The Impact of United Nations Sanctions on North Korea (DPRK)

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Abstract

The impact of the non-proliferation sanctions imposed by the United Nations Security Council on North Korea has been in question due to their nuclear explosion tests regardless of the adoption of those sanctions. Yet the research demonstrating the impact of the sanctions at the macro level is very limited. By conducting trade data analysis for non-proliferation purposes, this article reveals the patterns of exports that are possibly subject to the sanctions by North Korea's main trading partners and identifies if those trends are in line with the objective of the sanctions, impeding the development of North Korea's Weapons of Mass Destruction (WMD) programs without negative effect on its general population. Based on the result of the data analysis, the article shows that there was a significant shift in North Korea's procurement markets for sensitive items and concludes that the sanctions had the intended effect for a limited time period at the international level and that the size of the North Korean industries directly affected by the sanctions are relatively minor. The analysis on trading propensity at the individual state level and the overviews of their export control systems are provided, which are followed by the recommendations for robust export controls and for effective implementation of the sanctions.

Keywords

UN Security Council, sanctions, North Korea (or DPRK), non-proliferation, cxport controls, trade data analysis

Introduction

In response to the DPRK's nuclear tests in 2006 and 2009, the United Nations Security Council adopted resolutions 1718 and 1874 acting under Chapter VII of UN Charter. The objectives of the sanctions on the DPRK were to impede the DPRK's weapon program, secure time for a diplomatic solution, and maximize the effect of the sanctions without negatively affecting the DPRK's population through adequate

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implementation.[2] Notwithstanding the adoption of sanctions, the DPRK conducted its third nuclear test in 2013, which prompted a significant number of debates between policy-makers with respect to the effectiveness of the sanctions.[3] There is a great deal of research addressing the DPRK's illicit trafficking and the violations of the sanctions conducted by many institutions, scholars, and groups including the UN Panel of Experts. Most of them focus on individual case studies and the DPRK's trafficking techniques. However, in order to assess the impact of the sanctions and States' implementation, it is more appropriate to approach the issue from a holistic perspective. In this regard, this study focuses on the trends of international trading flows associated with the DPRK in order to explore how resolutions 1718 and 1874 affected the DPRK's economic ties with other States as well as the trading flows possibly subject to the sanctions. The recommendations for effective national export control systems and implementation of the sanctions are provided based on the findings, and the paper also introduces a methodology for quantitative research for export controls related studies.

United Nations Security Council Resolutions 1718 and 1874

Condemning the DPRK's nuclear tests as "a clear threat to international peace and security," the United Nations Security Council unanimously adopted resolution 1718 under Chapter VII of UN Charter on October 14, 2006. Resorting to Chapter VII power allows the Security Council to take enforcement measures against assumed threats, and those measures are generally interpreted as legally binding to all UN Member States. Each action invoked in such resolutions also can be categorized as mandatory and hortatory clauses depending on how the language was codified in its operative paragraphs.[4]

The mandatory actions, operative paragraphs beginning with "Decides" or "Shall" required under resolution 1718, are as follows: ban on transfer from or to the DPRK of chosen heavy arms and the items listed in S/2006/814, S/2006/815, and S/2006/816; prevention of exports of luxury goods to the DPRK; freezing assets of and prohibition of travels by the DPRK persons designated by the Security Council; and rejection of any technical training or service related to the aforementioned actions. To be specific, the items on the lists S/2006/814-816 are adopted from the guidelines of the Nuclear Suppliers Group, Annex of the Missile Technology Control Regime, and Common Control Lists of the Australia Group respectively while there is no certain list for luxury items. For ensuring the compliance of the requirements under resolution 1718, Member States are also called upon to take cooperative action such as cargo inspection under the hortatory clause.[5]

Following the DPRK's second nuclear explosion test in 2009, resolution 1874 was adopted by the Council resorting to the power of Chapter VII. Resolution 1874 presents the expanded scope of measures laid down in resolution 1718 and introduces new measures with both mandatory and hortatory natures. The ban of exports of the designated heavy conventional arms under resolution 1718 was expanded to all arms and related material except for small arms and light weapons, and the updated NSG list, INFCIRC/254/Rev.9/Part 1, was also included. Any bunkering service for vessels associated with the listed items has been prohibited, and Member States are required to seize and dispose those items and to report such cases to the Security Council Committee. As a part of hortatory measures, resolution 1874 requests Member States to conduct inspection of cargo and vessels upon reasonable grounds and not to enter into new financial commitments with the DPRK other than humanitarian and development purposes.[6]

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[2] "UN Sanctions on the Democratic People's Republic of Korea : Prospects and Problems," International Institute for Strategic Studies, March 19, 2013, http://www.iiss.org/en/events/events/archive/2013-5126/march-ea59/un-sanctions-on-the-dprk-prospects-and-problems-workshop-1ab4.

[3] Gallo, William. "Effectiveness of UN Sanctions on North Korea Questioned", *Voice of America*, February 5 2013. http://www.voanews.com/content/effectiveness-of-un-sanctions-on-north-korea-questioned/1597381.html.

[4] United Nations Security Council Resolution 1718, S/RES/1718, New York, October 2006.

[5] Ibid.

[6] UN Security Council Resolution 1874, S/RES/1874 (2009), New York, June 2009.

The unique feature of resolutions 1718 and 1874 is that they are equipped with an unconditional prohibition on exports of sanctioned items to the DPRK. For example, resolution 1737, imposed on Iran under chapter VII of UN Charter in 2006, prescribes that a part of items subject to the Nuclear Suppliers Group dual-use control list shall not be exported to Iran "if State determines that they would contribute to enrichment-related, reprocessing or heavy water-related activities."[7] Conversely, paragraph 8 of resolution 1718 stipulates that Member States "shall prevent the direct or indirect supply, sale or transfer to the DPRK" of the sanctioned items. While the sanction imposed on Iran in 2006, although it was strengthened later, leaves room for Member States' judgement on exports to Iran, the sanctioned items under resolution 1718 cannot be supplied to the DPRK regardless of the intended application of imported goods by end-users.

Methodology

Among the obligations under the sanctions regime, this article focuses on the impact of paragraph 8(a)(ii) which requires states not to export items on the control lists of the NSG, the MTCR and the AG. Bearing in mind that the objective of the sanctions on the DPRK are to slow down the DPRK's WMD programs without negative effect on the livelihood of its general public, this study assumes that the ideal implementation of resolutions 1718 and 1874 would be shown as decrease in exports of the sanctioned items to the DPRK amidst sustained trading relations. In this regard, this study examines the propensities of trade flows of the chosen subject entities, and that subject group includes 12 UN Member States, who are normally known to as DPRK's main trading partners and two special regions considering their significant values of trade with the DPRK. Those 14 customs regimes cover China, Germany, India, Indonesia, Italy, Japan, Malaysia, Philippines, Russia, Singapore, Sri Lanka, Thailand, Hong Kong and Taiwan. The Republic of Korea was not included due to the absence of reported data for several years in the database. Since the trading statistics were only available until 2012 at the time of writing, this study focuses on the international trade flows involving the DPRK for the period of 2004-12; therefore, the impact of resolution 2094, which was adopted in 2013 against the DPRK's third nuclear test, was not taken into account.

Open Source Trade Data Analysis

This study employs a quantitative research based on open source trade data analysis to understand the impact of sanctions on the trade in sensitive goods to the DPRK. There are several trade databases which are open to the public or available upon subscription such as UN ComTrade, COMEXT, and the Global Trade Atlas. These databases are structured with the Harmonized Commodity Description and Coding System, or HS codes, and differentiating between sensitive and non-sensitive codes is an essential part of this methodology.

The Harmonized System was designed by the World Customs Organization (WCO) and adopted at the International Convention on Harmonized Commodity Description which entered into force in 1988. As a standardized tariff nomenclature system between customs agencies, HS codes contribute to facilitating international trade by simplifying classification of traded commodities with six digit numbers. Chapter, the first two digits of HS code, classify the type of traded commodity, and the item is further clarified with subsequent digits known as Headings and Sub-headings which are each of two digit numbers. For example, Chapter 85 classifies a commodity as an electronic machinery, equipment, and its parts. Heading 01 under Chapter 85 further specifies that the product is an electric motor or generator. The following Sub-heading 10 clarifies the type of motor or generator and output of it with limited details, so that items falling under HS code 850110 are electric motors with output not exceeding 37.5 Watt. Depending on industrial needs for more specific classification of commodities, it is States' discretion

[7] United Nations Security Council Resolution 1737, S/RES/1737, New York, December 2006.

to add more digits to internationally consistent six digit codes in their nomenclature system. HS codes specified to the 12 digit level exist in some instances.

This study utilizes the Global Trade Atlas, a trade database offered by Global Trade Information Services, which provides the trade data collected from about 80 national customs agencies or relevant national institutes. The database enumerates the commodities presented with HS codes, traded by each customs regime by year, and the associated quantities and amounts are also provided. Due to the absence of import data of the DPRK in the database, the research was conducted through collecting the export data of the subject group of this study.

In order to distinguish the exports of products restricted under the sanction regimes from the regular commodities exported to the DPRK, a list of HS codes possibly indicating the items on the control lists of the NSG, MTCR, and AG was created through the textual comparison between the official definition of each HS code by the World Customs Organization (WCO), the control lists of three Multilateral Export Control Regimes (MECRs), and the HS Codes Concordance List for goods controlled under the Strategic Goods (Control) Act which was issued by Singapore Customs. Although there is a list providing HS codes related to dual-use products such as the EU Correlation table, it was necessary to establish a new list for this study as the scope of HS codes appearing in that table are too broad to be referred to. For instance, according to the Correlation table, HS codes representing uranium ore are also classified as nuclear material while the IAEA definition on nuclear material excludes ore or its residue.[8] The Singapore list postulates the limited number of HS codes with its possible applications which are almost analogous with the item descriptions prescribed in the control lists of the those three MECRs.[9] By retrieving those corresponding descriptions and listing the associated HS codes only whose official definition at six-digit level is logically connected to the descriptions on the MECRs, the list created for this study enumerates HS codes possibly subject to the sanctions and connect each code to applicable descriptions listed on the MECR guidelines.[10] For example, the descriptions of HS 902730 in the Singapore list is identical to the NSG Guidelines as a mass spectrometer for uranium enrichment and isotope separation, and its official definition by the WCO is spectrometers, spectrophotometers and spectrographs using optical radiations, so that HS 902730 became a part of the list under the NSG section. Finally, the trading statistics provided by GTIS were filtered by that list, and it was able to review the value of trades possibly subject to resolutions 1718 and 1874 by looking at the aggregated data.

