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THE NEXUS BETWEEN GOVERNMENT REVENUE, MONEY SUPPLY AND GROSS DOMESTIC PRODUCT IN CHINA

Zeraibi Ayoub
School of Economics and Finance
Xi'an Jiao-Tong University, Xian, Shaanxi, China
azeraibi@yahoo.com

Abstract

The objective of this empirical study is to find out the long and short-run relationships between government revenues, money supply, and Gross Domestic Product. The study used Time Sires data with secondary data collected from China's national office of statistics within the period (1990-2018) and employed the ARDL model based on the literature review. We used the Gross Domestic Product as a dependent variable and the money supply (M2) and Government revenue (Re) as independent variables. The study results show the independent variable to have positive signification on the Gross Domestic Product. The study recommends that the Chinese government needs to stay at the same level of money supply and use a good monetary policy to control the money supply value because it has a direct relationship. The government revenues play linkage role between the growing economy and the money supply.

Keywords: Monetary policy, Gross Domestic Product, Auto-regressive Distributed Lag, Public revenues

INTRODUCTION

The nature of the money supply process is of a fundamental factor in macroeconomic theory and policy. Whether or not it is endogenously determined, is an issue which has been hotly disputed as it is the role of the public sector to determine. This is clear from the different views expressed in the introductory quotations by two groups who come from the monetarist school who broadly defined money as anything that serves as a medium of exchange in the purchase

of goods and services, Anavar K. & Mohammad Karimi .A, (2010), that may be used to store purchasing power until it is needed by the owner. If we define money exclusively as a medium of exchange then it can be defined as the sum of all currency and coins held by the public (Bunescu, L .2011). The power to regulate its quantity and value was delegated by Congress early to the center of the Bank of China. This has become not only the principal source of currency and coin used by the public but also the principal source for the government and public economy. The number of studies in recent years have found a statistically significant relationship between the current and lagged changes in the money supply and the public economic sector (Government expenditure, government revenues, tax income) also significant relationship between the money supply and the macroeconomic variables (GDP, price level, exchange rate) and the essential implication of the different studies. Therefore the control of the money supply impact the government revenues with an indirect effect on the development of national and local development and the payment mechanism and eventually business (Joseph A. 2016).

In the long run, according to unpleasant monetarist arithmetic, the growth in the money stock will be governed by the public economy.

According to the principal of the public and macroeconomic fundamental, the money supply is the linkage between the two variables, government revenue, and the Consumer Price Index, so that the amount of money supply on the economic activity then return to the government in the form of returns and revenues. Inflation plays an important role as a control variable of money supply and based on the importance of the topic, have to be different. The study was to investigate the relationship between the variables such as the study by Rabiunnes, K. and Mahamudam, F.(2019). The study was to investigate the causal relationship between the money supply and inflation in the case of Bangladesh. In the study, monthly time sires data was used between (2011-2017). The data was not very long as to be able to interpret the causal relationship between the study variables. The study was also based on the relationship between money supply and inflation. It did not take into account the effect of this on the state revenues nor it's impacted in the long-term. Yakubu Musa and Umar Olorunfe Lola, Adeleke Peter. (2013) conducted study to test the correlation between the national revenues and supply of money. It was found to have signification between the variables but the study used old data (2010) which can’t interpret the current and present relationship between the variables. The study did not indicate nor explain the point of view of economic schools and economic thought between the two variables which makes the study lose the ability of econometric. It did not take into account the economic variables as a watcher for the relationship between the government revenues and the money supply for standard tests. Based on the shortcomings of previous research and

studies, we study the present study of the standard relationship between the three variables during the period 1990-2018 with regards to the consideration of the explanation of the different economic schools for the relationship between the variables in the long term. The relationship between government revenues and the economic growth created a wide debate empirically and theoretically. The relationship between the government revenues and the money supply and Gross Domestic Product is one of the important ones in the identification of the long-run relationship between the variables and has an important role in the development of the country. The value of the money supply is the linkage between the Gross Domestic Product and government revenue. The current study aims to investigate the long-run effect of government revenues on money supply and the Gross Domestic Product previous of the study relevant to issues flowing.

