

Starving the Beast: the Effects of China and the United Nations'  
Sanctions on North Korean Rason City's Rice Prices.

By

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## **Abstract**

Do economic sanctions targeting authoritarian regimes have effects on non-sanctioned goods, especially food commodities? Although there is a large and increasing amount of literature written on the effects of economic sanctions on authoritarian countries, only a handful of them have delved into the collateral damage of economic sanctions. Among these handful of studies, few studies have proposed a clear mechanism of how non-sanctioned goods could also be influenced by economic sanctions targeting authoritarian regimes with relatively isolated economies. In this article, by using of a unique quantitative data set consisting of daily food commodities prices sourced from North Korea Rason City's black and gray markets along with ten qualitative interviews with Chinese formal and informal business people in October and November 2017, I found that depending on the relationship between the targeted country and its ally which could potentially serve as its sanction buster country, economic sanctions targeting authoritarian countries could have large negative influence on non-sanctioned goods, especially food commodities, even on countries that have relatively isolated economies.

I also found that as for authoritarian countries with isolated economies such as North Korea, foreign goods could flow into the targeted country through both formal and informal (smuggling and illicit trade) trade channels. When sanctions are imposed, the higher demand for foreign goods stimulates the flourish of underground channels, which facilitates the inflow of both non-sanctioned and sanctioned goods into the targeted country's domestic market from the targeted country's sanction buster country. However, when the targeted country's sanction buster country which is economically connected to the targeted country through both formal and informal trade channels also participates in the international community to impose economic sanctions on the targeted country, economic sanctions from the targeted country's sanction buster country could have negative effects on even

non-sanctioned goods because the previous underground channels could be cut (formal channels are also likely to diminish due to economic pressure), hence the inflow of both sanctioned and non-sanctioned goods could be prohibited.

Combined these findings, I propose a unique method to study and measure the effects of economic sanctions on authoritarian regimes with isolated economies: by looking at the effects of economic sanctions on non-sanctioned goods, especially food commodities. Because when economic sanctions are imposed on authoritarian regimes with isolated economies, non-sanctioned goods could follow the flow of sanctioned goods into the targeted country through informal trade channels, hence we can monitor whether economic sanctions do have negative effects on sanctioned goods or not by looking at sanctions' effects on non-sanctioned goods: if non-sanctioned goods are in fact immune to economic sanctions and remain non-influenced by economic sanctions, then it is likely that underground channels still remain active, which provides potential valid opportunities for informal traders to smuggle sanctioned goods into the targeted country, and hence eventually bust sanctions. On the other hand, if economic sanctions are proved to have larger effects even on non-sanctioned goods, then this phenomenon suggests that underground channels have already been cut and hence the underground flow of sanctioned goods are likely to have been sufficiently prohibited.

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## **Introduction**

Do economic sanctions have effects on non-sanctioned goods, especially food commodities? How do we know if sanctions are working? How can we measure the effects of sanctions on specifically sanctioned items?

Economic sanctions have been considered and adopted as an approach to project power or to influence other countries' governments' behavior without resorting to more violent military conflicts (Kaempfer and Lowenberg, 2007). Even though economic sanctions are less violent as compared to wars or other direct military approaches, it is still designed to inflict serious and non-negligible pain on targeted country's domestic economy, and hence to eventually force changes in the targeted country's policies.

How can we measure the actual effects of economic sanctions? It might be relatively easy to measure the aggregate level effects of economic sanctions on the targeted countries' domestic economy as a whole by looking at the targeted countries' general indicators of domestic economy. But it is much more difficult to monitor if economic sanctions do have negative consequences on specific goods and commodities that sanctions target. This is particularly the case as for authoritarian regimes with isolated economies not only because that isolated economies rarely publicize detailed data on their domestic economies, but also because of the possible engagement of informal trade and smuggling. When goods, both sanctioned as well as non-sanctioned goods, flow into the targeted country through underground trade channels, it is much more difficult to measure the effects of economic sanctions on such specifically sanctioned goods.

In cases where authoritarian regimes with isolated economies are targeted by economic sanctions, how do we measure the effects of economic sanctions on specifically sanctioned goods? Do economic sanctions have effects on targeted and non-targeted goods? The answers to these questions are crucial to our understanding of the effects of economic sanctions, and

are also important to policy-makers who are influential to the use of economic sanctions. If the effects of sanctions on targeted goods are ambiguous, how could politicians use economic sanctions properly?

So far, a large and growing body of literature has been written to examine the effects of economic sanctions on authoritarian countries, even those with isolated economies. The question that whether economic sanctions are effective or not has been debated by scholars over the last several decades. Those debates are heavily guided by two points of views. The first group of scholars such as Elliott asserts that economic sanctions can be effective, although effective sanctions could be costly politically and economically and that economic sanctions could achieve only modest goals when economic sanctions are not imposed along with other policy tools (Elliott, 1998). Other scholars in the “sanction success group” also found that sanctions do have deleterious consequences on the targeted countries’ bilateral trade, in cases when economic sanctions are large and comprehensive (Caruso, 2003). Specifically, as argued by these scholars, economic sanctions could negatively impact the targeted country’s bilateral trade when economic sanctions are extensive and comprehensive (Caruso, 2003) and hinder the target country’s economic growth by decreasing the targeted countries’ real per capita GDP growth rate (Neuenkirch and Neumeier, 2015). Besides, some literature has also proposed various of theories and mechanisms on how economic sanctions could effectively inflict economic pain on targeted countries. For example, scholars like Peksen and Son found that economic sanctions could result in currency collapses by harming the target country’s domestic economy as well as increasing political risks (Peksen and Son, 2015).

However, the other group of scholars argues the opposite, that economic sanctions do not work and that sanctions always fail in forcing the targeted countries to change their policies. This opinion has by far become the most dominant point of view in the debate of sanctions’

effects and effectiveness (Hovi, Huseby and Sprinz, 2005). Scholars such as Jadoon, Shin, Choi and Luo argue that economic sanctions don't work in hurting the targeted country's economy, this is because that they found economic sanctions do not work in hurting the economic conditions of the sanction targeted countries (Shin, Choi and Luo, 2016).

As the literature narrows down to economic sanctions imposed on authoritarian regimes, the answer to whether economic sanctions do cause economic pains or not remain undecided.

A number of studies that look at the effects of economic sanctions on authoritarian regimes such as Cuba and Iraq found that economic sanctions could cause negative consequences on the availability of food, clean water, and medicine in the sanction target state, hence those studies argue that sanctions could harm the sanctioned state's public health conditions (Allen and Lektzian, 2013; Garfield, 1999). This finding is further probed by Allen and Lektzian. In their 2013 paper, Allen and Lektzian found that economic sanctions significantly harm the target state's public health conditions, but this is only the case when economic sanctions have relatively large economic effects on the sanction targeted countries (Allen and Lektzian, 2013).

