

Debt of Agencies under State Supervision in Thailand: Risk and Uncertainty of Contingent Liabilities

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Abstract

This study attempts for the first time to compile list of agencies under state supervision in Thailand as well as their outstanding debts in order to provide policy makers more complete picture of public debt. It finds that there are eighty-six agencies with total debts of 3.846 trillion baht as of 2011, accounting for 46.37 per cent of total public debt. The analysis of the effects of debts of agencies under state supervision on fiscal sustainability framework reveals that adding new information on debts of those agencies causes public debt to GDP indicator to be violated, in addition to balanced budget within 2005 and capital expenditure to total budget expenditure, leaving only debt service to total budget expenditure that still remains within the target. This study suggests that government should make an effort to balance budget and lower level of public debt so that they are in line with the targets since prolong budget deficit and rising public debt could cause serious trouble for the government in the future.

^{*} Public Debt Management Office, Ministry of Finance, Kingdom of Thailand. The views expressed herein are those of the author and not necessarily those of the Public Debt Management Office and/or the Ministry of Finance. This paper is based on research supported by the United Nations Conference on Trade and Development under “Building Capacities to Address Financial Implications of External Shocks and Climate Change Mitigation through Innovative Risk-Management Instruments Project” (Contract No. 38937). All errors are mine.

JEL Classification: B50; E62; H63

Keywords: Public Debt; Fiscal Sustainability; Self-Organized Criticality

บทคัดย่อ

การศึกษานี้เป็นความพยายามครั้งแรกในการเก็บรวบรวมรายชื่อและหนี้คงค้างของหน่วยงานในกำกับดูแลของรัฐในประเทศไทย เพื่อเป็นข้อมูลให้ผู้กำหนดนโยบายได้เห็นภาพรวมของหนี้สาธารณะ การศึกษานี้พบว่า ในปี 2554 มีหน่วยงานในกำกับดูแลของรัฐจำนวน 86 หน่วยงาน หน่วยงานเหล่านี้มีหนี้คงค้างจำนวน 3,846 ล้านล้านบาท หรือคิดเป็นร้อยละ 46.37 ของหนี้สาธารณะ การวิเคราะห์ผลกระทบของหนี้หน่วยงานในกำกับดูแลของรัฐต่อตัวชี้วัดภายใต้กรอบความยั่งยืนทางการคลังพบว่า ข้อมูลหนี้คงค้างของหน่วยงานในกำกับดูแลของรัฐที่การศึกษานี้เก็บรวบรวมได้เพิ่มเติมส่งผลให้หนี้สาธารณะต่อผลิตภัณฑ์มวลรวมภายในประเทศ ไม่เป็นไปตามที่กำหนดไว้ภายใต้กรอบความยั่งยืนทางการคลัง นอกเหนือจากตัวชี้วัดด้านการจัดทำงบประมาณสมดุลภายในปี พ.ศ. 2548 และสัดส่วนงบลงทุนต่องบประมาณรายจ่าย เหลือเพียงตัวชี้วัดด้านภาระหนี้ต้องงบประมาณรายจ่ายเท่านั้นที่ยังอยู่ภายใต้กรอบความยั่งยืนทางการคลัง การศึกษานี้ขอเสนอแนะว่า รัฐบาลควรพยายามจัดทำงบประมาณสมดุลและลดระดับของหนี้สาธารณะให้สอดคล้องตามที่กำหนดไว้ภายใต้กรอบความยั่งยืนทางการคลัง เนื่องจากการขาดดุลงบประมาณเป็นเวลานานและหนี้สาธารณะที่เพิ่มขึ้น อาจสร้างปัญหาให้กับรัฐบาลได้ในอนาคต

1. Introduction

It is widely accepted that the ratio of public debt to gross domestic product (GDP) is one among many economic indicators that can provide a signal about the fitness of both developing and developed economies. Prolong rising level of public debt without rising level of GDP should provide a symptom that a country may not be in good shape going forward. The situation could get worse if that country were hit by an unexpected negative shock. This is

mainly because a country with higher level of public debt has less room to borrow in order to stimulate the economy than a country that has lower level of public debt.

While the issue of public debt has been analyzed and the ratio of public debt to GDP has been compared among different countries around the world, it is critical to note that a number of policy makers and analysts often overlook the fact that it is very difficult to get any meaningful sense out of such an exercise. This is mainly because definition and composition of public debt do vary from country to country. Unless one employs the same base rate, one should be very careful when analyzing and comparing the level of public debt as well as the ratio of public debt to GDP across countries.

For Thailand, according to the Public Debt Management Act B.E. 2548 (2005), public debt is defined as any debt incurred by the Ministry of Finance, state agency or state enterprise through raising or guaranteeing of loan by the Ministry of Finance, but does not include a debt incurred by a state enterprise which undertakes money lending business and such debt is not guaranteed by the Ministry of Finance. In addition, it includes debt of agencies under state supervision defined as state agencies other than a government agency and state enterprise. Examples of agencies under state supervision are public organizations, funds having legal personality, independent administrative organizations, and universities under state supervision.

While there are many agencies under state supervision in Thailand, a preliminary investigation reveals two important findings. Firstly, there is no single centralized government authority that has a complete list of all agencies under state supervision. This is mainly due to the fact that agencies under state supervision are established by their own laws and are under supervision by different ministers¹. Therefore, the list of agencies under state supervision is scattered among different ministries. Secondly, with regard to the issue of public debt, many agencies under state supervision are empowered by their establishing laws to issue their own

¹ Agencies under state supervision report directly to ministers in charge as stated in their establishing law or act without accountability to the ministries.

debts and/or obtain loans. Hence, their debts are counted as public debt and have to be reported to the Public Debt Management Office². Thus far, agencies under state supervision have yet to report their outstanding debts to the Public Debt Management Office³. While the Public Debt Management Office has requested some agencies under state supervision to inform their annual borrowing plans to be incorporated in the annual public debt management plan on a regular basis, there has been no evidence of any formal attempt by the Public Debt Management Office to compile a list of agencies under state supervision and their outstanding debts prior to this study.