LITERATURE REVIEW

The discussion so far has explored at length several routes through which an increase in public sector deficits might be associated with an increase in the money stock while a set of theoretical linkages have been established. There is nothing inevitable or unambiguous about the relationship in Practice as many authors have made clear :

Yu Yong He (2000) in a literature review study published by China and world economy journal. The author used the deceptive methodology to analyze the development of China’s macroeconomic variable in the period of (1990-2000). The Author also was referring to China's monetary policy including the money supply in the period of the study indicated in the period (1990-2000). China's general macroeconomics and money supply, in particular, was unstable, such as the economic growth decreased from 9.5% to 8.0%, and inflation from 14.5 % to 10%. The study discussed China's macroeconomic challenges, like the investment (FDI) problem and instability of government expenditure and revenues. In conclusion, the Author shows comments and remarks to develop China's macroeconomy and China's economy in general.

Sulaiman (2009) in an empirical study tested the relationship and the linkage between the Money supply and government expenditure and the inflation on Pakistan in the period between (1977-2007) and used ARDL econometric method and Granger causality technique. The study was published in the European Journal of economics, finance, and administrative sciences journal. The author next gave a short introduction and literature review. The empirical test between the variables was found to have a negative relationship between government expenditure and inflation and the economic growth had a positive relationship with the Money supply in the long run. The author also explained the negative relationship between inflation and

the government expenditure in the case of Pakistan related to the slow growth of government expenditure and increase of inflation.

Busian (2011) conducted a correlation study between the government expenditures and the population and the money supply. The study was published in the international journal of art and sciences. The author used Specs 2018 to analyze the indicators; the study collected the data from different counters to answer the research question, "What is the impact level of government revenue on the macroeconomic variables?". The research result indicates a strong relationship and strong correlation between the variables.

Joseph (2012) was investigating the relationship between the stability of macroeconomic variables and the fiscal policy in the period (1971-2010). The study result indicated the inflation has a positive shock to government spending and infect the economic stability.

Olorundemi (2012) tested the relationship between the Money Supply and the inflation in the case of Nigeria in the period between (1970-2008). The study was published in the modern economy journal. The author used the Vector Auto-Regressive (VAR) method model to test the data. The searcher next then tested the stationary of data. The test indicated to have an indirect relationship and indirect causality between the price level and money supply. In conclusion, the authors gave comments and commendation to the Nigerian government to control the price level and use them as a guide of operation is a vital factor in the monetary and macroeconomic policy. Yakubu (2014) studied the linkage relationship between government revenues and the money supply in the case of Nigeria. The searcher used the data in the period (1970-2010) and used the ARDL model with bounds test technique to analyze the relationship between the data. The test result found and indicated to have positive signification between the money supply and government revenue in both the long and short run.

Mohsen (2015) tested the relationship between the money supply and the government spending in the case of Iran. The author published the study on the international letters of social and humanistic sciences. The searcher collected data from (1959 to 2010) and used the ARDL Model to test the relationship between the variables. The study test result indicated not to have any significance between economic growth and government spending and exchange rate with the inflation in the case of Iran. In conclusion, the author also recommended the Iranian government to control the inflation rate and decline the liquidity relation and OIL price. In a study by Collins Frimpong Ofori, B.,& Adjei, D.(2017) examines the effect of money supply on the inflation in the case of Ghana, in the period of (1967-2015). The data was secondary time sires data collected from Ghana Central Bank. In the study, he used the ordinary least squares technique. The study results indicate to have a long and short-run relationship between the variable in the case of Ghana and in the case Bangladesh Montasir (2018) in the investigation

study testing the causality between the inflation and budget deficit and money. The study covers the period (1980-2018). It used the vector error correction and the Granger causality technique to test the casualty between the variables in the long and short run. The study result indicates not to have casualty between the budget deficit and the inflation in the short run also between the money supply and the inflation in both long and short-run in the case of Bangladesh in the period of study. In the same context of study in Bangladesh by Nair sultana (2019). In empirical study analysis, the causality between the money supply and the inflation, the study used monthly data (2010.05-2017.02), using the error correction modeling method. The study result indicates that the money supply effects on both the long and short run. In the case of Bangladesh, the study recommendation show Bangladesh monetary policy need more support in the period of study. Corelia (2019) indicates the effect of government revenue on the government money supply. The study was secondary data annual-time sires data in the period (1981-2017). The data was collected from Nigeria's office of statistics and used the Ordinary least square method statistics package social sciences. In the case of Nigeria, the study results showed that government revenue had a direct effect on the government in the period of study and the local government revenue does not have any effect on the money supply.

