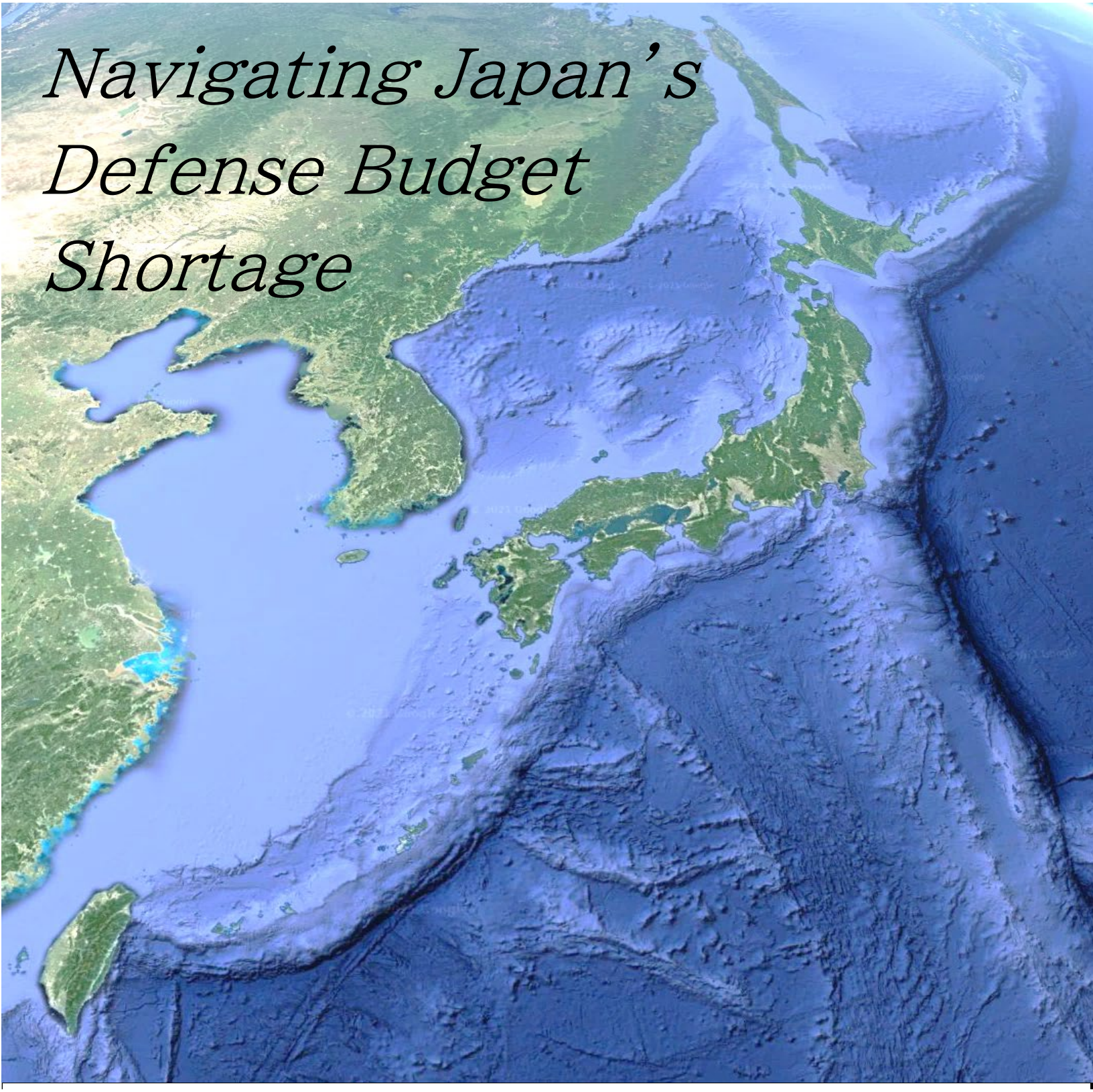
Navigating Japan's Defense Budget Shortage



Ryo Sengoku

University of Virginia

Frank Batten School of Leadership and Public Policy

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INTRODUCTION

Comparatively speaking, Japan has a considerably high defense budget; however, it was recently revealed that personnel of the Japan Self-Defense Force (JSDF) paid for bath tissue out of their own pocket (Ogasawara, 2019). In addition, the JSDF suffers from a chronic shortage of personnel. Despite Japan's prominent role on the world stage, the country suffers from chronic financial shortages, as much of their budget is reserved for acquiring state-of-the-art weaponry..

It is undeniable that the People's Republic of China (PRC) is modernizing its armed forces at an astonishing pace. Among the PRC's aggressive activities around the globe, spanning from the Arctic to the Antarctic, its advancements into the East China Sea and the South China Sea are particularly prominent. In the East China Sea, Chinese warships, including an aircraft carrier, regularly sail through the Taiwan Strait, and Chinese warplanes often make incursions into the air defense identification zones of Taiwan and Japan. Moreover, China's Coast Guard ships have frequently entered Japan's territorial waters near the Senkaku Islands. At the same time, China has unilaterally claimed a border called the "nine-dash line," which spans much of the South China Sea, in an attempt to protect its sovereignty over the region. To further this aim, the PRC has constructed artificial islands and illegally occupied islands in the Spratly Islands and the Paracel Islands. While Beijing emphasizes that these activities are for peaceful purposes, it is evident that they are rooted in military incentives.

Aside from these provocative activities, China has utilized its ample capital to develop and deploy cutting-edge weaponry. For example, the J-20, the fifth-generation fighter after the F-22 and F-35, entered service in 2017, and the first domestically produced aircraft carrier, Shandong, was introduced in 2019. China's progress in terms of its missile capabilities is also remarkable. The DF-41 intercontinental ballistic missile, which was first deployed in 2017, is capable of reaching Washington, D.C., and the DF-26 intermediate-range ballistic missile is called the "Guam killer" or "carrier killer" due to its range and accuracy.

To contain China's attempts to change the status quo through force, it is necessary for each country to build up its own defense capability and engage in multilateral cooperation. However, this is easier said than done. Since the beginning of the Cold War, weaponry has evolved and diversified, which has considerably increased the cost of weapons procurement, especially the cost of weapons development. The development of fighters, which requires state-

of-the-art technology, is a strong example; for example, the American stealthy fighters F-22 and F-35 cost respectively US $32.5 billion and $68 billion to develop (Defense Acquisition Management Information Retrieval, 2010) (Defense Acquisition Management Information Retrieval, 2018) This trend makes it financially difficult for countries with relatively small military spending to develop and procure such front-line weaponry—Japan is one such country.

Given the immediate threats of the Chinese Communist Party's (CCP) revisionism, it is understandable that Japan would prioritize building up its defense capabilities; however, further compression on its logistical and personnel budgets would debilitate the JSDF. In other words, this would put the cart before the horse. Japan, however, has ample reason not to be able to increase its defense budget. As such, this paper will explore cost-effective ways for Japan to procure cutting-edge defense equipment and weaponry to maintain its prominent role in the Indo-Pacific region.

PROBLEM STATEMENT

Japan is one of the important players in the Indo-Pacific region, ranking fifth in the world in terms of its military strength. However, the top four countries in this list are occupied by Indo-Pacific superpowers: the US, China, Russia, and India, and the difference between Japan and these countries is clear. While Japan has steadily increased its defense budget to catch up with them, this comes at the expense the personnel budget. This begs the question, how can Japan procure state-of-the-art weaponry to keep its military forces up to date without pressing personnel expenses?

CLIENT OVERVIEW

My client is Dr. Satoru Nagao. He is a fellow (non-resident) at Hudson Institute, based in Tokyo, Japan. From December 2017 through November 2020, he was a visiting fellow at Hudson Institute, based in Washington, D.C.

Dr. Nagao's primary research area is U.S.-Japan-India security cooperation. He was awarded his Ph.D. by Gakushuin University in 2011 for his thesis titled "India's Military Strategy," the first such research thesis on this topic in Japan. Gakushuin University is a premier institution from which members of the Japanese Imperial Family have also graduated.

Dr. Nagao holds numerous other research positions, including research fellow at the Institute for Future Engineering (strategy, defense policy), visiting research fellow at the Research Institute for Oriental Cultures in Gakushuin University, research fellow at the Japan Forum for Strategic Studies, associate at the Society of Security and Diplomatic Policy Studies, research fellow at the Security and Strategy Research Institute for Japan, senior fellow at the Institute of National Security Studies Sri Lanka, and senior research fellow of the Indian Military Review.

Dr. Nagao was a visiting scholar at the Center for Strategic and International Studies (CSIS), in Washington D.C. He worked previously as a research fellow at the Tokyo Foundation and the Ocean Policy Research Foundation in Tokyo, as a post-doctoral fellow at the Research Institute for Oriental Cultures at Gakushuin University, and as a lecturer at Gakushuin University, Aoyama-Gakuin University and Komazawa University. He was also a security analyst at the Ministry of Foreign Affairs (MOFA) and a first lieutenant of the Japan Ground Self Defense Forces (Japanese Army).

Dr. Nagao has authored numerous books and articles on security issues, and he also contributes to the column, "Age of Japan-India 'Alliance'" at Nikkei Business, the journal of one of Japan's leading newspapers.

UNDERLYING CONTEXT

Overview of World Military Expenditure

According to the Stockholm International Peace Research Institute (SIPRI), Japan's 2019 military expenditure ranked ninth in the world with $47.6 billion. Given that there are roughly 200 countries in the world today, ninth place is relatively high. However, if you take into account the ratio of each country's military expenditure to GDP and growth rate, you will find that Japan's relative proportion of military spending is fairly small. A country's military expenditure as a percentage of GDP (also known as the military burden) is the simplest measure of the relative economic burden the military puts on that country.

