ISSN 2616-5902 Vol. 3, Issue 8: 34-38, DOI: 10.25236/AJBM.2021.030807

Research on the influence of US QE policy on Sino-US trade

Xin Weng[1], Xianhui Meng[2]

[1]School of International Trade and Economics, University of International Business and Economics, Beijing, 100000, China
[2]School of Business Administration, Northeastem University, Shenyang, Liaoning, 110167, China

Abstract: *This article selects the major international commodity price index, the RMB against the dollar, foreign direct investment in China, the broad money supply of US, China's exports to the US and China's imports from the US of monthly data from January 2020 to June 2021, using multiple linear regression model to study how the quantitative easing monetary policy of US impact on Sino-US trade during the outbreak of the COVID-19. The empirical results show that international commodity price index has a negative correlation with China's exports to the US and imports from US, the RMB against the dollar has a negative impact to China's imports from US, the broad money supply of US has a significant positive impact on both China's export to US and import from US and FDI has a positive impact to China's imports from US to some extent.*

Keywords*: Sino-US trade, monetary policy, Quantitative easing*

1. Introduction and literature review

In 2020, the sudden outbreak of the COVID-19 brought great shocks to the global economy. The three major stock indexes of the United States suffered an unprecedented four circuit breakers in March 2020. In order to stabilize market sentiment, the US quickly launched the quantitative easing policy. As the world's two largest economies and most important trading partners, the change of monetary policy in the US is bound to have an impact on CHINA through a variety of channels. This paper uses multiple linear regression to build export and import models to analyze the impact of QE policy of the US on Sino-US trade.

The influence of US QE policy on Chinese economy has been widely studied in academic circles. Liu Lanfen and Han Liyan (2014) [1] study the spillover effects of QE policy of many countries on China and find that the spillover channels of capital flow of QE monetary policies are obvious. Li Zilei and Zhang Yun (2013) [2] study the relative importance of the transmission path and find that the commodity trade channel is an important transmission channel. Bai Yueming (2015) [3] thinks the unconditional monetary policy of the US has a significant spillover effect on China's economy through exchange rate channel. Liu Xiaolan and Lai Mingyong(2014)[4] find that the QE policy mainly influences Chinese export through The RMB exchange rate channel, the international commodity price index channel and the US output channel.

Based on existing literature, this paper analyzes the impact of quantitive easing policy on Sino-US trade from four channels: major international commodity price, international capital flow, exchange rate and local US economy.

2. Sample data and variable analysis

2.1 Data source and variable description

Based on the premise that the US implemented QE policy in the context of COVID-19, this paper studies the spillover effects of QE policy on Sino-US trade through international commodity price channels, exchange rate channels, international capital flow channels and domestic economic channels of the US, using monthly data from January 2020 to June 2021.

Concrete variables are shown in the table 1. CRB and FDI comes from WIND database, E comes from China Customs database, M2 comes from the Federal Reserve Website and EX and IM come from

ISSN 2616-5902 Vol. 3, Issue 8: 34-38, DOI: 10.25236/AJBM.2021.030807

the Statistic and Analysis Department of the People's Bank of China.

Table 1: Symbols and Explanation of Different Variables

Symbol	Explanation
CRB	Commodity Research Bureau, stands for the major international commodity price
E	Exchange rate of RMB against US dollar, stands for exchange rate channel
FDI	Foreign direct investment to China, stands for the international capital flow channel (billions of dollars)
M2	Us broad money supply, stands for local US economy channel (billions of dollars)
EX	Exports from China to US (billions of dollars)
IM	Imports from China to US (billions of dollars)

2.2 Stationarity test

According to the metrological knowledge, checking the stationarity of data is an important step before establishing the model. This paper uses ADF unit root test method to check the stationarity of variables in order to avoid spurious regression. Table 2 shows the result of ADF unit root test.

Table 2: ADF Unit Root Test Result of All Variables

Variable	(C,T,L)	t	1% level test critical values	5% level test critical values	10% level test critical values	Prob	stationarity
CRB	(0,0,1)	0.879919	-2.610192	-1.947248	-1.612797	0.896	nonstationarity
E	(0,0,1)	-0.497278	-2.610192	-1.947248	-1.612797	0.496	nonstationarity
EX	(0,0,0)	-0.234251	-2.609324	-1.947119	-1.612867	0.5972	nonstationarity
FDI	(0,0,7)	1.129116	-2.616203	-1.94814	-1.61232	0.9307	nonstationarity
IM	(0,0,1)	-0.045514	-2.610192	-1.947248	-1.612797	0.663	nonstationarity
M2	(0,0,2)	2.689639	-2.611094	-1.947381	-1.612725	0.9979	nonstationarity

The table 2 illustrates that explanatory variables and explained variables of this paper are not stationary. They all have unit root on 1%, 5%, 10% significance level. In order to ensure the smooth of measurement and accuracy of model, we take first difference on all variables and do ADF unit root test again. The result is showed in table 3.