Limitation and Significance of the Methodology

Analyzing trade data only with HS codes has certain limitations in fully revealing the dual-use nature of the items exported to the DPRK.[11] Generally, the HS codes on the list of this study involve a broad range of variation in the level of reflecting the dual-use nature of the traded items. While some HS codes unambiguously identify the dual-use nature of traded commodities such as nuclear material, heavy water, and chemical weapons precursors at 6-digit or 8-digit HS level albeit with limited details, some dual-use items for nuclear, chemical and biological weapons production are hard to be identified only with HS codes due to its various industrial applications. To be specific, HS 284420 classify exporting commodities as uranium enriched in U235 and its compounds, plutonium and its compounds, dispersions, ceramic products and mixtures containing uranium enriched in U235, or plutonium or its compound. These are fall under the definition of nuclear material according to the IAEA Statute and subject to control in its

[8] INFCIRC/153, Paragraph 112, International Atomic Energy Agency, June 1973.
[9] HS Codes Concordance List for goods controlled under the Strategic Goods (Control) Act, Singapore Customs
[10] "Guidebook on the Determination of Strategic Codes." The HS Codes Concordance List for goods controlled under the Strategic Goods (Control) Act," Singapore Customs, http://www.customs.gov.sg/NR/rdonlyres/E5D64083-A9B0-424D-A585-87250213455A/27480/GuidebookOnTheDeterminationofStrategicGoods.pdf.
[11] C. Versino, G.G.M. Cojazzi, F. Contini. "Understanding Nuclear Trade: Data Sources and Tools," International Atomic Energy Agency, IAEA-CN-184/313, https://www.iaea.org/safeguards/symposium/2010/Documents/PapersRepository/313.pdf.

international transfer pursuant to the NSG guideline. On the other hand, the description of HS 845951, numerically controlled milling machines, necessitates more clarification in its industrial specification such as positioning accuracies or the number of contouring axes to be subject to the NSG.

More HS digits could enable drawing a more clear-cut conclusion for sensitive exports to the DPRK, and the way to address this limitation can be only focusing on the items with limited industrial applications or when the research is companioned with other types of open source information such as transactional trade database or market price information. However, this research had to be built on the six digits-based analysis since only six digits are internationally standardized and the main focus of this article is looking at the trade flows at the macro level.

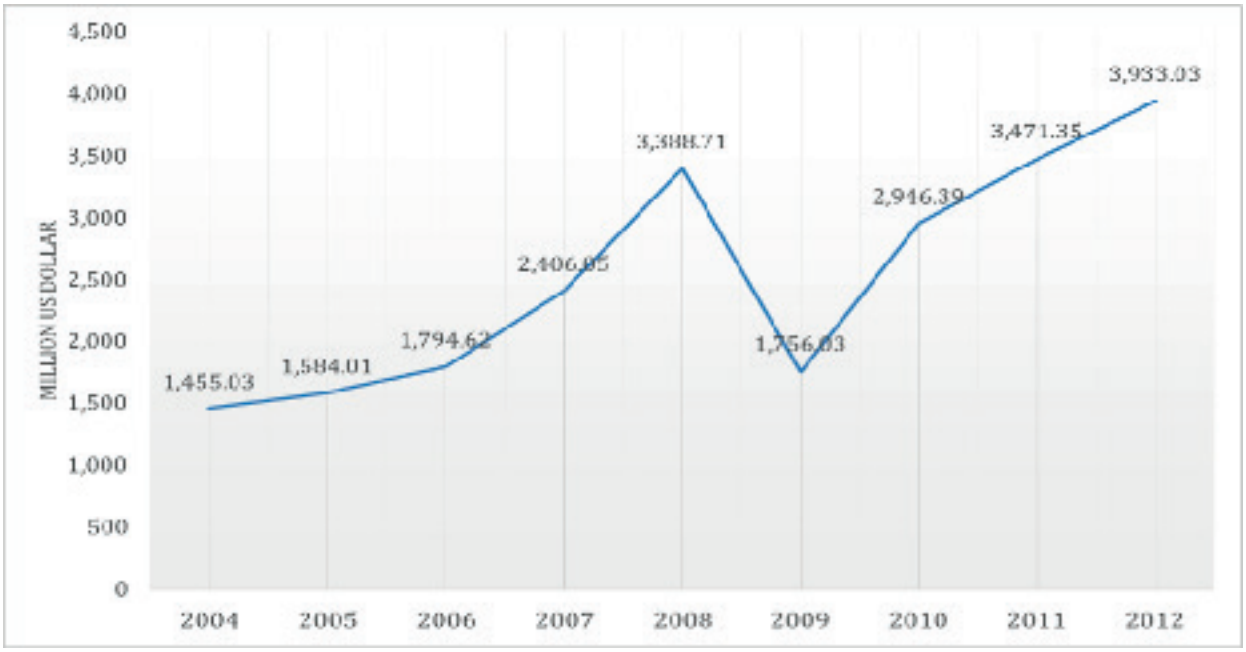
In order to address the aforementioned limitation, HS codes used for this study are defined as HS codes with Proliferation Concern (HSPC.) From the point of view of customs officers, HSPCs may draw more attention than other HS codes. Products falling under HSPC may include items for obvious WMD purposes, dual-use industrial machines or materials, under-threshold items for the control of MECRs, and legitimate goods. Therefore, it is impossible to make a definite judgement on the amount of total trade pertaining to the sanctions. However, the methodology of this study offers a rough picture of the trends of trading flows possibly subject to the sanctions and suggests which industrial sectors states need to focus on in reviewing export control systems and their implementation of the sanctions on the DPRK.

Findings at the International Level

As of the adoption of resolution 2006, the total exports of all commodities to the DPRK increased in the period of 2006-12 with a dip in 2009. Figure 1 illustrates that the total value of exports to the DPRK gradually increased between 2004 and 2006, and that significant growth followed until 2008. In 2009, the trade flow to the DPRK plunged to about the half of the previous year's level and then rebounded until 2012. In general, the sanctions imposed on the DPRK appear not to have dramatically changed the rising trend of total exports to the DPRK except in 2009. Due to the diversity of items and a number of economic factors affecting national trades, it is hard to pinpoint a conclusive reason for the drop in 2009. The one of major factors possibly affecting the subject group's trading relations with the DPRK in that year could be the global economic recession between 2008 and 2009, which entailed protectionist sentiment in the international trade market.[12] The other factor for the dip in 2009 can be explained with the trend of China's exports to the DPRK. Exports from China account for about 70% of the total exports in that year (Figure 3), which is about 1.2 billion dollars, so the trend shown in Figure 1 reflects the general trend of Chinese exports to the DPRK to a certain extent. According to data issued by the Ministry of Commerce of China (MOFCOM), Chinese exports in 2009 constituted about 1.9 billion dollars, which is negative growth by 7.1% from the preceding year.[13] Considering that growth rate, the exports in 2008 can be estimated as 2.023 billion dollars which is similar to the data used for this article, about 2.033 billion dollars. While both databases show similar values of exports in 2008, there is a gap for the values of 2009, which is about 0.7 billion dollars. However, even though the discrepancy is reflected in the total exports in Figure 1, it is still in downtrend between 2008 and 2009.

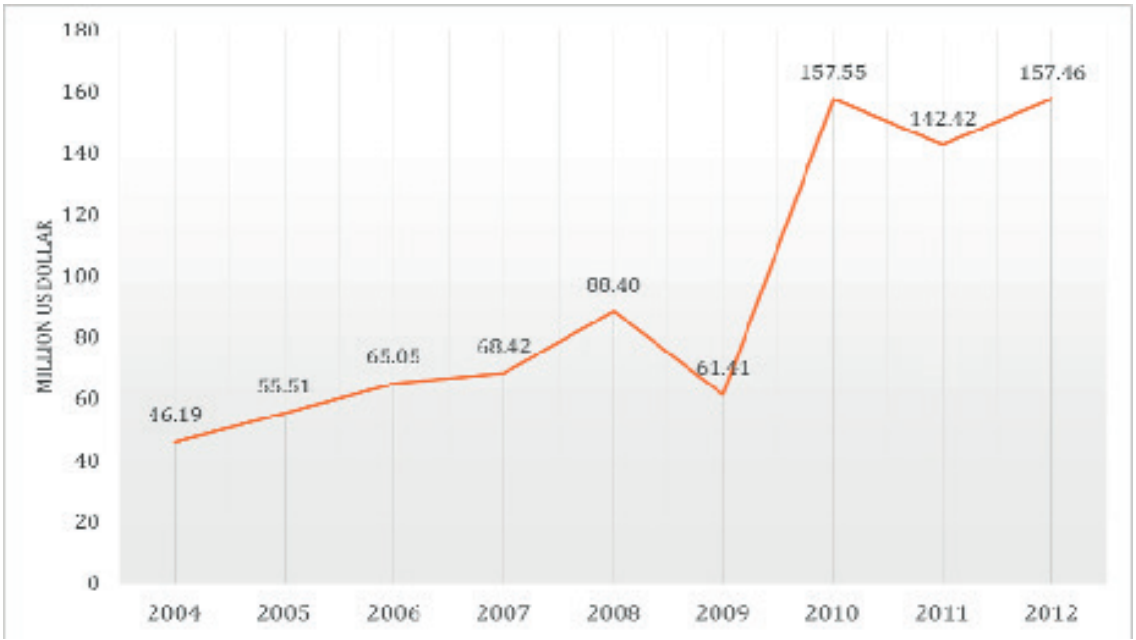
[12] "International Trade After the Economic Crisis: Challenges and New Opportunities." United Nations Conference on Trade and Development, 2010, http://unctad.org/en/Docs/ditctab20102_en.pdf.
[13] "Trade with Countries and Regions in Asia (2009/01-12)," Ministry of Commerce People's Republic of China, February 2010, http://english.mofcom.gov.cn/article/statistic/lanmubb/ASEAN/201002/20100206776202.shtml.

Figure 1: Total exports of all commodities to the DPRK, 2004-2012



The HSPC related exports to the DPRK maintained a similar trend with the exports of all commodities between 2004 and 2008. As shown in Figure 2, the value of the total HSPC exports steadily increased until 2008 and skyrocketed in 2010 after the plummet in 2009. Differing from the tendency of all commodities exports, the HSPC exports lost growth momentum from 2010. Regarding the drop of 2009, there are some notable commodities whose trading values were considerably decreased from the preceding years. Those products are x-ray related equipment, nickel alloys, platinized catalysts, explosives, filtering or purifying machineries possibly including centrifuges, vacuum pumps, data processing machines, and transmission apparatus, normally imported from China and Germany in the period of 2007-8. Considering that the ideal implementation of the sanctions should appear as a declining trend in HSPC exports without substantial variations in exports of all commodities, it is hard to draw a conclusion that the sanctions had the intended impact on the trades with the DPRK at the macro level.

Figure 2: Total exports of commodities of HSPCs to the DPRK, 2004-2012



Figures 3 and 4 display the contributions of each customs regime to the total exports to the DPRK. The data reveals that there was a significant shift in the DPRK's trading relations with other customs regimes. First of all, the DPRK's reliance on China in both all commodities and HSPC exports had remarkably increased during the referenced time period. In 2004, Chinese exports accounted for about 55% of the total exports of all commodities to the DPRK, and it grew up to about 90% of the total exports in 2011-2. Following the Chinese portion, India's sudden emergence between 2007 and 2008 was mostly driven by exports of light oil and its preparations, amounting to 464.7 and 633.2 million dollars respectively for each year.