Unsurprisingly, the United States has the largest military expenditure in the world. According to the SIPRI, total U.S. military expenditure in 2019 amounted to $732 billion, which is equivalent to 3.4% of its GDP. This is more than 15 times larger than that of Japan and accounts for roughly 40% of the world's total military expenditure. The North Atlantic Treaty Organization

(NATO) and the US call for its members and allies to spend more than 2% of their GDP on military expenditure; therefore, the 3.4% of GDP that the US spent on the military is fairly excessive. Moreover, the growth rate of the U.S. military spending from the previous year was 5.3%.

China holds the world's second-largest military expense, as the PRC announced that its 2019 military spending was approximately $178 billion. However, foreign think tanks are suspicious of this claim and argue that the country's actual military expense is likely much larger than the figure the CCP announced. The SIPRI, for instance, estimated that China's 2019 actual military spending was $261 billion. Assuming this estimate is correct, this means that China's 2019 military spending was more than five times larger than Japan's, accounting for about 14% of the world total. Although this amount constitutes only 1.9% of China's GDP, which is considerably less than that of the US, the U.S. Department of Defense admitted in its 2020 annual report to Congress that "China has already achieved parity with—or even exceeded—the United States in several military modernization areas, including shipbuilding, land-based conventional ballistic and cruise missiles and integrated air defense systems."

It is also important to take the growth rate into account. According to the SIPRI, the CCP increased its military spending by 5.1% from 2018, which is similar to the US's 5.3%. More importantly, based on the prices and exchange rates of the U.S. dollar at that time, China's military expenditure has grown by 85% since 2010. This vastly surpasses that of the US, which decreased by 15%. This rapid modernization of the military aligns with the goal established by leaders of the CCP that the PRC will field a "world-class" military by the end of 2049, the centennial of the founding of the PRC.

The third was India, with $71.1 billion. This amount might dwarf in comparison to the budgets of the US and China, but this number is still staggering. First, this amount is equivalent to 2.4% of GDP, exceeding the 2% standard. Second, India's military expenditure had significantly swollen over the past few decades, increasing by 6.8% since 2018 and 37% since 2010. Going further back, it grew by 259% from 1990 to 2019. India's escalating tensions and rivalries with China and Pakistan are among the major factors that contributed to its increase in military spending.

Returning to the case of Japan, as previously mentioned, the country's defense expenditure was $47.6 billion in 2019. This accounts for only 0.9% of Japan's total GDP, which does not reach even half of the 2% level that the US and NATO called for from its allies and

member states. Moreover, among the world's top 15 countries in terms of military expenditure in 2019, Japan was the only country that spent less than 1% of its GDP on the military. In addition, the growth rate in Japan's military spending from the previous year and over the past decade were -0.1% and 2%, respectively. Compared to the more than 5% growth rates in the military spending of the US, China, and India, Japan's growth rate overwhelmingly pales. Table 1 summarizes these data above.

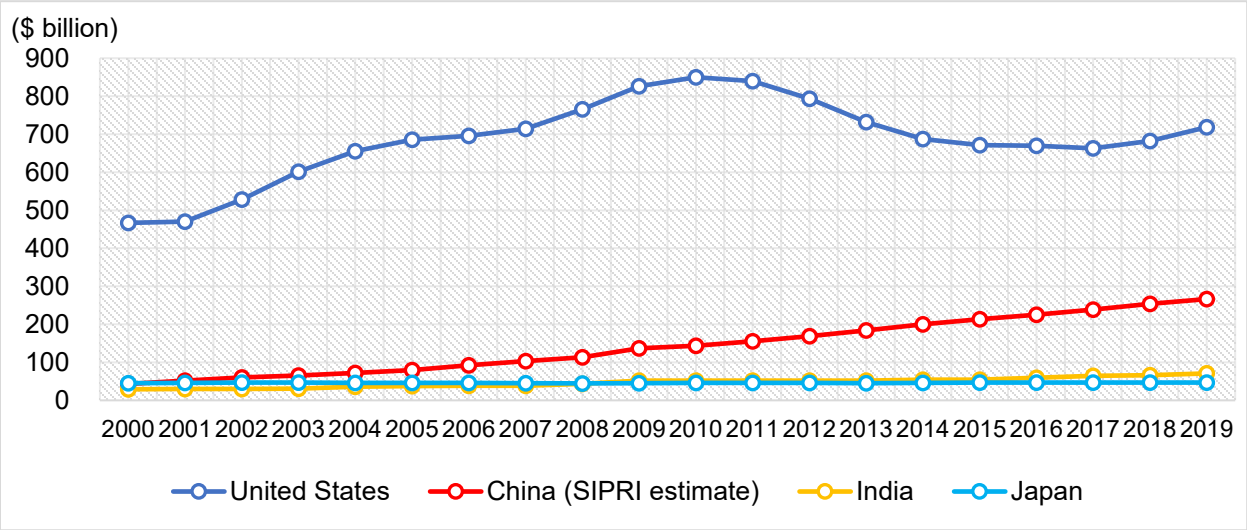
Table 1. *The three countries with the highest military expenditure in 2019 and Japan*

Country	Rank	Spending ($ b.), 2019	Change (%)		Spending as a share of GDP (%), 2019
			2018-2019	2010-2019	
United States	1	732	5.3	-15	3.4
China	2	261	5.1	85	1.9
India	3	71.1	6.8	37	2.4
Japan	9	47.6	-0.1	2	0.9

Note. The table was created by the author from "Trends in World Military Expenditure, 2019," by N. Tian, A. Kuimova, D. L. Silva, P. D. Wezeman and S. T. Wezeman 2020, SIPRI.

Figure 1 below demonstrates trends of military expenditures of the US, China, India, and Japan from 2000 to 2019. As shown in the figure, India's military expenditure used to be smaller than that of Japan. However, it exceeded Japan in 2008, leaving Japan to trail behind the other key players in the Indo-Pacific region in terms of defense expenses.

Figure 1. *Military Expenditures from 2000 to 2019 of the United States, China, India and Japan*

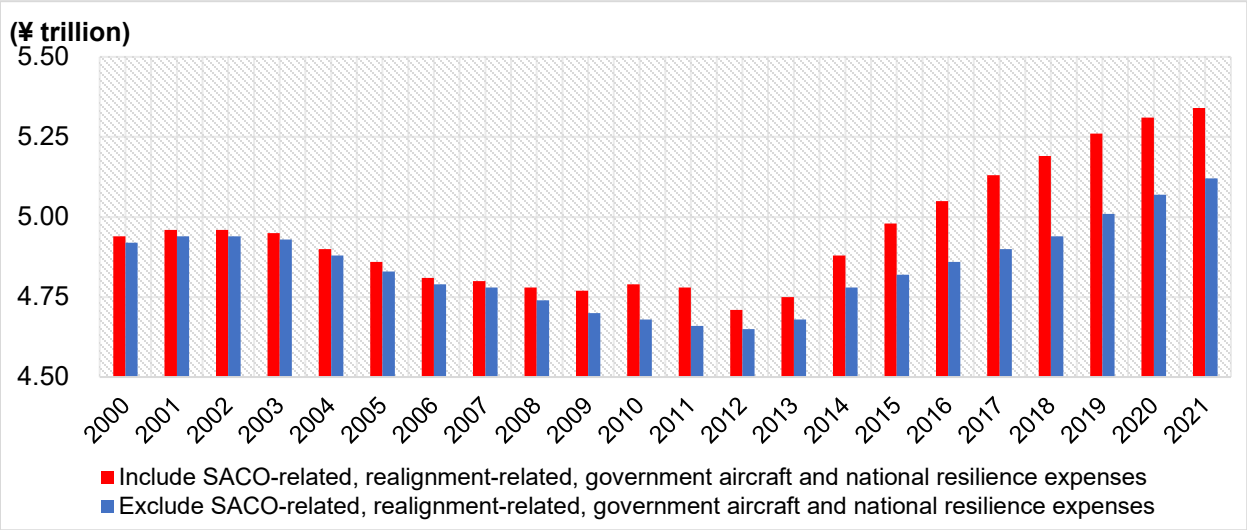


Note. The figure was created by the author from *What Does China Really Spend on its Military?*, 2020, https://chinapower.csis.org/military-spending/.

Japan's Defense Budget

I will next focus on Japan's defense budget in depth. To begin, I will examine the trend of the defense budget from the fiscal years between 2000 and 2021. The SIPRI indicated that Japan's 2019 defense budget declined by 0.1% from the previous year if based on exchange rates of the U.S. dollar. In reality, however, as shown in Figure 2 below, this number had continued to rise for seven consecutive years as of 2019 if based on the Japanese yen. Moreover, as of 2021, Japan's defense budget has increased for consecutive nine years and hit a record high for seven straight years. The bar on the left in Figure 2 presents the defense-related expenses, including expenses related to Special Action Committee on Okinawa (SACO), the U.S. Forces realignment, and the three-year emergency measures for disaster prevention/mitigation and building national resilience. The bar on the right does not include these expenses. In general, when discussing Japan's defense budget, these expenses are typically excluded. Therefore, when I refer to Japan's defense expenses, I hereafter specifically mean defense-related expenses excluding those expenses unless otherwise stated.

