

## *Original Paper*

# The Limits of Sanctions as Instrument for Interest Actualisation in the International System: The Case of North Korea's Nuclear Weapons Development

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### ***Abstract***

*This paper interrogates the potency of sanctions as US and UN instrument for de nuclearising DPRK and the intervening variables thereof. With the aid of secondary methods of data gathering, content analysis, and rational action theory as framework of analysis, the paper observes that sanctions failed to actualize US and UN goals in denuclearising DPRK. It further observes that this failure is attributed to the absence of most of sanctions enhancing factors in the international system such as weak economy and political instability, quick imposition with decisive maximal impact, and active participation in liberalized trade, tacit coordination of enforcement, of sanctions with manifest political appetite to enforce penalties, lack of capacity to circumvent sanctions, avoiding an overuse of sanctions, weak offshore capital, and immobility of target assets. Therefore, this paper recommends objective international engagement and integration of DPRK as a nuclear state.*

### ***Keywords***

*nuclear weapons, sanctions, US, UN, DPRK, denuclearisation*

## **1. Introduction**

The nature of emergence of Democratic People's Republic of Korea (DPRK), i.e., North Korea in 1948 defines its nuclear programme and success in spite of numerous international sanctions. DPRK emerged as an extreme self-reliant hermit kingdom, isolationist, and socialist state with strict dictatorship out of the struggle between US allies (capitalist enclave) and that of former Soviet Union (socialist enclave) for the control of the Korean peninsula. State power is concentrated in the hands of the military, which

from the emergence of DPRK has the priority of acquiring assured national security in the midst of powerful multilateral threats. As posited by Mearsheimer (2003), they want to maximize their power as a guarantee for long-term security, and attain a nuclear deterrent posture against the US and allies (Sagan, 1996, p. 97; Pritchard, 2007). The same view was expressed by Pinkston (2003) in the following manner:

“The bitter history of colonialism and war and the lack of confidence in Pyongyang’s security alliances partners have driven the North Korean leadership to allocate a tremendous number of resources to its missile program” (p. 11).

The United States military capabilities and international behaviours are the “central nervous system” of this threat. Precisely, the US nuclear bombings of Hiroshima and Nagasaki during World War II, US role in the 1950s Korean War (Scobell & Sanford, 2007), and the disintegration of the Soviet Union—DPRK’s major ally, laid the background for these threats. However, General Douglas MacArthur of US threat to use nuclear weapons against North Korea during the 1950s Korean War prompted Kim Il-Sung—the founding father of DPRK—to practically embark on the development of nuclear weapons as deterrence and/or for security reasons. This view was validated by DPRK’s ambassador to the United Nations, Se Pyong, who stated that “If the United States continues, then we have to make the counter-measures also. So we have to develop and we have to make more deterrence—nuclear deterrence” (Al Jazeera, 2016).

Thus, President George Bush’s doctrine of unilateral pursuit of US critical national security interests through the spread of democratic values; and his preparedness to wage preventive wars (Jervis, 2005; BBC News, 2006) as seen in Afghanistan, Iraq, and Libya; the administration’s declaration of North Korea as “axis of evil” in the January 2002 State of the Union address, and categorisation of DPRK as a threat to America’s national security (Arkin, 2002); the U.S. crack down on the Macau-based Banco-Delta Asia due to its alleged money laundering and counterfeiting; US freezing of moratorium on missile and nuclear weapons development programmes, and the United States reckless imposition of financial sanctions against DPRK exacerbated the perceived threat. These are responsible for DPRK’s ambition and success in developing nuclear weapons capabilities.

Consequently, they announced its intent to withdraw from the Nuclear Non-Proliferation Treaty (NPT) on 13 June, 1994 and subsequently withdrew in 2003. The country intensified her nuclear weapons and missile development programmes, which eventually led to DPRK’s conducting of her first nuclear missile test on October 9, 2006. This development attracted serious condemnation and international pressure led by the US and with the United Nations as a willing instrument that culminated in multiple multilateral negotiations and imposition of international sanctions aimed at slowing down the nuclear programme and coercing Pyongyang into a negotiated reversal of the programme (Kim, 2014). On one part, the US and its allies prominently Japan and South Korea imposed multiple bilateral sanctions on DPRK, while international sanctions form the other part.

