THE GOVERNANCE OF FEDERAL DEBT IN THE UNITED STATES OF AMERICA

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Abstract

The United State of America has been experiencing high debt to GDP ratio of more than 100% and these Public debts are detrimental. The main purpose of this study was to examine the shocks of the variables on others in the USA economy by using quarterly data. The variance decomposition and the Generalised Impulse Response Function techniques were employed to analyse the data. The result revealed that high variation of shocks in real federal debt is explained by their own innovations in the short run, by CPI followed by real federal debt its self. In the long run, this leads to CPI and real government spending. The GIRF reveals that in the short run, real federal debt responds negatively to shocks from CPI, real federal interest payment and real federal government tax receipts and positively to real federal debt and real government spending. In medium term, only real federal government tax receipts are negative while the others are positive. In the long run, the response are all positive to shock from the independent variables. The results lead to the recommendation that the US government should focus on real federal debt in the short run. In the medium term, US government should focus on increasing real government spending and reducing only real federal government tax receipts. In the long run the target should real be federal debt, CPI, real federal interest payment, real government spending and real federal government tax receipts.

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1. INTRODUCTION

The United State of America (USA)'s public debt has been increasing in recent years with value of 102.98% to gross domestic product (GDP).This has been stated by the United State (US) Bureau of public debt. Thornton (2012) argues that the USA had a large deficit which was lower, it was mainly as a result of wars (1812 war, the Civil War and the First and the Second World Wars). Abel, Bernanke and Croushore (2008) suggest that the debt to GDP increased to more than 100% during World War II and later reduced over a 35 year period. Another huge deficit occurred in 1933 during the Great Depression whereby the USA had a deficit of 6.6% (IMF, 2013). According to Thornton, the problems started when the government increased spending significantly without corresponding tax revenue increases in the 1970s. From mid-1974, the Congressional Budget Act was reformed such that the congress could not challenge the president's budgets. This led to difficulties in the control of deficit. As a result in 1980, the USA experienced a rise in debt due to budget deficit lower than 50% (Abel *et al.,* 2008). From 1980 to 1989 military spending was increased while taxes were lowered and the congressional democrats blocked any attempt to reverse spending on social programmes. Later on public debt was reduced due to decreases in military spending after the Cold War from 1993 to 2001 (Thornton, 2012).

It is argued that in the early 21th century, sovereign debt increased due to President Bush's tax cuts, increase in military spending due to two wars and the entitlement Medicare programme. As a result from 2001 the USA public debt stood at $5.7 trillion and by the end of 2008, it rose to $10.7 trillion mainly because of Bush's actions. Furthermore, public debt increased due to the Global Financial Crisis (GFC) that started in 2008. In 2010, the debt increased due to a decrease in tax revenues and tax cuts and by early 2012, the sovereign debt was estimated at $15.5 trillion, about 101.99% of GDP (Baccia, 2013). Despite the debt ceiling of $15.2 trillion in 2011 that increased to $16.4 trillion in 2012 by the Budget Control Act of 2011, debt of the USA kept on increasing. In February 2013, the president and the congress suspended the debt limit and in May 2013, the debt ceiling was increased to $16.7 trillion (Baccia, 2013). By October 2013, the US government had to increase the May 2013 debt limit in order to avoid default.

Rising government debt has negative effects on the economy of a country because they create a burden for future generations since taxes have to be raised. Another reason is that high public debt can cause an economy to go bankrupt. This is based on Smith's (1776) notion that a government should not get into deficit spending because it is not good for a nation even if the debt is domestic. Smith argues that when a government borrows and has to repay the debt, it adopts the following measures: increase in taxation, increase in the flight of domestic capital

as well as devaluation of the local currency. Pannizza and Presbitero (2012) maintain that sovereign debt seriously reduces the growth of a country towards wealth and prosperity because resources that could have been used by the private sector in a positive way are directed to the government and used in unproductive activities.

Several studies have been conducted on this topic with a special emphasis on developing economies and just a little of them have been directed towards developed economies. This study will attempt to provide a contribution by adding to the literature on the response to shocks of government debt from other variables in a developed economy. The study will also employ variance decomposition and GIRF techniques which have not been used often to analyse the shocks on government debt. The analysis is envisaged to assist policy and decision-makers to determine which variables to target in order to reduce the rising government debt. We hope that this will go a long way in building confidence among them in the implementation of policies and strategies to reduce the rising government debt.