Figure 2. *Trend of Japan's Defense-Related Expenses*



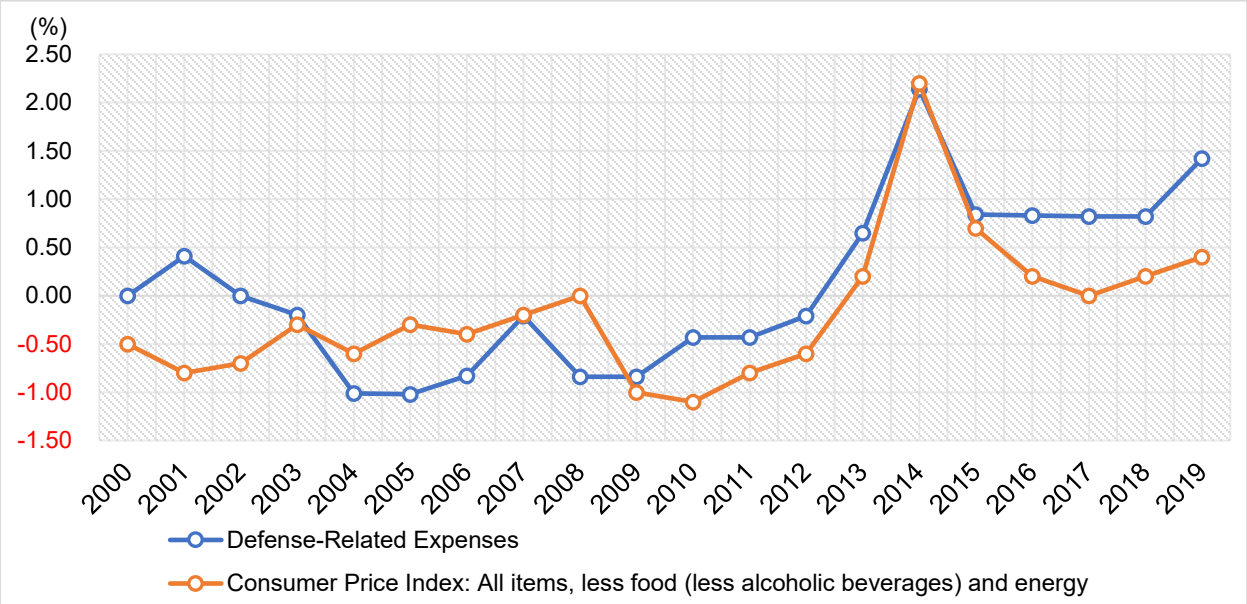
Note. The figure was created by the author from "Defense Programs and Budget of Japan Overview of FY2021 Budget Request," by Ministry of Defense of Japan, 2020.

Further, Figure 3 illustrates Japan's year-on-year increase rates in defense-related expenses and the consumer price index from 2000 to 2019. In the previous section, I mentioned that the top three countries, the US, China, and India, increased their military expenses by more than 5% in 2019. Conversely, as evident in this figure, Japan's defense budget has never grown by more than 3% per year over the past two decades.

The largest growth rate during this period was 2.14% in 2014, but technically speaking, this value is not an accurate reflection, as this increase is attributed to a 100 billion yen increase in personnel expenses. This amount was extracted from personnel's salary in 2013 to secure financial resources for reconstruction after the Great East Japan Earthquake. As the salary reduction ended in 2014, the personnel expenses returned to their original level. Taking this into account, the actual increase rate in 2014 was almost zero. Therefore, Japan's defense expenditures have never risen by over 1.5% per year throughout the past two decades.

Moreover, growth rates in defense budgets each year were just slightly greater than those of the consumer price index. Therefore, removing the effect of a rise in commodity prices, Japan's defense spending had increased by only 1% per year at most. In short, although growth rates in Japan's defense spending have steadily increased, they have never kept pace with those of the US, China, and India.

Figure 3. *Year-on-Year Growth Rates in Defense-Related Expenses and Consumer Price Index of Japan*

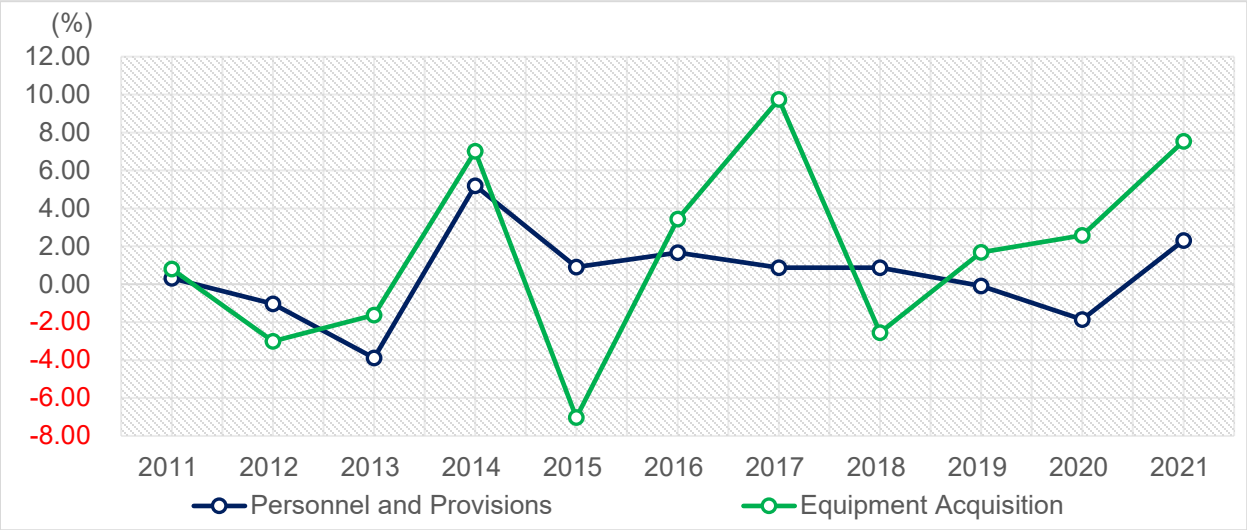


Note. The figure was created by the author from "Defense Programs and Budget of Japan Overview of FY2021 Budget Request," by Ministry of Defense of Japan, 2020, and "Long-Term Index for Japan--All Items, Less Food (Less Alcoholic Beverages) and Energy," by Statistics Bureau, Ministry of Internal Affairs and Communications of Japan, 2021.

In this case, which factor contributes most to an increment in the defense budget? Figure 4 compares year-on-year growth rates in personnel and provisions expenses and equipment acquisition expenses from 2011 to 2021; Figure 5 indicates the changes in the composition ratio of the personnel and provisions expenses and equipment acquisition expenses in the defense budget during the same period. Personnel and food provisions expenses include personnel wage and food expenditures, and equipment acquisition expenses include the purchase of arms, vehicles, and aircraft, and the construction of ships.

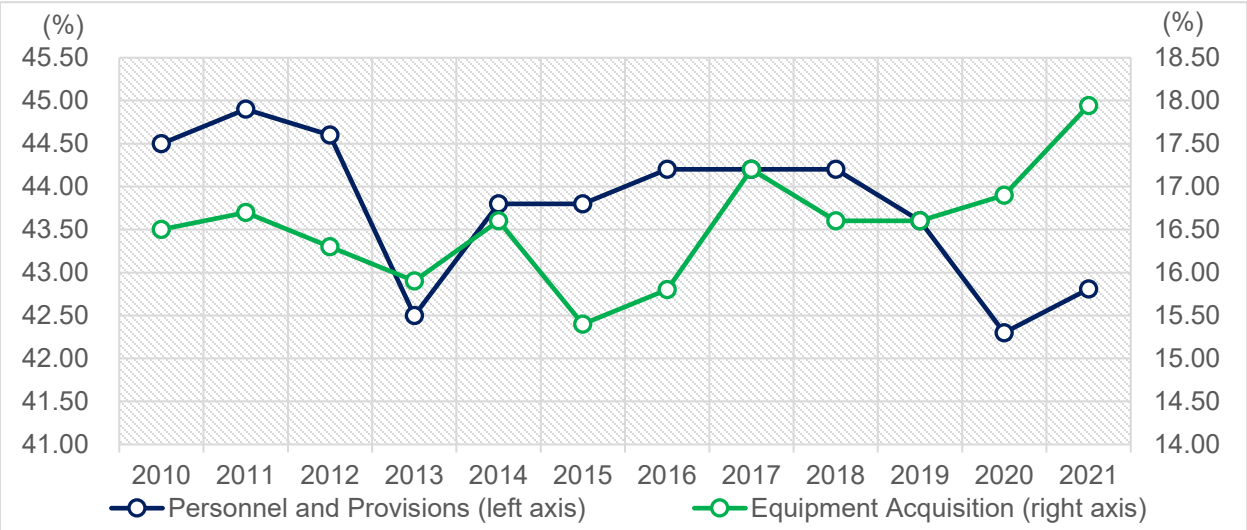
Figure 4. *Year-on-Year Growth Rates in Personnel and Provisions Expenses, and Equipment*

Acquisition Expenses



Note. The figure was created by the author from "Defense of Japan 2020," by Ministry of Defense of Japan, 2020

Figure 5. *Changes in Composition Ratio of Personnel and Provisions Expenses and Equipment Acquisition Expenses in Defense Budget*



