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THE TRADE ECONOMIC RELATIONSHIP
AND POLITICAL POSITION
BETWEEN AMERICA AND CHINA

Master's thesis

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Year of the defence: 2021

Declaration

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2. I hereby declare that my thesis has not been used to gain any other academic title.
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References

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Abstract

This paper focuses on the asymmetry in Sino-US trade relations. It combines the theory of interdependence and empirical analysis. It analysis the theory based on the two concepts of sensitivity and vulnerability.

First of all, this paper reviews the previous definitions and arguments of interdependence. It shows an indicator system for measuring sensitivity and vulnerability. Trade size, trade dependence are the independent variables of symmetry sensitivity. The conception of vulnerability consists of market substitutability, trade structure, and strategic commodities.

The study found that Sino-US trade remains in an asymmetrical state in terms of trade in goods. China's sensitivity to Sino-US trade declined, its vulnerability was stable. As a whole, the degree of asymmetry in Sino-US trade in goods has weakened. The dependence on Sino-US trade is deepening.

Moreover, it compares with the approach of TiVA. Since the beginning of tariffs conflicts in 2017, I will explain the credit expansion on behalf of the political perspective behind it.

Abstrakt

Práce se zaměřuje na asymetrii v čínsko-amerických obchodních vztazích. Kombinuje teorii vzájemné závislosti s empirickou analýzou. Analyzuje teorii založenou na dvou konceptech – citlivosti a zranitelnosti.

Nejprve tento článek přezkoumá předchozí definice a argumenty vzájemné závislosti. Ukazuje indikátorový systém pro měření citlivosti a zranitelnosti. Velikost obchodu a závislost na obchodu jsou nezávislé proměnné citlivosti symetrie. Pojem zranitelnosti se skládá z nahraditelnosti trhu, obchodní struktury a strategických komodit.

Studie zjistila, že čínsko-americký obchod zůstává z hlediska obchodu se zbožím v asymetrickém stavu.

Citlivost Číny na čínsko-americký obchod poklesla, její zranitelnost byla stabilní. Celkově se míra asymetrie v čínsko-americkém obchodu se zbožím oslabila a závislost na čínsko-americkém obchodu se prohlubuje.

Navíc se srovnává s přístupem TiVA. Od začátku tarifních konfliktů v roce 2017 vysvětlím expanzi kreditu jménem politické perspektivy, která je za tím.

Keywords

trade interdependence, sensitivity, vulnerability, political explanation

Klíčová slova

vzájemná závislost obchodu, citlivost, zranitelnost, politické vysvětlení

Název práce

Obchodní ekonomický vztah a politická pozice mezi Amerikou a Čínou

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Master thesis proposal

The trade economic relationship and political position between America and China

Research question and motivation

Learning to describe the economic interdependence between China and the United States through economic interdependence theory, from China's accession to the WTO to the 2008 US financial crisis, the period extend their economic interdependence by 2015. It is further divided into quantitative sensitivity indicators and qualitative vulnerability indicators to analyze the degree of changes in trade relations. Finally, empirical analysis to illustrate which factors are important factors in Sino-US trade relations.

On the other hand, although economic dependence has brought enormous benefits to both countries, in order to protect national sovereignty, countries implement policy constraints.

Contribution

Cooper put forward the economy interdependence in 1968. It applies in international relations, or the political factors before Cooper. I am going to describe the trend of interdependence and derive the key factors affecting the degree of interdependence from empirical analysis.

Methodology

At the beginning of the thesis, I am going to study the theory about interdependency. Then based on the previous literature, I will provide with the measurements to describe the economic interdependency. Furthermore, I am going to run a regression model with actual data from the collecting resources.

Outline

- 1 Introduction
- 2 Economic interdependence theory
- 3 Asymmetric Dependence Analysis of Sino-US trade in the field of trade
- 4 Empirical Analysis of the Factors Affecting the asymmetric dependence of Sino-US trade
- 5 Conclusions

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Chapter 1 Introduction

1.1 Background

In the era of economic globalization, it shows a tight connection among all countries. The United States and China are acting as the world's biggest and 2nd largest economies(World Bank, 2020). There are enormous mutual interests among them. Along with the more economic communication, the deeper the interdependence relationship. China's economy is heavily dependent on the United States and investment flows(Morrison, 2009), China was the United States's largest supplier of goods imports, totaled 451.7 billion dollars in 2019(Office of the United States trade representative, 2019).

China has been stated as vital to US economic health due to its low-cost manufactured goods and the truth that China is the biggest holder of US government debt. Meanwhile, the United States investment is critical to China because the country is China's significant contributor of direct foreign investment, as one of its largest investors and export markets. Mainly, the level of economic interdependence is characterized as obviously mutually.

Exceptional levels of economic interdependence have generated a symbiotic concern between the Us and China. Remarkably, economic ties have managed to eliminate bottlenecks, and interweaved them actively, diminish some inclination into instability(Friedberg, 2005). As a matter of fact, it is apparent that economic interdependence represents an extremely crucial role in promoting proportional prosperity between these two countries.

In general, the emerging Sino-Us economic ties have had a beneficial impact on the two countries. In the long previous years, during the post-Cold War, it has installed a partnership between the United States and China against the Soviet Union. This cooperation had formed the cornerstone in the 1970s and 1980s, then the two massive economies have evolved highly interdependent(Sutter, 2013, p.191).

In contrast, the interdependent ties between these two countries are well interrelated, comes a reason for anxiety. Several notable initiatives complain a broad range of US interests preoccupied with apparent disadvantage impacts of the increasing Sino-US economic relationship(Sutter, 2013, p.192). Alongside these issues, the US becomes trade deficit, Chinese currency valuation flexible, and because of the large holding treasury causes substantive conflict or controversy.

With the rapid development of China's economy, there are more conflicts and trade frictions emerge. Along the huge trade surplus has triggered further fields involved. More disagreement on trade protection issues, intellectual property disputes and so on. Although the degree of interdependence between China and the United States is deepening. It reveals a different position in the asymmetry relationship of interdependence.

1.2 Literature review

Cooper work on the interdependence theory in the international economics field. He provides the value of economic transactions between two countries scale to national output(Cooper, 1985). Keohane and Nye contribute to the concept of asymmetry interdependence. Furthermore, they provide sensitivity and vulnerability to measure the asymmetry of interdependence(Keohane& Nye, 1977).

The concept of interdependence has spawned a substantial debate in the international relations and economy field. The concept is short of clarification has received a great number of scholars to work on this subject.

On the whole, different researchers have diverse concepts between interdependence and mutual dependence. Barbieri considers interdependence and mutual dependence are different meanings. Barbieri states interdependence ensues from dependence either because of the existence of mutual needs, otherwise, these two concepts can not be closely alleged to the same occurrence (Barbieri, 1996). On the other scholars' ideas, Keohane and Nye believe these two are synonyms. Dependence can be described as “a state of being determined or significantly affected by external forces“, furthermore, interdependence determined to be simply defined means mutual dependence (Keohane& Nye, 1977, p8).

Besides them, Baldwin provides a new definition to measure the similar dependence by using sensibility interdependence and vulnerability interdependence(Baldwin, 2016, p. 475). Also, this research will convey the conceptions according to sensibility and vulnerability.

It is not enough to express a notion of comparison by one definition, consequently, different ideas will be applied. This paper is contributed to study the interrelationship between the United States and China, following part will meet the various aspects of economic interdependence.

1.2.1 The theoretical background of the interdependence theory

Cooper emphasis on economic interdependence. His mutual theoretical research focuses on economic interdependence between countries, or between a country and the rest of the world. It shows a decline in the inviolability of state sovereignty. When increasing economic interdependence to countries, one response relates to reduce the interdependence and protect national freedom. A second options involves one country trying to inflict its beneficial policies on others. A third is based on economic innovation(Cooper, 1968, p1195).

Nye and Robert define the concept of interdependence and construct a composite interdependence model. The two scholars intergrate globalization, international mechanisms, and interdependent concepts. They beside divide the perception into three types: equal dependence, absolute dependence, and relative dependence. They believe that interdependence interaweaves competition, along with inevitable cost in the process (Nye& Robert, 1977). More important to this paper, they propose two concepts of sensitivity and vulnerability to measure the model.

In the 1980s, Japan studies the interdependence theory. Abe divided the interdependence into 12 groups of corresponding concepts (Abe, 1983).

In the late 1980s, Zhu and Xia found an important indicator, it is the growth of international trade to the growth of GDP. If the ratio shows rising of the trade exceeds the GDP growth, it indicates the domestic market has more dependent on the external market (Zhu and Xia, 1986). Deng and Luo analyze the development trend of the world economy from the perspective of the structure of international trade. They found that the economic interdependence of countries after the war has strengthened, since then international trade expansion changes

the structure of international markets (Deng; Luo, 1986). Although the countries have more trade than before, but Gao considers interdependence to reflect on natural resources and technology trade. He puts forward developing countries should treat interdependence as significant cooperation (Gao, 1987). However, Zhang argues that the composition of interdependence is not reasonable and mechanism causes disputes (Zhang, 1988).

After deepening economic interdependence, some researchers realise there are few balance status in the trade relationship. Xiao agrees growing globalization expands the economic interdependence. Nevertheless, developed countries gain more benefits than developing countries on politics and economy. The status demonstrates developing countries more attach to developed countries (Xiao, 1990).

In recent years, Li believes that there are problems with data and methods for export trade (Li&Li, 2004). In 2005, Shen proposes the idea of improving the dependence on foreign trade. She concludes by taking the total amount of economic trade to replace the GDP (Shen, 2005). This paper considers their methods are logical, the trade dependence formula is taking the factors into consideration.

1.2.2 The theoretical background of Sino-U.S. trade dependence

Fung and Lau state that China and United States have large differences in trade statistics. Both countries should adjust and reassess asymmetry trade (Fung; Lau, 1996,2001). They use the adjusted U.S. trade data to analyze and found that the gap with the Chinese statistics is still huge (Fung; Lau, 2003).

Burke explains that trade deficit grows with U.S. multinationals have a direct relation. The U.S. multinationals invest in China to produce labor-intensive products, and export into the U.S. and other markets (Burke, 2000). The final product is exposure to Chinese value-added. Ron holds that China's comparative advantage products are labor-intensive products. While the United States' comparative advantage is the service (Ron, 2003). The added value of labor-intensive products are relatively low. Davis added the trade asymmetry between China and the United States is a long-term policy issue (Davis, 2002).

Prasad studies on the economic relationship between China and the United States. Since the financial crisis in 2007, the economy continues to raise, capital flows are increasing. But more and more asymmetric emerged. United States FDI in China is declining, nevertheless, China's FDI in the U.S. is increasing. He also points out

that RMB currency remains undervalued(Prasad, 2009). Bergsten supports that China intervenes in the RMB exchange rate and the RMB undervalued extends the growing trade surplus (Bergsten, 2010).

Danis & Michels conclude China assumed a more assertive role on the global stage((Danis & Michels, 2011, p25). In 2010, the US trade deficit with China increased, accounting for more than 50% of the total U.S. trade deficit. One of the key reasons is that even if RMB appreciated by 6% in 2010, it remains undervalued((Danis & Michels, 2011, p45). The report figures out that the proportion of low-cost labor-intensive manufactured goods exported from China has dropped from 37% in 2000 to 14% in 2010 (Danis & Michels, 2011)

Zhang believes that there is an increasing complementarity between two countries at various levels. Because China has a comparative advantage in trade, while the United States has obvious advantages in investment(Zhang, 2006). Song insists on the United States has dominant power in the asymmetry(Song, 2007) . He provides ideas based on the bilateral trade and national debt purchase perspective. Wu held that the United States is gradually becoming more dependent on China(Wu, 2007). Due to the development economy of China, it changes partially its position in the international division of labour, however, the U.S was force to make more modifications(Lei; Zhao, 2008). More specially, China bears higher expense than the United States in the perspective of vulnerability, Xu affirms that U.S. policy target on China is far greater influence(Xu, 2008).

1.2.3 Research on the economic interdependence of other countries

Xu analyses the degree of trade dependence between Japan and the United States and calculates negotiations times between the two countries. It shows the more frictions turn up with higher trade dependence (Xu, 1999). Over the analysis of economic development and among China's, Japan's, and ASEAN's country structure. Zhang believes that China increasing ties in ASEAN's trade relations and Japan has declined. The small economy countries have a tight connection with China, the large economy countries have a close dependent on Japan(Zhang, 2013).

1.2.4 Conception reviews

It is not enough to express a notion of comparison by one definition, consequently, different ideas will be applied. This paper is contributed to study the interrelationship between the United States and China, following part will meet the various aspects of economic interdependence.

Keohane and Nye described sensitivity interdependence as mutual effects while defined the opportunity cost of sabotaging the relations as vulnerability interdependence(Keohane& Nye,1973, pp. 121). To keep the concepts of these two items, Waltz(Waltz,2010, p. 142.) and Cooper (Cooper, 1985, pp. 178-179) present they can explain different field situations, and they don't covary the same extent. After they provided the usage, the students of the international relations have permitted to Baldwin's point can be on the contrary to Keohane and Nye, Waltz has indicated that the vulnerability interdependence is related to daily matters, but rather than substantially impacted by "external forces"(Keohane& Nye, 1973, p8.). Baldwin tried to clear "vulnerability interdependence" has a superior claim to the mantle of conventionality, at least in international relations, and perhaps even in economics"(Baldwin, 1980).