This paper thus examines the effects of the response of shocks of government spending and tax receipts on federal debt in the USA. This is attained in the following sections: section 2 will be the theoretical framework and literature review while section 3 is the methodology. Section 4 presents the empirical finding and finally the last section 5 is conclusion and recommendation.

2. THEORITICAL FRAMEWORK AND LITERATURE

According to Blanchard (2011), deficit is the amount of money which a government can borrow during a period of time, and to the budget deficit of the year, t is given as:

$$Deficit_t = rD_{t-1} + G_t - T_t \quad (1)$$

where D_{t-1} is government debt at the beginning of year t, r is the constant interest rate, rD_{t-1} is the real interest payment on the government debt in period t, G_t is the government spending on goods and services during year t, T_t is taxes minus transfer during year t.

Furthermore the government budget constraint is the change in government debt during a period of time *t* which is the same as the deficit during year *t*:

$$D_t - D_{t-1} = Deficit \quad (2)$$

If a government runs a deficit, the debt increases and if it runs a surplus, the debt decreases. This is expressed as:

$$D_t - D_{t-1} = rD_{t-1} + G_t - T_t \quad (3)$$

where $G_t - T_t$ = Primary deficit, $D_t - D_{t-1}$ = change in the debt, rD_{t-1} = interest payment.

It becomes:

$$D_t = (1+r)D_{t-1} + G_t - T_t \quad (4)$$

At the end of the period *t*, debt equals $(1+r)$ multiplied by the debt at the end of period $t-1$. The implication of a one period decrease in taxes for the path of debt and the future taxes assume that until year 1. In that case, the government has balanced its budget so that the initial debt is equal to zero. To repay such debt, the government must have a surplus which equals to $(1+r)^{t-1}$ for the year t. If taxes are reduced by 1 in period 1, this would cause an increase in taxes of $(1+r)^{t-1}$ during period *t*. The effect is that if the government does not change its spending, there will be an increase in future taxes and the real interest rates will increase and eventual taxes will also increase.

Empirical studies such as Heylen *et al.* (2013) maintain that both permanent cut in expenditure and increase in tax contribute significantly to the reduction of debt in the long run. Cutting down subsidies and public sector wage bill are effective in reducing debt when the public sector is efficient in administration. This has more effects in the long run as compared to the short run. Von Hagen, Hallett and Strauch (2002) argue that expenditure cuts, especially on wage component of public spending make fiscal consolidation to be more successful than tax increases.

Alesina and Ardagna (2009) state that when there is fiscal adjustment, spending cuts are more effective than tax increase in stabilising debt and avoiding economic downturns. When there is permanent increase in tax and/or decrease in spending, it reduces the danger of costly fiscal adjustment in the future thus generating a positive effect on wealth. According to Agnello *et al.* (2013), spending-driven fiscal consolidation programmes have a better chance of success than tax-driven fiscal consolidation and cuts in public investment. At the same time, interests and inflation rates need to be carefully addressed as a means of obtaining a signal of the successfulness of the fiscal consolidation programme. As emphasised by Heylen *et al.* (2013), when the government is efficient, fiscal consolidation is more effectively realised. Also, a government that uses expenditure cut is more significant in fiscal consolidation than other governments. With the product market deregulation, fiscal consolidation policies are significantly more successful because where there is competition, there is productivity and growth as well. As emphasised by Agnello *et al.* (2013), factors that may have an impact on the probability of having successful fiscal adjustments are timing of austerity measures, and the size of the austerity as well as its composition. When the consolidation is gradual, it is more successful than when it is done with full force. On the other hand, Von Hagen *et al.* (2002) prove that when fiscal consolidation lasts for a relatively long period of time, the adjustment process will last for a relatively long period, the reverse is higher. The size of the fiscal consolidation programme is determined by the commitment of the government to achieve long-term sustainability of public debt (Giavazzi & Pagano, 1996).

Yet another study was conducted on the determinants of public debt using panel data for

various countries by Sinha, Arora and Bansal (2011). Their results revealed the effect of central government expenditure, education expenditure and current account balance on public debt in these countries. Similarly, inflation and foreign direct investment of these countries did not determine public debt in high income groups. It turned out that GDP growth rates were the only variables that affect debts the most in all the countries. When the average of the public debt was considered, the forecasts results of countries with high income revealed a constant increase over the periods while middle income showed that the debt may worsen over the next 5 years.