That the number of agencies under state supervision and their outstanding debts are not known might result in the current figure of public debt to be understated. More importantly, debts of agencies under state supervision, if poorly managed and/or with bad luck, could have adverse effects on government fiscal balance and pose potential risk and uncertainty on fiscal sustainability in the future. Debt of agencies under state supervision therefore could be considered as hidden contingent liabilities⁴.

While the Thai government plans to issue more debts in the near future as a means to finance intellectual and physical infrastructure projects in order to improve standard of living of people as well as country's competitiveness, it is critical for policy makers to understand the overall picture of public debt before making a decision on how much to borrow. Compiling a list of agencies under state supervision, examining whether or not their establishing laws permit them to borrow, collecting data on how much debt those agencies

² Under the Rule of Ministry of Finance on Public Debt Management B.E. 2549 (2006), agencies under state supervision are obliged to report their debts to the Public Debt Management Office.

³ Only two agencies under state supervision report their outstanding debts to the Public Debt Management Office. They are National Village and Urban Community Fund and Energy Fund Administration Institute.

⁴ Section 19 of Public Debt Management Act B.E. 2548 (2005) states that Ministry of Finance and other state agencies will not be responsible for and will not guarantee debts issued by agencies under state supervision. In addition, Ministry of Finance and other state agencies will not set out annual appropriation to pay for principal and/or interest for any debts incurred by agencies under state supervision.

have incurred, and analyzing the potential effects of debt of agencies under state supervision on fiscal sustainability should, therefore, make public debt picture more complete and help policy makers in terms of future public debt monitoring and conducting debt sustainability analysis as well as providing policy recommendation.

This study makes an effort for the first time to compile a list of agencies under state supervision in Thailand and ascertain whether or not the laws establishing those agencies permit them to issue debt and/or obtain loan. If so, what are outstanding debts of those agencies? The potential effects of debts of agencies under state supervision on fiscal sustainability are also examined in order to provide guidance for future policy formulation and recommendation.

This study is divided into five sections. Following the introduction, section 2 provides a background of Thailand's public debt with emphasis on debts of agencies under state supervision. Section 3 shows a list of agencies under state supervision and their outstanding debts as of 2011. The potential effects of debts of agencies under state supervision on fiscal sustainability framework are examined in Section 4. Finally, Section 5 concludes and provides suggestions for policy implications as well as directions for future research.

2. Thailand's Public Debt and Debts of Agencies under State Supervision

It has been observed that the composition of public debt varies from countries to countries depending upon what types of public sector a country counts as public debt⁵. For Thailand, public debt is defined as any debt incurred by the Ministry of Finance, state agency or state enterprise through raising or guaranteeing of loan by the Ministry of Finance, but does not include a debt incurred by a state enterprise which undertakes money lending business and

⁵ For more information regarding the coverage of public sector, please see International Monetary Fund (2001), pp. 14-15.

such debt is not guaranteed by the Ministry of Finance⁶. However, for the purpose of public debt report, the Public Debt Management Office classifies public debt into five categories. They are direct government debts, state enterprise debts, specialized financial institution debts guaranteed by the Ministry of Finance, Financial Institution Development Fund debts⁷, and agencies under state supervision debts.

Table 1 shows Thailand public debt from 1996 to 2011. Public debt was at 656,214 million baht in 1996, accounting for 14.23% of GDP. Public debt had risen sharply to approximately 1.67 trillion baht in 1997 when Thailand encountered financial crisis in that year and had to abandon fixed exchange rate regime and adopted managed float exchange rate system. Since then, public debt had been leveled around 3 trillion baht before rising again to around 4 trillion baht in 2009⁸. However, in terms of public debt to GDP, the ratio has been declining steadily to 37.53% in 2008 since it was peak at 60.79% of GDP in 1999. During that period, Thai economy had grown around 7.46% measured in terms of nominal GDP⁹ which resulted in the public debt to GDP ratio to decline.

Table 2 shows data on debts of agencies under state supervision from 2001 to 2011¹⁰. As stated earlier, there are only two agencies under state supervision recorded in the public debt data base which are National Village and Urban Community Fund and Energy Fund

⁶ State enterprises undertaking money lending business are called specialized financial institutions.

⁷ Even though Financial Institution Development Fund is categorized as one of state enterprises, its debt figure has been classified as a separate item mainly because the Public Debt Management Office wants to highlight this debt which resulted from the closure of fifty-six financial institutions during the Asian Financial Crisis in 1997 and their debts had been bailed out by the government.

⁸ The increase in public debt in 2009 resulted mainly from the Emergency Decree Authorizing the Ministry of Finance to Raise Loan for Economic Rehabilitation and Stabilization B.E. 2552 (2009) which allowed the government to borrow from domestic financial market in order to stimulate the economy that was adversely affected from the slowdown of the World economy due to financial crisis in the United States of America starting from 2007.

⁹ The reason for using nominal GDP is because public debt is measured in nominal term.

¹⁰ Note that there was no record of debts of agencies under state supervision before 2001.

Table 1
Public Debt (1996-2011)

Unit: Million Baht

Fiscal Year ⁺	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Direct Government	175,308	241,902	499,912	959,685	1,113,935	1,263,712	1,670,548	1,651,628	1,828,412	1,826,994	1,967,704	2,051,363	2,162,111	2,586,513	2,907,482	3,181,159
State Enterprises	329,664	615,849	449,113	832,777	908,934	920,554	842,727	794,098	839,143	1,012,765	911,473	911,309	988,440	1,108,580	1,083,983	1,079,704
Specialized Financial Institutions (Guaranteed)	107,489	146,622	180,009	199,691	188,307	158,977	99,501	87,040	94,779	114,171	114,609	101,652	102,346	208,702	177,179	156,942
Financial Institution Development Fund	43,753	667,770	1,124,427	814,594	781,410	700,165	365,349	427,364	398,914	437,739	273,515	185,154	138,219	98,146	61,445	30,445
Agencies Under State Supervision	-	-	-	-	-	50,000	64,384	56,950	60,085	111,492	80,429	35,593	17,116	-	-	-
Total Public Debt	656,214	1,672,143	2,253,461	2,806,747	2,992,586	3,093,409	3,042,509	3,017,081	3,221,333	3,503,162	3,347,730	3,285,072	3,408,231	4,001,942	4,230,089	4,448,250
Total Public Debt to GDP (%)	14.23	35.33	48.71	60.53	60.79	60.26	55.82	50.99	49.64	49.39	42.67	38.53	37.53	44.26	41.86	42.27

Source: Public Debt Management, Ministry of Finance.

