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МАКРОЭКОНОМИЧЕСКИЕ ФАКТОРЫ ДИСБАЛАНСА КИТАЙСКО-АМЕРИКАНСКОЙ ТОРГОВЛИ

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Китай – одна из развивающихся стран с наиболее быстрыми темпами роста, а США – развитая страна с наибольшей экономической мощью. Экономическое развитие двух государств стало движущей силой роста мировой экономики. Быстро развивающаяся двусторонняя торговля Китая и США является важной составной частью мировой торговли, поэтому проблема дисбаланса торговли между Китаем и США вызывает большую озабоченность правительств и академических кругов двух стран, особенно после вступления Китая в ВТО. В данной статье проанализировано влияние макроэкономических факторов – сбережений и обменного курса – на дефицит торгового баланса между Китаем и США. Заниженный обменный курс может удерживать относительно низкие цены на продукцию китайского производства, в то время как растущий внутренний спрос в США предоставляет Китаю широкий спектр возможностей на внешнем рынке. В статье показано, что разница в нормах сбережений между двумя странами является важным макроэкономическим катализатором продолжения роста положительного сальдо торгового баланса Китая с Соединенными Штатами в международной торговле. Обменный курс юаня тоже является существенным фактором, но не основополагающим.
Ключевые слова: дисбаланс китайско-американской торговли, сбережения, обменный курс.

MACRO-ECONOMIC FACTORS OF SINO-US TRADE IMBALANCEт

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China is one of the developing countries with the most rapid development and the U.S. is developed country with the strongest economic strength, economic development of the two countries has become main impetus of the world economic growth. Sino-US bilateral trade has become the most important constituent part of global trade. With the rapid development of Sino-US bilateral trade, trade imbalance also lead great concern of the two governments and academic circles, especially after China entered into WTO, the problem of Sino-US trade imbalance become even more serious. This paper mainly analyzes the influence of macroeconomic factors on China-US trade deficit, as economists generally believe that savings and exchange rates are closely related to trade balance. Undervalued exchange rate can keep relatively low prices for products made in China, while the booming domestic demand in the United States provides China with a wide variety of external market opportunities. This paper points out that difference in saving rates between the two countries is an important macroeconomic reason for the continued growth of China's trade surplus with the United States in international trade. The RMB exchange rate is an influencing factor, but not a fundamental one.
Keyword: China-US Trade imbalance, Savings, Exchange Rate.

Introduction

In recent years, the imbalance of the world economy has become increasingly severe, among which the Sino-US trade imbalance that is the most pressing. The economic imbalance between China and the United States is particularly reflected in the persistent bilateral trade deficit of the United States. Since the mid-to-late 1980s, the total value of US trade with China has grown steadily. Then it has experienced a rapid increase especially after China's accession to the WTO in 2001. As of 2018, the total value of China-US bilateral trade in imports and exports was US$633.52 billion, and China's trade surplus with the US was US$323,32 billion [12].

The structural feature of the Sino-US trade imbalance is that the exports rose much faster than the imports. Then the factor that can be used to explain exports greater than imports can also apply to the imbalance in Sino-US trade. On the one hand, the exchange rate represents the relative price of goods of the two countries. If the RMB exchange rate is undervalued, it will inevitably cause the drop in prices of Chinese exports, making it internationally competitive, thereby promoting China's exports to the US. Meanwhile, the prices of imported commodities have been raised to inhibit China's imports from the United States. As a result, China's exports to the US will be greater than its imports. On the other hand, changes in demand can cause imbalances in the trade between the two countries. Increasing domestic demand in the US will cause its imports from China to increase, resulting in a US trade deficit with China. There is a dual relationship between demand and savings. High demand tendency means low propensity to save. Measuring the performance of the savings rates in China and the United States helps figure out the demand performance of the two countries. Therefore, this paper takes savings and exchange rates as important macroeconomic factors for studying trade imbalances.

Literature Review

Donald R. Davis and David E. Weinstein proposed that the US-China trade deficit is a long-term policy issue, and the US-China trade imbalance can be put down to the overall macroeconomic imbalance or triangular trade. There into, the US current account deficit is closely related to the macroeconomic imbalance of investment excessively exceeding savings [3].

Huang argued that about 1/3 of the foreign exchange reserves brought by Sino-US trade surplus were used to purchase the US Treasuries, and a large amount of the benefits from China's trade surplus with the United States flow back to the United States, which is conducive to long-term interest rate stability of the United States, and then to the development of the realty business, the expansion of resident consumption demand and economic growth in the United States [8].

Some overseas scholars, represented by Goldstein and Lardy, believe that the artificially low level of the RMB makes Chinese goods exports more competitive and that is the main reason for China's foreign trade surplus [6]; Goldstein believes that RMB was undervalued by 15–25% [5], while some mainstream media outlets in the United States or American companies doing business with China are not impressed, in response to krugman's argument, Stephen roach, President of Morgan Stanley Asia, said rudely that krugman should be hit in the head. «His suggestion is totally wrong. We always blame China and ignore our own business». Whether the trade gap is due to the Yuan's exchange rate is debatable, he said, and encouraging Chinese consumers to spend would be a more effective way.