Two other important studies are by Blanchard and Perotti (2002) and Agnello *et al.* (2013) who are of the opinion that positive government spending shocks increase output and private consumption. They also contend that the government spending shocks have a crowding-out effect over private investment while positive tax shocks have a negative effect on output and private spending. When tax reforms are implemented alongside labour market reforms, fiscal adjustment increasingly gets successful. Furthermore, Agnello *et al.* argue that budget deficits, level of public debt, degree of openness, inflation rates, interest rates as well as GDP per capital are important to the implementation of fiscal consolidation. Also, when consolidation is spending-driven, its implementation period is shorter than when it is tax-driven. But both types of fiscal consolidation have longer duration period in countries out of Europe compared to countries in Europe which do not significantly affect duration. Hence, spending cuts bring an economy into sustainable path for public debt. So far, the studies reviewed by this paper did not examine the effects of shocks on government debt. The first study to be considered on the issue is by Blanchard and Perotti (2002).These scholars carried out a study in order to identify exogenous changes in fiscal policy and to further estimate fiscal multiplier both on the tax and spending side of the government using the structural VAR. They found out that positive government spending shocks increase output and private consumption and have a crowding-out effects over private investment while positive tax shocks have a negative effect on output and private spending. The study is complemented by yet another which was conducted by Wheeler (1999).This researcher studied the impact of government debt in US using variance decomposition and impulse response functions for the 1980s and 1990s in that study, he tested the Ricardian Equivalence hypothesis focusing on the effects of government debt on output, price level and interest rates. The results revealed significant negative relationships between government debt on interest rates, price level and output.

While Blanchard and Perotti's (2002) focus was on output and private consumption and Wheeler (1999) on interest rates, price level and output; this study focuses on real federal government tax receipts, real government spending, consumer price index and real federal interest payment. The question raised and tested is as follows: does the real federal debt respond positively to shocks from consumer price index, real federal interest payment as a percentage of GDP, real federal government constant tax receipts as a percentage of GDP and real government spending as a percentage of GDP in the USA?

3.EMPIRICAL INVESTIGATION (METHODOLOGY)

3.1.Data and Model Specification

Based on the government budget constraint, the following variables were selected for the US model using the quarterly data: Federal Debt (FDEBT), Consumer Price Index (CPI), Federal Interest Payment (FINTP), Federal Government Current Tax Receipts (FTAX) and Government Spending on goods and services (GSPEN).

The functional form of this study is as follows:

$$FDEBT_t = f(CPI_t, FINTP_t, GSPEN_t, FTAX_t) \quad (5)$$

All the variables are expressed in real terms and as a percentage of GDP where R stands for real and G_t for percentage of GDP. As a general trend, most economic time series tend to exhibits strong trends with time, hence the data is transformed into logarithmic values. This brings about a stable pattern in the data over time and avoids heteroskedasticity throughout the period of study. Asteriou and Hall (2006) argue that this brings about the elimination of fluctuation tendencies when individual variables are expressed as logarithms. The coefficients of such variables are interpreted as elasticities. Therefore, the debt reduction model for the USA using quarterly data is expressed as follows:

$$l(RFDEBT_t) = \beta_o + \beta_1 l(CPI_t) + \beta_2 l(RFINTPG_t) + \beta_3 l(RGSPENG_t) + \beta_4 l(RFTAXG_t) + \varepsilon_t \quad (6)$$

3.2. Estimation Techniques

The Variance decomposition and the GIRF are estimated based on the VAR model to reveal the dynamics of the variables of interest. The steps involved are as follows:

3.2.1.The Ng Perron (NP) unit root test

In order to analyse the unit root conditions of the variables understudy, the NP unit root test was preferred over the commonly used Augmented Dickey-Fuller and the Phillip-Perron tests because of their low power in their null hypothesis against the alternative for stationarity (Dejong, Nankervis, Savin and Whiteman, 1992). The NP test deals with these problems by detrending through the Generalised Least Square (GLS) estimator. This helps to improve the power of the test when there is a large Autoregressive (AR) root and when there is reduction in the size of distortion if there is a large negative Moving Average (MA) root in the differenced series. Also, NP test modifies lag selection criteria accounts, hence avoiding the choice of wrong lag length. After a stationarity test, the

next step is to determine the appropriate lag length for further analysis.