THEORETICAL FRAMEWORK

Within the important monetary theory, we have the classical theory development which shows that money demand does not have any effect on the interest ratio. Also, Fisher's theory examined the nexuses relationship between the monetary quantity and spending on goods and services and the test result was defined on the quantitative equation MV=PY. Based on the theory, the money velocity will increase when people use the money charge at the same time. The theory also shows the effect of the charge on people's accounts will increase the monetary velocity and the Fisher theory has early prediction and considers the role of technology on the monetary velocity in the short run (MISHKIN, 1998).

Cambridge also approved to have the same point of view with the Fisher theory equation but used different proof and different arguments such as the economist Pigou and Marshall. However the Cambridge economist improves the effects of the people's wealth on the money value which directly affected people hoarding money and that is what the demand of money equation proves, that money demand is proportion with income and K as a coefficient. (M=K*PY). The Classical theory ruled out the role of rate interest on the demand of money, but the Cambridge theory is the opposite of the Classical, where the interest rate is an important role in the demand for money (MISHKIN, 1998).

And based on (Cottrell, 1997), there are two important hypotheses for the monetary theory. The first hypothesis, however, is that any changing of one of the quantities of money need to use the quantity of money as an external factor. The second hypothesis is to use each of the variables (V, Y) treated as dependent variables from the quantity monetary (Cottrell, 1997) and follow the monetary theory development we find. Keynes theory is also one of the monetary references spicily the liquidity theory where the Keynes assume there is a direct correlation between interest rates and income. It also proves any change in the external trends will have a direct effect on the income and veracity of money and recognize that any increase or any change in the money loans will affect the interest rate by the investment and have an impact on the monetary velocity, and reject the hypothesis of constant of velocity of money. Keynes confirmed that the labor market is full, and also assumed the spending level will be increased (Batiz, 1985).

The change in the money offer have direct infects on the prices levels, and this equation is according to the hypothesis. The first one is the economy in full employment and the second one is the stability of the money supply speed. The quantum equation of Fisher Irving which explains the quantum relationship between the variables is the following :

MV = P T……..…….(1)

And the inflation equation theory is the following :

P= MV/T…….(2)

The Quantitative equation variables indicate the M is the money offer and the V is the money rotation speed. P is the consumer price level and the T mean Volume of goods and services exchanged. And from the first and second equation, we infer that to have a direct relationship between the price level and money supply, where any increase in the money supply leads to an increase in the price level.

METHODOLOGY

In this study, we utilized annually time sires data from China's national office of statistics in the period between 1990-2018. The data is the Chinese Government Revenue, Money Supply, and Gross Domestic Product.

Based to the literature, we select the variables and period study data from 1990-2018 , Analysis of low growth in the 1990s and analysis of the role of monetary policy instruments in raising continuous growth rates and the extent of their impact on government revenues and how they reflected on the Chinese economy, which is witnessing continuous growth rates as this period contains the most important Chinese reforms and the most important financial reform

1994, which gave the Chinese economy more freedom and openness to the international economy, which has recently come out .

Data Description

In the investigation and analysis of the relationship between the variables and factor in the long-run relationship, the applied Econometric model ARDL or the bound test techniques was developed by Pesaran (2001) and the ARDL can give solution for determining relationship issues between the variables in the long run or short run, also whether they are stationary or not. The ARDL can re-parade the co-integration between the variables by the error correction model ECM. However, the variables are I(1), I(0) or both. The ARDL technique can develop and prevent the pretest issues between the variable under the co-integration stander and analysis the classification of variables' are I(1), I(0).

