

A Policy-Centric Analysis on Japan's Defense Industries: From TPEA to TPTDET Regime

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Abstract: Abe Cabinet's substitution of the new Three Principles on Transfer of Defense Equipment and Technology (TPTDET) for the long-lasting Three Principles of Arms Exports (TPAE) has aroused debate over whether it has signified the abolishment of Japan's postwar pacifist policy, as well as whether it will stimulate the staggering Japanese Defense Industries. The purpose of this article is to explore the actual impact of policy, using TPEA and TPTDET as a case, on Japan's defense industries. The article has five sections. The first section introduces the background and significance of this topic, current research status, approaches to be used in the article, and the novelty of the research. The second section is an overview of Japan's defense industries under TPAE regimes. The third section covers the development and characteristics of the new TPTDET regime. The fourth section examines the implication of TPTDET to Japan's defense industries. The fifth section is the conclusion.

Keywords: Japan, Defense Industry, TPAE, TPTDET, policy.

INTRODUCTION

Background and significance

The modern structure of Japan's heavy industry dated well back to the 1880s, after the Meiji Restoration, established alongside with modern Japanese military. Thanks to the extensive transplantation of industries from advanced countries, Japan's heavy industry has achieved a rapid growth in productivity, technology and management since the 1890s. The reforms following the Great Depression in 1930s have further diversified the heavy industry, pushing it to the peak as Japan was on its way to wage a war.

The total defeat of Japan in WWII marked the end of Japan's heavy industry and the economic basis it relied upon. Postwar Japan, especially its military affairs, has always been in a subtle condition under various influences, among which one of the most heavily affected is the resurrected defense industry. The development of postwar Japan defense industry is, in many ways, subject to policy and regime changes. The long-lasting Three Principles on Arms Export (TPAE) provides an example for reference. Recently, the TPAE itself has been replaced by the new Three Principles on Transfer of Defense Equipment and Technology (TPTDET), provoking public concern about the effect of the new regime.

The significance lying behind the study of TPTDET is twofold. First, it facilitates establishing an

economic relationship between a certain regime and a specific industry, which may explain the rationale of the changes done to the regime and the government's implication expressed through the changes. Second, it is a case of realistic meaning that involves economics, international relationships, politics, etc. The study can explore the factors of a governmental decision, as well as possible reactions from various parties.

Current Research Status

Japan defense industry has always been a heated subject of study due to its sophistic and unique nature. For the background of immediate postwar Japan heavy industry, Kauko Laitinen [1] has conducted a brief comparison of Japan and the United States in military industry, especially about women's work. In regard to the labor relation development of Japan defense industry, Andrew Gordon [2] has written an article consisting of interwoven case studies of 5 major firms in the Tokyo-Yokohama region, showing the ambivalent state of Japanese management and labor system.

As the remilitarization proceeds, public concern about whether politic regimes can no longer check and balance the Japanese defense industry arises. In his article Bee Yun Jo [3] used a rationalist firm-centric analysis on Mitsubishi Heavy Industries to find out whether firms or policies are the actors for profit maximization in Japan defense industry, and listed

several examples to point out main sources for Japan Inc.'s reinvigoration in the arms building.

Approaches of the research

This paper will mainly incorporate two research methods: Documentary Research and interdisciplinary research. This paper will combine the published TPTDET text with the existing archives about Japan defense industry, defense strategies and import and export restrictions, etc. to analyze the relationship between industry and policies from a fact-proven perspective. Also, studies of international relationships, politics and finance will also be utilized as well as those of industrial economics to establish a comprehensive influence of the new TPTDET regime.

Novelty

Since Prime Minister Abe declared to change Japan's national defense strategy on July 1st, 2014, the debate of its effect on Japan defense industry, especially on arms import and export has been heated. Nevertheless, given the limitation of its time, little research has been done about the new TPTDET text and the most of the research was from the perspective of politics. By the time this article is written, the whole text of TPTDET has been unveiled and started to show its effects, which helps to analyze precisely with the combination of up-to-date examples.