⁺Note that Thailand fiscal year starts from 1 October and ends on 30 September of the following year.

Administration Institute. The data in Table 2 indicate that debts of both agencies have similar pattern but differ in time period. Debt of National Village and Urban Community Fund was incurred in 2001, reached its peak in 2003, and then started to decline gradually from 2004 to 2009. For Energy Fund Administration Institute, it started to borrow money from domestic financial market in 2004. Debt of Energy Fund Administration Institute reached its highest in 2006 and started to lower significantly from 2007 to 2009¹¹. Note that there were no debts of both agencies in 2010 and 2011.

Without a background knowledge regarding the amount of debt of agencies under state supervision, it is likely that one might come to the conclusion that although the number had been fluctuated during the period of 2001-2009, it was small relative to total public debt, and hence should not cause any trouble to the government. This is not what happened to the Thai government in 2006. During the rise of global oil prices in 2005, the Thai government used the Oil Fund to stabilize domestic fuel prices with confidence that the global oil prices would come down. The government policy to stabilize the fuel prices was successful at the beginning as global oil prices did decline in the second half of 2005. However, success that comes with the help of luck could be taken away by luck (and often rapidly and unexpectedly)¹². In 2006, the global oil prices started to rise again. And the Oil Fund made a big loss with a significant amount of debt due to fuel price subsidy policy. At the end, the government decided to float some of domestic fuel prices while the prices of diesel, liquefied natural gas, and liquid petroleum gas, were still being controlled.

¹¹ It should be noted that even though the Public Debt Management Act was not enacted during the period of 2001 to 2004, debts of National Village and Urban Community Fund and Energy Fund Administration Institute were recorded by the Public Debt Management Office because the former borrowed money from the Government Savings Bank to support government's poverty alleviation program while the latter borrowed money from domestic financial market to subsidize the loss of Oil Fund, a fund that is managed by Energy Fund Administration Institute with the main purpose to stabilize domestic fuel prices.

¹² Taleb (2007), p. 4.

Table 2
Debts of Agencies under State Supervision (2001-2011)

Unit: Million Baht

Fiscal Year⁺	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Agencies under State Supervision	50,000	87,684	106,340	83,205	179,286	285,833	131,827	58,390	35,670	-	-
- National Village and Urban Community Fund	50,000	87,684	106,340	71,305	62,976	55,397	43,993	30,716	17,810	-	-
- Energy Fund Administration Institute	-	-	-	11,900	116,310	230,436	87,834	27,674	17,860	-	-
Total Public Debt	3,093,409	3,042,509	3,017,081	3,221,333	3,503,162	3,347,730	3,285,072	3,408,231	4,001,942	4,230,089	4,448,250
Debts of Agency under State Supervision to Total Public Debt (%)	1.62	2.88	3.52	2.58	5.12	8.54	4.01	1.71	0.89	-	-

Source: Public Debt Management Office, Ministry of Finance.

⁺Note that Thailand fiscal year starts from 1 October and ends on 30 September of the following year.

This brief story of the Oil Fund provides a lesson that a seemingly small proportion of debt at first could result in a larger debt that had adverse effects on government's fiscal and economic stance a few years later. As the numbers are shown in Table 2, the debt of the Oil Fund increased more than twenty folds from 11,900 million baht in 2004 to 230,436 million baht in 2006. Note however that, in this case, the Public Debt Management Office incorporated the Oil Fund's borrowing plan in the annual public debt management plan. So policy makers knew the plan and the status of Oil Fund's debt before they made their decision regarding policy on public debt management. Whether or not their decision was deemed appropriate is debatable.

The more interesting question is that: what if policy makers do not know beforehand how many agencies under state supervision there are and how much debts they have incurred? And then all of a sudden, the government found out that there are many agencies under state supervision that incur debts and default on their debts simultaneously. No government would want this situation to happen during their term in the office. It is therefore an attempt of this study to compile a list of agencies under state supervision and investigate whether or not they have incurred any debts which are discussed in the next section.

3. List of Agencies under State Supervision and Their Outstanding Debts as of 2011 Unfold

As stated in the Introduction, there is no single centralized government authority that has a complete list of agencies under state supervision. This study therefore compiles list and outstanding debts of agencies under state supervision by coordinating with relevant ministries and asking for their cooperation to inform agencies under their ministers' supervision to check whether or not their law or act allows them to borrow, and if so, how much debt they have

incurred, and then report back to the Public Debt Management Office¹³. The information received from each agency under state supervision was cross-checked with the information of agencies under state supervision that this study compiled from various sources such as Bureau of the Budget, Office of Auditor General of Thailand, Office of the Public Sector Development Commission, the Prime Minister's Office, and agencies' website. The new information on each agency under state supervision regarding its legal status, ability to borrow and/or obtain loan as stated in the law, and outstanding debt was added and/or updated accordingly.

This study finds that there are eighty-six agencies under state supervision in Thailand. Since types of agencies under state supervision have never been categorized into sub-groups, this study therefore divides agencies under state supervision into four groups according to their legal status. They are public organizations, funds having legal personality, independent administrative organizations, and universities under state supervision. At present, there are fifty public organizations. Among fifty public organizations, there are thirty-eight public organizations that were established under A Royal Decree Enacted Pursuant to the Public Organization Act B.E. 2542 (1999) and twelve public organizations that were established according to specific laws or acts. There are fourteen funds having legal personality, seven independent administrative organizations, and fifteen universities under state supervision.

