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The Resilience of the Thai Economy: An Analysis on Output Losses after the 1997 Crisis

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Abstract

The 1997 crisis, considered as a shock in the business cycle for the Thai economy should temporarily have slowdown economic prosperity and then once it bounced back, the same long-term trend would be expected, but such circumstance have not been observed. Despite the economic recovery led by the vigorous contribution of exports, output loss has been realized. Various factors in post crisis conditions such as internal and external stabilities, and financial expansion are examined with the application of a simple OLS regression. The results show that the collapse in both investment and total factor productivity estimated by Solow's residuals are the causes. Reasons behind these slumps are the fact that both private and public sectors hesitate to invest. Furthermore, financial institutions became more conservative and firms were deleveraging to prevent bankruptcy. Political instability also hurt Thai competitiveness. This paper also utilizes data from 1980 to 2010 annually in a series of vector auto regression models creating a spectrum of impulse responses from 1990 to 2020 and finds that investment expenditure and total factor productivity enhancement are the main drivers to pave the resilient paths. Correct strategies have to be carefully implemented to promote capital spending of the society as crowding-in effect from infrastructure establish- -dence, is achievable.

Keywords: Output Loss, Total Factor Productivity, Macroeconomic Policy

I. Introduction

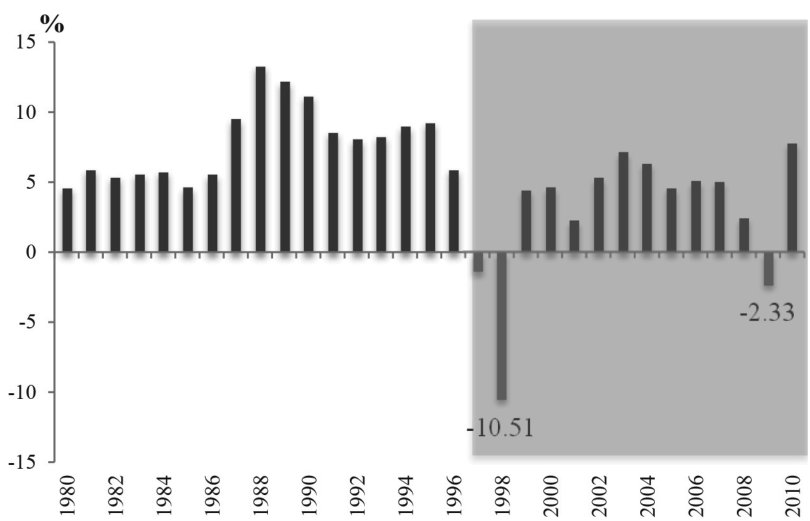
Thai economy was successfully liberalized and reformed since 1980s. The growth spurt of Thai economy was observed. Many factors contributed to a rapid development in the past decades (Siriprachai, 2009). Openness to international trade, since Bowring treaty, was one of the major sources of growth. Culture also played a part determining such a rapid progress (Sussangkarn, 1992). Even though there were several political conflicts, the economic stability was always recognized from 1980 to 1996, as indicated by Feng (2003); both the overthrown government and coup leaders still shared commitment on market economy. Low inflation and low unemployment rate were realized. Wage was kept low in the past and resulted in price steadiness (Siamwalla and Setboonsarng, 1989). In 1990s, the high stability of the economy gave the confidence and secure environment to investors. National economic and social development plans were drafted and implemented. Investment in infrastructure was promoted. Favorable business climate and robust macroeconomic management were attributed to the Thai economic prosperity before 1997.

1997 marked a remarkable year. Thailand experienced the first economic collapse in her history. Twin crises, banking and currency ones, were the consequences from speculation and bubble economy (Jitsuchon, 2006). The maturity and currency mismatches of external debt were the causes. Overoptimistic attitude in macroeconomic management was also a problem. Bankruptcy of firms and financial institutions were the outcomes. The tightening monetary and fiscal policies, advised by the IMF, were employed in the hard time, resulting in output losses after the crisis up until now.

Thai economy enjoyed 7-8 percent economic growth for many years before the bust of economic bubble (Figure 1). After Thailand recovered from a severe hit of Asian economic recession, the economic growth was only around 4-5 percent each year except for the year 2010 that the economic growth is 7.8 percent due to the recovery from global financial crisis in 2008.

Still, 1997 crisis should be considered as the business cycle type of phenomena. Once the recovery of Thai economy is in the way, the same growth trend should still be held. National Economic and Social Development Board (NESDB) also planned that the growth of the economy should be around 8 percent in the 8th national and economic development plan (1997-2001) launched before the crisis. Nonetheless, the 10th plan (2007-2011) expected that the economic growth would be around 3 percent each year. The question arises what factors are contributing to such a decline in the prosperity of Thai economy and how Thai economy can make a resilient path back to its good old days. This paper will first introduce the engine of growth of Thailand in section 2 and then investigate what are the causes of the deterioration in the prospects of Thai economy in section 3. More resilient paths will also be discussed in section 4 and then the conclusion will be in the final section.

Figure 1: Thai GDP Growth Rate from 1980 to 2010



Source: NESDB

II. Anatomy of Thai Economic Growth

Many institutions were established to pursue economic progress. National Economic Development Board, later changed to National Economic and Social Development Board, outlined plans for the economic advancement. Some policies were launched after the problem tackled. Export-oriented strategy has been employed for the prosperity of Thai economy up until now.

Whether it was bubble economy, there is a Thai miracle. Since 1980, Thai economy enjoyed positive prospect of economic growth for decades. Sources of prosperity were favorable business atmosphere and strong macro-economic management. The success of export promotion policy was also a key. The prolonged growth in Thailand can be explained by learning mechanism and structural shift from agriculture to exportable (Diao, Rattso and Stokke, 2006). Siddique and Selvanathan (2002) also found that there have been significant and positive causal relationships running from economic growth to exports, import growth to economic growth and export growth to import growth.

Apart from export, technological progress is also the foundation for the prosperity. Many studies computed total factor productivity to explain sources of growth of Thai economy. Table 1 listed chronological total factor productivity calculation from various researches. Various estimates on productivity growth are conducted with different data set as well as methodologies. The different contributions to growth are inevitable.

The computation on total factor productivity suggested that such a miracle was achieved by rapid growth in inputs, both increase in labor force and accumulation of capital rather than the technological improvement (Young, 1994). Nevertheless, total factor productivity still did its job contributing to the economic prosperity. Several studies indicated that TFP contribution to growth was around 7-50 percent of the growth spell. Tinnakorn and Sussangkarn (1998) found that TFP growth was influenced not only by the pace of capital accumulation but also resource allocation and degree of openness.

