# If There is a Space, Just Use It

## –International Comparison of Taiwan's Fiscal Space

University of Colorado, Boulder
Frank S.T. Hsiao*

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* Frank S.T. Hsiao is Professor Emeritus of Economics, University of Colorado, Boulder, Colorado, USA. The author has benefited from discussions with the Economic Study Group of the North America Taiwanese Professor's Association, and also from Professors Peter Chow and Henry Wan, Jr. As usual, all errors of omissions and commissions are the author's. His recent publications include《Economic Development of Taiwan–Early Experiences and the Pacific Trade Triangle》(with Mei-Chu Wang Hsiao), World Scientific, 2015.

## Summary of the paper

**International comparison of government budgets.** According to the CIA World Factbook, Taiwan's government budget deficit in 2015 was 1.0% of its GDP. The world average and median budget balances of 219 countries and economies, including both surplus and deficit countries, were -3.9% and-2.9%, respectively. If we consider only the 186 deficit countries, the average and median deficits were -5.3% and -3.4, respectively. Taiwan's current budget deficit is also historically low. Thus, in terms of government budget, Taiwan has some fiscal space to expand.

**International comparison of government debt.** According to the CIA World Factbook, Taiwan's government debt in 2015 was 32.8% of its GDP. The world median and average debts of 178 countries in 2015 were estimated 47.2% and 54%, respectively. Thus, in terms of government debts, Taiwan also has some fiscal space to expand.

**Fiscal space estimated by Moody's.** Taiwan's fiscal space in May 2014 was estimated as to be 209.5%, while its actual government debt was 32.8%. Hence, Taiwan has ample space to expand its government debt, as much as up to 50% without jeopardizing its credit position, that is, Taiwan can still remain in the "safe" category in Moody's ratings.

**The average credit ratings** of three major credit rating companies on the Taiwanese government in 2016 is 4.3, ranked #25 among the 140 countries, and is in the "upper median grade" category. It appears that the financial position of the Taiwanese government is in a good standing and should be able to take a more proactive fiscal policy to pump up the economy, as the new government is facing an unprecedented economic recession.

**If there is a space, just use it.** Our study above indicates that Taiwan still has ample fiscal space to spare. As such, it appears that it is not wise to adopt the balanced budget strategy at this time when Taiwan is facing an unprecedented economic recession caused by reduced private investment and decreasing foreign exports.

While we advocate effective and productive uses of the fiscal space, in view of international isolation of Taiwan from world financial institutions, we also see the merit of "**fiscal conservatism.**" Some of the current urgent economic and social programs to improve the standard of living and to build future economic growth potentials are explored briefly at the end of the paper.

# Part I. International Comparisons of Taiwan's Government Deficit and Public Debt

## 1. Introduction

According to the recent report by a World Bank group (Didier, 2015), the growth of 24 emerging markets (EM) economies have been slowing down since 2010, as their investments and exports declined sharply, while the advanced economies have been recovering slowly but steadily since 2012. Curiously, in their study, South Korea is included in the EM study. Thus, Taiwan, despite its advanced country status (Hsiao, 2016), may as well be included in the EM economies.

As the advanced countries are expected to tightening their financial conditions, financial costs are expected to increase, and capital flow to emerging countries may slow down further. Thus, the fiscal policy, instead of monetary policy, becomes an important government policy tool in emerging markets. The availability and efficiency of fiscal policy in turn depend on the size of the fiscal space. We define fiscal space as the difference between the actual size of fiscal instruments (government deficit, public debt, and government credibility) and the upper limit or threshold of these fiscal instruments that a government can incur (deficits and debts) without destabilizing the economy, or going to bankruptcy (default). The idea is based on the notion that, like individual, a government cannot incur debt indefinitely to cater to its public spending. How much debt or deficit is too much? To answer this question, the concept of fiscal space has become popular since the early 2000s.

Due to the recent crises in Greece and some highly indebted countries like Italy, Japan, and Cyprus, the concept of fiscal space has gained more and more attention among business people, economists, and politicians. The problem is how to measure the fiscal space. Many definitions are given, and so far as we know, they are too abstract or too complicated to be applied to practical policy formation.

The problem is basically empirical. In this paper we compare the ratios of the government deficit to GDP (Section 2), of the public debt to GDP (Section 3), and of countries and regions of the world. We then define the fiscal space of a country narrowly as the difference between the country's ratios and the average or the median of the world ratios. We also give some practical interpretation of the fiscal space of the 30 countries calculated by Moody's (Section 4). Similarly, we evaluate the upper limit of government credibility numerically by using its median or average of the world (Section 5). Lastly, we explore some uses of the fiscal space recommended by the World Bank (Section 6).

## 2. International Comparison of Government Budget

In addition to national debt, when we discuss the fiscal policy we also have to know the solvability of the government budget, espciatlly its relation to GDP. Like personal finance, idealy the government budget should be balanced every year. However, this is almost impossible as the economy is exposed to a cyclical trend of the world economy. During the depression, the government budget tends to become a deficit, as the tax revenue decreases and unemployment expenditure increases. During the prosperity, the government budget tends to a surplus as the tax revenue increases and the unemplyment rate decreases. Thus, the Keyensian macroeconomic theory suggests that the budgets be balanced over the business cycle, rather than every year. The new growth theory even allows the budget deficits over time for the purpose of building future economic growth.

Figure 1 shows the government budget situation as the ratio of GDP (hereafter we call it the net budget GDP ratio or simply ratio) in 219 countries/regions[1] (hereafter we simply call them countries) taken from CIA World Factbook (2016a, also See Appendix A of this paper). According to the Factbook, "budget surplus or deficit records the difference between national government revenues and expenditures, expressed as a percent of GDP. A positive (+) number indicates that revenues exceeded expenditures (a budget surplus), while a negative (–) number indicates the reverse (a budget deficit)."

Among the CIA data,  the estimates of 182 countries are for 2015, and the estimates of other 37 countries have different years, ranging from 2005 to 2016. Since the data do not change in a short period, and since we are interested in finding Taiwan's position in the world, we include the data for all 219 countries.

Figure 1 draws the scatter diagram of the distribution of the net budge GDP ratios when the countries are arranged in the decreasing order of the ratios. It shows that the ratios are concentrated around the zero axis, ranging from -20% to 20%. However, there are outliers in both ends. They are Tuvalu (#1, 30.1%), Macau (#2, 14.9%) at the positive end, and on Venezuela (#219, -109.9%), Libya (#210. -49.3%), Timor-Leste (#217, -42.5), Afghanistan (#216, -23.7%), and Saudi Arabia (#215, -18.3%) at the negative end.

