The relative effectiveness of Monetary and Fiscal Policies on growth: what does long-run SVAR model tell us?

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Abstract

This paper studies empirically the relative effectiveness of monetary and fiscal policies on growth. Unlike many previous papers which have focused, to a large extent, on the effect of monetary or fiscal policies separately, this paper considers the comparative efficacy of the two policies on growth by applying the Structural Vector Autoregression (SVAR) model to the quarterly data for Turkey over the period 2001:Q1-2014:Q2. The empirical findings of this paper show that both monetary and fiscal policies do have significant effects on growth. However, monetary policy is more effective than fiscal policy in stimulating growth. More specifically, interest rate ―a monetary policy variable― is the most potent instrument in affecting growth. Then budget deficit ―a fiscal policy variable― becomes the second important variable after interest rate. These findings suggest that although the relative effectiveness in boosting growth is different, both policies significantly influence growth, suggesting that they should be used jointly but in an efficient manner.

Key Words : Monetary Policy, Fiscal Policy, Growth, Macroeconomic Policy Management, SVAR, Turkey.

JEL Code : E52, E58, E62, E63

1. Introduction

Undoubtedly, macroeconomic policy plays a fundamental role in providing as well as maintaining sustainable and acceptable economic environment which makes it possible for an economy to achieve a faster, stable and sustainable growth. This fundamental role is conducted by the two leading instruments of macroeconomic policy in an economy: Monetary and fiscal policies. However, the comparative efficacy of both monetary and fiscal policies is highly an unresolved issue between the Keynesians and Monetarists especially since 1960s. In this regard, theoretical as well as empirical debates are still on-going. The Keynesians strongly argue that fiscal policy is more effective in relation to monetary policy in stimulating economic activity, while the Monetarists assert the opposite, claiming that this is the case with monetary policy. This dispute between two main economic views has never resolved and has been still on-going among academic economists as well as policymakers. The seminal paper by Andersen and Jordon (1968) sparked empirical discussions on the relative effectiveness of the two policies on economic activity. In reviewing the literature, to date no convincing empirical evidence has been found with regard to the relative effectiveness of monetary and fiscal policies.

The recent two developments, the Stability and Growth Pact of the EU and then more recent global recession broke out in the aftermath of the 2008 financial crisis, have received a renewed attention on the comparative efficacy of monetary and fiscal policies.

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The primary purpose of this paper is to empirically examine which of monetary and fiscal policies is more effective in stimulating growth. The paper attempts to answer the following questions: i) if monetary and fiscal policies are the primary instruments of macroeconomic policy and closely related to each other in achieving desirable macroeconomic outcomes, and then what is their relative effectiveness in terms of growth ? ; ii) how and what direction growth can respond to changes in these policies ?; iii) are they substitute or competent to each other ?

We strongly believe that to answer all these questions properly, the econometrical model chosen is highly important. Generally speaking, the SVAR model proposed by Blanchard and Perotti (2002) and then developed further by Perotti (2005) is a most suitable model in capturing the relative effectiveness of monetary and fiscal policies. The first and foremost advantage of the SVAR model is its simplicity. Secondly, it is a well-suited tool, such as impulse response functions and variance decomposition, for tracing the dynamic interactions between a set of endogenous variables (Petrevski et al., 2015). Thirdly, to the best of our knowledge, to date it has not been employed for examining the relative effectiveness of monetary and fiscal policies (See Appendix).

The rest of the paper is designed as follows: Section 2 provides an overview with regard to monetary and fiscal policy stance in Turkey, while Section 3 reviews the related empirical studies. Section 4 then outlines the data and methodology of this paper. Section 5 reports and discusses the empirical findings. And finally, a conclusion is presented in Section 6.

2. An Overview of Monetary and Fiscal Policy Stance in Turkey

Monetary and fiscal policy is an interesting as well as important issue not only for developed countries but also for developing ones. Turkey is also the case in this matter. Before turning our attention to empirical analysis, it would therefore be useful to review recent developments in the Turkish economy with a special focus on monetary and fiscal policy.

Turkey experienced with high and chronic inflation starting from the second half of 1970s and CPI inflation reached triple digits in 1980 and 1994 soon after the introduction of two major stabilization programmes. As a result of these programmes, Turkey was kept away from hyperinflation trap along with other economic difficulties. Nevertheless throughout the 1980s and 1990s inflation remained high and chronic, exceeding the levels of 60% on average. Undoubtedly, the main reason behind high and chronic inflation was unsustainable budget deficits. Budget deficits were largely and often financed through the Central Bank of the Republic of Turkey's [CBRT] resources especially from the 1970s to 1984. It would not be wrong to say that the CBRT operated like a branch of the Treasury in that period. Under the law of the CBRT, the Central Bank used to lend short-term advances to the Treasury at the beginning of every fiscal year as much as 15% of current year's public allowances. In fact these advances were never returned or paid back by the Treasury in time. Within that period, short-term advances to the Treasury turned to a cumulative debt, an unpaid domestic debt of the treasury. After the year 1984, the Treasury changed its deficit financing policy by switching from monetization to domestic debt borrowing due to a fear of the possibility of accelerating inflation trap. However, this policy change made the economic situation worse. The Turkish economy, at that time, faced with a significant decline in GDP, while inflation continued to remain high and chronic during the second half of the 1980s and throughout the 1990s. All these developments forced the Treasury and CBRT officials to make a good deal to overcome the adverse economic situation. And then they decided to make a protocol for providing monetary and fiscal policy coordination. The protocol came under implementation in the year 1997.

Under the protocol, the treasury would no longer demand for short-term advances from the CBRT. Soon after the implementation of the protocol, all the loans provided by the CBRT not only to the Treasury, but also to other public institutions, such as state economic enterprises and municipalities, were cut down. Shortly after the implementation of the protocol the economy has made a quite good progress. However, Turkey was hit by twin consecutive economic crises, November-2000 and February-2001, due to a number of economic and/or political reasons. In fact, these successive crises were a turning point for the Turkish economy. Immediately after all the articles of the CBRT which ruled on financing governmental organisation were repealed, it became formally independent monetary institution. Besides, a series of structural reforms, ranging from a more robust public finance management to prudential measures which strengthened the financial sector were put into practice. These measures showed their impact shortly. Soon after the central bank became independent and structural reforms were introduced, inflation started to drop sharply seeing historically a low level along with significant reductions in interest rates and other macroeconomic indicators.

Overall, in the second half of the1980s and 1990s the Turkish economy like many other developing economies was characterised with a fragile banking sector, a non-independent central bank, a poor fiscal policy management, and a double-headed economic management. All these resulted in a bad economic environment, thereby leading to extremely high interest rates, high and chronic inflation, huge budget deficits, unstable exchange rate, unequal income distribution, low investment and high unemployment, and so on. Since 2002, the Turkish economy has made a significant progress from a number of aspects. Long lasting inflation incredibly dropped to single digits, growth rate made a remarkable high progress; for instance, it was annually on average at 7% between the years 2002-2007. All these put Turkey in a better place among emerging economies. However, the Turkish economy has recently had high current account deficits, exceeding much more than the Dornbush threshold, along with high unemployment and slowing growth. Since then, like many other countries regardless of whether industrialized or developing one, Turkey has showed economically a poor performance. Annual growth rate dropped from 9.2% in 2010 to 2.9% in 2014 as CPI remained relatively high levels. In addition to these, between the years 2010-2014, current account deficit-to-GDP always remained above the Dornbush threshold, which is thought to be financial crisis indicator. The last five year's economic indicators of Turkey are presented in Table 1.