Figure 3: Proportion of total exports of each customs regime

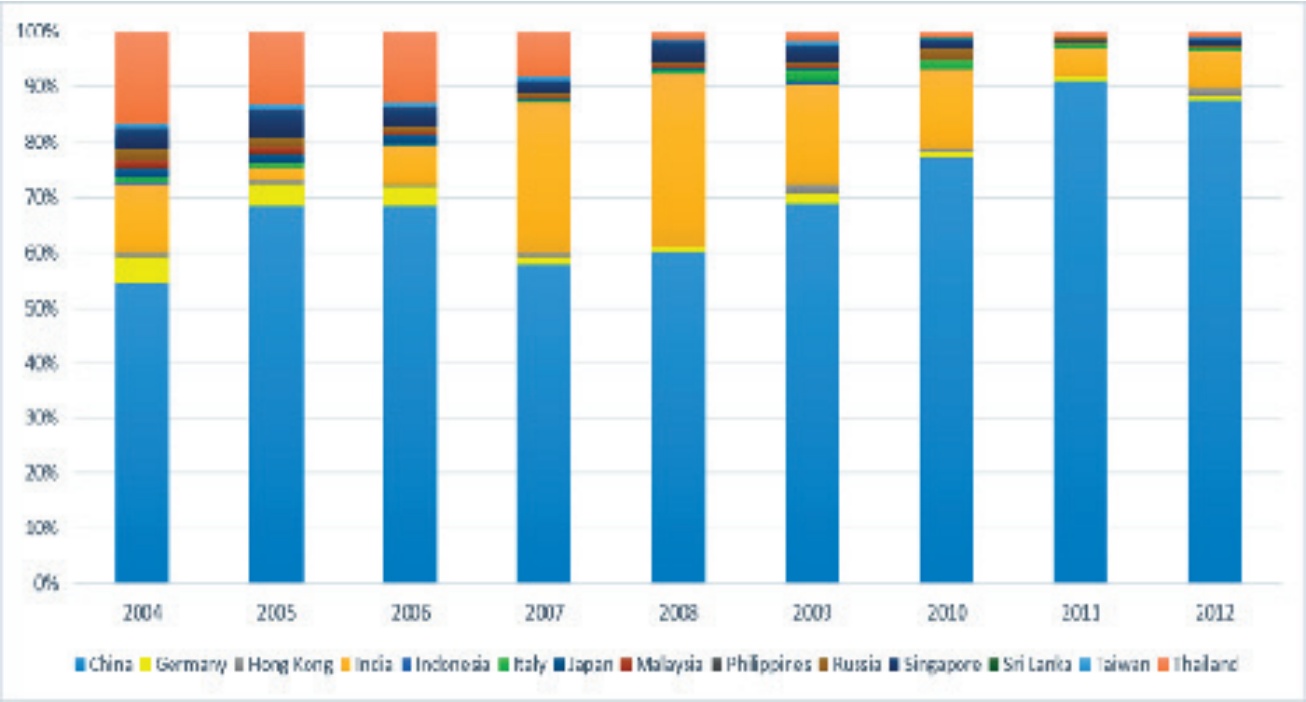
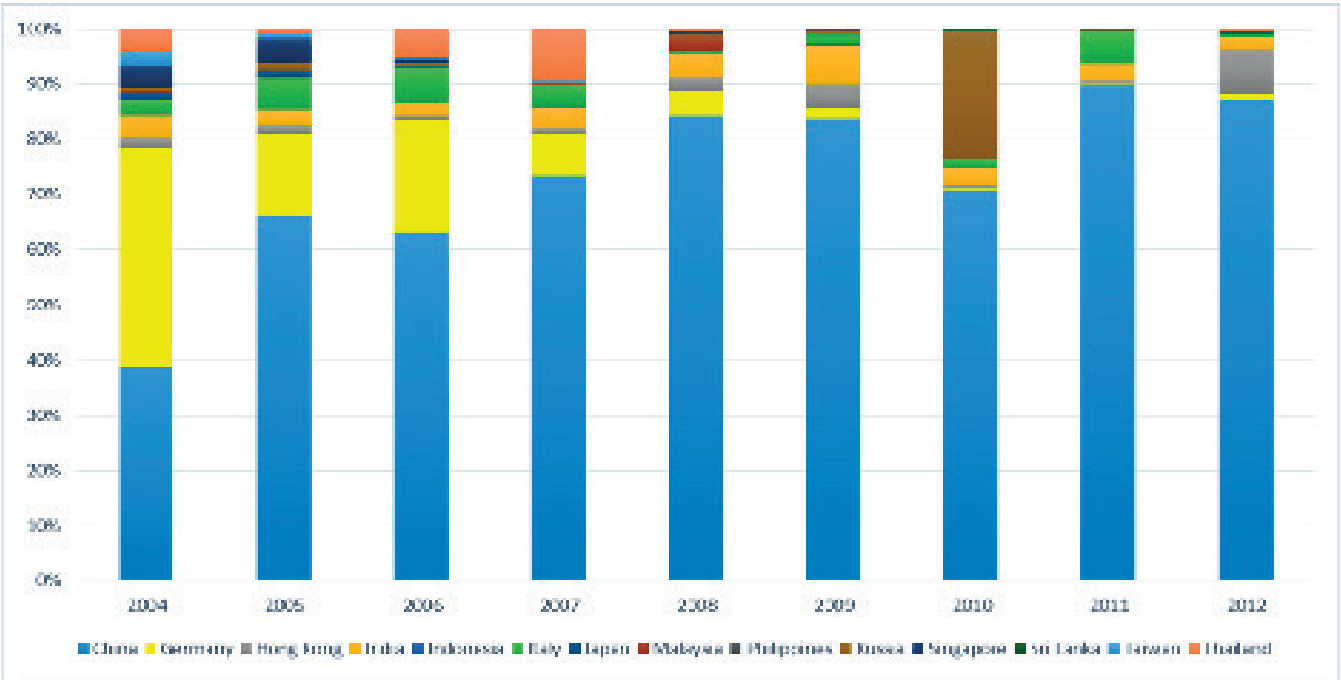


Figure 4: Proportion of HSPC exports of each customs regime



In the case of HSPC exports, China's proportion was below 40% of the total amount in 2004 and considerably rose to about 90%, more than 95% if Hong Kong is included, of the total HSPC exports in the end of time period. The portion of Russia in 2010 was driven by the aircraft sale, amounting to approximately 36 million dollars, and it is possibly attributed to the civilian aircraft handed over to the DPRK's Koryo Airline in 2010.[14] Thailand's share in 2007 was dominated by 4.1 million dollars of stainless steel sales and 1.3 million dollars of the exports of "processor and controllers." Aircraft, stainless steel, and electronic circuits are commodities prohibited to be exported to the DPRK under the sanctions if they meet the conditions prescribed in the MECR guidelines while there are a broad range of civilian applications of those commodities.

While the DPRK's reliance on China had heavily increased for the period of 2004-12, a notable transition had been made in the DPRK's HSPC related procurements. In 2004, Germany's share of total exports of all commodities was merely about 5%; however, their HSPC related exports accounted for approximately 40% of the total HSPC flows to the DPRK of 14 customs regimes, which was greater than the portion of China. Germany's HSPC related portion was significantly diminished in 2005, and it had been further shrunken after 2006. The HSPCs with the greatest drops in value during the period of 2004-7 are apparatuses based on x-rays, automatic data processing units, machine tools for metal processing, spectrometers, and machine tools for electroplating, all of which have nuclear or missile applications if certain conditions are met. The possible reasons for the fall in 2004-7 could be the adoption of Security Council resolution 1540 in 2004 or the sanction imposed on the DPRK in 2006.

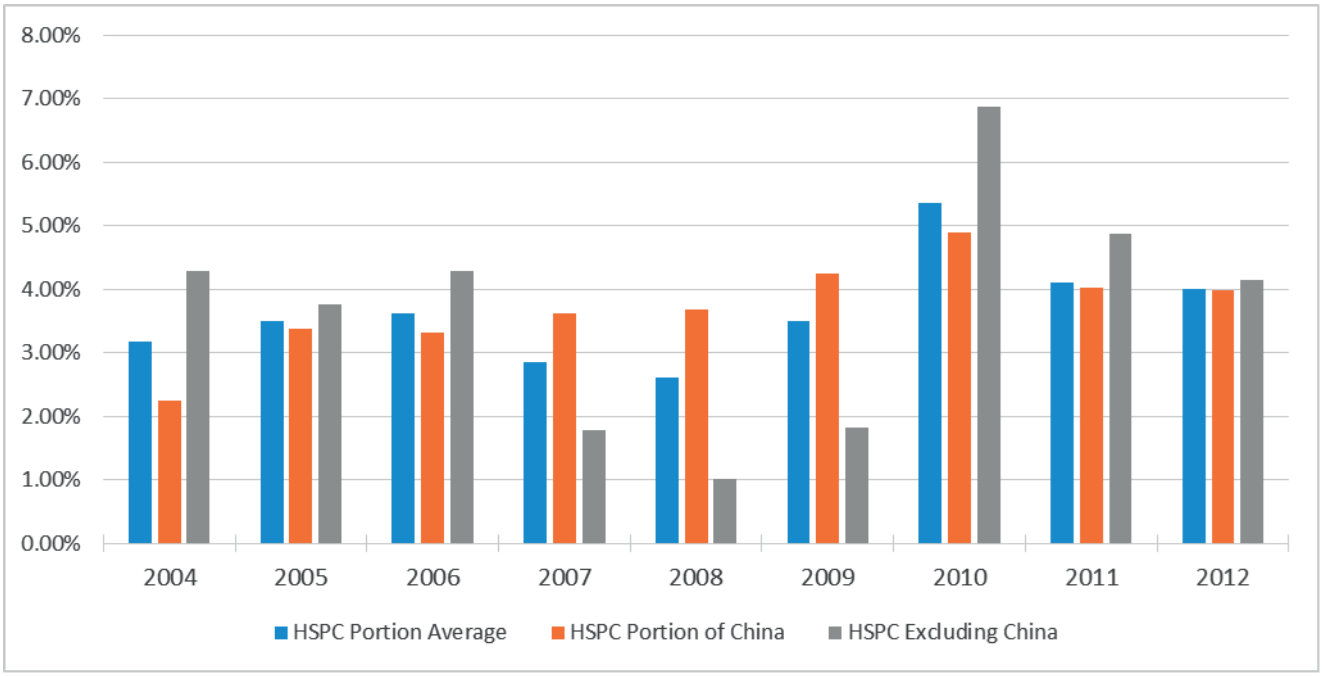
Another noteworthy finding from the data is the potential emerging trading partners of the DPRK such as Hong Kong and Sri Lanka. Hong Kong intermittently accounted for the notable portions of the total HSPC exports between 2008 and 2012, and its portion in 2012 was greater than that of any other customs regime except for China. Regarding Sri Lanka, its portion is not perceptibly displayed in Figures 3 and 4 due to the relatively insignificant values. However, the total exports of both all commodities and HSPCs by Sri Lanka had escalated considerably since 2010, which is a year after the DPRK's second nuclear test. Although not all goods reported under HSPCs mean they are subject to the sanctions, the data suggest that there were significant shifts in the patterns of DPRK's trading relations with other customs regimes during the referenced time period.

Considering the dominating portion of China, it is worthwhile to explore how the impact of the sanctions is presented when China is excluded. Figure 5 demonstrates that the total exports of all commodities by 13 customs regimes remarkably soared between 2006 and 2008, and it was followed by descending propensity with the recurring rises and falls for the rest of time period. The increase in 2006-8 and the plunge in 2009 can be attributed to India since its total exports to the DPRK escalated from 123.5 to 1,048 million dollars between 2006 and 2008 due to light oil sales and plummeted to 315.3 million dollars in 2009. The data excluding China reveals that it is hard to conclude that the sanctions had negatively affected the DPRK's economic ties with other customs regimes due to volatility appearing in the regular trades with the DPRK over the whole period. More importantly, HSPC exports normally accounted for less than 4% of the total exports of all commodities of most years (Figure 6), and it means that the maximum size of DPRK's industries directly affected by the sanctions are relatively minor compared to the size of its national economy.[15]

[14] "Airplane Tu-204-100B handed over to airline company 'Air Koryo,'" Argumenty i fakty (Аргументы и Факты), March 9, 2010, http://www.ul.aif.ru/money/details/805314, accessed on 24 April 2015.
[15] HSPC imports by the DPRK account about 4% of the total national imports. Considering that HSPCs include under-threshold and legitimate items, the portion of actual HSPC imports would be far less than 4%.

