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**Effectiveness of macroeconomic policies in the context
of closed and open economies**

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Abstract

Monetary policy and fiscal policy are the two important macroeconomic policies which are used to achieve certain major macroeconomic goals like economic growth, unemployment reduction, counteract inflation and overall economic development of the nation. The effect of macroeconomic variables may differ in terms of degree, duration, different economic systems and under different exchange rate regimes. This study analyses the effectiveness of monetary policy and fiscal policy on the economy in terms of economic integration and different exchange rate regimes. Regression analysis in this study found that the fiscal policy is more effective in a closed economy and monetary policy is more effective in an open economy. Also the study finds that the fiscal policy is more effective under managed float exchange rate regime and monetary policy is more effective under perfectly flexible exchange rate. So this study also validated Mundell–Fleming model.

Keywords: monetary policy, fiscal policy, closed economy, open economy, exchange rate, economic growth.

JEL Classification: E4, E5, E6, E10, E63.

Introduction

Monetary and fiscal policies have long been the important instruments for policy makers to achieve their macroeconomic goals like economic growth with price stability and exchange rate stability and economic development. Monetary policy is the policy used by the central bank to control the liquidity in the market

which involves controlling inflation, exchange rate oscillations through various monetary instruments like CRR, SLR various interest rates and open market operations. Likewise finance ministry uses fiscal policy to achieve its objectives like economic growth and development through various fiscal tools like public revenue, public expenditure and public borrowings.

According to traditional macroeconomic theories, fiscal policy is more effective in the case of fixed exchange rate system and monetary policy is more effective under flexible exchange rate system. Economists usually compare the effect of both these policies on different economies under different exchange rate regimes and different economic systems. The reason behind is both the policies are equally important to achieve major and common macroeconomic goals like economic growth (growth rate of GDP) and economic development directly or indirectly through GDP. In case of economic growth and development, fiscal policy can be applied directly and results can be obtained immediately, but monetary can be applied directly for economic growth through decreasing rates and it is difficult to apply monetary policy directly to achieve development goals. It is possible only through decreasing interest rate and its impact on investment, employment and income. Also it will take some time to achieve the development goals. That's why it is always necessary and important to test the effectiveness of fiscal and monetary policy in the economy. In order to analyse the effectiveness of macroeconomic policies on the economy; this study uses Money Supply (M1), Interest rate (R), Government expenditure (G), Taxation (T) and Exchange rates (E) for analysis.

In the last few centuries countries across the world have been increasingly engaging with one another in terms of trade. The advent of mass production techniques and discovery of new technology and hence greater demand have opened up several fronts in global trade. Countries which earlier were self-sufficient became reliant on others. Much of the work in economics had an underlying assumption that the nation was a closed economy.

Several new models were proposed by various eminent economists like Mundell–Fleming, Trevor Swan and other models widely followed in international macroeconomics. Globalization has only accelerated the process of higher trade between nations. The western world was the first to embrace the concept of open economy. Many Asian countries like South Korea and Singapore adopted the open economy in early 1960s. Asian giants India and China have been relatively late in adopting the open economy model. India freed the control of government over key sectors in the 1990s reforms that had restricted the interaction of India with foreign nations.

Opening up of the economy brings in several benefits. However, due to limited governmental control over the functioning of the economy now it becomes difficult for the policy makers to strike a balance between governmental interference and market forces. Due to various factors, the effectiveness of a policy may or may not produce the desired effects. It becomes more important to consider the implications and the behavior of such policy actions. Analyzing the effect of macroeconomic policies under different exchange rate regimes may provide clue towards taking appropriate measures.

The impacts of these decisions seem to have profound effect on several key economic parameters and hence their analysis assumes considerable significance. The present paper is structured as follows: Introduction and significance of the study are given in Section 1. Section 2 presents review of literature which referred past studies rigorously. Section 3 provides data sources and methodology which includes research questions, objectives of the study, tools that are applies for analysis and limitations of the study. Section 4 examines the effectiveness of macroeconomic policies in the context of open and closed economies. Thought-provoking findings are also discussed in the same section. Conclusions, policy suggestions and scope for future research is given in the fifth and final section.