Table 1: The Recent Selected Main Macroeconomic Indicators of Turkey, 2010 - 2014

Indicator	Unit	2010	2011	2012	2013	2014
GDP	Billion U$	732	774	786	823	800
GDP Growth Rate	%	9.2	8.8	2.2	4.2	2.9
CPI Inflation	Year end, %	6.40	10.45	6.16	7.40	8.17
Unemployment Rate	Average, %	11.9	9.8	9.2	9.7	10.4
Indicative Bond's Rate	%	7.1	11.0	6.2	10.10	8.02
Primary Balance/ GDP	%	0.8	1.9	1.4	2.0	1.6
C. Government Debt Stock/ GDP	%	43.1	40.1	37.6	36.2	37.7
[C. Government + Private External Debt Stock]/GDP	%	39.8	39.3	43.1	40.8	49.0
Exchange Rate	Year end, US$/TL	1.55	1.91	1.78	2.13	2.32
Current Account Deficit/ GDP	%	-6.2	-9.7	-6.0	-7.9	-5.7
M2/GDP	%	53.4	52.0	52.4	57.9	58.1
Central Bank's Reserves [FX + Gold]	Billion US$	86.0	88.7	125.4	124.2	126.4

Source: Ministry of Finance, Ministry of Development, Central Bank of the Republic of Turkey, Treasury, and Turkish Statistical Institute.

3. Related Empirical Studies

As mentioned earlier, empirical discussions related to the relative effectiveness of monetary and fiscal policies date back to the 1960s. In this regard, the two seminal papers by Friedman and Meiselman (1963), and Andersen and Jordan (1968) are important examples of this case. Especially, the paper by Andersen and Jordan (1968) is thought of as the first empirical study on the relative effectiveness of monetary and fiscal policy on output (See, for instance, Waud (1974), and Hussain (2014) for a detailed discussion). In examining the relative effectiveness of monetary and fiscal policies, Andersen and Jordan (1968) employed a dynamic econometric model and concluded that monetary policy is more certain, more effective and faster in influencing the economy in relation to fiscal policy. Since then, the relative effectiveness of monetary and fiscal policies has become the subject of numerous empirical studies. By the late 1980s, however, many studies agreed upon the superiority of monetary policy over fiscal policy in terms of magnitude, predictability, and lag of influence at least in the case of the US (Atchariyachanvanich, 2007).

In line with the purpose of this paper, in this section we will only concentrate on the empirical studies. The current literature contains many studies which have highlighted the effects of monetary and fiscal policies on growth and it has been continuing to expand. Especially, in last two or three decades, the number of studies examining the effect of fiscal policy compared to that of monetary policy has increased further. This may be attributed to the increasing role of fiscal policy in combatting economic turbulences and downturns which were faced by a number of both developed and developing countries.

In reviewing the literature, we observe that earlier studies as to the effectiveness of monetary and fiscal policies have focused to large extent on industrialized countries, especially on the US. For example, an early study by Waud (1974) investigated the relative efficacy of monetary policy vis-à-vis fiscal policy on GNP in the US and found that the influence of both policies on economic activity is significant and appears equally important. These results are in sharp contrast to those of Andersen and Jordan (1968), arguing that monetary influences on economic activity are much stronger than fiscal ones.

Another study by Batten and Hafer (1983) examined the relative effectiveness of monetary and fiscal actions in six industrialized countries covering the UK, the US, Canada, France and Germany for the period of the late 1960s – the early 1980s by employing the St. Louis approach. They concluded that while monetary actions have a significant as well as permanent effect on nominal GNP growth, fiscal actions exert no statistically significant and lasting influence. A recent study on the US by Senbet (2011) investigated the relative effectiveness of the two policies and reached that monetary policy affects the real output relatively better than fiscal policy.

In recent years we also observe a considerable increase in the studies which have examined the topic in the context of developing countries. These sorts of studies range from low-income developing countries to relatively high income countries. For instance, the studies of Ajisafe and Folorunso (2002), Olaloye and Ikhide (1995), Adefeso and Mobolaji (2010), among some others, centered on the case of Nigeria, other studies such as Chowdhury (1986a, 1986b), Looney (1989), Fatima and Iqbal (2003), Ali and Ahmad (2010), Havi and Enu (2014), focused on the other countries like Bangladesh, Korea, Saudi Arabia, Pakistan, Serbia, Ghana, and Kenya (See Appendix).

Using cointegration and error correction estimation techniques, a country-specific study by Ajisafe and Folorunso (2002) examined the relative efficacy of monetary and fiscal policy in Nigeria during the period 1970-1998, and found that monetary policy rather than fiscal policy exerts a great impact on economic activity. Another study by Adefeso and Mobolaji (2010) on the same country but for a different time period, 1970-2007, applied the same econometric procedure and then reached the same results as those found by Ajisafe and Folorunso (2002), suggesting that the effectiveness of monetary policy is much stronger than that of fiscal policy. However, in contrast to the two studies above, a study by Olaloye and Ikhide (1995) revealed that fiscal policy exerts more influence on the economy than monetary policy. In addition to these contradictory empirical findings, a recent study on the same country by Sanni et al. (2012) produces further controversy over the issue. Their findings imply that the relative efficiency of the two policies is different from each other, depending on the number as well as the type of variables. Accordingly, monetary policy exerts more influence on the economy when all the five variables ―debt financed deficits, fiscal deficit ratio, money printing financed deficits, M1, and M2 ― are taken into account.[1] However, the exclusion of money printing financed deficits reverses the case. Based on all these findings, they argued that none of the policies is superior to the other, and that a proper mix of both monetary and fiscal policies may spur economic growth.

Another recent country-specific study by Havi and Enu (2014) examined the relative importance of monetary and fiscal policy on growth in Ghana by using OLS estimation techniques for the period 1980-2012. Their study showed that although the effect of monetary policy is more powerful, both policies positively affect growth in the case of Ghana. In a similar vein, another country-specific study by Jawaid et al. (2010) analyzed the comparative effect of the two potent macroeconomic policy tools on growth in Pakistan during the period 1981-2009. Their empirical findings revealed that there exists a positive long-run relationship between both policies and growth. However, according to their findings, monetary policy is more effective than fiscal policy in promoting growth. In contrast, the study of Mahmood and Sial (2011) using time series data over the period 1973-2008 for the same country found that monetary and fiscal policies both play a significant role in growth in Pakistan.

In recent years, we have also observed from the literature that the number of studies examining the relative effectiveness of monetary and fiscal policies on the basis of country regardless of their development level rather than single country has increased. Among these sorts of studies, the studies such as Batten and Hafer (1983), Owoye and Onafowora (1994), Jayaraman (2002), Atchariyachanvanich (2007), Ali et al. (2008), Hussain (2014), and Petrevski et al. (2015) are the main studies. For instance, Owoye and Onafowora (1994) examined the relative importance of monetary and fiscal policies in stimulating growth in 10 African countries –Burundi, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Sierra Leone, South Africa, Tanzania and Zambia– by using a Trivariate Vector Autoregressive (VAR) model for the annual data spanning from 1960 to 1990. Their findings support the Monetarist view in 5 of 10 countries, indicating that monetary policy is more important than fiscal policy. However, for the rest of 5 countries, their findings showed that Keynesian view, which is that fiscal policy is more important than monetary policy, was confirmed. Based on these findings, they argued that it is not possible to generalize a particular economic philosophy ―neither the monetarist, nor the Keynesian view― for African countries with regard to the relative importance of monetary and fiscal policies.

[1] The first three is the proxies for fiscal policy, whereas the latter two is the proxies for monetary policy.

