Tax Cuts And Interest Rate Cuts: An Empirical Comparison Of The Effectiveness Of Fiscal And Monetary Policy

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Abstract:

Can expansionary fiscal or monetary policy stimulate the U.S. economy in light of recent events? Using an Error-Correction-Vectorautoregression, we examine the relative effectiveness of both types of governmental stabilization policy. Unlike previous studies, we use a more general error correction vectorautoregression (ECM) approach. Our focus is on determining the relative explanatory power of measures of monetary policy (M2 and the Federal Funds Rate) and fiscal policy (marginal income tax rates and government spending) in explaining movements in consumption, investment, and output. Results suggest that monetary policy is relatively more powerful than fiscal policy.

Introduction

The United States federal government, having enjoyed three years of budget surpluses during the late 1990s, seemed to be on the verge of a new era of expansionary fiscal policy. Recent events, most notably President Bush's tax cuts, the Iraq War, and the terrorist attacks of September 11, 2001, have prompted renewed discussion of the relative merits and perceived need for discretionary fiscal policy to help prop up a somewhat uncertain macroeconomy. Indeed, the U.S economy has seen vast stimulative fiscal policy since President Bush took office in early 2001.

As explained in Taylor [2000], the modern role of fiscal policy in the broader spectrum of stabilization policy is largely undetermined, especially given the recent successes of the Federal Reserve in conducting prudent monetary policy. The large federal budget deficits of the 1980s and early 1990s became commonplace, making discretionary fiscal policy more politically and financially difficult. Consequently, during this time period, the Federal Reserve focused on fighting inflation and became very successful in managing the macroeconomy throughout the longest economic expansion on record. The economic question remains, however, whether President Bush's immense stimulative fiscal policy is useful, or even merited, during a time when interest rates are at a 40-year low.

We examine the relative effectiveness of both types of policies in the context of modern time series econometrics. The Federal Funds interest rate was cut over ten times in 2001 and, as of this writing, stands at 1 percent, its lowest level in over 40 years. Can and did this aggressive monetary policy help the U.S. recover from its most recent recession? If so, how long does it take for expansionary monetary policy to stimulate the economy? If monetary policy is effective, what is the role of fiscal policy?

Following a brief discussion of our motivation for undertaking this research and an overview of some recent studies in Section 2, we outline our econometric methodology and describe our data in Section 3. Results are presented in Section 4, followed by a conclusion. In sum, our results indicate that monetary policy is relatively more successful than fiscal policy at generating movements in consumption, investment and overall output.

Motivation and Prior Literature

The relative importance of monetary and fiscal policy has been one of the most debated issues in economics. Friedman and Meiselman [1963] found that consumption was correlated with changes in money but not fiscal variables, suggesting that monetary policy exerts a stronger impact on taming business cycles than fiscal policy. As noted in Ansari [1996], monetarists used a "St. Louis" style equation to argue against the effectiveness of fiscal policy based on its inflationary and crowding-out effects.

In a recent survey of this topic, Taylor [2000] notes that counter-cyclical discretionary fiscal policy was not considered to be an option during the 1960s and 1970s, largely as a result of theorists such as Friedman and Meiselman. During the 1980s and 1990s Federal Reserve monetary policy became more reactive, explicit, and systematic towards changes in output and inflation, which may have further diminished the need for fiscal policy.

In contrast, Keynesian economists have long suggested that increases in government spending or income tax rate cuts increase aggregate demand, thus eventually increasing output. Thus, as Nottage [2001] suggests, the recent federal income tax cut package may have a stronger direct impact for individuals in the U.S. economy than the Federal Reserve interest rate cuts.

A number of earlier studies have examined the impacts of fiscal and monetary policy on various aggregates. This research can be divided into theoretical and empirical analyses. As examples of the former, Taylor [1993] and Blanchard and Perotti [1999] are among those who provide evidence that fiscal policy can affect GDP. Additionally, Chari and Kehoe [1998] develop a set of theoretical policy rules that are largely confirmed in Taylor's [2000] recent summary. Unsurprisingly, though, the body of theoretical research has not reached a consensus regarding the relative power and usefulness of fiscal and monetary policy.