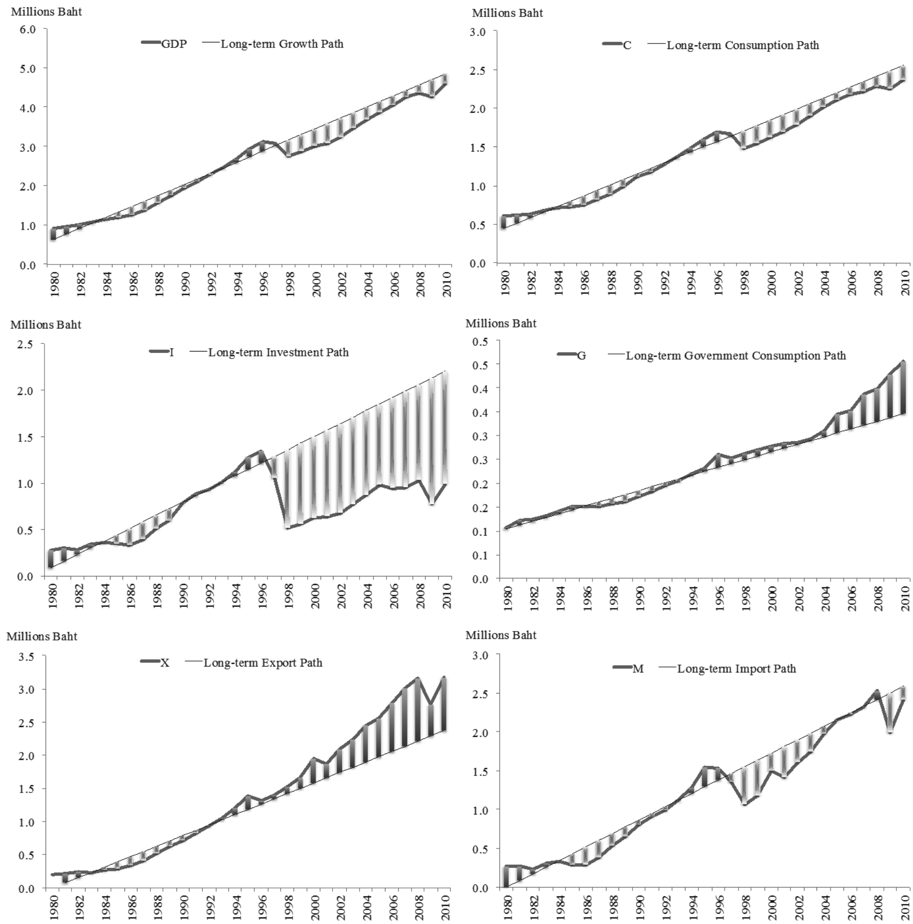
Table 1: Total Factor Productivity calculated from various studies

Study	Period	TFP Growth	Contribution to Growth
Ikemoto (1986)	1970-1980	1.40	19.70
Limskul (1988)	1970-1985	0.46	7.20
World Bank (1993)	1960-1989	2.40	-
Young (1994)	1970-1985	1.90	51.35
Drysdale and Yiping (1995)	1950-1988	1.70	29.30
Kawai (1995)	1970-1990	1.90	27.10
Marti (1996)	1970-1990	1.60	42.50
Collin and Boswoth (1997)	1973-1994	2.40	40.40
Sarel (1997)	1979-1996	2.03	38.74
Tinakorn and Sussangkarn (1996)	1978-1990	1.20	15.79
Tinakorn and Sussangkarn (1998)	1981-1995	1.27	15.64

Source: Complied by Tinnakorn and Sussangkarn (1998)

Before 1997, Thailand followed Washington consensus. Liberalization, stabilization, privatization and deregulation were in progress. Too rapid process of liberalization may be the causes of the crisis. During that time, Thai economy, after enjoyed lower wage rate for many years, reached the turning point. Real wage went up, deteriorating the export competitiveness and the balance of payment. Dutch's disease was the distress (Warr, 2004). Whereas Bank of Thailand adopted fixed exchange rate system to mitigate the currency risks, impossible trinity should not be held. Inability of the authority to conduct independent monetary policies given pegged exchange rate and perfect capital movement was realized. Speculation attack rose after the signal of poor economic position. Capital was flowing out. Bank of Thailand decided to float the exchange rate and that was the collapse of economy. IMF assistance was asked from Thailand's authorities. Firms that have foreign loans went bankrupted. Many financial institutions were closed from that crisis. The bubble was eventually pricked.

Figure 2: GDP Components at 1988 price and Long-term Trend from 1980 to 2010



Source: NESDB and author’s extrapolation

Note: The long-term paths are estimated by OLS method, using data from 1980 to 1996, and are extrapolated linearly thereafter.

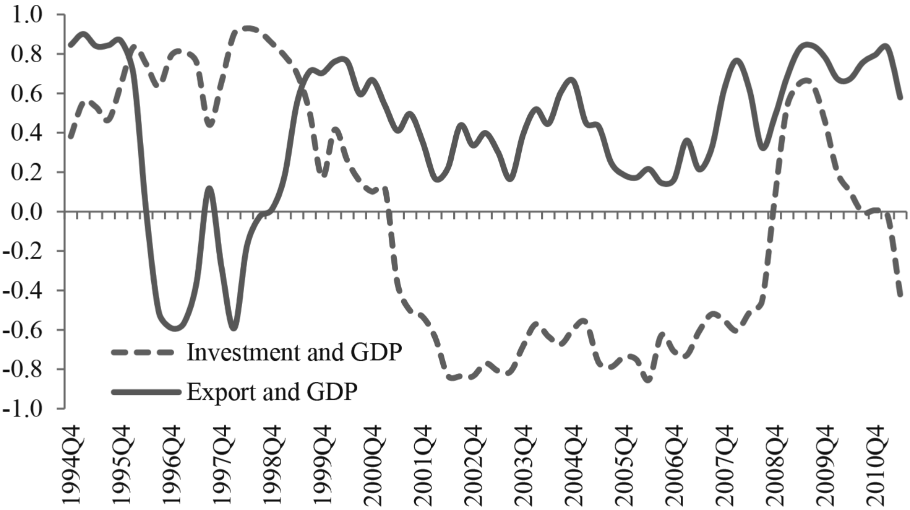
Figure 2 illustrated each component in Gross Domestic Product from 1980 to 2010. Long-term paths are estimated. These figures are to compare output losses after the 1997 crisis, which is seen by the difference between the long-term path, using data from 1980 to 1996 and then extrapolated linearly thereafter, and the actual value of GDP. Gross Domestic Product is still under the long-term trend even though Thai economy has already bounced back from the economic calamity. Nevertheless, it has never reached the same rate of growth.

Consumption, after the crisis, was still lower than the long-term path, indicating that households are still not willing to purchase goods and services like the previous economic boom stage. Investment was perceived as an engine of growth before 1997. After 2000, even if GDP had already reached the same level, gross capital formation is still lower than estimated due to many factors, which is persistent and prolonged. Thank to the initiation of many populist policies, government consumption has been over the estimated path, together with the actual import. Export has been performing very well since 1997. All together, output losses have obviously been detected since the collapse of the Thai economy.

III. Thai Economy after the Crisis: the Vanishing Smiles

A small and open economy like Thailand imposed export-led growth strategy for many years. It went well to pull the economy out of the recession in 1997 catastrophe and since then the main engine of growth for Thai economy has been changed from investment to export. Figure 3 confirms that investment was the driving machine for the economy due to its positive correlation before the crisis and export emerged to replace investment after that. In the year 2008, the global financial crisis, investment turned to correlate positively to GDP.