1. Literature Review

Phillips [1954] tried to project the visible impact and stability derived by implementing policies by looking at the behavior of various parameters. More importantly recommendations for stabilizing aggregate production and employment have usually been derived from the analysis of multiplier models, using the method of comparative statics. The study also argued that this type of analysis does not provide a very firm basis for policy recommendations, for two reasons. First, the time path of income, production and employment during the process of adjustment is not revealed. It is quite possible that certain types of policy may give rise to undesired fluctuations, or even cause a previously stable system to become unstable, although the final equilibrium position as shown by a static analysis appears to be quite satisfactory. Second, the effects of variations in prices and interest rates cannot be dealt with adequately with the simple multiplier models which usually form the basis of the analysis. This study begins with the usual assumption of constant prices and interest rates are retained, and a process analysis is used to illustrate some general principles of stabilization policies. In the later part these principles are used in developing and analyzing a more general model, in which prices and interest rates are flexible.

Fleming [1962], examines “Domestic financial policies under fixed and floating exchange rates”, states that the bearing of exchange rate systems on the relative effectiveness of monetary policy on the one hand, and of budgetary policy on the other, as techniques for influencing the level of monetary demand for domestic output, is not always kept in mind when such systems are compared. The study finds the fact that the expansionary effect of a given increase in money supply will always be greater if the country has a floating exchange rate than if it has a fixed rate. By contrast, it is uncertain whether the expansionary effect on the demand for domestic output of a given increase in budgetary expenditure or a given reduction in tax rates will be larger or smaller with a floating than with a fixed rate. In all but extreme cases, the stimulus to monetary demand arising from an increase in money supply will be greater, relative to that arising from an expansionary change in budgetary policy, with a floating than with a fixed rate of exchange.

Swoboda [1973] analyzes the impact of monetary policies on the economy in the view point of closed economy and the open economy. In a closed economy most economists would agree that monetary policy can be used as a counter-cyclical device, and that the rate of growth of money can, in some average sense over the medium run, be controlled, however difficult it may be to exercise such control in the short run. In the case of open economy, the role of monetary policy and capital mobility on balance-of-payments adjustment mechanism are emphasized. This study summarizes the effectiveness and proper use of monetary policy in an open economy under fixed exchange rates. This study also aims at the determinants of the length of time required to regain equilibrium after a monetary disturbance. Finally this study found that it is appropriate to use monetary policy under fixed exchange rates.

Cooper [1976] has identified several respects of the macroeconomic policies in small open economies with special reference to the effectiveness of monetary and fiscal policies under alternative exchange rate regimes. According to the study, the Capital movements must be viewed in the context of portfolio equilibrium rather than as continuous flows. The impact of changes in exchange rates on nominal factor prices has been taken into account. The effect of exchange rate regimes on the magnitude of the stabilization task has figured in the evaluation of alternative exchange rate regimes. This study finds that the choice of exchange rate regime for a small country has influenced by the magnitude of external economic disturbances relative to internal ones.

Frenkel and Mussa [1981] evaluated the effectiveness of optimal monetary policy in open economies by proposing a unified analytical framework. This study then examines deviations from this benchmark in cross-country strategic

policy interactions, incomplete exchange-rate pass-through and asset market imperfections are accounted for. Finally the study concludes that the failure to internalize international monetary spillovers results in attempting to manipulate international relative prices to raise national welfare, causing inefficient real exchange rate fluctuations. Local currency pricing and incomplete asset markets (preventing effective risk sharing) shift the focus of monetary stabilization to redressing domestic as well as external distortions: the targeting rules characterizing the optimal policy are not only in domestic output gaps and inflation, but also in misalignments in the terms of trade and real exchange rates, and cross-country demand imbalances.

Clarida, Gali, & Gertler [1999] analyze the New Keynesian Perspective of monetary policy and its impact on real economy. To analyze the effectiveness of monetary policy, this study start with a basic model in order to characterize a number of broad principles that underlie optimal policy. In the end, the results from the analyses are compared with real life values regarding monetary policy and it was found that the determinants of inflation play a major role in the prediction of the impact of monetary policy. The study also cautioned that the extension to an open economy framework would probably lead to new insights and change the results. In such a case, the only way to increase real interest rates would be to raise the expected inflation.