However, in the case of North Korea, which is widely acknowledged as a typical authoritarian regime with isolated economy, most existing literature asserts that economic sanctions do not succeed. Noland found that economic sanctions imposed by the United Nations Security Council on the export of heavy arms and luxury products to North Korea in 2006 (this sanction was imposed shortly after North Korea's nuclear test in October 2006) do not have perceptible consequences on North Korea's trade with South Korea or China which were at that time North Korea's two primary trading partners (Noland, 2009). This theory (economic sanctions on North Korea generally fail) is supported and developed by a number of other scholarly articles, for example, in their 2006 article, Whitty, Kim and Crick further argue that future United States' economic sanctions on North Korea will also fail due to the

lack of China's actual help and participation (Whitty, Kim and Crick, 2006). One of the primary causes for China's reluctance to help is China's concern of potential refugee issues due to harsh economic sanctions (Whitty, Kim and Crick, 2006). Furthermore, Frank developed this theory by positing that although economic sanctions (on North Korea) could lead to expected consequences (inflicting pain on North Korean economy or force policy changes), the longevity of such a campaign (against North Korea) is highly unlikely to be able to maintain---this is likely due to the relatively complicated constellation of self-interests among those six different states which participated in such campaign (Frank, 2006).

Why should there be any differences between the effects of sanctions on isolated economies and non isolated economies? Why would most scholars consider economic sanctions as non-effective in the case of North Korea? I argue that given the isolated nature of the North Korean economy, North Korea is connected to the outside world mainly through its economic ties with its largest and most important ally, China. Therefore, the willingness of China to participate in the sanctions campaign against North Korea is a key factor on the effectiveness of economic sanctions on North Korea. With that said, domestic economic conditions of isolated economies are significantly dependent on its connections to its major allies and donors, and when economic sanctions are imposed, such allies and donors play particularly important roles in either helping the targeted country to bust sanction, or inflicting the most lethal pain on the targeted country's domestic economy. On the other hand, non-isolated economies are connected to the outside world in a variety of ways, so individual allies and donors of non-isolated economies might not be as influential as those of isolated economies. In the case of North Korea, as China, North Korea's most important ally, has always been indecisive and inconsistent in terms of sanctioning North Korea due to its concern that harsh economic sanctions might result in the collapse of the North Korean regime and trigger potential refugee problems for China to deal with, any economic sanctions

imposed on North Korea without China's actual participation or help could be difficult to be effective (Whitty, Kim and Crick, 2006).

None of the existing published literature, however, has discussed any possible impact of economic sanctions on non-sanctioned goods in the case of North Korea, particularly food commodities. The study of the possible effects of economic sanctions on North Korean food commodities is important because food commodity is among the most widely consumed goods which are indispensable for people's daily basic needs. Therefore, if food commodities in targeted countries suffer from the negative effects of economic sanctions, then the deleterious effects of sanctions are likely to be significant and hence might be able to sufficiently coerce policy changes in the targeted states. Besides, as food commodities have never been listed as sanctioned items in the cases of sanctions on North Korea, studying the effects of economic sanctions on North Korean food commodities could help scholars and policy-makers to understand the effects of economic sanctions on non-sanctioned goods in North Korea.

In the case of North Korea, most existing literature examining the effects of economic sanctions on North Korea looks at the aggregate-level effects of economic sanctions on the North Korean economy, such as if and how sanctions from the U.N. affect North Korea's trade with China and South Korea (Noland, 2009). But due to the lack of data in the case of North Korea, it is relatively difficult to measure the actual effects of economic sanctions on specifically sanctioned goods. Since North Korea is widely known as one of the most heavily and comprehensively sanctioned countries in the world, then is it possible that economic sanctions on North Korea could have collateral damage on non-sanctioned goods, particularly food commodities?

In this article, by using a unique quantitative data set of daily food commodity prices in North Korea Rason City's informal markets and ten qualitative interviews with Chinese

business people, I found that depending on the relationship between the targeted country and its ally which could potentially serve as its sanction buster country, economic sanctions targeting authoritarian countries could have larger negative influence on non-sanctioned goods, especially food commodities, even these countries that have relatively isolated economies.

Besides, I also found that in authoritarian countries with isolated economies such as North Korea, imported goods could flow into the targeted country through both formal and informal (smuggling and illicit trade ) trade channels from its sanction buster country. When sanctions are imposed, the higher demand for foreign goods stimulates the flourish of underground channels, which facilitates the flow of both non-sanctioned and sanctioned goods into the targeted country's domestic market. However, when the targeted country's sanction buster countries which are economically connected to the targeted country through both formal and informal trade channels also participate in the international community to impose large and comprehensive sanctions on the targeted country, economic sanctions from the targeted country's sanction buster country could have significant effects on even non-sanctioned goods, because the previous underground channels could be cut and the flow of both sanctioned and non-sanctioned goods could be prohibited.

Combined these findings, I propose a unique method to study and measure the effects of economic sanctions on authoritarian regimes with isolated economies: by looking at the effects of economic sanctions on non-sanctioned goods, particularly food commodities. Because when economic sanctions are imposed on authoritarian regimes with isolated economies, non-sanctioned goods could follow the flow of sanctioned items to get into the sanctioned country through informal trade channels. Therefore, we can monitor whether economic sanctions do have negative effects on sanctioned goods or not by looking at sanctions' effects on non-sanctioned goods: if non-sanctioned goods are in fact immune to

economic sanctions and remained non-influenced by economic sanctions, then it is likely that underground channels still remain active, which provides potential valid opportunities for informal traders to smuggle sanctioned goods into the targeted country, and hence eventually bust sanctions. On the other hand, if economic sanctions are proved to have larger effects on even non-sanctioned goods, then this phenomenon suggests that underground channels could have been cut and hence the underground flow of sanctioned goods are likely to have been sufficiently prohibited.

In this article, I make several important contributions to existing literature in the fields of international political economy and conflict studies as well as existing literature in Northeast Asian studies, particularly existing literature in the political economy of economic sanctions on North Korea.

First, I contribute to existing research on economic sanctions on authoritarian countries with isolated economies by proposing a unique theory about if economic sanctions could have negative effects on even non-sanctioned items, particularly food commodities. My findings suggest that depending on the relationship between the targeted country and its ally which could potentially serve as its sanction buster country, economic sanctions on authoritarian regimes with isolated economies could have significant negative effects on even non-targeted goods, particularly food commodities.

Second, I contribute to the understanding of Sino-North Korean economic relationship. My findings show that the economic effects of China's sanctions on North Korean food commodity prices are greater than the effects of U.N. sanctions on North Korean food commodity prices, indicating that China is indeed North Korea's most important ally and donor country, and could also be North Korea's sanction buster country when U.N. economic sanctions are imposed on North Korea.