The list of agencies under state supervision and their outstanding debts as of September 2010 and 2011 is provided in Table 3. The finding reveals that fifty-nine agencies

¹³ The information received is in form of letter correspondence between each ministry and/or agency under state supervision and the Public Debt Management Office during the period of 26 June and 1 August 2012. Note that, out of eighty-six agencies under state supervision, there are twenty-four agencies that did not reply and are marked with asterisk in Table 3. This study finds that thirteen out of twenty-four agencies are permitted by their establishing law or act to borrow and/or obtain loan while the other eleven cannot borrow according to their establishing law or act. For those that are permitted by law or act to issue debt instrument and/or obtain loan and did not reply, the data on their outstanding debt is indicated in Table 3 as not available (N.A.). All data are available upon request.

under state supervision are empowered by laws to issue debt and/or obtain loan while twenty-seven of them are not allowed to borrow according to their establishing laws. In addition, it is interesting to note that even though the laws allow these agencies to borrow, most of them have not done any borrowing. Among fifty-nine agencies, there are only three agencies that have borrowed which are Neighboring Countries Economic Development Cooperation Agency, Office of the Welfare Promotion Commission for Teachers and Educational Personnel, and Bank of Thailand. For Neighboring Countries Economic Development Cooperation Agency and Office of the Welfare Promotion Commission for Teachers and Educational Personnel, their outstanding debts as of September 2011 were 507.2 and 685.2 million baht which are considered as small compared to the total amount of public debt¹⁴. However, with regard to the debt of the Bank of Thailand, the number as of September 2011 was approximately 3.846 trillion baht which is not trivial when compared to the total public debt which was approximately 4.448 trillion baht at the same period. Note that once debt of the Bank of Thailand is included in the public debt figure, the total amount of public debt as of September 2011 is almost doubled.

The data in Table 4 shows public debt and the ratio of public debt to GDP after including debts of Neighboring Countries Economic Development Cooperation Agency, Office of the Welfare Promotion Commission for Teachers and Educational Personnel, and the Bank of Thailand. It should be noted that Neighboring Countries Economic Development Cooperation Agency and Office of the Welfare Promotion Commission for Teachers and Educational Personnel started to incur debt in 2011.

For the Bank of Thailand, before 2008, the Bank of Thailand Act B.E. 2485 (1942) defined legal status of the Bank of Thailand as a juristic person which is neither a government agency nor state enterprise under the law on budgetary procedure and other laws. Later in

¹⁴ It is important to note that, given the nature of nonlinear relationship between the size of public debt and its effects on fiscal position and the economy, the relatively small amount of public debt could cause serious problems later as for the case of debt of the Oil Fund discussed in Section 2.

2008, the Bank of Thailand Act B.E. 2485 (1942) was amended by Section 5 of the Bank of Thailand Act (No. 4) B.E. 2551 (2008) that altered the legal status of the Bank of Thailand to be a juristic person *which is a state agency* [emphasis added], and is neither a government agency nor state enterprise under the law on budgetary procedure and other laws. Therefore, debts of the Bank of Thailand incurred before 2008 were not counted as public debt but those incurred in 2008 onwards would be counted as public debt.

According to the data provided in Table 4, debt of the Bank of Thailand has been on the rising trend from 2.134 trillion baht in 2008 to 3.846 trillion baht in 2011¹⁵. By adding debts of Neighboring Countries Economic Development Cooperation Agency, Office of the Welfare Promotion Commission for Teachers and Educational Personnel, and the Bank of Thailand into public debt, public debt figures would increase significantly from 3.408, 4.001, 4.230, and 4.448 trillion baht in 2008, 2009, 2010, and 2011 to 5.583, 6.773, 7.264, and 8.295 trillion baht respectively. So do the ratios of public debt to GDP which increase from 37.53%, 44.26%, 41.86%, and 42.27% in 2008, 2009, 2010, and 2011 to 61.49%, 74.91%, 71.89% and 78.83% respectively.

Given the debts of additional agencies under state supervision, namely Neighboring Countries Economic Development Cooperation Agency, Office of the Welfare Promotion Commission for Teachers and Educational Personnel, and the Bank of Thailand have yet to be included in the public debt, this would result in the current figure of public debt to be highly understated, 4.448 trillion baht or 42.27% of GDP in 2011 without debts of these three agencies compared to 8.295 trillion baht or 78.83% of GDP at the same period when debts of these three agencies are included. It is interesting to see if this figure has any effects on fiscal sustainability, a framework adopted by the Ministry of Finance to promote fiscal discipline. This issue is analyzed in Section 4.

¹⁵ The rising trend of the Bank of Thailand's debt is mainly due to the fact that the Bank of Thailand has issued debt instruments in order to use the proceed to manage liquidity in domestic financial market and to intervene in the foreign exchange market under managed float exchange rate regime.

Table 3
List of Agencies under State Supervision

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
 I.I Public Organization Established under A Royal Decree Enacted Pursuant to the Public Organization Act B.E. 2542 (1999)				
1. Thailand Convention and Exhibition Bureau *	The Prime Minister's Office	No	-	-
2. The Office for National Education Standards and Quality Assessment *		No	-	-
3. Office of Knowledge Management and Development *		Yes	N.A.	N.A.
4. Designated Areas for Sustainable Tourism Administration *		Yes	N.A.	N.A.
5. The Land Bank Administration Institute *		Yes	N.A.	N.A.
6. Thailand Vocational Qualification Institute *		No	-	-
7. Thai Health Promotion Foundation *		No	-	-

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
I.I Public Organization Established under A Royal Decree Enacted Pursuant to the Public Organization Act B.E. 2542 (1999)				
8. Office of Education Reform [*]	The Prime Minister's Office	Yes	N.A.	N.A.
9. Defence Technology Institute	Ministry of Defence	No	-	-
10. Neighboring Countries Economic Development Cooperation Agency	Ministry of Finance	Yes	-	0.5072
11. Community Organizations Development Institute	Ministry of Social Development and Human Security	Yes	-	-
12. Highland Research and Development Institute [*]	Ministry of Agriculture and Cooperatives	Yes	N.A.	N.A.
13.The Golden Jubilee Museum of Agriculture Office [*]		Yes	N.A.	N.A.