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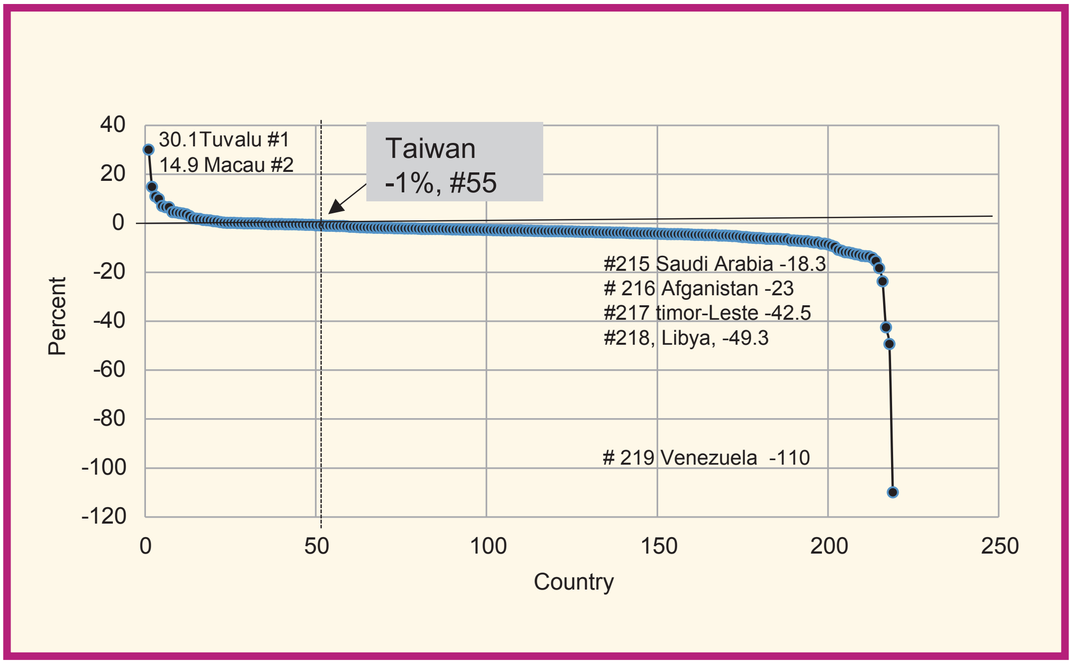
[1] We excluded the European Union (-0.3%) from the dataset to obtain 219 countries/regions.

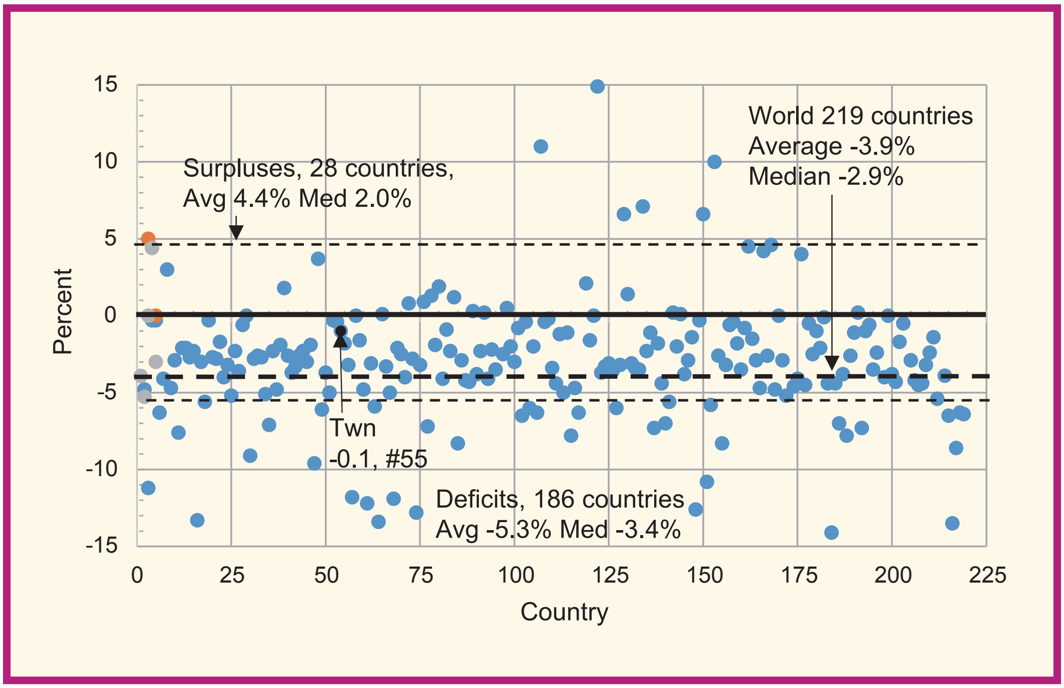



Sources: World Factbook (2016a). Figure drawn by the author

**Figure 1. Fiscal Surplus and Deficit as Percentage of GDP**

**219 Countries/Regions, 2015**

Figure 2 shows the scatter diagram of the ratios ranging from -15% to 15%, excluding the outliers. The pattern of the chart shows clearly that fewer countries have a surplus budget, much fewer countries have a balanced budget, and the majority of the countries have a deficit budget. Thus, a balanced budget is an exception rather than the rule. In fact, the enclosed box of Figure 3 shows that the world average ratio is -3.9% and the median is -2.9%. As shown in Table A1 in Appendix A, only five countries out of 219 countries (2.3% of 219) achieved a balanced budget in 2015. Similarly, only 28 countries (12.8%) had budget surpluses with an average surplus of 4.4% of GDP, and the median of 2%, ranging from 0.1% to 30.1%. The other 186 countries (85% of 219) had a deficit in 2015, with an average of -5.3% and median of -3.4% of GDP, ranging from -1% to -109.9%.




Sources: World Factbook (2016a). Figure drawn by the author

**Figure 2. Budget Surplus and Deficit as Percentage of GDP**

**2015 Estimate, 219 Countries/Regions**

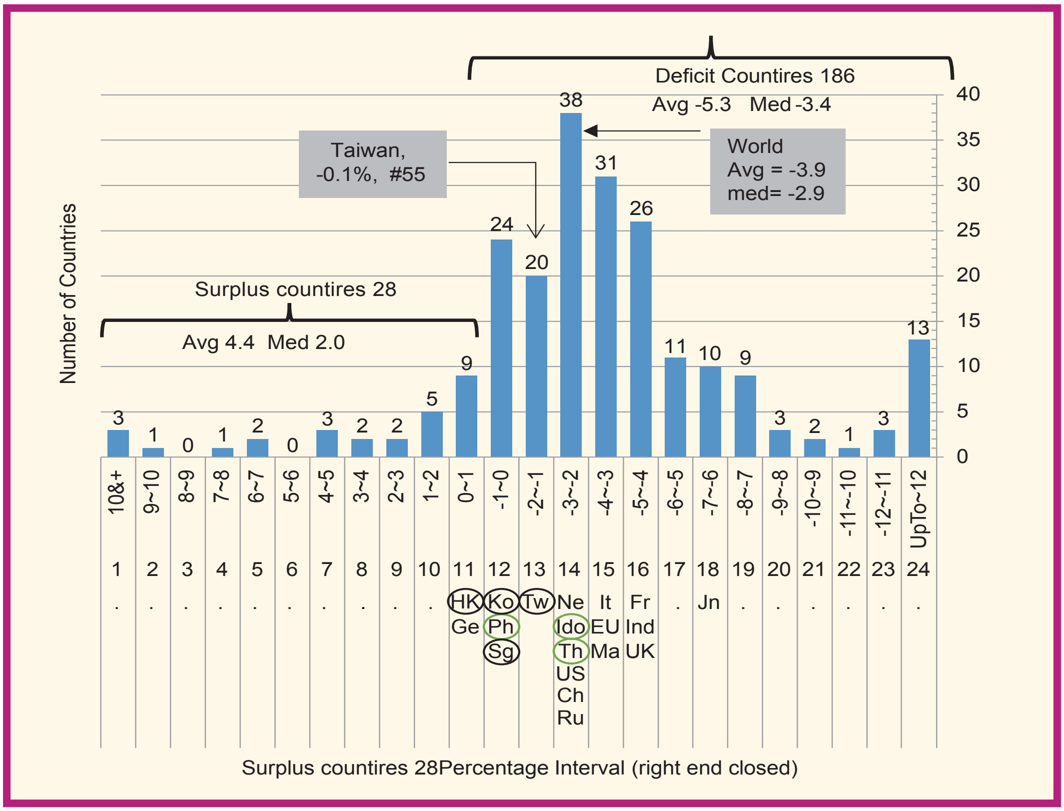
Figure 3 summarizes the scatter diagram in a frequency distribution of the ratios of all countries in the world. The interval is taken with the range of 10% and the number below the axis shows the interval which is closed on the right (that is, in the interval (-2 ~ -1], where -1 is included in the interval, but -2 is not). As shown above, the world median is -2.9% (shared by Armenia and UAE). Taiwan (circled along the horizontal axis) had a 1.0% budget deficit (that is –1.0%) in Interval #13, ranked at 55$^{th}$ if the data are arranged from largest (surplus) to smallest (deficit) as shown along the horizontal axis. There are 20 countries inside the interval of –2% to –1%, and Taiwan had the smallest deficit among them.