Figure 3: Rolling Correlation between Investment, Export and GDP



Source: Author's Calculation

Note: The window size for each rolling is 8 (8-quarter or 2-year period). Each point represents the correlation of that variable to GDP using data including that period with 8 periods lagged.

The output losses after the crisis are enormous. Smiles, the symbol of Thais, have been fading. IMF (2007) argued that pre-crisis investment was far beyond fundamentals. Overinvestment took place due to overly optimistic expectation of the economy. Three factors were examined as the explanation of slow investment recovery, which are riskier investment environment, weakness in corporate and financial sector as well as the sluggishness in nontradable sector. Balakrishnan, et al. (2009) found that output losses are persistent after the crisis, which can be explained as following; capital assets vanished during the crisis year need time to rebuild, the collapse in financial system takes time to be healed and also the rigidities of resource allocation impede the necessary change needed to rebalance the economy. Still if right policies are introduced in the timely fashion, lower output losses could have been realized. However, Thailand was limiting herself in the policy implementation, building up the macroeconomic imbalances and more economic casualty.

In case of Thailand, this paper applied simple regression to study the output loss after the crisis as employed in Balakrishnan et al (2009). Investment and total factor productivity are the sources of Thai economic growth (Jitsuchon, 2002). Credit to GDP will disclose the way banking system operates and involves with the losses. Current account to GDP is also another indicator which tells the external solidity of the economy. Inflation and fiscal balance will elaborate how well the government manages the internal stability.

Granger's causality tests are employed to find the connection of each variable. Nonetheless, the results are inconclusive due to the studied series are not long enough to perform the test of longer lag periods (Table 2) but at least investment and TFP do have some linkages to the prosperity of the economy. Table 3 shows that out of six variables investigated, only two are statistically significant at the 1 percent level. Total factor productivity plays a crucial role in alleviating the problem. Decline in investment is also the cause of the loss Thai economy faces. Hence, the fall of these two factors will be considered.

Table 2: Granger Causality Tests

Number of Lag	**1**	**2**	**3**
Current Account to GDP	✗	✓	✓
Credit to GDP	✗	✗	✓
Fiscal Balance to GDP	✗	✗	✓
Investment to GDP	✗	✓	✗
Inflation	✗	✗	✗
TFP Growth	✓	✗	✓

Note: Each item in each row indicates that variable does Granger Cause Output Loss at 0.1 level of significance.

Table 3: Output Loss Analysis

Dependent Variable: Output to pre-crisis trend (in percentage)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) Current Account to GDP	-0.004***						0.001					0.004				0.006				0.002
	[-2.132]						[0.281]					[1.415]				[1.591]				[1.015]
(2) Credit to GDP		-0.19**						-0.127					0.143				0.188			0.17***
		[-3.000]						[-1.505]					[1.140]				[1.361]			[1.999]
(3) Inflation			0.005						0.001					0.004				0.008*		0.008*
			[1.064]						[0.28]					[1.671]				[2.741]		[3.755]
(4) Fiscal Balance to GDP				0.012***						-0.005					-0.004				-0.005	-0.016**
				[1.936]						[-0.451]					[-0.665]				[-0.583]	[-3.164]
(5) Investment to GDP					**1.102***		1.350	0.580	**1.052***	1.452	-0.184					0.608	-0.489	**-1.11*****	0.169	-0.001
					[2.711]		[1.378]	[1.120]	**[2.290]**	[1.642]	[-0.330]					[0.845]	[-0.842]	**[-2.012]**	[0.202]	[-0.002]
(6) TFP Growth						**0.006***					**0.007***	**0.009***	**0.010***	**0.006***	**0.007***	**0.008***	**0.012***	**0.001***	**0.007***	**0.016***
						[4.631]					**[2.806]**	**[3.880]**	**[2.887]**	**[4.920]**	**[3.602]**	**[3.384]**	**[2.610]**	**[4.504]**	**[2.713]**	**[5.542]**
(7) Constant Term	0.927*	1.071*	0.894*	0.924*	0.669*	0.916*	0.609*	0.891*	0.676*	0.585*	0.957*	0.904*	0.798*	0.904*	0.912*	0.763*	0.869*	1.140*	0.873*	0.727*
	[71.110]	[19.389]	[56.676]	[72.993]	[7.583]	[141.460]	[2.636]	[5.254]	[7.045]	[2.835]	[7.732]	[85.963]	[7.684]	[98.432]	[96.975]	[4.542]	[6.431]	[9.728]	[4.520]	[4.740]
Number of Observation	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
R^2	0.292	0.450	0.093	0.254	0.401	0.661	0.405	0.511	0.405	0.413	0.665	0.718	0.700	0.735	0.675	0.738	0.722	0.817	0.677	0.944

Note: columns 1-20 report estimation results based on ordinary least squares with robust t-statistics in square brackets. Each column represents each regression on different variables in each row. *, **, and *** indicate significance at the 1, 5, and 10 percent level, respectively.

a) Total Factor Productivity Growth Sluggishness

Total factor productivity (TFP) is the technological progress the economy exhibits. Solow's residual is used as TFP. Solow (1957) expressed growth decomposition and resulted in total factor productivity. TFP is defined as the difference between the output growth and the accumulation of inputs. Magalhães (2005) found that Solow's residual, in case of Brazil, tends to overestimate the role played by technology shocks and also presents statistical properties that do not match the theoretical characterizations in the real business cycle model. Still, this approach has been acceptable for more than fifty years. From its first introduction, the models are occasionally augmented. For simplicity, this paper will use the convention method to calculate the total factor productivity. Simple OLS is applied to find the residuals of equation;

$$e_t = \alpha \rho_t + \varepsilon_t$$

,where

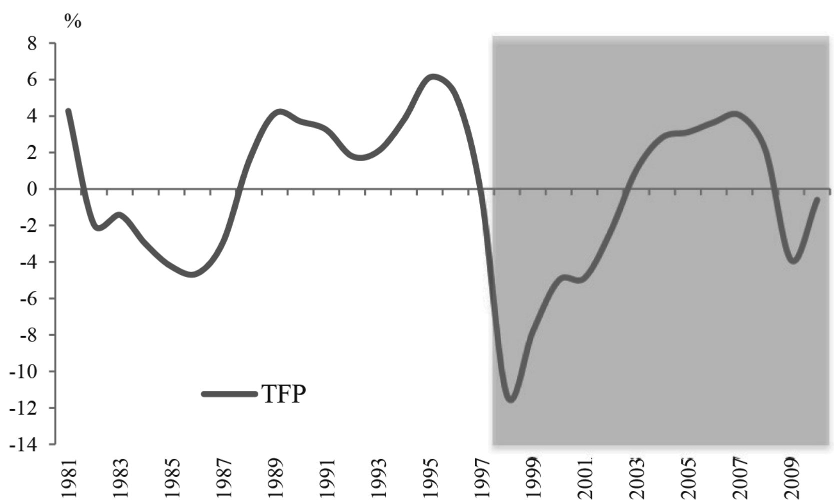
$$e_t = \frac{\dot{Y}_t}{Y_t} - \frac{\dot{L}_t}{L_t}, \rho_t = \frac{\dot{K}_t}{K_t} - \frac{\dot{L}_t}{L_t}, \text{ and } \varepsilon_t = TFP_t = (1-\alpha)\frac{\dot{A}_t}{A_t}$$