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
I.I Public Organization Established under A Royal Decree Enacted Pursuant to the Public Organization Act B.E. 2542 (1999)				
14. Agricultural Research Development Agency	Ministry of Agriculture and Cooperatives	Yes	-	-
15. Biodiversity-Based Economy Development Office	Ministry of Natural Resources and Environment	Yes	-	-
16. Thailand Greenhouse Gas Management Organization		Yes	-	-
17. Electronic Transactions Development Agency	Ministry of Information and Communication Technology	Yes	-	-
18. Electronic Government Agency		No	-	-
19. Software Industry Promotion Agency		Yes	-	-

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
I.I Public Organization Established under A Royal Decree Enacted Pursuant to the Public Organization Act B.E. 2542 (1999)				
20. The Energy Fund Administration Institute	Ministry of Energy	Yes	-	-
21. The Gem and Jewelry Institute of Thailand	Ministry of Commerce	Yes	-	-
22. The Support Arts and Crafts International Centre of Thailand		Yes	-	-
23. Thailand Institute of Justice	Ministry of Justice	Yes	-	-
24. Princess Mahachakri Sirindhorn Anthropology Centre	Ministry of Culture	Yes	-	-
25. Moral Promotion Center		Yes	-	-
26. Film Archive		Yes	-	-

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
I.I Public Organization Established under A Royal Decree Enacted Pursuant to the Public Organization Act B.E. 2542 (1999)				
27. Geo-Information and Space Technology Development Agency	Ministry of Science and Technology	Yes	-	-
28. Thailand Center of Excellence for Life Sciences		Yes	-	-
29. National Innovation Agency		Yes	-	-
30. National Astronomical Research Institute of Thailand		Yes	-	-
31. Hydro and Agro Informatics Institute		Yes	-	-
32. Synchrotron Light Research Institute		Yes	-	-
33. Thailand Institute of Nuclear Technology		Yes	-	-

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
I.I Public Organization Established under A Royal Decree Enacted Pursuant to the Public Organization Act B.E. 2542 (1999)				
34. National Institute of Educational Testing Service	Ministry of Education	Yes	-	-
35. The International Institute for Trade and Development *		Yes	N.A.	N.A.
36. Mahidol Wittayanusorn School		Yes	-	-
37. The Healthcare Accreditation Institute	Ministry of Public Health	Yes	-	-
38. Banphaeo Hospital		Yes	-	-

Table 3

List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
I.II Public Organization Established under A Specific Law				
1. National Health Commission Office of Thailand*	The Prime Minister's Office	No	-	-
2. Thai Arbitration Institute	Ministry of Justice	Yes	-	-
3. National Science and Technology Development Agency	Ministry of Science and Technology	Yes	-	-
4. National Institute of Metrology (Thailand)		Yes	-	-
5. National Science Technology and Innovation Policy Office		No	-	-
6. The Institute for the Promotion of Teaching Science Technology*	Ministry of Education	Yes	N.A.	N.A.

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
I. Public Organization				
I.II Public Organization Established under A Specific Law				
7. The Teacher's Council of Thailand (Khurusapha)	Ministry of Education	Yes	-	-
8. Office of the Welfare Promotion Commission for Teachers and Educational Personnel		Yes	-	0.6852
9. Health Systems Research Institute	Ministry of Public Health	Yes	-	-
10. National Health Security Office		No	-	-
11. Emergency Medical Institute of Thailand		No	-	-
12. Office of Small and Medium Enterprises Promotion *	Ministry of Industry	Yes	N.A.	N.A.

Table 3

List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
II. Fund Having Legal Personality				
1. The Thailand Research Fund ⁺	The Prime Minister's Office	No	-	-
2. National Village and Urban Community Fund ⁺		No ⁺	-	-
3. Student Loans Fund	Ministry of Finance	No	-	-
4. Public Debt Restructuring and Domestic Bond Market Development Fund		No	-	-
5. Life Insurance Fund		No	-	-

⁺The Notification of the Office of the Prime Minister Regarding Dissolution of the National Village and Urban Community Fund states that, upon the establishment of the National Village and Urban Community Fund under the National Village and Urban Community Fund Act B.E. 2547 (2004), the undertakings pursuant to the objectives of the National Village and Urban Community Fund established under the Royal Decree Establishing the National Village and Urban Community Fund B.E. 2544 (2001) shall be deemed as terminated. In the consequence, undertakings of the National Village and Urban Community Fund pursuant to the Royal Decree Establishing the National Village and Urban Community Fund B.E. 2544 (2001) shall be terminated. This means that, under the new law, National Village and Urban Community Fund cannot issue debts and/or obtain loans whereas it could under the old law.

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
II. Fund Having Legal Personality				
6. General Insurance Fund	Ministry of Finance	No	-	-
7. National Catastrophe Insurance Fund		No	-	-
8. The Government Pension Fund		No	-	-
9. National Savings Fund		No	-	-
10. The Office of Farmer's Reconstruction and Development Fund	Ministry of Agricultural and Cooperatives	Yes	-	-
11. Office of the Rubber Replanting Aid Fund		No	-	-
12. Office of the Cane and Sugar Fund*		Yes	N.A.	N.A.
13. Land Readjustment Fund	Ministry of Interior	No	-	-
14. Aid Funds*	Ministry of Education	No	-	-

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
III. Independent Administration Organization				
1. Office of the National Broadcasting and Telecommunications Commission *	The Prime Minister's Office	No	-	-
2. Thai Public Broadcasting Service *		No	-	-
3. Bank of Thailand	Ministry of Finance	Yes	3,034.25	3,846.08
4. Securities and Exchange Commission Thailand		No	-	-
5. Deposit Protection Agency		Yes	-	-
6. Office of Insurance Commission		No	-	-
7. Energy Regulatory Commission *	Ministry of Energy	No	-	-

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
IV. University under State Supervision				
1. Chulalongkorn University	Ministry of Education	Yes	-	-
2. Chiang Mai University		Yes	-	-
3. Mahidol University		Yes	-	-
4. King Mongkut's University of Technology North Bangkok		Yes	-	-
5. King Mongkut's University of Technology Thonburi		Yes	-	-
6. King Mongkut's University of Technology Ladkrabang		Yes	-	-
7. Suranaree University of Technology*		Yes	N.A.	N.A.
8. Mae Fah Luang University		Yes	-	-
9. Walailak University		Yes	-	-

Table 3
List of Agencies under State Supervision (Continued)

Unit: Billion Baht

Agency under State Supervision	Ministry/Office	Ability to Issue Debt	Debt Outstanding	
			As of Sep. 2010	As of Sep. 2011
IV. University under State Supervision				
10. Mahachulalonglornrajavidyalaya University*	Ministry of Education	Yes	N.A.	N.A.
11. Mahamakut Buddhist University		Yes	-	-
12. Thaksin University		Yes	-	-
13. Burapha University		Yes	-	-
14. University of Phayao		Yes	-	-
15. Bangkok Metropolitan University*	Bangkok Metropolitan Administration	Yes	N.A.	N.A.