Negrete [2001] probes into the relationship between fiscal institutions and welfare in an open economy. The major objective of the study is to rationalize such fiscal institutions in an open economy in which budget deficits generate spillovers. Also the study shows how fiscal institutions are endogenously determined in an open economy where budget deficit generate externalities on other countries. When fiscal stabilization policies generate negative externalities commitments that reduce the amount of these externalities are Pareto-improving. However, no matter the sign of the spill overs, the externalities are completely internalized (first best) if countries collectively design their fiscal institutions. In this cooperative scenario these deficit-reducing technologies are only required when spill overs are negative.

Clarida, Gali & Gertler [2001] examined the Optimal Monetary Policy in Open versus Closed Economies. According to them the openness complicates the problem of monetary management to the extent that the central bank must take into account of the impact of the exchange rate on real activity and inflation. This study finds that the open economy case for monetary policy design is similar to the one for closed economy, and that all the qualitative results from the closed economy case can be applied to the open economy case as well. It is also found that the general form of the optimal interest-rate feedback rule re-

mains the same as in the closed economy case. This study suggested that the central bank should target domestic inflation and allow a floating exchange rate regime, even though this could cause a lot of exchange rate variability on the CPI.

Devereux and Engel [2003] in their paper “Monetary Policy in the open economy revisited: Price setting and exchange-rate flexibility” develop a welfare-based model of monetary policy in an open economy. The paper also examines the optimal monetary policy under commitment, focusing on the nature of price adjustment in determining policy and also investigates the implications of these policies for exchange-rate flexibility. In the light of empirical evidence on nominal price response to exchange-rate changes—specifically, that there appears to be a large degree of local-currency pricing in industrialized countries the expenditure-switching role played by nominal exchange rates may be exaggerated in the traditional literature.

Xinsheng Lu & Francis In [2005] analyze open market operations and implementation of monetary policy in an open economy. This study examines various measures that have been taken by the central bank of New Zealand to control the economy. The economy of the U.S and Australia are also compared to the New Zealand economy with the similarities and differences being accounted for so that in case of comparison of data is done then the difference in result can be explained and accounted for.

This study focuses more on the impact of monetary policy on the exchange rate. The analysis overviews transition of New Zealand Economy from Monetary Condition Index to Official Cash rate. The case of New Zealand, the open market operations of the bank where it sucks out the money from the market and certain times it pumps money to the market. The Major finding of the study shows that the OMO decreases monetary transparency. Thus, what they show is that the effect of the OMO was more when the system of MCI was followed and its impact was lesser when OCR came into play, nevertheless the role of OMO and its impact still play a significant role in shaping the investor sentiments and market expectations today in the country. Thus, in the empirical analysis it is pointed out that even though the effect of the OMO operations has changed over years and has become less prominent, but it won't demise and still be a crux in shaping market sentiments, mean returns and volatility of the market.

Campbell & Wren-Lewis [2008] studied the Interactions between Monetary and Fiscal Policy under Flexible Exchange Rates. In this study, a two-country open economy model is developed wherein each country has overlapping generations of consumers who supply labor to imperfectly competitive firms which can only change their prices infrequently. Consumers in each country purchase differentiated goods produced both at home and abroad. Given this model, a case

where the two countries operate under a flexible exchange rate with independent monetary and fiscal policies is studied. It was found that the minimum responsiveness of tax revenues to debt disequilibrium required to support an active monetary policy was greater when consumers were non-Ricardian. Additionally if any fiscal authority did not meet this minimal requirement then there was limited scope for the other fiscal authority to compensate. In the absence of such behavior, the monetary authorities would have to operate a passive monetary policy which offset any debt disequilibrium by reducing debt service costs. However, in a model featuring free trade, where output price inflation in one economy affects consumer prices in the other, there was no reason for the passive monetary authority to reside in the same country as the insolvent fiscal authority.