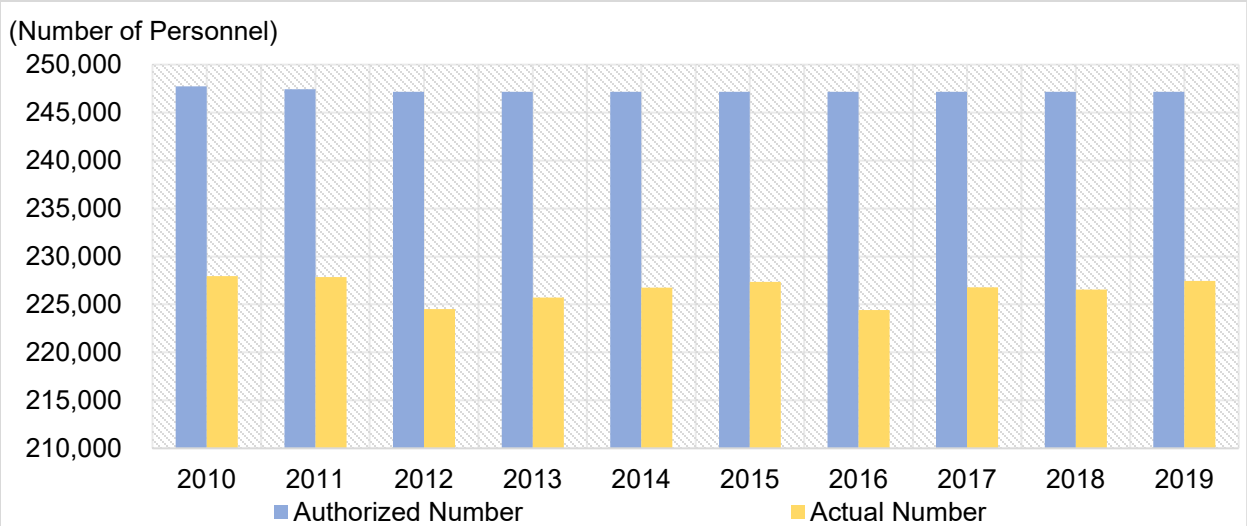
Note. The figure was created by the author from "Defense of Japan 2020," by Ministry of Defense of Japan, 2020

As depicted in Figure 4, the equipment acquisition expenses were more volatile than the

personnel and provisions expenses, although equipment acquisition expenses have increased more rapidly. At the same time, Figure 5 tells us that while the share of personnel and provisions expenses has declined by approximately 2% since 2010, the composition ratio of equipment acquisition costs has increased by about 1.5%.

In brief, a rise in equipment acquisition costs has contributed to an increase in the defense budget, which has hindered personnel and provisions expenses from expanding. This has resulted in the chronic shortage of personnel and essential goods, such as bath tissues, as mentioned in the introduction. Figure 6 below demonstrates the authorized number and the actual number of JSDF personnel since 2010. As shown in the figure, the JSDF has chronically been short of around 20,000 personnel. Besides, as of 2019, the number of fixed-term personnel newly recruited by the JSDF has fallen below its recruiting plan for six consecutive years. Masahisa Sato, a member of the House of Councilors, argues that this is largely because the JSDF's wages are lower relative to the police, which competes against the JSDF for securing new graduates.

Figure 6. *Trend of Authorized and Actual Number of Uniformed SDF Personnel*



Note. The figure was created by the author from "Defense of Japan 2020," by Ministry of Defense of Japan, 2020.

Nevertheless, the JSDF has expanded its areas of operation in recent years, including, missile defense, maritime affairs, space, and cyberspace. For instance, in 2018, it established the Amphibious Rapid Deployment Brigade, which is essentially the Japanese version of the Marines,

and built the Space Operation Squadron in 2020, which is the JSDF's first specialization in the space domain. In addition, it is considering the introduction of new Aegis vessels instead of the land-based missile-interception system Aegis Ashore, which the Japanese government abandoned last year. However, the Aegis vessel requires 300 crew members per ship to operate, which further exacerbates the personnel shortage.

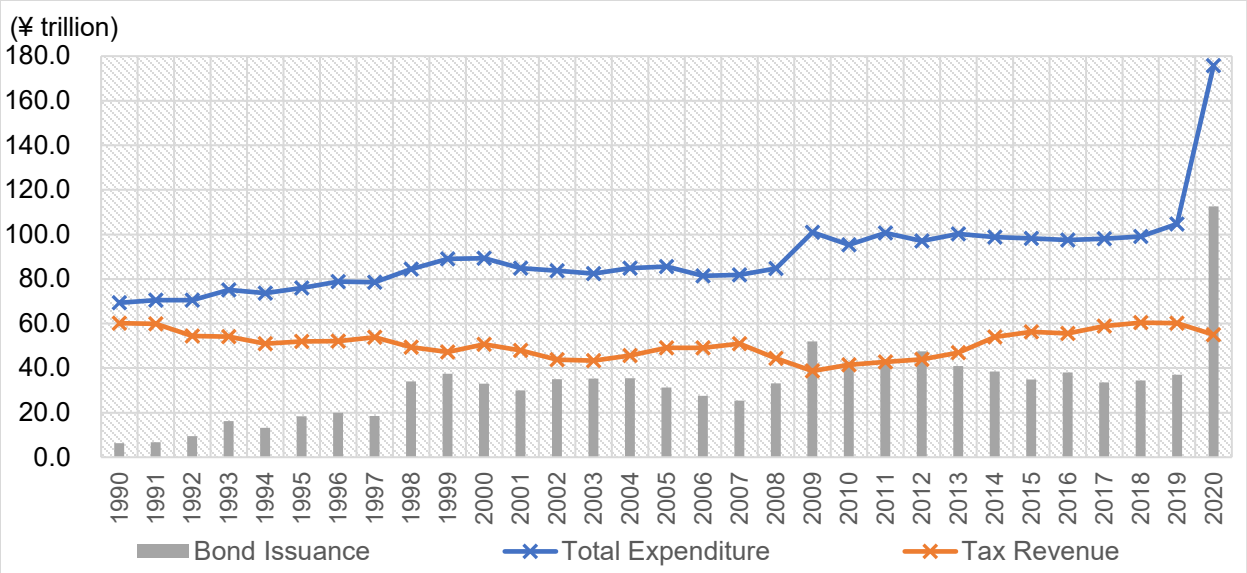
In summary, while Japan faces pressure to procure sophisticated weapons and equipment, but prices of such weaponry have continued to increase since the beginning of the Cold War. Consequently, the increasing costs of acquiring weaponry have constricted labor costs, while the JSDF is continually expanding the domains in which it operates. These facts make the chronic shortage of personnel more critical. As such, Japan has no choice but to increase its defense budget or reduce the costs of acquiring advanced weaponry.

Japan's Fiscal Condition

Why has Japan chosen not to increase its defense budget? One might think that this dilemma would be resolved if Japan increased its defense budget to the level of 2% of GDP, as demanded by the US and NATO. This could be true; if the Ministry of Defense decided to double the current budget to account for 2% of GDP, Japan could procure cutting-edge weaponry and hire more personnel. However, taking the country's fiscal situation into account, it is evident that this would be unfeasible.

While Japan's fiscal condition is not terrible, it is by no means good. For instance, Figure 7 below depicts trends in Japan's total expenditure, tax revenue, and bond issuance from 1990 to 2020. As shown in the figure, Japan's budget deficits have continued to deteriorate over the past three decades. Furthermore, the 2008 financial crisis had a significant impact on the Japanese economy, as it did with other countries across the globe. This fiscal condition is the main reason why Japan cannot easily increase the defense budget.

Figure 7. *Trends in General Account Tax Revenues, Expenditures, and Bond Issuance*



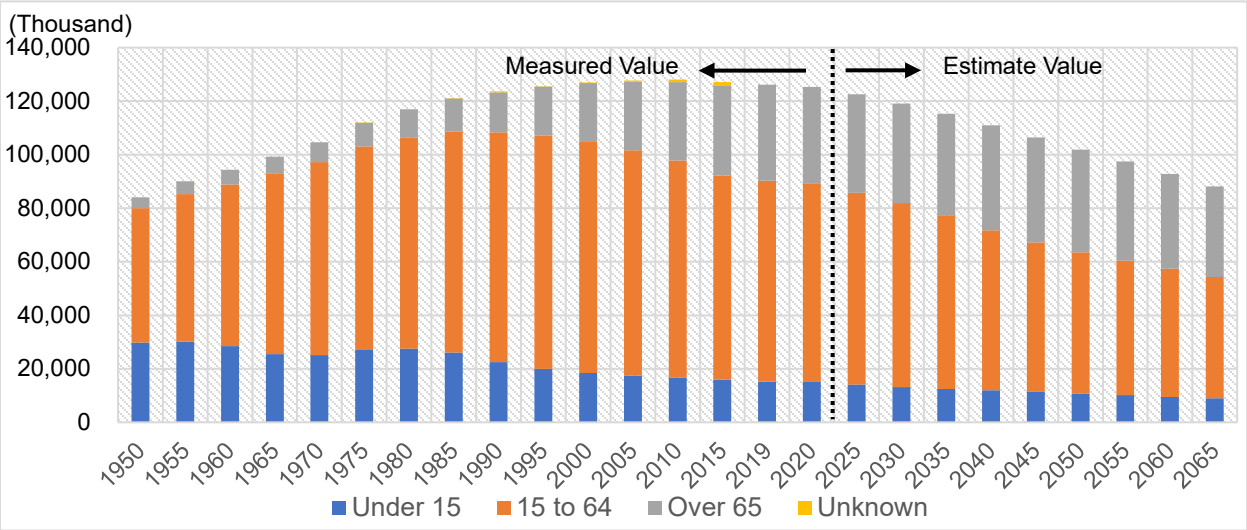
Note. The figure was created by the author from "Japanese Public Finance Fact Sheet," by Ministry of Finance of Japan, 2020

This begs the question, why is Japan's fiscal situation so bad? First of all, the burst of the Japanese bubble economy in the early 1990s catalyzed a serious deflation of the Japanese yen. Since then, tax revenue has remained stagnant up until now. For example, although the tax revenue peaked at 60.1 trillion yen in 1992, this record was never surpassed until it hit a new high in 2018 with 60.4 trillion yen.