A highly interesting study by Atchariyachanvanich (2007) investigated the relative efficacy of monetary policy vis-à-vis fiscal policy on the output level of 12 countries; some of them are industrialized countries, while the others developing countries. Employing OLS technique to the quarterly data ranging from the early 1990s to the late 2004, and then dividing the twelve countries into three main groups as: i) monetary policy dominated, ii) fiscal policy dominated, iii) monetary and fiscal policies mixed countries, he examined the impact of the two policies on the output level. His study showed that the impact of the two policies is not clearly distinguishable. Another, but a fresh, multiple-country study by Petrevski et al. (2015) examined the effects of monetary and fiscal policies in three South Eastern Europe economies: Bulgaria, Croatia, and Macedonia. Applying the recursive VARs to the quarterly data for 1999-2011, they found that positive fiscal shocks induce higher output in the all economies, pointing to the expansionary effects of fiscal consolidation.

Overall, in reviewing the related literature we can conclude that although there exist the vast majority of studies examining the relative effectiveness of monetary and fiscal policies, the empirical findings of these studies are highly mixed. In other words, the empirical studies reveal inconclusive results with regard to the relative effectiveness of two potent macroeconomic policy tools. Some studies, such as Kretzmer (1992), Ali et al. (2008), Adesefo (2010), Senbet (2011), Rakic and Radenic (2013), Havi and Enu (2014), found that monetary policy is more effective in boosting growth compared to fiscal policy, whereas some others, i.e. Chowdury (1986), Olaloye and Ikhide (1995), found the opposite results. On the other hand, other studies, such as Batten and Hafer (1983), Rahman (2009), and Anna (2012), suggest that only monetary policy is effective but fiscal policy is ineffective, whereas some other studies ―Chowdhury (1986a), Olaloye and Ikhide (1995), and Cyrus and Elias (2014), claim the opposite results. Moreover, multiple-country studies yield highly mixed results. For instance, in some countries monetary policy is dominant to fiscal policy or vice versa, while in others the results is inconclusive (See, Appendix). These results do not allow us to make a generalization with regard to the relative effectiveness of monetary and fiscal policies. The contradictory empirical results which emerged from the studies above may be attributed to a number of factors, depending on country-specific elements such as institutional, developmental, political and so on as well as methodological approaches, variables chosen, treatment, etc.

4. Data and Methodology

In this section, we first present the data. And then, we produce impulse-response functions. As a next step, we forecast error variance decomposition analysis from the estimated SVAR model.

4.1. Data

In this paper, we use the quarterly data for Turkey covering the period 2001:Q1-2014:Q2. The data is compelled from main national resources, such as the Central Bank of the Republic of Turkey, the Ministry of Finance, and the Ministry of Development. The data set is presented in Table 2.

Table 2: Data Set

Data	Definition	Unit
y	GDP growth rate	%, percentage change according to previous year
bd	Central government budget deficit	%, as a share of GDP
ds	Central government debt stock	%, as a share of GDP
int	Real interest rate	%
p	CPI Inflation	% (1998=100)
exc	Real effective exchange rate	%
nr	Net reserves	%, as a share of GDP
open	Trade openness (X + M)	%, as a share of GDP
eugdp	European GDP growth rate	%, percentage change according to previous year

Note: The variables are converted into natural logarithmic form before analyzing.

The variables used in the model consist of the GDP growth rate, central government budget deficit, central government debt stock, real interest rate, inflation, real effective exchange rate, trade openness, and net reserves. European GDP growth rate is also added to the model as an exogenous variable.

Before moving to the estimation, it is important to summarize the observed adjustments of these variables over time. The visual presentation of the series can be seen in Figure 1. The figure presents the series of GDP growth rate (y), central government budget deficit (bd), central government debt stock (ds), interest rate (int), inflation (p), exchange rate (exc), net reserves (nr), and trade openness (open). As shown from the figure, the time series for all variables are not stationary. Budget deficit and debt stock, and net reserves variables have a clear trend. Budget deficit and debt stock have a downward, but net reserves have an upward trend.

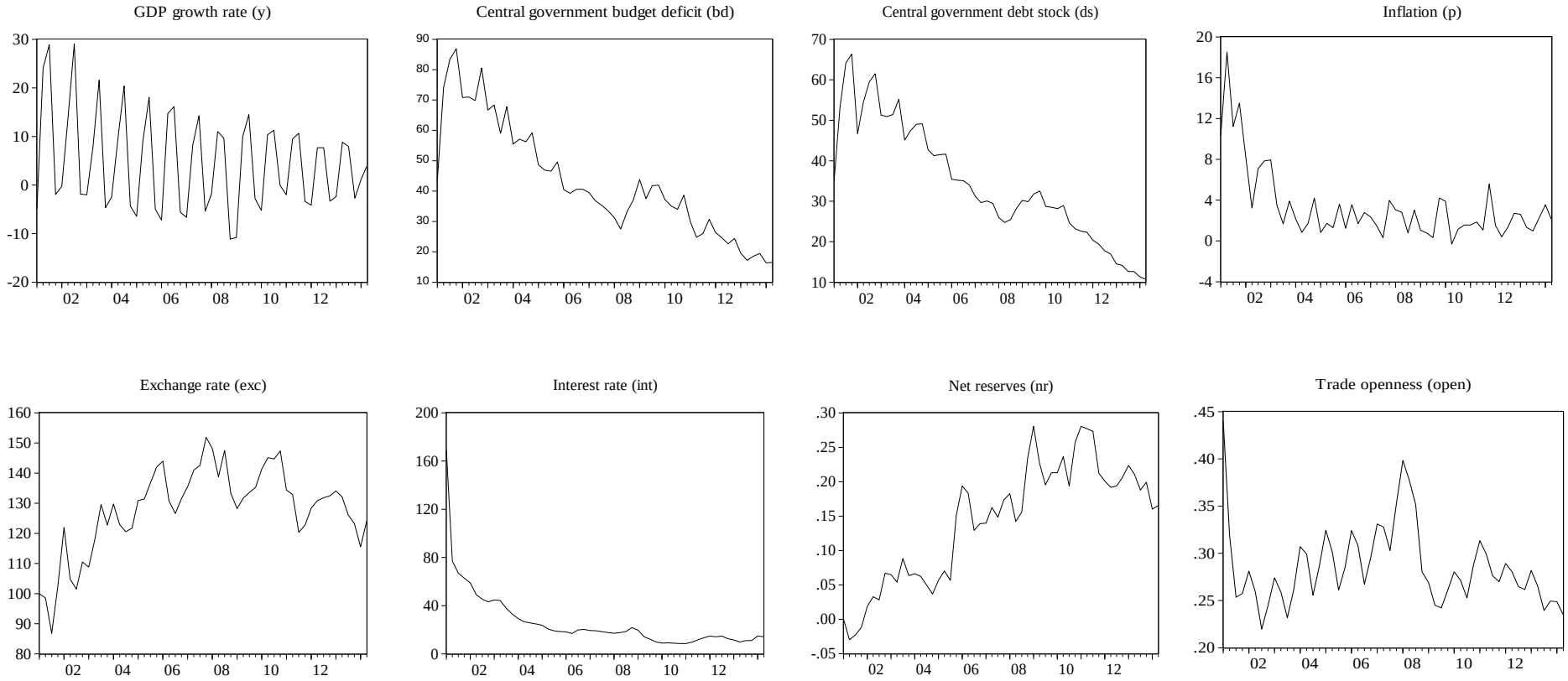
4.2. Methodology

A model is "structural" only if one can use it to predict the effects of deliberate policy actions or of "major" changes in the economy (collectively, these can be viewed as either positive or negative shocks[2]). To realize this prediction, the model should be capable of telling us how the intervention corresponds to changes in some elements of the model (parameters, equations, observable or unobservable random variables), and it must be true that the changed model is an accurate characterization of the behaviour being modelled in post-shock. SVAR model allows us to impose both short- and long-run restrictions, consistent with theory; however, VAR model does not allow this and vector error correction model (VECM) only allows one to impose long-run restrictions (Narayan et al., 2008).