Unite root test

In different economics and finance study its very necessary for the behavior study of the time sires of variables, and the stationery of the variables is important to test out nut will be according to the time sires of variables time sires stationary. If the variables are not stationary or stable, the result will probably be unacceptable .

In the analysis of data, the study was conducted through the stationary ADF test and in short and long-run relationship between the data using (Johansen co-integration) test with the re-integration test to test the impact of independence on dependent variables and LM test for identifying the economics and statistics issues. The relationship between the money supply and the government revenues, in the long run, is based on and is according to the F-statistic result. It is also according to the Wall test result by using new limitation on the estimation coefficient in the long run on the log level of the variables (money supply and government revenue) to be zero. Because the co-integration relationship was tested, the relationship between the variables in the short and long run.

However the stationary and the ADF results' most important steps are to trend the logarithms of variables.

Auto-regressive Distributed Lag Model

$$\Delta Ln\,\mathrm{Re} = \partial_0 + \delta_1 Ln\,\mathrm{Re}_{t-1} + \delta_2 LnM2_{t-1} + \delta_3 LnGDP_{t-1} + \sum_{i=1}^{n} \lambda_1 ln\,\mathrm{Re}_{t-1} + \sum_{i=1}^{n} \lambda_2 \Delta LnM2_{t-1} + \sum_{i=1}^{n} \lambda_3 \Delta LnGDP_{t-1} + \omega_T \quad \text{.....(3)}$$

$$\Delta Ln\,\mathrm{Re} = \partial_0 + {}_{t-1} + \sum_{i=1}^{n} \lambda_1 ln\,\mathrm{Re}_{t-1} + \sum_{i=1}^{n} \lambda_2 \Delta LnM2_{t-1} + \sum_{i=1}^{n} \lambda_3 \Delta LnGDP_{t-1} + \lambda_4 \omega_{T-1} + \omega_T \quad \text{...(4)}$$

The long-run equation Parameter follows the specification :

$$\Delta LnM2 = \partial_0 + \delta_1 LnM2_{t-1} + \delta_2 Ln\,\mathrm{Re}_{t-1} + \delta_3 LnCPI_{t-1} + \omega_T \quad \text{.....(5)}$$

Table 1. Variables Estimations

Variables	Meaning	Resource
(M2)	Real total money M2	The national office statistic of P.C. China
(Re)	The national government revenue	The national office statistic of China
(CPI)	Consumer Price Index	The China national office statistics of China

RESULTS AND DISCUSSIONS

Table 2. United root Test Result (ADF) (Eviews 10 output)

	Level		First difference	
	ADF	Result	ADF	Result
Re	3.283243	Stationary	2.263495	Stationary
M_2	2.282439	Stationary	2.222783	Stationary
GDP	2.289136	Stationary	2.886409	Stationary

Table 3. The Bound test result (Eviews 10 output)

F – statistic =18.0264 K=2		
Signification	**I(0)**	**I(1)**
10%	2.63	3.35
5%	3.1	3.87
2.5%	3.55	4.38
1%	4.13	5

Table 4. The Auto-regressive Distribute lag (ARDL) long-run relationship test result (Eviews 10 output)

Variables	coefficients	T. value	P.value
M2	0.845784	8.989298	0.0000
Re	-3.537932	-4.444452	0.0012
C	22529.61	13.54894	0.0000

EC = GDP - (0.8458*M2 -3.5379*RE + 22529.6070)

Table 5. The Auto-regressive Distribute lag (ARDL) Error Correction Representation Result (Eviews 10 output)

Variables	Coefficients	Standard error	T-statistics	P. value
D(M2)	2.183	2.05	0.15111	0.066
D(Re)	-1787.16	-3.88	8.32911	0.003
ECM (-1)*	-1.449	0.1497	-9.6818	0.000

Table 6. Granger Causality test (Eviews 10 output)