OVERVIEW: JAPAN'S DEFENSE INDUSTRIES UNDER TPAE REGIMES

Background of TPAE

In terms of output, Japan's heavy industries have achieved remarkable growth since its industrialization beginning in the late 1880s. This holds especially true after the outbreak of war with China in 1937. The rapid growth can be partly explained by the relocation of investment in equipment, capital and labor. Most of the heavy industry products recorded peak of production in late war as the last ditch effort to boost the output. Steel production peaked at 5.6 million tons in 1944, Aluminum production peaked at 110.3 thousand tons in 1944 [4], and Machinery production peaked at 135.6 in 1944. With the fast growth of heavy and chemical industries, the weight of metal, machinery and chemicals production in total manufacturing output rose in an acute manner while civilian-purpose light industry, which used to be Japan's major labor and export contributor, has met a slow decline since the latter half of 1930s. Shares of heavy and chemical industries in total output rose to a record-breaking 79% in 1944 [5], reflecting a heavy focus on satisfying wartime demand.

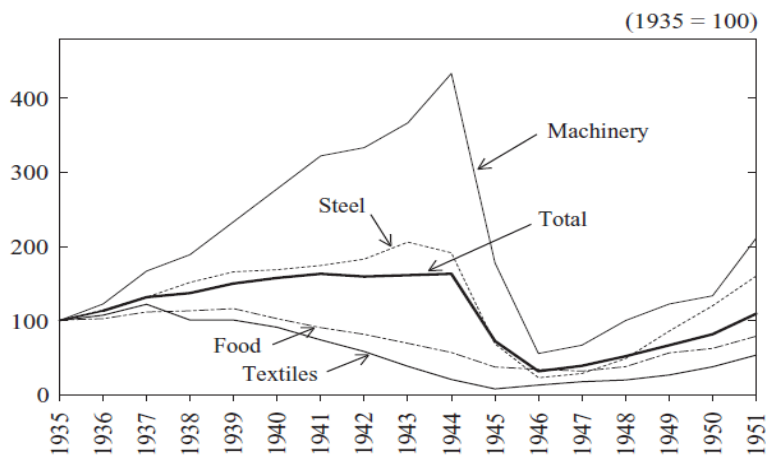


Fig-1: Main Industrial Product Index [6]

The output of heavy industry of Japan dropped sharply in the late stages of the war. This was mainly attributed to the damage inflicted on the industrial infrastructure of Japan. Postwar study suggested two major reasons that contributed to the collapse of Japan's wartime heavy industry: The blockade of sea transport, which prevent Japan from importing energy and raw

materials; and Strategic bombing, which crippled the manufacture plants and transport lines, as well as decimated the labor force needed in heavy industry. As the war came to an end, the heavy industry of Japan was severely damaged, with general industrial production index being only 20% of the highest level [7].

Table-1: The loss of heavy industry due to war [8]
(In millions of Yen at immediate postwar prices)

Type of Asset	Prewar	Postwar	Ratio of loss
Ships	9,125	1,796	80.3%
Industrial machinery	23,346	15,352	34.2%
Industrial materials	32,953	25,089	23.9%
Structures	90,435	68,215	24.6%

Postwar Japan's defense industry was given a confined space of development. As Japan was indirectly ruled by GHQ [9] before the Treaty of San Francisco, Japan's economic reconstruction was sternly directed and scrutinized by the GHQ, which envisioned a Japan with mediocre economic level and no military forces. The massive and systematic demilitarization and disposal of the remnants of Japan's war-making capacity (e.g. Zaibatsu, a Japanese form of plutocrat) effectively halted Japan's defense industry [10]. This did not change until 1950, when the escalation of Cold War has changed world situation and Japan was allowed to rearm itself, and Japan's defense industry was resurrected. The general economic liberalization, combined with a procurement of 1560 million dollars from contracts during Korean War, direct financial assistance provided by the US and encouragement of machinery production inspired by Korean War all contributed to the postwar reconstruction of Japan's defense industry.