Chinese scholars have also conducted a series of scientific studies on such differences: when analyzing the relationship between Sino-US trade and the RMB exchange rate, Chou [2] found that fluctuations in the real exchange rate of the RMB against the dollar (conditional variances) have a negative effect on China's exports to the US. That is, when the real exchange rate of RMB against the US dollar fluctuates greatly, China's exports to the US. will decrease. However, the analysis does not mention the effect of the real exchange rate of RMB against the US dollar and the exchange rate of nominal exchange rate itself on the trade pattern between China and the U.S., but only analyzes the volatility of the real exchange rate. Artificially inflating exchange rate volatility to balance trade surpluses is obviously highly inappropriate, the articles of Zhang [17], Lu and Dai [11] are not point at the imbalance of Sino-US trade, but are the analysis of China's overall foreign trade pattern. Take China to the world trade as the research object, Lu and Dai test the relations of the weighted real exchange rate fluctuations of RMB to the world's major currencies from 1994 to 2003 and long-term relationship between China's import and export with co integration vector auto regression method, the results show that RMB real exchange rate volatility has a significant influence on China's import and export trade, Marshall – Lerner condition was established, and J curve effect existed. Zhang [17] estimates the scale of the foreign investment, export volume, GDP and employment reduction caused by the exchange rate appreciation of different ranges by measuring the FDI function, the import and export function and the exchange rate elasticity of China. They concluded that exchange rate appreciation had a significant effect on imports and exports, but that the effect fell by more than half after three quarters and disappeared more recently after seven quarters, and that exchange rate appreciation had no effect on trade imbalances in the long run. Then Wang and others (Qu [13], Li [9] Gao [4] respectively used econometric analysis to show that the trade imbalance between China and the United States has no direct relationship with the RMB exchange rate, and came to the conclusion that the RMB appreciation can only alleviate the surplus to some extent in the short term, but has a weak effect in the long run. Yu [15] used a

gravity model to study the impact of RMB appreciation on trade between China and the United States. The results showed that the appreciation of RMB significantly reduced China's exports to the United States. But it also points out that a continued appreciation of RMB could seriously hurt exporters and thus influence China's macroeconomic growth. The macroeconomic research center of Xiamen University team uses CQMM model to analyze the appreciation of the RMB (6% a year) [10], they concluded that such a rapid appreciation will cause a sharp decline in foreign trade surplus, but it will have seriously negative impact on China's GDP growth that may cause the economic crisis.

Theoretically, the exchange rate may be the main reason for the trade imbalance between China and the United States, but from the empirical research, there is still no strong evidence that the exchange rate change between the RMB and the US dollar contributes to the trade balance between China and the United States.

Saving factor

Saving is the remaining part of output or income subtracting consumption, and it is an important indicator of macro economy. Saving is the counterpart of consumption. If the national income is simply broken up into two parts of consumption demand and saving, then the demand factor can be replaced by saving factor. In other words, high demand tendency means low saving tendency, and the two has precisely the opposite effect. Keynes' national income balance theory implies the relational expression that the balance between savings and investment is identically equal to the balance on trade account, that is, if a country's saving is higher than investment, then the balance of international trade will be favorable, otherwise, it will be adverse. However, from the dynamic perspective, if the investment remains unchanged and the country's saving increases and consumption decreases due to some external factor, then the country will still usher in a trade surplus. If the saving keeps rising, then the country's trade surplus will continue to increase. Saving ratio is the ratio of saving to output or income, which can better reflect the level of saving than the absolute amount of saving. Therefore, more attention is paid to the changing situation of saving ratio [7].

The national aggregate savings can be divided into personal saving of the residential sector, business saving or corporate saving of the enterprise sector and government saving or public saving of the government sector. The personal saving is defined as personal disposable income subtracting personal consumption; corporate saving is defined as year-end undistributed corporate profit. The government saving is defined as government revenue subtracting government nonproductive expenditure.

The national saving ratio of China

The reform and opening up was proposed and established by Deng Xiaoping, the second generation of top leader of the PRC. It covers a series of economic-dominated reform measures implemented after the Third Plenary Session of the Eleventh Central Committee on December 18, 1978, which can be summed up as «domestic reform and opening to the outside world».

After the implementation of the reform and opening-up policy in 1978, China has gotten rapid economic development, which has promoted the sustaining and rapid expansion of the investment scale, but the growth rate of domestic savings is far higher than that of investment, thereby generating a large amount of savings surplus in China [1]. After the reform and opening up in 1978, China's national saving ratio has been continuously rising. As the 2000–2018 data in the figure 1 above shows, China's national saving ratio was 38.50% in 2000, while the ratio rose to 45,29% in 2018.