Similarly, the available empirical research has not offered conclusive evidence. For example, Kim [1997] finds that tax system differences across a group of countries are responsible for roughly thirty percent of the differences in economic growth across those countries. Chowdhury [1988] shows that fiscal policy effects are different across industrialized countries and very dependent upon institutional factors in each country. He later suggests that increases in government expenditures are fully offset by negative wealth and substitution effects on private investments, resulting in expansionary fiscal policy eventually lowering income by crowding out private investment. This may be why Garrison and Lee [1995] find weak support for the negative effect of high marginal tax rates on economic growth and no evidence that government spending alters income.

However, in an earlier paper using a vector autoregression (VAR) approach, Chowdhury, Fackler, and McMillin [1986] find support for the monetarist view, which suggests that monetary policy generally dominates fiscal policy in accounting for unanticipated movements of investment in the United States. However, Cardia [1991] finds that monetary policy and fiscal policy play only a minor role in changing investment, consumption, and output.

We build on this literature by investigating the relative predictive power of monetary and fiscal policy for changes in aggregate demand using a more general error correction vector autoregression (ECM) approach similar to that of Ansari [1996] and Chowdhury et al [1986]. In doing so, we explicitly step back from the longstanding theoretical discussion on this topic and let the data speak for themselves. As an additional contribution, we rely on more recent quarterly data, spanning the period from 1966 through 2000.

Estimation Procedure and Data

An empirical investigation into the relative importance of monetary and fiscal policy is perhaps an even more relevant exercise in the modern economy, especially given the recent the implementation of large-scale fiscal stimulus packages. However, as Ansari [1996] notes, the majority of the studies in this literature have used a bivariate approach. This single equation "St. Louis" type makes exogeneity assumptions, which place structural causality assumptions onto the model. Following Chowdhury et al [1986], we employ a VAR technique to avoid imposing potentially spurious *a priori* constraints on the exogeneity of the variables in the system and to allow us to incorporate the proper lags of each series. This helps avoid both a simultaneity and omitted variable bias.

Chowdhury et al [1986] show that the theory underlying the estimation of the VAR is based upon the use of stationary data, thus the first step is to determine if each series is stationary. Augmented Dickey Fuller (ADF) tests reveal, unsurprisingly, that each of our series has a unit root (i.e., each series is nonstationary). ADF test results are available upon request. Consequently, we can increase the models' efficiency by estimating error correction autoregressions or ECMs, which incorporate the necessary cointegrating terms to make the system stationary. To determine the proper number of cointegrating terms for the ECMs, we perform Johansen tests for each specification. The results of these tests indicate that the insertion of one cointegrating term is necessary to make the system stationary. The cointegrating term is a linear combination of variables in the model, which adds information regarding the long-term relationships between these variables, making the results more efficient than a standard VAR technique. An ECM is also a useful method for analyzing the impact of a given variable on itself and on all other variables in the system by using forecast error variance decompositions (FEVD), Granger causality tests, and impulse response functions (IRF), which can all be seen in the Appendix. Thus, using the more general approach of an error correction vector autoregression (ECM) allows for a direct comparison between the effectiveness of monetary and fiscal policy.

Since all ECMs in this paper are estimated using a Cholesky decomposition (to ensure that the covariance matrix of the innovations is diagonal), impulse response function results may be dramatically altered depending upon the order of equations in the system. To avoid the potential sensitivity of results to the chosen ordering, all models are re-estimated using several alternative orderings. We have placed policy variables first, with monetary policy following a shock to fiscal policy and output last in all reported results in order to maximize the predictive power of each type of policy. It is feasible that a shock to fiscal and/or monetary policy would alter consumption, investment and output. However, we should note in advance that results from all reordered specifications are highly robust and are available upon request.

To examine the relative impacts of fiscal and monetary policy, we begin by estimating two separate four-variable ECMs. These essentially allow us to determine the all-else-equal impacts of each type of policy, holding variables regarding the other type of policy constant. For fiscal policy, we explore changes in the average federal marginal income tax rate *(Tax)* and real government spending (*G*), either real investment (*I*) or real consumption (*C*), and real output (*GDP*). We then estimate a six-variable ECM with both fiscal and monetary policy variables, which enables more direct comparisons between the two policies. This allows us to test the robustness of our results and provides a glimpse at the interrelationships between the policies.