The defense industry of Japan, however quickly it reconstructed, were always developed with pacifism in mind. During Shigeru Yoshida's office, heavy industries such as Metallurgy, mining, chemical and automobiles were encouraged and formed the backbone of Japan's economic growth. On the other hand, military-related defense industry was intentionally refrained and the strategy towards defense industry from Yoshida Doctrine succeeded to the cabinets to come. The major reason of this strategy was not industrial strength, but the pacifism trend among war spite Japanese people. Actually Japan's defense industry was substantially developed during the postwar period. After U.S. and Japan Mutual Defense Assistance Agreement (MSA) were signed, Japan received a total of 5760 yen military assistance, allocating to 27% the sum of Japan's military procurement that year. With further assistance in technology and finance, Japan obtained the capability to produce high-end defense machinery and products, and arms export becoming a viable choice to trade for the much needed foreign currency. The remilitarization move, however, was met with public resistance, culminating in the massive protests and riots in the 1960.

In the light of abating the stressed domestic political situation and clarifying Japan's position in the Cold War, Prime Minister Eisaku Satou first proposed the then famed Principles of Arms Exports (TPAE), which is often translated as to embody Japan's postwar antimilitarism as the Three Principles have explicitly

prohibited the export of arms to the following countries or regions:

- (1) Communist bloc countries
- (2) Countries designated as arms export embargo under the resolutions of the United Nations Security Council (UNSC), and
- (3) Countries involved or likely to be involved in international conflicts (Ministry of Foreign Affairs of Japan, 2014 a).

In 1976, Japanese government further adopted a guideline in the Diet to stipulate a more expansive ban on arms exports to the countries that were not included in the TPAE. Based on the commitment to non-arms exports and small arms industry, the TPAE presented Japan as a pacifist nation.

Impact of TPAE

Serving as an exertion of the postwar national policy, the TPAE is designed to have long-term effects on the defense industry of Japan. The effects are threefold: Limitations of market size, high cost, and the emergence of dual-purpose technology.

Limitations of Market Size

During the time TPAE was in effect, Japan has been enforcing a prohibition against the export of complete weapon systems to overseas customers. After 1967, Japan's arms export dropped in a quick session. The embargo was aggravated as Prime Minister Takeo Miki further tightened the regime by taking machinery into restricted goods. From 1976 to 1990, Japan's complete arms export is virtually non-existent [11].

Consequently, the bulk of the market for Japan's defense industry came from domestic demands, and Japan's export potential in defense is ultimately tied to the strength of its domestic market. This is a two-side blade for the defense industry. On one hand, Japan's defense industry has been protected from fierce domestic and international competition through close government attention, which ensured a stable development.

On the other hand, dependence on domestic demands instead of foreign markets limited the experience of Japan's defense industry because of the relatively small size of Japanese military R&D and acquisition. As shown in the table below, the 1% ceiling of defense expenditure share in GNP, coupled with comparatively low ratio of R&D and acquisition in defense budgets, greatly affected the size of domestic markets.

Table-2: Defense Expenditure Trends, 1975-1990 [12]

Year	Budget	R&D	Acquisition	R&D and Acquisition	Defense/GNP	R&D and Acquisition/Defense	Personnel/Defense
1975	1327	11.9	252	263.9	0.84	19.9	52.9
1976	1512	13.6	248.5	262.1	0.9	17.3	56
1977	1691	15.2	293.9	309.1	0.88	18.3	55
1978	1901	17.1	325.8	342.9	0.9	18	54.4
1979	2095	21	392.5	413.5	0.9	19.7	51.4
1980	2280	22.3	460.9	483.2	0.9	21.7	49.3
1981	2400	24	539.9	563.9	0.91	23.5	47.7
1982	2586	28.4	580.3	608.7	0.8	23.5	46.6
1983	2754	30.3	684.4	714.7	0.98	26	44.5
1984	2985	85.2	772.5	807.7	0.99	27.5	44.6
1985	3137	50.2	822.1	872.3	1	27.8	45.1
1986	3344	56.8	899.7	956.5	0.99	28.6	45.1
1987	3517	66.8	965.7	1032.5	1	29.4	43.9
1988	3700	74	1038.9	1112.9	1.01	30.1	42.7
1989	3920	82.3	1097.6	1179.9	1.01	30.1	41.2
1990	4159	92.9	1140.3	1233.2	1	29.6	40.1
1991	4386	102.9	1216.2	1319.1	1	30	40.1