The goals or purposes of the multiple bilateral sanctions are broader than the international sanctions, which is associated with the nuclear and missile programs. South Korea imposes its own sanctions primarily to punish DPRK for its military actions, Japan's case is to punish the country for cases of abductions, while the US raises human rights violations and trade in illicit goods as reasons. The policy objective of the multilateral or international sanctions pursues a verifiable nuclear disarmament and cessation of all efforts to procure nuclear weapons. In addition, the US wants to know the actual status of the nuclear weapons and the forms of plutonium and highly enriched uranium, and to establish an inspection regime to determine the baseline and ensure compliance.

The United States began to impose sanctions on DPRK from March 6, 1992 when it sanctioned Lyongaksan Machineries and Equipment Export Corporation and Changgwang Sinyong Corporation for missile proliferation activities. Subsequently, other sanctions followed. These include 23 June, 1992 "missile sanctions"; 24 May, 1996 sanction for missile technology-related transfers; 6 August, 1997 sanction for unspecified missile-proliferation activities; 17 April, 1998 sanction for transfer of missile technology and components to Pakistan; 6 April, 2000, 2 January, 2001 and 26 June, 2001 sanctions against Changgwang Sinyong Corporation for proliferating MTCR Category I items; 16 August, 2002 sanctions against Changgwang Sinyong Corporation of DPRK and the DPRK's government for transferring missile technology to Yemen; 24 March, 2003 against Changgwang Sinyong Corporation of North Korea for transferring missile technology to Pakistan; 29 June, 2005 sanction and assets froze of three North Korean entities "responsible for WMD and missile programs; 21 October, 2005 sanction against 8 DPRK for proliferation of nuclear, chemical, or biological weapons or related delivery vehicles; and 30 March, 2006 punishment of a Swiss and US companies for procuring "goods with weapons-related applications" for DPRK (Blix, 2017) among others. United States allies such as Japan, Australia among others joined the sanction regime after the 2006 DPRK nuclear weapon's test.

Subsequent multilateral and bilateral negotiations on stopping DPRK from acquiring nuclear weapons and missiles led to series of United Nations Security Council Resolutions that impose severe sanctions on DPRK between 2006 and 2017. These sanctions include UNSC 1695 of July 2006, UNSC 1718 of October 2006, UNSC 1874 of June 2009, UNSC 2094 of February 2013, UNSC 2270 of March 2016, UNSC 2321 of December 2016 (Haggard & Noland, 2017), and the UNSC 2371 of August 5, 2017 that imposed additional sanctions, including a complete ban on the export of coal, iron, seafood and lead.

These sanctions regime "were accompanied by other forms of collective enforcement. Inspection and interdiction activities were conducted not only under the aegis of the UN resolutions but through the US-led Proliferation Security Initiative (PSI) as well" (Haggard, 2016, p. 945). The primary objectives of these sanctions and enforcement mechanisms are to prevent nuclear and missiles related items, materials, goods and technology export to DPRK, prevent the provision of conventional arms, nuclear technology and training to North Korea. They seek also to prevent the procurement of such items from DPRK and the transfer of fund to aid the weapons programmes. Consequently, the sanctions regime target DPRK's international financial flows, third-country brokers, and financial enablers of the nuclear

programs.

However, in spite of all these multilateral and bilateral sanctions, a total of 21 missiles were advertised, tested, and/or launched in 2016 alone on 14 different occasions DPRK. Pyongyang celebrated the success of majority of these launch, which international observers equally acknowledged as successful. These weapons include the Hwasong-6, Nodong, Musudan, Taepodong and Pukguksong-1, which are medium—and long-range missiles (Macias, 2016). Advancing these tests, DPRK successfully launched a ballistic missile—the Pukguksong-2—on February 12, 2017. Further, four ballistic missiles were also launched on March 6, 2017; others were tested on April 5, 2017; April 16, 2017; May 14, 2017 testing of an intermediate-range ballistic missile known as Hwasong-12; July 3, 2017 testing of an ICBM known as Hwasong-14; August 25, 2017 testing of 3 short-range ballistic missiles; August 28, 2017 test of Hwasong-12 missile; and September 3, 2017 testing of a hydrogen bomb. Significantly, each of these tests is more sophisticated and advanced than the former.

