturing productivity, a relationship observed across many countries, explaining why emerging economies pursue industrialization.

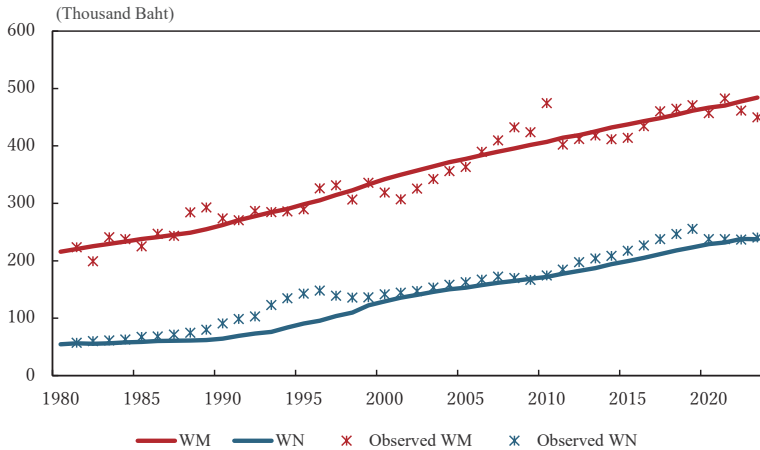


Fig. 4 Difference of wages

Comparing bubble and non-bubble scenarios reveals that the bubble economy led to increased wages in the non-manufacturing sector, which can distort resource allocation and hinder industrialization.

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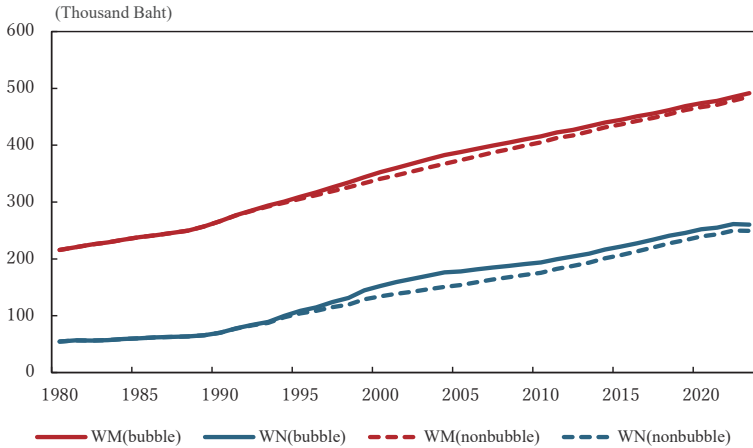


Fig. 5 Difference in wages under two scenarios

Figure 6 shows the share of manufacturing in employment.

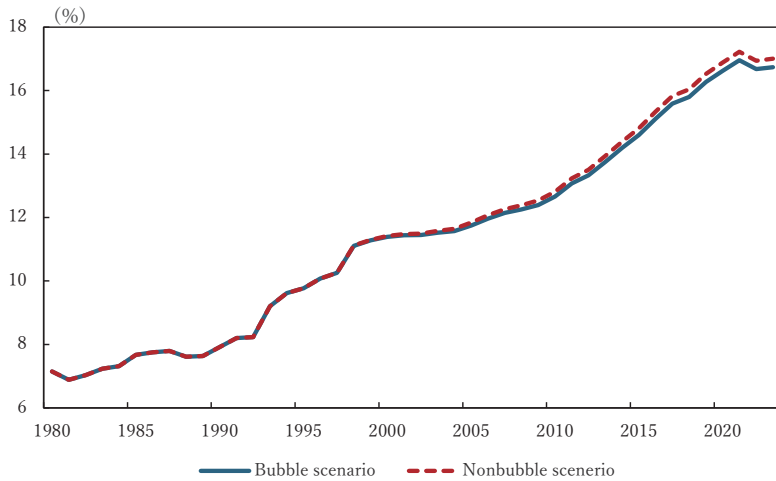


Fig. 6 Share of manufacturing in employment

The experience of the bubble economy limited the growth of the manufacturing sector's employment share and impeded the expansion of high-productivity industries, adversely affecting emerging economies.

5. Conclusion

Thailand has experienced multiple bubble economies. This paper has developed an economic growth model to explain the bubble economy that triggered the 1997 Asian financial crisis, a clear case of bubble collapse.

Under bubble economies, inflated capital flows into unproductive assets. The author's model shows that while bubble economies generate temporary income growth, they cannot resolve the fundamental problems faced by emerging economies, such as significant sectoral productivity gaps and wage disparities. It also highlights how such income growth delays employment in manufacturing, negatively impacting the goal of industrialization.

While tourism has helped maintain relatively good non-manufacturing productivity in Thailand, achieving further economic growth requires reallocating capital and labor to more productive sectors.

Appendix

A data set was assembled for the years from 1980 to 2024. A value in parentheses under the coefficient is t -distribution, R^2 is a coefficient of determination, and \bar{R}^2 is a coefficient of determination adjusted for degrees of freedom.

$$I_t = \begin{cases} -272444.3 + 2.186440DC_t + 0.058941FDI_t + u_t, & t \leq 1993, \\ -451221.6 + 4.556046DC_t - 0.034685FDI_t + u_t, & 1994 \leq t \leq 2004, \\ 1559944. + 0.316810DC_t + 0.001952FDI_t + u_t, & 2005 \leq t \leq 2024, \bar{R}^2 = 0.9739. \end{cases}$$

$$\log\left(\frac{Y_t^M}{L_t^M}\right) = 4.510139 + 0.014444t + 0.149824 \log\left(\frac{K_t^M}{L_t^M}\right), \bar{R}^2 = 0.9367.$$

$$\log\left(\frac{Y_t^N}{L_t^N}\right) = 0.775583 + 0.010980t + 0.606430 \log\left(\frac{K_t^N}{L_t^N}\right), \bar{R}^2 = 0.9896.$$

$$DC_t = \begin{cases} 212540.5 - 0.063805Y_t^M + 0.091654Y_t^N + 237.4615SET + u_t, & t \leq 2006, \\ 249147.2 - 0.888349Y_t^M + 0.363519Y_t^N + 1430.7565SET + u_t, & 2007 \leq t \leq 2014, \\ 3982940. - 1.709240Y_t^M + 0.290750Y_t^N + 1005.5835SET + u_t, & 2015 \leq t \leq 2024, \end{cases}$$

$$\bar{R}^2 = 0.9950.$$

$$SP_t = -336.4226 + 0.000674I_t, R^2 = 0.8499.$$

The DC was calculated based on the ratio of domestic credit to private sector to GDP, as reported by the World Bank (World Development Indicator). SET is a Thai composite stock market index by the Stock Exchange of Thailand (SET)

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