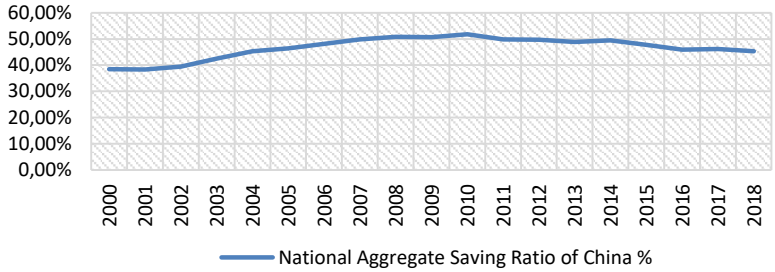

Figure 1. National Aggregate Saving Ratios of China over the Years[1]

Whether it is for residents or enterprises in China, the investment channels are very limited after the gain of income, and what they can only do is to continuously improve their saving ratio, which can lead to a ceaseless rise in China's national saving ratio. Since the traditional ideas and consuming behaviors of Chinese residents can hardly change within a short period of time, after absorbing such vast sums, the banks will definitely provide strong financial support to the country's infrastructure construction and product reproduction. In view of the different corporate properties, different types of Chinese enterprises have different abilities to obtain funds from banks. Non-state-owned enterprises are very worried about future financing, they tend to invest a large amount of accumulated undistributed profits in reproduction or reserve them, leading to a continuous improvement of China's export capacity. In terms of China's saving situation, Chinese people have been converting their income into savings, which has restrained the domestic consumption and reduced the demand for imported goods. The reduction of imported goods can lead to the aggravation of Sino-US trade imbalance.

[1] *Sources Figure 1, 2*: URL: https://www.federalreserve.gov/data.htm

China's overall situation is that the domestic national saving ratio is excessively high and there is a large amount of saving glut, while the Sino-US international trade has accumulated huge trade surplus. Internationally, in the absence of more secure investment channels, the huge trade surplus can only be converted into the US dollar assets dominated by the US treasuries. China has provided a large amount of capital to support the US economic development, which has led to the continuous imbalance of Sino-US trade.

Since the reform and opening-up, it has been over 40 years and China has been making efforts to expand government investment and build infrastructure. China's high national savings provide fund guarantee to the government. According to the data released by the National Bureau of Statistics of China, the aggregate investment of fixed assets of the whole Chinese society in 2019 was 55,1 trillion Yuan, while the figure in 2000 was 3,3 trillion Yuan, with an increase of 16,69 times over 19 years[1]. The fast-growing investment scale will be inevitably transformed into massive infrastructure construction and manufacturing industries, which will undoubtedly increase the export volume of low-end traded goods and promote the continuous expansion of the volume of Sino-US trade surplus. China is exerting its comparative advantage in international trade, increasing its infrastructure construction and gradually changing from a global product manufacturing base to a more perfect industrial structure. Most of the banks and large-scale enterprises in China are state-owned, and the ability of each resident is very limited. There is no mature financial market in China, so the residents can only deposit their money in banks with a very low interest rate and endure a high inflation rate. This has resulted in the huge gap between saving and investment in China. Although China's rapid economic growth is supported by the high national saving ratio, the growth rate of savings is far higher than that of investment on the whole.

At present, the rapid development of China's economy cannot be separated from the financial support brought by the high national saving ratio. Chinese enterprises have gained huge economic benefits through investment, and some companies tend to pay higher wages to the employees. Meanwhile, enterprises further invest their profits in expanded reproduction, and thus boost the growth of China's national saving ratio [14]. For Chinese private enterprise, due to the imperfect financial system, the information opacity and the weak anti-risk capability, the financing channels are very narrow; hence, the enterprises must reinvest the undistributed profits through their own accumulation, so as to promote the upgrade of the corporate industrial technology and equipment and drive scale production of the company. For residents, most of the middle class have accumulated a certain amount of savings through hard labor to prevent the possible instability of their future

[1] Website of China Statistics Bureau. – URL: http://www.gov.cn/xinwen/2020-01/17/content_5470113.htm

life. China's regional economic development is unbalanced, and a large number of migrant populations provide the labor needed by economic development, making the growth rate of China's economy much higher than that of wages. Through expanded reproduction, China's domestic aggregate supply is greater than its aggregate demand, and the excessive production capacity has to be exported through international trade to be resolved. Such economic development model will inevitably lead to increasingly severe Sino-US trade imbalance.