Araoz et al. [2009] examined the empirical evidences on Fiscal Policy Sustainability in Argentina. This study contributed to the study of the economic history of Argentine crises by analyzing the fiscal sustainability for the period 1865-2002. Fiscal deficits are sustainable if the current market value of debt equals the discounted sum of expected future surpluses. It is found that Argentina never had 'strong' fiscal sustainability. At most, it reached weak sustainability for some sub-periods and no sustainability at all during the sub-period, 1950-1989. Interestingly, sustainability got worse as the economy went from mostly open to relatively closed state.

However, on second thought, this is an obvious conclusion rather than a surprising one, by any means, sooner or later, a country must meet the intertemporal budget constraint. The difference is the way in which emergent and developed countries attain sustainability. On the other hand, when fiscal sustainability is considered by sub periods, we find that it was either weakly sustainable or not sustainable at all depending on the sub period analyzed.

Chang & Liu [2010] studied Monetary and Fiscal Policy Rules in a Closed Economy. This is based on dynamic general equilibrium model with sticky prices and shopping time assumptions. It aims to examine issues such as liquidity effect or price puzzle, by using the real business cycle (RBC) approach. This study assumes two situations – active monetary policy and passive fiscal policy, and passive monetary policy and active fiscal policy. The parameters that have been used are obtained by the existing RBC works or by the empirical U.S. data. The study found that though the active monetary policy passive fiscal policy system led to rise in both nominal interest rates and inflation rates, the liquidity effect was not observed. The study concludes by saying that higher inflation will cause the agents to reduce their real money holdings so as to increase their spending on consumption goods.

Based on the existing studies the research gap was identified:

- no empirical study for the effectiveness of the monetary and fiscal policy has been separately done for different exchange rate regimes;
- policy effectiveness has not been contrasted for developed and developing countries; and
- there is no study on the difference in policy effectiveness for an open and a closed economy.

2. Research goals and methodology

2.1. Research questions and goals

Over the years, the effectiveness of monetary and fiscal policies on major macroeconomic variables have given rise to several **policy issues and questions**. For instance:

- What is the effectiveness of the monetary and fiscal policy under different exchange rate regimes namely fixed, floating and managed float exchange rate regimes?
- How does the degree of effectiveness vary for monetary and fiscal policy for developing and developed countries?
- How does the openness and closed-ness of an economy affect its policy effectiveness?

It will be academically significant and occupationally useful to find credible and reasonable answers to the above questions. In this context, the specific objectives of the study is:

- to analyze the effectiveness of monetary and fiscal policy under different exchange rate regimes;
- to compare and contrast the effectiveness of monetary and fiscal policy in an open and closed economic system;
- to evaluate the impact of monetary and fiscal policy in shaping the markets and the economy of developing and developed countries; and
- to suggest suitable and effective macroeconomic policies for different economic systems.

2.2. Research methodology

The methodology that has been used for tackling our objectives is slightly different, and untested. This study has considered monetary policy represented by money supply (for which narrow money, M1 is taken as proxy) and interest

rate (for which lending rates, r , are taken) and fiscal policy represented by government spending (G) and tax revenues (T). The public expenditure and taxation are also taken as percentage of GDP. After that the effect of these policy variables on GDP (Y) is estimated using OLS. To account for fluctuations due to exchange rate (E), that too has been included as an explanatory variable.

Regression equation:

$$\text{Ln}(Y) = \text{Ln}(M1) + r + G + T + E \quad (1)$$

Model 1 might appear simplistic, but has surprisingly resulted in high R-squared values during the analysis.

This regression equation is applied for each of the three exchange rate regimes: fixed, floating and managed float. For each regime, an example of a developed and a developing country is taken, to contrast the effects of the monetary policy.

To contrast the effects between closed and open economy, a huge approximation is made. Since no data is available on the non-existent, closed economies, we could only resort to this very crude approach of estimation of the effect of policy variables by ‘discounting’ the openness of the economy. To do this, Net Exports are subtracted from Y and the effects of changes in forex reserves are removed from money supply. The regression is performed again, without exchange rate, and the result has been obtained, give an approximation of what the effectiveness would have been under closed economy.