Figure 3 also shows the ratios of three other Asian Newly Industrializing Economies (NIEs), South Korea (-0.2%), Singapore (-0.5%), and Hong Kong (0.3%). All three have better fiscal position than that of Taiwan. However, with the exception of Germany, 0.9%, Taiwan has a better fiscal position than the highly developed European countries: the Netherlands (-2.0%), Italy (-3.0%), France (-4%), the United Kingdom (-4.6%), and the EU (-3.0%).

Taiwan also has a better fiscal position than other ASEAN-4: Indonesia (-2.2%), Thailand (-2.4%), and Malaysia (-3.6), except for Philippines (-0.4%). Taiwan also has better fiscal position than some other larger countries in Asia, the United States (-2.4%), China (-2.6%), India (-4.1%), and Japan (-6.5%).

In addition to the comparison of Taiwan's current government budget among other governments in the world, we may also examine the time series of Taiwan's government budget. Figure B1 of Appendix B shows Taiwan's government net budget from 1992 to 2013 taken from NDC (2015, 32-33). During the past 21 years, only one year, 1998, had a surplus of about 1.0%. All other years had a deficit of about 0.2% to about 6%, and the ratios varied greatly over the years. In 2013 or 2014, it had a deficit of about 1.5%. Thus, Taiwan's current deficit of 1% as shown by the World Factbook can be considered to be historically low.

In conclusion, the current government budget situation of Taiwan is in general much better than its "neighboring countries." Thus, at this time of severe economic recession and uncertainty, it appears there is a room to adopt a stronger fiscal policy to stimulate the economy. How much could the Taiwanese government increase its budget deficit? Since the world average is -3.9 and the world median is -2.9%, and since other advanced developed countries have higher debt ratios, the Taiwanese government may consider increasing the deficit from -1% to -2% of its current GDP (from Interval #13 to Interval #14), provided that the budget is spent on rebuilding the sagging industries and services for future sustainable growth.




Sources: World Factbook (2016a). Figure drawn by the author.

**Figure 3. Budget Surplus and Deficit as Percentage of GDP**

**219 Countries/Regions, CIA 2015 Estimate**

## 3. International Comparison of Taiwan's public Debt

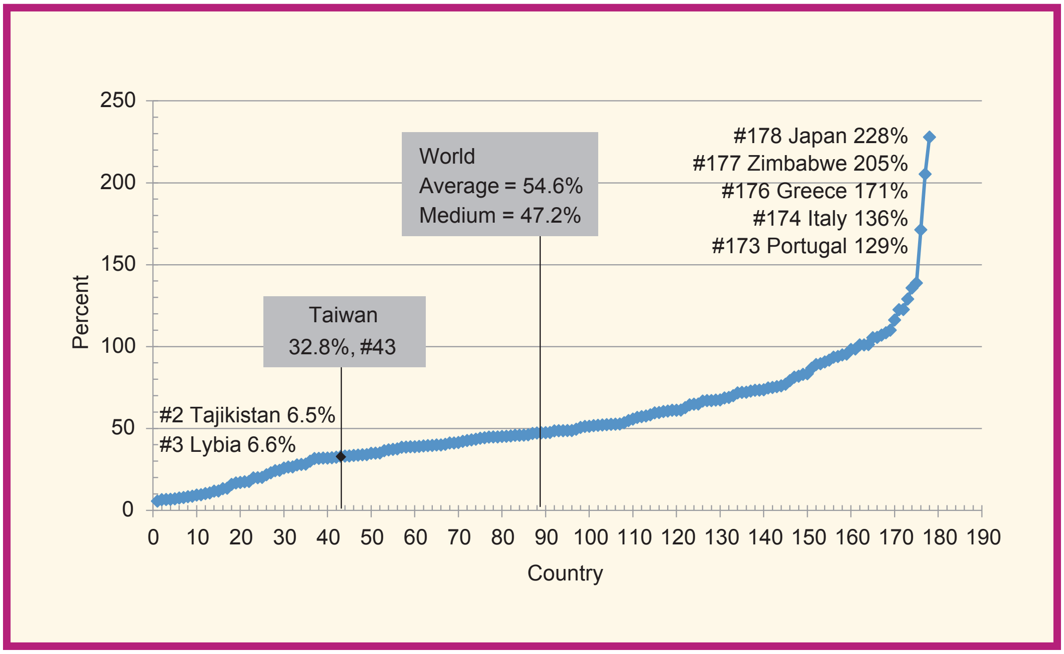
Another method of financing government expenditure is public debt. Figure 4 shows the scatter diagram of the percentage of public debt to the country GDP measured in the national currency of 178 countries in the world, arranged according to the increasing public debt ratios. The dataset was downloaded from the CIA World Factbook (2016).

According to the CIA explanation at the website, "Public debt compares the cumulative total of all government borrowings less repayments that are denominated in a country's home currency. Public debt should not be confused with external debt." Most of the countries have estimated values for 2015, only

25 countries show the estimated values between 2008 and 2014. Since the public debt situation generally does not change in a short period, and we are only interested in comparing Taiwan's public debt position with the world, we put them together with the others, arranging the public debt ratios in decreasing order.

From Figure 4, we see that the size of the debts is scattered between 0% and 150%, mostly from zero to 100 percent. A few countries exceeded 100% of their nominal GDP, with five outliers: Portugal (129%, ranked #173), Italy (136%, #174), Greece (171.3%, ranked #176), Zimbabwe (205. 3%, #177), and the highest one, Japan (227.9%, #178). The world median is 47.2% (shared by the Republic of Congo #89 and Honduras, #90), and the world average is 54.6% (Malaysia, #108).

Taiwan's debt to GDP ratio is 32.8%, ranked at #43 out of 178 countries, which is much lower than both world median and average as shown in Figure 4.




Sources: World Factbook (2016b). Figure drawn by the author.

**Figure 4 Public Debt as Percentage of Nominal GDP**

**178 Countries, 2015 estimate**

Similar to Figure 3, Figure 5 shows the world distribution of public debt ratios. The ratios are divided into 15 equal intervals except interval 15, which shows the ratios that are greater than 140%. There are only 3 countries in interval 15, which we have shown as the outliers from Figure 4. The lower part of Figure 5 shows some countries of interest in each interval. The dotted line is the cumulative frequency distribution of the countries measured from the right hand axis.