The US national saving ratio

In modern times, the US has seized the historic opportunity of electronic information technological change and applied advanced production technology to promote the upgrade of its domestic industrial structure and the perfection of its economic structure. Then the American economy as a whole began to change qualitatively, and the US domestic economy has undergone earth-shaking changes. The GDP of the US increased rapidly and the production efficiency has been constantly enhanced. Meanwhile, the inflation and unemployment rate have been controlled at a low level. Since the 1990s, under the excellent situation of the American economy, the gap between the US savings and investment has been enlarged year by year. To cope with this adverse situation, the US took advantage of the status of the US dollar, which is a global settlement currency and the major currency for foreign exchange reserves, as well as the mature American financial market to make up for the deficiency of domestic savings. After entering the 21st century, this trend has become more prominent. The American economic development and the improvement of scientific and technological level need the support of lots of funds, but the US national saving ratio has been decreasing, which can hardly meet the needs of the US economic development and domestic investment. Hence, the US needs continuous capital inflow from other countries to support its economic development.

According to the 2000–2018 data in the above figure 2, the national saving ratio of the US shows a decreasing tendency. In 2000, the US national saving ratio was 20,2%, and the figure dropped to 18,1% in 2018.

The US has developed financial market and the Americans have excessive consumption habit, the household consumption expenditure rises rapidly, but the income did not increase synchronously. From the perspective of the whole market, the commodities produced in the US domestic market cannot meet the domestic consumption needs; hence, without goods imported from the foreign market, the US must bear the high inflation rate. There is a complementary relationship between a country's saving ratio and its demand for foreign capital. With high saving ratio, the demand for foreign capital decreases; in the case of low saving ratio, the demand for foreign capital increases. China's domestic high saving ratio has led to the large supply of

foreign capital, while the low saving ratio in the US makes its demand for foreign capital increase continuously. A large amount of capital flows from China to the US, which generally needs to be balanced by the current account trade deficit.

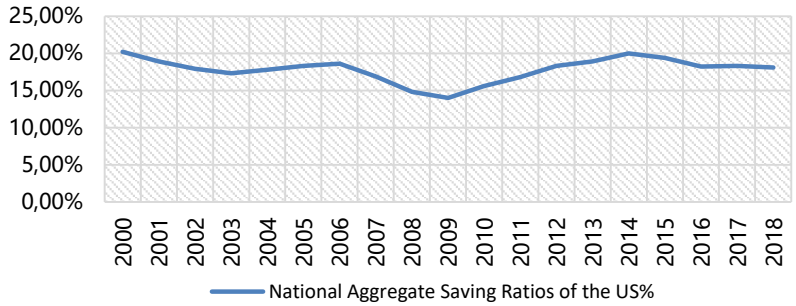

Figure 2. National Aggregate Saving Ratios of the US over the Years

In view of the actual situation of China and the US, with the increase in China's national saving ratio, China's domestic investment will increase, while export has been an effective way to boost China's economy and deal with excess production capacity, a majority of the domestic investment will flow to the field of export production, thereby promoting the growth of the entire export production and leading to the growth of China's trade surplus in Sino-US trade. Meanwhile, when the national savings increase to the extent that they cannot be consumed by investment, the essence of capital seeking profit will be fully demonstrated, and the excessive savings will cause capital account deficit in various forms. High national saving ratio can lead to reduced demand for imported goods. In addition, China already has excess production capacity, and a large number of Chinese products need to be digested by exports. For the US, because of its low national saving ratio and excessive consumption mode, the US has to import a large amount of goods and capital from other countries, and thus the US trade deficit in Sino-US trade continues to increase.

The long-term excessive domestic consumption demand in the US has led to the low national saving ratio, which is a key factor of the long-term sustaining trade deficit of the US to China in international trade. As the largest economic entity in the world, the US should assume the responsibility of maintaining the stability of the world economy, and gradually reduce the implementation of quantitative easing policy according to the economic development. In addition, it should maintain the stability of the dollar exchange rate, gradually increase the national saving ratio and restrain the excessive consumption behavior of the residents, thereby alleviating its trade deficit and maintaining the overall stability of international trade. The in-depth research of the US domestic economy shows that, because of the

developed security system and financial market in the US, a variety of financial products are flooding the American market, and the residents rarely convert their income into savings, instead, they invest in the financial market or use the money borrowed from the financial market for excessive consumption. The government has no force of constraint on such behaviors, and it cannot timely supervise and effectively control financial risk, as a result, the financial market has become an effective channel for American national consumption to get funds, and greatly encouraged American residents to use their future income for current consumption. Due to the American consumers' tendency of low savings and high consumption, the US needs to import a large number of consumables from China; moreover, the US domestic accumulation is unable to meet the demand of economic development, so in the face of trade imbalance, it has to obtain international capital inflow to support its economic development. The US treasury enjoys high reputation worldwide because of its stable income and low risk, and it is irreplaceable compared with other government bonds, hence, it is the main channel for other countries to obtain investment income from foreign exchange reserve. The international capital continues to flow into the US and becomes the core impulse for economic development.

Exchange rate factor

The nominal exchange rate can affect the real relative price of two countries by affecting the effective exchange rate, and thus ultimately affects the trade balance between two countries. A number of scholars in China and abroad have conducted numerous studies on whether China manipulates the nominal or effective exchange rate and gains trade surplus in this way, and the conclusions are highly inconsistent.