There are also some arguments against Keohane and Nye, Duvall has stated the dependence are broad enough to prevent facing meaningful subject. He finds out the relationship during trading should be reflected in power and control (Duvall, 1978). He divided the relationship into two parts, the total gain country B receiving from country A and the expense regarding the relationship. First of all, the price of loss from trade must be costly to make sure the observance of country B to country A. Then, country B is not the only option to provide the trade items for country A. Baldwin thinks interdependence is a way to mirror the opportunity cost in a trade relationship(Baldwin, 1980). Keohane and Nye measure interdependence in two dimensions, sensitivity and vulnerability(Keohane& Nye, 1973). According to their research, sensitivity is a country or a state relatively affected by changes in other countries or states. Meanwhile, vulnerability is the capacity to adjust or recover from those changes (Crescenzo, 2005).

Baldwin believes that interdependence should be divided into different dimensions. Nevertheless, he also thinks the complexity of interdependence should be simplistic using. Even he refutes three conclusions to continue the sensitivity and vulnerability distinction about mainstream utilization of the conception, and the degree of

potential misleading(Baldwin, 1980, p 490). First of all, he identifies the conventional utilization of the term interdependence. The second meaning is more useful in international relations, it seems there is no necessity to sustain the difference between sensibility and vulnerability. He establishes The works surveyed here suggest that the concept has corresponded with “vulnerability interdependence”(Baldwin, 1980, p486). Meantime, Baldwin relies that scholars seem to vie with one another to invent yet another definition of “interdependence”, the need for new concepts has not been demonstrated(Baldwin, 1980).

Secondly, Baldwin indicates the gradually enhanced confusion caused by the sensitivity and vulnerability distinction. Owing to the sensitivity interdependence against the meaning to its conventional way, it is negative to present a diverse concept for a traditional construct(Baldwin. 1980).

At the last, Baldwin provides more thoroughly items, especially mutual responsiveness, mutual sensitivity, to clear the concept of “ the sensitivity of economic transactions between two or more nations to economic developments within those nations“

In summary, it is important to understand and figure out the sensitivity and vulnerability distinction among plenty of fields for years. Whereas, the difference between sensitivity and vulnerability of interdependence is not necessary to expand. Consequently, the sensitivity should be adjusted to rename for avoiding troubles and obtain the vulnerability as a unique and clear dimension of interdependence(Baldwin, 1980. p492).

1.3 Methodologies

Quantitative analysis of this paper is analytical methods - data collection - data collation - conclusions. First of all, the methods are based on relevant theories, models and predecessors’ research. After the completion of the selected indicators and data. This thesis goes on the quantitative analysis and qualitative comparison. In addition, establish an empirical regression model by evIEWS8 to analyse the causes for the symmetrical changes in the Sino-US trade.

Chapter 2 Economic interdependence theory

Economic interdependence is the product of globalization. The policies and production factors linkage the interdependence. The interdependence interweaves the mutual effect and restraint among countries.

2.1 Main researches

2.1.1 Theory of economic interdependence by Richard Cooper

In the late 1960s, the studies on dependence develop into theoretical methods. In 1968, Richard Cooper published the book “Economics of interdependence: economic policy in the Atlantic community”. Cooper's essential contribution is explaining various economic benefits by expanding international exchanges. However, he believes there are two ways to threaten the autonomy of a country (Cooper, 1968, p5). They emerge after the expansion of international economic growth. First of all, countries adjust domestic policies to maintain the balance of payments. It is harder for some countries with weak international financing capacity. Thus, the cost of gain more economic benefits is unavoidable. Waiving part of the domestic economic autonomy is the price of the profits. Secondly, the international economy affects domestic regulation and taxation. International company activities can exceed the authority of the domestic government.

The interdependence of foreign trade is rise since WW II . From the end of WW II to the 1960s, there is an increase in trade in goods and services among developed countries. International trade has become more sensitive to fluctuations in factors, such as changes in income, exchange rate, and so on. At the same time, the reduction of trade barriers and transportation costs strengthens the sensitivity. Yet the higher sensitivity causes the faster appearance of trade imbalance.

Furthermore, economic interdependence ties countries more interdependent. Because of the raised international mobility of capital and labor. Along with liquidity of the factors, domestic development becomes more sensitive to external countries. The faster flow production spreading leads extra burden on domestic countries. As a result of the pressures, the interdependence allies countries to cooperate and solve new problems.

Lastly, financial globalization has heightened the degree of interdependence. Alongside the integration of financial markets expand, it reduces the effects of the country's monetary and credit policies. Even so, it enhances the influence of external currency disturbances on the domestic economy. The external currency disturbs monetary policies, for individual countries, their monetary policy cannot fully control the money supply and interest rate. The uncertain international capital reinforces the interdependence of monetary policies in various countries.

2.1.2 Complex Interdependence Theory by Keohane and Nye

They published “the work Power and Interdependence: World Politics in Transition”. Keohane and Nye believe that the interdependent parties are not in complete balance with each other (Keohane and Nye, 1970). They propose two core concepts of sensitivity interdependence and vulnerability interdependence (Keohane and Nye, 1970). The sensitivity interdependence explains the spread of the policy network. What is the reflection speed for a country when another interdependent country changes its domestic policies? Vulnerability interdependence clarifies the modification cost to adapt to external changes.

2.2 The concepts of economic interdependence

2.2.1 Definition

David Baldwin conceptualizes economic interdependence as the opportunity costs because of potential exit costs, in consequence breaking current cooperation between countries (Baldwin, 1980).

James Dougherty and Robert Pfalz have defined interdependence from a power perspective. Interdependence means that a country influences the right of another country. Due to the dependence is mutual, breaking the linkage cause damage to both parties (Dougherty & Robert, 2003).

Robert J. Gilpin defines interdependence as a dominant strength. Along with the appearance of vulnerability and manipulation. Each country tries to enhance its independence in the relationship (Gilpin, 1987).

This paper understands interdependence as a concept to describes a country's policies that have an impact on the economic operation of an individual country. We use asymmetry trade based on economic interdependence. Alongside the expansion of interdependence, one country dominates in the relationship.

2.3 Method for measuring trade interdependence

To examine the degree of economic interdependence between China and the United States. This paper is using quantitative measures of sensitivity and qualitative analysis of vulnerability as methodology. The sensitivity reflects the speed of external policy network changes. Vulnerability interdependence presents the cost for the adjustments. We are going to use trade dependence as our standard to compare historical data.

2.3.1 *Quantitative methods of sensitivity analysis*

Sensitivity refers to a country adjust its domestic policies once external network changes. It represents the degree of interaction between countries tie trade links. The higher the value, the country is susceptible to the external environment.

1. Economies of scale

The volume of bilateral trade is expressed as the total import and export between two countries. However, the trade volume can not be clear if the country is sensitive to the interdependence country's change. Because the trade volume is a part of international trade volume. Thus, I calculate the share of trade volume to a country's international trade, to determine the sensitivity on an absolute scale. The deviation in the relative share of trade volume mirrors the distinct sensitivity of the two parties.

Table 2.1: List of symbols

Symbol	Meaning/Description
T	volume of bilateral trade
XMCN	China exports and imports
XMUS	U.S. imports and exports
D_1	the share of bilateral trade to China international trade
D_2	the share of bilateral trade to U.S. international trade
E_1	China exports
E_2	U.S. Exports
BT_1	China goods exports to U.S.
BT_2	U.S. goods exports to China
D_3	the share of China exports to U.S. to China exports
D_4	the share of U.S. exports to China to U.S. exports
GDP_1	the gross domestic product in China
GDP_2	the gross domestic product in the United States
TGR_1	the impact of bilateral trade volume on China economy
TGR_2	the impact of bilateral trade volume on U.S. economy
TIR	the share of bilateral trade volume in the Chinese and U.S. Economies
I_1	U.S. imports
I_2	China imports
P_1	the degree of dependence of Chinese exports on U.S. Imports
P_2	the degree of dependence of U.S. exports on Chinese imports

Thus, D_1 is equal to T divides XMCN, we have the indicator to measure the percentage of bilateral trade volume in China's international trade. It shows the importance of international trade with the United States for China. By the same logic, D_2 is equal to T divides XMUS, which reflects the importance of international trade with China for the United State.

D_3 is the result of China exports to the U.S. divides China exports, the percentage exhibits the degree of dependence of Chinese exports on the United States. D_4 is the share of U.S. exports to China to U.S. exports. It exposes the degree of dependence of U.S. exports on China market. The higher result of the number, the country is deeply dependent on another country's market.

2. Trade-to-GDP ratio

Countries have different trade dependence, some countries are more open to have more international trade. However, it does not reflect on their gross domestic product. In this part, we also going to compare the trade volume in GDP to know the interaction in the country's economy.

TGR represents the impact of bilateral trade volume on a country's economy. TIR can state the share of bilateral trade volume in the Chinese and U.S. Economies. However, this percentage can not detect the reason if the TIR is higher. It may be that the volume of trade between the two countries has increased, or the rate of increase in the transaction is greater than the rate of economic growth.

$$TGR_1=(BT_1+BT_2)/ GDP_1 \quad 2.1$$

$$TGR_2=(BT_1+BT_2)/ GDP_2 \quad 2.2$$

$$TIR= (BT_1+BT_2)/(GDP_1+GDP_2) \quad 2.3$$

3. the asymmetry of trade interdependence

P_1 represents the degree of dependence of Chinese exports on U.S. imports. According to the adjustment calculation, the import dependence coefficient considers the degree of China's dependence on U.S. product imports and the degree of U.S. product export dependence on the Chinese market(Yang& Ye, 2017). P_2 represents the degree of dependence of U.S. exports on Chinese imports

$$P_1=BT_1/E_1* BT_1/I_1 \quad 2.4$$

$$P_2=BT_2/E_2*BT_2/I_2 \quad 2.5$$

2.3.2 Qualitative analysis of the vulnerability of Sino-US trade relations

Vulnerability defines as the domestic country pays for the cost once external changes. It describes the relative ability of each actor to get an alternative choices. If the party has more alternative options when existing

relationship changes, its vulnerability is lower than its trade partner. This paper to analyze the degree of vulnerability on three perspectives.

2.3.2.1 Market substitution.

I analyze the catalogues related to import and export of China and United States. Assuming that a country's main import commodity market has highly substitutable, there are more resources with similar products. Furthermore, in case its major export commodities are competitive in the international market. It means its vulnerability is tiny on this front. Conversely it has a fragile vulnerability.

2.3.2.2 Market structure.

Helpman devotes that product differentiation reinforce the tendency to specialization, and in sequence, specialization can strengthen a volume of international trade (Helpman, 1999). If the product differentiation and differences in factor compositions determinate the structure of world trade, to distinguish the international market composition of China and the United States in their export and import market promote the status of their relationship.

2.3.3.3. Strategic commodities.

Strategic commodities have enormous impact on the economic security of the country. For example, it including the trade of resource products and the trade of high-tech products. They have tiny substitution than general trade products and is hard to be replaced. The more importing strategic goods, the country is increasing vulnerability in the relationship.

Chapter 3 Analysis of Sino-U.S. Asymmetric Dependence

Analysis in Goods

This chapter is using the methods introduced in chapter 2 to measure the sensitivity and vulnerability of Sino-US asymmetric dependence of trade in goods.

3.1 Sensitivity

The following analysis is the period of Sino-U.S. trade in goods through the 1997-2017.

US-China trade in goods.

3.1.1 Volume of Sino-U.S. trade

The total import and export of Sino-US trade in goods reflects the economies of trade in goods between the two countries. It developed speedily in 1997-2017. Along with the total volume of 75,419 million dollars increased to 635,364 million dollars. It is an eightfold increase in 20 years.

The growth of the trade demonstrates a tight connection between China and the United States. Calculate the volume of trade in goods accounts for the proportion in their international trade. The percentage is range from 0 to 1. The higher of the ratio, the greater sensitivity of the corresponding. Because when the external policies change, the unexpected cost of trade between the two countries is enforcing.

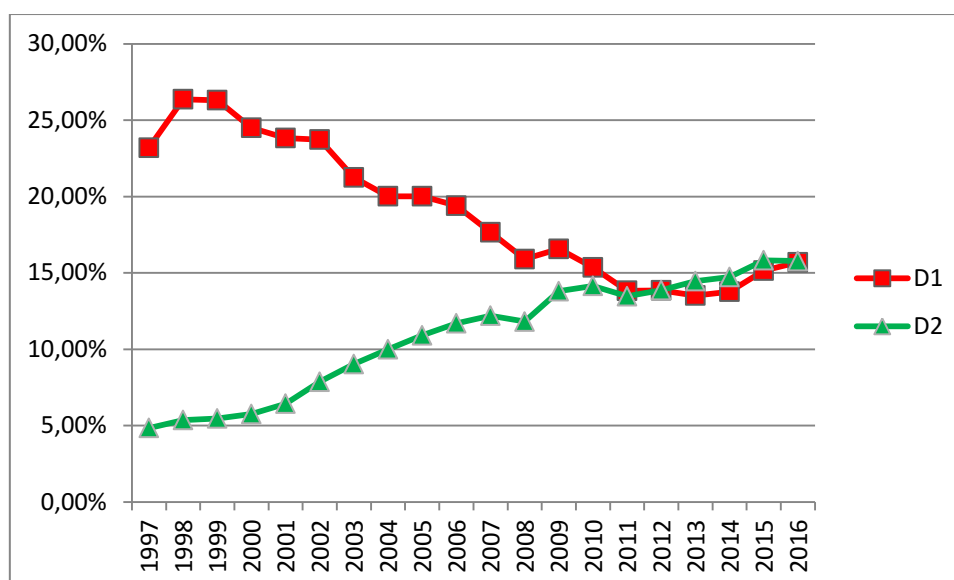
In the table 3.1, D_1 interprets the share of bilateral trade to China international trade. D_2 presents the share of bilateral trade to U.S. international trade. During the 1997-2017, D_1 reaches 26% in 1998 and 1999. It fell to below 20% in 2006, down to 19.4%, and then no more than 20%. In the United States, the indicator D_2 rose from 4.85% in 1997 to 15.8% in 2016. Before 2009, this indicator was below 13%, which is far lower than China's percentage. It shows U.S. foreign trade to Sino-U.S. trade before 2008, the sensitivity is much lower than that of China. After the financial crisis in 2009, this indicator grew quickly. In 2013, it began to surpass China, that is, U.S. foreign trade is more sensitive in trade relationship than China.