Table 4

**Public Debt after Including Debts of Neighboring Countries Economic Development Cooperation Agency,
Office of the Welfare Promotion Commission for Teachers and Educational Personnel, and Bank of Thailand (1996-2011)**

Unit: Million Baht

Fiscal Year ^a	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Direct Government	175,308	241,902	499,912	959,685	1,113,935	1,263,712	1,670,548	1,651,628	1,828,412	1,826,994	1,967,704	2,051,363	2,162,111	2,586,513	2,907,482	3,181,159
State Enterprises	329,664	615,849	449,113	832,777	908,934	920,554	842,727	794,098	839,143	1,012,765	911,473	911,309	988,440	1,108,580	1,083,983	1,079,704
Specialized Financial Institutions (Guaranteed)	107,489	146,622	180,009	199,691	188,307	158,977	99,501	87,040	94,779	114,171	114,609	101,652	102,346	208,702	177,179	156,942
Financial Institution Development Fund	43,753	667,770	1,124,427	814,594	781,410	700,165	365,349	427,364	398,914	437,739	273,515	185,154	138,219	98,146	61,445	30,445
<i>Agencies Under State Supervision</i>	-	-	-	-	-	50,000	87,684	106,340	83,205	179,286	286,548	131,835	2,192,522	2,771,120	3,034,254	3,846,087
<i>- National Village and Urban Community Fund</i>	-	-	-	-	-	50,000	87,684	106,340	71,305	62,976	55,397	43,993	30,716	17,810	-	-
<i>- Energy Fund Administration Institute</i>	-	-	-	-	-	-	-	-	11,900	116,310	230,436	87,834	27,674	17,860	-	-
<i>- Office of the Welfare Promotion Commission for Teachers and Educational Personnel</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	685
<i>- Neighboring Countries Economic Development Cooperation Agency</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	507
<i>- Bank of Thailand</i>	-	-	-	-	-	-	-	-	-	-	-	-	2,134,132	2,735,450	3,034,254	3,846,086
Total Public Debt	656,214	1,672,143	2,253,461	2,806,747	2,992,586	3,093,409	3,042,509	3,017,081	3,221,333	3,503,162	3,347,730	3,285,072	5,583,637	6,773,062	7,264,343	8,295,528
Total Public Debt to GDP (%)	14.23	35.33	48.71	60.53	60.79	60.26	55.82	50.99	49.64	49.39	42.67	38.53	61.49	74.91	71.89	78.83

Sources: Public Debt Management, Ministry of Finance and Bank of Thailand.

4. Potential Effects of Debts of Agencies under State Supervision on Fiscal Sustainability Framework

The Thai Ministry of Finance has adopted fiscal sustainability as a framework to conduct fiscal policy and enforce fiscal discipline since 2002. However, the notion of fiscal sustainability is not clearly articulated but is conducted by relying upon four indicators in order to achieve medium- and long-term fiscal stability. As of 2011, there are four indicators constituting fiscal sustainability framework¹⁶. They are: 1) the ratio of public debt to GDP must not exceed 60% 2) the ratio of debt service to total budget expenditure is no more than 15% 3) balanced budget had to be achieved by 2005 and 4) the ratio of capital expenditure to total budget expenditure must not be less than 25%. Table 5 shows history and development of fiscal sustainability framework in Thailand since 2002.

The empirical evidence from Table 5 indicates that the Thai Ministry of Finance would be able to achieve all targets prior to 2006. Since then, only two targets, namely, public debt to GDP and debt service to budget could be maintained¹⁷. It is interesting to note that there has been no evidence of fiscal crisis even though the Ministry of Finance could not achieve all targets for several consecutive years. While the questions of what should be appropriate indicators for fiscal sustainability framework and what macroeconomic model should be employed in order to assess the effects on the economy if those indicators are not met are still under debate, this study takes *a status quo* and analyzes the impact of additional debts of agencies under state supervision on fiscal sustainability framework.

¹⁶ Fiscal Policy Office (2011).

¹⁷ Technically speaking, the ratio of public debt to GDP in 2009 might have not been maintained had the Ministry of Finance not changed the target from 50% to 60% on 17 August 2009. In addition, it is interesting to note that while the ratios of public debt to GDP and debt service to total budget are often reported and hi-lighted by the government, the balanced budget and the ratio of capital expenditure to total expenditure are hardly mentioned. For example, please see National Economic and Social Development Board (2012), p. 18 and Theparat and Chantanusornsiri (2012), p. 3.

The numbers shown in Table 6 suggest that once debts of Neighboring Countries Economic Development Cooperation Agency, Office of the Welfare Promotion Commission for Teachers and Educational Personnel, and the Bank of Thailand are added, the ratio of public debt to GDP exceeds the 60% target. As a result, another indicator of fiscal sustainability framework has been breached in addition to two former indicators, namely balanced budget within 2005 and capital expenditure to total budget, that the Ministry of Finance has not been able to achieve since 2007. This would leave only the ratio of debt service to total budget that is still within the target of no more than 15%.