However, if China decides to also participate in the international community to sanction North Korea, such Chinese sanctions could increase food commodities prices in North Korean domestic markets because these sanctions are imposed by North Korea's sanction buster country. The mechanism could be that when China imposes economic sanctions on North Korea, it cuts informal trade channels between the two countries (formal trade channels are also likely to diminish due to economic pressure) which previously allow the flow of both sanctioned and non-sanctioned goods into North Korea from China, hence even though such economic sanctions do not specifically target food commodities, which is typical non-sanctioned goods, economic sanctions from China could have negative effects on even food commodities traded in North Korea's domestic markets as well.

Third, I propose a unique approach to measure the possible effects of economic sanctions on sanctioned goods: by looking at the effects of economic sanctions on non-sanctioned goods, especially food commodities. In the cases of economic sanctions on authoritarian countries with isolated economies, if non-sanctioned goods are in fact immune to economic sanctions, then it is likely that sanctioned goods also remain uninfluenced by economic sanctions. However, if non-sanctioned goods do suffer negative effects due to economic sanctions, then economic sanctions are likely to have significant effects on specifically sanctioned items.

### **The economic effects of sanctions on targeted countries**

For powerful countries, economic sanctions are usually adopted as a coerce tool to threat and induce policy changes in the target country so that to force the target country's policy to become more complementary to the sanction imposer's national interests (Hart, 2000; Neuenkirch and Neumeier, 2015). Since the end of the Cold War when the the Soviet Union collapsed in 1991, as the United State becomes the only remaining hegemony power after the

Cold War, in comparison to the United States, no other countries in the world have imposed economic sanctions more frequent (Carter, 1999; Garfield, 2002).

Conspicuously, following the end of the Cold War, when military intervention is no longer considered as a primarily desired approach to bring about political changes in a targeted country, economic sanctions have become more frequently used by powerful states. Economic sanctions have several major forms: the first form is general economic pressure imposed on a country as a whole to target the entire country's economy so that to force policy changes: this kind of sanctions include trade sanctions, which aim to isolate the targeted country from the international community economically by limiting the volume of goods imported from and exported to the sanctioned state (Kaempfer and Lowenberg, 2007). Another form of economic sanctions are more narrowly-targeted sanctions as they specifically focus on the targeted state's core elites, governmental officials as well as party cadres---this kind of sanctions is referred to as the "smart sanction" by Kaempfer and Lowenberg (Kaempfer and Lowenberg, 2007).

With that said, economic sanctions are used as a forcible approach to coerce targeted states to change their policy by effectively inflicting serious economic pains on the targeted countries. These economic pains not only include sanction's negative impact on the targeted country's overall domestic economic conditions such as GDP, international trade, foreign direct investment, but may also include negative influences on individuals (both ruling elites and civilians) who live in the target state.

Therefore, even though economic sanctions are less violent as compared to wars or other direct military approaches, it is still designed to inflict serious and non-negligible economic pain on the targeted country's domestic economy, and hence to force changes in the targeted country's policies.

To date, a large amount of literature has been written on the effectiveness and consequences of economic sanctions. However, the question that if economic sanctions do cause economic pains on targeted countries at all has become a long standing puzzle for social scientists and policy-makers. This question has been debated by scholars over the last several decades, and the debate is still in process. To date, existing literature on the economic effects of sanctions is heavily guided by two major points of views. The first point of view argues that economic sanctions are effective in achieving their goals while the second point of view asserts economic sanction do not succeed.

The sanction success theory argues that economic sanctions do work on targeted countries. Scholars such as Hufbauer, Schott, and Elliott found sanctions work best under certain conditions (hence sanctions might not work all the time), specifically, they analyzed 116 cases and then found that the proportion for “successful sanctions” within all 116 cases is thirty-four percent (Hufbauer, Schott, and Elliott, 1990; Hovi, Huseby and Sprinz, 2005). In other words, once adopted, economic sanctions actually do have a negative impact on the economy of the target country (although not in all cases). Besides, scholars argue that economic sanction cause deleterious effects on target state’s economic by prohibiting the flow of foreign capital, resulting in the withdrawal of foreign direct investment as well as decreasing foreign aid (Neuenkirch and Neumeier, 2015; Hufbauer et al., 2009; Evenett, 2002). That is to say, sanctions harm the targeted countries’ economy by constraining the target countries’ international trade with other countries in the international community, hence causing the de-investment from foreign businessmen. This theory is evidenced by Neuenkirch and Neumeier’s findings. Specifically, in their 2014 paper, Neuenkirch and Neumeier analyzed economic sanctions imposed by the United Nations and the United States by looking at the cases of sixty-eight states from 1976 to 2012 (Neuenkirch and Neumeier, 2015). Neuenkirch and Neumeier found both U.N. sanctions and U.S. sanctions harm the

targeted countries' annual real per capita GDP growth rate, although economic sanctions imposed by the United Nations did have larger and more significant consequences on the targeted economy (Neuenkirch and Neumeier, 2015).

Besides limiting the targeted country's import and export, there are other approaches through which economic sanctions could damage the targeted country's economic conditions as well. For example, Peksen and Son found that economic sanctions are likely to trigger the collapse of currency in the target economy: they argue that economic sanctions could cause negative consequences on the target countries' financial stability, and such negative consequences could hinder the target state's economic growth as well as financial prosperity (Peksen and Son, 2015). Apart from the negative economic consequences caused by sanctions, scholars such as Peksen and Drury found that economic sanctions also have negative effects on the target state's level of democracy (Peksen and Drury, 2010). In their 2010 paper, Peksen and Drury argue that the negative economic consequences due to sanctions could actually be used by the targeted country's regime in order to consolidate authoritarianism and hence hurt the level of democracy in the target states (Peksen and Drury, 2010).

One of the most recent examples of economic sanctions do cause economic pain in targeted country is the imposition of economic sanctions by the United States, the European Union as well as a number of other countries on the Russian Federation: introduced from March 2014, the European Union imposed a series of economic sanctions on the Russian Federation, which include both general sanctions, such as suspending beneficial loans to the Russian Federation as well as the so called "smart sanctions" such as visa bans on specific Russian corporations and personnel (Dreyer and Popescu, 2014). In Combination, these economic sanctions were able to inflict significant pain to the Russian Federation's domestic

economy, and furthermore, these sanctions also resulted in a quick decline in the prices of the Russia's oil as well as a rapid devaluation of Russia's currency (Dreyer and Popescu, 2014).