Thus, the efficacy of sanctions as instrument of interest actualization in the international system is highly disputed even among scholars. Many argue and research findings equally suggest that imposition of sanctions do not orchestrate behaviour change on the recipient actor or state (Martin, 1992; Morgan, 1994; Pape, 1998) but led to the actor's establishment or formation of new alignment or bilateral relations with other actors that did not support the sanctions (Escribà-Folch, 2012; Oechslin, 2014; Morgan, 2015; Huish, 2017).

With a sample of 116 case studies extracted from international activities between World War I and the 1990 UN embargo of Iraq, Hufbauer, Schott, and Elliott (1990) found that sanctions have poor track record of initiating or enforcing behaviour change among actors in the international system. These scholars argue that the efficaciousness of sanctions in achieving behaviour modification or change depends on the following factors: the relative modesty of the goals of the sanctions, when the sanction recipient is smaller than its protagonists, faced with weak economy and political instability, where pre-sanction bilateral relations exist between the two parties, if the sanctions are imposed quickly and decisively to maximize impact, and where the protagonist avoids high costs to itself (Ruediger, 2006). Thus, the success of sanction is rare and/or very little (Cortright & Lopez, 1995).

However, dominant position in the literature argues that sanction is an important instrument in enforcing behaviour change among actors in the international system (Giumelli & Ivan, 2013; Peterson, 2013; Lehne, 2013; de Vries & Hazelzet, 2005; Cortright & Lopez, 2000; Pape, 1997; Galtung, 1967) but certain conditions are needed for its effectiveness (Huish, 2017). These conditions include the sanction recipient must be an active participant in the liberalized international trade (van Bergeijk, 2009), the protagonists of the sanction must exhibit political appetite or will to enforce penalties (Bapat & Kwon, 2015; Huish, 2017), there should be lack of personal capacity on the part of the recipient government to circumvent the sanctions (Hufbauer & Oegg, 2000), sanctions target and inflict damages to the ruling elites and their hostile programmes or projects (Drury, 2001; Tostensen & Bull, 2002; Gordon, 2011), checkmating or avoiding the overuse, abuse, and/or misuse of sanctions as foreign

policy instrument of a particular state (Eckert, 2008), none availability or weak offshore capital (Hampton & Christensen, 2002), and where the recipient state is unable to move assets to safe location in time (Lopez & Cortright, 1997).

Consequently, this paper seeks answers to the following questions:

- 1) Were international sanctions potent in securing US and UN interest over DPRK's nuclear weapons development?
- 2) What are the factors that limited the efficaciousness of international sanctions against DPRK's nuclear programmes?

## 2. Materials and Methods

Considering the avalanche of literature and/or empirical studies available on international sanctions against DPRK against its nuclear programmes and the development of the programmes and its economy in spite of sanctions, this paper adopts the secondary method of data collection. In this method, accessible books, journals, conference/seminal papers, workshop and lecture papers, magazines and newspapers are the primary sources of data. Relevant publications from these sources were read and their findings extrapolated as data.

The data thereafter was analysed using content analysis. In the analysis, the consistency of opinion in each work was verified and evaluated in the light of other findings made by different scholars to establish their reliability. These findings having stood the test of time validate the pieces of information contained in this paper. The sources of these data are thoroughly referenced.

To explain inter-variables relations in a framework that enhances objective inferences, this paper adopts the rational action model/theory for its analysis. The theory holds that states are rational actors whose behaviours are rational options. Their behaviours balance "costs against benefits" in pursuit of maximal "personal advantage" (Friedman, 1953, p. 22). According to Elster (1986), Roemer (1988), and Wright (1989), individual state actors are motivated by the goals that express their "preferences". In this, they anticipate the outcomes of alternative courses of action and envisage the best cost-effective course of action that yields maximum advantage. Thus, such state actor rationally chooses the alternative that is likely to give them the greatest satisfaction (Heath, 1976; Carling, 1992).