3.2.2. Lag Length Selection Criteria

VAR models are mostly used in forecasting and analysing the effect of structural shocks. It is therefore critical to determine the appropriate VAR lag length in order to avoid inconsistencies in VAR results. In order to have error terms that are normally distributed, homoscedastic and do not have autocorrelation, according to Asterious and Hall (2007), it is also advantageous to select an appropriate lag length n. The selection of the lag length will be based on Asterious and Hall's (2011)'s accession that the optimal lag length is the one with the lowest value.

3.2.3. Variance Decomposition

It reveals the shocks that are mostly explained by variation on a variable over time. The forecast error variance decomposition tells the proportion of the movements in a sequence due to its own shocks versus shock to other variables (Enders, 2010). When the total forecast error variance is explained by shocks of other variables, then the variable is endogenous and if the total forecast error variance is explained by shocks in the variables itself, then the variable is exogenous.

Enders (2010) explains the variance decomposition by using a VAR model

The conditional expectation n-step forecast error ahead is:

$$E_t x_{t+n} = (I + A_1 + A_1^{\,2} + \ldots + A_1^{\,n-1})A_o + A_1^{\,n} x_t \quad (7)$$

and has its forecast error as:

$$e_{t+n} + A_1 e_{t+n-1} + A_1^{\,2} e_{t+n-2} + \ldots + A_1^{\,n-1} e_{t+1} \quad (8)$$

This n-step-ahead forecast can be broken down into proportions resulting from each shock whereby, the shock in ε_{yt} and ε_{zt} respectively on $\sigma_y(n)^2$ is expressed as:

$$\frac{\sigma_y^2\left\{\phi_{11}(0)^2 + \phi_{11}(1)^2 + \ldots + \phi_{11}(n-1)^2\right\}}{\sigma_y(n)^2} \quad (9)$$

$$\frac{\sigma_z^2\left\{\phi_{12}(0)^2 + \phi_{12}(1)^2 + \ldots + \phi_{12}(n-1)^2\right\}}{\sigma_y(n)^2} \quad (10)$$

Forecast error variance decomposition expresses the proportion of movement in a sequence due to its own shocks against the shocks to other variables.

3.3.1. Generalised Impulse Response Function

According to Asteriou and Hall (2011), an impulse response function identifies the responsiveness of a dependent variable in a VAR model to a shock in the error term. Furthermore, Sims (1980) indicates that impulse response allows one to trace out the effects of different shocks over time on variables in a system of equations in a VAR model. In this study, the Generalised Impulse Response Function (GIRF) was used in the place of Impulse Response Function (IRF).The rationale for this is that GIRF is not sensitive to the way variables are ordered in a VAR additionale, IRF gives distorted results if important variables are omitted.

Enders (2010) presents the GIRF of a VAR of variable y_t as:

$$y_t = \sigma V_t + \sum_{i-1}^{\infty} \Pi_i y_{t-1} + \varepsilon_t \quad (11)$$

where V_t stands for the deterministic vector of the variables and, ε_t is the error term. Since y_t is forecast n steps ahead, our equation above is expressed as:

$y_{t+n} - E\{y_{t+n} \mid \lambda_t\} = \sum_{j=0}^{n-1} C_j \varepsilon_{t+n-j}$ with λ_t being the set of information of y_t and V_t is the time path. C_j being the $C_j = \sum_{i=1}^{\min k,j} \Pi_i C_{j-i}$ and $C_0 = 1_p$ where $j \geq 1$.

The GIRF becomes

$$GI_X(n, \sigma, \lambda_{t-1}) = E\left[y_{t+n} \mid \varepsilon_t = \sigma, \lambda_{t-1}\right] - E\left[y_{t+h} \mid \lambda_{t-1}\right] \quad (12)$$

where σ is the known vector, $GI_x(h, \sigma, \lambda_{t-1}) = C_h \sigma$ represents a VAR that depends on the shock of σ .

4.FINDINGS AND DISCUSSION EMPIRICAL RESULTS

This section presents the analysis of the data and the interpretation of the findings of all the techniques employed in this study.