Contrary to those scholars who hold a positive opinion in the effectiveness of economic sanctions, the other group of scholar argue that sanctions do not work as expected, this is referred to as the sanction buster theory. The sanction buster theory has by far become the most dominant point of view in the debate of sanctions' effects and effectiveness (Hovi, Huseby and Sprinz, 2005). Scholars such as Shin, Choi and Luo found that economic sanctions in general do not work in hurting the targeted countries' economy, they found that economic sanctions failed to hurt the economic conditions of the sanction targeted countries (Shin, Choi and Luo, 2016). Specifically, in their 2016 article, Shin, Choi and Luo used a data set consisting of cross-national time-series data from 133 countries' cases during the period from 1970 to 2005, and found that economic sanction do not inflict economic pain on the sanctioned countries' economic conditions no matter how many countries participated in the sanctions imposer's campaign, and regardless of how high the levels of economic sanctions imposed are (Shin, Choi and Luo, 2016) .

This theory is supported by a large number of other scholars, those scholars argue that sanctions only worked in very few cases. Some of the most famous works that favor the sanction buster theory were written by Robert Pape, who challenged the optimistic point of view on sanctions' effectiveness: Paper found that merely four percent of the 116 sanctions cases finally resulted in "significant political concessions" by the target country. (Pape, 1997; Pape, 1998; Hovi, Huseby and Sprinz, 2005).

One of the most famous examples in which economic sanctions do not succeed in effectively force policy changes in targeted countries is that during the Cold War, when the United States sanctioned Cuba, Cuba was supported by its most important strategic ally, the Soviet Union, which helped Cuba bust US sanctions by providing it with subsidies and

assistance: served as Cuba's sanction busting country, the Soviet Union played a crucial role in sustaining the Cuban regime's ability to resist against the United States' sanctions: as a result, the United States' economic sanctions did not succeed because its sanctions were busted by the Soviet Union (Early, 2009).

When the literature narrows down to economic sanctions imposed on authoritarian regimes, there are still little consensus on if economic sanctions could work and if economic sanctions could effectively inflict pain on the targeted economy.

When authoritarian regimes are targeted, the sanction success theory argues that economic sanctions should still be able to cause economic pain and could be effective regardless of the authoritarian nature of the targeted regime. For example, case studies on authoritarian regimes with relatively isolated economies such as Iraq and Cuba found that sanctions could have severe deleterious consequence on public health outcomes by negatively influencing the the availability of food, clean water as well as medicine (Allen and Lektzian, 2013; Daponte and Garfield, 2000). In their 2000 article, Daponte and Garfield found that sanctions have deleterious influences on children's mortality in Iraq, that sanctions increased the risk of dying dramatically (Daponte and Garfield, 2000).

On the contrary, scholars who support the sanction busting theory insist that economic sanctions do not succeed, a most popular case is U.S. sanctions on Iran.

Started from 1979, the US imposed an episode of economic sanctions on Iran with a variety of targeted items, although disaster aid was generally not banned or intentionally prohibited by the terrorism list designation, or any other the United States' sanctions' law (Katzman, 2017). In April 1995, President Clinton tightened the economic sanctions in order to punish Iran's support for terrorism activities as well as the Iranian regime's development of nuclear programs (Torbat, 2005). Those sanctions, obviously caused negative consequences in Iran's economy: Katzman claimed that being influenced by the harsh

sanctions, the Iranian economy shrank by nine percent while the exports of Iran's crude oil fell as well (Katzman, 2017). Therefore, it is fair to conclude that economic sanctions have inflicted great pain on the Iranian economy. In the long run, whereas, the effects of economic sanctions on the Iranian economy is a bit more modest: for example, Torbat concluded that the oil import embargo did not work from a relatively long perspective (Torbat, 2005).

Specifically, Tobart found that Iranian oil export wasn't affected in response to the import ban: in his 2005 article that examines economic sanctions on Iran, Tobard argued that economic sanctions on Iran did not successfully inflict significant pain politically (Torbat, 2005).

Besides the case of Iran and Cuba, a number of studies on if and how economic sanctions work on authoritarian regimes with isolated economies look at the case of North Korea.

In the case of North Korea, however, most existing literature asserts that economic sanctions do not succeed. Noland found that economic sanctions did not work on North Korea primarily because economic sanctions did not have any effect on North Korea's trade with its major two partners, China and South Korea (Noland, 2009). This theory is supported and developed by a number of other scholarly articles, for example, in their 2006 article, Whitty, Kim and Crick further argue that future economic sanctions on North Korea are also likely to fail due to the lack of China's help and actual participation, hence China's sanction busting for North Korea could effectively bust the deleterious effects of economic sanctions imposed on the North Korean regime (Whitty, Kim and Crick, 2006). Furthermore, Frank developed this theory by positing that even though economic sanctions (on North Korea) could lead to expected consequences (inflicting pain on North Korean economy or force policy changes), the longevity of such a campaign (against North Korea) is highly unlikely to be able to maintain---this is due to the relatively complicated constellation of self-interests among those six different states which participated in such campaign (Frank, 2006).

Why would most existing literature reach the consensus that economic sanctions on North Korea do not succeed? Why is the isolation nature of the North Korean regime makes it different from non-isolated regimes?

I argue that as for most isolated economies, as these isolated economies have relatively scarce connections to the outside world, when economic sanctions are imposed, their allies and donors play an particularly important role in either assisting the targeted country to bust sanctions, or help imposing more economic sanctions on the targeted country. This is different from non-isolated countries, which might have a variety of approaches to bust economic sanction when economic sanctions are imposed.

However, in comparison to non-isolated economies, isolated economies do not have that many channels to minimize the pain of economic sanctions, one of the few approaches they could adapt to actively bust sanctions is to seek for more aid from their donors, the so-called “third party” (Early, 2009). I argue that this is particularly the case for authoritarian regimes with isolated economies. With that said, their (authoritarian regimes with isolated economies) relationship with the third party largely determines whether economic sanctions could be successful or not. That is to say, the major difference between isolated economies and non-isolated economies when facing economic sanctions is that isolated economies depend on the third party to bust sanctions to a much larger extent compared to non-isolated economies.

In the specific case of North Korea, North Korea is economically connected to the outside world mainly through its economic ties with its largest and most important ally, China. Therefore, the willingness of China to participate in the sanctions against North Korea is a key factor on the effectiveness of economic sanctions on North Korea. With that said, when facing economic sanctions, the effectiveness of North Korea’s sanction busting activity is significantly dependent on China’s attitude, because China plays an important role in either

to help North Korea bust economic sanction, or to inflict the most lethal pain on North Korea. However, as China has always been indecisive and inconsistent in terms of sanctioning North Korea for its concern that harsh sanctions could potentially lead to the collapse of the North Korean regime and potential refugee issues associated with that, economic sanctions imposed on North Korea without China's actual participation or help could be unlikely to be effective (Whitty, Kim and Crick, 2006).

Among all published literature written on the effects of economic sanctions on authoritarian regimes with isolated economies, from little to no literature, however, has discussed any possible impact of economic sanctions on non-sanction goods, particularly food commodities. In the case of North Korea, the study of possible effects of economic sanctions on food commodities is important because food commodity is probably among the most widely consumed goods which are indispensable for North Korean people's daily basic needs---after all, everyone in North Korea needs to eat food.