From the computation, an episode of negative of TFP from the year 1981 to 1986 tells the economic fundamentals (Figure 4) during the trough of world business cycle[2]. The assembling of inputs was far exceeding the economic growth. Over capital accumulation and technical inefficiency might be the reason. After that, Thai economy started to have positive TFP growth between 1987 and 1990. Coup and political conflicts distracted the growth rate of TFP as they were falling down in 1991 and 1992. Another 3 years of technological progress passed and then the economy collapsed, driving down the TFP. The accumulation of capital and additional labor force were still increasing while the economy was contracted. In 2001, economic slump in the US, the 911 incidence accompanied with the burst of the dot com bubble, caused a slight decline in total factor productivity. Since then the economy remains stable, positive TFPs are observed. Nevertheless, the global financial crisis in 2008 did push the TFP growth negatively in both 2009 and 2010.

[2] In 1982, there was the Latin America's debt crisis

Table 4 illustrated that pre-crisis total factor productivity, in Thai miracle period, was once greater than those of post-crisis years. The economic prosperity before 1997 came mostly from capital accumulation as well as a rise in labor force. 3.4 percent of total factor productivity in the period 1991 to 1995 strengthens the argument that after 1997, Thai economy has never utilized capital and labors, as efficiently as before since technological progress or TFP growth is lower. If 1998 was just the trough of the business cycle, all growth of inputs both capital and labor should rise back to the same level as those of pre-crisis periods. A decline in total factor productivity is obvious. After 1997, capital stock growth is always below than that before the crisis from two digits to more or less 2 percent.

Figure 4: Total Factor Productivity of Thai economy from 1981 to 2010



Source: Author’s Computation

Table 4: Growth rate of GDP, Labor Force, Capital Stock, and TFP

Growth	Labor Force	Capital Stock	GDP	TFP
1981-1985	3.67	7.22	5.45	-1.28
1986-1990	3.58	9.18	10.34	0.37
1991-1995	0.28	11.93	8.62	3.40
1996-2000	0.65	4.14	0.62	-3.86
2001-2005	1.69	2.01	5.14	-0.07
2006-2010	1.35	3.09	3.62	1.06

Source: Author's Calculation

Researchers have done many studies to find the source of productivity. Ozanne (2001) maintained that total factor productivity is determined by how much government intervene, how open the economy is and the quality of human capital. The success of East Asian economies is largely from the government intervention by augmenting the supply of investible resources, spreading the risks attached to long-run investment and steering the allocation of investment (Wade, 1990). Country can also benefit from competitive gains from trade. Foreign exchange generated by exports is very valuable to enable one economy to access better technologies (Pack and Page, 1994). In addition, human capital plays a major role for the prosperity of the growth spurts of Asia Pacific economies (Islam and Chowdhury, 1997).

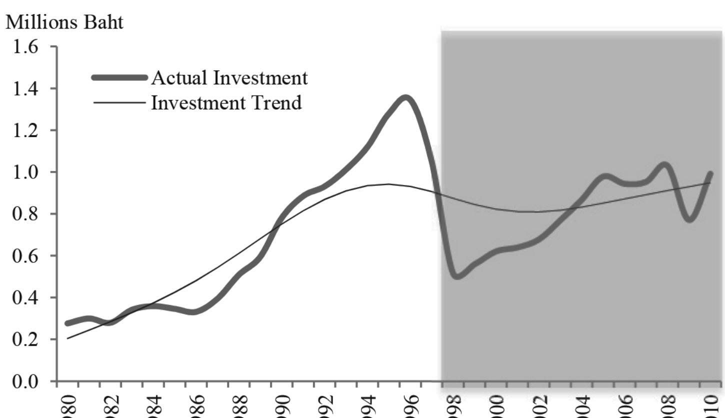
Warr (2009) indicated that, in Thailand, all factor productivity growth at the sectoral level derived from agriculture, but the reallocation of resources away from agriculture was a much larger source of aggregate productivity growth. Jeong and Townsend (2007) found that 73% of TFP growth is explained by occupational shifts classified workers with technology adoption and financial deepening. Expansion of credit is a major part. Access to credit helps poor people to relax the borrowing constraint on their occupational choices, encouraging the poor talented people to become entrepreneurs. Ahmed (2008) stated that FDI is positive with slight contribution to TFP intensity growth. Ariyapruchya et al. (2006) also discovered that the degree of competition in the economy could increase productivity of private companies.

Isaksson (2007) revised literatures and concluded that, among other variables, education, health, infrastructure, imports, institutions, openness, competition, financial development, geographical predicaments and absorptive capacity are the most important determinants contributing to the expansion of productivity. Total factor productivity then is influenced by various factors and can be improved if right policies are designed and implemented.

b) Investment Slump

The economic landscape has been shaped after the 1997 crisis. Investment slump has resulted in continual and extensive output losses. The investment trend has been transformed (Figure 5). A drift downward of gross capital formation tells the story. Figure 6 indicated a decline in both public and private investment to GDP. In pre-crisis years, investment was the driving machine for the Thai economy. It was around 30 to 40 percent to GDP, while private investment was around 20 to 30 percent and public investment was more or less 10 percent. After the year 1997, overall investment to GDP falls to not more than 30 percent. Private gross capital formation declines to not greater than 20 percent while public outlay seems to behave in the same fashion.

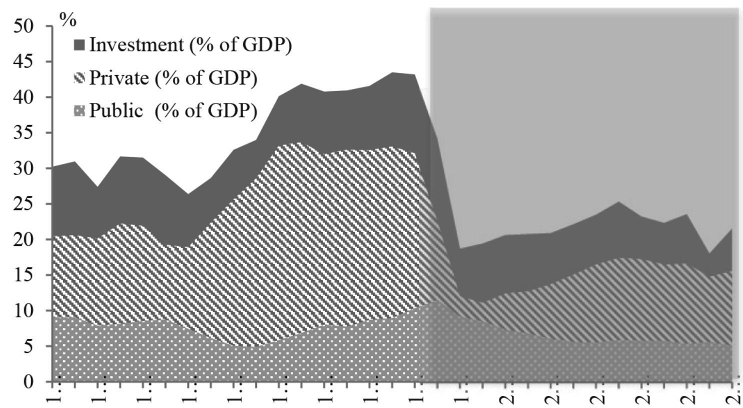
Figure 5: Actual Investment at 1988 price and Investment Trend