The advantage of the SVAR approach is that there is no need to build a structural model describing the economy in general and the mechanisms of fiscal and monetary policy design and transmission in particular. The SVAR model requires only a minimum number of restrictions. Moreover, like a standard VAR model, the SVAR model delivers two convenient tools in the form of impulse–response functions and variance decompositions that provide more information with regard to the effect and transmission of macroeconomic shocks and policy innovations (Aarle et al., 2003).

[2] What we mean by monetary and fiscal policy shocks are surprise [unexpected] changes in the variables. The structural monetary and fiscal shocks in this interpretation represent unanticipated monetary and fiscal policy innovations.

Figure 1: The visual presentation of the series, 2001:Q1-2014:Q2



Source: Prepared by the authors.

The structural VAR model imposes identifying restrictions upon VAR estimates to recover structural innovations from the estimated VAR. The identification can be practically achieved through imposing identifying short- or long-run restrictions. The advantage of using long-run restrictions is that in a number of cases, economic theory provides more guidance about long-run relationships than about short-run dynamics. Short-run restrictions impose typically that the effect of a given shock to a certain variable is null, which can be achieved by setting the appropriate elements in $C(0)$ to zero. As to long-run restrictions, they impose typically that there is no long-run effect of a shock to a variable, which is achieved by setting the appropriate elements of $C(1)$ to zero. In order to identify exactly a VAR model of n endogenous variables, $(n2-n)/2$ restrictions need to be imposed in the structural model (Aarle et al., 2003).

We can begin with a reduced form VAR model of the following form (Narayan et al., 2008):

$$Y_t = AY_{t-1} + \ldots + A_pY_{t-p} + \Psi Y_{t-p} + \Psi D_t + \mu_t \quad [1]$$

Where p stands for the order of the VAR model, Y stands for an nx1 vector of endogenous variables, μ_t stands for an nx1 vector of reduced form residuals, respectively. We can safely ignore the deterministic component simply because it is unaffected by shocks to the system. Then the SVAR model can be typed as follows:

$$AY_t = A_1^*Y_{t-1} + \ldots + A_p^*Y_{t-p} + \mathrm{B}\varepsilon_t \quad [2]$$

The matrix A is used to model the instantaneous relationships, while the matrix B contains structural form parameters of the model. ε_t is an nx1 vector of structural disturbances and VAR $(\varepsilon_t) = \wedge$, where $\wedge$ is a diagonal matrix with the variance of structural disturbances making up the diagonal elements.

It is commonly accepted view in the literature that shocks cannot be observed, directly. There is, therefore, a need to impose some restrictions. For this, the common practice is to multiply Eq. (2) by A^{-1} leading to the following relationship between the reduced form disturbances and the structural disturbances:

$$\mu_t = A^{-1}B\varepsilon_t \quad [3]$$

This allows us to rewrite Eq. [3] as follows:

$$\mathrm{A}\mu_t = B\varepsilon_t \quad [4]$$

Our SVAR model encompasses eight variables consisting of GDP growth rate (y), interest rate (int), inflation (p), central government budget deficit (bd), central government debt stock (ds), exchange rate (exc), reserves (nr), and trade openness (open). Therefore, we consider structural VAR model with the following restrictions:

$$\begin{bmatrix} \varepsilon_t^y \\ \varepsilon_t^{int} \\ \varepsilon_t^p \\ \varepsilon_t^{bd} \\ \varepsilon_t^{ds} \\ \varepsilon_t^{exc} \\ \varepsilon_t^{nr} \\ \varepsilon_t^{open} \end{bmatrix} = B \begin{bmatrix} \mu_t^y \\ \mu_t^{int} \\ \mu_t^p \\ \mu_t^{bd} \\ \mu_t^{ds} \\ \mu_t^{exc} \\ \mu_t^{nr} \\ \mu_t^{open} \end{bmatrix} \quad [5]$$

In Eq. [5] ε^y, $\varepsilon^{int}, \varepsilon^p, \varepsilon^{bd}, \varepsilon^{ds}, \varepsilon^{exc}$, ε^{nr} and ε^{open} are the structural disturbances; that are GDP growth shocks, interest rate shocks, inflation shocks, central government budget deficits shocks, central government debt stock shocks, exchange rate shocks, net reserves shocks, and trade openness shocks, respectively. Correspondingly, μ^y, $\mu^{int}, \mu^p, \mu^{bd}, \mu^{ds}, \mu^{exc}$, μ^{nr}, and μ^{open} are the residuals in the reduced form equations, representing unexpected disturbances. The left hand-side of Eq. [5] represents a contemporaneous response of real GDP growth to variables shocks, while the right-hand side of the equation depicts no contemporaneous relationship between real GDP growth and variables shocks. Up to one lags of all endogenous variables are included in the estimation of all the VAR models in this paper. We added the following variables to the VAR model as exogenous variables: European gdp growth rate, a constant, a trend, and seasonal dummies.

The VAR part estimates, if one likes a reduced-form model of gdp growth rate, interest rate, CPI inflation, central government budget deficit, central government debt stock, real exchange rate, net reserves, and trade openness. The VAR estimations for the variables can be interpreted as systematic or automatic or anticipated monetary and fiscal policy responses to the endogenous variables in the VAR (sometimes also interpreted as policy rules). Taken together the estimated relations between the endogenous variables included in the VAR model, determine how the identified structural shocks are transmitted in the model (Aarle et al., 2003). In the paper, the structural component of the model identifies eight structural shocks.

To identify the structural innovations from the VAR model, 28 identifying restrictions are required. All the restrictions can already be discerned from the ordering of our variables in the matrix form [5].

Shock identification is performed by way of Cholesky decomposition. It is well known that the impulse-response function depends on the order of the variables in the VAR. It is obvious that the order of endogenous variables in the VAR model is important since it implicitly determines the connection between the innovations. This is precisely the main objection to this factorization, because, although it is considered non-theoretical, it assumes a connection between innovations that is hardly in line with economic theory (Ravnik and Žilić, 2011). So, in all cases to better explain the order ―from the most exogenous to the least one― we consider a robustness check with other identification schemes and use a sign restriction which does not depend on the VAR order.

Given that the main purpose of this paper is to shed light on the compound effect of monetary and fiscal policies, using a more relevant monetary policy variable is in a major requirement. Thus, for instance, we use money supply in addition to interest rate for our analysis and robustness check, outcomes appear not to be very different. Besides, alternative orderings of the

variables implies less attractive identifying restrictions. We experimented with alternative identifying restrictions and generally found that the results not overly sensitive to small changes in the identifying restrictions.

5. Empirical Findings

Before proceeding to the estimation of our model, we need to test whether the variables under consideration are stationary. Recalling that in order to carry out a VAR analysis, time series must be stationary. For this purpose, we first applied Augmented Dickey-Fuller (ADF) test. The test results were reported in Table 3. As shown from the table, all variables are *I*(1). Here, the null hypothesis is that the series have unit root, which indicates non-stationarity or vice versa. In other words, the first differences of the y, int, p, bd, ds, exc, nr, and open are stationary, implying that these variables are in fact integrated of order one *I*(1).