2.3. Tools of analysis

The study uses secondary data obtained from various national and international sources such as Government Finance Statistics Yearbook, Handbook of statistics on the Indian economy and World Bank report. Simple linear regression model (OLS) is employed to test the effectiveness of macroeconomic policies on the economy.

2.4. Limitations of study

This study has some limitations, e.g.:

- this study considers only few countries for analysis due to lack of availability of data;
- the study is limited to the period 2000-2015 due to unavailability of data, especially for Qatar and Germany for other periods;
- only deficient functional form used for regression analysis; and
- this study uses only secondary data for analysis and applied only OLS method.

3. Research findings and discussions

An Analysis on the effectiveness of macroeconomic policies in the context of open and closed economies under different exchange rate regimes. Monetary policy and fiscal policy are the two instruments which can be used to achieve any macroeconomic goals in the economy. Both the policies can also be used to achieve certain common goals in the economy like price stability, GDP growth, unemployment reduction, etc. But the effectiveness or duration of the effects of these policies on macroeconomic variables may differ. The main objective of the study is to trace out the effectiveness of monetary policy and fiscal policy on macroeconomic variables and under different economic systems like closed and open economy. To do this, the study regresses major macroeconomic variables (GDP, Interest rate, Public Expenditure, Taxation, Money Supply and Exchange Rate) of U.S.A, India, Brazil, Germany, Qatar and U.A.E. The purpose of choosing the above six countries are to find out the effectiveness of monetary and fiscal policies in the open and closed economic system. The regression results and data analysis are as follows.

Table 1. OLS, using observations 1905/06/22-1905/07/02 (T = 11)

Model 1 for USA

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	32.3803	4.39898	7.3609	0.00073	***
ln_m1	-0.0926533	0.162722	-0.5694	0.59371	
r	-0.000859713	0.0053344	-0.1612	0.87827	
G	0.0106388	0.00551561	1.9289	0.11165	
T	0.0238301	0.0092617	2.5730	0.04985	**
E	-0.350119	0.048951	-7.1524	0.00083	***
Mean dependent var		30.14072	S.D. dependent var	0.063360	
Sum squared resid		0.000994	S.E. of regression	0.014097	
R-squared		0.975251	Adjusted R-squared	0.950502	
F(5, 5)		39.40531	P-value(F)	0.000510	
Log-likelihood		35.60827	Akaike criterion	-59.21654	
Schwarz criterion		-56.82917	Hannan-Quinn	-60.72145	
rho		-0.526905	Durbin-Watson	2.853613	

Note: Dependent variable: ln_y_.

Source: Own calculations.

The regression result from Table 1 shows high R square value, indicating that the model has been specified correctly. This shows that the explanatory variables like policy variables and exchange rate affects output very well. The coefficients corresponding to each of these variables are also affects the output. In the regression model, M1 is a measure of the money supply which includes currency in circulation plus demand deposits or checking account balances.

In a managed float system like the USA, each of these variables is important policy variables and is used to influence output. Theoretically, investment depends on interest rate inversely and the above data is in accordance with the theory that the output is inversely related to interest rate. According to the regression results on increasing money supply, output of USA is decreasing, which implies ineffectiveness of monetary policies in managed float regimes to attain internal and external equilibrium. In managed float system the central bank will have to purchase or sell foreign exchange. These transactions in foreign exchange will have an effect on the monetary base analogous to open market purchases and sales of government debt; if the central bank buys foreign exchange, the monetary base expands, and vice versa. This will lead to ineffectiveness of monetary policy, but in the case of a pure floating exchange rate, central banks and monetary authorities can at best 'lean against the wind' in a world where capital is mobile.

On the other hand when we see the relation between output with government spending and taxes results were found to be positively varying, when government spending was increasing the output are also increased same was the case with taxes. This leads to a conclusion that in a managed float regime in USA fiscal policy were effective to attain external as well as internal equilibrium.