In general, the ECM models that we will be estimating are represented by:

$$\Delta y_t = \Pi_0 + \Pi y_{t-j} + \Pi_1 \Delta y_{t-1} + \Pi_2 \Delta y_{t-2} + ...\Pi_p \Delta y_{t-p} + e_t \tag{1}$$

where, y_t is a vector of endogenous variables (Tax, G, M2, FFR, I, C, and GDP), Π is a matrix with elements Π_{jk} such that one or more of the $\Pi_{jk} \neq 0$, Π_i is a (nxn) coefficients matrices, *t* represents the time period and *p* represents the lag length, and e_t is a (nx1) vector of error terms.

We obtain the Tax data from the TAXSIM model, which was created by Feenberg and Coutts, 1993 and can be obtained at http://www.nber.org/taxsim. For monetary policy, we exchange the fiscal policy variables (*Tax* and *G*) with the seasonally adjusted money supply (*M2*) and the nominal Federal Funds Rate (*FFR*) taken from the St. Louis Federal Reserve Bank (FRED) Database or http://www.stls.frb.org/fred/. All other data are reported by the *Bureau of Economic Analysis* in 1996 dollars.

Results and Discussion

Does fiscal policy help stimulate the economy? Results in Tables 1 through 6 suggest that fiscal policy holds relatively little stimulative power, at least regarding the aggregate U.S. economy. In contrast to Mitchell [2001], who argues that tax reductions of the 1920s, 1960s and 1980s resulted in faster economic growth in the years to follow of close to 4-6%, a shock to tax rates appears to explain very little of the innovations in GDP today. FEVD results in Table 1 show that a shock to tax rates or government spending explains less than four percent of the innovations in GDP.

In fact, impulse response functions in Figures 2 and 4 show that a one-time standard deviation shock to tax rates has a relatively small positive impact on GDP. While this suggests that there is a positive correlation between an increase in tax rates and GDP for the first two quarters, it is most likely due to a timing issue. After the third quarter, an increase in tax rates appears to be related to a small reduction in GDP. The relatively small impact of a change in tax rates on output may be due to the infrequency of changes in tax rates, which reduces tax rate volatility and their subsequent ability to explain changes in other macroeconomic aggregates.

Mitchell [2001] also argues that future tax cuts should encourage small business growth and reassure consumer confidence, thereby helping to stimulate the economy. In contrast, our results indicate that tax rates are not a good predictor of changes in either investment or consumption. FEVD results in Tables 1 and 2 show that tax changes explain less than eight percent of the innovations in investment and less than three percent of the innovations in consumption. The relatively low predictive power combined with a lack of Granger-causality for aggregate demand and its components, shown in Table 7, suggests that while politicians argue that a tax cut will help us recover from the current recession, we are not able to provide empirical support to their claims.

While tax cuts do not appear to help tame business cycles, we should note that there are certainly other motivations for enacting a tax cut. These may include but are not limited to reducing dead-weight losses, enhancing equity, or achieving other economic or political ends. As Feldstein said in his February 13, 2001 testimony before the House Committee on Ways and Means, "Although I do not believe that temporary increases and decreases in tax rates are useful for reducing business cycle fluctuations, it is certainly convenient now to have a tax cut that is going to be made for other reasons."

Later in his remarks, he suggests "The increase in after-tax incomes and the expectations that such increases will continue in the future will boost confidence as well as spending power." However, results in this paper find that a shock to tax rates or government spending will have very little influence on consumer or investment spending.

Results also find that fiscal policy has very little influence on output. Thus, even though the U.S. is experiencing one of its largest tax reductions paired with an increase in government spending, it may have very little effect on helping stimulate the U.S. economy. FEVD results in Tables 1 and 2 show that a shock to government spending never explains more than three percent of the variation in GDP or its components. This contradicts the FEVD results found by Ansari [1996] who found that a shock to government spending explained close to a fourth of the movement in India's GDP.