Historical changes of RMB exchange rate system

1949–1980 is a period of China's national economic rehabilitation and planned economy. The RMB exchange rate became basically stable at first, and then the system of pegging a basket of currencies was implemented.

In this stage, the Chinese government exerted relatively strict control over the exchange rate. Even the single floating exchange rate system implemented between 1949 and 1952 was strictly controlled by the central government. During this period, the RMB exchange rate had little fluctuation and basically remained stable, which is closely related to China's planned economic system and the then international environment.

From 1981 to 1993, China's economy was in a transition period, the RMB exchange rate adopted in this period was a dual exchange rate, that is, the official exchange rate and the market-regulated exchange rate coexisted, which is also known as double-track system.

The market-regulated exchange rate was limited to foreign exchange settlement in import and export trade, while the official exchange rate was mainly applicable to foreign exchange settlement under service accounts such as tourism, transportation and insurance and current transfer accounts. This is an exchange rate system arrangement for the transition period. The government's objective of exchange rate policy in this period was to promote exports and maintain balance of international payment. The development of the foreign exchange adjustment market based on the foreign exchange retention system has played a positive role in the exports of enterprises, the foreign exchange flow of foreign-funded enterprises and the monetary policy of the central bank. The exchange rate arrangement of the double-track system possesses the characteristics of planning and marketing, it is a product of the transition of China's economic system. In this period, the exchange rate system had the following advantages: on the one hand, it adapted to the characteristics of the original planned economic system, and the government could effectively control the foreign exchange; on the other hand, the capital market could be gradually opened and act on international convention. However, the RMB exchange rate simultaneously existed in two separated markets, which would inevitably lead to the instability of the exchange rate and provide an excellent living space for the black market of foreign currency. Broadly speaking, the arrangement of the double-track system adapted to the complex economic environment at that time and made positive contributions to the smooth transition of China's economic system reform.

China’s managed floating exchange rate system of dollar peg from 1994 to 2005. In 1994, the RMB exchange rate system underwent a significant change. The official exchange rate of RMB was integrated with the foreign exchange regulated price, and a simplex RMB exchange rate system based on the market mechanism was implemented. The previous practice of intervening exchange rate by administrative means was changed, the fluctuation in exchange rate was mainly based on market supply and demand, and the market mechanism was fully exerted to regulate the foreign exchange market. Since then, the RMB exchange rate has been basically stable for the following 10 years. The government's policy objective in this stage was to maintain the stability of the RMB exchange rate, so as to provide a relatively healthy and sustainable domestic and overseas development environment. Therefore, the International Monetary Fund divided the RMB exchange rate system in the period to from the original «managed floating system» to the «fixed pegging system to the US dollar» [16].

China’s implementation of basket-pegged managed floating system since 2005. With the continuous increase of the double surplus of China's current accounts and capital accounts, China's disequilibrium of balance of payments has aggravated, which has brought great appreciation pressure to

the RMB. To cope with the balance of international payment and adapt to the domestic and international environment under the new situation, the Chinese government further reformed the RMB exchange rate system in July 2005, and announced to abandon the single pegging to the US dollar and adopt the exchange rate policy of pegging a basket of currencies. Meanwhile, China would further expand the average daily floating range of the RMB, and endow the currencies of the major trading partner countries with corresponding weight based on market supply and demand and according to the relationship between China and its major trading partners. Furthermore, the RMB multilateral exchange rate index would be calculated by referring to a basket of currencies, and based on this; the RMB exchange rate would be managed and adjusted, so that the RMB exchange rate can float within a more reasonable range.

The change of exchange rate of RMB against US dollar

As shown in the Figure 3 above, since the Chinese government implemented the exchange rate system of pegging a basket of currencies in July 2005, the exchange rate of RMB against US dollar slowly rose from approximately 8.1917 to 6.6174 in 2018 and increased by about 19%, and the trade surplus of China to the US continued to increase.

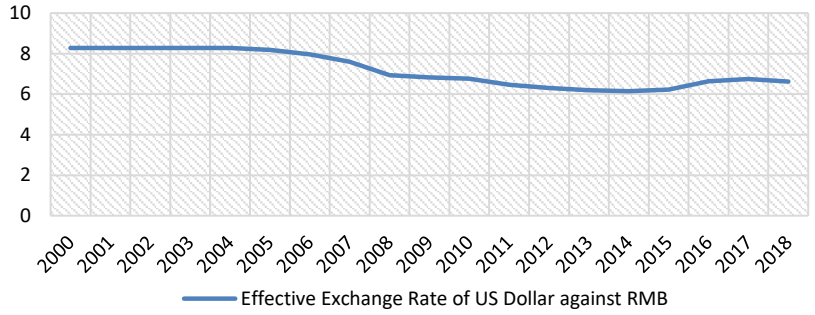

Figure 3. Effective Exchange Rate of US Dollar against RMB[1]