Table 2. OLS, using observations 2000-2010 (T = 11)

Model 2 for India

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	15.9866	0.286956	55.7110	<0.00001	***
ln_m1	0.520721	0.0136466	38.1576	<0.00001	***
r	0.00955847	0.0103654	0.9222	0.39876	
G	-0.000529447	0.00907737	-0.0583	0.95575	
T	-0.0148226	0.0124654	-1.1891	0.28779	
E	-0.00312983	0.00286328	-1.0931	0.32420	
Mean dependent var		31.20727	S.D. dependent var	0.254868	
Sum squared resid		0.000623	S.E. of regression	0.011163	
R-squared		0.999041	Adjusted R-squared	0.998082	
F(5, 5)		1041.544	P-value(F)	1.55e-07	
Log-likelihood		38.17479	Akaike criterion	-64.34959	
Schwarz criterion		-61.96222	Hannan-Quinn	-65.85449	
rho		0.006453	Durbin-Watson	1.786869	

Note: Dependent variable: ln_y_.

Source: Own calculations.

As far as a developing country like India adopting managed float exchange rate system. For India, the regression result from Table 2 shows high R square value pointing out that the model has been specified correctly. This shows that the explanatory variables considered in the model affects output drastically. The test result shows that the coefficients corresponding to each of these variables

affects the output. Regression results for India reaches positive relationship between money supply and output, which implies expansionary monetary policies in managed float regimes will increase output. In the managed float exchange rate system, the central bank will have to purchase or sell foreign exchange for economic objectivity. These transactions in foreign exchange will have an effect on the monetary base analogous to open market purchases and sales of government debt; if the central bank buys foreign exchange, the monetary base expands, and vice versa.

Table 3. OLS, using observations 1905/06/22-1905/07/02 (T = 11)

Model 3 for Brazil

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	25.4493	1.12237	22.6745	<0.00001	***
ln_m1	0.0772423	0.0503267	1.5348	0.18542	
r	-1.50823e-05	0.00160363	-0.0094	0.99286	
G	0.022462	0.0115137	1.9509	0.10855	
T	0.00287227	0.00188239	1.5259	0.18757	
E	-0.0299354	0.0169422	-1.7669	0.13749	
Mean dependent var		27.94828	S.D. dependent var	0.122061	
Sum squared resid		0.000775	S.E. of regression	0.012452	
R-squared		0.994796	Adjusted R-squared	0.989592	
F(5, 5)		191.1638	P-value(F)	0.000011	
Log-likelihood		36.97237	Akaike criterion	-61.94474	
Schwarz criterion		-59.55737	Hannan-Quinn	-63.44965	
rho		-0.365284	Durbin-Watson	2.651286	

Note: Dependent variable: ln_y_.

Source: Own calculayions.

The regression analysis from Table 3 gives high R square value stating that the model has been specified correctly. This indicates that the explanatory variables have direct relation with output. The above results are also in compliance with Mundell–Fleming views of expansionary monetary policy favors flexible exchange rate system. When expansionary monetary policy has been implemented, the decreased interest rate leads to increase in output. Decreased interest rate is also led to capital outflow from the economy and further it led to increase in imports. All these factors led to the depreciation of domestic currency which increases exports. The coefficient of Exchange rate is negative in above tests, which is in accordance with the methodology of the study and the Mundell–Fleming model.

Table 4. OLS, using observations 1905/06/22-1905/07/02/(T=11)**Model 4 for Germany**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	24.7038	1.22876	20.1046	<0.00001	***
ln_m1	0.157795	0.0511637	3.0841	0.02734	**
r	-0.000544446	0.00784877	-0.0694	0.94739	
G	-0.0136099	0.00397687	-3.4223	0.01879	**
T	0.0168414	0.0131104	1.2846	0.25523	
E	-0.0838874	0.067004	-1.2520	0.26595	
Mean dependent var	28.44773	S.D. dependent var	0.039239		
Sum squared resid	0.000752	S.E. of regression	0.012266		
R-squared	0.951140	Adjusted R-squared	0.902280		
F(5, 5)	19.46658	P-value(F)	0.002718		
Log-likelihood	37.13819	Akaike criterion	-62.27637		
Schwarz criterion	-59.88900	Hannan-Quinn	-63.78127		
Mean dependent var	28.44773	S.D. dependent var	0.039239		

Note: Dependent variable: ln_y_.