Table 3: Augmented Dickey-Fuller (ADF) Test Results, 2001:Q1-2014:Q2

Series	First Difference Constant	Critical Value (% 1)
y	-5.1734 (1)*	-3.5777
int	-4.7321 (1)*	-3.5713
p	-3.6545 (1)*	-3.5924
bd	-4.6280 (1)*	-3.5713
ds	-2.6609 (1)*	-2.5992
exc	-4.2061 (1)*	-3.5777
nr	-6.1840 (1)*	-3.5654
open	-4.3265(1)*	-3.5777

Note: The numbers in parentheses indicate the selected lag order of the ADF models. Lags chosen are based upon Akaike Information Criterion (AIC). The critical values are obtained from MacKinnon (1991) for the ADF test. The ADF tests examine the null hypothesis of a unit root against the stationary alternative. Asterisks (*) denote statistical significance at 5 % and variables have constant and linear trend, respectively.

Source: Computed by the authors.

And then, we identified the order of the VAR model using the Akaike Information Criterion (AIC), Schwarz Information Criteria (SC), and Hannan-Quinn Information Criteria (HQ). They all suggest a VAR model of order one. The optimal lag length criteria were presented in Table 4. After obtaining the estimation results of the VAR model, we implemented an AR Roots test to analyse the stability of the model. The AR roots graph is shown in Figure 2. Based upon the figure, it can be asserted that all the roots lie within the unit circle, indicating that the model is stable and, hence, we can move to a further step of the analysis.[3]

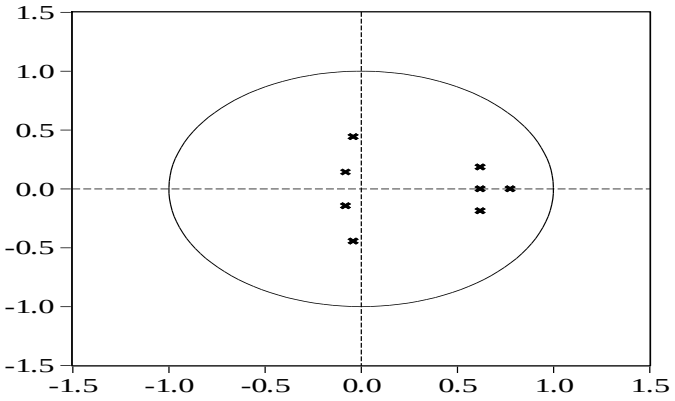
Table 4: VAR Lag Order Selection Criteria

Number of Lags	Log Likelihood Function	Final Prediction Error (FPE)	Akaike Information Criteria (AIC)	Schwarz Information Criteria (SC)	Hannan-Quinn Information Criteria (HQ)
0	-1454.232	7.72e+12	55.2163	55.5508	55.3449
1	-1074.313	1.02e.+08*	43.9363*	47.2821*	45.2229*

Note: Asterisk (*) donates lag order selected by the criterion.
Source: Computed by the authors.

[3] All diagnostic (misspecification) tests results may be obtained from the authors upon request.

Figure 2: Inverse Roots the Characteristic Polynomial Reduced form VAR Model, 2001:Q1-2014:Q2



Source: Prepared by the authors.

The following sub-sections of the paper presents the impulse-response functions and variance decomposition analyses produced from the structural VAR model. From the estimated SVAR model, it is possible to calculate impulse–response functions which show the effects of selected variables on growth.

5.1. Impulse-Response Functions

The impulse-response functions of the impact of variables on GDP growth rate are plotted in the figures from 3 to 9. It can be seen from these figures that the impulse response indicates combined shocks to all variables presented in variance matrix. In other words, impulse responses describe responses to specified shocks. In this paper, we estimated impulse response functions over the ten month period.

Figure 3 displays the compound effect of monetary and fiscal policy shock to interest rate on the GDP growth rate. It has a statistically significant as well as a positive effect on GDP growth rate after the first period and until for the entire 10 months horizon. In other words, a one standard deviation shock to interest rate results in an increase in GDP growth rate. When the same analysis is conducted for budget deficit, a similar result is obtained as shown in Figure 5, implying that budget deficit has a significant positive effect on GDP growth rate. As for Figure 4, it shows that inflation has a statistically significant positive effect on GDP growth rate after 6 months. However, when the same analysis is done for government debt stock as shown in Figure 6, different results are obtained. Between the 2 and 3 month period, debt stock has a negative effect on GDP growth rate. But then, it begins to affect the GDP growth rate positively.

Similarly, the net reserves shown in Figure 8 as well as trade openness shown in Figure 9 have a positive significant effect on GDP growth rate from the beginning of 5 months until the ten months period. And finally, the exchange rate displayed in Figure 7, has a positive significant effect on GDP growth rate only after 9 months. Based on all these findings, it can be safely concluded that the variables under consideration influence GDP growth rate in a one way another.

5.2. Variance Decomposition

Variance decomposition is a standard VAR tool that help us to realise what proportion in the variance of the next period certain shocks have, i.e. it breaks down the proportion of the variability of each variable on the part of the variability that resulted from the shock of the variable and the variability that is the result of shocks in other variables (Ravnik and Žilić, 2011). Table 5 shows the percentage of the forecast error variance decomposition of GDP growth rate. We attempted to estimate that what percentage of the forecast variance is for determining shocks to each of the variables. Table 5 displays the variance decomposition for the basic SVAR model for a period of one month to ten.

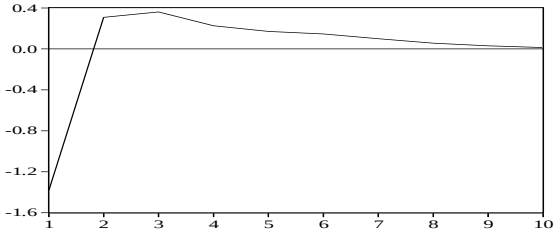
Shocks to interest rate appeared to be the most effective variable in explaining the variation in GDP growth rate. As also shown from Table 5, budget deficit became the second after interest rate. It explains 13.09% of the variation in GDP growth, while shocks to budget deficit explain only 4.46% of changes in GDP growth rate. These findings imply that interest rate and budget deficit are the two most effective variables in influencing growth in the case of Turkey.

Our findings indicated that price level is also important variable in explaining GDP growth rate. Price level explains 3.78% of the variation of GDP growth. Debt stock explains 2.04% of it while net reserves explain 0.53%. And the trade openness explains as 0.44% and exchange rate accounts for 0.12% of the variation of GDP growth.

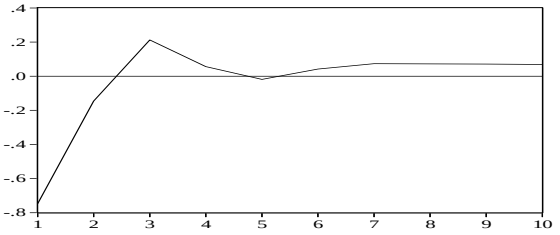
The proportion by which the variance share of forecasting error is explained by the variables increase rapidly; this is especially pronounced with variable interest rate. It is followed by budget deficit variable. The same conclusion is evident from the impulse response function, by which the effects of variables on growth can be clarified. Overall, our empirical findings reveal that the most effective variable in explaining growth is interest rate. It is followed by a fiscal policy variable, budget deficit. Inflation and government debt stock are the other two important monetary and fiscal variables in explaining growth in the case of Turkey, respectively.