High Cost

Japanese defense products are infamous for its exceedingly high unit price compared with those of other countries. Japan Ministry of Defense usually estimates the cost of a domestically developed at three times the cost of a comparable foreign design. American manufacturers experienced in licensing production in Japan cited that Japanese production costs as 50% to 200% higher than in the United States [13].

One of the most quoted examples of the high cost phenomenon is the tanks, since tanks are the comprehensive products of a wide range of defense industry sectors. In 2014, The Type 10 main battle tank, produced by Mitsubishi Heavy Industries for Japan Ground Self Defense Forces (JGSDF), costs approximately 8.4 million US dollars [14]. For comparison, a German Leopard 2 costs 5.74 million US dollars [15], while having similar, if not better combat effectiveness due to the same cannon, similar armor and power plant.

Numerous factors have contributed to the high cost of Japan's arms products, many of them are related with TPAAE regimes. One source of high costs comes from the limited market demand mentioned above; the resulting small scale of production has prevented Japan's defense industry from achieving economies of scale. Although numbers of units in most Japanese weapons procurements are usually small, Japan Ministry of defense favors stretching out production at low, inefficient rates over an efficient short term production that can finish the order quickly, thus raising the costs. A good example of economies of scale might be the Russian T-90, more than 3200 have been produced to meet both domestic and international

demands, each tank costs 4.25 million dollars maximum [16], half the price of a Type 10.

Another source of high costs comes from the low R&D rate, which has caused dependency on license production of foreign systems, as the license fee increases, the unit cost swells as well. Apart from the limitations in TPAAE, Japanese firms also have a tendency to treat their indigenous technologies as valuable assets and are unwilling to trade them in order to keep their technological advantage. This, coupled with the inexperience of defense industrial firms to integrate complex projects, the inexperience of Japan Ministry of Defense in purchasing military products and other reasons, are all responsible for the currently high cost of the defense industry products.

Emergence of Dual-Purpose Technology

The limitations of arms export cast by TPAAE have inspired the so-called dual-purpose technology, technology applied by both military and civilian. The then Japan Defense Agency was well aware the value of dual-purpose technology, affirming that "the Defense Agency is heavily relying on the private sector, while carrying out research to enable these private sector technologies to apply to future advanced defense equipment." [17]

The development of dual-purpose technology has two benefits. First, it circumvented the limitations of TPAAE, which has dubious explanation about exports of civilian products and technologies that can be used by the military. By taking advantage of the dual-purpose loop, Japanese firms enjoyed significant defense business while adhering to the government restrictions. This makes difficult to assess the actual number of Japanese defense-related export. For instance, in the

area of aircraft sales, it has been estimated that only \$14 million in defense-related exports originate in Japan annually, which is very likely to have underestimated the extent of Japanese exports to the US for defense purposes [18]. Also, the revenues from dual-purpose products can help cover the losses inflicted by low R&D. The experience from the US that defense industry can benefit from defense spin-offs were growing increasingly obsolete as the division between civilian and military technology enhanced, and initial investment for the military technology skyrocketed. Instead, under the regime of TPAE, it is believed that it is the civilian technological base that makes Japanese defense technology interesting. An executive from NEC's defense division noted: "In Japan, it is the civilian technologies that are being turned to military applications, and the utilization of defense technologies for non-military products is almost non-existent" [19].

INTRODUCING TPTDET

As mentioned above, TPAE regime has certain effects on Japan's defense industry, most of them being negative effects. As the world situation changes, perspectives towards TPAE have also changed accordingly. Under the background of 21st century, the existing TPAE was modified to meet the new strategy, thus creating the TPTDET.