Source: Own calculations.

Now the study considered the case of a developed country called Germany which follows flexible exchange rate system. Regression result from Table 4 shows high R square value for Germany. The high R square value pointing that the model has been specified correctly. This enlightens the explanatory considered in the model, like policy variables and the exchange rate, affects output of Germany. Monetary policy in the case of a developed nation under floating exchange rate regime also finds that the monetary policy is effective in attaining internal as well as external balance. So our tests and results obtained imply that monetary policy is superior over fiscal policy in attainment of general equilibrium.

Table 5. OLS, using observations 1905/06/22-1905/07/02 (T = 11)**Model 5 for Qatar**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	9.97815	1.45862	6.8408	0.00048	***
ln_m1	0.624065	0.0513039	12.1641	0.00002	***
r	-0.0224844	0.0308851	-0.7280	0.49403	
G	-0.00512944	0.00243971	-2.1025	0.08020	*
T	-0.00129026	0.0112804	-0.1144	0.91267	
Mean dependent var	25.36355	S.D. dependent var	0.447337		
Sum squared resid	0.021229	S.E. of regression	0.059483		
R-squared	0.989391	Adjusted R-squared	0.982319		
F(4, 6)	139.8935	P-value(F)	4.74e-06		
Log-likelihood	18.76820	Akaike criterion	-27.53640		
Schwarz criterion	-25.54692	Hannan-Quinn	-28.79049		
rho	-0.290469	Durbin-Watson	2.434340		

Note: Dependent variable: ln_y_.

Source: Own calculations.

Regression analysis for Qatar from Table 5 gives high R square value of 0.98 indicating that the model has been specified correctly. The result proves that there is a positive relationship prevails between the explanatory variables and output of Qatar. Other coefficients corresponding to each of these variables gives us the extent to which the variable affects the output. The test has been done on Qatar which has fixed exchange rate regime system indicated that the monetary policy has sufficed to attain the general equilibrium in Qatar. Above results also shows that the fiscal policies have been ineffective in attaining the same cause i.e. achieving internal and external equilibrium.

Table 6. OLS, using observations 1905/06/22–1905/07/02 (T = 11)

Model 6 for UAE

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-2.74585	4.2589	-0.6447	0.53965	
ln_m1	1.26513	0.17675	7.1578	0.00018	***
r	0.00914108	0.0111834	0.8174	0.44064	
G	-0.0286426	0.0072712	-3.9392	0.00561	***
Mean dependent var		27.46776	S.D. dependent var	0.157690	
Sum squared resid		0.005883	S.E. of regression	0.028991	
R-squared		0.976340	Adjusted R-squared	0.966201	
F(3, 7)		96.28797	P-value(F)	4.70e-06	
Log-likelihood		25.82617	Akaike criterion	-43.65233	
Schwarz criterion		-42.06075	Hannan-Quinn	-44.65560	
rho		-0.713808	Durbin-Watson	3.036760	

Note: Dependent variable: ln_y_.

Source: Own calculations.

The study also considered U.A.E for analysis for the case of a developed country (in term of per capita income and standard of living) with fixed exchange rate system. The regression from Table 6 analysis shows high R square value shows that the model has been specified correctly. The results are also same as for our previous case of developing nation (Qatar). Monetary policy in the case of developed nation in a fixed exchange rate regime was found to be effective in attaining internal as well as external balance majorly due to different government and central bank policies. So our tests and results obtained imply that monetary policy is superior over fiscal policy in attainment of general equilibrium.

Table 7. Comparisons between Brazil, Germany, India, USA, Qatar and UAE on the trends in money supply, interest rate, government spending, taxation and exchange rate

	BRAZIL	GERMANY	INDIA	USA	QATAR
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
Money supply	0.0772	0.1577	0.5207	-0.0926	0.624
Interest rate	-1.5024005	-0.000544	0.00955	-0.00085	-0.0224
Government expenditure	0.022	-0.0136	-0.00052	0.0106	-0.0051

Table 7 cont.