Source: NESDB

Note: HP filter is employed to get the investment trend

Figure 6: Investment to GDP

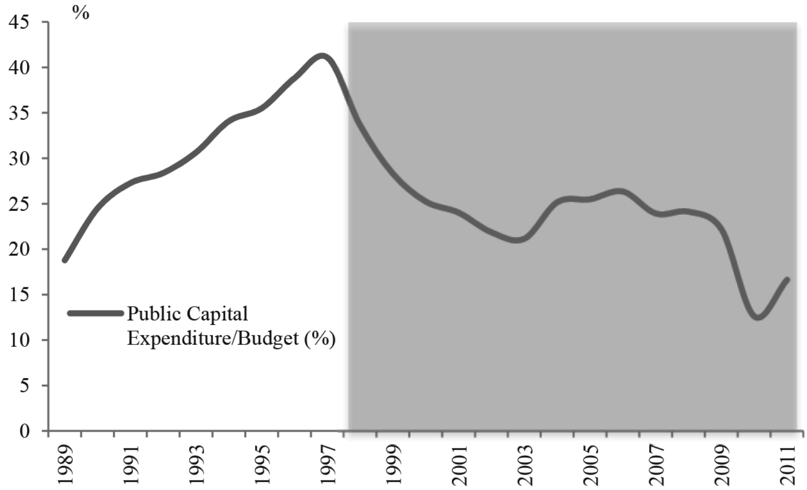


Source: NESDB

Public disbursement was subdued due to the frequent change in government offices as well as the political uncertainty in years after. The change in the policy regime toward populist schemes might also be the cause. Regulation and fear of corruption disrupt public projects. Corruption has a direct effect on growth that is in addition to its indirect negative effects via investment and other channels (Swaleheen, 2011). There is still no sign of the rise of the public investment to the Thai economy.

Fiscal sustainability rules pronounced that there should be certain limit of debt level government is committed, which is set at 60 percent as of 2010 for Thailand. Debt service to budget had better in the level that fiscal space is abundant, around 15 percent. Public capital expenditure should also be 25 percent so that the return on investment will be enough for the next generation but recently, the Royal Thai Government has failed to with comply rule number 3. Figure 7 shows that public capital expenditure declined after 1997 and for many years, the ratio was lower than 25 percent. Return on public investment is perhaps not sufficient.

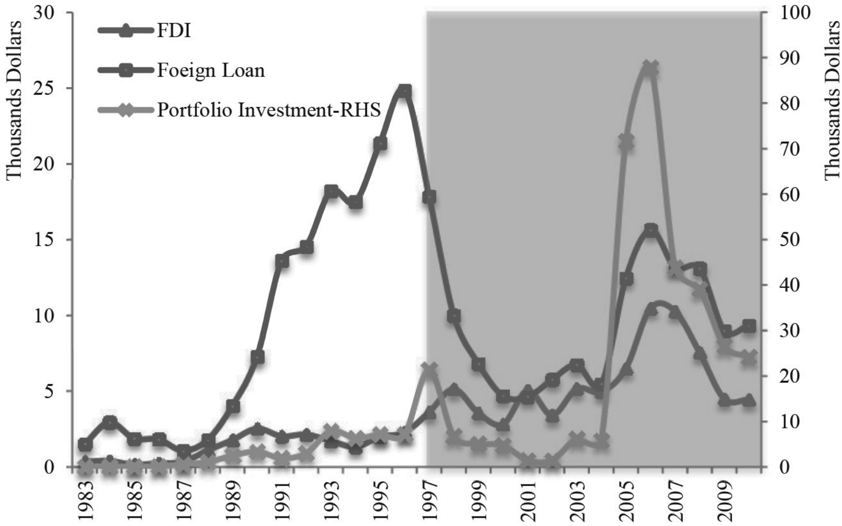
Figure 7: Public Capital Expenditure to Budget



Source: Fiscal Policy Office

Business climate remains less favorable, compared to the optimistic years before, causing a sharp decline in the share of private investment to GDP. There is evidence that real private investment is related positively to real net private capital flow (Greene, 2002). Foreign direct investment (FDI) does not get affected by the crisis, indicating the rising trend after the 1997, but once the global financial crisis hit the major economies in 2008, this investment, together with portfolio investment, was drawn out. Still there has been a decline in investment in stock market after 1997 to 2002 before starting to rise again and sharply in the year 2004. Foreign loan decreased substantially (Figure 8), lesson learned from the currency crisis in the year 1997.

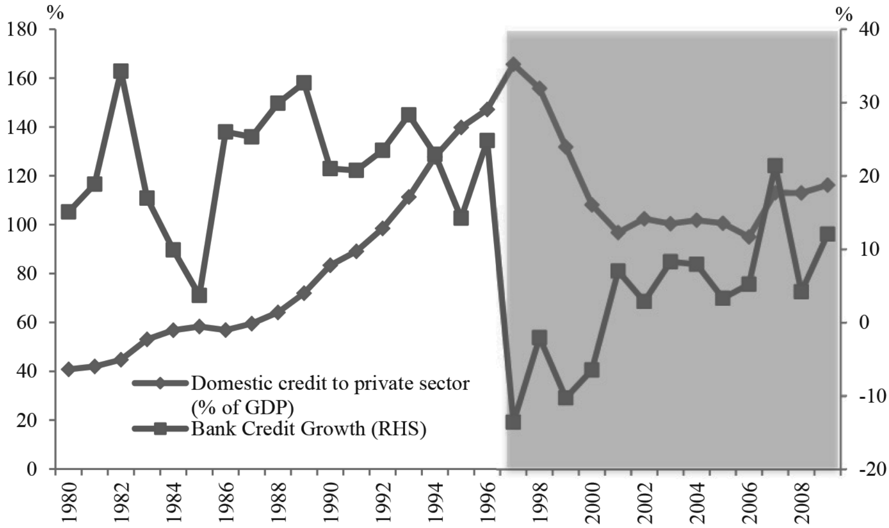
Figure 8: Level of FDI, Foreign Loan and Portfolio Investment in Dollars



Source: BOT

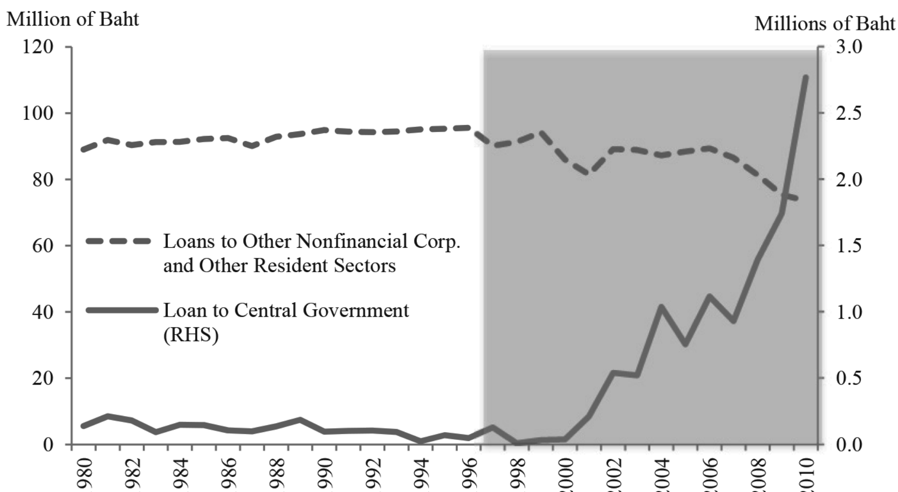
Banks with high level of profit and cost efficiency have more tendencies to give loans. However, both average profit and cost efficiency levels of the post-crisis period are found to be significantly lower than those of the pre-crisis period (Chunhachinda and Li, 2010). Ariff and Can (2009) discovered that bank efficiency has improved, but only to the pre-IMF intervention level. Commercial banks in Thailand are still not able to perform well. They become too conservative and do not take necessary risks to make profits. Domestic credit to private sector reduces and still cannot reach back to the same pre-crisis stage (Figure 9). Banking credit growth has been fluctuating across time. However, in 1997, credit growth was negative until the year 2001 and remains stable until these days. Loans to both corporate and government fall since 1997. Figure 10 suggests that banks are more willing to lend to central government whereas loans to private companies show the decreasing trend.