Impulse response functions and Granger causality tests support the lack of fiscal policy's influence on real variables. While Figure 1 shows that an increase in government spending displays a negative relationship with private spending, the influence of increases in public spending appears small. Similarly, changes in public (government) spending do not Granger cause changes in private (investment) spending. Collectively, this suggests that there is very little "crowding out."

What, then, happens to investment, consumption, and output when the Federal Reserve Bank alters monetary policy? Results show that while fiscal policy has very little influence on taming business cycles, monetary policy does predict changes in consumption, investment and output. Our four-variable ECMs show that M2 has a strong, growing influence on changes in consumption, investment and output. FEVD results in Table 3 reveal that

M2 explains close to a third of the innovations in investment and up to a fourth of the innovations in GDP. Similarly, the FFR explains close to fifteen percent of consumption and investment behavior and ten percent of the output behavior.

Impulse response functions in Figures 5-8 reinforce the positive and growing impact that expansionary monetary policy displays for aggregate demand and its components. In contrast, using annual data from 1960 to 1985 Cardia [1991] finds that increases in M1 create a reduction in consumption due to its inflationary tax effects. Granger-causality results further show that M2 and the FFR Granger cause consumption, investment and output. It appears that increases in M2 and reductions in the FFR precede increases in consumption, investment and output, suggesting that monetary policy may help stimulate the U.S. economy.

The results of our six-variable specification continue to suggest that monetary policy has a much stronger impact on real variables than fiscal policy, regardless of the ordering. Changes in monetary policy continue to be a good predictor of changes in investment, consumption, and GDP, while changes in the tax rate and government spending appear to have very little influence on taming business cycles. FEVD Tables 5 and 6 reinforce earlier results showing that M2 continues to explain close to a third of the innovations in investment and output behavior and that the FFR continues to explain close to fifteen percent of investment and output. Again, this result is also seen in the impulse response functions reported in Figures 9 and 10.

Conclusions

This paper presents new evidence regarding the relative importance of monetary and fiscal policy for taming business cycles in the U.S. Using quarterly data from 1966 to 2000, we estimate a series of error correction vector autoregressions to determine the predictive power of changes in tax rates, government spending, M2, and FFR in explaining movements in consumption, investment and GDP. Forecast error variance decompositions and impulse response functions support the relative importance of monetary policy. As Taylor [2000] suggests this may be due to the Fed executing a more aggressive and successful monetary policy since the 1980s, which may reduce the need for fiscal policy.

To be sure, our data contain few experiences with discretionary fiscal policy explicitly aimed at stabilizing the macroeconomy. Consequently, our results are only suggestive and should not be interpreted as an outright dismissal of fiscal policy. Furthermore, we would emphasize the other important goals of tax and expenditure policy, namely to improve general equity and efficiency in the economy. It would be most fortunate if fiscal policy could achieve these primary goals while also serving to stimulate a weak economy as a side effect. In terms of quick, easy-to-implement policies aimed at taming macroeconomic fluctuations, though, it appears that monetary policy reigns supreme.

References

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Appendix: Forecast Error Variance Decomposition (Fevd) Results

Table 1 FEVD of Investment (I) and Output (GDP) w/Tax and G from 1966.Q1 to 2000.Q4

Horizon			**Investment (I)**			**Output (GDP)**		
	TAX	G	I	GDP	TAX	G	I	GDP
2 Quarters	2	0	98	0	1	3	41	45
4 Quarters	3	0	96	0	1	2	49	49
6 Quarters	5	0	94	1	1	1	56	42
8 Quarters	7	0	92	2	2	1	59	38

Table 2 FEVD of Consumption and Output (GDP) w/Tax and G from 1966.Q1 to 2000.Q4

Horizon	**Consumption (C)**				**Output (GDP)**			
	TAX	G	C	GDP	TAX	G	C	GDP
2 Quarters	0	2	98	0	2	3	26	69
4 Quarters	1	1	97	2	1	2	33	64
6 Quarters	1	1	94	4	1	1	32	66
8 Quarters	2	1	92	6	1	1	47	51