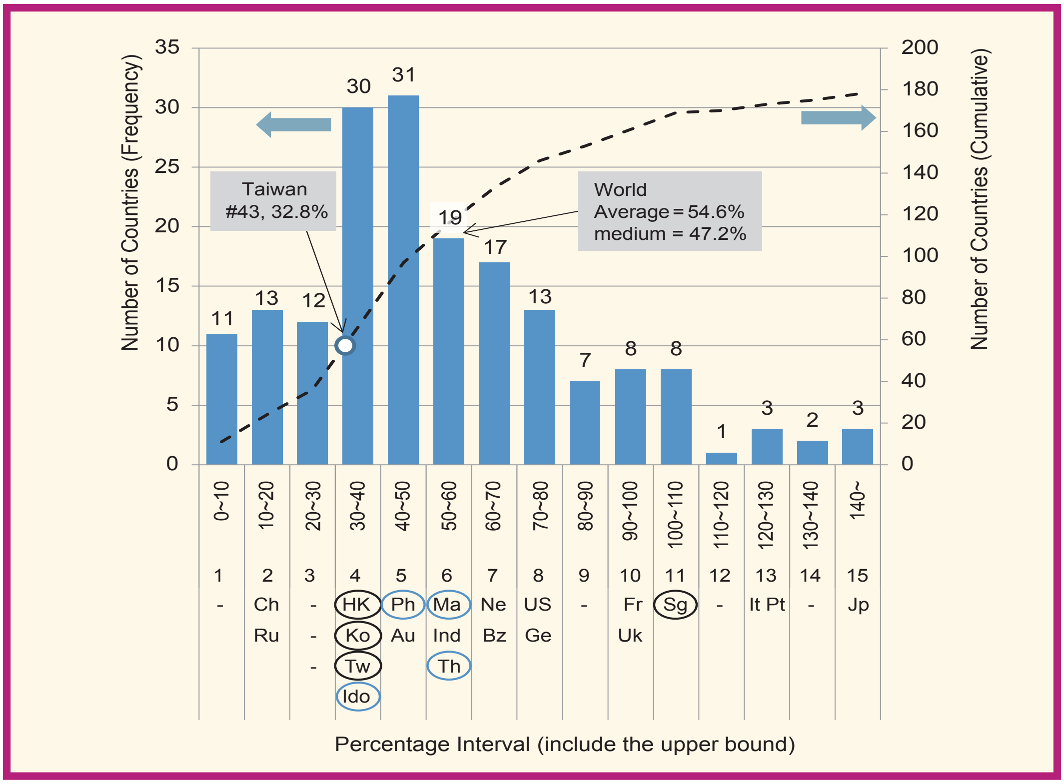
Taiwan's ratio, 32.8% (ranked at #43), is located at lower part of interval 4, which contains 30 countries, including Indonesia (Ido, 27.7%, #33), Korea (Ko, 34.9%, #51), and Hong Kong (HK, 39.5%, #63). Thus, Taiwan's debt ratio is more or less on a par with these three economies. Note that Singapore has 105.6% public debt (ranked #166), three times higher than that of Taiwan.

Among other countries, Russia (Ru, 13.5%, #17) and China (Ch, 16.7%, #19) have lower ratios than that of Taiwan. However, Taiwan's ratio is much lower than that of other three ASEAN-4: Philippines (Ph, 44.8 %, #78), Thailand (Th, 50.6%, #98), and Malaysia (Ma, 53.5%, #108). It is certainly lower than India (Ind, 51.7%, #101) and Brazil (Bz, 67.3, #129). All the major advanced countries have public debt ratios more than twice as large as that of Taiwan: Netherlands (Ne, 68.9%, #132), Germany (Ge, 71.7%, #134), USA (US, 73.6%, #140), the United Kingdom (UK, 90.6%, #154), France (Fr, 98.2%, #169), Portugal (Pt, 129%, #173), Italy (It, 136%, #174). The public debt of Portugal and Italy exceeded their GDPs, and they have some of the highest debt ratios in the world.

In addition to the comparison of Taiwan's current government debt among other governments in the world, we may also examine the time series of Taiwan's government debt. Figure B2 of Appendix B shows Taiwan's government debt from 1999 to 2014 taken from NDC (2015, 32-33). During the past 15 years, the debt have been increasing. It accelerated from 1999 to 2001 and decelerated from 2002 to 2014. In 2014, the debt was about 33%, almost the same as the CIA

World Factbook estimate of 32.8% (see Figure 5). Thus, Taiwan's current debt of 32.8% can be considered to be stable for the past five years.

In general, compared with most of other comparable countries, Taiwan's public debt ratio appears to be low, and there is certainly some room for expansion for the new government to take, namely, more proactive fiscal policy to pump up the economy. How much can the government increase its public debt? Considering that the world average is 54.6% and the world median is 47.2%, and most of Taiwan's "peer" countries have higher ratios, it appears that Taiwan's debt can be increased conservatively from the current 32.8% to about 50% without much difficulty, provided that the additional public debt is used to build long term economic and social infrastructures.




Sources: World Factbook (2016b). Figure drawn by the author

**Figure 5 Public Debt as Percentage of GDP**

**178 Countries, 2015 estimate**

# Part II. International Comparisons of Taiwan's Fiscal Space and Government Credibility

## 1. Fiscal Space –How much space does Taiwan have?

Figure 6 reproduces Moody's Estimate of Fiscal Space for May 2014. According to Moody's Analytics (2016), they "calculate fiscal space and related concepts using econometric techniques to identify how nations' fiscal policies have responded historically to increases in their public debt.[2] Each month our researchers update fiscal space estimates based on Moody's Analytics' monthly forecasts of real GDP, inflation and long-term market interest rates. The full set of fiscal space estimates accounts for 30 advanced economies and contains nearly 50 variables." The formula of calculation is not public. Since the calculation is based on the debt-to-GDP ratio, their fiscal space is presumably also expressed in percentage points (ppts).

Other thing being equal, Taiwan's real GDP, inflation, and long-term market interest rates are relatively stable, thus, we may use the fiscal space estimated by Moody's for our explanation of the availability of fiscal policy. In Figure 6, the solid filled green bars, except that of Taiwan, show the Moody's estimated fiscal space. For each country in Figure 6, we added the estimated public debt ratio taken from Figure 5. The public debt ratios are shown as the light brown bars. According to Moody's classification, if a country has a fiscal space greater than 124%, it is in the "safe" category. From 124% to 70%, it is in "caution". For 69% to 41%, the country is at "Significant Risk," and for 40% to 0%, it is at "Risk." Note that, as expected, the fiscal space shrinks as the debt ratio increases.