Table 3.1: Percentage of Sino-U.S. trade in goods in 1997-2016

Year	D ₁	D ₂	Year	D ₁	D ₂
1997	23,19%	4,85%	2007	17,66%	12,20%
1998	26,37%	5,37%	2008	15,90%	11,81%
1999	26,31%	5,47%	2009	16,57%	13,80%
2000	24,50%	5,76%	2010	15,36%	14,15%
2001	23,83%	6,44%	2011	13,83%	13,47%
2002	23,73%	7,87%	2012	13,86%	13,87%
2003	21,25%	9,03%	2013	13,52%	14,46%
2004	20,02%	10,00%	2014	13,77%	14,73%
2005	20,02%	10,91%	2015	15,15%	15,83%
2006	19,40%	11,70%	2016	15,69%	15,77%

Source: Collection from National bureau of statistics of china,
United States Census Bureau
and Bureau of Economic Analysis, U.S. Department of commerce

Diagram3.1: Trend of the percentage of U.S.-China trade in goods in 1997-2016



Source: Author's collection

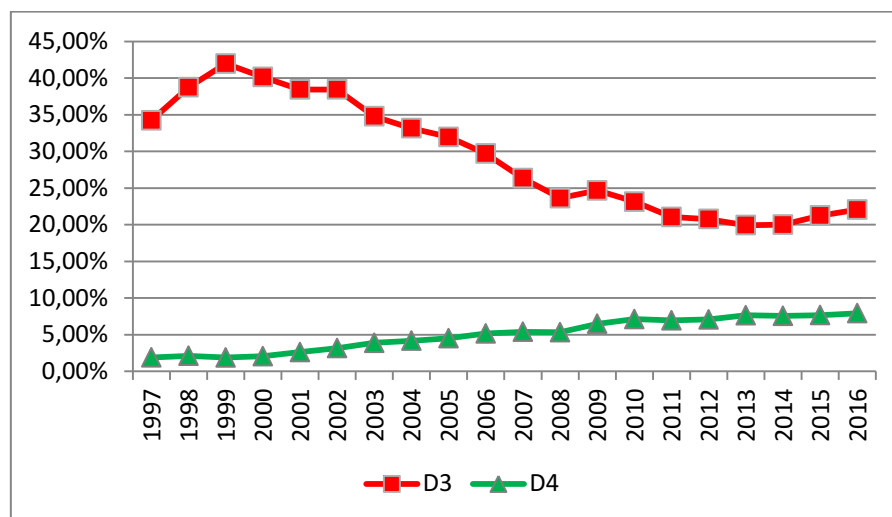
Combining with the data in table 3.1 and the trend line in diagram 3.1. Overall, China proportion to foreign trade is slowly declining, and the proportion of U.S. foreign trade rises rapidly. Especially China's accession to the WTO in 2002 and the financial crisis in 2009, the U.S. growth rate is reinforced. The trend line shows China's sensitivity is stable, and then slowly decline tendency. The U.S. sensitivity shows a sustained and rapid growth trend. According to this indicator, the weaker party has changed from China to the United States in 2013.

Table 3.2: Percentage of U.S.-China export in goods in 1997-2016

Year	D ₃	D ₄	Year	D ₃	D ₄
1997	34,22%	1,90%	2007,00	0,2634	5,40%
1998	38,74%	2,12%	2008,00	0,2361	5,33%
1999	41,96%	1,88%	2009,00	0,2466	6,49%
2000	40,14%	2,06%	2010,00	0,2313	7,12%
2001	38,44%	2,62%	2011,00	0,2104	6,95%
2002	38,45%	3,17%	2012,00	0,2077	7,07%
2003	34,78%	3,88%	2013,00	0,1994	7,64%
2004	33,15%	4,18%	2014,00	0,2	7,56%
2005	31,95%	4,51%	2015,00	0,2125	7,67%
2006	29,70%	5,16%	2016,00	0,2205	7,93%

Source: Collection from National bureau of statistics of china,
United States Census Bureau and Bureau of Economic Analysis,
U.S. Department of commerce

Diagram 3.2: Trend of the percentage of Sino-U.S. export in goods in 1997-2016



Source: Collection from National bureau of statistics of china,
United States Census Bureau and Bureau of Economic Analysis,
U.S. Department of commerce

In table 3.2, D₃ represents the share of China exports to the U.S. to China exports. The stability was 22%-29% since 2006. It means China is highly dependent on the U.S. market. D₄ is calculated in the share of U.S. exports to China to U.S. exports. The share increased gradually from 1.9% in 1997 and broke through 7% for the first time in 2010. Since then, it has fallen back but reached a new high of 7.9% in 2016.

Based on the calculation results and the obvious graph in diagram 3.2, China's dependence on the U.S. market is significantly higher than the U.S. dependence on China's market. Even though the U.S. dependence on China's market is ascending, the minimum divergence between the two countries' dependence is 12.3% in 2013. China's market has significant sensitivity to the U.S. market.

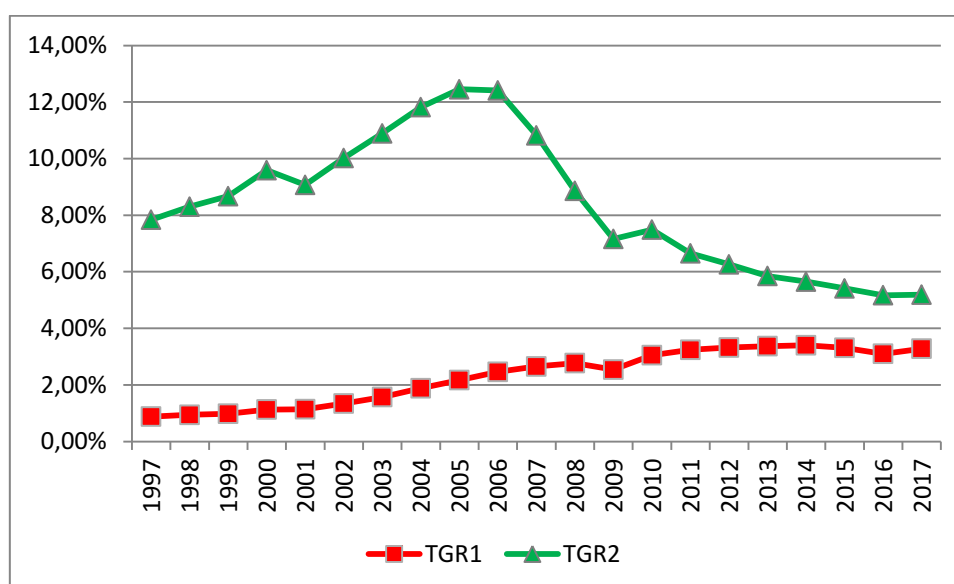
3.1.2 Impact of bilateral trade volume

Table 3.3: U.S.- China trade dependency index of goods in 1997- 2017

Year	TGR1	TGR2	TIR	Year	TGR1	TGR2	TIR
1997	0,88%	7,84%	0,79%	2008	2,77%	8,86%	2,11%
1998	0,94%	8,30%	0,84%	2009	2,54%	7,16%	1,87%
1999	0,98%	8,67%	0,88%	2010	3,05%	7,49%	2,17%
2000	1,13%	9,59%	1,01%	2011	3,24%	6,65%	2,18%
2001	1,14%	9,07%	1,02%	2012	3,32%	6,26%	2,17%
2002	1,34%	10,02%	1,18%	2013	3,37%	5,85%	2,14%
2003	1,57%	10,89%	1,37%	2014	3,40%	5,65%	2,12%
2004	1,88%	11,82%	1,62%	2015	3,31%	5,41%	2,05%
2005	2,17%	12,45%	1,85%	2016	3,10%	5,17%	1,94%
2006	2,46%	12,41%	2,06%	2017	3,28%	5,19%	2,01%

Note: Data in Table 3.3 were calculated by authors from the U.S. Bureau of Economic Analysis and World Bank WDI data.

Diagram 3.3: Trend of Sino-U.S. TGR in 1997-2017



Source: Author's collection

In Table 3.3, TGR_1 and TGR_2 respectively indicate the impact of bilateral trade volume on China's economy and the U.S. economy. It reflects the dependence of the two countries on the trade of goods between China and the United States. The U.S. dependence on China trade in the past 20 years from 1997 to 2017 is gradually increasing. On the contrary, China's trade dependence has fallen after 2008 and 2009.

The TIR represents bilateral trade volume impacts on the China and the United States economies. The percentage of outcome indicates China and the United States' dependence on the trade relationship. It rose continuously except for the reduction in 2009 and 2016.

As can be seen in figure 3.4 below, the U.S. dependence on China in 1997-2017 is much lower than China's trade dependence on the United States. The former has maintained an increasing tendency but has never exceeded 4%. China's trade dependence on the United States gradually declined sharply after 2008, but it has not fallen below 5%. Therefore, it can be seen that China's dependence on the United States is greater than the United States' dependence on China. The Chinese economy is appreciably more sensitive to the Sino-U.S. network than the United States. The Sino-U.S. trade volume plays a greater role in the development in China.

To conclude the degree of trade dependence between two countries is increasing year by year. The degree of China's dependence on trade is much larger than that of the United States. The extent of the gap has enhanced from 1997 to 2005 and has fallen since 2006.

3.1.3 Asymmetry trade dependence

Table 3.4: U.S.- China export market interdependence in 1997-2016

Year	P1	P2	td	Year	P1	P2	td
1997	31,78%	1,72%	18,48	2007	22,08%	5,05%	4,37
1998	35,74%	1,91%	18,71	2008	19,88%	5,00%	3,98
1999	38,64%	1,73%	22,34	2009	20,04%	6,04%	3,32
2000	36,88%	1,91%	19,31	2010	18,78%	6,65%	2,82
2001	35,03%	2,42%	14,48	2011	17,29%	6,53%	2,65
2002	34,35%	2,93%	11,72	2012	16,94%	6,64%	2,55
2003	30,62%	3,62%	8,46	2013	16,11%	7,16%	2,25
2004	28,77%	3,92%	7,34	2014	16,07%	7,08%	2,27
2005	27,37%	4,23%	6,47	2015	16,74%	7,14%	2,34
2006	25,15%	4,81%	5,23	2016	17,43%	7,35%	2,37

Note: Data in Table 3.4 were calculated by authors from National bureau of statistics of china, United States Census Bureau and Bureau of Economic Analysis

In the above table 3.4, P_1 presents the degree of dependence of Chinese exports on U.S. Imports. P_2 is the degree of dependence of U.S. exports on Chinese imports. The dependence of Chinese exports on U.S. imports is far greater than the dependence of U.S. exports on the Chinese imports. P_2 was only 1.72% in 1997 and fluctuated until 2000. It rose from 2.4% in 2001 to 7.35% in 2016. After China's accession to the WTO, China has more chances to other markets, with increasing international trade with the rest of the world, the dependent on U.S. imports is slowing.

In summary, China and the United States have a large gap in dependence on each other's import markets. To measure the asymmetry status between China and the United States, according to the indicator from Yang& Ye using for Hong Kong's market dependence on Mainland imports(Yang&Ye, 2017). This paper locates the asymmetric dependence, td , which equals P_1 divides P_2 to measure the outcome.

$$td = P_1 / P_2 \quad 3.1$$

As shown in table 3.4, td decreased from 18.48 in 1997 to 2.37 in 2016. China is more dependent on the US import market than the United States. The asymmetry sensitivity is declining, the United States dominates the relationship. The trade correction between the two countries shows strong asymmetry status. However the degree of asymmetry is declining, and the dependence of U.S. exports dependence on China's imports is increasing.

3.2 Vulnerability

The cost to obtain alternatives determines a country's trade vulnerability(Keohane& Nye, 1973). Therefore, investigating a vulnerability in Sino-U.S. relations, we analyze substitution of import and export commodities markets. This chapter uses the qualitative method introduced in Chapter 2, to summarize the characteristics of the asymmetry vulnerability of Sino-U.S. status.

First of all, this part studies the structural characteristics of import and export of China and the United States. As a result, the substitution of these commodities determines the country's export alternative strength. The more choices to the import countries with competitive products, the more vulnerable of the export country. The asymmetry vulnerability rely on the substitutability of the export.