Table 3 FEVD of Investment (I) and Output (GDP) w/M2 and FFR from 1966.Q1 to 2000.Q4

Horizon	**Investment (I)**				**Output (GDP)**			
	M2	FFR	I	GDP	M2	FFR	I	GDP
2 Quarters	20	3	77	0	4	7	38	51
4 Quarters	30	6	64	0	13	3	44	39
6 Quarters	34	13	53	0	24	5	40	30
8 Quarters	33	20	46	1	28	10	37	24

Table 4 FEVD of Consumption and Output (GDP) w/M2 and FFR from 1966.Q1 to 2000.Q4

Horizon	**Consumption (C)**				**Output (GDP)**			
	M2	FFR	C	GDP	M2	FFR	C	GDP
2 Quarters	7	3	90	1	2	7	37	53
4 Quarters	10	6	83	1	10	4	50	37
6 Quarters	11	12	76	1	16	7	52	25
8 Quarters	10	16	74	0	17	13	53	17

Table 5 FEVD of I with Fiscal and Monetary Policy from 1966.Q1 to 2000.Q4

Horizon	**Investment**					
	TAX	G	M2	FFR	I	GDP
2 Quarters	0	1	25	2	71	1
4 Quarters	0	0	38	13	47	2
6 Quarters	0	0	39	25	35	1
8 Quarters	0	0	34	35	30	1

Table 6 FEVD of GDP w/I, Fiscal and Monetary Policy from 1966.Q1 to 2000.Q4

Horizon	**GDP**					
	TAX	G	M2	FFR	I	GDP
2 Quarters	1	6	5	4	34	50
4 Quarters	1	4	19	4	30	42
6 Quarters	0	2	30	9	24	35
8 Quarters	0	2	32	15	23	28

Table 7: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests Null Hypothesis:	Obs	F-Statistic	Probability
FFR does not Granger Cause M2	142	3.16868*	0.01595
M2 does not Granger Cause FFR		9.50139*	8.7E-07
TAX does not Granger Cause M2	134	3.05114*	0.01942
M2 does not Granger Cause TAX		0.72072	0.57933
G does not Granger Cause M2	141	1.82943	0.12689
M2 does not Granger Cause G		4.08829*	0.00372
I does not Granger Cause M2	141	5.63942*	0.00032
M2 does not Granger Cause I		4.54515*	0.00180
C does not Granger Cause M2	141	3.53690*	0.00892
M2 does not Granger Cause C		1.68550	0.15709
GDP does not Granger Cause M2	141	3.98887*	0.00435
M2 does not Granger Cause GDP		2.88273*	0.02506
TAX does not Granger Cause FFR	134	1.02549	0.39686
FFR does not Granger Cause TAX		2.05394*	0.09084
G does not Granger Cause FFR	141	0.51770	0.72285
FFR does not Granger Cause G		0.36182	0.83541
I does not Granger Cause FFR	141	2.22642*	0.06954
FFR does not Granger Cause I		12.4411*	1.3E-08
C does not Granger Cause FFR	141	2.35785*	0.05680
FFR does not Granger Cause C		9.46847*	9.2E-07
GDP does not Granger Cause FFR	141	2.85611*	0.02613
FFR does not Granger Cause GDP		8.04121*	7.8E-06
G does not Granger Cause TAX	134	2.50419*	0.04557
TAX does not Granger Cause G		1.92732	0.10995
I does not Granger Cause TAX	134	0.64201	0.63353
TAX does not Granger Cause I		1.45313	0.22053
C does not Granger Cause TAX	134	0.53212	0.71235
TAX does not Granger Cause C		1.09340	0.36281
GDP does not Granger Cause TAX	134	0.28340	0.88828
TAX does not Granger Cause GDP		0.40503	0.80474
I does not Granger Cause G	141	1.45214	0.22047
G does not Granger Cause I		0.87900	0.47847
C does not Granger Cause G	141	1.24719	0.29417
G does not Granger Cause C		0.70421	0.59042
GDP does not Granger Cause G	141	1.35444	0.25328
G does not Granger Cause GDP		0.39308	0.81331
C does not Granger Cause I	141	3.58239*	0.00830
I does not Granger Cause CONSUMPTION		1.83664	0.12554
GDP does not Granger Cause I	141	1.81040	0.13055
I does not Granger Cause GDP		9.41167*	1.0E-06
GDP does not Granger Cause C	141	1.17394	0.32526
C does not Granger Cause GDP		9.32623*	1.1E-06

* Hypothesis is rejected at the 5% level.