Figure 9: Domestic Credit and Banking Credit Growth



Source: World Bank and BOT

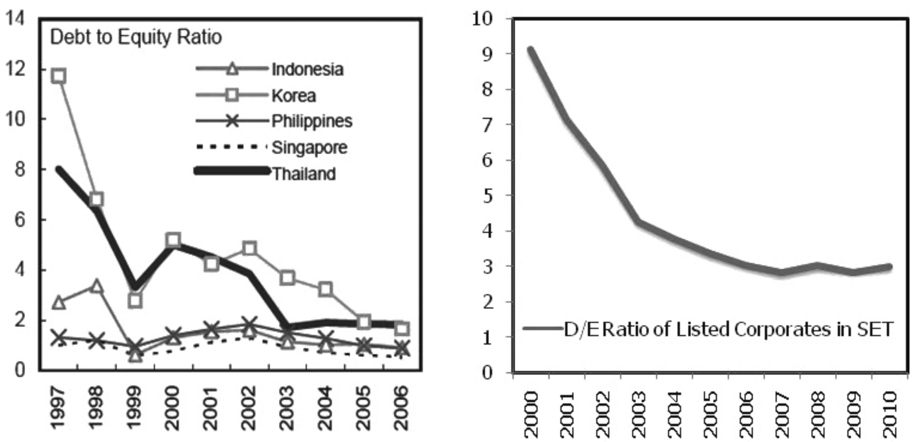
Figure 10: Level of Loans to Corporate and Central Government



Source: BOT

Private firms experienced the crisis and more than ten years have been passed, but it is still a fresh memory that changes the way companies conduct their businesses. Corporates tend to use their own money rather than loans from external places. Figure 11 shows a decline in debt-to-equity ratio for private companies in Thailand. In 1997, both South Korea and Thailand had debt to equity ratio far beyond other countries, even Singapore, which is the leading economy in the region. Since then, firms in both countries are prone to take fewer risks from 8 and 10 of D/E ratio to 2 and 3 of it for Thailand and South Korea respectively. Deleveraging is observed. This conservative trend is likely to be preserved. Companies have less incentive to invest in new ventures, which might be cause of the gradual recovery of investment.

Figure 11: Debt to Equity Ratio



Source: IMF[3] and Stock Exchange of Thailand

Recent political turmoil is also another challenge Thailand confronts. Private sector will feel less confident due to all that uncertainty. Violence deteriorates favorable business atmosphere. Animal's spirit will determine the level of investment (Akerlof and Shiller, 2009). Herd instinct will be directed if any bad information leaks out. Psychological forces are in the game. Investors will be likely to pull away their resources. Confidence is needed for investors.

[3] IMF (2009, page 98)

Investment slump after the 1997 crisis is then from the decline in both public and private capital spending. Lower level of public capital outlay is obvious. More conservative way to conduct the businesses of private companies and financial institutions becomes prevalent after the crisis. Macroeconomic environment is not favorable enough to attract both domestic and foreign investment, compared to that in the pre-crisis days. Although a decade has been passed and the recovery from the crisis has been realized, Thai economy can perform better if binding constraints from the crisis are carefully deciphered. The old engine of growth for Thai economy can still be ignited.

IV. Restoring the Engine of Growth

Thailand has already been out of the 1997 crisis since 2000 with the assistance and suggestion from the IMF. Output losses are expected. The collapse of investment is the culprit that has made Thai economy never go back to its long-term direction. Export growth is not enough to compensate the damages Thai economy has been through. There are still many means for Thailand to pave the way back to the same growth trend. Declines in total factor productivity and investment can still be coped with.

Investment and total factor productivity do matter to the economic growth. Figure 12 and Figure 13 shows the vintage of responses of macro-economic variables especially for investment, total factor productivity and gross domestic products. Series of vector auto regression with 1 period lagged are employed to study the reaction of economic prosperity to gross fixed capital formation and total factor productivity; the equations are as following,

$$Y_t = \alpha_1 + \beta_{11} Y_{t-1} + \beta_{12} I_{t-1} + \beta_{13} TFP_{t-1} + \varepsilon_{1t}$$

$$I_t = \alpha_2 + \beta_{21} Y_{t-1} + \beta_{22} I_{t-1} + \beta_{23} TFP_{t-1} + \varepsilon_{2t}$$

$$TFP_t = \alpha_3 + \beta_{31} Y_{t-1} + \beta_{32} I_{t-1} + \beta_{33} TFP_{t-1} + \varepsilon_{1t}$$

where, t = 2, …, T and T varies from 10 to 30 (1990 to 2010)
Y = GDP at 1988 price
I = Gross Fixed Capital Formation at 1988 price
TFP = Total Factor Productivity from author's computation