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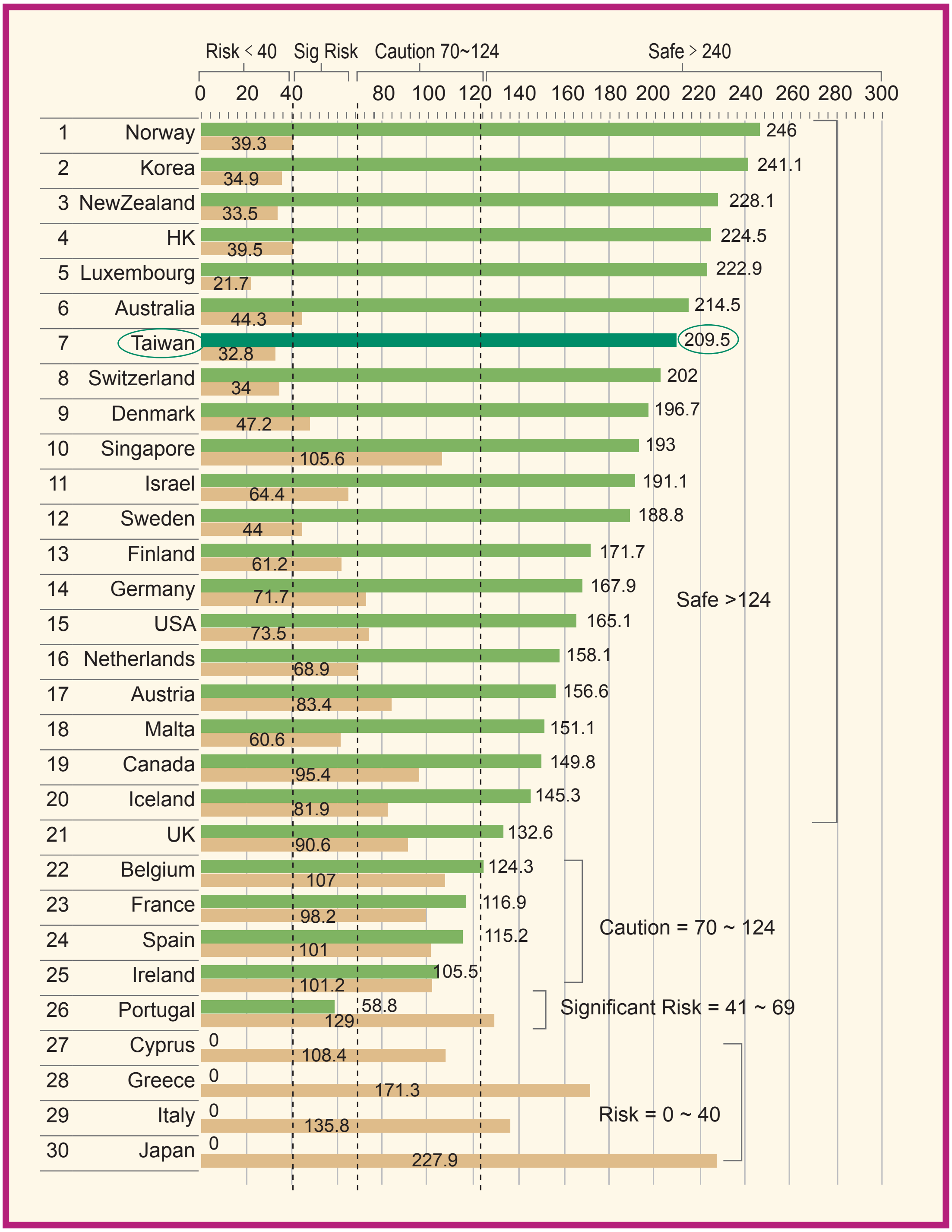
[2] Generally speaking, as stated in the Introduction, a fiscal space should include both the government deficit or surplus and the government debt. From this description, it appears that Moody's definition of fiscal space only includes public debt. Thus, we only consider the public debt in this section.




Sources: Moody's Analytics (2016). Redrawn by the author.

**Figure 6 Fiscal Ratios (FR) and Moody's Estimates of Fiscal Space (FS)**

**Selected Countries (FR 2015; FS May 2014)**

Most of the countries (21 out of 30) are in the "Safe" category; their fiscal space is larger than the actual debt ratio. However, four countries—Belgium, France, Spain and Ireland—are in the "Caution" category, as their fiscal space is only slightly higher than their actual debt ratio. One in the Significant Risk category, as its actual debt ratio is much larger than its estimated fiscal space. Lastly, four countries–Cyprus, Greece, Italy, and Japan—are at Risk, with a zero fiscal space and a huge debt ratio.

Taiwan's fiscal space bar is specifically filled with dark green and its title and number circled. It shows that Taiwan's fiscal space had 209.5% in May 2014,[3] whereas its estimated public debt ratio (in 2015) was 32.8%. If the data are more or less stable, there is an extra fiscal space of 179.7% for Taiwan in 2014-2015. However, noting that the four countries in the Caution category have debt ratios of about 100%, we may conjecture that Taiwan can at least expand its actual ratio cautiously from 32% to about three times more and up to 100%. Combined with our recommendation from the previous section, it appears that Taiwan can safely expand its debt conservatively up to 50% without incurring much risk.

## 2. Government Credit Ratings

Like personal credit ratings, there are several firms publishing sovereign credit ratings of countries. The three largest ones are Moody's, S&P, and Fitch. Expansion (2016) has a website summarizing the ratings of these three firms. Since each firm has a different alphabetic rating system, for convenience, we have translated the ratings into numerical numbers as shown in Appendix C (the shaded cells show our estimates).

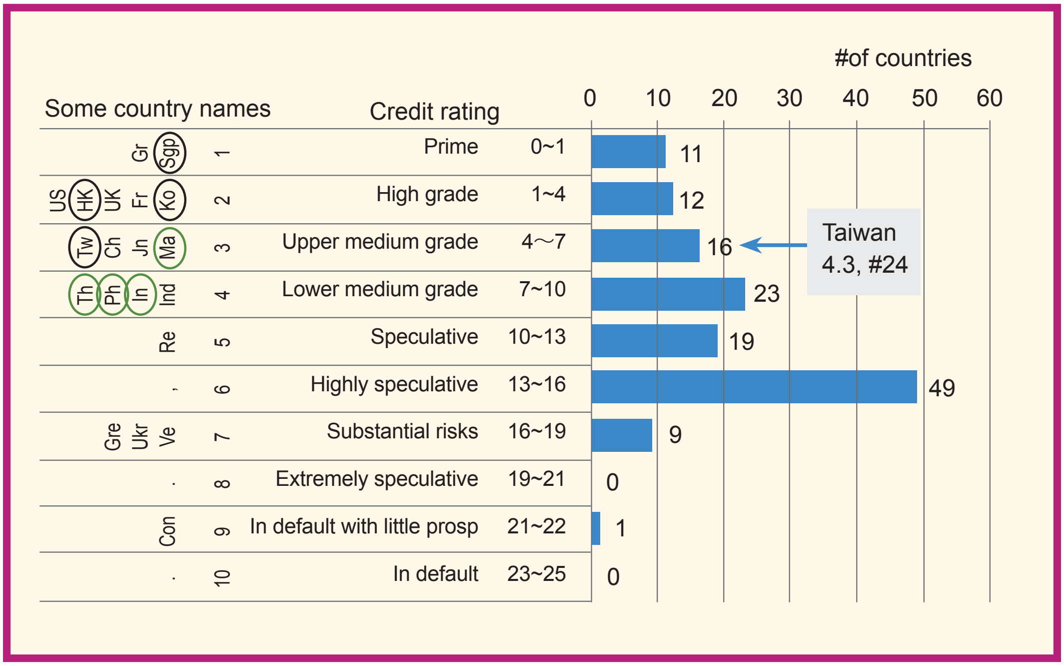
The Expansion table lists 141 countries, but one country (Grenada) was not

[3] Moody's latest dataset is not available to the author.

rated by all three companies. Thus, there are 140 countries rated by at least one firm, but most of them were rated by all three firms. The ratings are arranged as an ordered set (Moody's, S&P, Fitch). We then take the average of three ratings for each country. If one or two ratings are missing, we take the average of two or one ratings. For example, in the case of Taiwan, the ratings are (Aa3, AA-, A+) = (4, 4, 5). Using the conversion table in Appendix C, the average is 4.3. In case of Botswana, the ratings are (A2, A-, NR) = (6, 7, NR), where Fitch's rating is not reported (NR). Thus we take the first two numbers and obtain their average, which is 6.5 (this means that the best estimate of NR is 6.5). In the case of Vietnam, we have (NR, NR, BB-) = (NR, NR, 13). Thus, its average is 13 (this means that we assign 13 to both NRs). Using these estimations, Figure 7 compiles the frequency distribution of the 140 average ratings of the three credit rating companies.