While Thailand has not encountered fiscal crisis even though three-fourth of indicators constituting fiscal sustainability framework is violated for several consecutive years, one should not overlook the potential effects of continuing budget deficit and rising public debt since high debt and prolong budget deficit could cause serious economic and social problems. The debt crisis that some of European countries are facing should provide a good example *ex post*¹⁸. Given the positive feedback loop and the complexity of interconnection among sectors, it is widely accepted among scientific scholars that it is very difficult or almost impossible to timely predict when the fiscal crisis will erupt and how much it will catastrophically affect the economy *ex ante*¹⁹. The government should therefore be prepared to mitigate such a problem by setting policy aiming for budget surplus and lower level of public debt as soon as they could since negative shock could come from either domestic or external or both and often without any warning. And if possible, the government should consider the worst case scenario that could happen to fiscal position and its effects on the economy if things go wrong when conducting stress tests. Taleb (2013) criticizes the flaws of current knowledge about risk and uncertainty management and suggests how it should be conducted in order to reduce the chance of negative *Black Swan* event. It is worth to repeat his thought as follows:

¹⁸ Those countries are Iceland, Greece, Portugal, and Spain, for example.

¹⁹ According to Bak (1999), this is called self-organized critical state.

Table 5
Thailand Fiscal Sustainability Framework (2002-2011)

Fiscal Year ⁺	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. Public Debt to GDP (%)	≤ 60 (55.82)	≤ 55 (50.99)	≤ 50 (49.64)	≤ 50 (49.36)	≤ 50 (42.67)	≤ 50 (38.53)	≤ 50 (37.53)	≤ 50 (44.26)	≤ 60 (41.86)	≤ 60 (42.27)
2. Debt Service to Total Budget Expenditure (%)	≤ 16 (10.40)	≤ 16 (10.74)	≤ 15 (10.34)	≤ 15 (10.25)	≤ 15 (9.62)	≤ 15 (10.04)	≤ 15 (9.63)	≤ 15 (10.49)	≤ 15 (10.85)	≤ 15 (10.50)
3. Balanced Budget within (Year)	2008 (-200,000)	2005 (-174,000)	2005 (-99,000)	2005 (0)	2005 (0)	2005 (-146,200)	2005 (-165,000)	2005 (-347,100)	2005 (-350,000)	2005 (-420,000)
4. Capital Expenditure to Total Budget Expenditure (%)	-	-	≥ 25 (25.20)	≥ 25 (25.50)	≥ 25 (26.30)	≥ 25 (24.00)	≥ 25 (24.00)	≥ 25 (22.00)	≥ 25 (12.50)	≥ 25 (16.40)

Source: Adjusted from Sitthiyot (2009).

Remarks: The numbers in parentheses are actual numbers at the end of each fiscal year. The unit of the 3rd indicator is in million baht where the negative sign indicates budget deficit. The 4th indicator was added in 2004. However, due to unknown reason, the Ministry of Finance has not made any adjustment on the 3rd and 4th indicators even though it is obvious that these two indicators cannot be achieved since 2007. In addition, the ratio of public debt to GDP was adjusted upward from 50% to 60% on 17 August 2009 mainly because the Ministry of Finance concerned that the ratio might be breached because of a considerable amount of borrowing in order to stimulate the domestic economy as a result of economic slowdown. For further reading regarding criticisms of the Thai fiscal sustainability framework, please see Sitthiyot (2009).

⁺Note that Thailand fiscal year starts from 1 October and ends on 30 September of the following year.

Table 6

**Thailand Fiscal Sustainability Framework after Including Debts of Neighboring Countries Economic Development Cooperation Agency,
Office of the Welfare Promotion Commission for Teachers and Educational Personnel, and Bank of Thailand (2002-2011)**

Fiscal Year⁺	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. Public Debt to GDP (%)	≤ 60 (55.82)	≤ 55 (50.99)	≤ 50 (49.64)	≤ 50 (49.36)	≤ 50 (42.67)	≤ 50 (38.53)	≤ 50 (61.49)	≤ 50 (74.91)	≤ 60 (71.89)	≤ 60 (78.83)
2. Debt Service to Total Budget Expenditure (%)	≤ 16 (10.40)	≤ 16 (10.74)	≤ 15 (10.34)	≤ 15 (10.25)	≤ 15 (9.62)	≤ 15 (10.04)	≤ 15 (9.63)	≤ 15 (10.49)	≤ 15 (10.85)	≤ 15 (10.50)
3. Balanced Budget within (Year)	2008 (-200,000)	2005 (-174,000)	2005 (-99,000)	2005 (0)	2005 (0)	2005 (-146,200)	2005 (-165,000)	2005 (-347,100)	2005 (-350,000)	2005 (-420,000)
4. Capital Expenditure to Total Budget Expenditure (%)	-	-	≥ 25 (25.20)	≥ 25 (25.50)	≥ 25 (26.30)	≥ 25 (24.00)	≥ 25 (24.00)	≥ 25 (22.00)	≥ 25 (12.50)	≥ 25 (16.40)

Source: Adjusted from Sitthiyot (2009).

⁺Note that Thailand fiscal year starts from 1 October and ends on 30 September of the following year.

Nature is the master statistician and probabilist. It follows a certain logic based on layers of redundancies, as a central risk-management approach. Nature builds with extra spare parts (two kidneys), and extra capacity in many, many things (say lungs, neural system, arterial apparatus, etc.), while design by humans tend to be spare and overoptimized, and have the opposite attribute of redundancy—that is, leverage; we have a historical track record of engaging in debt, which is the reverse of redundancy (\$50,000 in extra cash in the bank or, better, under the mattress, is redundancy; owing the bank an equivalent amount is debt).

Now, remarkably, the mechanism called hormesis is a form of redundancy and statistically sophisticated in ways human science (so far) has failed us.

Hormesis is when a bit of a harmful substance, or stressor, in the right dose or with the right intensity, stimulates the organism and makes it better, stronger, healthier, and prepared for a stronger dose the next exposure. That's the reason we go to the gym, engage in intermittent fasting, or caloric deprivation, or overcompensate for challenges by getting tougher. Hormesis lost some scientific respect, interest, and practice after the 1930s, partly because some people mistakenly associated it with the practice of homeopathy. The association was unfairly done, as the mechanisms are extremely different. Homeopathy relies on other principles, such as the one that minute, highly diluted parts of the agents of a disease (so small they can hardly be perceptible, hence cannot cause hormesis) could help medicate against the disease itself. It has shown little empirical backing and belongs today to alternative medicine, while hormesis, as an effect, has shown ample scientific evidence.