Besides, most existing literature examining the effects of economic sanctions on North Korea looks at the aggregate effects of sanctions on the North Korean economy as a whole. But due to the lack of data in the case of North Korea, it has proved difficult to measure the actual effects of economic sanctions on specifically sanctioned goods. Empirical study has shown that economic sanctions could lead to severe negative public health consequences when economic sanctions cause relatively large economic effects on the sanction targeted states (Allen and Lektzian, 2013). Therefore, since North Korea is known as one of the most comprehensively sanctioned country in the current world, then is it possible that economic sanction on North Korea could also have collateral damage on non-sanctioned goods, particularly food commodities? To answer this question, I choose to look at the effects of economic sanctions on North Korea Rason City's rice commodities prices.

## **Economic effects of sanctions on autocratic countries with isolated economies**

The amount of literature on the economic effects of sanctions on targeted countries is not small, but when examining the case of economic sanctions on authoritarian countries with isolated economies, few of them have delved into the possible effects of economic sanctions on non-sanctioned goods. This is possibly due to the lack of data for isolated economies as they rarely release much detailed data on their economy (in comparison to democratic regimes with relatively open economy). But could economic sanctions have any effects on non-sanctioned goods, especially food commodities? The answers to these questions are crucial to our understanding of the political economy of sanctions, and are also important to policy-makers.

In this paper, I argue that depending on the relationship between the targeted country and its ally which could potentially serve as its sanction buster country, economic sanctions targeting authoritarian countries could have collateral negative influences on even non-sanctioned goods, especially food commodities, even these countries have relatively isolated economies. When sanctions are imposed, all targeted countries might seek approaches so that attempt to bust sanctions. However, different types of regimes might react differently. For non-isolated countries, these countries might have a variety of approaches to bust economic sanction.

As for most isolated economies, on the other hand, due to their isolation natures, isolated economies are connected to the outside world mainly through their allies, which are also regarded as “the third part” by Early (Early, 2009). When sanctioned are imposed, since these isolated economies have relatively scarce connections to the outside world, their allies and donors play a particularly important role in either assisting the targeted country to bust sanctions, or to help imposing more sanctions on the targeted country.

In authoritarian countries with isolated economies such as North Korea, foreign goods could possibly get into North Korea through both formal and informal (smuggling and illicit trade) trade channels. In the national level, due to the donor country's national interests, the donor country could have incentives to help bust economic sanctions. In the individual level, businessmen from the donor country that are engaged in trade between the two countries always have incentives to make a profit from their investments in the targeted country, regardless of the national interests of their home country: therefore, when sanctions are imposed on the targeted country from the international community, the higher demands for foreign goods could increase the incentives of individual business-people from the donor country to trade with the targeted country---this is supported by "the liberal theory of sanctions-busting" to some extent (Early, 2009). Under such conditions, if the donor country's government also has incentives to help bust sanctions for the targeted country, the government's acquiescence or even encouragement could stimulate the flourish of underground trade channels, which could then facilitate the flow of both non-sanctioned and sanctioned goods into the targeted country's domestic market. With that said, depending on the target state's major ally (the third party), the imposition of economic sanctions could further result in an proliferation of informal trade channels connecting the targeted country and "the third party".

However, when the targeted country's ally which is economically connected to the targeted country through both formal and informal trade channels also participates in the international community to impose economic sanctions on the targeted country, economic sanctions from the targeted country's sanction buster country (the third party) could have significant effects on even non-sanctioned goods because the previous underground trade channels could be cut and hence the flow of both sanctioned and non-sanctioned goods could

be prohibited (the formal trade channels are also likely to diminish in this case due to economic pressure).

In the case of North Korea, as China, North Korea's most important ally, has always been indecisive and inconsistent in terms of sanctioning North Korea due to its concern that harsh sanctions could possibly result in the collapse of the North Korean regime, economic sanctions imposed on North Korea without China's actual participation or help are unlikely to be effective (Whitty, Kim and Crick, 2006). However, once China also participates in the sanction campaign against North Korea either due to the pressure from the international community or due to North Korea's provocation that hurts China's national interests, China's sanctions could have more significant deleterious effects on the North Korean economy compared to sanctions from other countries. During China's sanctions periods, as China could cut both its formal trade channels (or at least decrease its formal trade with North Korea) with North Korea as well as its informal trade channels with North Korea, underground trade channels connecting the two countries could be cut off and formal trade channels could also diminish and hence the flow of both sanctioned goods and non-sanctions goods could be prohibited. Therefore, non-sanction goods, including food commodities, could also suffer from Chinese sanctions.

### **Description of data and empirical methods**

In this article, I measure the effects of economic sanctions on authoritarian countries with isolated economies by looking at the case of North Korea. Specifically, I attempt to measure the effects of economic sanctions on North Korea from the United Nations and China by using a data set consisting of the daily prices of food commodities sold in North Korean Rason City's informal markets between January 2010 and May 2015. Food commodities might be one of the most basic and widely consumed goods in North Korea because after all, everyone in North Korea needs to eat food, even during economic sanctions periods. In the

case of North Korea, food commodities have never been listed as sanctioned items, therefore, looking at the possible effects of economic sanctions on food commodities prices in North Korea could be a valid approach to study the possible impact of economic sanctions on non-sanctioned goods in North Korea.

The Rason City data set starts from January 2010 and ends in May 2015. The food prices data for Rason City was provided by a businessman who is in my personal network. This businessman, Mr. Feng (“Mr. Feng” is not the real name of my source: I choose not to use the real name of my source for the sake of confidentiality and to protect my source), is a Chinese businessman who has connections with North Korean black and gray markets as well as many Chinese officials, and other Chinese business-people doing business in North Korea who also have connections with Chinese officials and informal markets in North Korea. Therefore, Mr. Feng was able to collect and gather food prices data through his personal connections. Therefore, the prices data primarily comes from North Korean informal markets, then Mr. Feng provided the data for me. I am not aware of the specific methods that Mr. Feng used to collect the data. In general, I think it is fair to state that the food prices data provided by Mr. Feng is not representative to prices of all food commodities traded at Rason City’s black and gray markets. Therefore, I think the food prices data used in this article is not the most ideal data to probe the research question, and hence it may be biased in making statistical inferences. But given the isolation nature of the North Korean economy and the lack of data, this is the best data I could have access to. Besides, given the lack of literature and data on North Korean Rason City’s rice commodities, it is difficult to test the validity of the data used in this paper, hence underscores the reliability of the results of this study. To mitigate such problems, I thrive to increase the reliability of the empirical results in this article by also including qualitative interviews I conducted with Chinese investors. Specifically, to study how economic sanctions could affect the North Korea economy and

how China's sanctions are enforced at the border customs level, in Winter 2017, I conducted a number of interviews with Chinese formal and informal business people engaged in China-North Korea business. All interviews were conducted over the phone. These interviews were conducted on a snowball sampling basis, so they don't necessarily represent all Chinese traders. In this article, the quantitative data was collected for/sourced from a research project on North Korean trade networks and commodities prices with Justin Hastings and David Ubilava at the University of Sydney, and the interviews with Chinese investors were also conducted for this project.