As shown in the Figure 3 above, since the Chinese government implemented the exchange rate system of pegging a basket of currencies in July 2005, the exchange rate of RMB against US dollar slowly rose from approximately 8, 1917 to 6,6174 in 2018 and increased by about 19%, and the trade surplus of China to the US continued to increase. The continuous depreciation of RMB did reverse the current situation of Sino-US trade imbalance, and the US still accumulates huge trade deficit every year. According to the data released by the National Bureau of Statistics of China, China's trade surplus to the US in 2005 was $114,17 billion, while the figure in

[1] China Statistical Yearbook. – URL: http://www.stats.gov.cn/tjsj/ndsj/

ββ2018 was $323,32 billion. Thus it can be seen that China's trade surplus to the US did not decrease with the appreciation of the RMB. On the contrary, after the reform of China's exchange rate, the RMB entered the appreciation stage, and the trade surplus of China to the US has been continuously enlarged.

A statistical analysis of the macroeconomic factors of Sino-US trade imbalance

Data selection

In this paper, the data of China's surplus volume to the US (denoted as SC), the effective exchange rate of RMB against US dollar (denoted as R) and the difference in the national saving ratio between China and the US(denoted as QC) in Sino-US trade from 2000 to 2018 were selected. The multiple linear regression models were used to obtain the relationship among SC, R and QC, and further empirically analyze whether the decrease of QC and the appreciation of RMB can reduce SC.

The data of SC and R were from China Statistical Yearbook (2000–2018); the data of the national saving ratios of China and the US were from the Federal Reserve Date Base, and the QC was calculated indirectly (Table 1).

Table 1

The Data of SC, R and QC

YEAR	SC	R	QC	The US QC	China's QC	LNSC	LNR	LNQC
2000	297,3	8,2784	18,28	20,2	38,50	5,694742	2,11365	2,905534
2001	280,8	8,277	19,49	18,9	38,39	5,637659	2,113481	2,969902
2002	427,2	8,277	21,58	17,9	39,43	6,057263	2,113481	3,071767
2003	586,1	8,277	25,26	17.3	42,51	6,373539	2,113481	3,229222
2004	802,7	8,2768	27,51	17,8	45,26	6,68797	2,113456	3,31455
2005	1 141,7	8,1917	28,13	18,3	46,38	7,040302	2,103121	3,336837
2006	1 442,6	7,9718	29,57	18,6	48,14	7,274226	2,07591	3,386591
2007	1 633,3	7,604	32,94	16,9	49,86	7,398329	2,028674	3,494536
2008	1 708,6	6,9451	35,96	14,8	50,78	7,443412	1,938036	3,582268
2009	1 433,7	6,831	36,63	14,0	50,63	7,268031	1,921471	3,600868
2010	1 812,7	6,7695	36,24	15,6	51,79	7,502551	1,912427	3,590163
2011	2 023,4	6,4588	33,03	16,8	49,80	7,612528	1,865444	3,497265
2012	2 189,1	6,3125	31,42	18,3	49,69	7,691245	1,842532	3,447285
2013	2 158,5	6,1932	29,87	18,9	48,79	7,677175	1,823452	3,396687
2014	2 370,5	6,1428	29,46	20,0	49,41	7,77084	1,815281	3,383033
2015	2 608,0	6,2284	28,35	19,4	47,70	7,866345	1,829119	3,344627
2016	2 506,8	6,6423	27,73	18,2	45,88	7,826772	1,893458	3,322515
2017	2 758,1	6,7518	27,88	18,3	4,.20	7,922303	1,909809	3,32773
2018	3 233,3	6,6174	27,17	18,1	45,29	8,081249	1,889703	3,301929

Analysis indexes

In Sino-US trade, China's surplus volume to the US is denoted as SC, the effective exchange rate of RMB against US dollar is denoted as R, and the difference in the national saving ratio between China and the US is denoted as QC.

Modeling

To eliminate the possible influence of heteroscedasticity, the natural logarithms of the above variables were calculated to respectively get LNSC, LNR and LNQC. Based on this, the influence factor model of Sino-US trade imbalance obtained is as follows :

$$LNSC = \beta_0 + \beta_1 LNR + \beta_2 LNQC,$$

Where β_0 is a constant term, β_1 is the influence coefficient of the exchange rate on China's surplus to the US, β_2 is the influence coefficient of the difference in the national saving ratio between China and the US on China's surplus to the US, and ε is the residual term. Next, this paper will use the 2000–2018 sample data of various variables to analyze the influence of exchange rate and the difference in the national saving ratio between China and the US on China's surplus to the US.

Descriptive statistics

Descriptive statistical analyses are conducted on China's surplus to the US, the exchange rate and the difference in the national saving ratio between China and the US from 2000 and 2018, and the trend charts are drawn respectively (Table 2, Figure 4-6).