Meanwhile, expenditure has steadily increased over the past decades due to an increment in social security expenses. As seen in Figure 8, which represents changes in the structure of Japan's population, one can see that Japan's population is aging at a blistering pace. In 1950, the ratio of people aged 65 or over was below 5%; today, this number is approximately 30%, which is the highest in the world. As a result, the government has been forced to spend more of its budget on social security, including medical care, nursing care, and pension.

Even worse, as shown in Figure 8, Japan's population has already started declining. It is evident that Japan's population has been steadily declining in the last decade after peaking at 128 million around 2010. This is the opposite context of the US, China, and India, whose populations have increased up until the present. Moreover, the Japanese government estimates that its population will fall below 100 million by 2050 and reduce to about two-thirds of the current population by 2060.

Figure 8. *Population Trends of Japan*

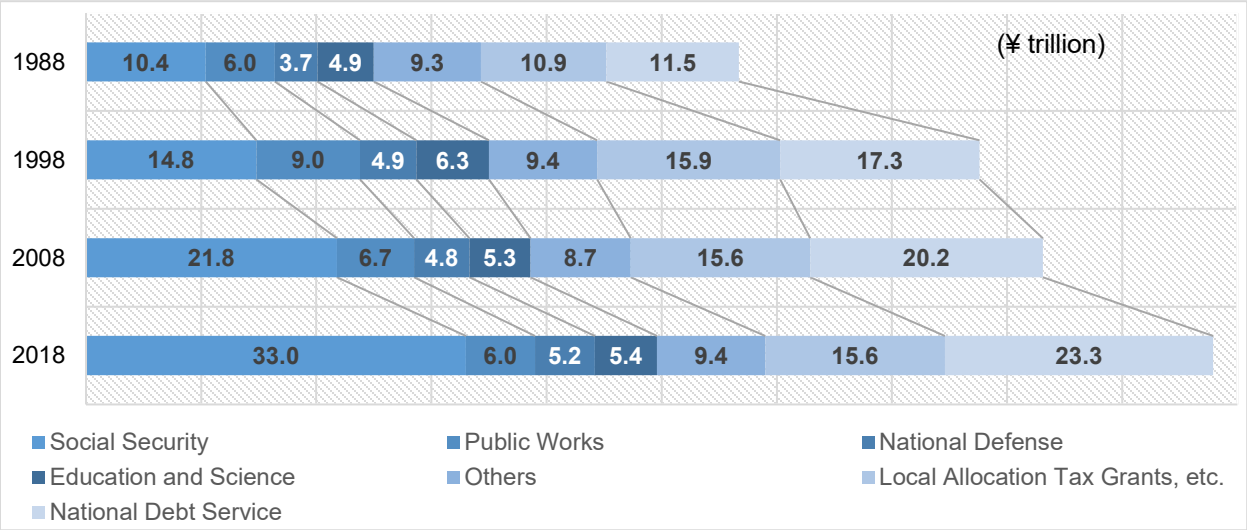


Note. The figure was adopted by the author from Shorai-Suikei-Jinko de Miru 50 Nengo no Nihon, by Cabinet Office of Japan, 2020.

A population decline, especially to this degree, greatly shrinks economic activity, which would inevitably result in a reduction in tax revenue. That is, the combination of an increase in social security costs caused by the rapidly aging society and a reduction in tax revenue due to population decline would significantly strain Japan's fiscal condition in the near future.

Figure 9 indicates how much each expenditure item in the general account had increased from 1988 to 2018 at intervals of ten years. For example, during that period of 40 years, expenses for public works had remained constant, and expenses for education and science had increased by only 10%. On the other hand, social security costs increased by more than 200%, from 10.4 trillion yen in 1988 to 33 trillion yen in 2018.

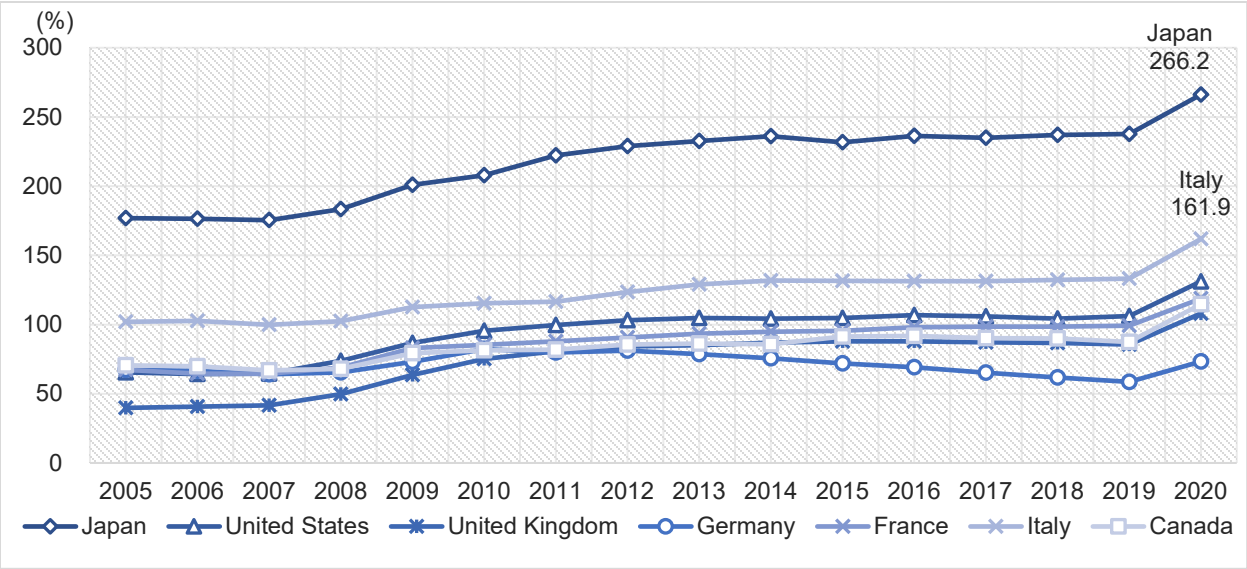
Figure 9. *Trends in Composition of Expenditures*



Note. The figure was created by the author from announced sources from the Japanese government.

To compensate for the enormous gap between increasing expenditure and declining tax revenue, the government has continued to issue bonds, such as the Japanese government bond (JGB). While the risk of default is considerably low, since the JGBs are local-currency (Japanese yen) denominated, government debts have piled up for decades. For instance, outstanding government debts at the end of 2020 exceeded 1.2 quadrillion yen, which is about US $11.5 trillion. This is 2.4 times larger than Japan's entire GDP. Figure 10 below indicates that Japan's cumulative debts are astoundingly higher than those of other major countries.

Figure 10. *International Comparison of Debts-to-GDP Ratio*



Note. The figure was created by the author from "Japanese Public Finance Fact Sheet," by Ministry of Finance of Japan, 2020

Moreover, the government boosted the 2020 fiscal year expenditure from 102.7 trillion yen in the initial budget to 175.7 trillion yen to speed up the recovery from a recession caused by the COVID-19 pandemic. Needless to say, the budget shortfall was covered by the additional issuance of JGBs. Consequently, the issuance of JGBs for the 2020 fiscal year reached 112 trillion yen, and the proportion of the JGBs to the budget reached 64.1%, which was an unprecedented level.

If the COVID-19 pandemic continues or worsens, the next fiscal year's expenditure is likely to remain high. Even if the pandemic comes to an end, the government simply cannot afford to increase the spending because it must focus on repaying this swollen debt. Rebuilding the economy and achieving fiscal soundness is the government's highest priority, so it is nearly impossible for the government to consider doubling the defense budget.

POLICY ALTERNATIVES

So far, I have discussed the threats posed by China's rising power, Japan's low military expenditure, and the reasons why Japan is unable to increase its military expenditure. With these factors in mind, how can Japan optimize its small military budget? In other words, how can Japan

procure expensive, state-of-the-art weaponry without constraining its personnel expenses? Here are three alternatives: producing weaponry domestically, purchasing weaponry from abroad, and developing weaponry with other countries. In this chapter, I explain the advantages and disadvantages of them.

Alternative 1: Producing Weaponry Domestically

In terms of the domestic production option, the Japanese government could commit the domestic defenseindustry to researching, developing, and producing weaponry. For decades, the most prioritized means of procuring weapons has been domestic production, followed by licensed production, purchase from abroad, and multilateral co-development. Although the number of weapons imports from abroad, especially from the US, has rapidly increased in recent years, domestic production still accounted for almost 90% of Japan's total weaponry procurement in the early-2010s. The main benefits of domestic production are the following: preservation and improvement of military technology, a positive influence on the economy, and ease of weapons maintenance.

To begin, if a country does not domestically produce sophisticated industrial products in the long term, such as rifles, tanks, warships, and fighters, they will lose related technology and knowledge, ultimately making them unable to produce them on their own. Moreover, it will take years to obtain this technology and knowledge again. For instance, after World War II, Japan lost a significant amount of its military technology, making it difficult for the country to independently produce weapons from scratch again. Therefore, it is important to continue to commission domestic defense-related companies to produce weapons for the sake of preserving technology. In addition, as evident by the increased utilization of cyberspace and outer space and the development of stealth and hypersonic weapons, military technology is rapidly progressing today. Whether or not a country possesses the technology required for such state-of-the-art weaponry significantly affects their defense and diplomatic power, but it also improves private companies' global competitiveness by transferring military-related technology for civilian use.

Secondly, suppose Japan purchases weapons from another country, such as the US. In that case, no matter how much the Japanese government pays, it will not have any beneficial influence on the domestic economy because that money merely goes to the to the country they are

importing from. As I have demonstrated, modern cutting-edge weapons are typically quite costly. For example, the F-35 fighter development project cost about US $68 billion, and each fighter costs almost US $100 million. As such, if foreign defense companies won such expensive arms deals with the Japanese government, Japanese defense-related manufactures would be significantly affected by the loss of business.