3.2.1 Commodity import structure of China with the U.S.

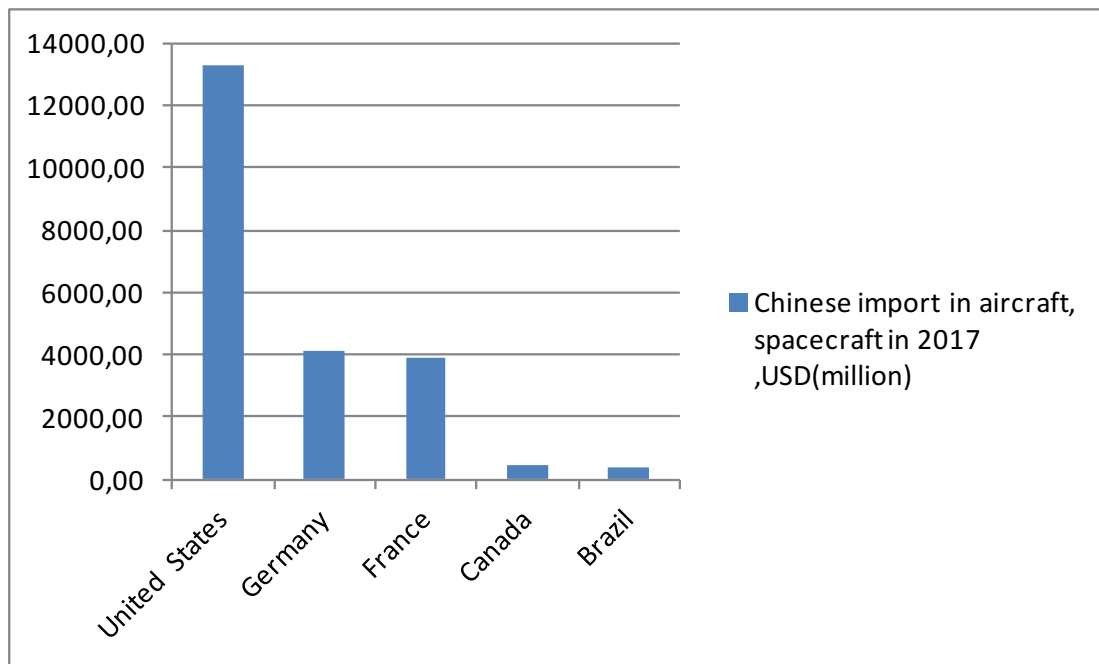
From the perspective of commodities, 60% of the top ten are high-technology-intensive goods or strategic commodities. To be specific, HS codes 88, 84, 85, 87, 90 are high technology-intensive goods, and 12 is a strategic commodity. Table 3.5 shows that the trade volume of those high-value-added commodities accounted for a high percentage of 74.2% of the top ten commodities in 2017. In the view of the importing country, China is fragile in this process, She is deeply dependent depend on the U.S. export. Normally, high-value products are competitive.

Table 3.5: Percentage of Chinese major import goods from the United State in 2007-2017
(United States Exports to China, Billion)

HS Code	Catalogue	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
88	Aircraft, spacecraft	16.8%	13.9%	16.6%	15.2%	14.7%	9.4%	7.4%	8.8%	10.2%	7.4%	11.4%
87	Vehicles other than railway, tramway	13.6%	14.6%	13.6%	13.9%	11.7%	10.1%	9.0%	6.4%	5.7%	4.9%	4.4%
12	Oil seed, oleagic fruits, grain, seed, fruits	13.4%	15.1%	13.4%	16.5%	14.8%	19.4%	17.1%	17.3%	18.1%	15.9%	9.3%
84	Machinery, nuclear reactors, boilers	13.3%	15.2%	16.4%	16.4%	16.8%	18.1%	20.8%	20.5%	19.9%	22.5%	23.6%
85	Electrical, electronic equipment	12.5%	13.0%	13.1%	11.8%	12.3%	11.9%	13.6%	17.4%	18.2%	21.3%	23.2%
90	Optical,photo, technical, medical apparatus	9.1%	11.7%	11.6%	11.1%	11.9%	12.4%	11.1%	10.5%	10.9%	10.5%	10.6%
27	Mineral fuels, oils, distillation products	8.9%	2.5%	2.7%	2.4%	3.1%	3.4%	3.1%	2.5%	1.4%	1.3%	0.9%
39	Plastics	5.8%	7.3%	6.3%	6.2%	7.4%	7.8%	8.9%	9.5%	9.9%	9.0%	9.7%
47	Pulp of wood, fibrous cellulosic material, waste	3.5%	4.0%	4.0%	3.9%	4.6%	5.4%	6.2%	5.3%	4.8%	6.1%	5.4%
44	Wood and articles of wood, wood charcoal	3.3%	2.6%	2.3%	2.8%	2.6%	2.1%	2.7%	1.8%	1.0%	1.1%	1.3%

Note: : Data in table 3.5 were calculated by authors from Trading economics database

Diagram 3.4: China import in HS88 main countries in 2017



Source: United Nations Commodity Trade Statistics Database

The highest proportion of China's imports from the U.S. is code HS88. It defends aviation, spacecraft, and its parts and components. Due to its high technical requirements, and advanced application. The importing country has strong fragility, that is, China is vulnerable.

Although, perhaps there are more countries that can provide this type of commodity. As shown in figure 3.4, the United States is the most important importer for such goods in 2017. Followed by Germany, France, and imports from countries outside Europe. It reveals China has an exceeding vulnerability in the import process of aerospace vehicles and their accessories with Germany, France, Canada, and especially the United States.

3.2.2 Commodity import structure of U.S. with China

Table 3.6: Percentage of the U.S. major import goods from the China in 2007-2017

HS Code	Catalogue	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
85	Electrical, electronic equipment	36.3%	35.2%	34.8%	34.4%	33.7%	32.8%	31.2%	31.1%	30.9%	30.5%	30.1%
84	Machinery, nuclear reactors, boilers	27.2%	26.7%	27.4%	28.7%	29.0%	29.6%	30.2%	28.4%	26.5%	24.9%	25.2%
94	Furniture, lighting signs, prefabricated buildings	8.4%	8.5%	7.9%	7.4%	7.5%	7.2%	7.0%	7.4%	7.3%	8.1%	8.8%
95	Toys, games, sports requisites	6.5%	6.7%	6.6%	6.3%	6.4%	6.7%	7.3%	8.7%	10.0%	10.6%	10.5%
39	Plastics and articles thereof	4.3%	4.2%	4.0%	4.0%	3.9%	3.8%	3.6%	3.5%	3.6%	3.6%	3.5%
87	Vehicles other than railway, tramway	3.8%	3.8%	3.6%	3.2%	2.9%	2.9%	2.7%	2.5%	2.2%	2.5%	2.5%
61	Articles of apparel, knit or crocheted	3.6%	4.0%	4.3%	4.4%	4.5%	4.5%	4.8%	4.9%	4.9%	4.1%	4.2%
64	Footwear, gaiters and the like	3.6%	4.1%	4.6%	4.7%	5.0%	5.2%	5.4%	5.6%	5.7%	5.6%	5.7%
62	Articles of apparel, not knit or crocheted	3.3%	3.8%	3.9%	4.0%	4.3%	4.4%	4.8%	5.2%	5.6%	5.2%	5.4%
73	Articles of iron or steel	3.0%	3.0%	2.9%	2.8%	2.7%	2.9%	2.9%	2.7%	3.3%	4.8%	4.1%

Source: UN comtrade database, United Nations Commodity Trade Statistics database

As shown in table 3.6, there are four types of tech-intensive goods, HS 84, 85, 87, 90 with high value-added. The rest six categories are labor-intensive goods. It tells that the proportion of less substitutable products is 40% of the top catalogs. The main imports products from China are labor-intensive products. Furthermore, labor-intensive products have low added value and more competitors. Once they have no comparative advantage, they are easily replaced by other exporting countries. The United States has a small export vulnerability.

3.2.3 Alternative to import and export dependency

3.2.3.1 Top export partners of China by commodities

Table 3.7: Country composition of major imported commodities to China in 2016

Electrical, electronic equipment 412.88		Percentage	
Top 5 export countries	China(Taiwan)	96.30	29.0%
	South Korea	73.60	22.0%
	Japan	40.50	12.0%
	Malaysia	31.90	9.6%
	United States	15.80	4.8%
Mineral fuels, oils, distillation products 176.54		Percentage	
Top 5 export countries	Russia	19.00	11.0%
	Saudi Arabia	16.40	9.2%
	Angola	13.90	7.9%
	Oman	11.20	6.3%
	Iraq	10.70	6.0%
Machinery, nuclear reactors, boilers 147.66		Percentage	
Top 5 export countries	Japan	27.20	19.0%
	China(Taiwan)	21.10	15.0%
	Germany	17.80	13.0%
	South Koras	15.40	11.0%
	United States	14.50	10.0%
Ores slag and ash 94.48		Percentage	
Top 5 export countries	Australia	39.60	42.0%
	Brazil	13.30	14.0%
	Peru	7.34	7.8%
	Chile	6.72	7.1%
	South Africa	4.99	5.3%

Source: General administration of customs P.R.China, United Nations Commodity Trade Statistics Database

The previous data dedicate that China reflects a higher vulnerability due to the higher substitution of the commodity in China's export. However, to accurately know China's dependence on the U.S., it depends on whether the United States is the main export option for China's major import.

The transaction amount, as shown in table 3.7, the most four types China imports are Electrical, Mineral fuels & oils, Machinery nuclear reactors, and ores. It reveals that the United States is not the top export market for China's imports. When export countries' policy changes, there are alternative resources as options. China has little vulnerability to U.S. export.

3.2.3.2 Top export partners of U.S. by commodities

In table 3.8, Electrical and Machinery are the most import goods of the United States. In 2017, China's export volume was 150 billion dollars, accounting for 44% of the total Electrical market. On Machinery, the import

volume from China is 112 billion dollars, accounting for 33% of the total market. On the Vehicles and Mineral fuels, China is not ranked in the top five import markets.

However, the impact of trade transfer and production shifts are the rapid growth reason of China's high-tech exports. In a later chapter, we will compare the traditional calculation with TiVA. Koopman proposed that using conventional gross based trade statistics may cause the double counting problem(Koopman et.al, 2008). To avoid attributing the full value of goods to the end origin country because the intermediate goods from various countries is share of the composition. WTO provides a means name trade in value-added(TiVA), trace the value that is added at each part of the whole production that are exported(WTO, 2019). In addition, some of the imports technology-intensive goods are the consideration for cost-saving. Even though China takes large a proportion of commodities with weaker alternatives of U.S. import, the United States has a wide vulnerability.

3.2.3.3 Top import partners from China by commodities

Based on the transaction amount in table 3.9, electrical equipment, mechanical and electrical products, machinery, furniture, and article apparel are the top four high exported commodities. The five most export markets for each type of product also display in table 3.9, and it constitutes the crucial markets for China's major export commodities. The United States is the major export, China's substitution to the U.S. export market is weak which leads China's extreme vulnerability. If the U.S.'s trading policy changes, influence will occur through export commodities to China.

Table 3.8: Country composition of major imported commodities to U.S. in 2017, Billion

Electrical, electronic equipment 356.78		Percentage	
Top 4 export countries	china	150.00	44.0%
	Mexico	62.20	18.0%
	Malaysia	24.70	7.2%
	Japan	17.50	5.1%
Machinery, nuclear reactors, boilers 349.11		Percentage	
Top 4 export countries	China	112.00	33.0%
	Mexico	54.30	16.0%
	Japan	31.70	9.3%
	Canada	21.50	6.3%
Vehicles other than railway, tramway 294.59		Percentage	
Top 4 export countries	Mexico	84.10	29.0%
	Canada	56.20	19.0%
	Japan	51.70	18.0%
	South Korea	20.60	7.1%
Mineral fuels, oils, distillation products 204.23		Percentage	
Top 4 export countries	Canada	77.90	38.0%
	Saudi Arabia	18.30	8.9%
	Venezuela	12.00	5.9%
	Iraq	11.10	5.4%

Source: General administration of customs P.R.China, United Nations Commodity Trade Statistics Database

Table 3.9: Country composition of China's major export commodities in 2016

Electrical, electronic equipment 553.17		Percentage	
Top 5 export countries	Hong Kong	96.30	28.0%
	United States	73.60	17.0%
	South Korea	40.50	6.3%
	Japan	31.90	6.1%
	Netherlands	15.80	3.4%
Machinery, nuclear reactors, boilers 343.77		Percentage	
Top 5 export countries	United States	79.50	23.0%
	Hong Kong	42.70	13.0%
	Japan	20.60	6.1%
	Netherlands	15.00	4.4%
	Germany	14.50	4.3%
Furniture, lighting signs, prefabricated buildings 87.51		Percentage	
Top 5 export countries	United States	27.40	32.0%
	Japan	4.73	5.5%
	United Kingdom	4.25	4.9%
	Hong Kong	3.68	4.2%
	Germany	3.66	4.2%
Articles of apparel, knit or crocheted 74.41		Percentage	
Top 5 export countries	United States	16.10	22.0%
	Japan	8.15	11.0%
	United Kingdom	4.82	6.5%
	Hong Kong	4.13	5.6%
	Germany	2.78	3.8%

Source: General administration of customs P.R.China,
United Nations Commodity Trade Statistics Database

3.2.3.4 Top import partners from the United States by commodities

Table 3.10: Country composition of the U.S. major export commodities in 2017

Machinery, nuclear reactors, boilers 201.65			Percentage
Top 4 export countries	Mexico	42.90	22.0%
	China	12.90	6.5%
	South Korea	8.78	4.5%
	Japan	7.53	3.8%
Electrical, electronic equipment 174.25			Percentage
Top 4 export countries	Mexico	41.30	24.0%
	China	12.10	7.2%
	Hong Kong	11.70	6.9%
	South Korea	6.60	3.9%
Mineral fuels, oils, distillation products 138.01			Percentage
Top 4 export countries	Mexico	26.10	19.0%
	Brazil	8.74	6.3%
	China	8.61	6.2%
	Netherlands	6.29	4.6%
Aircraft, spacecraft 131.17			Percentage
Top 4 export countries	China	16.30	13.0%
	United Kingdom	9.44	7.3%
	Canada	8.28	6.4%
	Germany	7.07	5.5%

Source: General administration of customs P.R.China,
United Nations Commodity Trade Statistics Database

This section examines whether China is the main export market for the United States. In table 3.10, machinery type is the main export commodity from the United States. According to the country composition of the major U.S. export commodities in 2017, China ranks in the top five in all aspects. Especially in the catalog of aircraft, it is the biggest import partner top sales in the export. The United States is highly vulnerable in its export to China. If China's policy breaks the current trading, the United States has to find a replacement market with its main export commodities.

