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Sino-US Trade Imbalance and Sino-US Economic Gap

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ABSTRACT: Since the Sino-US trade imbalance is regarded as the core content of the global economic imbalance, it has always been controversial and caused frequent bilateral trade disputes and frictions. Superficially it seems that China has gained tremendous trade benefits from China's huge surplus with the United States, which is also a significant cause for China's rapid economic growth. However, from the results of other scholars, it does not seem to be this. Actually, China is at a disadvantage in the distribution of trade benefits, which makes the economic gap between China and the United States widening. This paper aims to explain this phenomenon by judging the distribution of trade benefits from the overall impact of trade on a country's economy.

KEYWORDS: Sino-US trade, trade benefits, economic gap

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Introduction

Undoubtedly international trade plays an important role in a country's economic development. However, from the perspective of trade benefits distribution, international trade benefits should both be compared absolutely and relatively. For a country, internally speaking, international trade has an absolute promotion effect on the economy; and for both sides in the trade, even if trade has promotion effect on both sides, the promotion lies in varying degree. When it comes to benefits distribution, it is difficult for both trading parties to get the equal return in accordance with the production input due to various reasons. In addition to the economic factor itself, there are also political factor, cultural factor, factors of scientific and technological development, as well as other factors, which affect equitable distribution of trade benefits. Different degrees of influence can be exerted on the economic level in the two countries via multiplier effect and diffusing effect, which can widen, narrow or maintain the economic gap between the two countries.

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In 2018, China's trade surplus with the United States reached $633.52 billion, with a year-on-year increase of 8.5%, and the US trade deficit with China accounted for 47% of the aggregate US trade deficit (Phoenix Finance, 2018). Does China's huge surplus with the United States make China stand at an advantage in the distribution of Sino-US trade benefits? Does China's large surplus with the United States narrow the economic gap between China and the United States? This paper aims to study these issues.

Imbalance of Sino-US Trade Benefits Distribution

The issue of benefits distribution in international trade has always been the focus in international trade. From the perspective of trade effect, trade benefits include static trade benefits and dynamic benefits. Static trade benefits refer to the direct economic benefits obtained by both trading parties when the total amount of resources and technology remain unchanged. Dynamic trade benefits refer to the indirect positive influence on the economic and social development for both sides after the trade starts by means of international division of labor and exchange.

Heckscher preliminarily established an analytical framework for the impact of trade on factor prices. The trade benefits change the income of different factor owners through the change of factor prices, and non-trade participants can also attend the distribution of trade benefits through the change of factor prices (Heckscher, 1919). Lewis further expanded the sources of trade benefits. The trade benefits are not only limited to the fields of production and consumption, but should also contain value concepts and other aspects. Trade stimulates people's desire for more production or labor efficiency promotion by introducing new commodities to the society for demand stimulation (Lewis, 1955). Cai and Wang based on the specific analysis of Sino-US trade, both argued that on the condition of current huge Sino-US trade deficit, China's trade benefits are limited (Cai, 2006). Liu and Chen believed that under the circumstances of Sino-US trade imbalance, which benefit the most from Sino-US trade are the American corporate consumers (Liu, Chen, 2006). Lin and Duan analyzed the issue of Sino-US trade benefits distribution in the context of globalization from the subjects of the government, enterprise and individual, articulated that there was inflow of trade benefits for China behind US trade deficit which caused the unsustainability of China's economic development and

the sustainability of America's economic development, which fundamentally restricts the promotion of international competitiveness and prospect in future development for China. Thus, it is necessary to accelerate the transformation of China's foreign trade strategy to expand China's foreign trade benefits (Lin, Duan, 2008).