Development of TPTDET

The world setup is vastly different from the one in which TPAE was purposed. The Cold War ended with the demise of the Soviet Union and its satellite countries. A pluralistic world is rising as the economic globalization proceeds. The change also applies to

Japan. In 1967, Japan has a GDP of 123.7819 billion US dollars. By 2014 it has already grown into 4.6015 trillion dollars [20], ranking third in the world.

What doesn't tally with the economic position of Japan is its subtle state identity. It has been 70 years since the end of WWII and defeat of Japan, yet currently Japan does not own the sovereign right of belligerency and are not permitted to maintain an armed force with war potential. As the Japan economy came to stagnancy since the economics bubble crash in the 1990s, voices are that through the "normalization" of Japan, more industries can be liberated from the untimely limitations constituted since the end of WWII to suit better for global industrial restructuring, thus realizing a better allocation of resources.

The reinterpretation of the TPAE is among many of the moves to achieve the goal of Japan being a "normal country" which, contrary to popular belief, started well before Abe Administration. However, the reinterpretation does not come solely from political considerations. In the post-Cold War defense environment, continuing the relatively closed domestic defense market or license-producing products from the United States is becoming increasingly unrealistic as the domestic defense market proved too small to keep the defense production plants necessary to produce defense equipment meeting the standards, especially when the procurement level has decreased significantly after the Cold War, as well as the US being reluctant to provide cutting-edge production-licenses of technology to foreign countries, for example, the Lockheed-Martin F-22 [21].

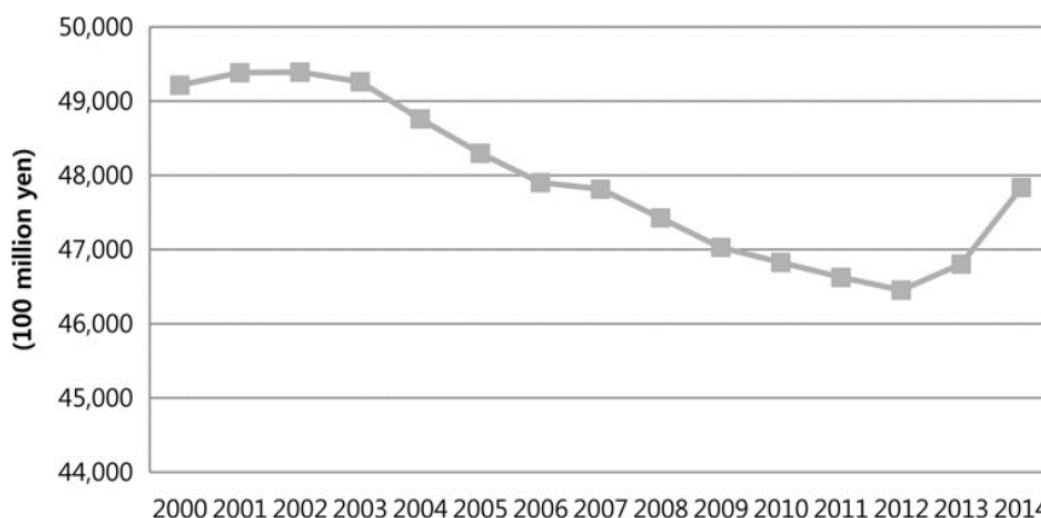


Fig-2: Japan's Defense Expenditures Trend (2002–2014) [22]

Since the technology-driven defense equipment development became the trend, wars in Iraq, Yugoslavia, and Afghanistan have proven the irreplaceable role technology played in modern warfare. But to integrate high technologies into the military, huge amount of fund in R&D, production, maintenance,

etc. is necessary. The fund often exceeds the capacity of a single country, even the US, leading to multinational joint programs in defense industry. As long as Japan restricts itself from such cooperation in the form of TPAE, it has effectively blockaded its own future. In

summary, a change in policy is needed for Japan's defense industry to survive. Hence, TPTDET was born.