Figures 3-9: The impulse-Response Functions

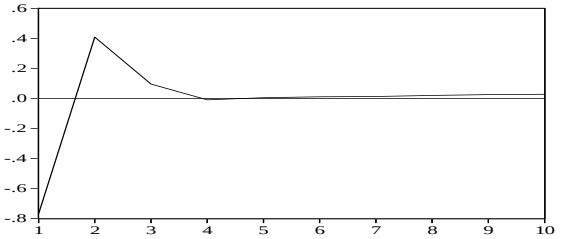
3. Response of GDP Growth Rate to A Shock in Interest Rate



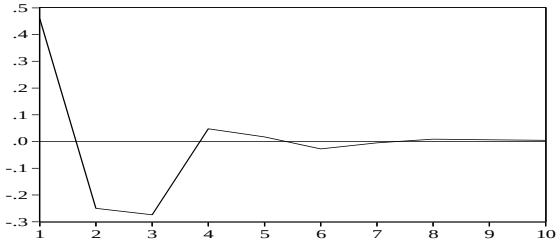
4. Response of GDP Growth Rate to A Shock in Inflation



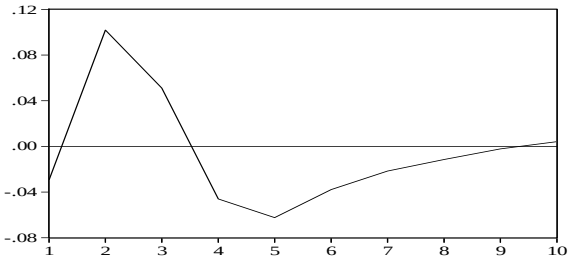
5. Response of GDP Growth Rate to A Shock in Central Government Budget Deficit



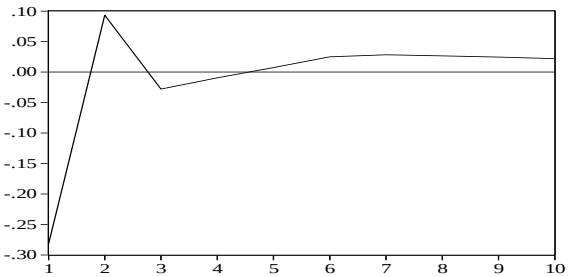
6. Response of GDP Growth Rate to A Shock in Central Government Debt Stock



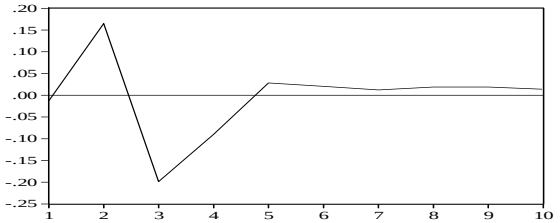
7. Response of GDP Growth Rate to A Shock in Exchange Rate



8. Response of GDP Growth Rate to A Shock in Net Reserves



9. Response of GDP Growth Rate to A Shock in Trade Openness



Source: Prepared by the authors.

Table 5: Variance Decomposition Analysis

Period	S.E.	Structural innovation of (y)	Structural innovation of (int)	Structural innovation of (p)	Structural innovation of (bd)	Structural innovation of (ds)	Structural innovation of (exc)	Structural innovation of (nr)	Structural innovation of (open)
1	4.019296	79.25486	11.83833	3.457567	3.646117	1.305369	0.005325	0.491439	0.000992
2	4.072915	77.43219	12.10023	3.495223	4.560879	1.647479	0.067838	0.531163	0.165000
3	4.111622	76.06294	12.64563	3.697406	4.530377	2.060386	0.081989	0.525800	0.395463
4	4.124649	75.81990	12.86727	3.692540	4.502254	2.060730	0.093940	0.523013	0.440349
5	4.136041	75.75017	12.96747	3.674307	4.477680	2.051125	0.116171	0.520460	0.442618
6	4.140947	75.65384	13.06075	3.675731	4.467854	2.050706	0.124230	0.522870	0.444020
7	4.143678	75.58836	13.10052	3.702027	4.463018	2.048157	0.126774	0.526845	0.444291
8	4.145495	75.55137	13.10717	3.729247	4.461514	2.046810	0.127427	0.530469	0.445992
9	4.146758	75.52183	13.10427	3.756415	4.462838	2.045794	0.127377	0.533686	0.447793
10	4.147687	75.49539	13.09946	3.782293	4.465501	2.044991	0.127419	0.536258	0.448680

Source: Computed by the authors.

6. Conclusion

In this paper, we examined the relative effectiveness of monetary and fiscal policy shocks on growth. For this purpose, we applied a long-run SVAR model to the quarterly data for Turkey for the period 2001:Q1-2014:Q2.

Our findings showed that both monetary and fiscal policies are effective on growth. However, the relative effectiveness of monetary policy is much stronger than that of fiscal policy. Fiscal policy for which we used central government deficits and central government debt stock as proxies accounts for only 6.51% of the changes in GDP growth rate, whereas the rest of the changes is explained by the monetary policy variables ―interest rate and inflation rate― and other variables, such as, openness to trade, and real effective exchange rate, which were added to the our model. However, the magnitudes of the effects of monetary policy variables on growth are relatively higher compared to fiscal policy variables.

Interest rates which is a proxy variable for monetary policy is the most effective variable. It is followed by budget deficits variable, which is a proxy for fiscal policy. A shock to interest rate which is a proxy variable for monetary policy affects GDP growth rate by 13.06 %, whereas central government deficits, a proxy variable for fiscal policy, influence it by 4.46%. On the other hand, inflation and government debt stock affect GDP growth rate by 3.78% and 2.04%, respectively. All these empirical findings indicate that monetary policy is relatively more effective than fiscal policy in influencing GDP growth rate in Turkey. This implies that monetary policy is dominant to fiscal policy in the period we examined. Based upon these findings, it can be argued that i) the effects of monetary and fiscal policies on growth are different from each other and the effectiveness of the first appears to be much stronger and larger in all cases, ii) if the two policies are used in a complimentary manner, ceteris paribus, it is highly likely to obtain a higher GDP growth at least in the case of Turkey.

Our findings are relatively in line with the findings of large number of recent empirical studies, such as Ali et al. (2008), Havi and Enu (2014), Rakic and Radenovic (2013), Senbet (2011), Adefeso and Mobolaji (2010), which support the Monetarist view implying that monetary policy is more effective than fiscal policy in stimulating growth. However, as we noted earlier, our findings are in sharp contrast to the studies of those, for example, Olaloye and Ikhide (1995), Rahman (2009), Anna (2012), Cyrus and Elias (2014), suggesting the validity of the Keynesian view.

Whatever our empirical findings are, however, the relative effectiveness of the two policies still remains a puzzle in macroeconomic policy management. No clear-cut results may be due to a number of factors, such as country-specific elements (institutional, developmental, political and so on), methodological approaches, variables chosen, treatment, etc. So, it is clear that further country-specific works focusing also very much on all these aspects are necessary to clarify the issue.

References

Aarle, B. Van., Garretsen, H., and Gobbin, N. (2003), "*Monetary and Fiscal Policy Transmission in The Euro-Area: Evidence from A Structural VAR Analysis*", Journal of Economics and Business, Vol: 55, pp. 609-638.

Adefeso, H. A. and Mobolaji, H. (2010), "*The Fiscal-Monetary Policy and Economic Growth in Nigeria: Further Empirical Evidence*", Pakistan Journal of Social Sciences, Vol: 7, No: 2, pp. 137-142.

Ajisafe, R. A. and Folorunso, B. A. (2002), "*The Relative Effectiveness of Fiscal and Monetary Policy in Macroeconomic Management in Nigeria*", The African Economic and Business Review, Vol: 3, No: 1, pp. 23-40.