M_2-GDP	GDP-M_2	R_E-GDP	GDP- R_E	R_E-M_2	M_2-GDP
Yes	Yes	No	Yes	No	No

According to the table result above, when the P-value of M2 has indicated 0.00 value also, the P-value of government revenue indicted 0.0012 value, with constant P-value equal zero. This result interprets that (M2 and Re) have the long-run relationship with GDP and the current result support the study result of Yugang He (2017) where the study test the relationship between the Macroeconomic including the GDP and money supply. The test study indicates to have a positive relationship in both the long run and short run. The study by Anthony *et al* also indicates to have a positive long-run relationship between the GDP growth and money supply. In the case of Ghana also the present study test indicated to have positive long and short-run relationship between the money supply and the government revenues. The study also follows the study by Yukubu (2014) where the investigation result has a relationship with the money supply and Government revenues in the case of Nigeria, and in the same context of the study, the study by S.Dingela (2017). The study investigation indicated to have positive signification between the Gross domestic product (GDP) and the money supply. The study supported the current investigation both in the long and short run in the case of South Africa and is what explains the similarity of the economies of the emerging countries like China and South Africa and in another kind of economies. The study by N.M. Gatawa (2017) indicated adverse results to the current study results showing not to have any signification between the money supply and Gross Domestic Product. The same test indicated to have positive signification with inflation (controlled variable) and the result interpret the components of the Nigerian economy with the inflation rates high. That is what's reducing the volume of the Gross Domestic Product (GDP) and following the investigation of the relationship between Government revenues and money supply, the result was positive, indicating a negative signification between the local government revenues and money supply (Cordelia, 2019). It was also a study contrary to the results of the current study between the state of China and Nigeria, where the results in the Chinese case is a

positive relationship. This is due to the different composition of the economy between the two countries and according to the table above, all the test variables are significant at 95% level in the estimation error correction model. The ECM test indicates that the percentage value of short-run imbalance was adjusted from different periods to reach the long-run equilibrium, or how many periods it takes the GDP to return to the long-run model estimated statistical significant at -1.449. So the model obtained 68% to estimate the model statistical significant. The study result was coming following the study of **(**Ibi & al .2019) when the study indicate the money supply and government revenues from taxes have an impact on the global growth economic. And have other several study and in similar study by (Xiuping. 2019) when the study analysis the monetary policy and the GDP which indicate the positive relationship between the borrowed money and GDP level also the author find on the positive relationship between the local government revenues and the monetary policy witch Noting the high level of money borrowing in China and its impact on growth in general. Also, the empirical study of Jounghyeon (2019) when test the relationship between the exchange rate and the money supply and the how can affect the economic growth which was indicated the positive relationship between the emigration and exchange rate on the supply money and positive impact on the growth of economic factors when the GDP is one of the important factors of economic growth.

Figure 1. China Government Revenue 1990-2018

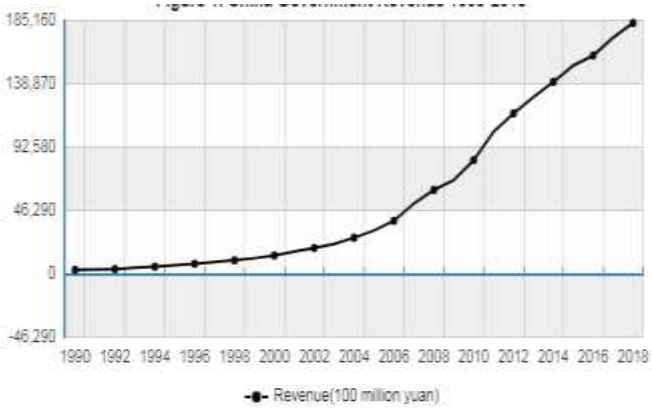
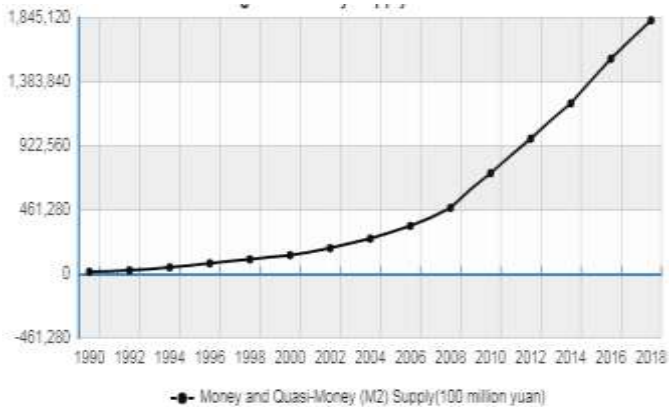