4.1.The NP Unit Roots

The study employed NP tests techniques to analyse stationarity of the variables and it was found that they are all non-stationary at level form and became stationary at first difference I(1) as illustrated in Table 1.

Table 1. Unit root test results

		Result At Level And Conclusion			*Result at First Difference and Conclusion*		*Conclusion*
VARIA-BLES	MODEL SPECIFI-CATION	MZA (LAGS)	MZT	CONCLUSION	MZA (LAGS)	MZT	
LRFDEBT	Intercept	-3.846(1)	-1.347	Non stationary	-9.676* (3)	-2.194*	Stationary, I(1)
	Trend and Intercept	-4.021(1)	-1.317	Non stationary	-48.421** (0)	-4.883**	Stationary, I(1)
LCPI	Intercept	1.255(5)	2.562	Non stationary	-0.096(4)	-0.074	Stationary, I(1)
	Trend and Intercept	-0.342(1)	-0.202	Non stationary	-3.487(4)	-1.285	Stationary, I(1)
LRINTPG	Intercept	1.506(4)	2.067	Non stationary	-0.876(7)	-0.510	Stationary, I(1)
	Trend and Intercept	-2.885(1)	-1.196	Non stationary	-11.706(3)	-2.411	Stationary, I(1)
LRSPENG	Intercept	-0.588(0)	-0.289	Non stationary	-9.999*(3)	-2.035	Stationary, I(1)
	Trend and Intercept	-15.563(4)	-2.776	Non stationary	-13.509(3)	-2.539(3)	Stationary, I(1)
LRFTAXG	Intercept	-0.543(4)	-0.283	Non stationary	-6.154(3)	-1.709	Stationary, I(1)
	Trend and Intercept	-66.999** (4)	-5.773**	Stationary	-8.503(3)	-2.060	Stationary, I(1)

** Reject H0: non-stationarity at a 5% level*
*** Reject H0: non-stationarity at a 1% level*

4.2.VAR Lag Order Selection Criteria

According to Liew (2004) AIC and FPE criteria results are recommended for estimation of the autoregressive lag length hence Lag 5 was chosen and used in subsequent tests. The test results are presented in Table 2.

Table 2. Results of Lag length

LAG	*LOGL*	*LR*	*FPE*	*AIC*	*SC*	*HQ*	*CONCLUSION*
0	543.382	NA	1.17e-10	-8.684	-8.570	-8.637	Not chosen
1	1693.224	2188.409	1.54e-18	-26.826	-26.144*	-26.549	Not chosen
2	1750.882	105.086	9.11e-19	-27.353	-26.102	-26.845*	Not chosen
3	1777.036	45.559	8.98e-19	-27.372	-25.552	-26.632	Not chosen
4	1802.463	42.242	9.00e-19	-27.378	-24.990	-26.408	Not chosen
5	1840.955	60.842*	7.35e-19*	-27.596*	-24.639	-26.395	Chosen
6	1858.213	25.887	8.52e-19	-27.471	-23.946	-26.039	Not chosen
7	1875.592	24.667	9.95e-19	-27.348	-23.254	-25.685	Not chosen
8	1896.070	27.414	1.12e-18	-27.275	-22.613	-25.381	Not chosen

*It should be noted that * indicates the best lag order selected by each criteria*

4.2 . Variance Decomposition Analysis Results

The results of variance decomposition of real federal, debt are represented in Table 3. The focus of interpretation will be on the dependent variable (real federal debt) over twenty quarters. High variation of shocks in real federal debt is explained by their own innovations in the first year from the 1st until the 4th quarter (short term) by 82.96%. In the 12th quarter (medium term), variation of shocks in real federal debt is mostly explained by CPI with 36.49%, followed by itself with 20.24%, its followed by real federal government tax receipts with 19.39% and 18.96% from real government spending. In the 20th quarter which is the long term, variation of shocks in real federal debt is mostly CPI with 31.94%, followed by real government spending with 31.59%, real federal interest payment with 14.27% and 11.63% by real federal government tax receipts. Hence government in the short run should focus on real federal debt while in the medium term, focus should be on CPI and then real federal debt itself, real government spending and real federal government tax receipts. In the long run, focus should be on CPI and real government spending and then on real federal interest payment and real federal government tax receipts. This is contrary to Alesina and Ardagna (2009) who maintain that spending cuts are more effective than tax increase in stabilising debt and it could be due to the fact that the US government has been lowering its taxes in the past years.