3.3 Evaluation of asymmetry status

China's sensitivity to Sino-US trade is a steady decline. Yet the sensitivity of the United States shows a sustained and rapid growth trend. China's dependency on U.S. imports is significant. China has active sensitivity to the U.S. import, the implementation policies of the U.S. will cost China to keep the networks. The data reveals strong asymmetric features, however, the degree of asymmetry is decreasing due to the United State is increasing its dependence on China.

In terms of import and export commodity structure. China imports weak substitutable products from the United States, simultaneously China is not a major exporter for the United States. China is vulnerable. On the contrary, the United States vulnerability is also relatively low. Mexico is a priority import country from the United States, at the same logic, China imports high-tech commodities, and strategic commodities reveal the U.S. is less vulnerable. Therefore, based on the vulnerability index. The asymmetry of the dependence of China and the United States is not decreased, U.S. maintains a dominant position.

In summary, the United States has become more dependent on China.

Sino-U.S. trade in goods is an asymmetry relationship, even so, the degree of asymmetry has weakened. China's sensitivity is declining. The vulnerability has not changed significantly.

Chapter 4 Model analysis of asymmetric dependency

4.1 Analysis of explanatory variables

After the above comprehensive analysis of the dependence on Sino-US trade in goods. There is a clear asymmetric dependence between China and the United States. The sensitivity and vulnerability of China are significantly greater than that of the United States. The U.S. has a dominant position in Sino-US trade relations. The main factors leading to this asymmetrical dependence ratio will be analyzed next.

The factors that influence the ratio of foreign trade dependence, which is introduced in chapter 3 asymmetry trade dependence and calculated as variable td . Exports and imports comprise a country's international trade and are thus influenced by all the factors that affect international trade. Many various factors, such as trade policy, exchange rates, foreign currency reserves, inflation, transportation costs, cultures, various trade agreements, and demand can affect international trade. This model emphasis on economic factors, so it is divided into three categories.

(1) Aggregate

The elements mainly include the Gross Domestic Product of China, China's foreign trade, the total value of the U.S. trade in goods with China, Gross Domestic Product of United States, U.S.'s foreign trade, foreign direct investment(FDI), domestic savings

(2) Price

Price levels play an important role in the purchasing power of consumers. There are some measurement indicators: consumer price index(CPI), industrial producer price index, consumer price index PPI.

(3) Exchange rate

The indicator is the Sino-US exchange rate

4.1.1 Aggregate

(1) Gross Domestic Product of China

GDP of China does not appear in the numerator or denominator of the formula. However, there is a tight relationship between international trade and total output.

The development of foreign trade and changes in international trade has an important impact on China's national economy. External economies affecting the domestic economy through import and export trade. This transmission can be reflected in the gross domestic product. Due to the development of the domestic economy, the increasing domestic demand for foreign products are also transmitted through import and export trade.

China's gross domestic product (GDP) values, the market value of all final products and services produced in China in one year(National Bureau of Statistics of China, 201). The output refers to the market value of all

domestic apartments within a year, which includes not only the final product but also Intermediate inputs, as raw materials for the production of final products. The GDP is included in gross output. In the short term, due to technology, the ratio of gross domestic product to output is stable. Because of the ratio is positive, GDP and output will change in the same direction. Based on the above analysis, with the same environment, we can conclude that an increase in the GDP of China will reduce China's dependence on US foreign trade, while a decrease in the GDP of China will increase China's dependence on US foreign trade.

(2) China's foreign trade

In the case of total output, according to the calculation formula of foreign trade dependence, the more China imports, and exports to the United States, the higher China's foreign trade dependence on the United States. The less China trade with the United States, the lower the degree of dependence on foreign trade. In addition, if China maintains the total imports and exports to the United States, but her economic activity is increasing, the lower China's dependence on the United States' foreign trade. The smaller the amount, the higher China's dependence on US foreign trade.

(3) Gross Domestic Product of United States

As the United States ranks first in the world's GDP, China's second-largest trading partner, its changes will not only affect China's economic development and import and export trade but also affect the world's economic development and global trade, then indirectly work on the relationship between China and other countries. The increase in the gross domestic product will drive the U.S. domestic market's demand for foreign products, it expands China's dependence on U.S. foreign trade. Conversely, if the U.S. economic recession and the decline in the gross domestic product, reduces US domestic demand, shorten Sino-US trade, and lower China's dependence on US foreign trade.

(4) Foreign Direct Investment (FDI)

Foreign Direct Investment (FDI) flows record the value of cross-border transactions related to direct investment during a given period of time(OECD, 2021), FDI is a supplement to domestic capital. On the one hand, products are produced instead of importing through investment and cooperation of enterprises, which reduces

the dependence on foreign trade; on the other hand, based on the advantage of the domestic resource, the country lowers the cost of production and export to other countries, however increasing dependence on foreign trade.

4.1.2 Price

The purpose of trading is to reduce production costs and pursue maximum benefits. Price is the monetary expression of cost. If the sum of the price of production abroad plus the import cost is lower than the price of a domestic product, according to the theory of international division of labor, this country will adopt to import this product. Otherwise, this country will try to bring about it.

Since there are many types of products traded between China and the United States, if the gap between the two countries is greater, the import will decrease from the lower price country and the export value will increase. The country with the higher CPI will increase the importing, the export value will decrease. Since the calculation of the degree of dependence on foreign trade is related to the imports and exports, the price has an impact on both imports and exports.

4.1.3 Exchange rate

The settlement currency for Sino-US trade is the U.S. dollar, then the exchange rate of RMB against the U.S. dollar affects Sino-U.S. trade. Renminbi appreciation reduces the cost of imports, it benefits the import trade. On the other hand, it reduces export revenue, it hurts the export trade. Renminbi devaluation increases the cost of imports, it against import trade, however, it facilitates export trade. The exchange rates are affected by the balance of international payments, and the important source of international payments is international trade. Therefore, foreign trade dependence intertwines the changes of exchange rates, they influence each other.

4.2 Empirical analysis

4.2.1 Data collection

Based on the previous theoretical analysis and data availability, this paper selects the direct investment position of the United States in China, Chinese foreign direct investment in the US, Gross domestic savings in the

United States, Gross domestic savings in China, China R&D expenditure, research and development expenditure in the United States, Money Supply M1 in China and Money Supply M1 in the United States as influencing factors.

(1) FDI

This influencing factor is independent of all factors, but it has an important impact on trade dependence.

Therefore, the author chooses the U.S. foreign direct investment in China.

(2) Domestic savings

The degree of dependence on foreign trade measures the dependence of the country's economy on foreign trade.

The price indicator is representing the price level, it must cover as many foreign trade products as possible.

Foreign trades include not only intermediate products in industrial, but also final products. In addition, foreign

trade products include the agricultural sector. Therefore, China Purchasing Price Index and U.S. China

Purchasing Price Index are not suited for, it shows the index of the purchase price of raw materials, fuels, and

power used as intermediate inputs when industrial enterprises organize production(China Statistic). They only

included the prices of industrial intermediate products. China Producer Price Index (PPI) and U.S. Producer

Price Index are not selected because the PPIs measure price change from the perspective of the seller. This

paper uses domestic savings to reflect the price level of foreign trade products.

The performance of certain sectors of an economy can not decide the trade balance according to the national saving and investment equation.

Domestic savings and investment are on the left of the identity and trade deficit on the right in equation 4.1.

$$I - S - (T - G) = (M - X) \quad 4.1$$

The balance of trade in the perspective of the national savings and investment identity is:

Trade surplus= Private domestic saving + Public saving – Domestic investment

$$(X - M) = S + (T - G) - I \quad 4.2$$

There will be capital outflow abroad due to the domestic savings are higher than domestic investment. From this standpoint, the capital can become a direct investment.

(3) Money Supply

This paper selects Money supply representing currency exchange rate factors as explanatory variables. Due to the mutual influence between exchange rate and foreign trade dependence, an independent indicator is needed here instead of the exchange rate affected by foreign trade. Therefore, I consider use currency issuance to represent changes in currency value instead of exchange rate factors. It is necessary to choose China and the United States to be uniform in the scope of indicators.

Table 4.1: The components of the money supply

The principal components of the United States
M1= Coins and Currency in Circulation +Checkable Deposits+ Travelers's Checks
M2= M1+ most savings accounts, money market accounts, retail money market mutual funds, and small denomination time deposits
M3= M2 + all other CDs (large time deposits, institutional money market mutual fund balances) + deposits of eurodollars+ repurchase agreements
The principal components of China are
M0= Coins and Currency in Circulation
M1= M0+ demand deposits in national currency of resident non-bank, non-government sectors with the PBC and banking institutions
M2= M1+ short-term time deposits in banks
M3= M2+ Bond (finance)+ Commercial paper + CDs

In China, M1 is used to characterize narrow money, M2 and M3 count as broad money. Because Chinese checks cannot be converted into cash, if the value is the same, the cash is M1 in the United States, but it is less than M1 in China. If M2 is the same, based on China's high savings rate and low liquidity status, most of China's M2 is savings. Due to the low savings rate in the United States, almost are M1, in fact, they are all M0.

Taking into account the availability of data and the differences in the money supply definition of the two countries, the author chooses M1, which has the most similar meaning.

4.2.2 Hypothesis

(1) Positive correlation between U.S. foreign direct investment in China and China's dependence on US foreign trade.

There are two ways the influence foreign direct investment.

One way is the substitution effect of foreign direct investment. In an open economy, due to the difference in resource endowments leads to differences in prices, but this difference is achieved through commodity trade. In free trade, commodity trade replaces the flow of resources and promotes the convergence of international resource prices. However, commodity trade can be restricted, then capital is easier to inflow than commodities and it is less susceptible. Therefore, international direct investment enables imported goods that were originally produced in other countries, produce by domestic resources and sell in the country. The process turns international trade into domestic trade, it reduces imports, it reflects a substitute effect on trade.

The other way is complementary effects from industry trade. Foreign direct investment will promote intra-industry trade with low transportation costs, low production costs and low investment costs. With the development of the international division of labor and technology, more and more multinational companies are investing and setting up factories in regions that have more cost advantages than their own countries based on the goal of reducing costs and maximizing profits. By using low cost resources in the region to produce intermediate products, the final product parts are assembled and then sold back to the headquarters or market location. So the international direct investment not only increases imports but also increases exports.

(2) Negative correlation between Chinese domestic savings and China's dependence on US foreign trade, and a positive correlation between the US domestic savings price index and China's dependence on US foreign trade.

When the domestic investment and public domestic savings maintains no change, private domestic savings are up, the trade deficit must fall. It limits international trade and decreases China's dependence on the US market. I estimate that higher private savings reduce China's dependence on US foreign trade. On the same logic, According to the data from the Bureau of Economic Analysis of the U.S. Department of Commerce in 2018, the U.S. has a savings rate of 6.669% in 2017. It leads to a decline in U.S. consumer spending and a reduction in

dependence on Chinese imports, thereby it has a positive correlation with China's dependence on US foreign trade.

(3) China's money supply M1 has a positive correlation with China's dependence on the United States' foreign trade, US M1 has a negative relationship with China's dependence on the U.S. foreign trade.

The RMB implements a floating exchange rate system. When the issuance of RMB currency increases or the issuance of U.S. dollars decreases, there will be an RMB devaluation. The devaluation of the Chinese yuan is good for exports but not good for imports. As the issuance of RMB decreases or the issuance of US dollars increases, it shows an appreciation of the RMB. The appreciation of the RMB is good for imports but has no benefit for exports.