First of all, in this article, I test if sanctions, regardless of where they come from (either from the United Nations or China), have any effects on North Korea at all. First, I focus on testing:

#### Hypothesis 1

*Economic sanctions imposed by both China and the United Nations have negative consequences on rices prices in North Korea Rason City.*

If this first hypothesis is evidenced by empirical analysis, I then move on to test the second hypothesis, which probes how economic sanctions actually work on authoritarian countries with isolated economies, in this case, North Korea.

#### Hypothesis 2

*China's sanctions have more significant and robust effects on Rason City's food commodities' prices than the United Nations sanctions in general.*

### *Dependent variable*

I take the prices of rice commodities traded in North Korea's Rason City as the dependent variable. Due to the isolation of the North Korean markets and the lack of data, I have to rely on prices data collected and provided by my personal source. This method, however, has certain disadvantages. Due to my source, the rice commodities data was sourced from different informal markets at Rason City and was for prices of different kinds of rice commodities. Therefore, this method inevitably decreases the consistency of the prices data (because the prices are not for one single type of rice commodity traded in one single market). Besides, the data also does have serial-correlation problem and I think it is fair to conclude the data is very noisy data. Hopefully, future research could find and use better quality data for Rason City rice prices. The rice commodities data in the data set ranges from January 2010 to May 2015. Besides, there is a small proportion of missing values in the data set.

### *Independent variables*

There are two independent variables in this article: the first independent variable is UN-Sanctions, which refers to economic sanctions from the United Nations. This independent variable is coded as an ordinal variable. Among all these UN sanctions, food commodities have never been listed as sanctioned items, hence is a good indicator for non-sanctioned items.

The second independent variable used in the statistical models is China-Sanctions, which refers to economic sanctions on North Korea from China. As North Korea's largest ally as well as its most reliable and generous donor, China has the potential to serve as North Korea's sanction busting country. However, due to the increasing pressure from the international community as well as the provocations from the Kim's regime, China

sometimes also sanctions North Korea. Therefore, I expect Chinese economic sanctions to have more significant effects on North Korea Rason City's food prices in comparison to economic sanctions from the United Nations. However, the major obstacle in measuring this independent variable is that when China sanctioned North Korea, it hardly ever officially announce any details regarding the specific levels of sanctions, not even the precise start dates and end dates of its sanctions. Therefore, to measure this variable. I have to find alternative sources: I talked with local Chinese people (who work or live in Northeast China, which is geographically close to the Korean Peninsula) in my personal network and asked them about when China sanctioned North Korea. In doing so, I was able to collect and gather data for this variable based on the narrative of my sources. This variable, China sanctions, is coded as an ordinal variable. There are, however, at least two weaknesses for this method. First, those Chinese people only remember the approximant start dates of sanctions (in most cases), but don't remember when each Chinese sanction ended, this is possibly because that the endings of Chinese sanctions are usually a gradual process rather than exact dates (Chinese businessman #6, October 2017, Dandong). Therefore, the level of this variable only increases over time, but doesn't decrease, and is hence less accurate or conventional. Second, data for this variable is based on the narrative of Chinese people (who work or live in Northeast China, which is close to North Korea) in my personal network, and it is possible that their memories on sanctions dates could be inaccurate, hence underscores the accuracy of data for this variable. Hopefully, future researchers could find higher quality data for Chinese sanctions on North Korea.

### *Control variables*

In this article, I include four variables as control variables. Specifically, the control variables I include in the statistical models are the natural logarithm of Won per US Dollars

exchange rates, the death of North Korea's former supreme leader Kim Jong il, North Korea's closure due to the fear of Ebola, and North Korean missile crisis.

First of all, the variable "exchange rate" is included in order to control for the possible influence of North Korea's currency value. I consider the value of North Korean currency could possibly be influential to the prices of rice commodities traded in North Korean domestic markets. Therefore, this variable is included in the statistical model in order to control for the possible influence of the North Korean currency values on Rason City's rice prices.

There are also a number of other variables that are included as control variables in the models, these variables include the death of North Korea's former supreme leader Kim Jong il, North Korea's closure due to the fear of Ebola as well as North Korean missile crisis. As for Kim Jong II's death and North Korea's missile crisis, because those events could have political influences, they could also be influential economically, hence I include them in the models.

Finally, North Korea's closure due to the fear of Ebola could also have an influence on North Korea's availability of food commodities, hence to impact the prices of food sold in North Korea Rason City's black and gray markets. The Ebola closure, due to the shut down of North Korean border customs, could possibly negatively influence the underground trade channels through which Chinese informal traders could smuggle goods into North Korea, hence decreased the amount of food commodities available in North Korean Rason City's black and gray markets.

### *Statistical method*

For the models of the effects of sanctions on Rason City's rice commodity prices, I use an Ordinal Least Square regression model. In order to deal with the issue of serial-correlation,

I use the lagged prices of rice in Rason city. In the Ordinal Least Square regression models, I first test the effects of UN sanctions and China sanctions on Rason rice price separately, and then include the two independent variables in same models along with a number of control variables.

### **Discussion of the results**

The results of my statistical tests are presented in the table below. To save spaces, I omitted a number of lags of the dependent variable---the full version of the regression output table could be found and viewed in the Appendix section.

Due to the table, when placed independently in different models, both U.N. sanctions and China sanctions have statistically significant effects on North Korea Rason City's rice prices (in Model 3 and Model 4). This could be interpreted as support for hypothesis one. However, when U.N. sanctions and China sanctions are included in the same models along with control variables, UN sanctions do not have significant effects on the lagged Rason rice prices any more (in Model 5, Model 6 and Model 7). Theoretically, it is possible that this is because that U.N. sanctions have many overlaps with China sanctions on North Korea, in other words, when China decides to participate in the international sanction campaign against North Korea, China sanctions is in many cases actually a part of U.N. sanctions. With that said, it is possible that the only reason that the regression coefficient of UN sanction is significant in model four is because that UN sanctions have a large number of overlaps with China sanctions which is statistically significant. Therefore, without China's participation or if China serves as North Korea sanction buster country, UN sanctions along do not have any significant impact on North Korea Rason City's rice prices.