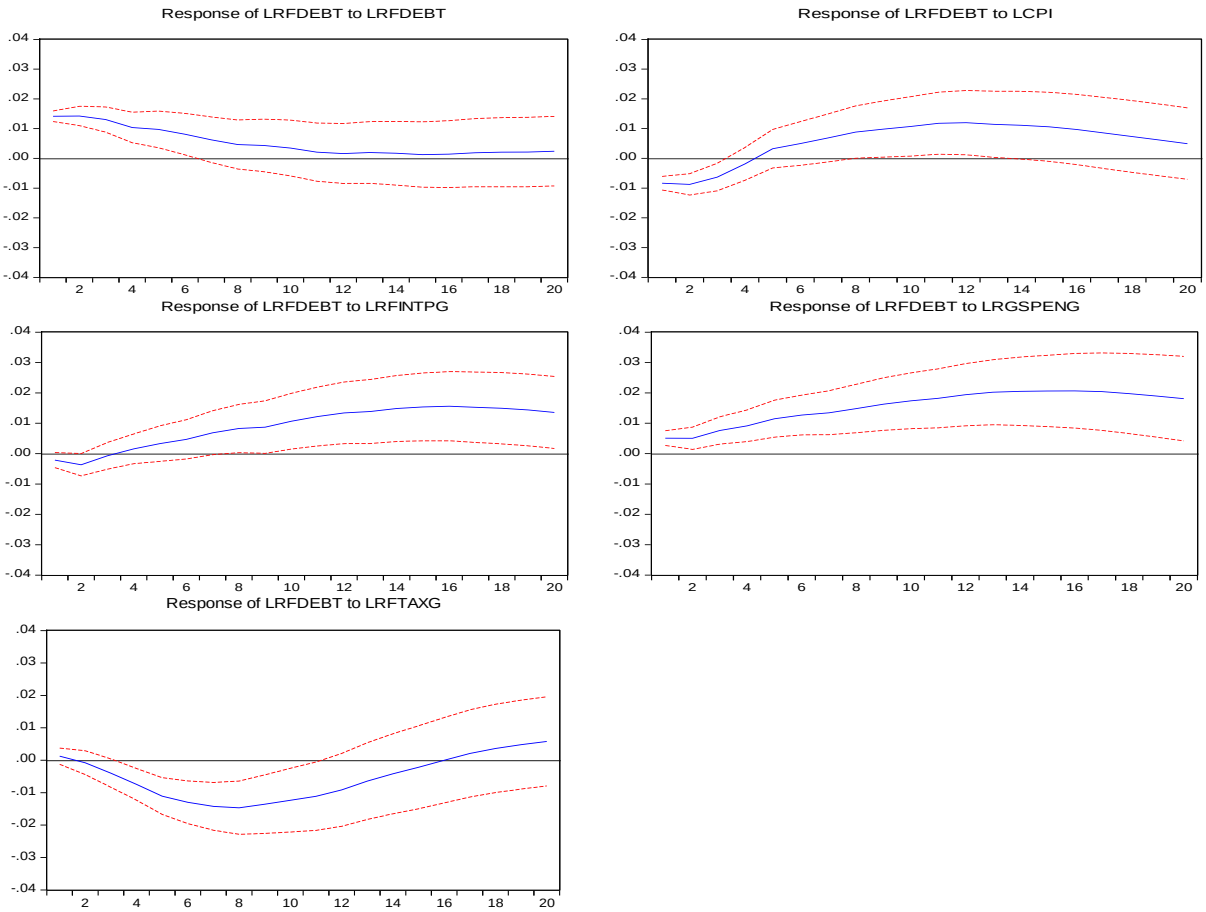
Table 3. Variance Decomposition Results of LFDEBT