Figure 2: Money Supply 1990-2018

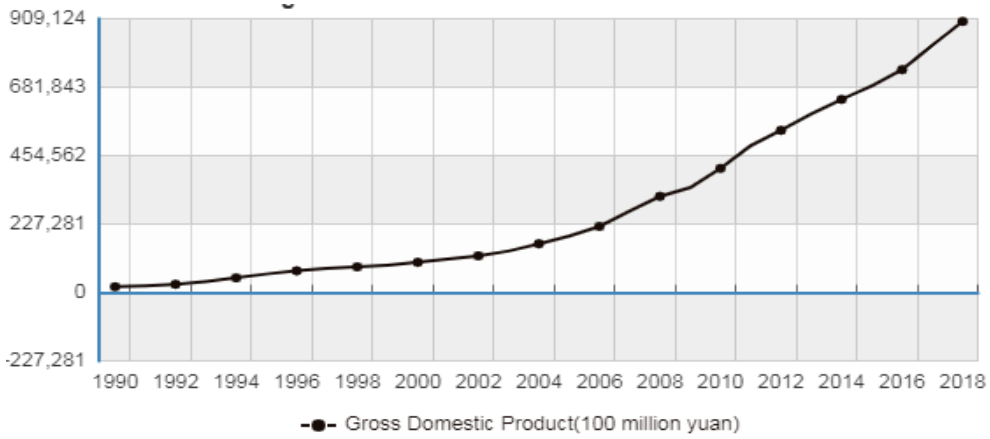


Source: Compiled from the National Bureau of Statistics of China http://www.stats.gov.cn/tjsj/

According to the figures above, observe the curve and interpret the development of China's government revenue in the study period between 1990-2018. We note the slow growth of government revenues where the policy of taxation and promotion of direct and indirect investment to a fiscal exemption and a large tax resulted in the loss of a large amount of the Chinese government revenues represented by direct and indirect tax taxation. The slow growth

of government revenues during the year 1990-1994 spectrum due to the lack of sufficient control experience to run the process of economic openness and control. The policy of taxation and promotion of direct and indirect investment to a fiscal exemption and a large tax resulted in the loss of the Chinese government revenues, represented by direct, indirect and tax taxation. But soon the financial reform of 1993, including the reform of the tax and taxation sector, resulted in the acceleration of the growth and increase in the volume of government revenues to the tax-exempt level in 2015, which had a direct effect on the government revenue.

Figure 3: GDP 1990-2018



Source: Compiled from the National Bureau of Statistics of China http://www.stats.gov.cn/tjsj/

Note: Unite (100 million yuan)

We notice such a growth trajectory forming in sync with the birth of China's prevailing economic reform when China's government revenue's history was rewritten through China's economic reform in 1994. Based on the GDP curve above we see the growth of the GDP value was slow between 1990-1994, and this was before China's economic reform. In the period between 1994-2004, the GDP growth was fast. There was casual change on the growth speed because China in 2004 entered the WTO and led China's government to adopt a new economic policy and technique. China's economic activity will be more active and more productive. This will impact China's government revenues from the economic activity and also impact china money supply value which activates the economical cycle.

COSUMQ and CUSUM

The short and long-run coefficient stability test used cumulative sum and sum squares test and based on the Bahamani and Okooee (2001) observation, the regression coefficients stability test and the stability can interpret as to if the equation is stable or not over the time. This test is

used especially in the case of time series in cases where the stability of the series is not confirmed, especially in cases of not being sure whether the vector coefficient of null hypothesis will be the same in all the study period.

The COSUMQ and CUSUM are plotted according to 5% as bound critical bound and the based to the Bhamani and Oskaloosa and wing (2002) observation, we can't reject the null hypotheses if the coefficients error correction is stable and the bound critical value 5 %.