This finding evidences the theory that as the so called "third party", China plays a significant role on sanctioning North Korea. As North Korea's most important ally as well as its major donor country, China is connected to North Korea economically while the North

Korean economy is also significantly dependent on China. Besides the formal trade channels between China and North Korea, it is possible that there are also a plethora of underground trade channels connecting the two countries. These underground channels could be used by informal traders to trade a variety of goods (both sanctioned and non-sanctioned goods) between China and North Korea. When economic sanctions from the international community are imposed on North Korea, if China doesn't actually want to participate in the sanction campaign, then China could serve as North Korea's sanction buster country and help North Korea bust economic sanctions by either giving aids to North Korea or acquiesce Chinese goods (formal and informal) flowing to North Korea through formal and informal trade channels, or both. The flow of both sanctioned and non-sanctioned goods into North Korea through underground trade channels could be a panacea for the North Korean regime under economic sanctions to survive while the higher demands for foreign goods in North Korea could also stimulated the flourish of underground trade channels. Besides, as underground channels are indiscriminate to all kinds of goods, both sanctioned and non-sanctioned goods could take use of these underground trade channels to flow into North Korea from China.

However, when China does also decide to participate in the international sanction campaign against North Korea, China could enforce its economic sanctions by restricting its formal trade with North Korea as well as cutting off the underground channels between the two countries. The cut-off the these underground trade channels, on one hand, could stagnate the flow of sanctioned goods from China to North Korea, on the other hand, could also prohibit the flow of non-sanctioned goods, including food commodities. Therefore, when authoritarian regime with isolated economy such as North Korea is targeted by economic sanctions, and the "third party" also participates in the sanction campaign, it is possible that

both sanctioned and non-sanctioned goods suffer from negative effects from economic sanctions.

Besides, the North Korea's Ebola closure in 2015 also have significant effect on Rason rice prices.

Finally, both the coefficients of D. wonperusd and LD. wonperusd are statistically significant, suggesting that North Korea's currency value is influential to North Korea Rason City's rice prices.

Table 1-Regression Table

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Model1	Model2	Model3	Model4	Model5	Model6	Model7
	D.rasonrice						
D.Wonperusd		-0.050*	-0.049*	-0.050*	-0.050*	-0.050*	-0.050*
		(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
LD.Wonperusd		0.046*	0.046*	0.046*	0.046*	0.046*	0.046*
		(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
China Sanctions			16.590**		21.583*	21.701*	30.605**
			(7.093)		(12.976)	(12.993)	(13.577)
UN Sanctions				20.522*	-11.392	-12.584	-16.552
				(12.137)	(22.193)	(22.994)	(23.093)
KJI Death					-103.685	-103.904	-103.748
					(124.361)	(124.397)	(124.268)
Missile Crisis						6.214	-7.446
						(31.273)	(31.833)
Ebola Closure							-106.961**
							(47.857)
Constant	41.896**	41.578**	39.594*	42.584**	38.715*	37.516*	35.191*
	(20.284)	(20.251)	(20.245)	(20.250)	(20.394)	(21.274)	(21.277)
N	1,932	1,932	1,932	1,932	1,932	1,932	1,932

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### **The effects of sanctions on formal and informal trade at the China-North Korea border**

As North Korea's major trading partner and its most important ally, it is fair to consider that China has always been particularly cautious in sanctioning North Korea. Therefore, it is possible that most of China's economic pressure on North Korea are more of warning than harming, because China expects to use these economic sanctions to force policy changes in North Korea, particularly in terms of North Korea's nuclear policies, therefore, although China anticipates these sanctions to have deleterious consequences on North Korea's domestic economy, China doesn't want to damage North Korea's domestic economy severely.

However, when being constantly provoked by North Korea, China could also put relatively harsh economic pressure on North Korea to force policy changes and to signal North Korea of China's displeasure.

That is to say, China has the capacity to actually inflict pain on North Korea's domestic economy, but China may not have the willingness to enforce sanctions against North Korea unless its own interests are challenged or damaged by North Korea. One trader reported that when sanctions are enforced, sometimes Chinese border inspectors differentiate between sanctioned goods and non-sanctioned food, and sometimes they don't (Chinese businessman #6, October 2017, Dandong). Besides, as claimed by a Chinese businessman, there are hardly any clear boundaries between formal goods and illicit goods as viewed by Chinese business-people: at the border checkpoints, while it is common sense for Chinese traders that the trading of sensitive goods such as drug, weapon and illicit medicine are definitely illegal and are strictly banned by the Chinese customs policies, the inspections on smuggling activities of less sensitive goods are generally not harsh or strict (Chinese businessman #6,

October 2017, Dadong). One Chinese businessman who is engaged in general import-export business claimed that: “Normally, Chinese customs don’t inspect our exported goods very strictly, basically so long as we don’t trade sensitive goods such as drug and weapon, the customs’ inspection process is generally very fast so our goods could pass the customs checkpoint relatively fast. (Chinese businessman #7, October 2017, Dalian)” Therefore, based on these interviews, it is likely that when the Chinese government doesn’t impose harsh sanctions on North Korea or doesn’t participate in the United Nations sanction campaign, neither formal or informal trade is likely to be significantly prohibited by the Chinese government---during these periods, because Chinese customs checkpoints don’t strictly inspect all exported goods to North Korea (unless sensitive goods such as drug and weapon are exported), many sanctioned items could possibly pass the border checkpoints and flow into North Korea from China. This could possibly lead to the emergence of informal trade channels through which both sanctioned items and non-sanctioned items could flow through. Therefore, in theory, food goods, which are typically non-sanctioned items, could also follow sanctioned items to flow through these informal channels. One food trader reported: “Previously the Chinese border customs basically did not target illicit food trade, so the smuggling of food goods was always relatively stable... (Interview with Chinese businessman #4, Hunchun, October 2017)” Therefore, when China lacks of the willingness to enforce harsh sanctions on North Korea, non-sanctioned goods, particularly food goods, could also flow into North Korea through informal trade channels.

When China decides to sanction North Korea, economic pressure from China has tremendous effects on bilateral trade between the two states. One Chinese food trader engaged in formal trade with North Korea reported that when China sanctioned North Korea, his business was prohibited (Interview with Chinese businessman #2, Yanji, October 2017). Another Chinese businessmen reported that when sanctions are enforced, Chinese border

inspectors inspect all kinds of goods more strictly. (Interview with Chinese businessman #1, Dandong, October 2017).

This of course, could prohibit the flow of food goods into North Korea. One Chinese businessman claimed that even though sanctions from China primarily target informal trade, formal food trade was also influenced, although such influence was not significant (Interview with Chinese businessman #5, Yanji, October 2017). This businessman also claimed that most food trade between China and North Korea was illicit trade, and such illicit food trade was sensitive to economic sanctions (Interview with Chinese businessman #5, Yanji, October 2017). Therefore, when China imposes harsh economic sanctions on North Korea, rice prices in North Korea Rason City could increase due to the prohibition of illicit food trade between China and North Korea. Therefore, the flow of food goods as non-sanctioned items could also be prohibited by economic sanctions from China.