Appendix B: Impulse Response Functions

Figure 1: Impulse Response Functions of Investment to a One S. D. Innovation in Tax, G, I, and GDP

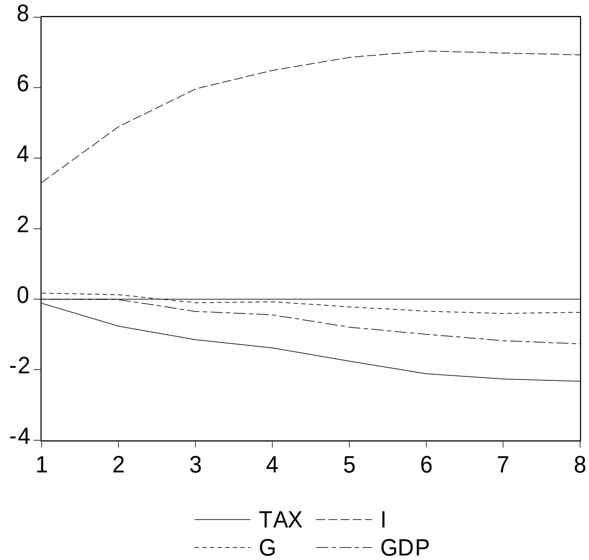


Figure 2: Impulse Response Functions of GDP to a One S.D. Innovation to Tax, G, I, and GDP

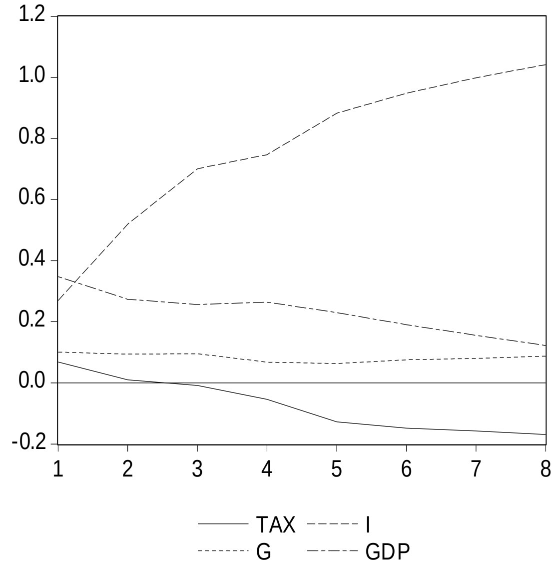


Figure 3: Impulse Response Consumption to a One S. D. Tax, G, C, and

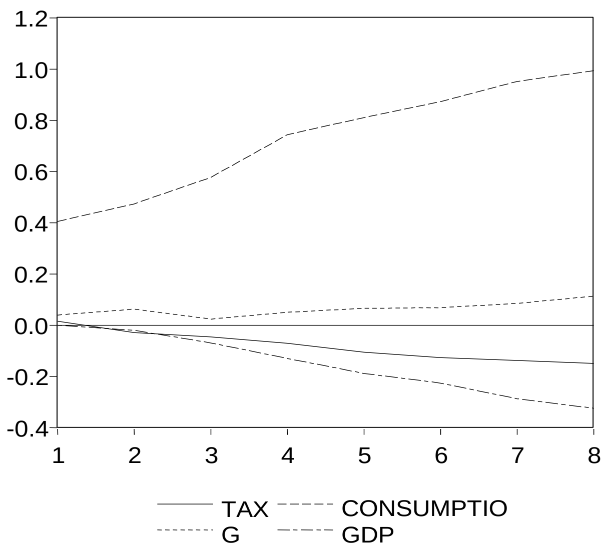


Figure 4: Impulse Response Functions of GDP to a One S. D. Innovations to Tax, G, C, and GDP