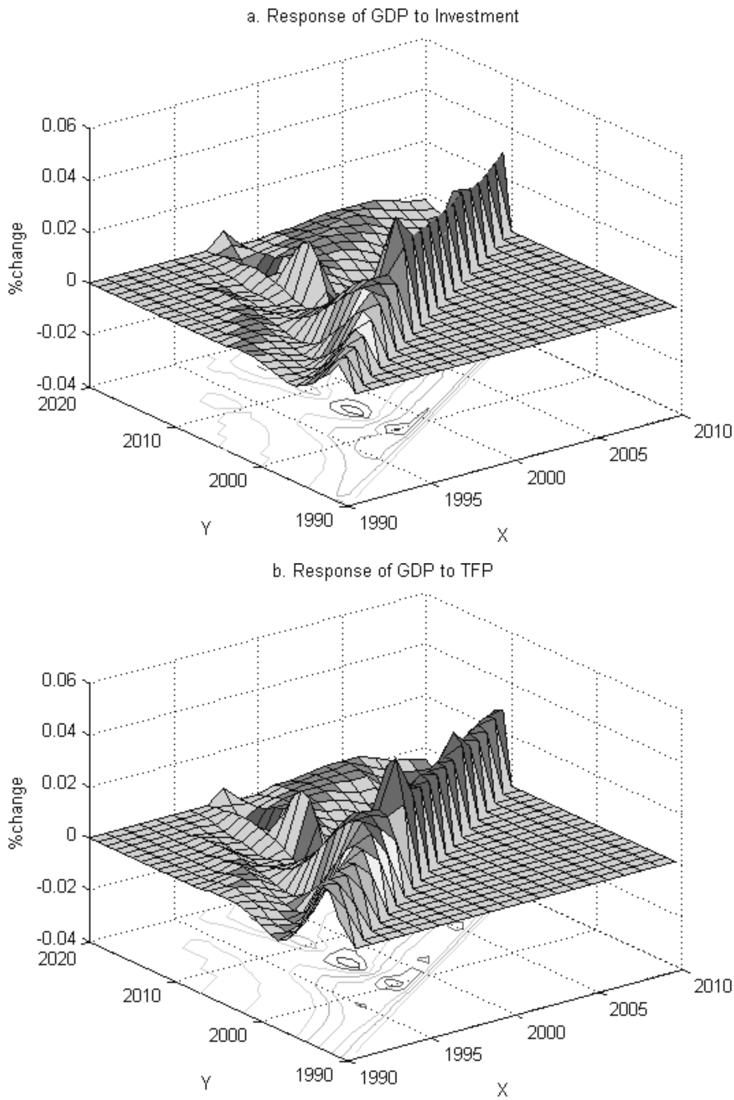
Data from 1980 to 2010 are scrutinized. GDP and investment are fed in logarithm form. HP filters are also used to eradicate the trend. There are no problems in unit root tests for filtered GDP, investment and total factor productivity. The appropriate time series data is then exploited in the study of responses. The first set of VAR, using data from 1980 to 1990, is employed and then this paper repeats and collects the impulse response of VAR(1) with time series from 1980 to 1991 onward until that from 1980 to 2010. All the responses are plotted in the vintage.

Figure 12 illustrates the outcome of GDP to the change in investment and total factor productivity. The height in the figure shows how much the change of GDP after a rise in 1 generalized standard deviation of a particular variable. Obviously, total factor productivity seems to have more impact to the economic prosperity and its influence does last longer. Short-live stimulations are found after both TFP and investment enhancement. Their effects on GDP are observed that it positively raises output at first sight and then its influence tends to fade away with a decline of income after certain periods of time. Though there is the abnormal reaction in the year 1998 due to the crisis. GDP after 1997 tends to react faster to investment as the vintage indicates that the response in 1991 of GDP is likely to increase just a little and then the effect fades away while the response in 2011 of GDP is raised with different degree. Same argument is for the response of GDP to total factor productivity.

Investment is one of the main factors driving up total factor productivity (Figure 13). When there is one positive shock in investment, productivity will be enriched. The effects diminish negatively afterwards. Same story goes for the response of total factor productivity to investment. Once the country demonstrates higher level of productivity, investors will find Thailand become more attractive. More gross capital formation will be poured into the economy. The improvement in total factor productivity will draw more investment.

The level of total factor productivity can be enhanced. Absorptive capacity must be strengthened. Openness to technology is vital so that the transfer of knowledge can fully be realized (Isaksson, 2007). Nararak (2007) argued that labor capability needs to be promoted via education and social security system. Better management in both private and public sectors is also a key. Technological advancement is important. Creative innovation should be supported. In 2011, even though Thailand has already employed 15-year-free education for all children, the quality of it should still be improved. More access to financial loans for university needed to be covered. Social safety net has already been expanded to informal workers but the procedures are still under the process.

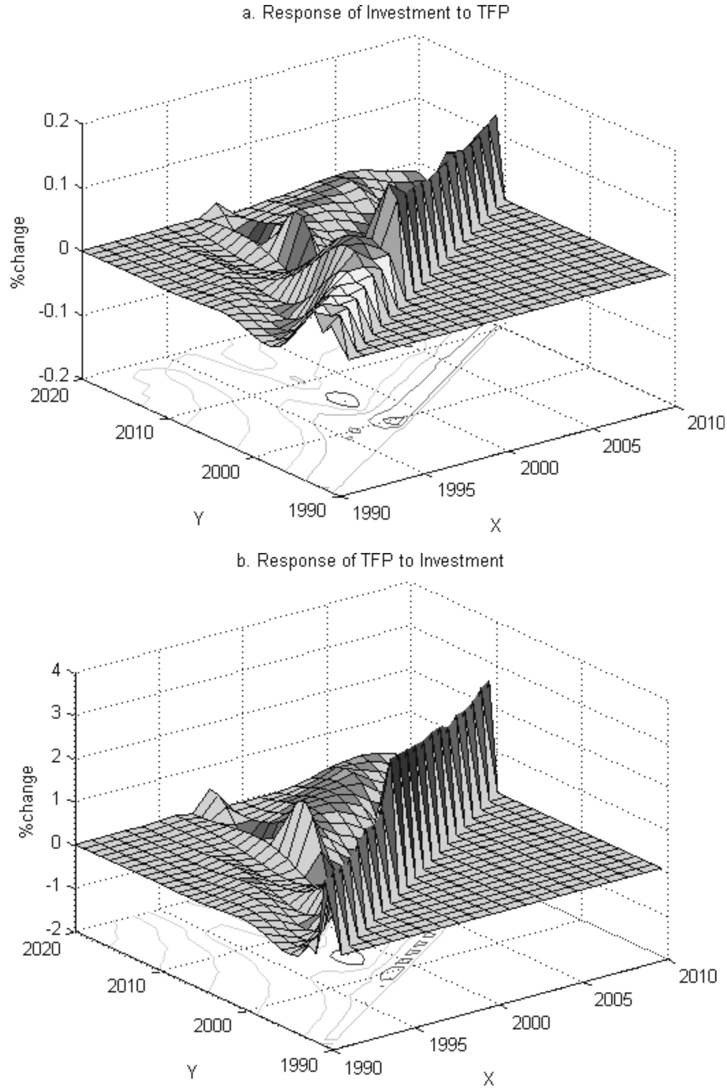
Figure 12: Vintage of Responses of GDP to Investment and TFP



Source: Author's calculation

Note: Color represents the economic growth after a rise in generalized 1 s.d. of investment or TFP. X-axis indicates the data ranges used from 1980 to that point in time. Y-axis tells the period of response after the shock hit. The result of each spectrum can be read horizontally.