### **Conclusion**

Do economic sanctions have negative effects on non-sanctioned goods, particularly food commodities? Despite the large amount of literature written on the effects of economic sanctions, only a handful of them have delved into the collateral damage of economic sanctions. Among these handful of studies, few of them have looked at authoritarian regimes with isolated economies.

My study contributes to the literature gap of sanctions' effects on non-sanctioned goods in cases of authoritarian regimes with isolated economies. Empirical evidences of this article suggest that depending on the relationship between the targeted country and its ally which could potentially serve as its sanction buster country, economic sanctions targeting authoritarian countries could have larger negative influences on even non-sanctioned goods, including food commodities, even these countries have relatively isolated economies. Moreover, economic sanctions from targeted country's sanction buster countries have more

significant effects on targeted country's economy because targeted country has stronger economic ties with its buster countries. This study has implications for the literature in the international political economy of sanctions, existing literature in conflict studies, and for the political economy of North Korea.

From my findings, it is clear that, despite the supposedly isolation nature of the North Korean economy, economic sanctions do have deleterious consequences on North Korea. As for U.N. sanctions, it has significant effects possibly because it has overlaps with Chinese sanctions. China's economic sanctions have stronger effects on North Korean economy because as North Korea's only ally, China is normally North Korea's sanction buster country, hence when China imposes economic sanctions on North Korea, China could restrict its formal trade with North Korea and cut off underground trade channels through which both sanctioned and non-sanctioned goods previously flow into North Korea from China. Therefore, economic sanctions from China could have negative impact on both sanctioned and non-sanctioned goods.

Besides this article's contribution to existing literature, it also has policy-making implications. Current methods that aim to measure the effects of economic sanctions on authoritarian countries with isolated economies are relatively scarce, most of them focus on aggregate level economic indicators (such as GDP, trade and public health, etc.) of targeted countries to measure economic sanctions' effects. There are, however, from little to no widely-acknowledged empirical methods established to measure the possible effects of economic sanctions on specifically sanctioned goods. This is especially the case as for authoritarian regimes with isolated economies.

Based on my findings, I propose a new way to measure the effects of economic sanctions on specifically sanctioned goods in the case of authoritarian regimes with isolated economies: by looking at the effects of economic sanctions on non-sanctioned goods, especially food

commodities. When economic sanctions are imposed on authoritarian regimes with isolated economies, non-sanctioned goods could follow the underground flow of sanctioned goods into the targeted country, hence we can monitor whether economic sanctions do have negative effects on sanctioned goods or not by studying sanctions' effects on non-sanctioned goods: if non-sanctioned goods are in fact immune to economic sanctions and remain non-influenced, then it is possible that underground trade channels still remain active, which could provide potential valid opportunities for informal traders to smuggle sanctioned goods into the targeted country, and thus bust sanctions. On the other hand, if economic sanctions do prove to have large negative effects on even non-sanctioned goods, then this phenomenon suggests that the underground trade channels could possibly have already been cut off and hence the underground flow of sanctioned goods could have been sufficiently prohibited. Therefore, this article also has important implications for policy-making on economic sanctions.

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## Appendix

Table 2-Regression Table (Full)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	model1	model2	model3	model4	model5	model6	model7
variables	D.rasonric e	D.rasonric e	D.rasonric e	D.rasonric e	D.rasonric e	D.rasonri ce	D.rasonr ice
LD.rason _rice	-0.544*** (0.023)	-0.540*** (0.023)	-0.543*** (0.023)	-0.542*** (0.023)	-0.544*** (0.023)	-0.544*** (0.023)	-0.545** *
L2D.raso n_rice	-0.293*** (0.025)	-0.292*** (0.024)	-0.296*** (0.025)	-0.294*** (0.025)	-0.297*** (0.025)	-0.297*** (0.025)	-0.299** *
L3D.raso n_rice	-0.203*** (0.026)	-0.204*** (0.026)	-0.209*** (0.026)	-0.207*** (0.026)	-0.211*** (0.026)	-0.211*** (0.026)	-0.213** *
L4D.raso n_rice	-0.085*** (0.025)	-0.086*** (0.025)	-0.091*** (0.025)	-0.088*** (0.025)	-0.092*** (0.025)	-0.092*** (0.025)	-0.095** *
L5D.raso n_rice	-0.322*** (0.025)	-0.321*** (0.025)	-0.325*** (0.025)	-0.323*** (0.025)	-0.326*** (0.025)	-0.326*** (0.025)	-0.328** *
L6D.raso n_rice	-0.130*** (0.023)	-0.128*** (0.022)	-0.130*** (0.022)	-0.129*** (0.022)	-0.130*** (0.022)	-0.130*** (0.022)	-0.132** *
L8D.raso n_rice	-0.054*** (0.020)	-0.056*** (0.020)	-0.056*** (0.020)	-0.056*** (0.020)	-0.057*** (0.020)	-0.057*** (0.020)	-0.057** *
L10D.ras on_rice	0.083*** (0.020)	0.080*** (0.020)	0.077*** (0.020)	0.079*** (0.020)	0.077*** (0.020)	0.077*** (0.020)	0.076** *
L15.raso n_rice	-0.010* (0.005)	-0.010* (0.005)	-0.023*** (0.008)	-0.015** (0.006)	-0.025*** (0.008)	-0.024*** (0.009)	-0.028** *
D.wonpe rusd		-0.050* (0.026)	-0.049* (0.026)	-0.050* (0.026)	-0.050* (0.026)	-0.050* (0.026)	-0.050* (0.026)
LD.wonp erud		0.046* (0.026)	0.046* (0.026)	0.046* (0.026)	0.046* (0.026)	0.046* (0.026)	0.046* (0.026)
china_sa nctions			16.590** (7.093)		21.583* (12.976)	21.701* (12.993)	30.605* (13.577)
un_sancti ons				20.522* (12.137)	-11.392 (22.193)	-12.584 (22.994)	-16.552 (23.093)
kji_death					-103.685 (124.361)	-103.904 (124.397)	-103.748 (124.268)
_crisis_ missile						6.214 (31.273)	-7.446 (31.833)
ebola_cl							-106.961

osure							**
							(47.857)
Constant	41.896**	41.578**	39.594*	42.584**	38.715*	37.516*	35.191*
	(20.284)	(20.251)	(20.245)	(20.250)	(20.394)	(21.274)	(21.277)
N	1,932	1,932	1,932	1,932	1,932	1,932	1,932
aic	29050.652	29045.936	29042.436	29045.060	29045.497	29047.45	29044.4
						7	24
bic	29106.315	29112.732	29114.798	29117.422	29128.992	29136.51	29139.0
						8	52

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1