Therefore the basic assumption of the theory is that the patterns of behaviour in the international system reflect the choices made by states in pursuit of benefits maximization with minimal costs. It entails choosing a "rational" action given one's preferences, the actions one could take and the expectations therein.

This paper considers the theory relevant in spite of its weaknesses such as its disregard for the role of uncertainty, assumption of actor's complete knowledge of other contending actors, and the assumptions of actor's full knowledge of environmental implications and different limitations affecting its rational capacities. Its relevance lies in its ability to highlight the place of (national) interests as drivers of states choices. In this case US/UN pursuit of denuclearizing DPRK and their pursuit of nuclear programme.

Equally, it enables this research to isolate specific rational choices made by US/UN, i.e., international sanctions, examine their costs and benefits, and therefrom assess the potency of the choices. The theory enables this paper to assess the role of the weaknesses of the theory on the failure of US/UN sanctions to abort DPRK's nuclear programmes.

### 3. Data Presentation and Analysis

This section investigates the nature and level of DPRK's external trade relations during the sanctions regime with a view to establish the impact of the regime. As reflected in Table 1, Japan is the only country that stopped all forms of exports to DPRK due to the sanctions. As a consequence, many other countries such as India, Italy, Sri Lanka, and Russia embarked on expanded and/or comprehensive export services during the sanctions regime to DPRK. The products, which they export to DPRK include among others: x-ray related equipment, nickel alloys, light oil, aircraft, platinized catalysts, explosives, filtering or purifying machineries possibly including centrifuges, vacuum pumps, data processing machines, and transmission apparatus. These led to a tremendous increase in DPRK's volume of international trade during the sanctions regime.

In addition to this, the report of International Institute for Strategic Studies (IISS) (2013, p. 1) observe that "Sanctions clearly have not stopped North Korea's nuclear and missile programs, but the sanctions have made it more difficult for North Korea to acquire goods for these programmes". Similarly, Choi, and Bae (2016) summarised the impact of sanctions on DPRK as follows:

"However, far from resolving the standoff with the North (Haggard & Noland, 2012), sanctions have made the situation worse. North Korea's ability to sustain its nuclear weapons program does not seem to be weakened and its regime remained intact even as it increased its nuclear and ballistic missile technologies" (p. 820).

This observation is supported by over 40 interception cases and consequent successful interdictions against DPRK's exports, and the various DPRK's launch and tests of high tech and advanced nuclear weapons such hydrogen bomb, Intercontinental Ballistic Missile, etc.

DPRK's successful defiance of international sanctions has been attributed to a number of factors. This include DPRK's evasions of sanctions through the "use of legitimate trade as a cover" up for sanctioned goods, the "use of multiple layers of intermediaries, shell companies and financial institutions" (IISS, 2013, p. 2), falsification of Cargo documentations and the use of legitimate shipping/courier companies and multiple ports for shipments, hidden trade relations, money laundering and other illicit activities.

Similar to this factor, poor and insufficient knowledge of DPRK's sources of nuclear technology, nuclear materials, and financing limits the impact of the sanctions on the development of the weapons programmes. Thus, United States and its allies could cause delays, create financial discomfort and harass the DPEK's efforts, but cannot abort programmes that are opaque to Western intelligence and enjoys limited outside support. As an addendum to this, the some members of the UNSC that are part of

the group that impose sanctions on DPRK are responsible for advancing the nuclear and missile development programmes. For instance, technological transfer from the Soviet Union and China's assistance led to the development of Nodong (Cordesman et al., 2011). Similarly, DPRK's initiation and development of indigenous intercontinental ballistic missiles (ICBM), the Taepodong-1 and the Taepodong-2 was facilitated and assisted by Chinese and Russian engineers.