Now it turns out that the logics of redundancy and overcompensation are the same—as if nature had a simple, elegant, and uniform style in doing things. If I ingest, say, 15 milligrams of a poisonous substance, my body will get stronger, preparing for 20, or more. Stressing my bones (karate practice or carrying water on my head) will cause them to prepare for greater stress by getting denser and tougher. A system that overcompensates is necessarily in overshooting mode, building extra capacity and strength in anticipation for the possibility of a worse outcome, in response to information about the possibility of a hazard. This is a very sophisticated form of discovering probabilities via stressors. And of course such extra

capacity or strength becomes useful—in itself—as opportunistic as it can be used to some benefit even in the absence of the hazard. Redundancy is an aggressive, not a defensive, approach to life.

Alas, our institutional risk management methods are vastly different. Current practice is to look in the past for the worst-case scenario, called "stress test," and adjust accordingly, never imagining that, just as the past experienced a large deviation that did not have a predecessor, such deviation might be insufficient. For instance, current systems take the worst historical recession, the worst war, the worst historical move in interest rates, the worst point in unemployment, etc., as an anchor for the worst future outcome. Many of us have been frustrated—very frustrated—by the method of stress testing in which people never go beyond what has happened before, and have even had to face the usual expression of naive empiricism ("Do you have evidence?") when suggesting that we need to consider worse.

And, of course, these systems don't do the recursive exercise in their mind to see the obvious—that the worst past event itself did not have a predecessor of equal magnitude, and that someone using the past worst case in Europe before the Great War would have been surprised. I've called it the Lucretius underestimation, after the Latin poetic philosopher who wrote that the fool believes that the tallest mountain there is should be equal to tallest one he has observed. Danny Kahneman has written, using as backup the works of Howard Kunreuther, that "protective actions, whether by individuals or by governments, are usually designed to be adequate to the worst disaster actually experienced....Images of even worse disaster do not come easily to mind."* For instance, in Pharaonic Egypt, scribes tracked the high-water mark of the Nile and used it as a worst-case scenario. No economist had tested the obvious: Do extreme events fall according to the past? Alas, back-testing says: "No, sorry."

The same dangerous recklessness can be seen in the methodology used for the Fukushima nuclear reactor, built to the worst past outcome and not imagining and extrapolating to much worse. Well, nature, unlike risk engineers, prepares for what has not happened before, assuming worse harm is possible.

* Kahneman (2011), p. 137.

Thus far, the effects of continuing budget deficit and rising public debt have yet to yield the adverse outcome which remains to be seen in the future. Nonetheless, the Ministry of Finance should not feel at ease and should take Taleb's advice seriously by running budget surplus and lower public debt as soon as they could in order to make economy more robust to negative shocks. These would take thorough understanding of risk and uncertainty management as well as courage.

5. Conclusions, Policy Implications, and Directions for Future Research

While the ratio of public debt to GDP is considered as one among many economic indicators that could be used to assess current and future states of both developing and developed economies, policy makers and analysts should be aware that definition and composition of public debt do differ across countries. In addition, the information on public debt may not be properly reported due to various possible reasons such as difficulty of data collection, unawareness of relevant authorities to report and/or to collect such data, financial accounting tricks, or political issues. Whatever reasons might be, it would result not only in public's misunderstanding about the true public debt figure but also in giving policy makers (assuming they are benevolent and forward looking!) as well as analysts a wrong perception regarding the fiscal position and the fitness of the economy.

To make the picture of public debt more complete, this study attempts for the first time to compile the list of agencies under state supervision in Thailand and their outstanding debts which, according to the Public Debt Management Act B.E. 2548 (2005), are counted as public debt. It finds that there are eighty-six agencies under state supervision with the total outstanding debts of approximately 3.846 trillion baht at the end of September 2011, accounting for 46.37% of total public debt. This finding suggests that the current public debt figure and public debt to GDP ratio are much lower than they should have been had debts of agencies under state supervision been included, 4.448 trillion baht or 42.27% of GDP in 2011 versus 8.295 trillion baht or 78.83% of GDP.

In addition, by investigating the effects of additional debts of agencies under state supervision on indicators under current fiscal sustainability framework adopted by the Ministry of Finance since 2002, this study finds that additional debts of agencies under state supervision cause public debt to GDP indicator to be violated, in addition to balanced budget within 2005 and capital expenditure to total budget expenditure, leaving only debt service to total budget expenditure that could be maintained within the target. As a result, three out of four indicators under fiscal sustainability framework have been breached for several consecutive years. Thus far, the effects of breaching targets, especially continuing budget deficit and rising public debt, have yet to yield a serious outcome to the Thai economy.

Given the fact that the economy is by and large in self-organized critical state, this study suggests that the government should be prepared for the worse outcome that has yet to happen by considering adopting the concept of redundancy as stated in Taleb (2013) instead of running budget deficit and continuing to increase its leverage. This could be done through increasing the economy's immune system by trying to balance budget or even better running budget surplus and lowering level of public debt. This is simply because negative *Black Swan* could come from various sources and it is very difficult or almost impossible to predict in advance. Therefore, it is more prudent for policy makers to be prepared rather than mitigating the effects after catastrophe occurs. These suggestions could be used as a caveat for policy makers (again assuming they are benevolent and forward looking!) in both developing and developed countries currently issuing and/or planning to issue public debt in the future. It should be noted that this is not an easy task and requires policy makers' thorough knowledge of risk and uncertainty management as well as courage. After all, a country should not live beyond her means.

While this study have improved knowledge about public debt and fiscal sustainability in Thailand, it has some limitations in a sense that it accounts for approximately 85% of agencies under state supervision since there are about 15% of them whose outstanding debts are not available. Future research may consider updating this missing information and

incorporating it in the analysis. In addition, this study simply analyzes whether or not including additional debt of agencies understate supervision violates any fiscal sustainability indicators. Future research could extend this analysis further by applying concept of self-organized criticality to examine potential effects of such a violation on the fiscal position and/or the economy. Finally, it would be of interest to explore through political and behavioral economic lens as to why breaching fiscal sustainability targets for many consecutive years does not cause any reputational damages on government. All of these are suggestions for future research.

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