

The impact of the currency war between the United States and China on the inter-trade balance - an econometric study.

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Abstract:

china took measures to reduce the local currency (RMB) in order to encourage exports and make imports more expensive, which the united states met by imposing tariffs in order to raise the value of Chinese goods and considered it a manipulative country according to American standards, which led to a trade war between the two countries.

And we reached results, including the increase in intra-regional trade between the two countries between 2005-2019 and the increase in Chinese exports due to the depreciation of the yuan, the mortgage crisis 2008 also affected intra-trade positively. The U.S trade policies (imposing tariffs on Chinese goods) have also affected Chinese imports negatively.

Keywords: currency war, trade balance, Currency devaluation, intra-trade, trade war.

JEL Classification : G010 ; F300 ; F10

Introduction

In late 2019, the Chinese renminbi (RMB) depreciated against the dollar, with \$7 equal to RMB. This 2% drop triggered a massive market reaction that led to China being accused of devaluing the yuan to neutralize the impact of US tariffs. Then the US Federal Reserve was pressured to lower the dollar and raise RMB, but in fact it is the Treasury that takes such measures. Previously, the Chinese central bank intervened to devalue the yuan to make Chinese exports cheaper, and imports more expensive. US tariffs would put pressure on the Chinese currency and thus the yuan's decline, but the Chinese authorities are working more to raise the value of the yuan. There are three American criteria for classifying a country as a currency manipulator, and China is accused of currency manipulation by not buying the RMB in the markets to support its currency in order to raise its value. It contradicts the rules of the OMC, and this effort would lead to a currency war and a trade war took place between the two countries, and from here we arrive to formulate the following dilemma: **What is the impact of fluctuations in the exchange rate of the Chinese yuan against the US dollar on the inter-trade balance?**

1- General definitions of currencies:

There are different types of currencies: soft, hard, hot, such as foreign currencies, and weak currencies. The hard currency is part of a strong geopolitical state and it is highly liquid and readily available, and over time its value remains to some extent fixed, and it is difficult to predict hard currencies in the future, such as the dollar, yen, Swiss franc and the euro, and the soft currency is a highly sensitive currency that sometimes fluctuates, these currencies respond Very sharply called soft coins. Soft currencies usually come from countries that are not secure (politically and economically), soft currencies, for traders are less convertible outside the host country, so there are no major international negotiations using soft currencies, for example, the Zimbabwean dollar. (Hussain Sarfraz, 2021)

1-1- Definition of currency war:

Also known as international depreciation, a condition in international affairs in which countries negotiate against each other to achieve a relatively low exchange rate for their currency, James Rickards says currency wars are fought once in 24 hours in all Major developed economies by bankers, traders, policymakers and automated networks around the world, ends the fate of markets and their citizens. According to Alan Skrinka, chief economist at Cornerstone Corporate Finance, a currency crisis is “when countries use their money as competition. (Guyer, 2017)

1-2- A Brief History of the Currency War:

In 1921, when the mark was eroded by Germany, the wheel was memorialized in images of wheelbarrows with cash that were not enough to buy a loaf of bread. France jumped for the first time in 1925, bringing the price of the franc down. (Edwards, 2017)

The Western world lowered the dollar significantly toward gold in 1933, from \$20.67 per gram to an additional \$1. The British and French exchange rates also fell again. The next currency war began in 1967 when Britain devalued the pound sterling against the dollar. Soon the US dollar was threatened, a problem because the dollar was still pegged to gold as a foreign currency. 1971 Pakistani rupee devaluation (4.76 rupees = \$1, 9.99 rupees = \$1 after devaluation, i.e. 110%, and in 1999, it was devalued against the US dollar by 63-53 at least 10 rupees per US dollar. (Shahbaz. M, 2018)

2- The trade war between the United States and China:

The trade war will not only affect the two countries, but will also affect the entire world. Global growth is expected to decrease by 0.5%. In 2020, the introduction of a 25% tariff on all Chinese imports into the United States will reduce exports. global by 3% and global product by 1.7%. Escalating tariffs between the United States and China will reduce global exports by up to 3 percent (\$674 billion) and global income by up to 1.7 percent (\$1.4 trillion) with losses. China and the United States recorded the largest declines in income, with 3.5% (426 billion US dollars) and 1.6% (313 billion US dollars) respectively.