In addition, DPRK does not produce luxury goods that are of interests to the protagonists of the sanctions regime. Similar to this, Table 1 reveals that there are no close trade ties between DPRK and these countries that are at the vanguard of the sanctions such as the United States, European Union, Japan, and South Korea, etc. Countries at the vanguard of the sanctions against DPRK either have negligible economic and trade exchange with or significantly reduced their exchange as a result of bilateral or secondary sanctions since the early 1950s. For instance the United States has little or nothing to cut-off again from DPRK, while South Korea and Japan are increasingly facing similar experiences since the contemporary nuclear stand-off. Therefore, their prohibition of exports to DPRK could not alter their trade equation. DPRK has being heavily dependent on inputs from the Soviet Union, trade with the Eastern bloc countries, and with other socialist states across the world.

Very important to note is the fact that Offshore Ownership and Weak Oversight of Maritime contributed to the failure of international sanctions against DPRK. Most of the vessels are owned, registered, and managed by companies based in Hong Kong, Bahamas, Singapore, and Pyongyang, etc., in offshore locations with the assistance of third-party intermediaries. This made it impossible for the US and its allies and the UN to enforcement DPRK's sanctions. The Offshore business is a closed one where it is impossible for the US, UN and others to identify their stakeholders, boards of directors, and intermediaries for punishment due to sanctions violation. DPRK maintains substantial offshore capital and links, which makes it impossible to stop their international transactions.

Complementing these factors, the prevalence of "weak links" and coordination problems among sovereign states who are members of the UN and UNSC advancing the sanctions regime hindered or obstructed the imposition of a robust sanctions regime on DPRK. For instance, Russia and China have always blocked such proposals, while they remain DPRK's major trading partners (Haggard, 2016; Hufbauer et al., 2007). Further, China is always playing a patronage role to DPRK in the international system because it has continued to provide the leeway for DPRK amidst of sanctions. China remains the life wire of DPRK's economy. Grieger (2016) observed it thus:

"China has huge economic leverage over North Korea, since it is the country's largest trading partner. In 2014, the volume of Sino-North Korean trade reached US\$6.9 billion, up from US\$1.7 billion in 2006 when the first UN sanctions were adopted. China has largely profited from North Korea's increasing economic isolation by monopolising trade with the country, resulting in the latter's reliance on trade with China growing to 90.1% by 2014. China provides North Korea an estimated 40% of its food, 70% of its crude oil, 95% of its foreign direct investment and a huge amount of foreign aid" (p. 6).

In addition, there are evidences that DPRK acquired enough stockpile of nuclear materials prior to their first nuclear test, which enables them to advance in the nuclear weapons development in spite of sanctions and blockades. Siegfried (2006) observed that DPRK has a stockpile of about fifty kilograms of plutonium, which is sufficient to build eight nuclear bombs prior to the post 2006 nuclear tests sanction.

However, some scholars like Zarate (2009), Rosett (2015), and Dethomas (2016) observe that the sanctions were ineffective in aborting the DPRK's nukes programme because they are inappropriate to reverse DPRK's nuclear programme (Dethomas, 2016). DPRK's nuclear and missile programmes has three great functions, which are regime security, instrument for international negotiations and felicitation for economic assistance, and independent source of energy. Consequently, any international pressure, programme and/or action that fail to provide trusted alternative security guarantee, alternative means of income and source of energy is bound to fail in swaying DPRK to abandon the nuclear and missile programmes.

On these alternative provisions that could influence DPRK, Ruediger (2006) observes that DPRK has no trust in international agreements, the United States, and the United Nations. As quoted in Ruediger (2006, p. 23, footnote 56), the DPRK Armed Forces Minister-Kim Il Chol—stated: “neither the UN nor anybody else can protect us .... one can defend the nation's dignity and the country's sovereignty and independence only when it has its own powerful strength”. The experiences of Colonel Muamar Ghaddafi of Libya who trusted international guarantees and aborted its nuclear weapons programme only to be invaded and killed, and President Saddam Hussein of Iraq that complied with international resolution and withdrew from Kuwait only to be invaded and killed may have influenced DPRK's stand.