When an increase in the M1 money supply of RMB or a decrease in the M1 money supply of U.S. dollars, the devaluation of RMB tends to climb. With the depreciation of the renminbi, China's exports to the United States have increased, and China's imports have decreased. With the appreciation of the renminbi, it decreases China's exports to the United States, and it shoots up China's imports from the United State. Therefore, this paper estimates that China's M1 money supply has a positive correlation with China's dependence on US foreign trade, and the U.S.'s M1 money supply has a negative correlation with China's dependence on US foreign trade.

4.2.3 Empirical model

First, this research evaluates whether there is a relationship between dependency ratio and possible reasons between two countries defined as China and the United States Bahmani uses a non-linear ARDL model with fixed effects for their analysis(Bahmani et al., 2019). Its specification is:

$$InX_{i,t}^{JP} = \alpha_0 + \alpha_1 InY_t^{US} + \alpha_2 InREX_{i,t} + \alpha_3 InV_{i,t} + \varepsilon_t \quad 4.3$$

In their equation, X^{JP} assumes that Japanese real export of commodity i, Y^{US} represents the level of income or economic activity in the US, Y^{US} , real industry i-specific yen-dollar rate, REX_i and the GARCH-based measure of the volatility of REX_i , denoted by V_i (Bahmani et al., 2019).

Orefice and Rocha (2013) provide an augmented gravity equation to investigate the impact of deep integration on trade: the log bilateral imports in parts and components as the dependent variable is explained by the depth of an agreement(PTAdepth), economic size(ϕ_{ip})and their multilateral trade resistance(ϕ_{jp}), and the characteristics that are specific to the countries(ϕ_{ij}).

$$\text{Ln}(\text{imports})_{ijt} = \alpha + \gamma_t + \phi_{ij} \phi_{ip} \phi_{jp} + \beta \text{PTAdepth}_{ijt} + \varepsilon_{ijt} \quad 4.4$$

This paper use yearly data over the period 1997 -2017. Interdependency degree between the United States and China, td, as the dependent variable. I include gross domestic savings in China(cngds), gross domestic savings in the United States(usgds), foreign direct investment from China in the United States(fdicn2us), foreign direct investment from U.S. in China(fdius2cn), China money supply M1(m1c) ad United States money supply M1(m1us) as the six explanatory variables.

Table 4.2: List of Variables

Variable	Description	Unit	Data Source
td	The interdependence between China and the United States		Author's calculation
cngds	Gorss domestic savings in China	Current Yuan Renminbi	The World Bank
usgds	Gorss domestic savings in the United States	Current Dollars	The World Bank
fdicn2us	Foreign direct investment from China in the United States	Current Dollars	United States Census Bureau
fdius2cn	Foreign direct investment from the United States in China	Current Dollars	National Bureau of Statistics of China
m1cn	China money supply M1	Current Yuan Renminbi	EPS China Data
m2us	The United States money supply M1	Current Dollars	Federal Reserve Economic Data

Table 4.3: The influence factors of China's dependence to U.S.

Year	td	cngds (Trillion, current Yuan renminbi)	usgds (Trillion, current dollars)	fdicn2us (Million, current dollars)	fdius2cn (Million, dollars)	m1cn (Billion, current Yuan renminbi)	m1us (Billion, current dollars)
1997	18.43	3.216630009	1.820236457	182	3239.15	34826.3	1070.1
1998	18.73	3.369368592	1.917962202	251	3898.44	38953.7	1080.6
1999	22.36	3.389706164	1.999704202	295	4215.86	45837.2	1102.3
2000	19.27	3.653126424	2.052207464	277	4383.89	53147.2	1103.6
2001	14.50	4.220198899	1.978794399	535	4433.22	59871.6	1140.3
2002	11.71	4.748994811	1.948692054	385	5423.92	70882.0	1196.7
2003	8.47	5.768702963	1.988148878	284	4198.51	84118.6	1274.0
2004	7.33	7.244572842	2.148381147	435	3940.95	95969.7	1344.6
2005	6.47	8.544637764	2.32681723	574	3061.23	107278.8	1372.0
2006	5.23	10.40741926	2.480925414	785	2865.09	126035.1	1375.0
2007	4.37	13.23552651	2.546607656	584	2616.23	152560.1	1373.0
2008	3.98	16.03454129	2.384119084	1105	2944.34	166217.1	1435.2
2009	3.32	17.39791096	2.176122025	1624	2554.99	221445.8	1638.1
2010	2.82	21.05378737	2.296073727	3300	3017.34	266621.5	1742.7
2011	2.65	24.31928343	2.389718104	3598	2369.32	289847.7	2010.5
2012	2.55	26.31360906	2.674213349	7076	2598.09	308664.2	2315.5
2013	2.25	28.62995644	2.935633196	7855	2819.87	337291.0	2549.7
2014	2.27	30.55319506	3.138992695	10071	2370.74	348056.0	2815.2
2015	2.34	31.69375323	3.333191569	14714	2088.89	400953.0	3021.9
2016	2.37	33.55886419	3.314258687	31871	2386.01	486557.0	3248.9

Notes: Data in table 4.2 were calculated by author from World Bank WDI data, United States Census Bureau, National Bureau Statistic of China, EPS China data and Federal Reserve Economic data.

In order to remove heteroskedasticity in variables, I use the log transformation, I use the log of td, cngds, usgds, fdicn2us, fdius2cn, m1cn and m1us, to get the new variables ltd, lcngds, lusgds, lfdicn2us, lfdius2cn, lm1cn, and lm1us as below. We have regression model 1:

$$Lytd = f(lcngds, lusgds, lfdicn2us, lfdius2cn, lm1cn, lm1us) \quad 4.5$$

The new variables data in table 4.4:

Table 4.4: The influence factors of China's dependence to U.S. after log

Year	ltd	lcngds	lusgds	lfdicn2us	lfdius2cn	lm1cn	lm1us
1997	1.2655	0.5074	0.2601	2.2601	3.5104	4.5419	3.0294
1998	1.2724	0.5275	0.2828	2.3997	3.5909	4.5905	3.0336
1999	1.3494	0.5302	0.3010	2.4698	3.6249	4.6612	3.0423
2000	1.2849	0.5627	0.3122	2.4425	3.6419	4.7255	3.0428
2001	1.1613	0.6253	0.2964	2.7284	3.6467	4.7772	3.0570
2002	1.0687	0.6766	0.2897	2.5855	3.7343	4.8505	3.0780
2003	0.9276	0.7611	0.2984	2.4533	3.6231	4.9249	3.1052
2004	0.8652	0.8600	0.3321	2.6385	3.5956	4.9821	3.1286
2005	0.8109	0.9317	0.3668	2.7589	3.4859	5.0305	3.1373
2006	0.7187	1.0173	0.3946	2.8949	3.4571	5.1005	3.1383
2007	0.6410	1.1217	0.4060	2.7664	3.4177	5.1834	3.1377
2008	0.5996	1.2051	0.3773	3.0434	3.4690	5.2207	3.1569
2009	0.5205	1.2405	0.3377	3.2106	3.4074	5.3453	3.2143
2010	0.4505	1.3233	0.3610	3.5185	3.4796	5.4259	3.2412
2011	0.4227	1.3860	0.3783	3.5561	3.3746	5.4622	3.3033
2012	0.4065	1.4202	0.4272	3.8498	3.4147	5.4895	3.3646
2013	0.3521	1.4568	0.4677	3.8951	3.4502	5.5280	3.4065
2014	0.3559	1.4851	0.4968	4.0031	3.3749	5.5416	3.4495
2015	0.3701	1.5010	0.5229	4.1677	3.3199	5.6031	3.4803
2016	0.3748	1.5258	0.5204	4.5034	3.3777	5.6871	3.5117

Source: Data in table 4.3 were calculated by author from table 4.2

(1) Stationarity and Unit-Root tests

Because the non-stationary data are unpredictable and cannot be modeled or forecasted, to avoid the pseudo periodic time series, and to receive consistent, reliable results, the non-stationary variables need to be transformed into stationary variables. The difference stationary is to avoid the influence of the abnormal value of a single data on the overall trend by a comprehensive index of multiple data, however, it is easy to lose the original content. This paper is using Engle and Granger approach to testing the cointegration equation, and there is a long-term stable equilibrium relationship among variables.

Table 3.2 shows the result of unit root tests using the ADF unit root test. Variables ltd, lusgds, lfdicn2us, and lfdius2cn of the ADF test on the first difference are stationary. The ADF results expose that the variables series were integrated series of order I(1). Variables lcngds, lm1cn, and lm1us of the ADF test on the second difference are stationary. The ADF results show that the variables series were integrated series of order I(2).

The response variable ltd is stationary at the first difference, the explanatory variables lsgds, lfdicn2us and lfdius2cn are stationary at the first difference, then I run cointegration regression. The results are showing in the table 4.5 below.

Table 4.5: ADF unit root test of the sequence

Variables	Augmented Dickey-Fuller test statistic	Critical level of 1%	Critical level of 5%	Prob.* Result
ltd	2,148	-4,728	-3,760	1,000 nonstationary
D(ltd)	-5,624	-4,616	-3,710	0,002 stationary
lcngds	-2,330	-4,728	-3,760	0,541 nonstationary
D(lcngds)	2,330	-4,668	-3,733	0,397 nonstationary
D ² (lcngds)	-6,729	-4,668	-3,733	0,000 stationary
lsgds	0,665	-3,959	-3,081	0,987 nonstationary
D(lsgds)	-3,766	-3,959	-3,081	0,014 stationary
fdicn2us	1,152	-3,832	-3,030	0,996 nonstationary
D(fdicn2us)	-4,593	-3,857	-3,040	0,002 stationary
fdius2cn	-0,991	-3,832	-3,030	0,734 nonstationary
D(fdius2cn)	-5,355	-3,857	-3,040	0,001 stationary
lm1cn	-3,000	-4,728	-3,760	0,164 nonstationary
D(lm1cn)	-3,465	-4,572	-3,691	0,074 nonstationary
D ² (lm1cn)	-5,424	-4,616	-3,710	0,002 stationary
lm1us	-1,421	-4,572	-3,691	0,818 nonstationary
D(lm1us)	-2,486	-4,572	-3,691	0,330 nonstationary
D ² (lm1us)	-5,060	-4,616	-3,710	0,005 stationary

(2) Cointegration Test

This part is using Engle-Granger methodology in Eviews. First, I employ the linear regression, as shown in table 4.6.

Table 4.6 Cointegration analysis of the factors

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2,5840	2,1202	-1,2187	0,2406
LFDIUS2CN	1,2295	0,5371	2,2892	0,0360
LFDICN2US	-0,3038	0,1331	-2,2833	0,0364
LUSGDS	-0,0377	1,1831	-0,0319	0,9750
R-squared	0,8380	Adjusted R-squared	0,8077	
F-statistic	27,5968	Prob(F-statistic)	0,0000	

The p value of the independent variable lsgds higher than 0.05 is not statistically significant. The other lfdius2cn and lfdicn2us less than 0.05 are significant.

Then we remove variable *lugsds* from regression because domestic investment influences the gross domestic savings. Even though domestic savings higher cause the trade deficit to lower, the domestic investment can increase simultaneously. To run the linear regression with fewer variables, the new result shows in table 4.7.

Table 4.7: Cointegration analysis of the adjusted factors

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2,6094	1,9066	-1,3686	0,1889
LFDIUS2CN	1,2357	0,4863	2,5411	0,0211
LFDICN2US	-0,3071	0,0821	-3,7411	0,0016
R-squared	0,8380	Adjusted R-squared		0,8190
F-statistic	43,9790	Prob(F-statistic)		0,0000

The r-squared is 0.8380, the regression analysis is well and foreign direct investment can explain the influence accurately. The p value is 0, the regression model is significant.

The result of the ADF test for a unit root of residuals in table 4.8 indicates a p value higher than 0.05 implying that the residuals are non-stationary.

Table 4.8: Unit root test of cointegration residual sequence

Residual	t-Statistic	Prob.*
ADF test statistic	-0,9292	0,9308
	1%	-4,5326
Test critical value	5%	-3,6736
	10%	-3,2774

However, cointegration exists among variables that have similar non-stationary properties, as equilibrium holds in the long run for the trade dependency and influence factors. It dedicates that *ltd* with *lfdius2cn* and *lfdicn2us* are cointegrated. Variable foreign direct investment was in line with our expectations.