Figure 5: Total exports of all commodities to the DPRK excluding China, 2004-2012

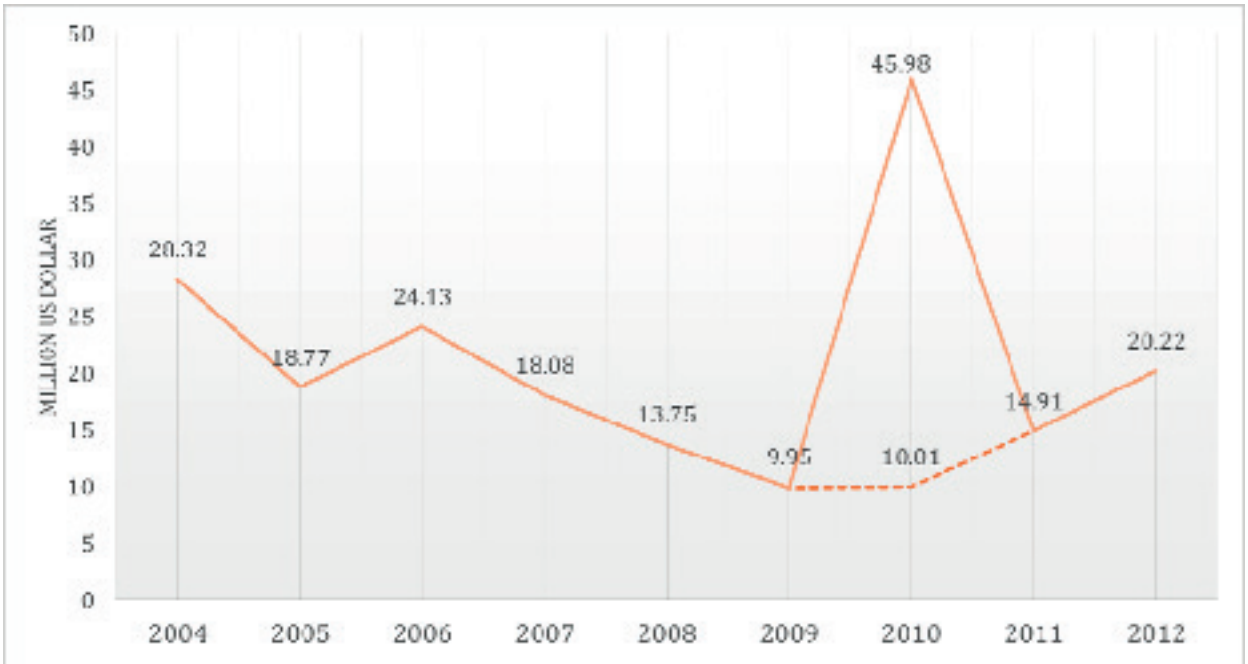
Figure 6: Proportion of the HSPC exports to the total exports of all commodities



In contrast to total regular exports, HSPC related exports excluding China present a consistently descending tendency for a certain period. The dotted line of Figure 7 displays the trend of HSPC exports which deducted the 35 million dollars of the Russian aircraft sale. The value of HSPC exports to the DPRK dipped in 2005, and it maintained the downturn for the period of 2006-9 and rebounded until 2012 after the levelling off in 2010. The data reveals that one of the driving factors for the recoiling in 2011 could be Italy's exports of the machineries for filament extrusion and for filling, which amount to about 6 and 1 million dollars respectively. As to the growth of 2012, it was mainly driven by the export of approximately 11.6 million dollars of electrical static converters by Hong Kong. Provided that the HSPC trading flows to the DPRK confirmed the descending trend between 2006 and 2009, the sanctions might have resulted in the desired effect on the exports subject to the MECRs for a limited time period. On the

other hand, the fact that the exports of single item by the particular customs regimes influenced the whole trend of HSPC exports necessitates looking at the trading patterns at individual customs regimes level.

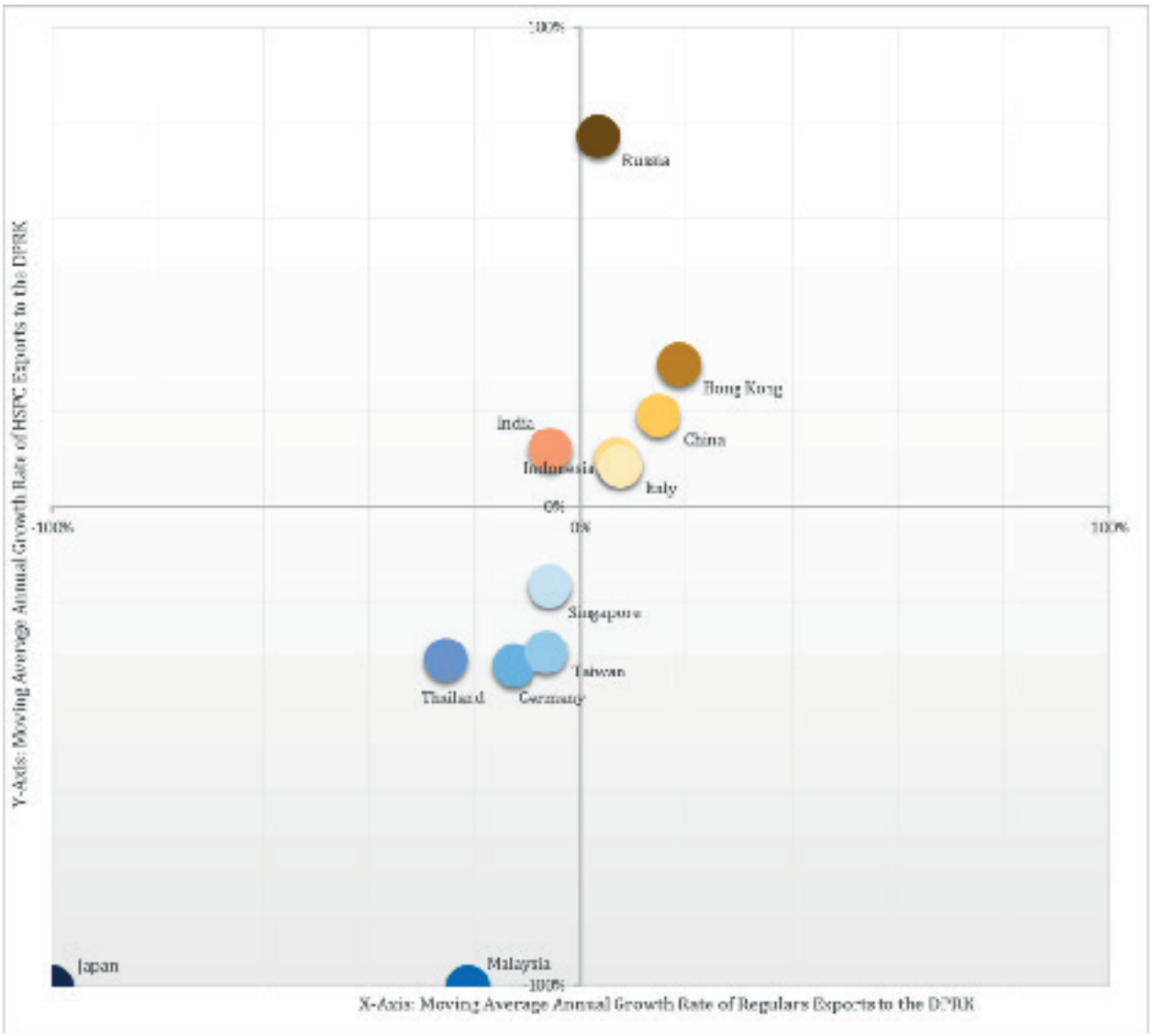
Figure 7: Total exports of commodities of HSPCs to the DPRK excluding China, 2004-2012



The trading tendencies of the subject entities of this study can be categorized into three groups. Figure 8 portrays trading patterns of each customs regime based on their moving average annual growth rates of exports to the DPRK during the period of 2006-2012. The first group including Indonesia, Italy, China, Hong Kong, and Russia shows increasing trends in exports of both all commodities and HSPC related goods. States in the second quadrant, India, presents a negatively growing trend in the total national export amid the expanding HSPC exports. The entities in the third quadrant consisting of Singapore, Taiwan, Germany, Thailand, Malaysia, and Japan have generally downward propensities in both types of exports. Sri Lanka is not displayed in Figure 8 due to its growth rates exceeding 100%, and Philippines is not shown as no HSPC related goods were exported to the DPRK in the period of 2004-10.

Recalling that the ideal implementation of resolutions 1718 and 1874 should be seen as a negative growth in HSPC exports without a significant change in regular trading relation with the DPRK, a quadrant perfectly representing the objective of the sanctions is the fourth quadrant in which no customs regime is displayed. However, the positions of customs regimes, especially Singapore, Taiwan, Germany and Malaysia, in the third quadrant are discernably closer to the fourth quadrant than the second quadrant, implying that the trading patterns of those four customs regimes reflect the ideal implementation of the sanctions to some extent. On the contrary, India is placed in the second quadrant which is in opposition to the intended impact of the sanctions. Regarding the customs regimes in the first quadrant, the ascending trends of HSPC exports render their trading patterns remote from the fourth quadrant while their economic relations with the DPRK had been seemingly enhanced during the period of 2006-12.

Figure 8: Moving Average Annual Growth Rates of Exports by Each Customs Regime in 2006-12



Findings at the National Level

A solid national export control system is a crucial basis for implementation of the sanctions. Interpretation of the Security Council resolutions on the DPRK should be followed by the implementation and enforcement by the competent regulatory authority and the adequate legal and regulatory framework must be in place for it. If there is any discrepancy between the guidelines of MECRs and the national item control list, the national list should be harmonized with the international standards at least for the implementation of the sanctions. In addition, export of the items, determined by the Security Council, which possibly could contribute to the DPRK's WMD programs should be denied to meet the goals of the sanctions through catch-all controls.

This paper provides overviews of the national export control systems of four States and explores plausible reasons for different outcomes in their trades involving the DPRK by means of comparing several factors in their export controls. Particularly, the paper looks at whether or not independence of the regulatory authorities could be secured in the decision making process for export licenses based on existing legal and institutional frameworks. Regarding sanctioned items, the national control lists are explored to compare with the lists of the sanctions, and the catch-all provisions of each country are also compared given that regular or under-threshold items could also contribute to the DPRK's WMD

program through modifications. Additionally, the national implementation reports for resolutions 1718 and 1874, submitted to the sanctions Committee, are reviewed in order to review the measures taken by States for sanctions implementation.