In the first place, domestic defense-related manufactures in Japan have very few customers other than the Japanese government. This is because, until the time when the government amended its regulation on arms exports in 2014, they had been unable to export their products abroad. Even after the amendment of the regulation banning arms exports, Japanese defense-related manufacturers that have neither sales channels nor actual sales results struggle to export their products worldwide. The domestic defense market is already tiny, and if the government chooses to purchase more weapons from foreign manufacturers, the domestic weapons industry might not be able to generate enough revenue to maintain production. In fact, some domestic manufactures have already withdrawn from the defense business, as it was simply not profitable enough. Therefore, beyond the impacts on the economy and employment, the preservation of domestic defense businesses has some important advantages.

Lastly, domestic production makes it easy for the JSDF to maintain weapons, which is indispensable. While troops can do some smaller and simpler maintenances by themselves, some technical maintenances, such as regular overhauls and extensive repairs, can only be done by manufacturers. For example, if Japan purchases weaponry from other countries, it might have to send its broken weapons back to those countries to get them repaired. Moreover, even if maintenance is simple, there is a possibility that troops will not possess the necessary parts, which often happens in the JSDF. In that case, they have to order the parts from foreign manufacturers and wait for them to arrive. While this would not be a major issue in peacetime, it would likely be highly problematic in wartime. In this sense, domestic weapons companies could more efficiently support the JSDF.

The most significant disadvantage of domestic production is that it is highly costly. As previously mentioned, the JSDF is currently one of the only buyers in the domestic defense industry. Even since the arms trade ban was lifted in 2014, there have only been cases of arms exports. Therefore, price reduction by mass production remains unfeasible, which keeps domestic production costly.

Alternative 2: Purchasing Weaponry from Abroad

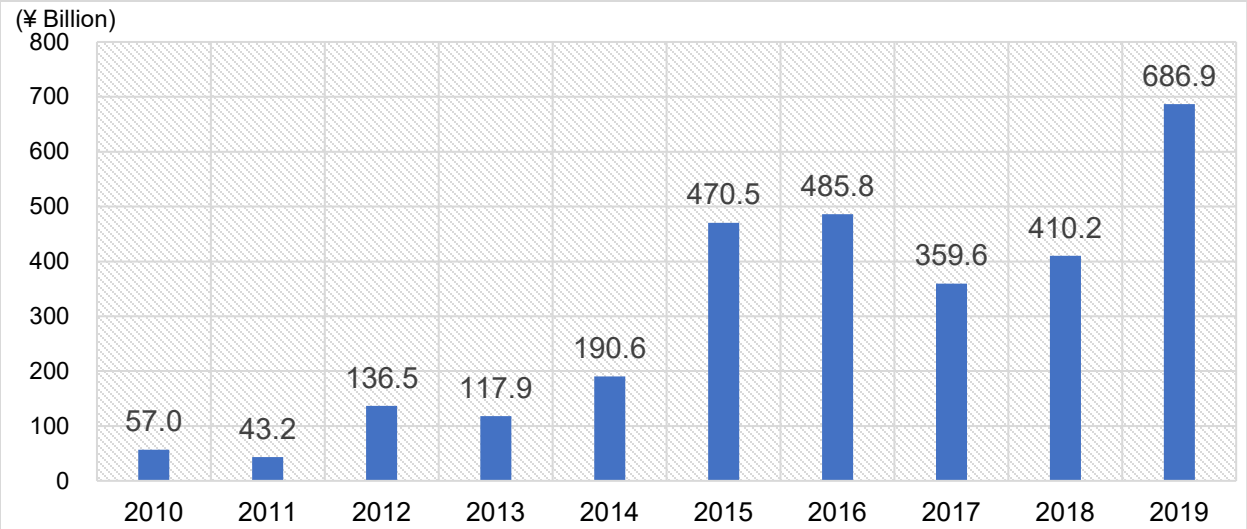
Purchasing state-of-the-art weapons from other countries would certainly be the easiest alternative, as Japan would mainly have to pay money. For example, even if one attempts to develop the most advanced weaponry, there is no guarantee that the project will succeed; rather, it is not unusual for such a project to exceed the budget or take longer than expected. At worst, the project would fail or be canceled. In that sense, purchasing from abroad allows Japan to hedge risks and serves to enhance its relations with foreign suppliers.

Importing weapons will likely save more money, time, and effort than producing them domestically. In terms of price, for instance, imported livestock and agricultural products are generally cheaper than domestic ones because they can be mass-produced. Similarly, imported small weapons such as handguns and rifles are likely to be less expensive than domestically produced ones. In fact, the Type 89 Assault Rifle, which is used by the JSDF, is two or three times as expensive as the M4 Carbine, which is used by the U.S. Army and Marine Corps.

Conversely, this is not the case for state-of-the-art weaponry. Because suppliers spend a significant amount of money on research and development, they try to sell their products for the highest price possible. Therefore, unless it has exceptionally significant bargaining chips, Japan would likely have to pay the asking price. Also, given subsequent necessary maintenances, additional costs would be required in the future. Besides, choosing this option would result in a loss of military technology.

Nevertheless, as weaponry has become highly sophisticated, international procurement has rapidly expanded in recent years. In the early 2010s, weapons imports accounted for around 10% of the total equipment acquisition of the JSDF, but now this number has shot up to more than 35%. As shown in Figure 11 below, purchases from the US through the Foreign Military Sales (FMS) have significantly risen from 57 billion yen in 2010 to 687 billion yen in 2019.

Figure 11. *Trends in Japan's Spending on the FMS*



Note. The figure was created by the author from "2019 Nendo Boei Kankeihi no Gaiyo," by Ryo Tange, 2019

The FMS is a U.S. program that facilitates the sales of U.S. arms, defense equipment, defense services, and military training to foreign governments. Countries of purchase do not deal directly with U.S. defense manufactures; instead, the Defense Security Cooperation Agency serves as an intermediary.

The benefits of the program for the purchasers are the following: (1) the ability to purchase state-of-the-art weaponry that only the US manufactures, and (2) the ability to receive necessary education and training from the U.S. government. In contrast, the drawbacks are that (1) the contract price and delivery date are just estimations, (2) the payment method is limited to advanced payment, and (3) the U.S. government can one-sidedly cancel contracts in light of its national interest, meaning that purchasers must follow the demands of the US if they want to purchase their advanced weapons.

Alternative 3: Developing Weaponry with Other Countries

Co-development of weapons is now a global trend, as exemplified by the Eurofighter Typhoon, the F-35 Lightning II, and the BrahMos cruise missile. The Eurofighter Typhoon was developed by four European countries: England, Germany, Italy, and Spain. Although collaborative development has many merits, such as share of costs, technology, knowledge, and

risks, one of the biggest advantages is that participating countries can share costs. Developing modern advanced weapons requires too much of an investment for a single country to cover. The F-35 fighter development program is a good example. Nine countries, centering on the US, shared the developing cost of $68 billion and collaborated to design and produce the weapon. Even the US, which has the largest military expenditure in the world, chose not to develop it independently. Therefore, how can Japan, whose defense budget is about one-fifteenth of that of the US, develop such state-of-the-art, costly weaponry by itself?

This is beneficial for not only the Japanese government but also the domestic weapons manufacturers. As I explained earlier, they cannot produce substantial revenue, even from domestic production, because the JSDF is virtually the only buyer. On the other hand, weapons developed by multilateral collaboration will at least be used among the participating nations, which allows manufacturers to ensure a certain level of sales. This is advantageous for Japan, which is eager to boost its arms exports and preserve its defense industry. Moreover, collaborative development gives domestic manufacturers access to the latest technology.

Aside from economic benefits, joint development is also beneficial from both the military and political perspectives. Possessing common weapons with partner countries enhances interoperability between them, making logistics more efficient. Co-development also raises a sense of alliance, reducing the risks of future military tension. Conversely, not taking part in international projects would, at worst, lead to isolation from the global security structure.

However, there are always opposing sides. For instance, if there is a disparity in power among participating countries, some countries might not benefit as much as they hoped they would. The co-development of the F-2 jet fighter between Japan and the US in the 1980s is a good example. Initially, Japan had planned to develop the new fighter jet by itself. However, at that time, the two countries were in the middle of trade friction, and Washington was dissatisfied with its increasing trade deficit with Tokyo. To decrease the trade deficit with Japan, the U.S. government pressured Japan to purchase US-made fighters. Consequently, Japan gave up the original plan and decided to develop the new fighter in collaboration with the US, thereby prioritizing interoperability with the US armed forces.

With some bumps and detours, the two countries eventually agreed to develop the F-2 by converting and upgrading the existing fighter, F-16, as a base. On the other hand, Washington pressured Tokyo to transfer all the Japanese technology that they desired to the US and to allow

them to keep the core technology for the F-16 confidential. These conditions were significantly favorable to the US, which made Japanese supporters of domestic production feel a sense of defeat. Japan's complaints and dissatisfaction surrounding this incident have resided through the present day, and this bitter memory is still discussed among politicians and individuals in the defense industry (Sato, 2015).

CRITERIA

To compare these alternatives and determine which is the best for Japan's weaponry procurement, I have set four criteria.

Criterion 1: Cost-Effectiveness

In the first place, since Japan's defense budget comes from Japanese taxpayers' money, the Ministry of Defense has a responsibility to be extremely cautious with how it spends its budget. In addition, the JSDF must use the budget effectively because the budget is quite limited. Therefore, cost-effectiveness is an extremely important criterion for the JSDF. It is measured by comparing the costs that the JSDF spends to acquire weaponry and the outcomes that the weaponry provides. That is, if every alternative gives the same or similar outcomes to the JSDF, a cheaper alternative is better.