For the sectors most affected are: agriculture, chemicals and transportation equipment in the United States. And electronic equipment, machinery and other manufacturing industries in China. The Organization for Economic Co-operation and Development believes that about one-third of the content of US imports from China is actually of foreign origin. The value added of China's exports to the United States may be \$329 billion - about 2.7 percent of China's \$12 trillion economy. So, even if the new tariffs cut Chinese exports to the US by 25 percent, the direct tax on China's GDP would be 0.7 percent. It will have a noticeable impact, but it will leave the Chinese economy growing at 6.1 percent annually. (Larisa Kapustina, january 2020)

3- challenges facing the US dollar:

Although the US economy is the largest economy in the world and no country has been able to take its place, it faces some challenges represented in:

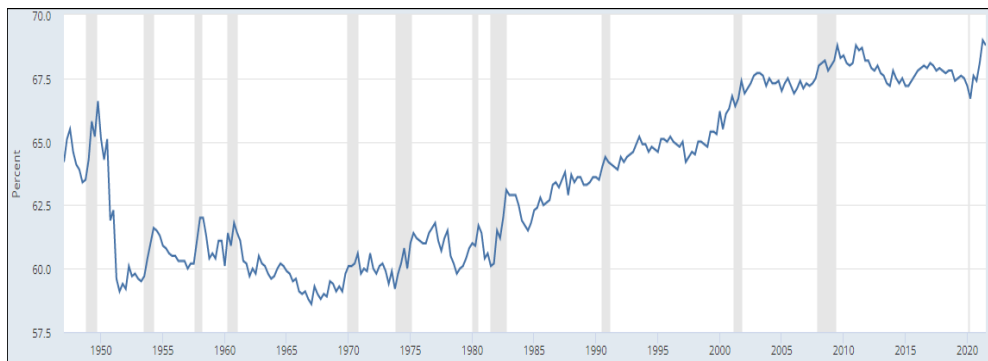
3-1- Government public debt:

In general, investors use government debt as a percentage of GDP to measure a country's ability to make its debt payments in the future, which affects borrowing costs and government bond yields. The rate of government public debt as a percentage of GDP has increased in the recent period until it reached in 2020 a rate of 127.11%, while in 2017, it reached 105.62%. (trading economics, 2021)

3-2- The large volume of private consumption as a percentage of GDP:

Consumer spending constitutes the largest proportion of the output, and the weak point here is that the bulk of this consumer spending is financed through bank borrowing and through credit cards, which changes the accumulation of private sector debts dramatically, and the huge volume of consumer spending is negatively reflected in the deterioration of saving rates. It increases the state of economic imbalance and dependence on foreign direct investments, and the private consumption rate has peaked between 2020 and 2021, according to the following figure. (trading economics, 2021)

Figure number (01): Gross Domestic Product Shares: Private Consumption Expenditures.



Source: Source: U.S. Bureau of Economic Analysis. (bureau of economic analysis (BEA), 2021)

3-3- Decline in the dollar's share of cash reserves:

The dollar is the first reserve currency in the world, as it constitutes 90% of the foreign exchange reserves of central banks. However, the dollar rose during the first quarter of 2021 by 59.5%. It currently does not pose a challenge to the United States after its value has recovered, and it is still the largest currency reserve held by global central banks. (REUTERS: BREAKING INTERNATIONAL NEWS AND VIEWS, 2021)

3-4- Quantitative easing:

Quantitative easing is represented in printing money (traditional finance), and after the 2008 financial crisis, the United States printed more money (quantitative easing), which caused the budget deficit to rise from 9 trillion dollars to 19 trillion dollars, and the second quantitative easing caused (in 2011) increased the money supply, and thus led to higher commodity prices, stock prices, consumer price inflation, and corporate profits. However, it also lowered real wages and overall real economic growth was actually significantly lower in the three quarters that followed than in the three that preceded it. There is little reason to believe that QE3 will be more successful in increasing real economic growth. (STEFAN, 2021)

4- Challenges facing the Chinese yuan:

We find that China suffered from many obstacles in the beginning, but these obstacles have decreased now due to the great growth achieved by China and due to the reforms achieved in the Chinese economy, and among those challenges:

4-1- The lack of development of financial markets:

Economic analysts agree that financial markets are still far from global markets, as they need major changes, trading in Chinese debt securities does not live up to what is required compared to the great growth of China, but we find that there is a great interest from the Chinese authorities to open markets. In November 2020, China introduced futures contracts on the Shanghai International Energy Exchange (INE) as a copper contract, and this contract attracted the interest of European and American foreign investors. The Chinese crude oil contract launched less than three years ago is now the third most traded contract in the world for the commodity, albeit far below the international benchmark Brent crude contract, and the US crude oil futures contract, WTI. Another desire of the National Institute of Statistics to attract foreign investors is that the exchange launched online courses in English last year on the Chinese futures market. (Evelyn, 2021)

The agreement (CQG with brokerage Nanhua Futures in Hangzhou in August 2020) will allow offshore access to six international futures products currently listed on three Chinese exchanges: copper, crude oil, rubber, low-sulfur fuel oil, iron ore, and purified terephthalic acid (PTA). which is used in polyesters.

Finally, the Chinese researcher in financial markets Cheng stated that the road is still long, and among the challenges is China's strictness not to release money for foreign investors, which undermines the acceleration of the development of investments in Chinese stock exchanges. As for China's role in setting prices, it is still limited due to the controls imposed by China on capital and limited foreign participation. (Evelyn, 2021)

4-2- Weak financial system:

The Chinese financial system is considered weak, as banks still control the financial system in China, and the government exercises direct control over the banking system.

4-3- Inflation:

The inflation rate is calculated using changes in the consumer price index. Since a country's inflation is viewed as a leading economic indicator, it is often used for international comparison. China showed a relatively low inflation rate among emerging countries in 2020. But the rate remains high compared to well-established industrial powers such as the United States or the European Union. According to IMF estimates for 2020. (Textor, 2021) Since the 1990s, product prices have risen at a record rate, and this is in September 2020, according to Eikon Refinitiv. The producer price index jumped by 13.5%. (Laura, 2021) The high inflation rate is attributed by the Chinese authorities to the rise in vegetable and gas prices, as the first jumped by 16% in October 2020.

Figure number (02): Developments in the inflation rate in China between 2010-2026.



Source: C. Textor, Oct 21, 2021 .Statista 2021. (Textor, 2021)

4-4- Energy:

Although China possesses important mineral and energy resources, its domestic production is not sufficient to meet the needs of industrial expansion, forcing it to look abroad to import energy and mineral materials and bear the continuous rise in the prices of these materials. China currently imports approximately 50% of its oil needs. The energy issue is one of the most important challenges facing China and shows strong interest in it, with the increase in China's energy needs and the rapid rise in import dependence. (Ögütçü, 1998)

At the end of 2020, the cost of coal mining and processing rose, and energy problems, shipping disruptions and a deepening real estate crisis affected China's economic growth. (Laura, 2021)

4-5- Income Distribution Inequality:

This statistic shows income inequality in China from 2004 to 2019 based on the Gini index. In 2019, China achieved a score of 46.5 (0.465) points. Gini index is a statistical measure used to represent unequal distributions, for example income distribution. It can take any value between 1 and 100 points (or 0 and 1). The closer the value is to 100, the greater the inequality. 40 or 0.4 is the warning level set by the United Nations. (statista: statistiques and data, 2018)

China has become one of the largest economies in the world. As parts of society have become richer, the Gini coefficient has also grown sharply over the past decades. As can be seen from the graph, the Chinese Gini coefficient has ranged above the warning line for increased risk of social unrest over the past decade. However, the situation has improved slightly since 2008, when the Gini coefficient reached its highest value recently. (statista: statistiques and data, 2018)

Figure number (03): Evolution of the Gini Coefficient: Inequality in Income Distribution in China from 2004 to 2019.



Source: <https://www.statista.com/statistics/250400/inequality-of-income-distribution-in-china-based-on-the-gini-index>

5- Measuring the impact of fluctuations in the exchange rate of the yuan against the dollar on the development of the inter-trade balance:

In order to reach accurate results, we relied in our study on the standard approach, based on the multiple linear regression method, in order to test the existence of a causal relationship between the change in the value of the Chinese currency against the US currency (the yuan against the dollar), and the balance of the inter-American trade balance with China, During the period from 2005 to 2019.