Kahn stated that, according to the report from Morgan Stanley, Sino-US trade saved nearly 100 billion US dollars for American consumers and created 4 million new jobs for the United States in 2004 alone (Kahn, 2007). A joint study was conducted by the Center for Strategic and International Studies and Institute for International Economics, Bergstern et al concluded that Sino-US trade increased nearly 70 billion US dollars wealth for the United States (Bergstern et al., 2006). Based on the Oxford Macroeconomic Forecasting Model, a report of Oxford Economics and the Signal Group showed that Sino-US trade could increase 0.7% in GDP for the United States and reduce 0.8% in the inflation rate by 2010 (Oxford Economics and the Signal Group, 2006). Despite China has gained a large surplus from its trade with the US in Sino-US trade, it turned out to be China's foreign exchange reserves and flowed into the capital market of the United States. Thus, Elwell believed that it was the inflow of Chinese capital that effectively reduced the long-term interest rate of the US and supported the economic development of the US (Elwell, 2007). Zhang and Dai argued that the United States not only occupies the high value-added links in the global value chain to monopolize the huge interests in the value chain, but also gains benefits through foreign direct investment. The trade gap between China and the United States cannot prove that the United States becomes the loser while China becomes the gainer (Zhang, Dai, 2019). Besides, in some literatures indexes such as export value added, value-added rate and factor added value have been adopted to measure the Sino-US trade benefits. For instance, Wang And Sheng, Zheng and Yu, Xiong and Fan and Zhao made a secondary decomposition of Sino-US trade benefits from the perspective of value added, and found that traditional trade statistics have caused a serious mismatch between Sino-US trade balance and trade benefits, and the distribution pattern of Sino-US trade benefits is developing in a direction unfavorable to China. (Wang, Sheng, 2014; Zheng Yu, 2016; Xiong, Fan, 2017; Zhao, 2018) Zheng and Yu believed that compared with increase value statistics, the

gross value statistics have overestimated the bilateral trade imbalance between China and the United States by about 25%, and the distribution of trade benefits is increasingly unfavorable to China (Zheng, Yu, 2016).

Wang combined the development of productivity, the change of labor value and the comparative benefits of trade and established the theoretical framework of dynamic comparative cost based on the theory of labor value. He deemed that when developing countries take advantage of their comparative advantages to participate in the division of international trade, they must bear the trade national value loss (Wang, 1995). By adopting the traditional surplus index, trade price index and trade value added index, Zeng and Zhang defined the trade gains of China's major manufacturing sectors against the United States and found that the main technical factors leading to trade disputes are different methods for calculating trade benefits. More significantly, the value added in China's manufacturing sector's trade with the US has been increasing year by year, but the proportion of trade value added has not substantially improved (Zeng, Zhang, 2018). Based on the theory of intra-product division of labor, Liu and Yang constructed a theoretical model for the distribution of bilateral trade benefits and made an empirical analysis of the trade benefits in major manufacturing sectors in China and the United States. The findings show that the benefits distribution is opposite to the direction of trade balance behind the Sino-US trade imbalance, and there is a huge profit for the United State and a meager profit for China (Liu, Yang, 2011).

Samuelson adopted the traditional free trade model and analyzed the distribution of Sino-US trade benefits. He believed that under the premise of demand inelasticity, China's technological innovation would not only lead to deterioration of trade conditions and GDP deduction, but also shake the leading economic status of the United States, resulting in that the United States could not profit from China's expanded product export (Samuelson, 2014).

Above all, trade benefits are the core issue of foreign trade, and economists have long focused on it and made the corresponding studies. Subject to the characteristics in era and their own interests of tendency, the conclusions reached also are different. Hence, constructing a model that can reflect the Sino-US trade and Sino-US economic gap to measure the Sino-US trade benefits is of great significance in figuring out and further alleviating the Sino-US imbalance and trade frictions between China and the United States.

Co-integration Test of General Exports of China and Economic Gap between China and the US

Model description

The commonly used method to study benefit distribution is terms of trade, that is, to judge the distribution of profits through the price of import and export commodities and factor prices. This paper attempts to judge the distribution of trade benefits from a new perspective, that is, to investigate the results of benefit distribution from the general impact of benefit distribution on a country's economy and on the macro level. The logic of this paper is as follows: if the benefit distribution of Sino-US trade is unbalanced, then the trade will definitely exert different degrees of impacts on the economic development of the two countries, namely, the advantageous party in the distribution will benefit more and thus the trade will promote its economy more than the disadvantageous party. In short, if the benefit distribution is uneven, the trade expansion and economic gap will be inevitable, the former is the cause, and the latter is the result. The other way round, if trade expansion and economic gap occur, then unbalanced distribution of trade benefits, the only reason, exists.