This argument is supported by the reality of United States long history of aggression, threats, and sanctions against DPRK, which are progressively being institutionalised and internationalised. It is not a classified policy goal that United States sanctions are designed to bring down DPRK's regime (Mihm, 2006). Concurring to this, McCormack (2006) observed:

“Under the direction of Vice President Dick Cheney, with Undersecretary for Arms Control Bob Joseph as coordinator, and in accordance with the national security provisions of the Patriot Act designed for the struggle against terrorism, they set out to squeeze North Korea on every front, especially in regard to its alleged illegal activities and its human rights record” (p. 2).

Equally, DPRK has continued to demonstrate its ability to circumvent or bypass US and UN sanctions. They always develop new networks and bilateral relations that counter the ones blocked or damaged by sanctions. For instance, the difficulties of engaging international exchange and payments in US dollar due to the sanctions led DPRK to covert to euros as its medium of international exchange and payment. China's crackdown on trading with DPRK due to sanctions has led DPRK to divert to Russia as major trading partner. In addition, DPRK's trade with others countries such as India, Pakistan, Burkina Faso,

Thailand, Iran, Hong Kong, Italy, Sri Lanka, and the Philippines among others increased (see Table 1 annexed).

In addition, black economy rose sharply and rapidly in DPRK as a substitute for legal trading and exchange concerns as a means of providing for people's needs. Accordingly, Ruediger (2006, p. 30) observed that "North Korea needs hard currency. If sanctions limit the options for earning hard currency by legal means, this will change the cost-benefit balance of illegal transactions". Generally, the imposition of US and UN sanctions have only led to trade diversion in DPRK and news international alliance with socialist countries and all other countries facing US aggression or threat. In all, DPRK's economy has continued to grow annually at the rate of 3.9% as at 2016 in spite of sanctions (Hutt, 2017).

Further, the nature of the sanctions makes them ineffective in influencing DPRK behaviour change. The sanctions were meant to increase the economic and political costs of the nuclear and missile programs as well as impede access to outside assistance for developing the nuclear weapons. The sanctions were never broad enough or powerful enough to be regime threatening. These types of sanctions are insufficient and impotent in stopping the DPRK nuke's development because the programmes are both a constitutional and security agenda. These programmes are managed by a military command structure and have attracted substantial investments, which such sanctions cannot easily neutralize. This position is countered by the nuclear deterrent regime security school, which argues that DPRK pursues the acquisition of nuclear weapon as their top most priority to secure regime security.

#### **4. Summary and Recommendation**

The necessity to acquire nuclear capability and achieve military deterrence against the United States and its allies led to the development of nuclear weapons and missiles programme in DPRK. This projected culminated in multiple bilateral and international sanctions against DPRK with the aim to freeze to programme and force the country to negotiating table. Nevertheless, DPRK's numerous launch and tests of different degrees of missiles capabilities between 2006 and 2017 demonstrate Pyongyang's technological advancement, development and diversification of improved missiles operational capabilities stockpile. Its launch of ICBM and hydrogen bomb in 2017 clearly demonstrate that the sanctions failed to achieve both their primary and secondary aims.

The sanctions failed because virtually all the pre-conditions for efficacious sanctions regime as demonstrated by scholars in the literature were lacking or none existing. Although DPRK is relatively an under size when compared with the US, Japan, South Korea, and the United nations in general; it enjoys considerable economic and political stability, and has being insulated from the sanctions protagonists who were its belligerent enemies prior to the sanctions. Economic relations between them were either infinitesimal or non-existing prior the sanctions, while DPRK was not an active participant in the liberalized international trade.

In addition, the sanctions were imposed gradually and were mixed with carrot policies. Initially, the US failed to exhibit stringent political will or appetite to enforce penalties on violations even with Executive Orders, while DPRK has sufficient capacity to circumvent the sanctions' regime with strong offshore capital. Equally, the sanctions are not targeted against neither do they inflict damages to the ruling elites individually. It is observed also that DPRK's nuclear and missile programmes are intertwined with its nationalism, regime and national security. Thus, they are managed by constitutionalised hierarchical military structure, which makes it impossible to terminate the programme because of the death of any individual or group of individuals in the country. Therefore, the alleged plots to assassinate DPRK's leader by United States, South Korea, and Japan does not guarantee the freezing of its nuclear programme.