Table 4.9: Result verification

Variable	Symbol	Hypothesis	Empirical Results
Foreign direct investment from China in U.S.	<i>fdicn2us</i>	-	-
Foreign direct investment from U.S. in China	<i>fdius2cn</i>	+	+

Due to the table 4.8, the linear regression model can be stated by the equation 4.6

$$Ltd = -2.6094067374 + 1.23566693921 * Lfduys2cn - 0.307115796623 * Lfdicn2us \quad 4.6$$

Chapter 5 Comparison TiVA with gross-export

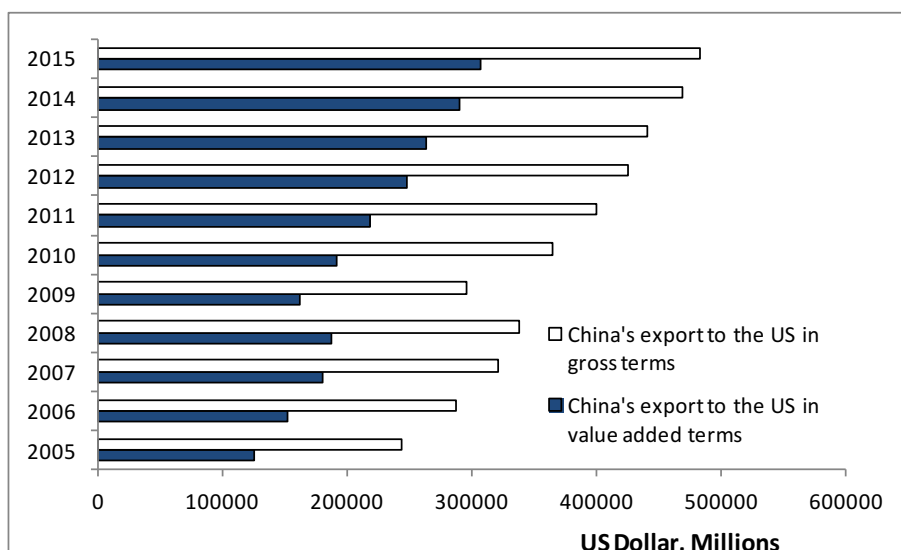
GDP is the most important indicator to find the economic activity, in conventional accounting, Benedetto concludes value added is gross output less intermediate inputs(Benedetto, 2012, p2). In trade, value added follows the goods trade with origin and destination. Then, the Organization for Economic Cooperation and Development have provided the concept of value-added to be the new accounting(OECD, 2018). It endeavors for the origin and destination of goods trade. Value-added trade measures trace raw materials and intermediate inputs from different countries in gross trade flows. TiVA admits that exports in a globalized economy rely on global value chains, the final export country imported various intermediate materials in several countries(WTO, 2019). In the iPhone example, China as a final assembler relies on intermediate items that are for a significant share imported from the US.

Conventional trade statistics calculate gross flows of goods every time once they are transported to diverse countries, this creates a double-counting or multiple counting problem. The TiVA approach proposes accounting net trade flow between two countries. This section compares the difference between China and the U.S. of gross-based accounting approach and TiVA approach.

To better explain the difference between the gross- and TiVA based bilateral trade balance. This part analyzes the WIOD data and shows some calculation outcomes. This section further calculates the bilateral trade in gross terms from the same database. I concern about analyzing the comparison of TiVA-based exports and gross-based exports between China and the US. The results are identified in figure 5.1, the difference between China's gross-based exports and TiVA-based exports with the US steadily rising in most years. Diagram 5.2 shows that the difference between the US's gross-based exports and TiVA-based exports to China also increased in the same duration. This is primarily due to both countries have been more and more aware of GVCs by complicated production grids. It presents that producing export goods includes importing more intermediate goods or materials. As a consequence, in diagram 5.3 shows that domestic value-added relative to gross exports. The number has a little decreased for the U.S., it steadily enhances for China. Moreover, the share of domestic value-added in gross exports for China is weaker than in the US. For the US, this figure is

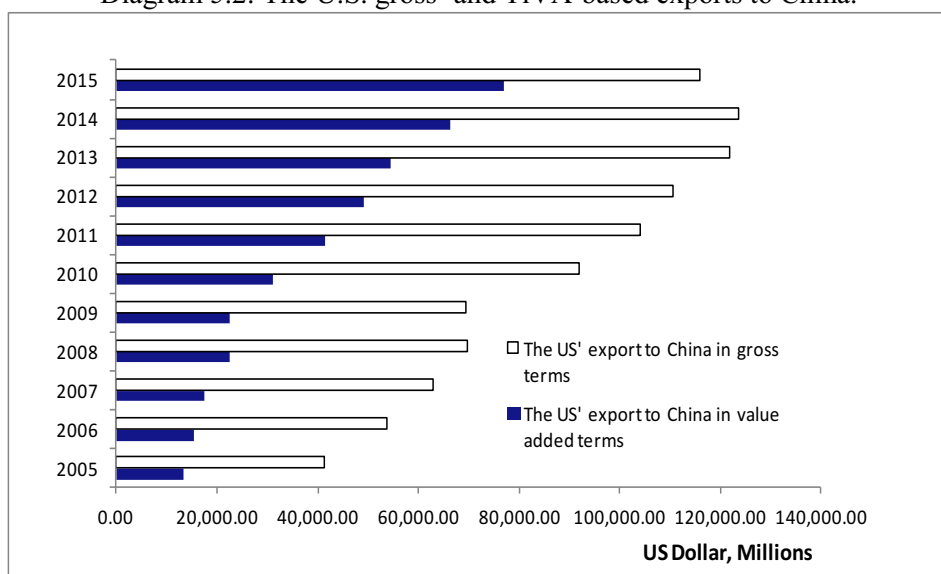
solid between 0.85 and 0.89, except 0.84 in 2008 and returned immediately in 2009. The same norm for China is from 0,6 to 0,69 but never reach 0,7 until 2011. In general, China's imports from other countries embody a significant proportion of the U.S. value-added. This is not captured by the conventional gross trade statistics, the iPhone case is the most famous example.

Diagram 5.1: China's gross- and TiVA-based exports to the U.S.



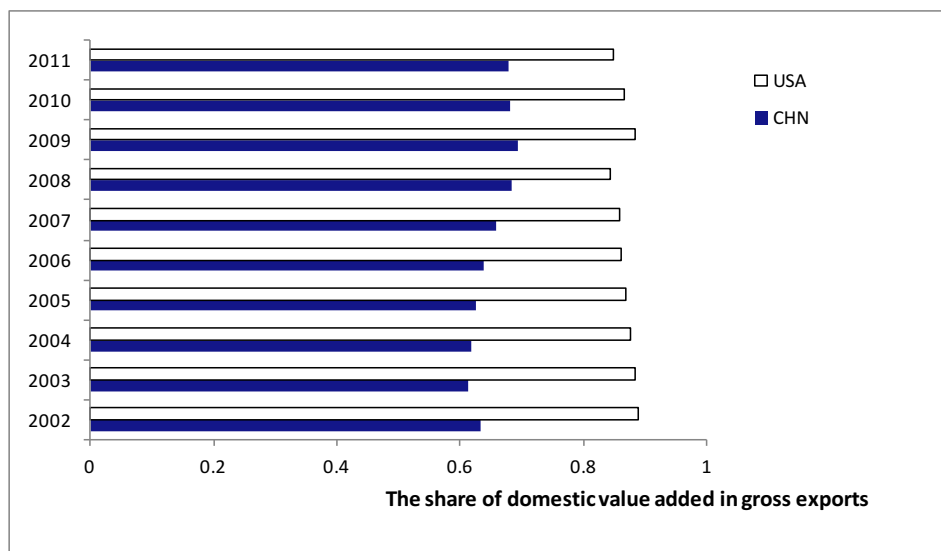
Source: OECD Trade in Value Added (TiVA): Origin of value added in gross exports, 2018

Diagram 5.2: The U.S. gross- and TiVA-based exports to China.



Source: OECD Trade in Value Added (TiVA): Origin of value added in gross exports 2018

Diagram 5.3: Domestic value-added share in gross exports for China and the US.



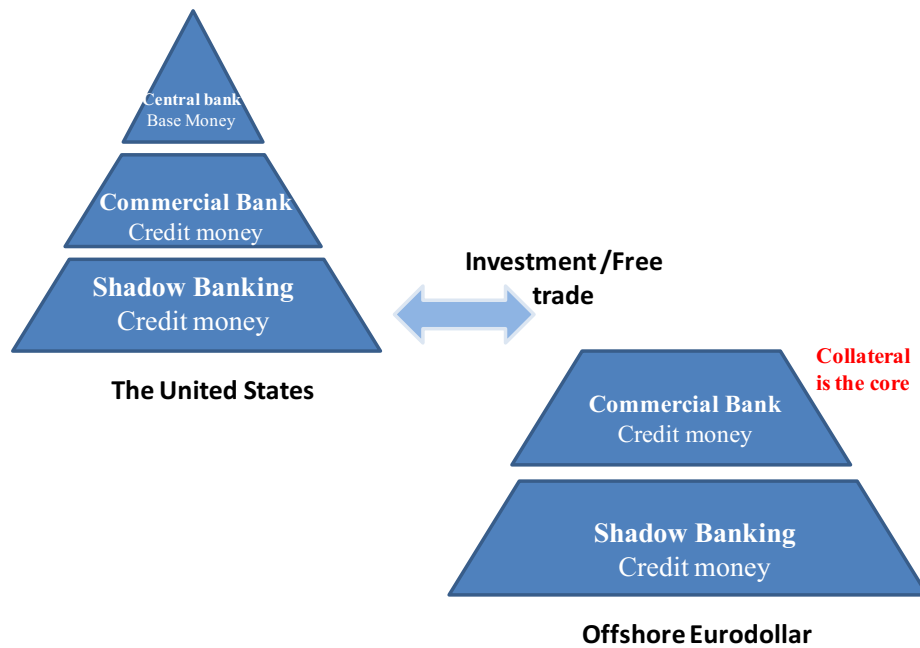
Source: OECD Trade in Value Added (TiVA): Origin of value added in gross exports 2018

Chapter 6 Credit expansion and asymmetric relationship

The United States imposes 25% tariffs on US\$250 billion worth of Chinese goods in 2018 since that, countries began to negotiate and throw trade frictions. This part leaving the previous data, on the political and financial perspective, provides a view on the impact of credit expansion to explain the reason for the trade war.

In the view of the politics, this paper brings out the idea that the fact behind the trade war is the world's largest bank run. Ostensibly, it is a trade dispute, but in fact, it is a struggle for supremacy through a financial war. Trump's real purpose is to run the People's Bank of China's U.S. dollars and destroy the offshore U.S. dollar commercial bank. So that the People's Bank of China no longer has the credit creation capabilities of U.S. dollars. The costs of sustaining the U.S.'s new Empire will become apparent to its public only when these costs directly add to them (Hensman & Correggia, 2005). Considering the dollar still plays the role of the world's reserve currency, it dominates the world's financial and economic order. Whoever controls the U.S. dollar controls the financial world.

Diagram 6.1: Description of the credit status



The creation of credit started with the bank. The original bank was a simple custodian institution used to store gold and silver. It reserves gold and silver currencies for others and charges a certain amount of storage fees every year (Konkel, 2018). Postliminally, it takes the opportunity that deposit is not for use at the same time and to issue credit loans. So, the bank's assets are no longer 100% actual operations. More and more credits are issued. Since then, banks have had the ability to create credit from nothing (Werner, 2014). However, the risk is that if too much credit is issued, far beyond actual operations, the deposit liabilities will far exceed the achievable gold and silver. If the client takes the deposit at the same time, a run will occur. The bank will not be able to pay for the gold and silver costs, so it must go bankrupt. Thus, banks must control the ratio of actual business to deposit liabilities not to be too low, which is the reserve ratio.

In modern times, the gold standard is the replacement of the base currency issued by the central bank. The reserve requirement ratio is the base currency reserve assets to total deposits. The reserves of commercial banks have always existed in the central bank. Transfers between banks are actually transfers of reserves. It is only the owner of the reserves. Changes between different banks are all bookkeeping. The reserve will not actually leave the currency reserve assets to total deposits. The reserves of commercial banks have always existed in the central bank. Transfers between banks are actually transfers of reserves. It is only the owner of the reserves.

Banks prerequisite hold reserves as deposits with a Federal Reserve Bank. Reserves are the underlying basic assets, it is indispensable for maintaining the operation of the banking system and maintaining credit expansion. But the offshore US dollar commercial bank does not have the Fed's base currency reserve. The offshore dollar system uses high-quality collateral, such as US Treasury bonds, to be the base reserve as a substitute. Due to that, the base currency is also produced through the purchase of US Treasury bonds, they equal to base currency reserves.

The Federal can only indirectly influence the offshore dollar system through interest rate policies and asset purchases and influence the general direction. From a global perspective, the biggest source of credit for the US dollar is definitely the credit creation of the banking system, especially the credit creation of offshore US dollar commercial banks, rather than the Fed's printing of money. Therefore, whoever masters the credit creation of offshore dollars will charge the world reserve currency, which equals to master the world finance.

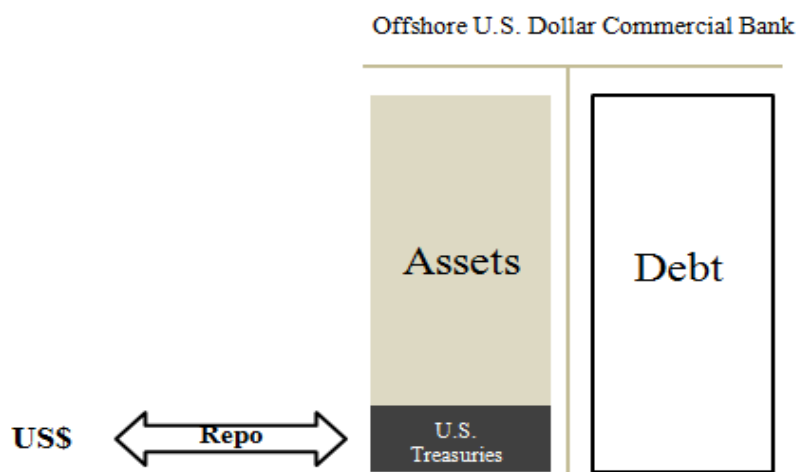
The Federal Reserve controlled the US dollar through stipulated the US dollar monetary policy, controlled interest rate, formulated quantitative easing policy, and printed the number of US dollars. However, the offshore dollar system was unfounded and far beyond the control of the Federal Reserve. The Fed can control the contraction and expansion of U.S. dollar credit and regulate the global gate, but it cannot control the flow of U.S. dollar credit.