The specific empirical analysis is to test the correlation between China's exports to the US and the Sino-US economic gap. If the regression coefficients of China's exports and the Sino-US economic gap are positive, then China's exports have widened the Sino-US economic gap, and the distribution of trade benefits is adverse to China, and vice versa. In this paper, considering that the export commodities contain domestic elements and resources, and the imported commodities contain foreign elements and resources, China's exports to the US are used to replace China's total import-export volume to the US. Such replacement can endow the analysis with more representativeness and practical significance. At the same time, because the econometric method used in this paper is co-integration, and the co-integration relationship between two variables does not affect the co-integration relationship between other variables and the two variables, the above replacement is reasonable in measurement theory.

In addition, the calculating equation of national income by expenditure approach, GDP=C+I+G+(NX), shows that in addition to trade, the factors affecting a country's economic development include consumption,

investment and government purchase. The difference between the GDP of China and the US is:

$$GDPB = GDP_A - GDP_C = (C_A - C_C) + (I_A - I_C) + (G_A - G_C) + (NX_A - NX_C)$$

To establish a regression model, the consumption, investment, government purchase and net export should be included in the model. However, this paper discusses the distribution of trade benefits, and the distribution result is embodied as the effect of exports on economic development. In addition, during the analysis period from 1983 to 2019, the trade structures of China and the US did not change greatly, indicating that the consumption, investment and government purchases of China and the US have not exerted enough impacts on the trade structure. Hence, when establishing the model, it is assumed that consumption, investment and government purchases are unchanged, and only the relationship between exports and economic gap is discussed.

Based on the above explanation, this paper intends to establish the following model to test the relationship between China's exports to the US and the Sino-US economic gap:

$$GDPB = c + \alpha \times EX \quad (0.1)$$

Where GDPB represents the Sino-US economic gap, which is defined as the total GDP of the US subtracting the total GDP of China, EX represents China's exports to the US, and c is a constant term. The regression parameters are estimated with EX as the explanatory variable. If the coefficient α of China's exports to the US is significantly positive, then the exports have widened the Sino-US economic gap (because GDPB=US GDP-China's GDP); if the coefficient of exports is significantly negative, then the exports have narrowed the Sino-US economic gap.

Econometric test

Because general economic indicators have a certain trend, if they are directly regressed, they can basically show a certain correlation. Therefore, to confirm the long-term equilibrium relationship between $GDPB_t$ and EX_t, it is necessary to conduct co-integration test on them. The economic significance of co-integration test lies in that although two variables have their respective long-term fluctuation law, as long as they are co-integrated, there is a long-term stationary proportional relationship between them. This is because if two sequences can be linearly combined into a new and stationary sequence, then there is a certain long-term stationary relationship between the two sequences, and the residual term produced by regression

analysis of the two sequences can be regarded as the linear combination of the two sequences. In this way, it is only required to prove that the residual term is integrated, and the integration order is smaller than that of the original sequences. In this paper, E-G two-step method is used to conduct the co-integration test.

Data source

Table 1 **The Difference of GDP between China and the US and China's Exports to the US**

Unit: US$100 million

Year	The US GDP	China's GDP	GDPB	China's exports EX
1983	36300	2307	33993	17.10
1984	40400	2599	37801	23.00
1985	43400	3095	40305	26.50
1986	45800	3008	42792	24.70
1987	48600	2730	45870	29.60
1988	52400	3124	49276	33.80
1989	56400	3478	52922	43.90
1990	59600	3609	55991	51.90
1991	66100	3834	62266	61.90
1992	65200	4269	60931	85.04
1993	68600	4447	64153	169.64
1994	72900	5643	67257	214.61
1995	76400	7345	69055	247.29
1996	80700	8637	72063	267.08
1997	85800	9616	76184	327.18
1998	90600	10300	80300	379.65
1999	96300	10900	85400	420.18
2000	102500	12100	90400	521.42
2001	105800	13400	92400	543.19
2002	109400	14700	94700	699.59
2003	114600	16600	98000	925.10
2004	122100	19600	102500	1249.73
2005	130400	22900	107500	1629.39
2006	138100	27500	110600	2035.16
2007	144500	35500	109000	2327.61
2008	147100	45900	101200	2523.27
2009	144500	51000	93500	2209.05
2010	149900	60900	89000	2833.75