It is also pertinent to aver that with the failure of sanctions and DPRK's acquisition of nuclear capabilities and weapons, military campaign shall equally fail. Its costs will be catastrophic and very high because millions of lives will be lost, cities on both sides of the divide shall be laid waste while the consequences shall hunt humanity for decades. Therefore, the reality of DPRK being a nuclear state should be acknowledged and proper international engagement pursued. Precisely, DPRK should be integrated into the world system as such due to its power balancing and deterrent posture.

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## Appendix 1

### Supplementary Data/Tables

**Table 1. Exports to DPRK from 2004 to 2012**

| countries | Pre-Sanctions (2004-2006) |                   |                                      | Post-Sanctions (2007-2012) |                   |                                      |
|-----------|---------------------------|-------------------|--------------------------------------|----------------------------|-------------------|--------------------------------------|
|           | HSPC                      | MECRs             | Description                          | HSPC                       | Possible MECRs    | Description                          |
|           | 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      |

|         |        |             |                                           |        |              |                                                           |
|---------|--------|-------------|-------------------------------------------|--------|--------------|-----------------------------------------------------------|
| Germany | 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                                           |
|         | 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                                         |
|         | 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     | Pumps                                     | 850590 | NSG and MTCR | Electro-magnets                                           |



|           |        |                   |                                   |        |             |                                             |
|-----------|--------|-------------------|-----------------------------------|--------|-------------|---------------------------------------------|
|           |        |                   |                                   |        |             | transmission apparatus                      |
|           |        |                   |                                   | 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 apparatus  | 852990 | MTCR        | Parts for transmission apparatus            |
| 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 apparatus  | 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 |
|           | 841950 | AG                | Heat exchange units               | 841869 | AG          | Refrigerating unit                          |

|           |        |                   |                                             |        |            |                                                   |
|-----------|--------|-------------------|---------------------------------------------|--------|------------|---------------------------------------------------|
| Japan     | 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&MTCR   | Other electrical machines                         |
|           |        |                   |                                             | 853230 | NSG        | Capacitors                                        |
| Russia    | 846029 | NSG               | Grinding machines                           | 844630 | NSG&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&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 machine                 |
|           | 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 balloons, aircrafts, Space crafts, 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                                         | 852580 | NSG          | Cameras                                 |

|  |        |                    |                                                                           |               |                 |                                                        |
|--|--------|--------------------|---------------------------------------------------------------------------|---------------|-----------------|--------------------------------------------------------|
|  |        |                    | reflectors                                                                |               |                 |                                                        |
|  | 841850 | AG                 | Refrigerating unit                                                        | 846593<br>NSG | NSG             | Grinding, sanding<br>or Polishing<br>machines          |
|  | 721933 | NSG<br>and<br>MTCR | Flat-rolled products<br>of stainless steel                                | 854370        | NSG and<br>MTCR | Other electrical<br>Machines                           |
|  | 841869 | AG                 | Refrigerating unit                                                        | 701919        | NSG             | Glass fibres                                           |
|  | 841480 | NSG<br>and<br>AG   | Air or gas<br>compressors                                                 | 842489        | MTCR and<br>AG  | Mechanical for<br>spraying liquids or<br>powders       |
|  | 845630 | MTCR               | Machine tools for<br>working material<br>(electro-discharge<br>processes) | 846031        | NSG             | Sharpening (tool<br>or cutter<br>grinding)<br>machines |
|  | 401519 | AG                 | Articles of apparel                                                       | 841319        | NSG             | Pumps for liquids                                      |

*Source:* Hyuk, Kim (nd.). The Impact of United Nations Sanctions on North Korea (DPRK), Stockholm International Peace Research Institute paper, pp. 109-113.