The residuals recursive is plated in Figures 4 as the plots show the graphs with critical boundaries which the parameters of the models stably follow the critical bounds.

Figure 4: Cu-sum plot

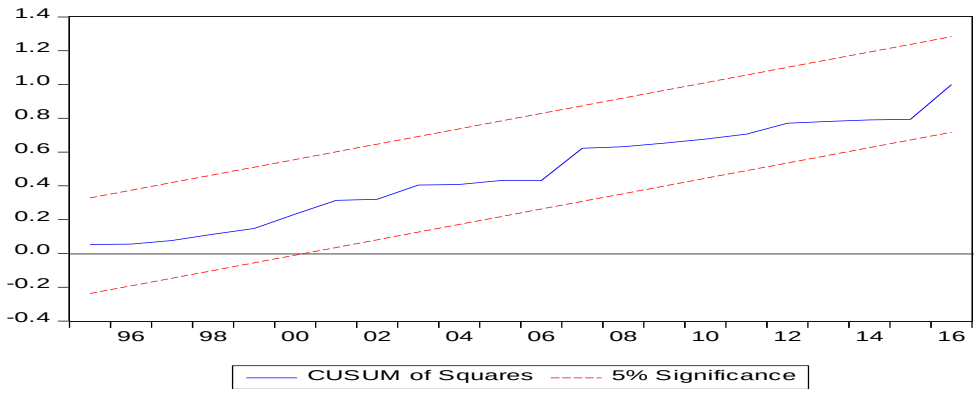
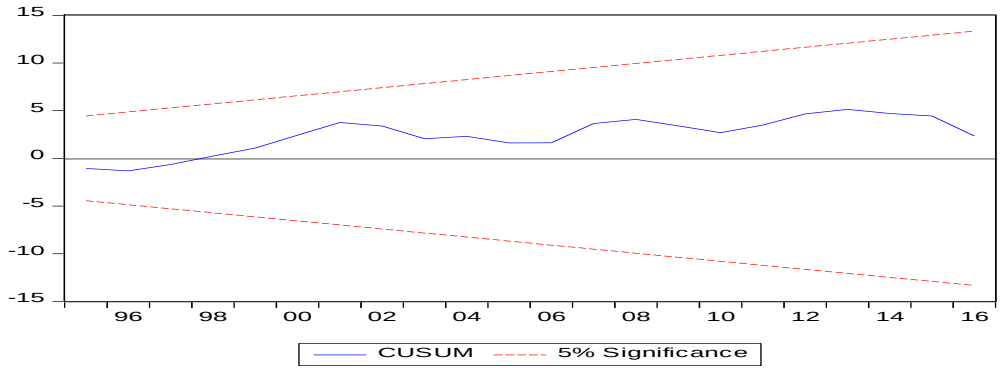


Figure 5: Cu Sum squares Plot



From the Cu-sum and cu sum squares, Plot graph indicate the stabilization of the model

CONCLUSION

The study above was an analysis of the relationship between the variables (money supply and the government revenues) in both long and short-run in China and the study adopted the ARDL Model with the ADF technique. Where the main objective of the study is to analyze the

relationship that exists or can exist between the variables of monetary policy and government revenues and its reflection on economic growth in both the short and long term that the study, in the end, deviated from some of the main objectives that were necessary in order to apply The standard analysis, including the uncertainty of time series instability, led us to reduce the number of variables, which is due to the nature of the Chinese economy, which is a direct economy and politics has a fundamental role in it and in economic decisions that the study had preliminary results but still need studies Future and expansion of the sample and within the framework of the road and belt group, which is the most important objective of which is financial cooperation using more diverse variables and expanding the size of the sample using the techniques of the economy, which is not harmful to the stability of time series in them such as the generalized method of moments (GMM) but in general. The study shows and indicate a positive direct relationship between the variables in the long run and to have a negative result between the government revenue and money supply in a short time. In the case of China also the general result indicates the government revenue drive the money supply in China, at least at the period of the test. The study recommendation address the monetary policy needed to find the difference why the revenues give more support to the national revenues because the revenues have a direct effect on economic growth.

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