Table 2

Descriptive statistics

	N	Mean	Maximum	Minimum	Std. Dev.
SC	19	1 653,39	3233,27	280,80	882,60
R	19	7,21	8,28	6,14	0,86
QC	19	28,76	36,63	18,28	5,17

According to the above statistical table and trend charts, the trade surplus of China to the US from 2000 to 2018 was continuously enlarged, and the fluctuation was large, from $29,73 billion in 2000 to $32,33 billion in 2018; the effective exchange rate roughly presented a downtrend, the RMB appreciated to some extent, and the RMB appreciation level reached the peak in 2014.

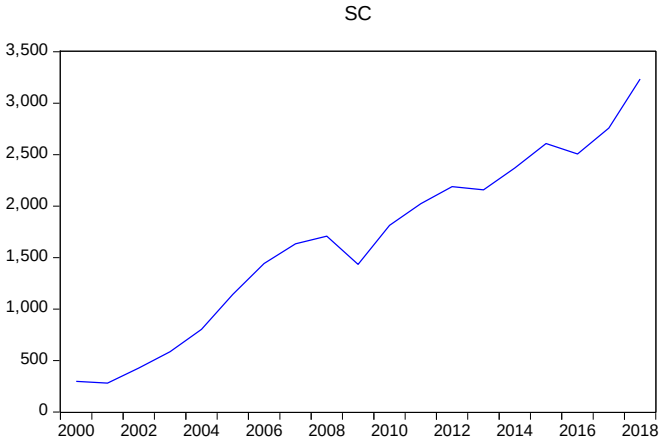

Figure 4. The Trend of SC

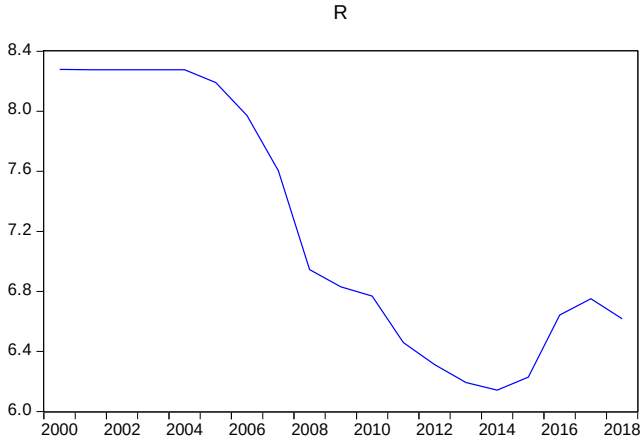

Figure 5. The Trend of Exchange Rate

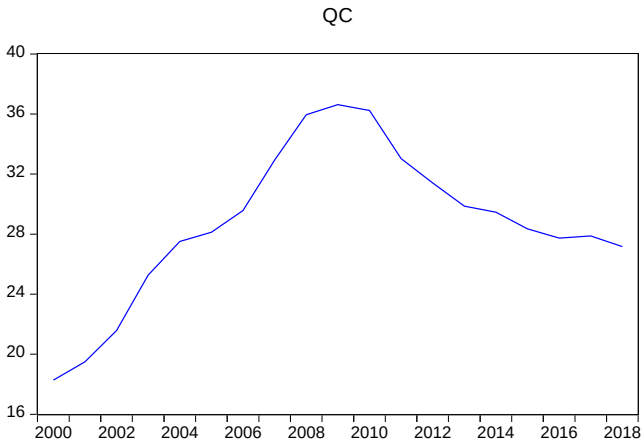

Figure 6. The Trend of QC

Besides, the difference in the national saving ratio between China and the US also presented an inverted V-shaped feature over time; it showed a continuously increasing trend from 2000 to 2009 and then gradually decreased from 2010 to 2018.

Stationary test

Since the data used in this paper was time series data, to avoid spurious regression, the stability of each variable needs to be judged at first. By using EVIEWS and the commonly used ADF unit root test, the stability of LNSC, LNR and LNQC was tested (Table 3).

Table 3

Stationary Test Results of Variables

Variables	ADF Statistics	P Value	1% Critical Value	5% Critical Value	10% Critical Value	Conclusion
LNSC	–1,353342	0,8392	–4,571559	–3,690814	–3,286909	Non-stationary
LNR	–0,534767	0,9706	–4,571559	–3,690814	–3,286909	Non-stationary
LNQC	–1,940899	0,5874	–4,667883	–3,733200	–3,310349	Non-stationary
ΔLNSC	–1,974949	0,2935	–3,920350	–3,065585	–2,673459	Non-stationary
ΔLNR	–2,257401	0,1953	–3,886751	–3,052169	–2,666593	Non-stationary
ΔLNQC	–1,407711	0,5538	–3,886751	–3,052169	–2,666593	Non-stationary
ΔΔLNSC	–7,040349	0,0000	–2,717511	–1,964418	–1,605603	Stationary
ΔΔLNR	–4,134039	0,0004	–2,717511	–1,964418	–1,605603	Stationary
ΔΔLNQC	–3,699487	0,0011	–2,717511	–1,964418	–1,605603	Stationary