Criterion 2: Political and Technical Feasibility

Even if there is an alternative that logically allows Japan to cheaply acquire high-performance weapons, it would be futile if that alternative proved to be infeasible. This criterion is measured by the levels of the defense industry in Japan and abroad, and whether the alternatives are politically acceptable or not to Japan and the world.

Criterion 3: Domestic and Global Impact

Any alternative generally has both domestic and international impacts, ranging from politics to economy to military. This criterion is measured by whether such effects are favorable or unfavorable, and whether they are acceptable or not to the Japanese government, Japan's

defense industry, and the world.

Criterion 4: Military Effectiveness

Japan needs weapons that are suitable for its unique geographic context. No matter how cheaply it gets the best-performing weaponry, it does not make sense unless they meet the needs of Japan. Also, it is important for the JSDF to cooperate with the military of other countries, especially the American military. This criterion is measured by whether weapons that are acquired through an alternative enhance Japan's military effectiveness and interoperability with the U.S. military.

ALTERNATIVE EVALUATION

Alternative 1: Producing Weaponry Domestically

Cost-Effectiveness: ***Low***

Considering Japan's current defense industry, it is evident that domestic production is a less cost-effective alternative. This is because, as I have discussed, the JSDF is one of the only buyers of Japanese-made weapons at the moment, making it difficult for domestic manufacturers to reduce costs by mass production. Even after the government eased regulations on arms exports in 2014, Japanese defense-related manufacturers have struggled to export their products worldwide because they do not have sales channels or actual sales results. In 2010, Mitsubishi Electric Corporation won an order to deliver air radar systems to the Philippines for about 10 billion yen (US $100 million), but this was the first export of a newly made "complete" defense product, excluding parts, since 2014. Although the Ministry of Defense is eager to promote the export of defense products, it is likely that this situation will not drastically improve over the next few years.

Political and Technical Feasibility: ***Middle***

Japan has consistently prioritized the domestic production of weaponry. Therefore, the country is now able to independently develop and produce a wide variety of weapons, such as tanks, vessels, submarines, and missiles. On the other hand, it is unlikely that Japan would be able to develop state-of-the-art high-tech fighters by itself, as it might not possess the necessary

technology; even if it is capable of producing such fighters, the task might require massive consumption of time and budget.

Producing weaponry domestically is certainly the most politically feasible option. Meanwhile, it should be noted that if nationalistic foreign leaders like former U.S. President Donald Trump put pressure on Japan to use their products, it is highly likely that domestic production would be affected.

Domestic and Global Impact: ***High***

Domestic production has the most significant impact on the domestic economy compared to other alternatives. Since the Japanese government is almost the sole customer of the domestic defense industry, if it were not for the government purchase, the industry would rapidly shrink or disappear. Therefore, domestic production and procurement are necessary to preserve the industry. In fact, some Japanese companies have already withdrawn from the defense industry in recent years because domestic procurement has grown at a sluggish pace while the government has purchased more defense products from foreign companies..

Further, defense-related companies are major donors of the ruling Liberal Democratic Party. If the government pushes forward with purchases from other countries, it will likely lose the financial support from these domestic companies. On the other hand, this option has little global impact because almost all production occur within the nation.

Military Effectiveness: ***High***

Needless to say, Japan-made weapons are specifically tailored to the needs of the JSDF, which inevitably enhances the military's effectiveness. Also, since Japanese weapons are usually designed to comply with US and NATO standards, domestic production hardly undermines military interoperability.

Alternative 2: Purchasing Weaponry from Abroad

Cost-Effectiveness: ***Low***

Purchasing weapons from abroad is not very cost-effective. The more Japan wants to import weapons, it is more likely that they will have to pay the asking price. Also, defense

equipment acquisition from the US has increased in Japan over the recent years, but there are many cases where the price of equipment purchased from the US was higher than expected.

In 2017, the U.S. government unilaterally announced a 20% increase in the price of the unmanned surveillance aircraft Global Hawk, manufactured by Northrop Grumman. The F-35A was initially priced at around 10 billion yen but temporarily rose to around 17 billion yen. The price increase of the plan. The costs were estimated to be about 80 billion yen per unit at the time of the decision of introduction but had swollen to about 120 billion yen. Japan's Ministry of Defense has explained that the FMS would decrease prices because the U.S. government, instead of Japan, negotiates with U.S. companies, but that is doubtful now.

Political and Technical Feasibility: ***High***

Technical feasibility does not matter for equipment acquisition from abroad. Rather, generally speaking, everyone wants to sell their products to Japan as much as possible. However, a foreign government might decide not to export weaponry to other countries, including Japan. For instance, Japan had long requested the US to sell the F-22, but the US never agreed to sell it to other countries. Further, the US does not export the Tomahawk cruise missile abroad, except to the United Kingdom. Therefore, it is evident that purchasing weaponry from abroad is highly subjected to international politics.

Domestic and Global Impact: ***High***

Weaponry acquisition from abroad has both domestic and global impacts. As opposed to domestic production, this alternative effectively undermines the domestic defense-related industry. Meanwhile, possession of the same weapons with other countries fosters strong political and military bonds and deepens diplomatic ties, which could lead to further cooperation in various fields.

However, as shown in the case that the US has imposed sanctions on Turkey for the introduction of the Russian surface-to-air missile S-400, choosing the wrong country as a supplier could result in heightened tensions with other countries.

Military Effectiveness: ***Middle***

Weapons that are designed based on Japan's demand and produced domestically would

increase military effectiveness more than those manufactured abroad. Besides, the more Japan purchases weapons from the Western Bloc nations, the more military interoperability increases.

Alternative 3: Developing Weaponry with Other Countries

Cost-Effectiveness: ***High***

By sharing resources, such as funds, technology, and knowledge, with other countries, Japan would be able to produce weapons that it could not produce by itself while saving costs. The Lockheed Martin F-35 and the Eurofighter Typhoon are good examples. Weapons like these require a considerable budget and high technology that Japan by itself cannot attain. Moreover, because countries participating in a joint project will surely purchase the weapon after developing it, manufacturers can expect a certain level of sales, which would lead to a reduction in manufacturing costs. Therefore, in terms of cost-effectiveness, co-development with other countries appears to be the best alternative.

Political and Technical Feasibility: ***High***

Co-development amplifies technical feasibility by allowing countries to share their resources such as funds, technology, and knowledge with each other. Japan would not be able to develop and produce cutting-edge fighters like the F-22 and the F-35 by itself due to technology and capital shortage. However, joint development allows Japan to produce and procure such weaponry with greater efficiency.

Moreover, joint development is currently a major global trend. Similarly to purchasing weaponry from abroad, this option is also subject to the global political climate, but yet, many joint development programs would likely welcome Japanese manufactures' expertise.

Domestic and Global Impact: ***High***

Similarly to weaponry purchase from abroad, the co-development of weaponry is beneficial for diplomacy. Moreover, as opposed to purchasing it from abroad, co-development helps the domestic defense industry, providing them jobs and opportunities to obtain front-line skills and knowledge. This would enhance the international competitiveness of the industry.

Military Effectiveness: ***High***

Joining a co-development program at an early point allows Japan to reflect its needs on the design of weapons, which would lead to an increase in its military effectiveness. Furthermore, weapons developed with other countries and possessed by several nations strengthen Japan's military interoperability.

However, for instance, if Japan chooses India as a partner to develop new weaponry, this might not be the case. India is a member of the Quad, a strategic dialogue between the United States, Japan, Australia, and India. Therefore, Japan and India are actively promoting bilateral and multilateral cooperation, and in 2020, the two countries signed an "Acquisition and Cross-Servicing Agreement." This agreement allows both militaries to exchange supplies and services on a reciprocal basis and participate in United Nations and humanitarian assistance operations together and visit each other's ports . As such, it would not be a surprise if the two countries sought to develop new weaponry together.

On the other hand, India has a historically close relationship with Russia, and Russian military forces are deployed in India. This strong tie led to the joint development of the BrahMos supersonic cruise missile. With this in mind, even if Japan and India collaborate to develop new weapons, it is unlikely that the US would allow the two countries to equip the weapons they jointly developed with data link systems for sharing information with U.S. forces. Ultimately, this would likely undermine military effectiveness with the U.S. military forces.

RECOMMENDATION

Outcome Matrix

Table 2 below summarizes the alternative evaluation. As seen in the table, Alternative 3: Developing weaponry with other countries is most recommended.

Table 2. *Outcome Matrix*

	Producing weaponry domestically	Purchasing weaponry from abroad	**Developing weaponry with other countries**
Cost-Effectiveness	Low	Low	High
Feasibility (Political and Technical)	Middle	High	High

Impact (Domestic and Global)	High	High	High
Military Effectiveness	High	Middle	High
Recommendation			◎

Implementation

The United States of America

In the past, Japan developed the F-2 fighter jet and the SM 3 block 2A anti-ballistic missile in collaboration with the United States. In addition, the Japanese government has chosen Lockheed Martin as a technical assistance supplier for its F-X next-generation fighter development project. Therefore, the US is often a strong candidate for future joint development.