The four countries reviewed in this paper are China, Japan, India, and Singapore as a representative of each quadrant in Figure 8. China was selected instead of Hong Kong from the first quadrant as only UN Member States are bound by the UN Security Council resolutions although Hong Kong takes a special position as a Special Administrative Region with independent judicial power. India is only one State in the second quadrant, and Japan was selected due to its prominent representation of the third quadrant. Even though Singapore is not in the fourth quadrant, the trading pattern of Singapore is the closest to the desired outcome under the sanctions regime with the least impact on its total national exports to the DPRK.

Overview: China

As non-proliferation became one of China's national interests in recent decades, their export control system also evolved from internal administrative controls to a legally-based system in the mid-1990s. The enactment of the Foreign Trade Law in 1994 represent this trend at the statutory level of the national legal hierarchy. The Foreign Trade Law provides a legal basis for restricting exports for protecting "state security, public interest, and public morals," as laws and administrative regulations specify, or in case the international laws which China is party to require.[16]

The statutory instrument is more detailed by regulations concerning exports of chemical, biological, nuclear, and missile related items and technologies, and those regulations were harmonized with the international standards between the end of 1990s and the beginning of 2000s. For example, the Regulation on Controlled Chemical, issued in 1995 in preparation for the ratification of CWC in 1997, became harmonized with Australia Group guidelines by adding certain chemicals into their national control list, together with the Regulations of the People's Republic of China on Export Control of Dual-Use Biological Agents and Related Equipment and Technologies. Also, the Nuclear Suppliers Group guidelines were incorporated into the Chinese export control system in 2002, and China became a member of NSG in 2004.[17][18][19] Although China is not a member of the Australia Group, the Missile Technology Control Regime (MTCR), or the Wassenaar Arrangement (WA), it is claimed that the existing regulations and control lists adequately regulates exports subject to those regimes.[20]

Based on the aforementioned legal framework, the MOFCOM takes a leading role as a licensing office for all exports in export licensing procedures except for cases concerning conventional weapons. A registered exporter submits an export license application to the governmental body responsible for the exporting item, such as the China Atomic Energy Agency for nuclear specific items or the Chemical Weapons Convention Implementation Office for chemical exports. Once the application is reviewed by those responsible bodies, the decision for approval is sent to MOFCOM for issuance of the license, or it is referred to the State Administration of Science, Technology, and Industry for National Defense (SASTIND) for further assessment of the application. If necessary, the Ministry of Foreign Affairs is involved in the decision making process to assess impact of license approval, and the State Council may be the final decision making body in case of licenses involving significant national interests. When the

[16] The Foreign Trade Law of the People's Republic of China, article 16, July 2004.
[17] Huang, C. *"Bridging the gap": Analysis of China's export controls against international standards,* UK Foreign and Commonwealth Office Counter-Proliferation Programme, April 2012, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207441/Final_FCO_Huang_Chinese_export_controls_report.pdf, accessed 1 April 2014.
[18] Lieggi, S. "From Proliferator to Model Citizen?: China's Recent Enforcement of Non-proliferation-Related Trade Controls and its Potential Positive Impact in the Region," *Strategic Studies Quarterly*, Summer 2010, p. 39 - 62.
[19] Medeiros, Evan S. *Chasing the Dragon* (Santa Monica: RAND Corporation, 2005).
[20] Letter dated 15 November 2006 from the Acting Permanent Representative of China to the United Nations addressed to the Chairman of the Committee (30 January 2008), S/AC.49/2006/21 (2008).

license is issued by MOFCOM, the information is sent to a customs agency for inspections.[2122]

For items not on the national control lists, the Chinese regulations contain provisions for catch-all controls that are codified differently between each other. The regulation on dual-use nuclear item exports stipulates that exports can be restricted if the exporter "knows" or is "informed by" the MOFCOM of proliferation risks incurred from the intended export.[23] On the other hand, under the regulations on exports of missile and biological items, exports are subject to catch-all control when the exporter "knows" that the exporting items could make a contribution to WMD programs, without having a "informed by" clause.[2425]

According to Chinese national reports submitted to the Security Council Committee, it is claimed that China established a complete foundation for export controls of conventional weapons and items referred to in the resolutions, and that their legal foundation is consistent with the guideline of MECRs. It was not confirmed by the Chinese reports whether or not China conducted adequate measures on ban of exports of luxury items to the DPRK. Regarding other measures such as travel ban and freezing financial assets of persons deemed to be involved in the DPRK's WMD programs, the report of 2006 states that the Chinese financial institutions and its government would take an action once the list of those entities is provided by the Committee. The same basis was maintained in the report of 2009 by only expressing its willingness to take an action for those measures.[2627]

Overview: Japan

The Japanese legal framework for export controls consists of one statutory law and two ministerial orders. As a governing law, the Foreign Exchange and Foreign Act of 1949 gives a basis for export controls to the ministerial orders by stating that exports of goods deemed to deteriorate international peace and security are subject to control which is further specified by the Cabinet Order.[28] The two Cabinet Orders are the Export Control Order and Foreign Exchange Order which regulate trading activities involving dual-use goods and technologies respectively. Especially in terms of WMD-related goods, the Export Control Order provides a unified control list covering all guidelines of MECRs as well as items possibly subject to catch-all control and a list of luxury items prohibited to be exported to the DPRK.

Based on the legal foundation, the Ministry of Economy, Trade and Industry (METI) assumes responsibility for export controls as a sole licensing body. Once an application is submitted by the exporter, the METI reviews the document and makes a decision on issuance of a license. A unique feature in the decision making process of Japan can be attributed to the maintenance of an end-user list that enumerates the hundreds of entities considered to be involved in WMD programs including entities of the DPRK. The end-user list is taken into account in the decision making process for export licenses as a watch-list but not as a denial list.[29]

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[21] Huang, C. *"Bridging the gap": Analysis of China's export controls against international standards,* UK Foreign and Commonwealth Office Counter-Proliferation Programme, April 2012, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/207441/Final_FCO_Huang_Chinese_export_controls_report.pdf, accessed 1 April 2014.
[22] Medeiros, Evan S.. *Chasing the Dragon* (Santa Monica: RAND Corporation, 2005).
[23] Regulations of the People's Republic of China on Control of Nuclear Dual-Use Items and Related Technologies Export, art.19, January 2007.
[24] Regulations of the People's Republic of China on Export Control of Dual-Use Biological Agents and Related Equipment and Technologies, art.16, December 2002.
[25] Regulations of the People's Republic of China on Export Control of Missiles and Missile-related Items and Technologies, art.16, August 2002.
[26] Letter dated 15 November 2006 from the Acting Permanent Representative of China to the United Nations addressed to the Chairman of the Committee (30 January 2008), S/AC.49/2006/21 (2008)
[27] Note verbale dated 3 August 2009 from the Permanent Mission of China to the United Nations addressed to the Committee (4 August 2009), S/AC.49/2009/23 (2009)
[28] Japan Foreign Exchange and Foreign Trade Act, art.1, Act No. 228 of December 1, 1949, final revision: Act No. 102 of October 21, 2005.
[29] Overview of Japan's Export Controls, Center for Information on Security Trade Controls, http://www.cistec.or.jp/english/export/Overview.pdf, accessed 3 April 2014.

With respect to items not on the list, the Japanese catch-all policy places those items under control by requiring an approval by METI based on two pillars. First, the exporter should obtain an approval when "notice has been made by" the METI. Second, the exporter should apply for a license when the exporting item is "likely to be used for" WMD programs.[30] The "likely to be used for" provision, or "know" condition, is based on assessments of the end-use and the end-user in objective manner. When the exporter knows that the end-use of the exporting items is intended for a WMD program through written information such as a brochure or a contract or when informed by the third party, the exporter is required to obtain a license. In case that items under catch-all control are exported to any entity on the end-user watch-list, the exporter must apply for an export license unless it is "apparent" that the exporting items are not intended for WMD related activities.[31]

In terms of the sanctions, the Japanese reports confirm that Japan took all measures laid down in resolutions 1718 and 1874 in a detailed manner. The report of 2006 provides a name of the DPRK-flagged ship denied to enter into the Japanese port and a list of the entities whose financial assets were frozen in the Japanese financial system. Also, the report enumerates the luxury goods banned to be exported to the DPRK while no luxury goods list are specified in resolutions 1718 and 1874. Most of all, the distinctive actions taken by Japan are the total bans of import from and export to the DPRK imposed in 2006 and in 2009 respectively of which the impact of those measures would be shown as zero value in the result of the data processing of this study.

Overview: India

The legislative basis for export controls in India is provided by the Foreign Trade Development and Regulation Act (FT Act) which enables provisions for regulating trading activities. As India's regulatory approach to WMD is developed through the enactment of the Weapons of Mass Destruction and their Delivery System Act (WMD Act) of 2005, the FT Act was amended to be harmonized with the WMD Act in 2010. In tandem with the FT Act and the WMD Act, statutory instruments, including the Chemical Weapons Convention Act of 2010, the Environment Protection Act of 1986, and the Atomic Energy Act of 1962, govern exports of chemical, biological, and nuclear materials respectively. The controls under each Act are further specified by the relevant rules, orders, and regulations thereunder. While India attaches special interest to the CWC by claiming that the CWC is "the only multilaterally-negotiated, non-discriminatory disarmament agreement of a universal character," there is no specific statutory instrument for missile-related controls.[32]

In Indian export control system, the Directorate General of Foreign Trade (DGFT) within the Department of Commerce and Industry takes a leading role in the licensing process, except for cases of nuclear materials which are controlled by the Department of Atomic Energy. The decision making process of India is based on consensus made by a standing body, the Inter-Ministerial Working Group (IMWG.) Once a license application is submitted to the DGFT, a consultation process is proceeded within the IMWG consisting of Ministry of External Affairs, Ministry of Defense, Defense Research and Development Organization, Department of Defense Production, Department of Atomic Energy, Indian Space Research Organization, National Authority of the Chemical Weapons Convention, Department of Chemicals, Department of Chemical and Petrochemicals, and the intelligence agencies. If a No-Objection Certificate is issued by the responsible bodies for the exporting item through the consultation process, the license is issued by the DGFT to the exporter.[33][34]

[30] Export Trade Control Order, art.4
[31] Overview of Japan's Export Controls, Center for Information on Security Trade Controls, http://www.cistec.or.jp/english/export/Overview.pdf, accessed 3 April 2014.
[32] Note verbale dated 1 November 2004 from the Permanent Mission of India to the United Nations addressed to the Chairman of the Committee (6 December 2004), S/AC.44/2004/(02)/62 (2004)
[33] India Weapons of Mass Destruction and Their Delivery Systems (Prohibition of Unlawful Activities) Act, sec. 11
[34] India's Export Controls: Current Status and Possible Changes on the Horizon, SECURUS, July 2011, http://securustrade.com/Indias_Export_Controls_Article_July_2011_FINAL.pdf, accessed 8 April 2014.

The Indian export control system maintains a unified dual-use item control lists, known as the Special Chemicals, Materials, Equipment and Technology (SCOMET). The SCOMET was significantly updated in 2001 from the Special Materials, Equipment and Technology (SMET), and India regularly updates the SCOMET to harmonize it with the guidelines of MECRs. While the SCOMET is consistent with the NSG and the MTCR albeit with slight difference, it is claimed to be not completely aligned with the WA and the AG. Among the seven Categories of the SCOMET, Category six for conventional weapons is marked as "reserved," and the biological dual-use items of the AG are known to be missing in the SCOMET.[35] For items not listed in the SCOMET, the WMD Act provides a ground for catch-all controls for exports involving those items. Section 11 of the WMD Act states that "No person shall export any material, equipment or technology knowing that such material, equipment or technology is intended to be used in the design or manufacture of a biological weapon, chemical weapon, nuclear weapon or other nuclear explosive device, or in their missile delivery systems."[36] The "informed by" clause for catch-all control is not found from the WMD Act of India.

