The second North Korea–United States Hanoi Summit broke down without producing an agreement. Although the denuclearization talks between North Korea and the United States will need to progress further for the situation to become clear, it appears that the U.S. considers sanctions against North Korea are having an impact on the North Korean economy, and is strongly pressuring North Korea to implement complete denuclearization first, before lifting sanctions.

However, we lack evidence to conclude that the North Korean economy is being seriously hurt by sanctions on North Korea. In the past we could estimate the impact of sanctions by analyzing North Korea's trade with China using the China Customs monthly trade data. Unfortunately, China Customs has discontinued its monthly trade statistics since March 2018 due to trade conflicts between China and the U.S. The only means to look into the North Korean economy has disappeared. The effectiveness of sanctions on the North Korean economy will play an important role in the

direction of future denuclearization talks. Therefore, if possible, it is necessary to analyze the impact of sanctions on the North Korean economy by analyzing North Korea's trade with China in 2018.

This paper analyzes the impact of sanctions on North Korea's economy in 2018 by analyzing North Korea's trade with China. We obtained statistics from China Customs, i.e. the General Administration of Customs of the People's Republic of China, on China's trade with North Korea by country, HS code, province, and trade type in 2018. Our analysis focused on three possibilities: a decrease in imports and exports, a rise in North Korea's alternative export items, and a possible slowdown in industrial production.

In 2018, North Korea's total exports of goods to China fell by 87.3% year-on-year, almost coming to a stop, while total imports from China fell by 37.3%. These figures indicate that North Korea's economy was negatively affected and unable to import necessary goods such as electronic goods even though the fall in imports was smaller than in exports. Commodity exports to China recorded 209 million USD, down 87.3% from 1,655 million USD the previous year, as main export items such as anthracite, iron ore, and apparel were banned due to sanctions. The imports from China recorded 2,228 million USD, down 33.4% from 3,330 million USD the previous year, as sanctions prohibited the import of electronic devices (HS codes 84), machinery (HS codes 85) and vehicles (HS codes 86-89). The total trade volume was 2,427 million USD, down 51.3% from 4,980 million USD last year.

North Korea recorded its largest trade deficit to date in 2018, which is expected to pose a huge burden on the North Korean economy. The trade deficit in commodities was 2 billion USD, 20.0% worse than the previous year’s 1.7 billion USD. The trade deficit in 2018 was three times larger than the annual average trade deficit of 0.6 billion USD. A trade deficit of 3.7 billion USD is quite serious for the North Korean economy, when considering that North Korea's GDP was estimated at 16.8 billion USD in 2016, according to UN data. It is doubtful whether the North Korean economy will be able to endure such a high trade deficit in 2019 as well.

North Korea has been known to possess an economic structure where it exports profitable goods to maintain a necessary level of imports. If exports fall below a certain level, the economy experiences difficulties due to the lack of foreign currency to import goods. The five UN Security Council's sanction resolutions against North Korea passed during 2016-17 have

caused acute difficulties in the North Korean economy by completely banning its major export items and means of foreign currency earning. For example, UNSCR 2371 of August 2017 prohibits exports of anthracite (HS 2701), which accounted for 42.5% of exports in 2015, and UNSCR 2375 of September 2019 bans the export of textiles (HS 50 – HS 63), which accounted for 32.6% of exports in 2015. North Korean workers dispatched overseas, which are a major source of foreign currency earning, must return to North Korea by December 2019 in accordance with UNSCR 2397 (adopted in December 2017). North Korea's neighbors, such as South Korea, China, and Russia, have faithfully implemented sanctions, and this has brought North Korea's exports to an almost complete stop and caused difficulties for the nation to earn foreign currency. At the second North Korea–U.S. summit, it was reported that North Korea demanded for the U.S. to partially lift these five sanctions imposed during 2016-17.