We also rank the averages in ascending order from 1 to 140. If several countries have the same average, we give the same rank at its first occurrence. Figure 7 shows that Germany (1.0, #1) and Singapore (1.0, #1) and nine other countries are in class 1, rated as prime. Class 2 includes USA (1.3, #12), Hong Kong (1,7, #13), the United Kingdom (2.7, #17), France (3.0, #18), South Korea (3.7, #23) and seven other countries. They are rated as High Grade. China (4.3, #24), Taiwan (4.3, #24), Japan (5.3, #29) and Malaysia (7.0, #35) and 12 other countries are rated as the Upper Medium Grade, etc. Class 7 has 9 countries, including Greece, Ukraine and Venezuela (all three are at 17.7, #133). Class 9 has only one country, the Republic of Congo, (22.0, #140), rated as "In default with little prospect of recovery."

As shown in Figure 7, Taiwan is at the upper end of class 3 due to Fitch's grade of 5 (otherwise, Taiwan can be in class 2, the same as Hong Kong and Korea), slightly lower than the other three Asian NIEs, but higher than all the ASEAN-4. While the sovereign credit rating is mainly used for the reference of external debt borrowing, the relatively high ranking of Taiwan's sovereign rating is an important indicator of the government's good standing and credibility. Taiwan's high credit ranking undoubtedly enhance its fiscal space.




Sources: Expansion (2016). Figure drawn by the author. Also see Appendix C1.

**Figure 7 Sovereign Credit Rating**

**Average of Moody's, S&P, and Fitch, 140 Countries**

## 3. If there is a space, just use it!

In Sections 2, 3, and 4, we have shown that Taiwan has some fiscal space for expanding either its government deficit or public debt or both,[4] and Section 5 shows that Taiwan's government credit rating is at a good standing. In view of

[4] Note that, we are talking about "if there is a space, then use is." This is different from "make a space, and use it." To make a space, government should reduce expenditure, increase efficiency, increase tax, reduce government debt or increase government surplus, and reduce public debt. Generally speaking, the space expands during the economic upturn and shrinks during the economic downturn.

current dismal economic situation facing the new government of Tsai Ing-wen (see Hsiao, 2016), it appears that the government policy of balanced budget and reducing the government debt may not be the best policy the new government can take.

While we have pointed out that Taiwan still have fiscal space for increase (conservatively) in government deficit and public debt, the government should have sound, careful, and productive economic and social planning for effective enhancement of social welfare and economic growth (IMF, 2016). No waste or corruption should be allowed. The government should always be aware of the fact that, Taiwan is isolated from most of the international organizations like the IMF, the World Bank, or other international institutes. As pointed out by S. C. Tsiang and Henry Wan, Jr. in the 1980s, if Taiwan experiences financial crisis, no international institutes will come to bail Taiwan out, and the "sudden stop" of foreign capital inflow cannot be ruled out. Thus the size of usable Taiwan's fiscal space should take this fact into consideration.

How to use the limited extra fiscal space? According to Taiwan's National Development Council (NDC, 2015), the future planning of the Taiwan government is "To boost economic vitality and to adjust economic structure, the government is currently focusing on three aspects of policies: upgrading industries, expanding exports, and promoting investments." No specific policy measures are given.

For the emerging economies, the World Bank (Didier, et al. 2015, 32) suggests infrastructure investment like water and sanitation, power facility, communication network, and railroad infrastructure.

However, these are almost completed since the days of the Japanese period and updated after the WWII. What Taiwan needs today are social welfare program reform, reconstructing and streamlining retirement program, urban renewal and planning, low cost housing project for youth, public nursery facilities for working women, and nursing homes for elders, natural and manmade disaster preparations, environmental protection, rural reconstruction and protection against agricultural imports, in addition to government funds to promote high-tech and biomedical industries, strengthening the defense industry, energy saving and gas emission controls, etc.

Admittedly, the needs of all these programs have been recognized by the new government. Nevertheless, the programs need strong public financial backing and supports. We believe these programs are good uses of the fiscal space. They are essential to stabilize and revitalize the current economy and society, and vital to raise the standard of living and economic performance for future economic growth of Taiwan.

## Appendix A Comparison of Original and Revised CIA 2015 Government Budget Estimates

The dataset of Figures 1 to 3 are taken from CIA World Factbook in August, 2016. When we started preparing for the final draft of this paper in November 2016, we found that the CIA data have been changed without any notes or explanations. We also noticed that almost all of the estimation dates are the same as the July dataset, except for five countries, which have different estimation dates. Among the 219 countries, the data of 100 countries have increased, 83 decreased, and 36 have no change.

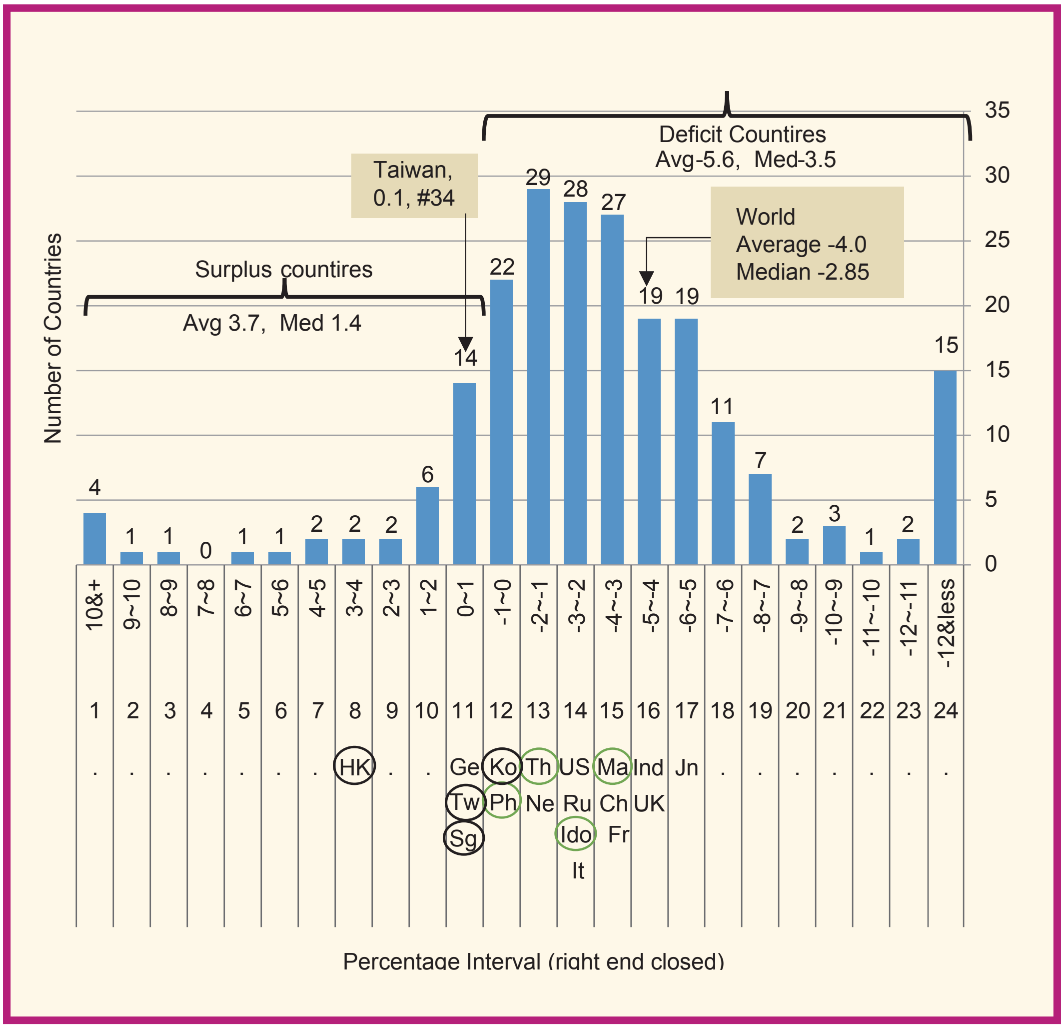
Table A1 shows that the average of the revised data [5] has decreased slightly from -3.92 to -4.03, and the median are the same. Note that about 80 percent to 85 percent of the countries in the world had budget deficits, and only 2 percent to 3 percent balanced the government budgets.