Figure 13: Vintage of Responses of TFP to Investment and Investment to TFP

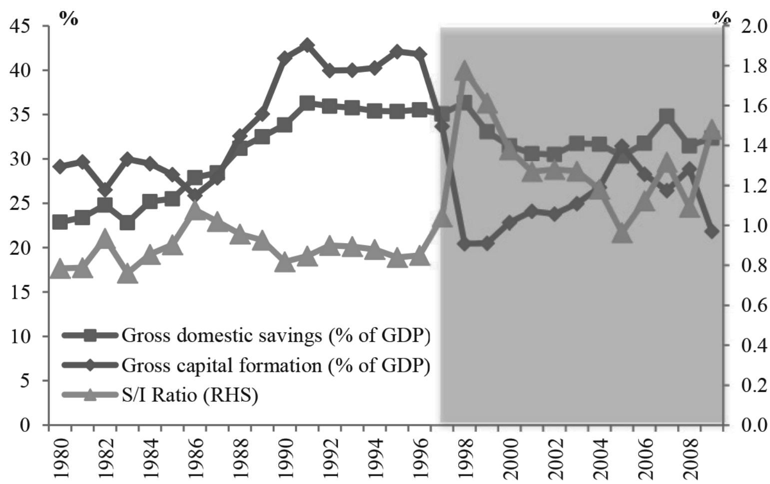


Source: Author's calculation

Note: Color represents the growth after a rise in generalized 1 s.d. of investment or total factor productivity. X-axis indicates the data ranges used from 1980 to that point in time. Y-axis tells the period of response after the shock hit. The result of each spectrum can be read horizontally.

There are numerous ways to increase investment. Gross capital formation can be boosted as saving exceeds investment (Figure 14). Its ratio is greater than one. Investment to GDP has been lower than saving to GDP since 1997. There is a problem in the resource allocation since sources of funds are still available but they are not fully utilized. Right schemes are required to exploit saving to invest and promote the prosperity of the economy.

Figure 14: Saving and Investment



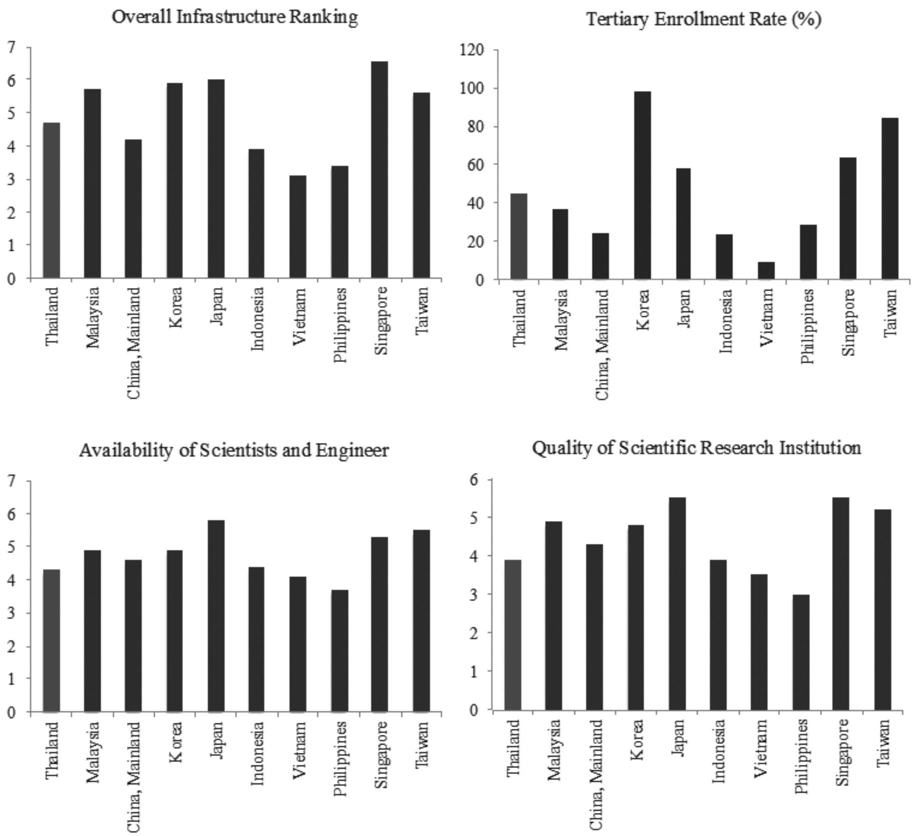
Source: World Bank

Reinhart and Khan (1989) found that government should create conditions which make private investment attractive. Establishing a stable macroeconomic atmosphere, provision of adequate legal and institutional arrangement for the protection of private property and facilitating private investors to conduct their business are the lists for the benefits toward long-term prosperity. Furthermore, IMF (2010) purposed four broad areas to boost investment. Increasing the returns on investment, improving access to external financing to reduce the cost of capital, especially for smaller and domestically oriented firms, reducing excess leverage and promoting SME restructuring to create space for new investment, and strengthening risk management and reducing uncertainty should be the way out.

Since private sector is still uncertain to invest, public investment should be signified. Even though Holt-Eakin (1992) discovered that there are no sufficient linkages between public sector capital and private production activities, recent study from IMF (2010) and Udomkerdmongkol et al. (2010) revealed that improvement in infrastructure would crowd in private investment and lift potential growth. Figure 15 indicates that Thailand still needs more investment in infrastructure. The overall ranking of Thailand is still lower than neighboring countries. Thailand's tertiary enrollment rate is still behind those of developed countries in Asia. Scientists and engineers are still not enough, compared to other places. Quality of scientific research institution needs to be improved. Investment in education to expand the research and development frontier should be emphasized. Other infrastructures should not be ignored.

Budina and Tuladhar (2010) highlighted that public-private partnerships (PPPs) should be now another alternative authorities consider. Improvement of quality and quantity of publicly provided infrastructure services needs to be taken into account. IMF (2007) also pointed out that the increase in public investment should be concentrated on high-priority and high-return projects in bottleneck sector. The increase should also be complied with the fiscal sustainability rules. Furthermore, the complementary between different infrastructure and non-infrastructure investment need to be pondered when prioritizing public investment. With this, the economic competitiveness of the country will be improved. Private companies will have more incentive to invest once all fundamentals are well established.

Figure 15: Infrastructure Index



Source: World Economic Forum (2011)

V. Concluding Remarks

Thailand has been through many stages of development. Taking off processes have been accomplished. Promising business environment and strong macroeconomic administration were the foundation for the prosperity of the economy. Catching up was almost reached but some mistaken policies were followed. The collapse of the economy was the consequence. The perspective of economic growth, after years passed, has not been the same.

Total factor productivity has not been achieved its peak like those before the crisis. A sharp decline in investment triggers the output losses.

Public capital spending is lower. Private sector hesitates to invest. Financial institutions become more conservative. More secure loans are provided and risky credits tend to be avoided. Firms are deleveraging to prevent the threat to their bankruptcy. Political instability is also another challenge for Thailand.

The resilience of Thai economy can be realized. Thai economic fundamentals are still robust but the reform is required to be carried out. Productivity is a key. Better education and social safety net can be used to promote labor capacity. Innovative idea should also be encouraged. Exports are now the main driving machine of the economic prosperity, and it will perform better if economic and physical infrastructures are augmented. However, investment multiplier will play a better part fueling the economic growth. Hence, favorable business environment and macroeconomic stability should be strengthened. Animal spirits have to be monitored. Saving is available to be resorted for investment. Appropriate strategies are needed so that those saving can be exploited. Public investment should be more introduced to improve infrastructures and raise country competitiveness via both public disbursement and public-private partnership agreement. Incentives for investment are desirable but need to be carefully supported. Rebuilding another engine of growth is attainable.

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