5-1- Data and analysis of results:

5-1-1- Defining the variables of the study:

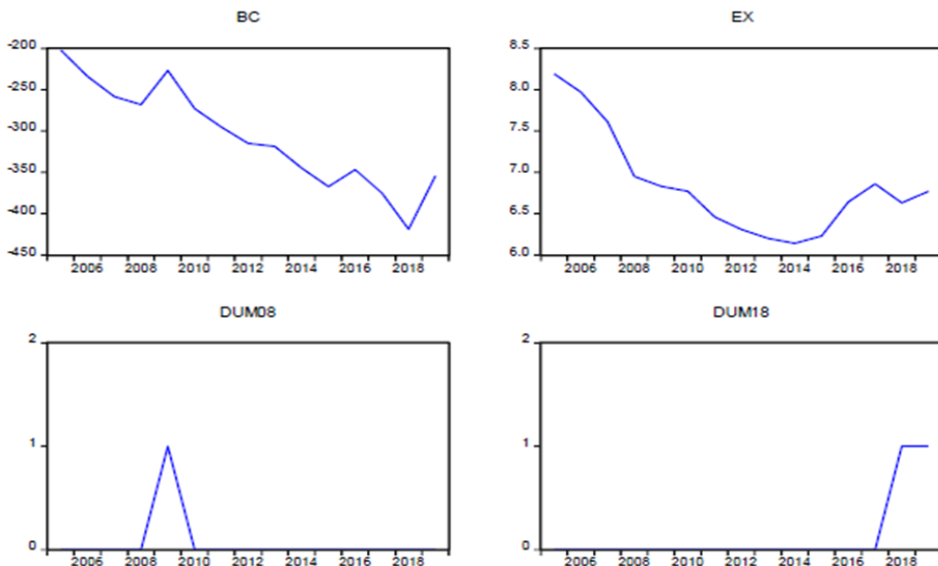
for the purpose of evaluating the balance response: the inter-trade between the United States of America and China as a dependent variable (BC) to the developments of the yuan exchange rate against the dollar (EX), We are not satisfied with taking the latter as the only explanatory variable for the evolution of the dependent variable, but rather we take two dummy variables, which are (08 DUM) and (18 DUM).

The variable (08DUM) is considered on the impact of the mortgage crisis of 2008, which takes zero values during the period 2005-2019, except for the year 2009, where it takes the value one (1), because the impact of the

mortgage crisis on international trade occurred with a delay. It is expected that its impact will be positive, because the analysis presented in the second chapter shows that both countries experienced a recession that was reflected in the decline in their exports to the outside world, but we noticed that China's exports to the United States of America witnessed a significant decline compared to its imports from the United States of America.

The second dummy variable (18 DUM) expresses the impact of the trade war between the two countries, which began to show its effects on trade relations between the two countries in 2018 and continued until 2019. For this reason, we give this variable a value of 0 during the period 2005 to 2017, and give it a value of 1 in The years 2018 and 2019. We expect the impact to be negative because this crisis has reduced China's exports to the United States and increased China's imports from the United States, which reduces the balance between the two countries in general.

Figure number (04): Graphic representation of the series DUM18, (DUM08), (EX), (BC).



source: Prepared by researchers based on the statistical program (Eviews10).

In sum, we have the following data which is used to estimate the impact of exchange rate developments on the intra-trade balance.

5-2- Estimation Model:

To estimate the response of the intra-regional balance of trade to changes in the Chinese yuan exchange rate, we use the following equation:

$$BC = c + \alpha_1(EX) + \alpha_2 (DUM08) + \alpha_3 (DUM18) + \varepsilon_t \dots \dots \dots (1)$$

From equation (1), (c) represents the fixed boundary. (α_1) represents the response of the intra-trade balance to the change in the exchange rate of the yuan against the dollar, which is expected to be positive, since the depreciation of the yuan (the appreciation of the exchange rate) increases the competitiveness of Chinese goods. Thus, it increases its exports to the United States of America, and China's imports from the United States of America decrease, and the inter-deficit expands. (α_2) expresses the response of the trade balance to the impact of the mortgage crisis, and we expect the effect to be positive as we mentioned earlier. (α_3) represents the response of the intra-trade balance of the trade crisis between the two countries, and we expect the effect to be negative as mentioned above. (ε_t) represents the residual series.

5-3- Presentation and Analysis of Standard Results:

This part of the study aims at presenting and analysing the results of the standard study and estimating the relationship between the study variables, by presenting and analysing the results obtained.