Year	The US GDP	China's GDP	GDPB	China's exports EX
2011	155400	75500	79900	3245.65
2012	162000	85300	76700	3520.00
2013	167800	95700	72100	3684.81
2014	175200	104800	70400	3961.47
2015	182200	110600	71600	4101.45
2016	187100	112300	74800	3891.13
2017	194900	123100	71800	4331.46
2018	205300	138900	66400	4798.12
2019	213700	143400	70300	4179.36

Data sources: Website of China Statistics Bureau, Wind-Economic Database

In the table above, the second and third columns respectively represent the GDP of the two countries, the fourth column GDPB represents the difference between the GDP of the US and China, and the fifth column EX represents China's exports to the US. Eviews8.0 is used in this paper for econometric analysis.

Integration test

Firstly, integration test is conducted on GDPBt. The appropriate model for ADF test is:

$$\Delta^3 GDPB_t = -1.271207 \times \Delta^2 GDPB_{t-1} \quad (0.2)$$
$$(-6.656506)$$

Dependent Variable: D(GDPB,3)
Method: Least Squares
Date: 04/11/21 Time: 22:53
Sample (adjusted): 1986 2019
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPB(-1),2)	-1.271207	0.190972	-6.656506	0.0000

R-squared	0.571500	Mean dependent var	311.8474
Adjusted R-squared	0.571500	S.D. dependent var	5103.590
S.E. of regression	3340.806	Akaike info criterion	19.09478
Sum squared resid	3.68E+08	Schwarz criterion	19.13968
Log likelihood	-323.6113	Hannan-Quinn criter.	19.11009
Durbin-Watson stat	1.884687		

In the bracket is the t-test value. t=-6.656506<-1.95100 (critical value at 5%), the ADF test value is smaller than the critical value, and the hypothesis that there is unit root in the sequence is rejected. Therefore, the sequence GDPB is stationary after two differences, and it is second-order integrated.

The model for ADF test on EX_t is as follows:

$$\Delta^3 EX_t = -1.422411 \times \Delta^2 EX_{t-1} \quad (0.3)$$
$$(-6.783775)$$

Dependent Variable: D(EX,3)
Method: Least Squares
Date: 04/11/21 Time: 22:53
Sample (adjusted): 1986 2019
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EX(-1),2)	-1.422411	0.209678	-6.783775	0.0000

R-squared	0.580155	Mean dependent var	-31.85326
Adjusted R-squared	0.580155	S.D. dependent var	442.7736
S.E. of regression	286.8970	Akaike info criterion	14.18509
Sum squared resid	2716227.	Schwarz criterion	14.22999
Log likelihood	-240.1466	Hannan-Quinn criter.	14.20040
Durbin-Watson stat	1.943289		

In the bracket is the t-test value. t=-6.783775<-1.95100 (critical value at 5%), the ADF test value is smaller than the critical value, and the hypothesis that the sequence has unit root is rejected. Hence, the sequence EX is also second-order integrated.

As the two sequences are second-order integrated and meet the conditions of same order integration, the co-integration test can be done on the two sequences.

Co-integration test

Firstly, the regression models of $GDPB_t$ and EX_t are established:

$$GDPB_t = 67931.77 + 4.060189 \times EX_t \quad (0.4)$$
$$(15.57747)\ (2.048007)$$

R^2 =0.101818 D.W. =0.052469 F=3.967612

Dependent Variable: GDPB
Method: Least Squares
Date: 11/03/20 Time: 23:11
Sample: 1983 2019
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EX	4.060189	1.982507	2.048007	0.0481
C	67931.77	4360.900	15.57747	0.0000

R-squared	0.101818	Mean dependent var	74036.74
Adjusted R-squared	0.076156	S.D. dependent var	20711.21
S.E. of regression	19906.95	Akaike info criterion	22.68806
Sum squared resid	1.39E+10	Schwarz criterion	22.77514
Log likelihood	-417.7292	Hannan-Quinn criter.	22.71876
F-statistic	3.967612	Durbin-Watson stat	0.052469
Prob(F-statistic)	0.054231		

Residual term E=GDPB-67931.77-4.060189EX

Test the residuals
Null Hypothesis: E has a unit root
Exogenous: None
Lag Length: 1 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.805351	0.0679
Test critical values:	1% level	-2.632688	
	5% level	-1.950687	
	10% level	-1.611059	

*MacKinnon (1996) one-sided p-values.