[5] In the revised data, a peculiar exception is Anguilla, it has increased from old -4.1% to revised 5025.4%. Thus, we excluded Anguilla from the calculation of average but included it in the calculation of median.

In the revised November dataset, Taiwan's budget deficit of -1.0 percent estimated in July 2015 was revised to +0.1 percent in November 2015. Therefore, the theme of this paper that Taiwan has the fiscal space to spare does not change, rather, the new revised dataset has reinforced our argument. Thus, we continue to use the July dataset in the text.

Table A1 also present the average and the median budgets of 35 OECD and 28 EU countries. Note that the proportion of budget deficits countries in each group is almost the same as the world proportion, but the average and the median of budget deficits as well as the budget surplus are much less than those of the world. This indicates that the rest of the world is generally less prudent with regard to budget deficit than the OECD and the EU countries.

Figure A1 reproduces Figure 3 using the revised data. The frequency distributions appear to be similar, and the group of countries we are interested are also clustered between 1 percent to -4 percent. Taiwan's fiscal position improved from Interval 13 in the old data to Interval 11 in the revised data. Its position is the same as German's, second (only next to Hong Kong) among all the countries of our interest listed in the lower part of the figure. This reinforces our contention that Taiwan has an ample fiscal space to use.




Source: World Factbook (2016a). Figure drawn by the author. Also see Appendix A.

**Figure A1 Budget Surplus or Deficit as Percentage of GDP**

**219 Countries/regions, CIA November 2015 revised estimate**

**Table A1　Budget Surplus or Deficit as Percentage of GDP**

**Two versions of CIA 2015, original and revised estimate**

Unit: Number and %

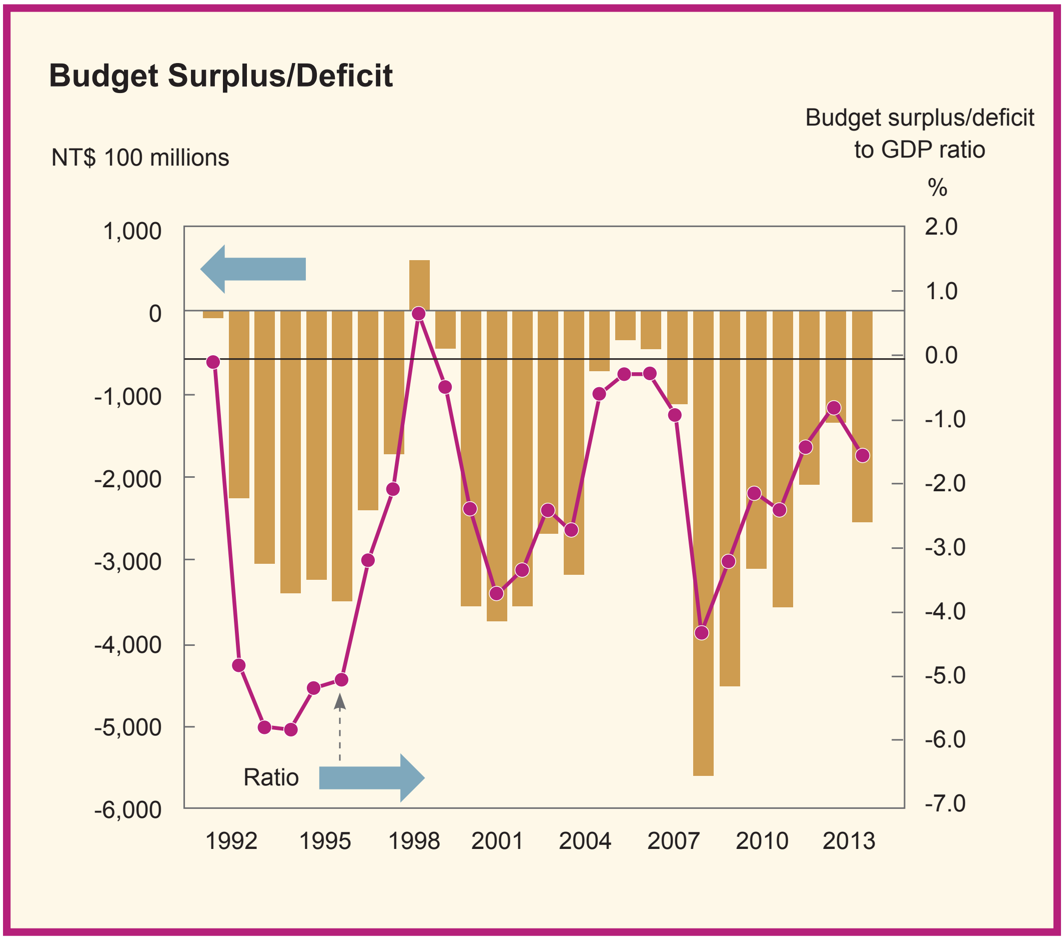
| | July 2016 (original) | | | | | November 2016 (revised) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | total | | Neg | Zero | Pos | total | | Neg | Zero | Pos |
| **The world** | | | | | | | | | | |
| No. | 219 | a | 186 | 5 | 28 | 219 | a | 179 | 6 | 34 |
| % | *100.0* | | *84.9* | *2.3* | *12.8* | *100.0* | | *81.7* | *2.7* | *15.5* |
| average% | -3.92 | | -5.27 | 0 | 4.4 | -4.03 | b | -5.59 | 0 | 3.73 |
| median% | -2.90 | | -3.40 | 0 | 2.00 | -2.85 | c | -3.50 | 0 | 1.40 |
| **OECD countries** | | | | | | | | | | |
| No. | 35 | | 28 | 1 | 6 | 35 | | 27 | 2 | 6 |
| % | *100.0* | | *80.0* | *2.9* | *17.1* | *100.0* | | *77.1* | *5.7* | *17.1* |
| average% | -1.81 | | -2.55 | 0 | 3.73 | -1.67 | | -2.51 | 0 | 1.47 |
| median% | -2.00 | | -2.35 | 0 | 1.40 | -2.00 | | -2.40 | 0 | 0.55 |
| **EU countries** | | | | | | | | | | |
| No. | 28 | | 23 | 1 | 4 | 28 | | 24 | 1 | 3 |
| % | *100.0* | | *82.1* | *3.6* | *14.3* | *100.0* | | *85.7* | *3.6* | *10.7* |
| average% | -1.77 | | -2.49 | 0 | 1.95 | -1.82 | | -2.23 | 0 | 0.8 |
| median% | -1.95 | | -2.30 | 0 | 0.55 | -1.85 | | -2.00 | 0 | 0.70 |

Notes: a. Does not include EU. For revised Nov. 2016 data, b. the "Average" does not include Anguilla. c. the "Median" includes Anguilla.