Ali, S. and Ahmad, N. (2010), "*The Effects of Fiscal Policy on Economic Growth: Empirical Evidences Based on Time Series Data from Pakistan*", The Pakistan Development Review, Vol: 49, No: 4, pp. 497-512.

Ali, S., Irum, S. and Ali, A. (2008), "*Whether Fiscal Stance or Monetary Policy is Effective for Economic Growth in Case of South Asian Countries*", The Pakistan Development Review, Vol: 47, No: 4: pp. 791 -799.

Andersen, L. C. and Jordan, J. L. (1968), "*Monetary and Fiscal Actions: A Test of Their-Relative Importance in Economic Stabilization*", Federal Reserve Bank of St. Louis Review, November 1968, pp.11-24.

Anna, C. (2012), "*The Relative Effectiveness of Monetary and Fiscal Policies on Economic Activity in Zimbabwe (1981: 4 – 1998: 3) "An Error Correction Approach*"", International Journal of Management Sciences and Business Research, Vol: 1, No: 5, pp. 1-35.

Atchariyachanvanich, W. (2007), "*International Differences in the Relative Monetary-Fiscal Influence on Economic Stabilization*", Journal of International Economic Studies, Vol: 21, pp. 69-84.

Batten, D. S. and Hafer, R. W. (1983), "*The Relative Impact of Monetary and Fiscal Actions on Economic Activity: A Cross-Country Comparison*", Federal Reserve Bank of St. Louis Review, January 1983, Vol: 65(1), pp. 5-12.

Blanchard, O. and Perotti, R. (2002), "*An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output*", Quarterly Journal of Economics, Vol:117, pp.1329-1368.

Chowdhury, A.R. (1986a), "*Monetary and Fiscal Impacts on Economic Activities in Bangladesh: A Note*", The Bangladesh Development Studies, Vol: 14(2), pp. 101-106.

Chowdhury, A.R. (1986b), "*Monetary Policy, Fiscal Policy, and Aggregate Economic Activity in Korea*", Asian Economies, Vol: 58, pp. 47-57.

Chowdhury, A. R. (1988), "*Monetary Policy, Fiscal Policy and Aggregate Economic Activity: Some Further Evidence*", Applied Economics, Vol: 20, Issue: 1, pp. 63-71.

Cyrus, M. and Elias, K. (2014), "*Monetary and Fiscal Policy Shocks and Economic Growth in Kenya: VAR Econometric Approach*", Journal of World Economic Research, Vol: 3(6), pp. 95-108.

Fatima, A. and Iqbal, A. (2003), "*The Relative Effectiveness of Monetary and Fiscal Policies: An Econometric Study*", Pakistan Economic and Social Review, Vol: 41, No: 1/2, pp. 93-116.

Friedman, M. and Meiselman, D. (1963), The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1887-1957, In Stabilization Policies, Englewood: Prentice Hall.

Havi, E. D. K. and Enu, P. (2014), "*The Effect of Fiscal Policy and Monetary Policy on Ghana's Economic Growth: Which Policy Is More Potent?*", International Journal of Empirical Finance, Vol: 3, No: 2, pp. 61-75.

Hilbers, P. (2005), Interraction of Monetary and Fiscal Policies: Why Central Bankers Worry about Government Budgets?, IMF Seminar on Current Development in Monetary and Financial Law, Washington, Chapter 8, IMF European Department.

Hussain, M. N. (2014), "*Empirical Econometric Analysis of Relationship between Fiscal-Monetary Policies and Output on SAARC Countries*", The Journal of Developing Areas, Vol: 48, No: 4, pp. 209-224.

Jayaraman, T. K. (2002), "*Efficacy of Fiscal and Monetary Policies in the South Pacific Island Countries: Some Empirical Evidence*", The Indian Economic Journal, Vol: 49:1, pp. 63-72.

Jawaid, S. T., Arif, I. and Naeemullah, S. M. (2010), "*Comparative Analysis of Monetary and Fiscal Policy: A Case Study of Pakistan*", NICE Research Journal, Vol: 3, pp. 58-67.

Kretzmer, P. E. (1992), "*Monetary vs. Fiscal Policy: New Evidence on an Old Debate*", Federal Reserve Bank of Kansas City, Economic Review, Second Quarter 1992, pp. 21-30.

Looney, R. E. (1989), "*The Relative Efficacy of Monetary and Fiscal Policy in Saudi Arabia*", Journal of International Development, Vol: 1, Issue: 3, pp. 356–372.

MacKinnon, J.G. (1991), Critical Values for Cointegration Tests, in: R. F. Engle and C. W. J. Granger (eds.), Long-run Economic Relationships, Oxford: Oxford University Press.

Mahmood, T. and Sial, M. H. (2011), "*The Relative Effectiveness of Monetary and Fiscal Policies in Economic Growth: A Case Study of Pakistan*", Asian Economic and Financial Review, Vol: 1, No: 4, pp. 236-244.

Narayan, P.K., Narayan, S., Smyth, R., (2008), "*Are Oil Shocks Permanent or Temporary? Panel Data Evidence from Crude Oil and NGL Production in 60 Countries*", Energy Economics, Vol: 30, pp. 919-936.

Olaloye, A. O. and Ikhide, S. I. (1995), "*Economic Sustainability and the Role of Fiscal and Monetary Policies in a Depressed Economy: The Case Study of Nigeria*", Sustainable Development, Vol: 3, pp. 89-100

Owoye, O. and Olugbenga, O. A. (1994), "*The Relative Importance of Monetary and Fiscal Policies in Selected African Countries*", Applied Economics, Vol: 26, pp. 1083-1091.

Perotti, R. (2005), Estimating the Effects of Fiscal Policy in OECD Countries, Center for Economic Policy Research, CEPR Discussion Paper, No: 4842, p.62.

Petrevski, G., Bogoev, J. and Tevdovski, D. (2015), *"Fiscal and Monetary Policy Effects in Three South Eastern European Economies"*, Empirical Economics, February 2015, pp.1-27.

Rahman, H. (2009), "*Relative Effectiveness of Monetary and Fiscal Policies on Output Growth in Bangladesh: A VAR Approach*", Bangladesh Journal of Political Economy, Vol: 22, No: 1 & 2, pp. 419-440.

Raj, J., Khundrakpam, J. K. and Das, D. (2011), An Empirical Analysis of Monetary and Fiscal Policy Interaction in India, Reserve Bank of India, Department of Economic and Policy Research, RBI Working Paper Series, No: 15/2011, p. 25.

Ravnik, R. and Žilić, I. (2011), "*The Use of SVAR Analysis in Determining the Effects of Fiscal Shocks in Croatia*", Financial Theory and Practice, Vol: 35 (1), pp. 25-58.

Sanni, M. R., Amusa, N. A. and Agbeyangi, B. A. (2012), "*Potency of Monetary and Fiscal Policy Instruments on Economic Activities of Nigeria (1960-2011)*", Journal of African Macroeconomic Review Vol: 3, N: 1, pp. 161-176.

Senbet, D. (2011), "*The Relative Impact of Fiscal versus Monetary Actions on Output: A Vector Autoregressive (VAR) Approach*", Business and Economic Journal, Vol: 25, pp. 1-11.

Waud, R. N. (1974), "*Monetary and Fiscal Effects on Economic Activity: Reduced Form Examination of Their Relative Importance*", The Review of Economics and Statistics, Vol: 56, No: 2, pp. 177-187.