According to its national report submitted in 2007, India implemented the sanctions through the issuance of Order No. S.O. 131(E) and Notification No. 39 (RE2006)/2004-2009. The Order stipulates that the Indian government "shall have all power to take measures to" all obligations under paragraph 8 of resolution 1718, which are a trade ban of heavy conventional weapons, items subject to the MECRs, and luxury goods. However, the report of 2007 further states that India would wait for a finalized list of luxury goods provided by the Security Council Committee.[3738] The report of 2009 confirms that required actions under resolution 1874 were taken by India through the issuance of Order No S.O. 2374(E).[3940]

Overview: Singapore

The Strategic Goods Control Act (SGCA) and the Regulation of Imports and Exports Act form the legal framework for Singapore's export control system. The SGCA covers transfer and brokering of WMD-related goods and technologies, and the SGCA is detailed and specified by its subsidiary legislation, the Strategic Goods Control Regulation (SGCR.) The Act and Regulation were amended in 2007 for harmonization with the guidelines of MECRs although Singapore is not a member of any of them. In line with the amendment of 2007, the control list became consistent with the MECRs by adopting the Munition List from the WA and the Dual-use List from the European Union in 2008.[41]

According to Section 4 of the SGCA, the Ministry of Foreign Affairs of Singapore can appoint a body for implementation of export controls, and the Singapore Customs (SC) has become the sole competent authority in the national export control system.[42] As an administer and enforcement authority, the SC is responsible for the all procedures related to export permits, registering and auditing arms brokers, functioning as a focal point, conducting industry outreaches, and enforcing the SGCA and the SGCR.[43] A multi-agency approach is conducted with the Immigrant and Checkpoint Authority and other customs agencies in enforcement of export controls, and the Defense Science and Technology Agency cooperates

[35] Ibid.
[36] Nayan R. "*Export Controls and India,*" in I.J. Stewart (ed.), Centre for Science and Security Studies, King's College London, London, UK, 2013, www.kcl.ac.uk/sspp/departments/warstudies/research/groups/csss/pubs/India-export-control.pdf.
[37] Letter dated 20 February 2007 from the Permanent Representative of India to the United Nations addressed to the Chairman of the Committee (15 March 2007), S/AC.49/2007/23 (2007)
[38] Order No S.O. 131(E)
[39] Letter dated 23 June 2010 from the Permanent Representative of India to the United Nations addressed to the Chairman of the Committee (29 June 2010), S/AC.49/2010/8 (2010)
[40] Order No S.O. 2374
[41] Letter dated 28 May 2013 from the Permanent Representative of Singapore to the United Nations addressed to the Chair of the Committee (4 June 2013), S/AC.44/2013/8 (2013)
[42] Singapore Strategic Goods (Control) Order, sec.4, 2013.
[43] Singapore Customs, http://www.customs.gov.sg/stgc/leftNav/ove/National+Authority.html

with the SC by providing technical advice and supports.[44]

The catch-all provision of Singapore prescribes a literally broader scope of controls than those of other States covered in this Chapter. According to subsection (2) of Section 5 of the SGCA, exports of any item could be restricted when the exporter is "informed by" the authority, "knows" proscribed end-use, or "suspects" a WMD-related intention of the recipient with reasonable grounds.[45] In addition to "knows" and "informed by" conditions, "suspects" clause was incorporated in Singapore catch-all provision.

Regarding implementation of DPRK sanctions, the reports of Singapore present a unique feature not found from the other States in this paper. According to the national reports, the requirements laid down in resolutions 1718 and 1874 could be implemented with the existing legal framework and the United Nations Act (UN Act).[46] For any decision taken by the Security Council under Article 41 of Chapter VII of the UN Charter, the UN Act of Singapore gives effect to those decisions through secondary legislation without additional statutory legislation. Therefore, any measures not covered by the existing legal instruments could come into effect through making regulations when it is deemed necessary to implement those measures effectively.[47]

Comparative Analysis

As regulation and promotion are competing interests, it is desirable to separate those interests in decision making process for effective export controls. In other words, the independence of a licensing authority should be secured to the extent that it can avoid interference of other entities having political interests in exporting certain items or with trade promotional functions in making a judgement on the export license. There are several factors which could affect the independence of regulatory authority, such as the structure and technical capabilities of it, the existing legal framework, technical capability, resources, and procedure for the decision making.[48] Although there is no uniform way to assess the effectiveness of national systems, the data of this study reveal that there is certain commonalities between States with similar trends in the HSPC exports to the DPRK.

Within the Chinese and Indian export control systems, the main actors who review and approve export applications are other governmental bodies than the authority known to take a leading role in their export control system. In China, the responsibility for making judgement on export licenses is relieved by other governmental bodies such as the CAEA, the SASTIND, and the Ministry of Foreign Affairs than the MOFCOM. Similarly in India, the DGFT can issue a license when the IMWG issues No-Objection Certificates based on the consensus made from the inter-ministerial consultation process.

In contrast to China and India, making a judgement on export licenses is a discretion of the sole regulatory authorities responsible for export controls in the case of Japan and Singapore. Interestingly, the dichotomized aspects in the decision making process is further demonstrated as two opposite tendencies in HSPC exports. The Chinese exports of HSPC-related commodities maintained an ascending trend for the period 2004-12 except for the drop of 2009, and the HSPC exports by India continuously escalated since 2006 when resolution 1718 was adopted against the DPRK's first nuclear test (Figure 9 and Figure 10.) On the other hand, HSPC exports by Japan and Singapore remarkably fell since 2006 and did not show any aberrational increase until 2012 (Figure 11 and Figure 12.) Regarding the zero values in the figures, Japan imposed a total ban on exports to the DPRK in 2009 as previously mentioned, and there was no reported data by Singapore in 2011.

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[44] Letter dated 28 May 2013 from the Permanent Representative of Singapore to the United Nations addressed to the Chair of the Committee (4 June 2013), S/AC.44/2013/8 (2013)

[45] Singapore Strategic Goods (Control) Order, sec.5, 2013.

[46] Letter dated 13 November 2006 from the Charge d'affaires ad. of the Permanent Mission of Singapore to the United Nations addressed to the Chairman of the Committee (30 November 2006), S/AC.49/2006/9 (2006)

[47] United Nations Act, art.2

[48] *Handbook on Nuclear Law (Vienna:* International Atomic Energy Agency, 2003).