To be precise, the U.S. dollar is not the world's reserve currency, but the offshore U.S. dollar. Offshore U.S. dollars exist in the form of U.S. dollar credit. The contemporary U.S. dollar has long been out of the gold standard. The old gold as base money to the U.S. dollar is similar credit to offshore U.S. dollars, but credit is not an object. a pure credit currency, which is produced utterly by credit and circulates all over the world. So whoever masters the offshore dollar will exactly master world finance.

The commercial bank in the offshore dollar system promotes the development of the world economy through lending. Let us look at a typical offshore dollar system, that is, the balance sheet of a commercial bank. In figure 6.2, on the left side of the balance sheet are assets, the most important of which is U.S. Treasury bond assets. The U.S. Treasury bonds are equal to the base currency reserves of general commercial banks. These US Treasury bonds can gain interest, you can pledge it as collateral at any time when you need the liquidity.

The offshore dollar system determines who can generate dollar credit and the flow direction of dollar credit. The flow of the dollar credit will bring prosperity. It improves the productivity, military strength, and political power of the country. Furthermore, the supremacy of the generation and flow direction achieve expanding ideology. It strengthens comprehensive political, economic, and military capabilities on the national level.

Diagram 6.2: Component of offshore U.S. dollar commercial bank balance sheet



It indicates the United States only hurts others without necessarily benefiting oneself. U.S. increasing tariffs, but US consumers are paying for the tariffs in terms of higher prices(Soergel, 2019). If retaliatory tariffs by other countries were taken into account, the costs incurred would be even larger (Flaaen et al., 2019). It shows lower growth in the United States and China(OECD, 2019) and reduces China’s surplus, which is a lose-lose situation from the perspective of data. But on the view of world hegemony, this approach might be the way to gain the greatest advantage at the least cost. The U.S. pulls the plug.

Trump said that China has a huge surplus to takes advantage of the U.S., this paper understands that the United States is afraid of China will accumulate enormous dollars. China will dominate the offshore dollar credit system, then dominate the world financial system.

After World War II, the United States acquiesced to the existence of the offshore dollar system. With the help of the expansion of the offshore dollar system, the U.S. exported its values to the world. The U.S. gained tremendous profits by reshaped the world economic system (Murau et al., 2020).

Money and currency have no value in themselves, and credit either has no value. To settle the values and ideologies of manipulators, they manage the creation and flow of credit. The credit is the mechanism. The offshore dollar system is the control tower, to determine the direction of the world economy and politics.

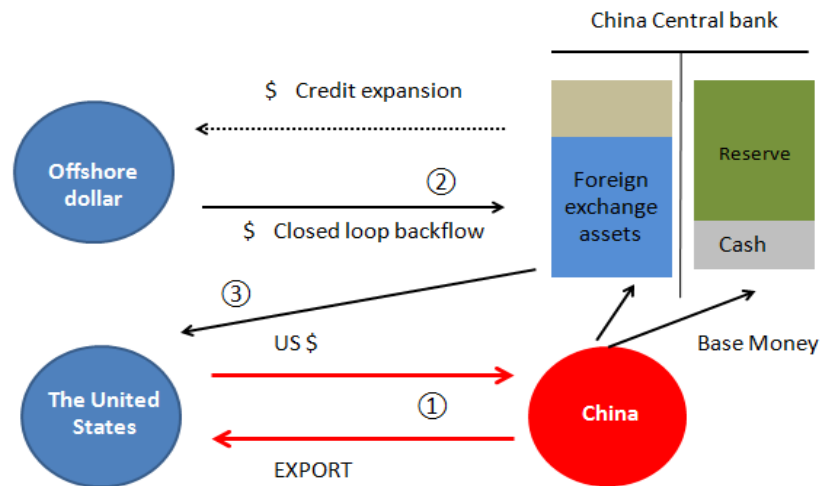
In balance sheet table 6.1, the People's Bank of China, two-thirds are foreign exchange assets. About three trillion U.S. dollars, including about one trillion U.S. Treasury bonds. If there are no restrictions, the Central Bank of China can generate credit creation of up to one trillion US dollars. Over financial institutions depend on the one trillion high-quality collateral. There is one difference, it limits to convertible of the RMB/USD or vice versa in the People's Bank of China

Table 6.1: Balance sheet of China's Monetary Authority

Balance Sheet of Monetary Authority					
Item	2020. 01	2020. 04	2020. 07	2020. 10	2020. 12
Foreign Assets	218649.84	218310.70	218374.92	218185.21	218039.98
Foreign Exchange	212374.43	211914.83	211723.16	211577.49	211308.10
Monetary Gold	2855.63	2855.63	2855.63	2855.63	2855.63
Other Foreign Assets	3419.78	3540.24	3796.14	3752.09	3876.25
Claims on Government	15250.24	15250.24	15250.24	15250.24	15250.24
Of which: Central Government	15250.24	15250.24	15250.24	15250.24	15250.24
Claims on Other Depository Corporations	120824.15	107996.43	106614.95	120745.14	133355.47
Claims on Other Financial Corporations	4740.84	4741.31	4762.43	4740.42	4447.14
Claims on Non-financial Sector					
Other Assets	14030.02	14048.99	12922.35	12891.70	16582.70
Total Assets	373495.10	360347.67	357924.90	371812.72	387675.54
Total Liabilities	373495.10	360347.67	357924.90	371812.72	387675.54
1. As of 2017, RMB accounts with international financial org					
2. Deposits of Non-financial Institutions refers to deposit					

Sauce: Sauce: The People's bank of China

Diagram 6.3: Description of the credit expansion



To maintain the operation of this system, to avoid the run of the bank. I am going to show the whole process with picture 6.3. Firstly, it shows as ① in the picture, the RMB is not exchanged openly with other currencies. As the dollars payment into China, it usually is converted to RMB on the owners' account. The credit currency issued by the central bank is RMB. It equals to the deposits is a liability of the central bank. These liabilities exist in the form of the convertible RMB, which is equivalent to a bank's depositors who cannot withdraw USD. And the People's Bank of China avoids the run risk.

As the U.S. dollar flows into China, it must be converted to RMB before it can be used. The credit currency issued by the central bank is RMB. The equivalent of deposits is a liability of the central bank. These liabilities do not exist in the form of U.S. dollars but in the form of the non-freely convertible renminbi, which is equivalent to a bank's depositors who cannot withdraw money and cannot run on.

Secondly, China issues U.S. dollar credit loans. Rest countries, whether it is developing or developed, all need credit loans. Developing countries need to boost weak infrastructure because of lacking investment. High debt countries demand credit loans make up the high welfare burden. To the borrowed credit dollars can be controlled to slip back to China again. Credit loans are arranged in the condition of purchasing the products and services of Chinese companies. For the purpose of creating more surplus in US dollars, China earns

foreign exchange through exports. By adopts subsidies, tax cuts, and lower exchange rates to obtain competition.

Generally speaking, these measures are to maintain the closed-loop of the system. At the same time, allowing the system to continuously expand its credit. But the weakness of the entire system is that the source of the US dollar surplus. This paper assumes all of Trump's methods target this flaw in the trade war. Also, it tends to break the process two.

Furthermore, there are three implements. First of all, the United States increases tariffs. To prevent Chinese products from entering the United States and reduce China's dollar surplus. Even though most of the manufacturing industry is turn to developing countries such as Vietnam and Mexico. Instead of a return to the United States and re-create jobs. The main intent reduces the U.S. dollar deposits of the Central Bank of China. By shortening China's surplus with the United States. As well, the United States strike the Chinese companies. They are responsible for generating foreign exchange and completing the dollars loop. This strategy alters the direction of closed-loop to open-loop. Thirdly, Trump desires that American companies leave China. If cutting the existed investment in China, equal to encourage the withdraw from the account. To expand the possibility of running the central bank.

The last but not least, cutback the U.S. debt held by China, showing as ③ in figure 6.3. The U.S. treasuries provide liquidity through Repo collateral. High-quality collateral is the base currency for enlarging credit creation. The channel of Repo mortgage is suspended, it drops the response to liquidity. It forces the side that requests the liquidity to sell the underlying basic assets. However, it is extremely hurt the liquidity of the United States. Meanwhile, China's capital outflows if there is a run on the banks in China through the U.S. ceases the Repo liquidity. The result is the excess reserves of the base currency of China's banking system may be exhausted at any time as there is an increasing demand for U.S. dollars, thus destabilising the domestic banking operation system. But the Chinese central bank can deal with the threat by lower the reserve requirement ratio (RRR) which also strains the exchange rate further leads to more capital outflows. In contrast to trade surplus with the U.S., China has to face the trade war run by tightening the exchange rate of the renminbi to the U.S.

dollar, reducing imports and encouraging some leading companies to borrow foreign debt to encourage the inflow of U.S. dollars, defending cutback the U.S. debt held by China.

All in all, the essence of the Sino-US trade war is the US runs on the Central Bank of China. Entire measures arrange to run on this offshore dollar credit system and shatter its ability to create dollar credit. This analysis concludes with a finding that behind the battle there is the control of the offshore dollar system from the political perspective. The U.S. and China are waging a trade war, it is important to notice that a real driver of the trade war is political. Continued hegemony is essential to hold the order (Keohane, 1984, p.31), it illustrates that the US attempts to warn China from replacing its hegemony so that to remain America's hegemonic power.

Chapter 7 Conclusion

The degree of interdependence of Sino-U.S. is constantly increasing. The U.S. economy has maintained low interest rates and high consumption. China preserves the highest savings rate in the world. China has boosted exports by vigorously developing foreign trade, thereby stimulating the economy. Under the situation, the economies of scale continue to expand. It deepens an interdependent state. Although the financial crisis caused a large decline in the U.S. economy, later the dependence increased with a steady increase. China's sensitivity to Sino-US trade is a steady decline. Yet the sensitivity of the United States shows a sustained and rapid growth trend. China's dependency on U.S. imports is significant. However, the degree of asymmetry is decreasing due to the United State is increasing its dependence on China.

In terms of import and export commodity structure. China imports weakly substitutable products from the United States, simultaneously China is not a major exporter for the United States. China is vulnerable. On the contrary, the United States vulnerability is relatively low. Mexico is a priority import country from the United States, at the same logic, China imports high-tech commodities, and strategic commodities reveal the U.S. is less vulnerable. Therefore, based on the vulnerability index, the asymmetry of the dependence of China and the United States is not decreasing, and the U.S. maintains a dominant position.

Sino-U.S. trade in goods is an asymmetry relationship, even so, the degree of asymmetry has weakened. China's sensitivity is declining. China's accession to the WTO empowered it to gain the Most-favoured-nation

agreement, which promoted the opportunities of Chinese exporters to foreign markets. Meanwhile, it has boosted China's economic growth and improved its legal and governmental reforms, more countries had become China's trading partners. The United States is one of the countries that have increased transaction volume, nevertheless, China's international trading volume has increased more, which caused the total percentage is decreasing. Therefore, China's sensitivity to the United States has declined. The United States is China's largest trading partner, but since the United States is not an export-oriented country, the increase in trade with China has led to an increase in the sensitivity of the United States to China. In respect of vulnerability, there is 60% of the top ten exports are labor-intensive items which China export to the U.S, it indicates that China is vulnerable to the US import market. On the contrary, high value-added products take 74.2% of the total value of the top ten commodities of the U.S. export to China in 2017, which shows the U.S. vulnerability is relatively low. In 2007, the proportion of high value-added products is 74.1%. I conclude that the vulnerability has not changed significantly.

The empirical model analysis the impact of China's foreign trade dependence on the U.S., then this thesis selects independent variables: gross domestic savings in China(cngds), gross domestic savings in the United States(usgds), foreign direct investment from China in the United States(fdicn2us), foreign direct investment from the U.S. in China(fdus2cn), China money supply M1(m1c) ad United States money supply M1(m1us). After performing cointegration regression analysis, there is a negative correlation between the foreign direct investment from China in U.S. and trade dependency. Besides, there is a positive correlation between the foreign direct investment from the U.S. in China and trade dependency, those results coincide with theoretical expectations.

Due to the status of China's technology in the current international division of labor. Most of the products are low-value added. But the profits of low labor costs, preferential policies, and broad market have attracted lots of foreign investment in China. It reflects the foreign direct investment from the U.S. in China cause China gets more dependent on the U.S. market.

The conventional gross-based trade data may lead to estimation biases. TiVA shows gross-based trade data are double counting, with the result that estimates of bilateral trade balances are inaccurate, considering intermediate inputs and transferring across multiple countries multiple times.

The explanation of perspectives on politics, the trade war looks like a trade dispute, but it is actually a struggle for hegemony, which relies on financial operations. The increase in tariffs by the United States is not only to reduce the trade deficit. Meanwhile, U.S. increases tariffs, the domestic people also cannot obtain cheap Chinese goods, which reduces China's surplus. It is a lose-lose scenario. The previous article also analyzed the historical changes and reasons in the asymmetric relationship, according to the data, the United States has no reason to do it because it harms China without benefit to the U.S. But from the perspective of politics and credit, it is a way to get the most advantage at the least cost.

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