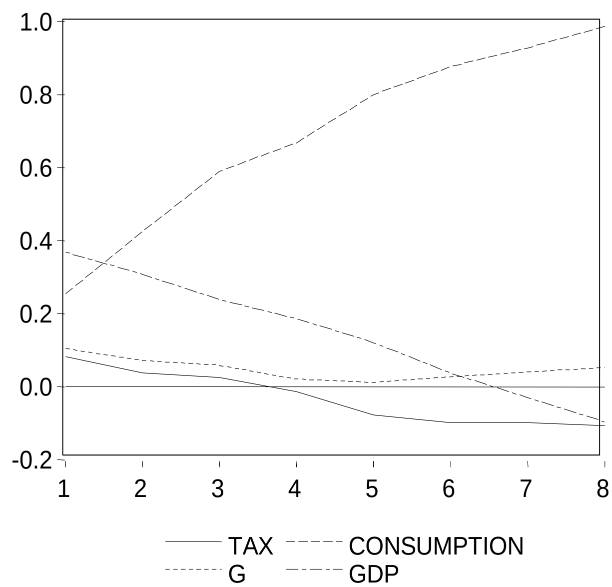


Figure 5: Impulse Response Functions of Investment to a One S.D. Innovation to M2, FFR, I, and GDP

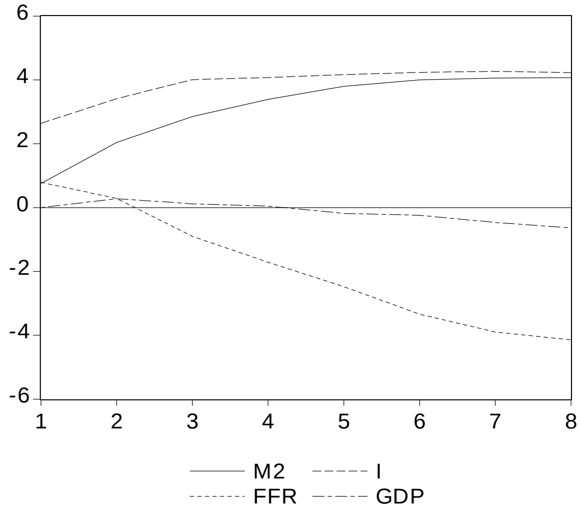


Figure 6: Impulse Response Functions of GDP to a One S.D. Innovation to M2, FFR, I and GDP

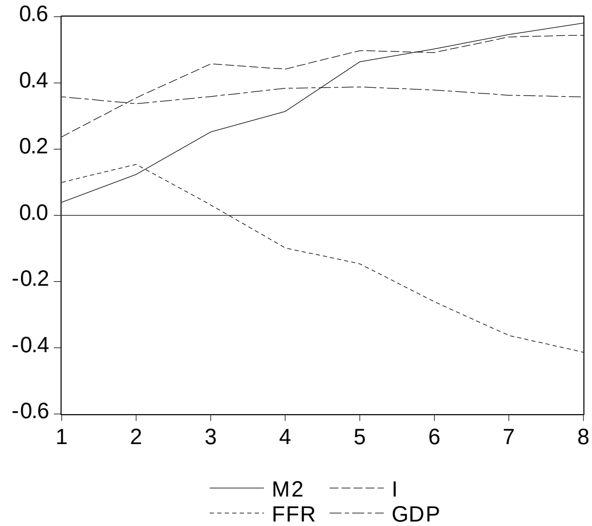


Figure 7: Impulse Response Functions of Consumption to a One S. D. Innovations to M2, FFR, C, and GDP