Sources: World Factbook (2016a). Table compiled by the author.

## Appendix B　Historical data on Taiwan's Government Deficit and Public Debt

Figure B1 shows the time series from 1992 to 2013 on Taiwan's government deficit or surplus in NT$ millions (the columns) and their GDP ratios (the solid line) in percentage. The ratio ranges from almost -6 to +0.8%, but +0.8 was achieved only once in around 1998. While the budget deficit ratio has been decreasing since around 2007 from about -4.5% to recent -1.5% (2013), the revised estimate of +0.1 surplus by World Factbook (2015) appears to be an exception.




Notes: Net budget revenue excludes revenue from government bond issuance and borrowing, and surplus form previous fiscal years; net budget expenditure excludes debt principal repayments. For other details see NDC (2015), 32-33.

Source: Figure taken from NDC (2015), pp. 32-33.

**Figure B1 Taiwan's Government Budget Deficit to GDP Ratio 1992-2013**

Figure B2 shows the time series from 1999 to 2014 on Taiwan's government Debt in NT$ billions (the columns), and its GDP ratio (the solid line). While the debt ratio increased greatly from about 10% in year 2000 to almost 30% in 2001, it has been increasing slowly since 2012 to less than 35% in recent years.

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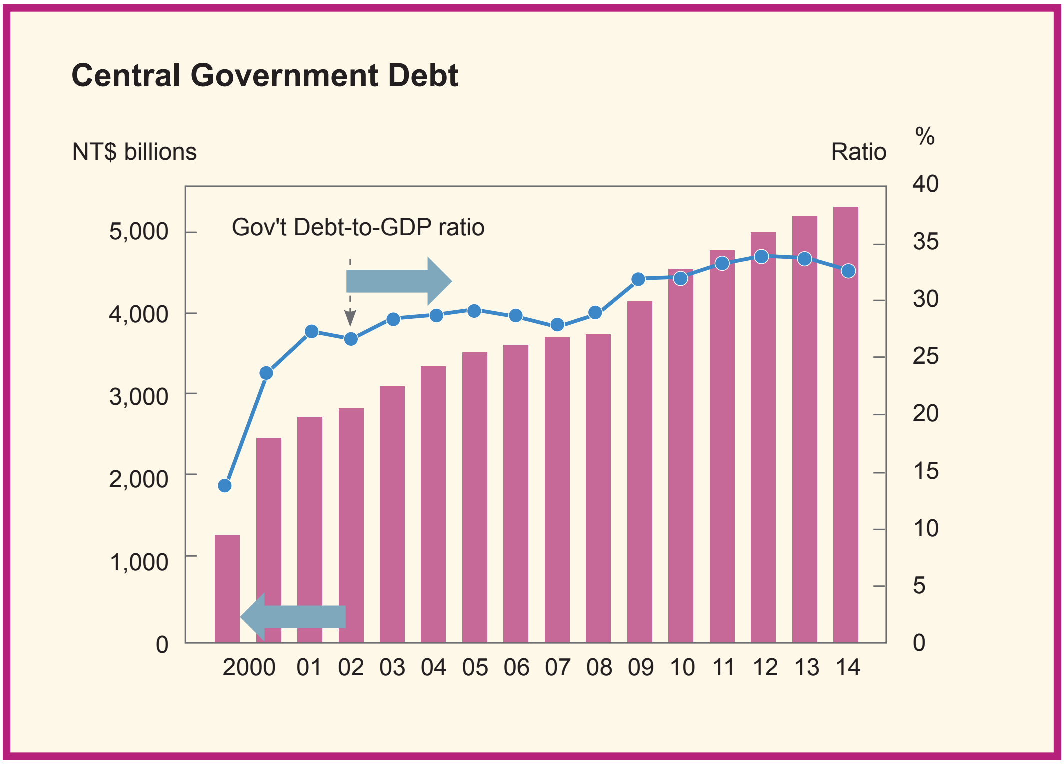


Notes: Outstanding debt excludes foreign debt. For other details see NDC (2015), 32-33.

Sources: Figure taken from NDC (2015), pp. 32-33.

**Figure B2 Taiwan's Government Debt to GDP Ratio 1992-2013**

## Appendix C Numeric Conversion of Country Credit Ratings

Table C1 shows our method of converting the alphabetical grades of the three rating companies into the numerical grades.

### Table C1 Classification of Government Credit Risk for Three Ratings

| Category | | Grade | | | Numerical Grade | | |
|---|---|---|---|---|---|---|---|
| | | Moody's | S&P | Fitch | Moody's | S&P | Fitch |
| Prime | 1 | Aaa | AAA | AAA | 1 | 1 | 1 |
| High grade | 2 | Aa1 | AA+ | AA+ | 2 | 2 | 2 |
| | 3 | Aa2 | AA | AA | 3 | 3 | 3 |
| | 4 | Aa3 | AA- | AA- | 4 | 4 | 4 |
| Upper medium grade | 5 | A1 | A+ | A+ | 5 | 5 | 5 |
| | 6 | A2 | A | A | 6 | 6 | 6 |
| | 7 | A3 | A- | A- | 7 | 7 | 7 |
| Lower medium grade | 8 | Baa1 | BBB+ | BBB+ | 8 | 8 | 8 |
| | 9 | Baa2 | BBB | BBB | 9 | 9 | 9 |
| | 10 | Baa3 | BBB- | BBB- | 10 | 10 | 10 |
| Non-investment speculative | 11 | Ba1 | BB+ | BB+ | 11 | 11 | 11 |
| | 12 | Ba2 | BB | BB | 12 | 12 | 12 |
| | 13 | Ba3 | BB- | BB- | 13 | 13 | 13 |
| Highly speculative | 14 | B1 | B+ | B+ | 14 | 14 | 14 |
| | 15 | B2 | B | B | 15 | 15 | 15 |
| | 16 | B3 | B- | B- | 16 | 16 | 16 |
| Substantial risks | 17 | Caa1 | CCC+ | CCC+ | 17 | 17 | 17 |
| | 18 | Caa2 | CCC | CCC | 18 | 18 | 18 |
| | 19 | Caa3 | CCC- | CCC- | 19 | 19 | 19 |
| Extremely speculative | 20 | Ca | CC | CC | 20 | 20 | 20 |
| | 21 | Ca | CC | C | 20 | 20 | 21 |
| In default with little prospect of recovery | 22 | Ca | SD | RD | 22 | 22 | 22 |
| In default | 23 | C | D | D | 24 | 24 | 23 |
| | 24 | C | D | DD | 24 | 24 | 24 |
| | 25 | C | D | DDD | 24 | 24 | 25 |
| Not rated | 26 | WR | NR | NR | | | |

Notes: This original list of the grading was downloaded from Expansion (2016). The shaded parts in Categories 21 and 24 are filled by the author.

Sources: Table compiled from Expansion (2016).

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