Figure 9: Total HSPC exports to the DPRK by China

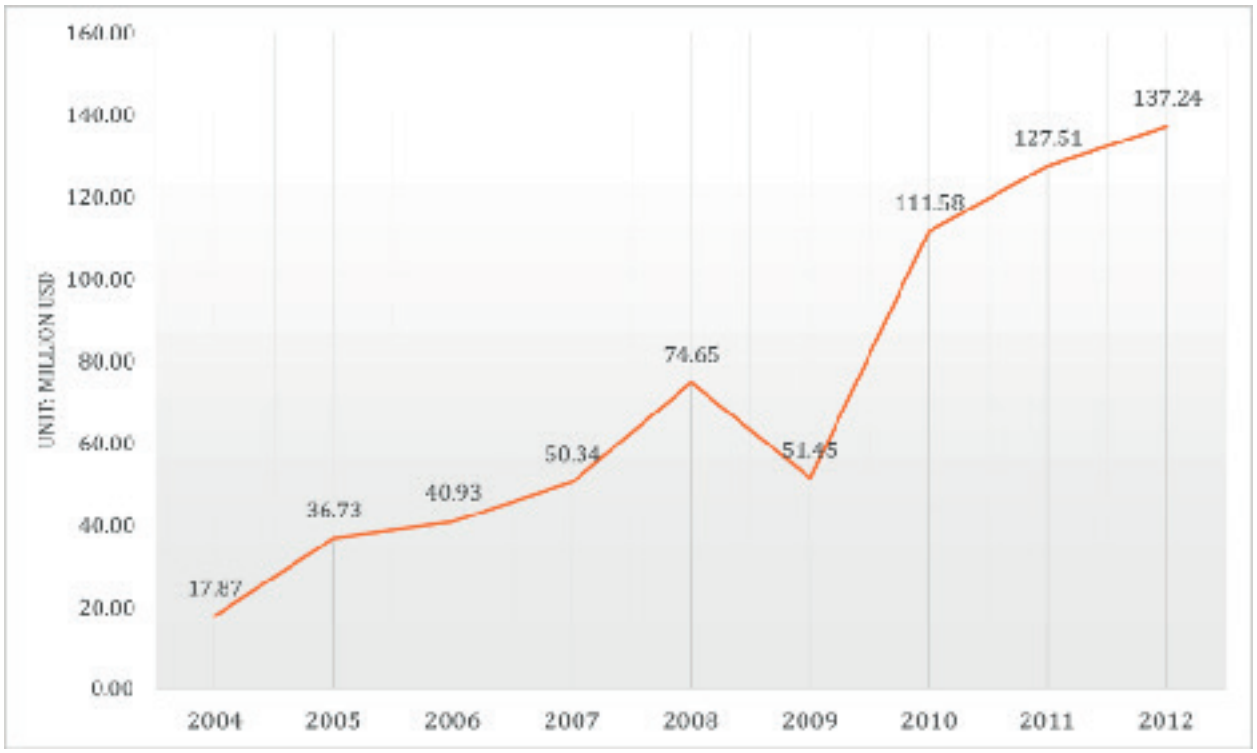


Figure 10: Total HSPC exports to the DPRK by India

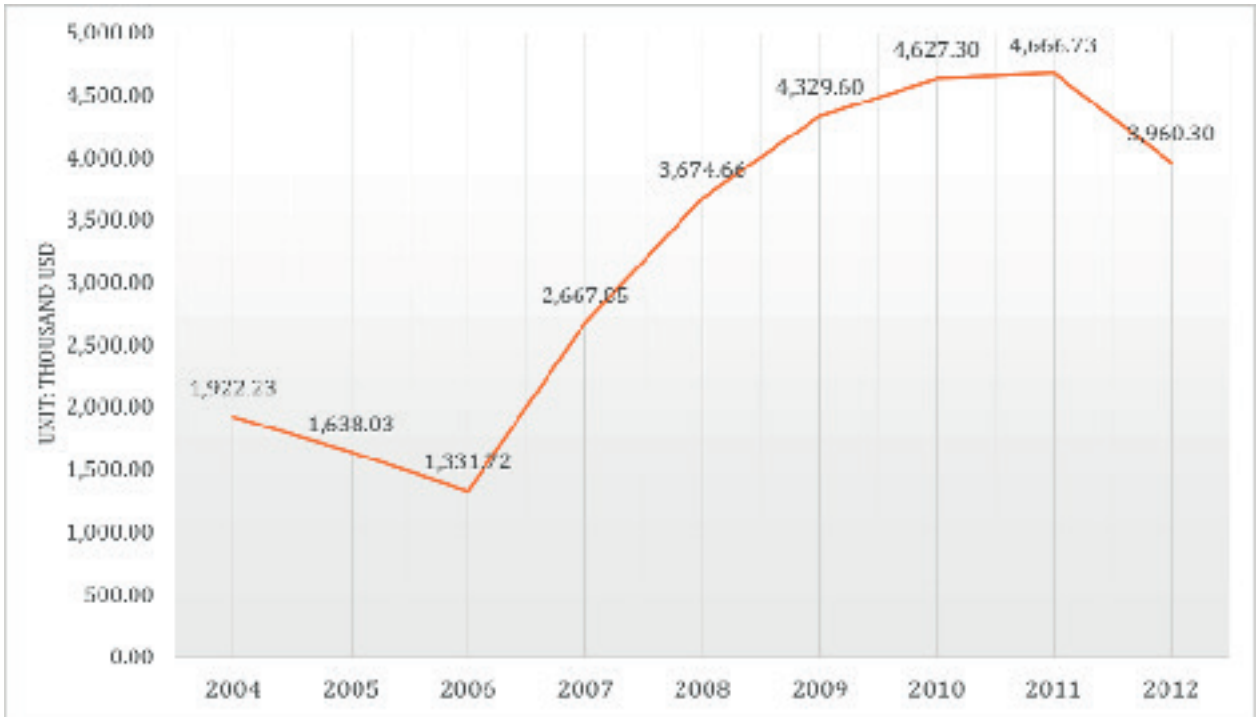


Figure 11: Total HSPC exports to the DPRK by Japan

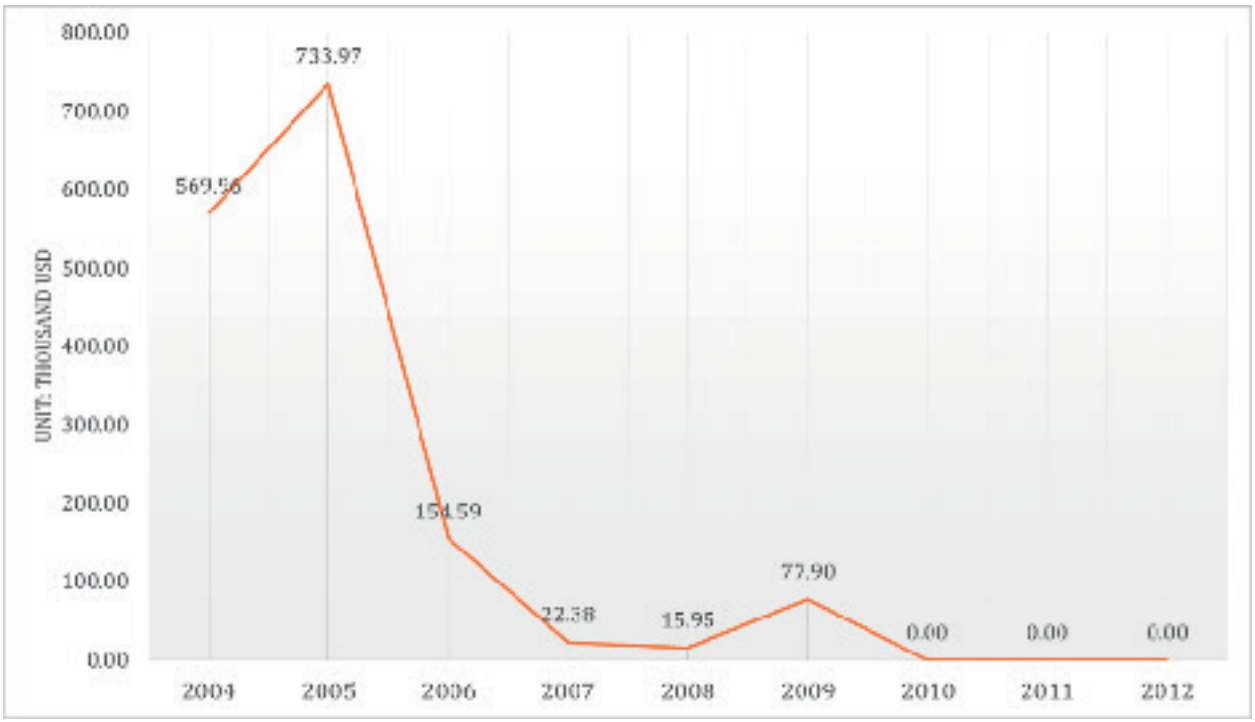
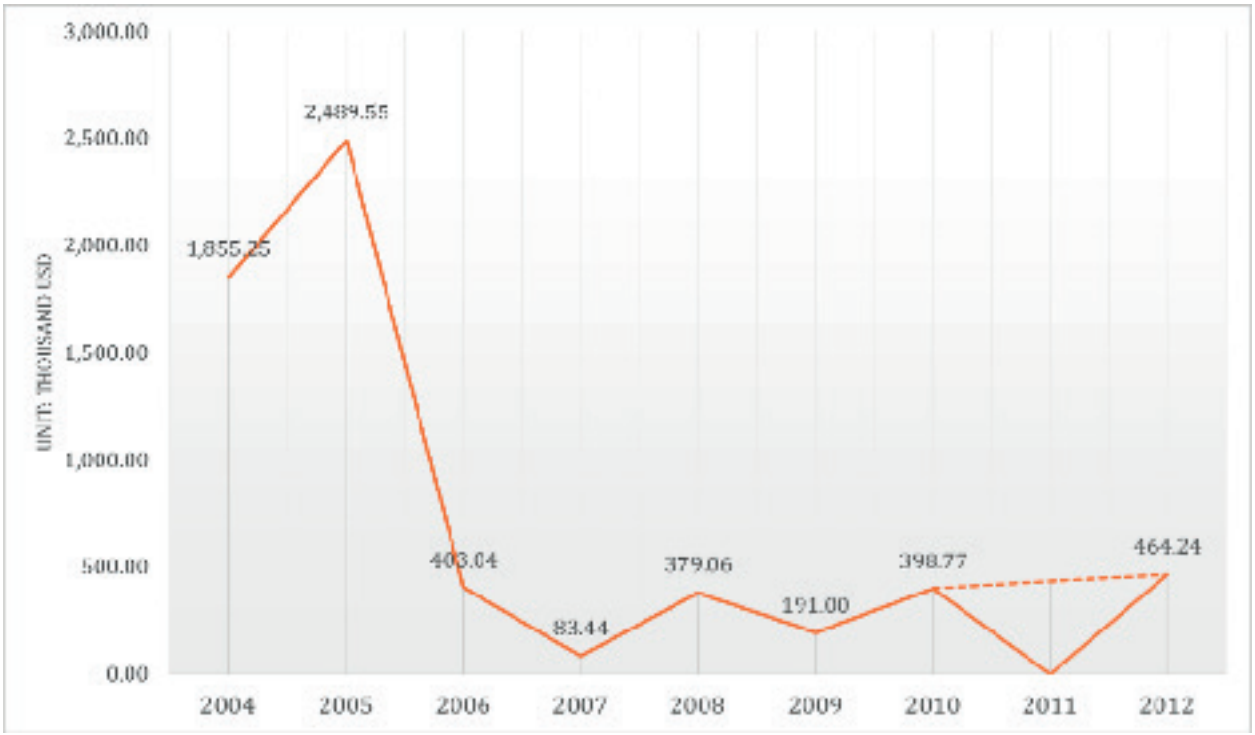


Figure 12: Total HSPC exports to the DPRK by Singapore



Due to the broad scope of industries subject to export controls, it is recommendable for a leading authority for export controls to receive external advice or assistance when the license applications are out of their technical capabilities. Not only China and India, but also Singapore is also known to have an inter-ministerial consultation process in their decision making process. However, the question is whether or not the authority can make its own judgement based on the assistance provided by external entities regardless of their interests. If the judgement is subject to approval of other actors having opposite interests to the

regulation, the independence principal can be significantly compromised.[49]

Apart from the independence principle, the structure of legal frameworks could raise an issue of consistency in control over different types of items. In the cases of Singapore or Japan, there is one statutory instrument mainly governing export controls, and it is further specified with subsidiary legislation such as a regulation or two cabinet orders respectively. Conversely, in case of India, there are multiple instruments at the statutory level which individually govern exports of nuclear, missile, biological, and chemical items. Within the Chinese system, those individual categories are controlled by separated regulations, resulting in differently codified provisions for catch-all controls and penalties against export control violations. The existence of manifold legislations at the same level of legal hierarchy doesn't necessarily indicate a less effective control system; however, the issue of efficiency could arise as certain rules and principles should be consistent to each other in lawmaking or the amendment process. In addition, the fragmented legal framework could affect the relevant institutions and it would be challenging to deal with each license application in an objective and uniform manner.

Conclusion and Recommendations

Conclusion on the Impact of the UN Sanctions on the DPRK

Security Council resolutions 1718 and 1874 were adopted against the DPRK's nuclear tests with the aim of impeding the DPRK's WMD programs without negatively affecting its general population. Taking into account that objective, the impact of the sanctions in international trade involving the DPRK is desired to be shown as decreasing export value of the items on the guidelines of the NSG, the MTCR, and the AG amid sustaining economic relations with the DPRK. Assuming that the items reported under HSPC to customs reflect the actual trends of exports subject to the sanctions on the DPRK, this paper revealed that there are notable findings which the sanctions might have affected.

Both the total regular and the HSPC-related exports by 14 customs regimes, who are known to be the DPRK's major trading partners, to the DPRK maintained inclining trends between 2004 and 2012. The rising trends were mainly driven by the Chinese portion which rose up to about 90% of totals of the subject group. The aggregates of exports excluding China suggest that the trend of exports of all commodities was volatile. Conversely, the total value of HSPC exports to the DPRK was in downturn for the period of 2006-9 followed by a rebounding trend due to exports with great amount of certain single items by a few individual states. This means there was an intended impact on the possible dual-use exports to the DPRK for a certain period while it is difficult to conclude that the sanctions negatively affected the DPRK's general economic development given that the total value of national imports by the DPRK was volatile in 2006-12 and that the upper threshold of exports possibly subject to sanctions was less than 5% of the total national imports of the DPRK.

There were notable shifts in the DPRK's procuring markets for both regular and sanctioned commodities during the period subject to the sanctions. While the DPRK's reliance on China heavily increased, the DPRK's imports of HSPC-related goods from Germany remarkably reduced during the referenced timeframe. Sri Lanka became an emerging trading partner of the DPRK albeit with relatively minor values of both types of exports, and the DPRK's dependence on Hong Kong in procurement of potential dual-use goods surged in the end of experimental period. Occasionally, the DPRK tended to import large amounts of oil products from India between 2007 and 2009.

The impact of the UN sanctions on the DPRK differently appears in the individual customs regime's international trades with the DPRK. Each customs regime can be categorized into three trends based on their trading patterns for the period of 2006-12. The first group including China, Sri Lanka, Hong Kong, Indonesia, Italy, and Russia shows the improved or steadied economic ties with the DPRK, which might

[49] Ibid.

have been unavoidably laced with the increased export value of the potential restricted items to the DPRK. India presents a growing trend in its exports of the possible sanctioned items, while the national exports to the DPRK appeared as a downtrend. The trading patterns of the third group consisting of Japan, Germany, Taiwan, Malaysia, Thailand, and Singapore were in downtrend for both regular and HSPC exports. Japan's exports to the DPRK involving HSPC items significantly plunged since 2006, and no such export was made as a result of the total ban on export to the DPRK after 2009. There is no customs regime categorized as a group with increasing or stabilized total national exports to the DPRK accompanied by a declining trend in HSPC exports, which is in line with the assumed ideal implementation of the sanctions; however, out of the third group, some customs regimes remarkably reduced its HSPC-related exports to the DPRK with the least impact on the regular exports.