PERIOD	*S.E*	*LRFDEBT*	*LCPI*	*LRFINTPG*	*LRGSPENG*	*LRFTAXG*
1	0.0135	100.000	0.000	0.000000	0.000000	0.000000
1	0.014	100.000	0.000	0.000000	0.000000	0.000000
2	0.020	98.452	0.040	0.547223	0.025538	0.936065
3	0.025	93.587	0.538	0.440006	1.145672	4.289590
4	0.029	82.975	3.836	0.556251	2.990213	9.642252
5	0.034	66.903	13.446	0.464653	4.458964	14.72724
6	0.039	54.465	19.635	0.553842	6.295237	19.05034
7	0.044	44.556	24.001	1.038956	8.001786	22.40208
8	0.050	36.706	27.690	1.561355	10.07190	23.97018
9	0.054	31.095	30.95451	1.917482	12.38287	23.65000
10	0.059	26.721	33.46309	2.683371	14.65994	22.47219
11	0.064	23.167	35.33662	3.670437	16.95060	20.87539
12	0.068	20.324	36.49392	4.831220	19.39262	18.95871
13	0.072	18.132	37.11836	5.979875	21.75570	17.01387
14	0.076	16.332	37.23854	7.313950	23.82728	15.28862
15	0.080	14.832	36.86737	8.690274	25.73164	13.87814
16	0.084	13.587	36.13762	10.05954	27.39990	12.81579
17	0.087	12.583	35.22338	11.26262	28.79382	12.13720
18	0.090	11.764	34.16453	12.39505	29.91724	11.75877
19	0.093	11.096	33.04348	13.41021	30.84559	11.60518
20	0.096	10.561	31.94326	14.27175	31.59363	11.63023

4.4. Generalised Impulse Response Function Results

The GIRF estimated on the VAR model shows how federal debt respond to shocks from the variables in this study. The results are presented in Figure 3. The movement above the zero line indicates the positive effect while below the zero line is the negative effect. Furthermore the interest is on the response of real federal debt to the shocks of the independent variables.

Figure 3. Response of LFDEBT to independent variables



Based in Figure 3, in the short run, that is the fourth quarter, the response of real federal debt to shocks from the independent variables are as follows: positive to real federal debt, negative to CPI, negative to real federal interest payment, positive to real government spending and negative to real federal government tax receipts. In the medium term (12^{th} quarter), real federal debt respond positively to shocks from real federal debt CPI, real federal interest payment, real government spending, real federal government tax receipts and negatively spending real federal government tax receipts. In the long run (20^{th} quarter), real federal debt responds positive to shocks from real federal debt, CPI, real federal interest payment, real government spending and real federal government tax receipts. This means that in the short run, as soon as real federal tax and real government spending increases, real federal debt will increase. Also, as CPI, real federal interest payment and real federal government tax receipts increases, real federal debt will decrease. In the medium term, as real federal government tax receipts increases real federal debt will decrease while real federal debt will increase as all the other variables increases. In the long run real federal debt respond positively to shocks from real federal debt, CPI and real government spending and then on real federal interest payment and real federal government tax receipts. This means that the government can increase CPI, real federal interest payment and real federal government tax receipts in the short run only for real federal debt to decrease. Real federal government tax receipts can also be increase until the medium term and real deferral debt will decrease.However, in the long run, if any of the variables increases real federal debt will increase. The implication is that the US government needs to adopt a twin-policy, one that focuses on addressing government spending and the other looking at increasing tax revenues in the short and medium term. Also, it should increase CPI and real federal interest payment in the short run only.

5. CONCLUSION

Many developed economies are battling on how to reduce their debts. The main purpose of this study was to examine the shocks of the variables on others in the USA economy by using quarterly data. High variation of shocks in real federal debt is explained by their own innovations in the short run. In the medium term, variation of shocks in real federal debt is mostly explained in the following starting from CPI, and followed by real federal debt its self, real federal government tax receipts, real government spending and on real federal interest payment. In the long run, the order of variation of shocks in federal debt are: CPI, real government spending, real federal interest payment and real federal government tax receipts. The GIRF reveals that in the short run, real federal debt responds negatively to shocks from CPI, real federal interest payment and real federal government tax receipts and positively to real federal debt and real government spending. In the medium term, only real federal government tax receipts is positive and the other variables in negative. In the long run, the response are all positive to shock from the independent variables.

The results recommend that the US government should focus on real federal debt in the short run. If CPI, real federal interest payment and real federal government tax receipts are increase to reduce real federal debt as reveal in the GIRF, its variation is not much on real federal debt. In the medium term, US government should focus on increasing real government spending and reducing only real federal government tax receipts which it is already doing. In the long run the target should be on reducing real federal debt itself, CPI, real federal interest payment, real government spending and real federal government tax receipts with more focus on CPI and real government spending which has high variation of shocks in real federal debt.

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