Table 3: ADF Unit Root Test Result of All Variables after First Difference

Variable	(C,T,L)	t	1% level test critical values	5% level test critical values	10% level test critical values	Prob	stationarity
D(CRB)	(0,0,0)	-4.0437	-2.610192	-1.947248	-1.612797	0.0001	stationarity
D(E)	(0,0,0)	-4.1184	-2.610192	-1.947248	-1.612797	0.0001	stationarity
D(EX)	(0,0,0)	-8.7957	-2.610192	-1.947248	-1.612797	0	stationarity
D(FDI)	(0,0,10)	-3.5783	-2.621185	-1.948886	-1.611932	0.0007	stationarity
D(IM)	(0,0,0)	-11.6689	-2.610192	-1.947248	-1.612797	0	stationarity
D(M2)	(0,0,2)	-2.0864	-2.612033	-1.947520	-1.612650	0.0366	stationarity

It is evidence to see that all variables have been stationary after first difference. So then we can conduct the Granger Causality test of Export and Import model respectively to verify the causal relationship between explanatory variables and Export and Import.

2.3 Stationarity test

As the result of Export model shown in table, granger causality test rejects the null hypothesis that Us broad money supply (M2) is not the granger causality of Exports from China to US(EX) at 5% confidence level. But it accepts that the null hypothesis that Commodity Research Bureau(CRB), RMB/DOLLAR Exchange Rate(E) and Foreign Direct Investment to China(FDI) are not granger causality of Exports from China.

Table displays the Granger Causality test result of Import model. We can see that there is a bidirectional granger causality between Import and Exchange Rate at a 10% confidence level, which means they influence each other and are closely connected. And Us broad money supply (M2) does Granger Cause Import at a 5% confidence level. But the result accepts that the CRB and FDI are not granger causality of Imports from the US (IM).

ISSN 2616-5902 Vol. 3, Issue 8: 34-38, DOI: 10.25236/AJBM.2021.030807

Table 4: Granger Causalities betwween China's Exports to the US and Other Variables

Null Hypothesis	F-Statistic	Prob.
EX does not Granger Cause E	12.0879	0.0034
E does not Granger Cause EX	0.02079	0.8873
EX does not Granger Cause CRB	15.0879	0.0015
CRB does not Granger Cause EX	0.04454	0.8357
EX does not Granger Cause FDI	5.21202	0.0374
FDI does not Granger Cause EX	0.09992	0.7563
EX does not Granger Cause M2	4.40779	0.0531
M2 does not Granger Cause EX	5.71429	0.0304

Table 5: Granger Causalities betwween China's Imports from the US and Other Variables

Null Hypothesis	F-Statistic	Prob.
IM does not Granger Cause E	3.75729	0.0716
E does not Granger Cause IM	5.38476	0.0348
IM does not Granger Cause CRB	10.0422	0.0064
CRB does not Granger Cause IM	0.62217	0.4425
IM does not Granger Cause FDI	3.98565	0.0644
FDI does not Granger Cause IM	0.19204	0.6675
IM does not Granger Cause M2	0.11569	0.7385
M2 does not Granger Cause EX	5.71429	0.0304

3. Empirical analysis

3.1 Export model

We establish the export model and use EVIEWS to conduct regression analysis. The model is as followed:

$$\mathrm{EXPORT} = \mathrm{C} + \alpha\mathrm{CRB} + \beta\mathrm{E} + \lambda\mathrm{FDI} + \gamma\mathrm{M2}$$

C is the constant term in this equation. α, β, λ, γ are coefficients. CRB, E, FDI and M2 stand for Commodity Research Bureau, exchange rate of RMB against dollar, Us broad money supply and foreign direct investment to China. The result of multiple regression is in the table 6.

Table 6: Results of multiple regression analysis on the impact of variables on China's export to the US

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56365505	128000000	0.441863	0.6658
CRB	-115194.6	53885.49	-2.137767	0.0521
E	-12775519	14531286	-0.879173	0.3953
FDI	45383.16	62778.64	0.722908	0.4825
M2	6131.136	1558.727	3.933425	0.0017

(1) From the table we can get the complete export model:

$$\mathrm{EXPORT} = 56365505 - 115195\mathrm{CRB} - 12775519\mathrm{E} + 45383.16\mathrm{FDI} + 6131.136\mathrm{M2}$$

(2) The Prob values of CRB and M2 are less than the critical values at 10% significant level, which means that these two variables have appreciable influence to China's exports to the United States. When CRB increases by one unit, EXPORT increases by 115195 unit. When M2 increases by one unit, EXPORT increases by 6131.136 unit.

(3) Because the P values of E and FDI exceed the critical values at 10% significant level, the relationship between these three variables and China's exports to the United States rejects the null hypothesis. In other words, there is no long-term relationship between E, FDI and China's exports to the United States.