Secondly, stationary test is conducted on the regression residual term. The test value t=-1.805351<-1.611059(critical value at 10%), indicating that $GDPB_t$ and EX_t are (2, 2) co-integrated.

In the above model, t-test value is in the bracket. The t-test value, F-test value and coefficient of determination show that, the fitting degree of the model is general. At the same time, the DW value suggests that the residual term in the model has strong auto-correlation, so appropriate lag

term can be added to eliminate the auto-correlation. The distributed lag models $GDPB_t$ of EX_t are as follows:

$$GDPB_t=3149.659-4.556012\times EX_t+4.187052\times EX_{t-1}+1.516470\times GDPB_{t-1}-0.538202\times GDPB_{t-2}\ (0.5)$$
$$(1.629745)\ (-2.082037)\ (1.880320)\ (9.960671)\ (-3.570797)$$
$$\bar{R}^2=0.976514\ \text{D.W.}=1.975344\ \text{F}=354.4142$$

Dependent Variable: GDPB
Method: Least Squares
Date: 11/03/20 Time: 23:11
Sample (adjusted): 1985 2019
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3149.659	1932.609	1.629745	0.1136
EX	-4.556012	2.188247	-2.082037	0.0460
EX(-1)	4.187052	2.226777	1.880320	0.0698
GDPB(-1)	1.516470	0.152246	9.960671	0.0000
GDPB(-2)	-0.538202	0.150723	-3.570797	0.0012

R-squared	0.979277	Mean dependent var	76216.16
Adjusted R-squared	0.976514	S.D. dependent var	19066.10
S.E. of regression	2921.921	Akaike info criterion	18.92943
Sum squared resid	2.56E+08	Schwarz criterion	19.15163
Log likelihood	-326.2651	Hannan-Quinn criter.	19.00613
F-statistic	354.4142	Durbin-Watson stat	1.975344
Prob(F-statistic)	0.000000		

Here, DW approaches 2 and the auto-correlation are eliminated. ADF test is carried out on the residual term e_t.

$$\Delta e_t=-1.028180\times\Delta e_{t-1}(0.6)$$
$$(-5.754769)$$

Null Hypothesis: E has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.754769	0.0000
Test critical values:	1% level	-2.634731	

	5% level	-1.951000
	10% level	-1.610907

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(E)
Method: Least Squares
Date: 11/03/20 Time: 23:03
Sample (adjusted): 1986 2019
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
E(-1)	-1.028180	0.178666	-5.754769	0.0000

R-squared	0.499876	Mean dependent var	173.5054
Adjusted R-squared	0.499876	S.D. dependent var	3911.594
S.E. of regression	2766.258	Akaike info criterion	18.71735
Sum squared resid	2.53E+08	Schwarz criterion	18.76224
Log likelihood	-317.1949	Hannan-Quinn criter.	18.73266
Durbin-Watson stat	1.942253		

The test value t=-5.754769<-1.95100 (critical value at 5%), the residual term has no unit root under the significance level of 5%, and it is stationary. Equation (0.5) presents their long-term stationary equilibrium relationship. The long-term variable proportion of EX_t and $GDPB_t$ is: -4.556012+4.187052）/（1-1.516470）=0.7144.

The parameter estimation of the above regression model and co-integration test results show that China's exports to the US have indeed widened the Sino-US economic gap. Every 1 unit increase of exports can lead to 0.7144 units' expansion of economic gap.

Conclusion

By discussing the distribution of Sino-US trade benefits, the paper has reached the conclusion that trade can widen the economic gap between China and the United States. What China needs to pay attention to is how to get its own competitive advantages in international economic relations, seek advantages and avoid disadvantages, so as to obtain long-term development and refine on China's prosperity. China's absolute economic

power is undergoing rapid progress, even with the uneven distribution of trade benefits.

In the era of global value chain specialization, free and open trade environment conforms to the common interests of China and the United States and the world in a better way. Regarded as two major economies, Sino-US trade benefits are closely linked and complementary, efforts should be made to solve the problems in the trade via negotiation by the two countries, so as to maintain the international environment conducive to trade benefits growth for all the parties, promote the development of bilateral and multilateral trade benefits, and make due contribution to the prosperity and development of international trade.

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