5-3-1- Presentation of the standard results:

The following table summarizes the descriptive statistics of the time series used in the study:

Table number (01): Statistical description of time series.

Std. deviation	L-value	S- value	Mean	Variables
62.18139	202.2780-	418.9540-	306.6175-	BC
0.626538	8.190000	6.14000	6.83733	EX
0.258199	1.00000	0.00000	0.066667	DUM08
0.351866	1.00000	0.00000	0.13333	DUM18

Source: Prepared by researchers based on the statistical program (Eviews10).

Through the results of the above table, we note that the US intra-American trade balance suffers from a deficit with China, where the largest value was estimated at 418.954 - billion dollars, and the smallest value was 202.278 billion dollars. With regard to the Chinese exchange rate, it witnessed large fluctuations towards the rise, and the highest value

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witnessed by the Chinese yuan against the dollar reached 8.19, while the smallest value recorded by the latter during the study period was 6.14 yuan against the dollar.

a- Results of the correlation matrix:

The following table represents the results of the correlation coefficients between the study variables: (18 DUM, BC, EX, 08 DUM)

Table number (02): The matrix of correlations between variables DUM08 EX BX DUM18.

	BX	EX	DUM08	DUM18
BX	1			
EX	0.671528276064	1		
DUM08	0.354761333264	0.0032379623344-	1	
DUM18	0.5220898297428-	0.088992553276255-	0.10482848367-	1

Source: Prepared by researchers based on the statistical program (Eviews10).

Through the results of the above table, we note that there is a strong correlation between the dependent variable and the independent variables, during the study period (2005-2019), and the highest correlation coefficient is 67.1%, it was between the variables (BC) and (EX), and this indicates a significant correlation between the trade balance The US-Chinese interface and the exchange rate of the yuan.

b- Estimation of the simple linear regression model by least squares:

The method of ordinary least squares is among the best statistical and standard methods, as it is based on the principle of minimizing the sum of the squares of errors, and the results obtained in the following table:

Table number (03): Parameters of the multiple regression model by least squares.

depenendent variable: BC
METHOD: Least squares

Date: 09/30/2020 Time: 13:31				
Sample: 2005 2019				
included observations: 15				
Variable	coefficient	Std. Error	t-Statistic	Prob
EX	62.92208	14.6483	4.295522	0.0013
DUM08	74.99876	35.60024	2.106693	0.0589
DUM18	-76.52337	26.22736	-2.91769	0.014
C	-731.6336	100.9833	-7.24509	0.00
R-squared	0.762306	Mean dependent var		-306.618
Adjusted R-squared	0.697481	S.D. Dependent var		62.18139
S.E. of regression	34.20085	Akaike info criterion		10.12556
Sum squared resid	12866.68	Schwarz criterion		10.31437
log likelihood	-71.94167	Hannan-Quinn criter.		10.12355
F-statistic	11.75935	Durbin-Watson stat		0.90845
Prob (F-statistic)	0.000933			

Source: Prepared by researchers based on the statistical program (Eviews10).

We note from the table that the model indicates a direct relationship between the independent variables, represented by the exchange rate, the mortgage crisis, and the trade war, on the dependent variable: the inter-trade balance. The model takes through equation (2) the features on the figure:

$$BC = -731.63 + 62.92(EX) + 74.998(DUM08) - 76.52(DUM18) \dots (2)$$

5-4- Analysis of the standard results:

From the data obtained using the least squares method, the following can be concluded:

The depreciation of the yuan by one value leads to an increase in the US-Chinese trade by: 62.922 billion dollars, which is statistically significant at the level of 1%.

This is consistent with economic theory, because the depreciation of the yuan during this period, along with the massive economic reforms adopted by China, increased the competitiveness of its products at the international level, so its exports to the United States of America increased significantly.

The first dummy variable (DUM08) positively affects the inter-trade balance, and the latter's response to it amounted to about \$75 billion, which shows the impact of the volume of the 2008 mortgage crisis on the volume of US-Chinese trade, which is significant at the level of 10%.

As for the second dummy variable (DUM18), it negatively affects the inter-trade balance by \$76.52-billion, which indicates the success of the trade policies imposed by the United States on Chinese imports, and one of its results is to reduce the inter-US trade deficit, which is statistically significant at the level of 5%.