Characteristics of TPTDET

Although Japanese defense industry has become widely portrayed as on the tip of a significant "change" upon Abe Cabinet's replacement of TPAE for the new TPTDET, the latter is not a total overturn of the existing regime. The new guidelines for defense equipment transfer established under existing law are consistent with legislative and administrative decrees to date, and do not significantly alter existing measures outlined in past exemption statements. In fact, these new guidelines reconfigure existing arrangements to permit security cooperation through relaxation of regulations rather than complete amendment. Even the number of the principles (three) has been inherited.

That being said, several alternations have been done to the TPAE text. As a result, several novel characteristics has been shown, namely

Expanding Exemptions

On the second principle of the new regime the wording has been changed to "Limitation to cases where transfers may be permitted as well as strict examination and information disclosure", after which are two cases of exemptions, namely-

1. Transfer (that) contributes to active promotion of peace contribution and international cooperation
2. (Transfer that contributes) to Japan's security [23].

After case 2 there is a list of situations satisfying the aforementioned contribution, including international joint development and production projects, enhancing security and defense cooperation and supporting the activities of the Self-Defense Forces. In this sense, the exemptions of embargo have been significantly expanded.

Enhanced Government Involvement

The new third principle emphasized the significance of government involvement in examination and monitoring. The new principle outlines the process for examination and approval of defense equipment transfers from the Ministry of Economy, Trade and Industry and the Ministry of Defense; the role of licensing authorities; ministerial-level consultation mechanisms; and the role of the newly established National Security Council (NSC) in making final decisions.

Deletion of Obsolete Provisions

Given that the TPAE was enacted during the Cold War, a number of the provisions are written in accordance with the Cold War ideology. These provisions are deleted in the new TPTDET, as in the first principle, a clause related to transfers to communist countries was deleted. The new principle also puts a cap

on futile debate about "countries party to a conflict", which aimed for the then Japanese opposition parties.

IMPLICATION OF TPTDET TO JAPAN'S DEFENSE INDUSTRIES

The TPTDET of 2014, combined with the subsequent Strategy on Defense Production and Technological Bases in June 2014, has laid down the executive outlines for the export of defense equipment and technologies under current Japan's national defense strategy. As an economic move to liberalize defense industry, the actual meaning of TPTDET may be twofold: It encourages more active international defense industry cooperation, as well as solving some structural deficiencies.

Encouraging Effects

With the long lasting embargo on defense industrial products partially lifted, TPTDET has paved the way for the transfer of defense equipment and technologies in the name of maintaining Japan's security. As the investment and technology get their clearance to flow through different countries, Japan is facing a rare opportunity to forsake the long established industrial position of producing foreign (especially United States) designs under license and take its part in the joint programs, which is a critical step to master the core technology and consequently form its own indigenous R&D capability.

A rational case explaining the encouraging effects of the new TPTDET is the acquisition of the F-35. Lockheed Martin F-35 is a family of fifth generation stealth jet fighters designed to be capable of performing both air defense and ground strike missions. Its state-of-art design and versatility has drawn the attention of Japan, which announced on 20th December, 2011 its intent to acquire 42 F-35s as Japan's next generation fighter, replacing the severely aging McDonnell Douglas F-4EJ [24]. Japan's procurement of F-35s is the first case to establish as an exemption from the TPAE, in that some Japanese firms, namely Mitsubishi Heavy Industries, participate in both importing and exporting some finished aircrafts. Japan has also participated in producing components and parts for other F-35 customers, with Mitsubishi Heavy Industries (MHI) responsible for producing the fuselage and IHI for the engine. Both of the transaction would have infringed the 1967 TPAE, but regime changes have made possible Japan's active participation in producing, equipping and trading this fifth generation stealth fighter. Recent cases also involve MHI producing components for PAC-2 Patriot surface-to-air missiles that will export to Qatar, and joint research of missile technology with Britain. As the limitation being lifted, it can be safely assumed that with the more relaxing TPTDET in effect, Japan will experience an increasing number of similar defense industry transactions.