However, despite the dramatic decline in North Korea's imports and exports, there is yet no consensus on whether sanctions have negatively affected the North Korean economy. Although sanctions are banning all of North Korea's major export items, the decline in imports was relatively small, and market prices and exchange rates remained stable. Rice prices and exchange rates (RMB, USD) showed relatively stable changes within 10%, while corn and pork prices showed stable changes within 20%. Note that, in the case of North Korea, maintaining commodity price changes within 20% can be interpreted as successful management of price levels. As a result, two contradicting hypotheses are being raised at the same time: the first stating that the North Korean economy has somehow found a way to muddle through its difficulties, and the second stating the North Korean economy is falling into a crisis due to the sanctions.²

North Korea's total exports to China fell by 87.3% year-on-year, directly affected by sanctions against North Korea. As the sanctions completely ban major products of export such as anthracite, fishery products, and textiles, exports of these products recorded near to zero. The most exported product was in the category of portable watch movements (HS 9108), with exports to China's Jilin Province amounting to 31 million USD, up 1,604.2% from the previous year. The second-most exported product was alloy iron (HS 7202), which recorded 22.5 million USD in exports to Guangdong Province of China, up 26.5% from the previous year. The third-most exported product was wigs and eyelashes (HS 6704), which recorded 20 million USD in exports, up 126.4% from the previous year.

North Korea's total imports from China were affected by the sanctions as well, but the changes in imports are more complicated. North Korea's total imports declined by 33.4% from the previous year, but imports of non-sanctioned products increased slightly from the previous year. North Korea's exports have nearly come to a stop, and this is causing difficulties in foreign currency earning. How was it possible for North Korea to increase its imports of non-sanctioned products? Various hypotheses have tried to explain this. The first is that North Korea possesses more foreign reserves than expected, allowing it to maintain a certain level of imports. The second is that North Korea's economy is durable enough to overcome sanctions because it is an almost closed economy, and restricting imports and exports have but a minor effect on the economy. The last hypothesis is that North Korea was optimistic about the denuclearization negotiations and expected that sanctions would be lifted in the first half of 2019, soon to be followed by foreign economic aid, and expended its foreign currency reserves ahead of schedule.

However, we need to be more careful when interpreting the increase in North Korea’s imports of non-sanctioned items. It would not be appropriate to interpret this as meaning the sanctions are ineffective and the North Korean economy has not been impacted. There are various indications that North Korea's economy is not holding up well under the sanctions. We want to point out that North Korea’s unique import invoicing system can cause the illusion of imports. North Korea does not settle payments immediately when importing products. Instead, the nation imports and sells the goods first without payment, and then settles the bill afterwards. Due to this unique invoicing system, if a trading company increases its imports due to demands from the North Korean authorities, or for the purpose of absorbing foreign currency held by North Korean citizens, it would be possible for imports of non-sanctioned products to increase without payments actually being made. On the other hand, it is also possible that there could be substitution effects between sanctioned and non-sanctioned products.

The most imported product of North Korea was soybean oil (HS 1507), up 21.7 percent from the previous year to a total of 135 million USD. The second-largest import product was synthetic filament yarn (HS 5407), down 38.7% from the previous year to 126 million USD. It seems that imported yarns are used for domestic use rather than for processing export products. The third-most imported product was nitrogen fertilizer (HS 3102), imports of which increased to 80 million USD, or 162.7% over the previous year. The fourth-most imported product was wheat flour (HS 1101), up by 93.3% from the previous year to 63 million USD.

North Korea's import changes can be interpreted in two ways. First, imports of capital goods related to industrial production were discontinued, and this is due to sanctions. Second, most
major import products were related to grocery goods, which seems to be the result of increased imports of groceries for the purpose of earning foreign currency from North Korean citizens and funneling this to the North Korean authorities. Food products have the advantage that they can be sold in the market and easily converted into cash.

In summary, it seems that sanctions have adversely affected the North Korean economy. Exports have almost stopped due to the sanctions, and imports related to industrial production have almost stopped as well. As firms face difficulties in foreign currency earning, it seems they have been importing groceries that can be sold in private markets in order to absorb foreign currency from North Korean citizens.

In 2019, North Korea's total exports are expected to remain at or slightly rise over 2018 levels. The nation is expected to increase exports to some extent based on its experience with sanctions. However, given the fact that North Korea is not importing capital goods, export growth will likely remain within a very limited range. In 2019, North Korea's total imports are expected to remain at or slightly drop from 2018 levels. The main reason for this decline in imports is that North Korea is having a difficult time earning foreign currency due to the current sanctions.