The analysis of the above test results shows that, suppose LNSC has a unit root, the P value of the test is 0,8392 and greater than 0,05, so the null hypothesis accepted. This indicates that LNSC has a unit root and is non-stationary; similarly, LNR and LNQC also have a unit root and are non-stationary. Then their first difference sequences ΔLNSC, ΔLNR and ΔLNQC are tested and the results show that the corresponding P values are still greater than 0.05, so the three first difference sequences are non-stationary. The results of their second difference sequences ΔLNSC, ΔLNR and ΔLNQC show that, the corresponding P values are lower than 0,05, so the hypothesis that the second difference sequences have no unit root in the confidence level of 5% can be rejected. This suggests that all the above second difference sequences have no unit root and are stationary.

Because LNSC, LNR, LNQC and their first difference sequences are all non-stationary, while their second difference sequences are stationary, the three variables are all second-order single integrated time series and belong to the case of single integration in the same order. Next, the co-integration test is conducted.

Co-integration test

The co-integration test on LNSC, LNR and LNQC is carried out by using EG two-step method. The idea is to first carry out regression analysis on the model, and then conduct ADF unit root test on the regression residual. If the residual is stationary, then there is a co-integration relationship between the variables, and the estimated results of the model are reliable.

Firstly, by using the EVIEWS software and the least square method, a regression analysis of the model is conducted, and the estimated results (Table 4).

Table 4

Estimated Results of Model Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNR	–3,944094	0,863097	–4.569700	0,0003
LNQC	1,525821	0,527994	2,889842	0,0107
C	9,868632	3,075472	3,208819	0,0055
R-squared	0,805707			
Adjusted R-squared	0,781421			
F-statistic	33,17498			
Probe(F-statistic)	0,000002			

It can be observed from the above table that the R-square estimated by the model is 0.805707, and the goodness of fit is relatively high; the corresponding P-value of F statistic is 0.000002 and less than 0.05, indicating that the linear relationship between LNSC and LNR and LNQC is significant. Therefore, the regression results of the model are ideal.

Then ADF unit root test is conducted on the residual obtained above (Table 5).

Table 5

Stationary Test Results of the Residual

Variables	ADF statistic	P value	1% Critical Value	5% Critical Value	10% Critical Value	Conclusion
Residual	–2,711161	0,0099	–2,708094	–1,962813	–1,606129	Stationary

It can be seen that the P value is 0.0099 and less than 0.05, so the null hypothesis can be rejected at the confidence level of 5%. This indicates that the

residual has no unit root and is stationary. Therefore, there is a long-term co-integration relationship between LNSC and LNR and LNQC, and the development trend is stable. The relation equation between the variables is obtained as below

$$LNSC = 9{,}868632 - 3{,}944094 \cdot LNR + 1{,}525821 \cdot LNQC.$$

The regression results show that, the P values of the significance test on the estimated coefficients of LNR and LNQC are 0,0003 and 0,0107, respectively, and less than 0.05, so the estimated coefficients passed the significance test. Hence, the exchange rate and the difference in the national saving ratio between China and the US have a significant impact on the trade surplus of China to the US. The exchange rate exerts a negative impact on the trade surplus, and the difference in the national saving ratio between China and the US exerts a positive impact on the trade surplus.

Analysis of results

According to the analysis of the above results, there is a long-term co-integration relationship between the trade surplus of China to the US and the exchange rate and the difference in the national saving ratio between China and the US, with a stable development trend. Specifically, the effective exchange rate of RMB against US dollar exerts a significantly negative impact on the trade surplus of China to the US. This shows that the trade surplus did not decline with the relative appreciation of RMB, and the scale of Sino-US trade imbalance is quickly expanding. The difference in the national saving ratio between China and the US exerts a significantly positive impact on the trade surplus of China to the US, that is, the greater the difference in the national saving ratio is, and the larger the trade surplus will be.

Conclusion

In conclusion, the difference in saving ratio between China and the US is an important cause for the sustainable increase of China's trade surplus to the US in the international trade. China's national saving ratio is excessively high, with a large amount of saving gluts. Meanwhile, China has accumulated huge trade surplus through the Sino-US trade. Since there is no more secure investment channel in the world, Chinese people can only convert the huge trade surplus into US dollar assets dominated by the US treasuries, which provides a large amount of capital to support the economic development of the US. In addition, the high consumption of the US can increase imports, while the high savings of China can increase exports, thereby resulting in the long-term Sino-US trade imbalance as well as the gradually enlarged trade gap between the two countries.

The RMB exchange rate is one of the influencing factors of Sino-US trade imbalance, but it is not the fundamental one. The restriction on RMB

appreciation by political means within a short time only exerted an impact on the import and export trade in the short run, but did not change the base for the Sino-US trade. Based on the economic strength of the two countries and the industrial division in different stages, the present Sino-US trade imbalance in international trade will not change fundamentally because of exchange rate fluctuation.

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