Solving Structural Deficiencies

The new TPTDET, with its enhanced government involvement, may help to solve the chronic problem existing in Japan's defense industry. Before TPTDET, The procuring services of Japan did not have the support of specialized technical organizations of the type created in the United States to assist in both requirement generation and program management, such as the Applied Physics Laboratory, MITRE Corporation, or the Aerospace Corporation.

One of the consequences is that the military, JSDF is kept an inexperienced buyer in setting product requirements, purchase numbers and equip plans, leaving the initiative to factors such as the preference of engineers, the profits of industrial firms or even politics instead of tactical and strategic needs.

Another consequence is that without a governmental decision making unit, defense industry firms tend to act upon the rule of profit maximization. Firm's lack of incentives can be best illustrated in the case of the exporting Sōryū-class submarines. Sōryū-class submarine is the embodiment of postwar Japanese maritime submarine development. With the cutting-edge air-independent propulsion system, it is one of the most advanced diesel-electric attack submarines. Countries such as Australia, Philippines and India have all shown avid interest in purchasing this class of submarine. Australia even proposed a joint development and production, in which Australia produces some components as well as participates in the final building and maintenance [25]. Nevertheless, MHI and Kawasaki Heavy Industry (KHI) have both shown their "strong reservations" about the submarine deal, for fearing taking long-term risks in international arms sales because of the longer life of operation requested by Australia [26].

The increasing government involvement in monitoring transactions will help correct the firm's tendency. Especially the newly established National Security Council (NSC) will make decisions based on the principle of transparency and overall merits instead of short-term profits. The transparency has always been a problem hampering Japan's defense industry before the outbreak of WWII as factionalism and bureaucracy of different firms soared. If the government involvement plays its role, the persisting problem may face a final solution.

CONCLUSION AND FUTURE PROSPECT

At first, the article uses several statistics to show the economic status of postwar Japan, and the background of the TPAAE regime, with TPAAE text at the end of the background section. Next, three impacts of TPAAE on Japan's defense industry are discussed, namely: limitations of market size, high cost, and emergence of dual-purpose technology. After that, the

new TPAAE regime, also known as TPTDET is introduced, with emphasis on its development and three main characteristics. Consequently, based on previous discussion and real life examples, the implication of TPTDET to Japan's defense industry is clarified. The new regime will have encouraging effects as well as solve a number of structural problems.

Japan was once a considerable heavy industry power in the East Asia. The defeat of Japan in WWII has largely impaired Japan's heavy industry capacity. When postwar Japan was trying to reconstruct its heavy industry, defense industry was intentionally controlled and limited in accordance with the pacifism among Japanese people, this pacifism culminated in the TPAAE.

Regardless of the initial idea of enacting TPAAE, the TPAAE has negative effects on Japan's defense industry development. The market was limited to virtually just domestic demands in Japan, resulting in the high unit cost of defense industry products and heavy technological dependence on the United States. On the other hand, in order to circumvent the limitations of TPAAE, the dual-purpose technology in Japan flourished, accounting for some invisible arms export profits.

As the time passes, the TPAAE proved increasingly unfavorable for Japan's defense industry. In the light of liberalizing the industry, the TPAAE was reinterpreted in the 21st century, thus creating the TPTDET. This new regime holds some novelty from the old version, as it expands the exemption to promote arms export, increased government involvement as well as deleted some untimely provisions. It can be speculated that the new TPTDET will imply two effects. First, it will encourage Japan's defense industry to actively participate into international joint programs and alike, as shown in the F-35 case. Also, it will resolve some of the problems that trouble Japan's defense industry in a structural deficiency manner, such as the lack of decision making unit, and the firm's short-sightedness.

Given the short time and limited materials, the article is written in a hasty manner, with some of the viewpoints not bolstered by solid statistics. For examples, the statistics of procurements in the late 20th century are missing, which leave the assumption that governmental procurements shrunk after Cold War somewhat unwarranted because of the data discontinuity. To sum up, there are still many ways in which this article can be improved.

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