Appendix: Empirical Studies on the Relative Effectiveness of Monetary and Fiscal Policies*, 1968-2015

Empirical Study	Period and Country Specification		Method or/and Model	Empirical Findings: Relative Effectiveness of Monetary and Fiscal Policies
	Period	Country		
Petrevski et al. (2015)	1999:Q1-2011:Q4	Three South Eastern European Countries: Bulgaria, Croatia, and Macedonia	VAR model	Monetary tightening produces a negative response in output in Bulgaria, but responses of fiscal policy are counterintuitive. In Croatia and Macedonia, fiscal authorities react in a countercyclical manner by adjusting the budget balance as a response to economic activity.
Hussain (2014)	1974-2007	SAARC (South Asian Association of Regional Cooperation) countries: Bangladesh, India, Nepal, Pakistan, and Sri Lanka	VAR model	Monetary policy has been more effective on output than fiscal policy in the case of Pakistan and Sri Lanka, whereas fiscal policy has had a more powerful effect than monetary policy on Bangladesh, India and Nepal.
Havi and Enu (2014)	1980-2012	Ghana	OLS method	Although fiscal policy affects growth positively, monetary policy has a more powerful effect on it.
Cyrus and Elias (2014)	1997-2010	Kenya	VAR model	Fiscal policy has a significant positive impact on real output growth while monetary policy shocks are completely insignificant with fiscal policy shock significantly change the real output for a period of almost eight quarters.
Rakic and Radenovic (2013)	2003-2012	Serbia	OLS lineer regression	Monetary policy is more effective in stimulating economic growth compared to fiscal policy.
Anna (2012)	1981:Q4-1998:Q3	Zimbabwe	Cointegration and error correction approach	The monetary influence is relatively stronger and more predictable compared to fiscal policy in determining economic activity. Fiscal policy has an insignificant effect on economic activity.
Sanni et al. (2012)	1960-2011	Nigeria	Error correction model	In general monetary policy instruments are more effective.
Senbet (2011)	1959:Q1-2010:Q2	US	Granger causality tests and VAR model	Monetary policy affects the real output relatively better than fiscal policy.
Jawaid, Arif and Naeemullah (2010)	1981-2009	Pakistan	OLS method	Both monetary and fiscal policies have significant and positive effect on economic growth.

* According to reverse chorological order.

Appendix: Continued…

Empirical Study	Period and Country Specification		Method or/and Model	Empirical Findings: Relative Effectiveness of Monetary and Fiscal Policies
	Period	Country		
Adefeso and Mobolaji (2010)	1970-2007	Nigeria	Error correction and cointegration tests	The effect of monetary policy is more dominant compared to fiscal policy on economic growth.
Rahman (2009)	1975-2003	Bangladesh	VAR model based on the St. Louis equation	Monetary policy alone has a significantly positive impact on real output growth in Bangladesh. The impact of fiscal policy on real output growth remains completely insignificant.
Ali et al. (2008)	1990-2007	Four South Asian Countries: Pakistan, India, Sri Lanka, and Bangladesh	Autoregressive distributed lag (ARDL) approach	Monetary policy is more powerful macroeconomic policy instrument than fiscal policy in enhancing economic growth.
Atchariyachanvanich (2007)	1990:Q2-2004:Q4	Six industrialized and six developing countries (Australia, Brazil, Mexico, the Netherlands, Peru, the Philippines, South Africa, Spain Sweden, Switzerland, Thailand, and the US	OLS method	The impact of monetary and fiscal policies on the output level is not clearly distinguishable.
Fatima and Iqbal (2003)	1970-2000	Five Asian Countries: Pakistan, India, Thailand, Indonesia and Malaysia	Granger causality test and ECM	For Thailand, there exists a strong bi-directional causality between fiscal policy and economic growth as well as between monetary policy and economic growth. For Indonesia, there exist a unidirectional causality between monetary policy and economic growth and a unidirectional causality between fiscal policy and economic growth. As for Malaysia, for this country there exist only unidirectional causality between the variables representing both of the policies and economic growth. In the case of Pakistan, monetary policy is found to be influencing economic growth. While for India study found out a unidirectional causality between monetary policy and economic growth.

Appendix: Continued…

Empirical Study	Period and Country Specification		Method or/and Model	Empirical Findings: Relative Effectiveness of Monetary and Fiscal Policies
	Period	Country		
Ajisafe and Folorunso (2002)	1970-1998	Nigeria	Cointegration and error correction modelling techniques	Monetary policy rather than fiscal policy exerts a great impact on economic activity.
Jayaraman (2002)	Fiji (1980-1995), Samoa (1983-1995), Tonga (1983-1995), Vanuatu (1984-1995)	Four South Pacific Island Countries: Fiji, Samoa, Tonga and Vanuatu	OLS method	Fiscal policies are effective in any of the four countries for promoting economic growth. In Samoa, in particular, both fiscal and monetary policies have no influence on growth. In Fiji, Tonga and Vanuatu, monetary policy has a positive impact on growth. In short, fiscal policies are found to be less effective.
Olaloye and Ikhide (1995)	1986 -1991	Nigeria	OLS method	Fiscal policy exerts more influence on the economy than monetary policy.
Owoye and Olugbenga (1994)	1960-1990	Ten African countries: Burundi, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Sierra Leone, South Africa, Tanzania and Zambia	VAR model	Monetary policy is more important than fiscal policy in the half of countries. However, for the other half of countries fiscal policy is more important than monetary policy.
Kretzmer (1992)	1950:Q2-1979:Q4 1962:Q2-1991:Q4	US	VAR model	Monetary policy becomes less effective over time, but is still more effective than fiscal policy.
Looney (1989)	1965-1985	Saudi Arabia	Macroeconomic simulation model	The relationship between money and economic activity is more predictable than that stemming from changes in autonomous expenditures.
Chowdhury (1988)	1966:Q1-1984:Q4	Six European Countries: Austria, Belgium, Denmark, The Netherlands, Norway, and Sweden	OLS method	Monetary policy, rather than fiscal policy, appears to have a stronger as well as more predictable effect on GNP in Denmark, Norway, and Sweden. However, in the case of Belgium and the Netherlands, fiscal policy appears to have a greater influence on economic activity but the results are inconclusive for the case of Austria.

Appendix: Continued…

Empirical Study	Period and Country Specification		Method or/and Model	Empirical Findings: Relative Effectiveness of Monetary and Fiscal Policies
	Period	Country		
Chowdhury (1986a)	1972-1983	Bangladesh	OLS method	Fiscal actions exert greater impact on economic activity in Bangladesh than monetary actions.
Chowdhury (1986b)	1966 -1984	Korea	OLS method	Growth in the monetary policy variable has a greater impact on changes in real income than growth in the fiscal policy variable. The long-run effects of a change in the growth rate of the monetary and the fiscal policy variables are also different. The effects of a change in the growth rate of M1 on real income last for a relatively longer period. Moreover, the magnitude of the effect is also greater in case of the monetary policy variable.
Batten and Hafer (1983)	1960-1980	Six industrialized countries: Canada, France, the UK, the US, Japan, and Germany	OLS method	Monetary actions have a significant as well as lasting effect on nominal GNP growth in all six countries. However, fiscal actions exert no statistically significant and lasting influence on growth in these countries.
Waud (1974)	1953:Q1-1968:Q4	US	OLS method	Fiscal influences and monetary influences on economic activity represented by GNP are both significant and appear equally important.
Andersen and Jordan (1968)	1952:Q1-1968:Q2	US	OLS method	The influence of monetary actions on economic activity is more certain than that of fiscal actions. Furthermore, monetary influence is stronger and operates more quickly in relation to fiscal influence. In short, monetary policy is more effective than fiscal policy in influencing the economy.

Source: Authors' preparation.