Coefficient of determination $R^2 = 0.76$: acceptable and high, and indicates that the independent variables (DUM18, DUM08, EX) collectively contribute to affecting the balance of the US-Chinese trade balance by 76%, and the remaining 24% are other variables that were not taken into account in the proposed model, such as social, political factors and global economic factors such as change in global economic growth and international trade.

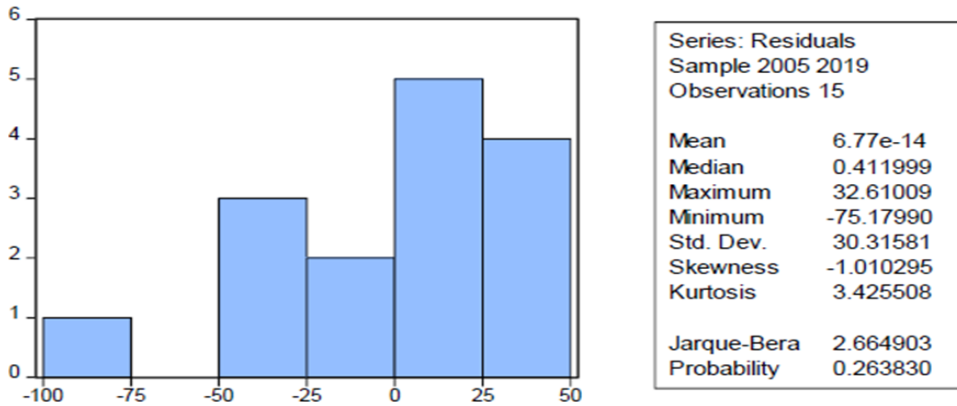
Fisher's test: The results of Fisher's test show us that the model is significant, with a confidence level greater than 99%, and this indicates that the model is of high quality.

Through the assumptions on which the least squares method is based, it is necessary to know the credibility of equation (1), by conducting a set of tests, represented in:

5-4-2- Normal distribution test for residuals:

The results of the Jarque-Bera test for equation (1) showed the following:

Figure number (05): The results of the Jarque-Bera equation test.



Source: Source: Prepared by researchers based on the statistical program (Eviews10).

Through the above figure, we note that the degree of probability (Jarque Bera = 26%) is greater than 5%, and therefore we reject the alternative hypothesis (H1) which says that the residuals do not have a normal distribution, and we accept the null hypothesis (H0), which indicates that the residuals have a normal distribution.

5-4-3- Test for instability of variance: Breusch-Pagan-Godfrey:

The results of this test showed that the probability degree for each (Prob, chi-square = 0.8826) and (Prob, chi-square = 0.9339) is greater than 5% and 10%, and therefore we reject the alternative hypothesis (H1) We accept the null hypothesis (H0), which states that there is no autocorrelation of errors.

Table number 05: Breusch-Pagan-Godfrey Equation 1 . Results.

Heterodkydasticity Test: Breusch-pagan-Godfrey			
F-statistic	0.168718	Prob. F(3,11)	0.9153
Obs R-squared	0.659846	Prob. Chi-square(3)	0.8826
Scaled explained SS	0.430346	Prob. Chi-square(3)	0.9339

Source: Prepared by researchers based on the statistical program (Eviews10).

6- Conclusion:

The reserve currencies are the main pillar on which the stability of the international monetary system is based, and any fluctuations in which these

currencies are exposed will inevitably lead to its disruption, in light of the intense competition between the dollar and the yuan, the characteristics and advantages of each currency that make it a pioneering currency in a way that is difficult to defeat.

It has become clear through the standard study that the competitive devaluation of the currency practiced by China against the United States is not the only and main factor for the chronic deficit suffered by the American trade balance, which the United States has long accused China of, but is mainly due to the preferential advantages that Chinese goods have over the United States. The United States of America, and in order to get rid of it, the United States must carry out new reforms and impose alternative policies that are more effective.

China's manipulation of its currency does not contradict the rules of international law (the International Monetary Fund, the World Trade Organization), so the articles of those rules must be reviewed by amending them, which is the only option. (Mercurio, OCTOBER 2009)

Even without the pressure of the dollar (2020) starting to decline due to the interest rate cut by the Federal Reserve, the trade war has slowed US growth, and this gradual process will do little to resolve the trade imbalances between the US and China.

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Annexe:

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