Recommendations

The sanctions on the DPRK require States not to export any items on the control lists of NSG, MTCR, and the AG. For implementation, states firstly need to properly understand the obligations required by the resolutions imposed on the DPRK. As previously mentioned, the measure on exports subject to the three MECRs are a total ban that goes beyond the mechanism of usual export controls. Within export control framework, such items could be supplied to the recipients if it is proven that the exporting goods are not intended for WMD application. However, the sanctions on the DPRK require States not to export any item referred to in the resolutions to the DPRK regardless of intention, and exports of any item which could make a contribution to the DPRK's WMD program should be denied.

Second, states need to harmonize their item control lists with the guidelines of the MECR for implementation of the sanctions on the DPRK. Even if states maintain robust export control systems, their implementation of the sanctions could be rendered incomplete if the control lists omit certain items required to be controlled under resolutions on the DPRK. For those missing items, states should incorporate them into their control lists, and that information should be readily made available to their exporters.

To facilitate implementation, the Security Council Committee could consider the adoption of a sanction matrix, which could provide a list of obligations with details necessary for the implementation of the sanctions. Since there is no certain format for national reports, in some cases it is not clearly shown in the reports whether all requirements under the sanctions regime were adequately taken by states. Although formatting of national reports at the discretion of each State, the sanctions matrix could provide states with a good reference to check and understand specific measures necessary to implement the obligations. The 1540 Matrix could be referred to when the sanction matrix is established.

As effective national control systems underpin the implementation of the sanctions, it is recommended that states improve their national systems through streamlining their legal frameworks. A streamlined legal framework brings about flexibility in accommodating new issues arising from national interests or international requirements. An example of those legal structures could be a legal system consisting of one statutory instrument providing a basis for export controls, subsidiary legislations consistently specifying binding regulations, and a unified control list as an attachment. If a State with such a legal framework decides to improve their national export control system or is bound by new international obligations such as the sanctions on the DPRK, those demands can be met without amendment or additional legislation at the statutory level of their legal hierarchy.

Regarding institutional aspects, it is recommended for states to design their institutional structure in a way that independence of a licensing authority can be secured enough to avoid conflict of interests in making decisions on export licenses. In many states, the bodies for export controls are placed within the ministries in charge of economy or trades. The existence of a parental organization doesn't necessarily mean that the

independence of the regulatory authority could be compromised. However, the export regulator should be able to make a judgement without approval from the parental organization with promotional functions. In addition, the integrity of the leadership of the regulatory authority should not to be affected by other organizations, and the leadership should be technically competent enough and be supported by adequate resources.

For effective export controls, states may also give consideration to adopting an end-user list together with effective catch-all controls. The end-user list doesn't have to be a denial list; rather it could be a watch list consisting of foreign entities involved in WMD proliferation. When an exporter is not able to ascertain the export license requirement for the exporting item, the end-user list could provide a reference in making that judgement. Meanwhile, the regulatory authority could make itself available to assist the exporter by informing the license requirement based on thorough assessment.

In reviewing the export control system, states are encouraged to explore their industries in order to identify the sectors more exposed to risk of WMD proliferation. By doing so, the regulatory authorities could efficiently reach out those sectors and conduct enhanced due diligence in reviewing the license application submitted by them. In terms of the sanctions, this paper provides the list of main or notable items exported to the DPRK in the period of 2004-12 in the appendix, which could be a reference for reviewing their implementation of resolutions 1718 and 1874.

Lastly, it should be highlighted that robust export control enforcement plays a significant role for maintaining the effectiveness of the system, and without it, effectiveness can be compromised despite existing legal and institutional frameworks that are claimed to be adequate for export controls. Also, for the purpose of raising awareness of export controls, it is recommendable for a regulatory authority to conduct outreach activities targeting employees at both management and working levels of their industry. In this way, compliance officers of business entities can be empowered with sufficient support from the management level while employees with sales promotional responsibility can conduct or perceive the need for an assessment of proliferation risk before signing commercial contracts.

Annex I: Main items exported by each customs regime

Exporter	Pre-Sanctions (2004-2006)			Post-Sanctions (2007-2012)		
	HSPC	MECRs	Description	HSPC	Possible MECRs	Description
Germany	902214	NSG	Apparatus based on the use of X-rays	902214	NSG	Apparatus based on the use of X-rays
	847989	NSG, MTCR, and AG	Machines	847989	NSG, MTCR, and AG	Machines
	846390	NSG and MTCR	Machine tools for metal processing	842129	AG	Filtering or purifying machines
	902730	NSG	Spectrometers or spectrophotometers	902720	AG	Chromatographs or electrophoresis instruments
	847150	MTCR	Data processing units	902710	AG	Electronic gas analysis apparatus
	903149	MTCR	Optical Instruments	850440	NSG	Electrical static converters
	841350	NSG and AG	Reciprocating positive displacement pumps	847141	MTCR	Data processing machines

China	847141	MTCR	Data processing machines	847141	MTCR	Data processing machines
	841480	NSG and AG	Air or gas compressors	870590	MTCR	Special purpose vehicles
	391721	AG	Tubes and pipes	391721	AG	Tubes and pipes
	391723	AG	Tubes and pipes	391723	AG	Tubes and pipes
	690290	MTCR	Refractory bricks	621040	AG	Garment
	760429	NSG	Aluminium bars and rods	841869	AG	Refrigerating unit
	850440	NSG	Electrical static converters	850440	NSG	Electrical static converters
	841780	AG	Industrial or lab furnaces (incinerator)	711510	NSG	Catalysts in the form of wire cloth or grill, of platinum
	842119	MTCR and AG	Centrifuges	847989	NSG and MTCR	Machines
	848210	MTCR	Ball bearings	841370	NSG	Centrifugal pumps
	870590	MTCR	Special purpose vehicles	760429	NSG	Aluminium profiles
	841381	NSG and AG	Pumps	850590	NSG and MTCR	Electro-magnets
Hong Kong	902710	AG	Electronic gas analysis apparatus	902720	AG	Chromatographs or electrophoresis instruments
	841480	NSG and AG	Air or gas compressors	853230	NSG	Capacitors
	852910	MTCR	Aerials and aerial reflectors	847150	MTCR	Data processing units
	901480	MTCR	Navigational instrument	854320	NSG	Electric signal generators
	851410	NSG	Resistance heated furnaces and ovens	854370	NSG and MTCR	Other electrical machines
	847989	NSG, MTCR, and AG	Machines	847989	NSG and MTCR	Machines
				854239	MTCR	Integrated electronic circuits
				850440	NSG	Electrical static converters

India	721914	NSG and MTCR	Flat-rolled products of stainless steel	721934	NSG and MTCR	Flat-rolled products of stainless steel
	741999	NSG	Articles of copper	721914	NSG and MTCR	Flat-rolled products of stainless steel
	841480	NSG and AG	Air or gas compressors	810890	NSG and AG	Titanium
	852990	MTCR	Parts for transmission appratus	841350	NSG and AG	Reciprocating positive displacement pumps
				852990	MTCR	Parts for transmission appratus
				841480	NSG and AG	Turbo charger (or air or gas compressors)
				902214	NSG	Apparatus based on the use of X-rays
				841780	AG	Industrial or lab furnaces (incinerator)
Indonesia	852990	MTCR	Parts for transmission appratus	852990	MTCR	Parts for transmission appratus
Italy	841950	AG	Heat exchange units	381512	NSG	Reaction initiators with precious metal
	847989	NSG, MTCR, and AG	Machines	842489	MTCR and AG	Mechanical for spraying liquids or powders
	852610	MTCR	Radar apparatus	841850	AG	Refrigerating unit
	852990	MTCR	Parts for transmission appratus	880330	MTCR	Parts of aircrafts or helicopters
	903180	NSG, MTCR, and AG	Measuring or checking instruments	391721	AG	Tubes and pipes
				391723	AG	Tubes and pipes
				844400	MTCR	Filament extrusion machines
				842230	AG	Machines for filling, closing and labelling

Japan	841950	AG	Heat exchange units	841869	AG	Refrigerating unit
	870590	MTCR	Special purpose vehicles			
	841869	AG	Refrigerating unit			
	841370	NSG	Centrifugal pumps			
Malaysia	283711	AG	Sodium cyanides	841480	NSG and AG	Air or gas compressors
	841950	AG	Heat exchange units	854370	NSG and MTCR	Other electrical machines
				853230	NSG	Capacitors
Russia	846029	NSG	Grinding machines	844630	NSG and MTCR	Weaving machines
	841480	NSG and AG	Air or gas compressors	850440	NSG	Electrical static converters
	841950	AG	Heat exchange units	880240	MTCR	Airplanes
	810890	NSG and AG	Titanium tube and pipes	841181	NSG and MTCR	Gas turbines
				847150	MTCR	Data processing units
				847141	MTCR	Data processing machines
Singapore	841869	AG	Refrigerating unit	847150	MTCR	Data processing units
	847149	MTCR	Automatic data processing machine	847149	MTCR	Automatic data processing machine
	847989	NSG, MTCR, and AG	Machines	842890	NSG	Lifting, handling, loading or unloading machinery
	847130	MTCR	Portable automatic data processing machines	852580	NSG	Digital cameras
	847150	MTCR	Data processing units	847130	MTCR	Portable automatic data processing machines
	292219	AG	Oxygen-function amino-compounds			
Sri Lanka				401519	AG	Articles of apparel
				250410	NSG	Graphite

Taiwan	845891	NSG	Numerically controlled lathes	847141	MTCR	Data processing machines
	846599	NSG	Machine tools for processing materials	841360	NSG	Rotary positive displacement pumps
	850162	NSG and MTCR	AC Generators	846019	NSG	Flat-surface grinding machines
	847141	MTCR	Data processing machines	280429	NSG	Rare gases
	847149	MTCR	Automatic data processing machine	854370	NSG and MTCR	Other electrical machines
	845969	NSG	Milling machines			
	903180	NSG, MTCR, and AG	Measuring or checking instruments			
	850440	NSG	Electrical static converters			
Thailand	847989	NSG, MTCR, and AG	Machines	721933	NSG and MTCR	Flat-rolled products of stainless steel
	880390	MTCR	Parts of ballons, aircrafts, spacecrafts, and satellites	854231	MTCR	Processors and controllers
	841989	NSG, MTCR, and AG	Machinery, plant or laboratory equipment	721934	NSG and MTCR	Flat-rolled products of stainless steel
	852910	MTCR	Aerials and aerial reflectors	852580	NSG	Cameras
	841850	AG	Refrigerating unit	846593	NSG	Grinding, sanding or polishing machines
	721933	NSG and MTCR	Flat-rolled products of stainless steel	854370	NSG and MTCR	Other electrical machines
	841869	AG	Refrigerating unit	701919	NSG	Glass fibers
	841480	NSG and AG	Air or gas compressors	842489	MTCR and AG	Mechanical for spraying liquids or powders
	845630	MTCR	Machine tools for working material (electro-discharge processes)	846031	NSG	Sharpening (tool or cutter grinding) machines
	401519	AG	Articles of apparel	841319	NSG	Pumps for liquids