The United Kingdom

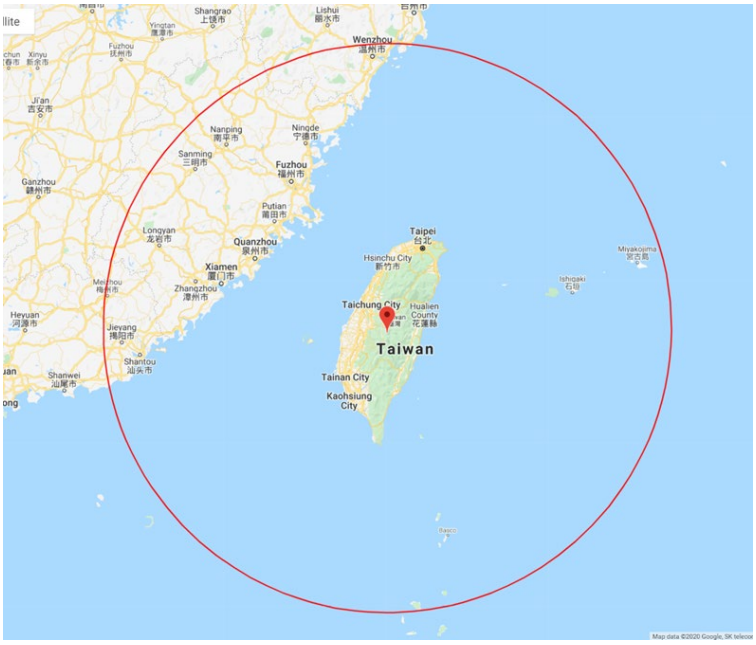
The United Kingdom is also jointly working with Japan on improving an air-to-air missile. Moreover, the UK is expected to join the F-X development project, cooperating in the fields of engine and high-performance radar systems. Pushing forward cooperation with the UK would be one of the most promising.

Taiwan

Taiwan and Japan are under Chinese threat, so they are pressing forward to increase their missile strike capabilities. For instance, in 2010, Taiwan and the US made an arms deal that stipulated that the US would sell Taiwan hundreds of the Harpoon anti-ship missiles that would improve its ability to fend off a potential naval invasion from China. Furthermore, Taiwan has decided to buy an upgraded version of the Patriot surface-to-air missile of Lockheed Martin as the island strengthens its forces to guard against a rising threat from China. Meanwhile, in March 2021, Taiwan announced that it had begun mass production of a long-range missile and is developing three other models to improve strike capacity amid growing Chinese pressure.

Japan is now developing hypersonic weapons by itself, and the range of which will be about 500km (300 miles). As depicted in the picture below, this range is enough for Taiwan to strike Chinese military bases on the coast without getting close to the border.

Figure 12. *A Reach of Missile with Range of 500 km*



Taiwan is not developing hypersonic weapons now but successfully developed a short-range ballistic missile Sky Spear, capable of striking targets on mainland China. This type of weapon is what Japan does not possess. Most importantly, the the two countries have strong diplomatic relations with each other. Therefore, co-development by Taiwan and Japan would bring significant benefits to the two countries, which is not exclusively limited to the national security field.

Australia

In June 2020, Australia decided to boost the defense budget by 40% over the next 10 years, purchasing long-range military assets that would be focused on the Indo-Pacific region. On the other hand, the Japanese cabinet decided in December of the same year to improve the Type 12 Surface-to-Ship Missile to extend its range from the current 200 km (120 miles) to more than 1,000 km (620 miles.) Unfortunately, a few weeks before that decision was made, Australia announced it would jointly develop air-launched hypersonic cruise missiles with the US. Moreover, in March 2021 , the country revealed the plan to build its own guided missiles in close collaboration with the US. However, if the timing was right, Australia and Japan, who are members of the QUAD

and share similar threats posed by China, would have been able to become partners.

In the first place, Australia and Japan had a chance to build Australian next-generation submarines together in 2014. At that time, the Australian government considered importing Japanese submarines, which were close to the Navy's performance demand, since producing its own submarines would carry a high level of technical risk. Then-Australian Prime Minister Tony Abbott and then-Japanese Prime Minister Shinzo Abe were on a first-name basis, calling each other "Tony" and "Shinzo," and signed a defense cooperation agreement to restrain China's advance into the Pacific Ocean. At the time, it was deemed certain that Japan would receive the order.

However, the Abbott administration's approval rating began to decline due to the economic slowdown at the time, and there was a growing voice that Australia would obtain no economic benefit if Japan received the order, since Japanese manufacturers seemed hesitant to produce the submarines in Australia. This forced Australia to hold competitive bidding, inviting France, Germany, and Japan to the table. Worse, Abbott resigned, and Turnbull, his rival, took office before the competition ended. Japan lost the strong support from Turnbull, and as a result, lost the competition that it had initially been cut out to win; instead, Australia chose France as a partner to build the next-generation submarines.

Nevertheless, this project has made little progress, while the costs have continued to swell and there are media reports that current Prime Minister Scott Morrison is considering canceling the project. This could be a prosperous opportunity for Australia and Japan to work together again.

CONCLUSION

I have explained how Japan's defense expenditure is fairly small compared to other important players in the Indo-Pacific region, the extent to which Japan's defense budget has increased in recent decades, and how Japan's current fiscal condition makes it difficult for the government to increase the defense expense to the level of 2% of GDP. Meanwhile, as technology rapidly continues to advance, weaponry has become more sophisticated and expensive, which is pressing Japan's defense budget. Thus, finding a cost-effective manner to procure weapons is essential.

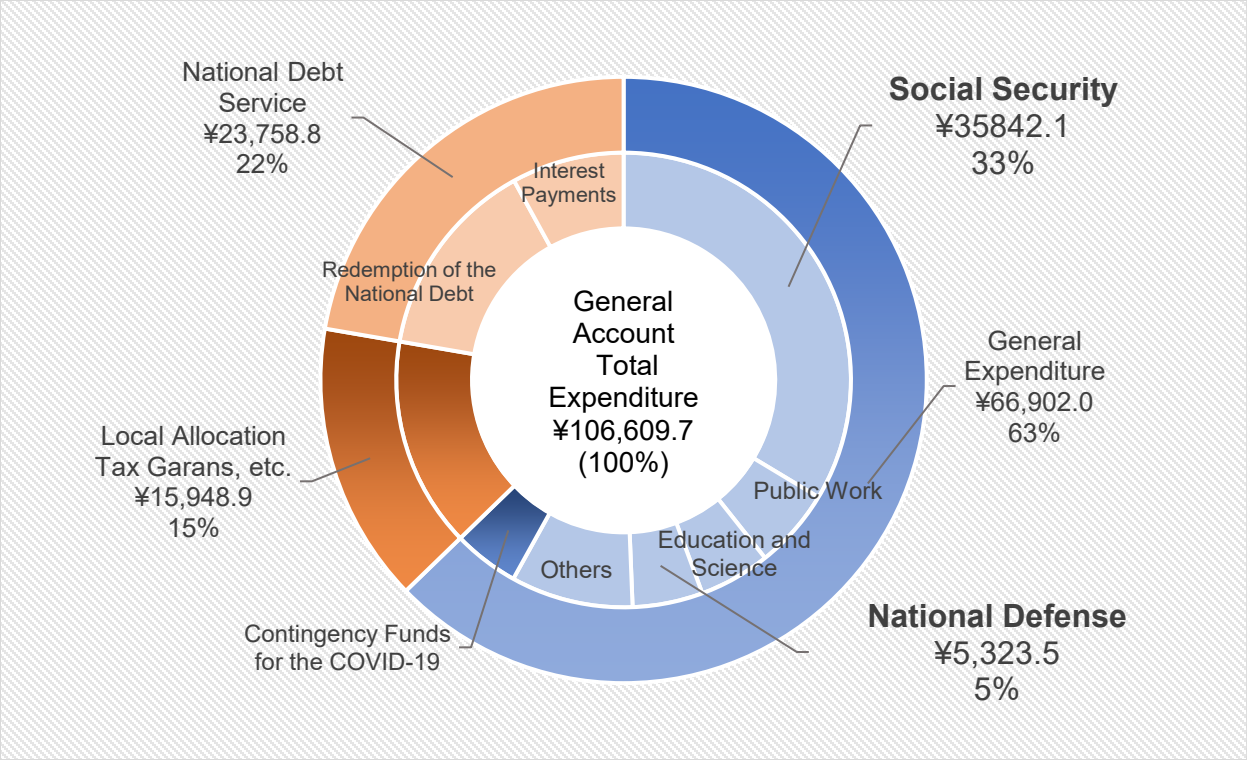
From the policy evaluation, I conclude that among the three alternatives, producing weaponry domestically, purchasing weaponry from abroad, and developing weaponry with other countries, the last option is more cost-effective than the others. Joint development would most effectively help Japan constrain the increasing equipment acquisition costs and preserve the domestic defense industry. Moreover, the saved budget would improve the working environment and conditions and alleviate the JSDF's personnel shortage. As a result, the strengthening of Japan's military capability would likely contain the PRC's aggressive and provo in the South China Sea and East China Sea cative activities. To this end, it is desired for the government, military, and industry to push forward flexible and bold joint development projects without adhering to precedents.

On the other hand, all three alternatives I introduced have their drawbacks, so it is important to balance them. In other words, it is advised to not focus exclusively on one alternative. Iwao Oyama, the Commander-in-Chief of the Japanese armies in Manchuria during the Russo-Japanese War, emphasized the importance of local production of weapons, saying, "without domestic production of weaponry, no true independent country,". Also, since it is undeniable that American-made weapons are generally more sophisticated than others, importing them is always an option.

As Omar Bradley, general of the U.S. Army and the first Chairman of the Joint Chiefs of Staff, stated, "Amateurs talk strategy. Professionals talk logistics." Logistics, including weaponry acquisition and maintenance, are crucial. Boosting its logistics with cost-effective weaponry acquisition would significantly enhance Japan's military capability, thereby positioning it to adequately address the threats/challenges posed by the People's Republic of China.

Appendix

Figure 13. *The FY2021 Budget: Expenditure and Revenue*



Note. The Figure was adopted from "Highlights of the FY2021 Draft Budget," by Ministry of Finance of Japan, 2021.

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