(4) The R^2 of the cointegration test above is 0.71, and the adjusted R^2 is 0.62, indicating that the cointegration test results have a good fitting degree.

ISSN 2616-5902 Vol. 3, Issue 8: 34-38, DOI: 10.25236/AJBM.2021.030807

3.2 Import model

We establish the export model and use EVIEWS to conduct regression analysis. The model is as followed:

$$\text{IMPORT} = \text{C} + \alpha\text{CRB} + \beta\text{E} + \lambda\text{FDI} + \gamma\text{M2}$$

The result of multiple regression is in the table 7.

Table 7: Results of multiple regression analysis on the impact of variables on China's import to the US

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	94160011	23408947	4.022394	0.0014
CRB	-30583.57	9888.446	-3.092859	0.0086
E	-12023622	2666615	-4.508946	0.0006
FDI	24559.42	11520.42	2.131817	0.0527
M2	514.9673	286.0396	1.800335	0.095

(1) From the table we can get the complete import model:

$$\text{IMPORT} = 94160011 - 30583.57\text{CRB} - 12023622\text{E} + 24559.42\text{FDI} + 514.9673\text{M2}$$

(2) It is evidence that the Prob values of CRB and E are less than the critical values at 5% significant level. This demonstrates CRB and E have significant influence on imports from China to US. Besides, FDI and M2 also have a lower Prob values than the critical values at 10% significant level, which means these two variables have an impact on imports to some extent.

(3) The R^2 of the cointegration test above is 0.88, and the adjusted R^2 is 0.84, indicating that the cointegration test results have a good fitting degree.

4. Conclusions and recommendations

According to the result of empirical study above, we come to the following conclusions:

(1) CRB has a negative correlation with China's exports to the US and imports from US.

The Federal Reserve implements QE policy, results in the devaluation of US dollars and lax global liquidity conditions. China is an export-oriented country and one of the most important importers of major international commodities. CRB rises, leading the prices of raw materials go up, accordingly rising production costs for Chinese importers and exporters, therefore making a negative impact on Sino-Us trade.

(2) Exchange Rate has a negative impact to China’s imports from US.

Generally speaking, the appreciation of RMB would boost Chinese imports. One possible reason is China has imposed import controls during the period of the sample because of COVID-19. All provinces and cities in China have issued regulations on the control of imported goods. It is strictly prohibited to import goods without certificate of Disinfection, Certificate of Inspection and Quarantine of Entry Goods, Certificate of Nucleic acid Test of COVID-19. Even if RMB exchange rate rises, imports still reduces because of strict control measures.

(3) FDI has a positive impact to China’s imports from US to some extent.

QE policy of FED lowers the federal funds rate and widens the interest rate gap between China and the US. The expected appreciation of RMB will increase the profit expectation of multinational companies and attract more foreign direct investment. As foreign direct investment enters the production process, it increases the import of related equipment and raw materials needed for production. Accordingly, China's import from the United States increases, which has a positive impact on imports in the long run.

(4) M2 has a significant positive impact on both China’s export to US and import from US.

Increasing currency supply in the US helps stimulate domestic investment and consumption and boost consumer confidence. On one hand, it will promote the entry of foreign direct investment. China will import more raw materials, high-value-added products and related equipment for production. On the other hand, the improvement of consumer confidence leads to the increase of demand for Chinese goods in the U.S. Therefore M2 has a positive impact on both China’s export to US and import from US.

ISSN 2616-5902 Vol. 3, Issue 8: 34-38, DOI: 10.25236/AJBM.2021.030807

Under the situation of increasing downward pressure on global economy caused by COVID-19, China must deepen the reform of exchange rate system, strengthen risk management of RMB exchange rate and promote the internationalization of RMB in order to effectively deal with the impact of US QE policy on Chinese economy. At the same time, we should promote the diversification of international strategic reserves of bulk commodities, establish a scientific supervision system for foreign investment, and improve relevant legal systems.

References

[1] Liu Lanfen, Han Liyan. The Spillover Effect of Quantitative Easing Policy on emerging markets: A case study of China and Brazil [J]. Management Review, 2014, 26(06): 13-22.
[2] Lil Zilei, Zhang Yun. Does QE Policy in the United States Affect Inflation in China?-- Empirical Research Based on SVAR Model [J]. International Financial Research, 2013(08): 13-21.
[3] Bai Yueming. Changes in RMB Exchange Rate and Signal Impact of International Monetary Policy: Evidence from QE policies of the United States, Europe, Japan and Britain [J]. Economic Science, 2015(06): 51-64.
[4] Liu Xiaolan, Lai Mingyong. Research on the Spillover Effect of QE Policy on China: Based on Trade Channel Analysis [J]. Financial Theory and Practice, 2014, 35(05): 2-7.
[5] Wang Xiaotong. Analysis of the Spillover Effect of U.S. QE policy on Sino-U.S. trade [D]. Dalian: Dongbei University of Finance and Economics, 2015.