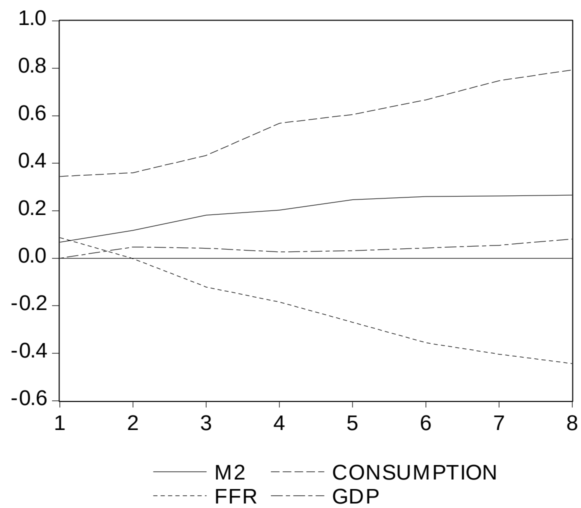


Figure 8: Impulse Response Functions of GDP to a One S.D. Innovations to M2, FFR, C, and GDP

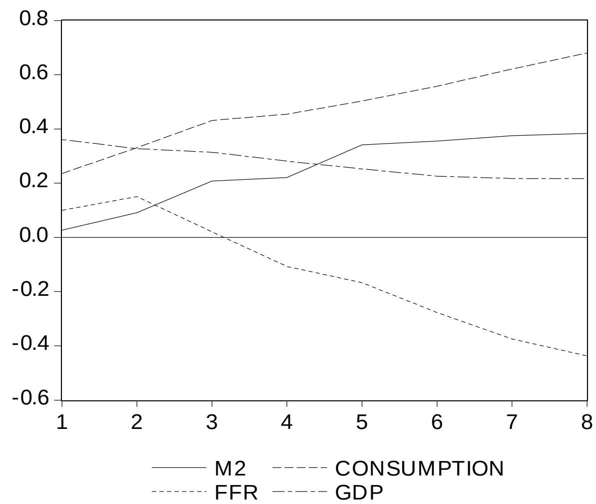


Figure 9: Impulse Response Functions of Investment to a One S.D. Innovations to Tax, G, M2, FFR, I, and G

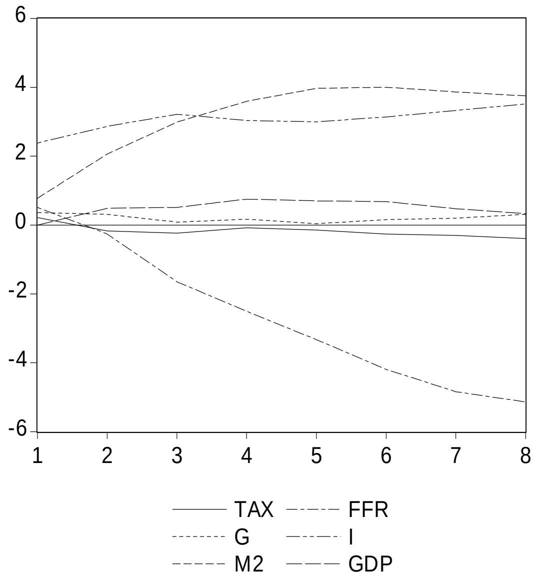
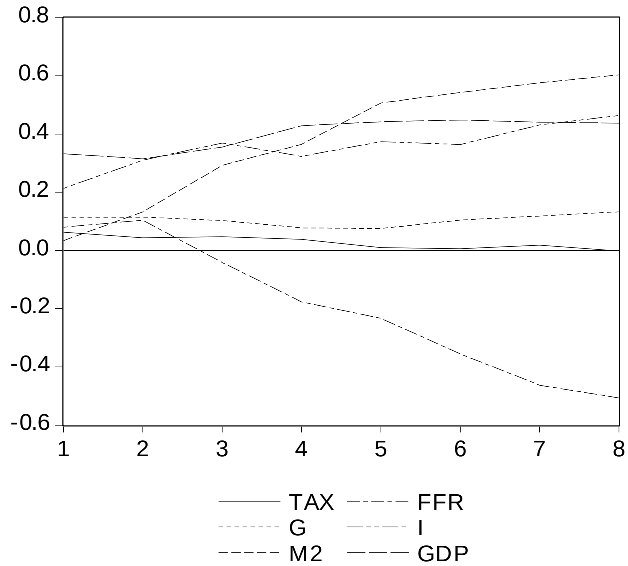


Figure 10: Impulse Response Functions of GDP to a One S.D. Innovations to Tax, G, M2, FFR, I and GDP



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