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
Taxation	0.0028	0.0168	-0.01482	0.0238	-0.00129
Exchange rate	-0.0299	-0.0838	-0.00312	-0.35011	-

Source: Own calculations.

Table 7 summarizes the results for all the countries considered for analysis and the values of major macroeconomic variables for all the countries are given evidently. Though there are differences in the expected results and the ones obtained in some cases because of the exclusion some other necessary explanatory variables which would influence the output. If the model can be specified correctly, then the coefficients for policy variables for all countries would reflect the same results.

3.1. Approximating a closed economy

To approximate a closed economy, the study consider country which follows fixed exchange rate and then the study uses two steps to approximate the selected economy as a closed economy. The first step is the removal net exports from the total output and the second step is the removal of the effect of forex reserves in money supply. Based on these two step procedures, the study chooses UAE and Qatar for analysis for a closed economy case.

Table 8. OLS, using observations 1905/06/22-1905/07/02 (T = 11)

Model 7 for Qatar Closed

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	17.1768	2.23778	7.6758	0.00012	***
I M New	0.425759	0.0904456	4.7073	0.00219	***
r	-0.0361747	0.009747	-3.7114	0.00754	***
G	0.0405874	0.0115254	3.5216	0.00971	***
Mean dependent var		27.44604	S.D. dependent var	0.151103	
Sum squared resid		0.009826	S.E. of regression	0.037465	
R-squared		0.956966	Adjusted R-squared	0.938522	
F(3, 7)		51.88703	P-value(F)	0.000038	
Log-likelihood		23.00528	Akaike criterion	-38.01057	
Schwarz criterion		-36.41899	Hannan-Quinn	-39.01384	
rho		-0.412611	Durbin-Watson	2.726333	

Note: Dependent variable: I_Y_new.

Source: Own calculations.

Table 9. OLS, using observations 1905/06/22-1905/07/02 (T = 11)**Model 8 for UAE Closed**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	17.1768	2.23778	7.6758	0.00012	***
l_M_New	0.425759	0.0904456	4.7073	0.00219	***
r	-0.0361747	0.009747	-3.7114	0.00754	***
G	0.0405874	0.0115254	3.5216	0.00971	***
Mean dependent var		27.44604	S.D. dependent var	0.151103	
Sum squared resid		0.009826	S.E. of regression	0.037465	
R-squared		0.956966	Adjusted R-squared	0.938522	
F(3, 7)		51.88703	P-value(F)	0.000038	
Log-likelihood		23.00528	Akaike criterion	-38.01057	
Schwarz criterion		-36.41899	Hannan-Quinn	-39.01384	
rho		-0.412611	Durbin-Watson	2.726333	

Note: Dependent variable: l_Y_new.

Source: Own calculations.

Tables 8 and 9 give the results obtained showing the change in the coefficients for each policy variable before and after approximation to a closed economy.

Table 10. Regression results of UAE and Qatar under closed and open economic conditions

	<i>UAE Closed</i>	<i>UAE Open</i>	<i>Qatar Closed</i>	<i>Qatar Open</i>
ln (M)	0.425759	1.26513	0.42576	0.62407
r	-0.0361747	0.00914	-0.0362	-0.0225
G	0.0405874	-0.0286	0.04059	-0.0051

Source: Own calculations.

Regression analysis for a closed economy, the study obtained high R-squared value for both the economies (UAE & Qatar) indicated that the model has been specified correctly. According to the test results which are indicated in Table 10 shows that the fiscal policy proved to be efficient in achieving the goals of a closed economy. Simultaneously, the study also proved that the monetary policy play a significant role in the closed economy. But the degree of the effectiveness of fiscal policy in the closed economic system is very high compared to the degree of effectiveness of monetary policy which proves that this study validated Mundell-Fleming model like many other scholarly work reviewed in the literature part.

Conclusions

From the regression analysis and case studies, it can be derived that different solutions are recommended by different economists for different exchange rate regimes and there is no common solution to major economic problems. It is

generally seen that fiscal policies are more effective in the closed economy and monetary policy is more effective in the open economy. It was seen that the fiscal policy was very effective in gaining internal and external equilibrium also in the managed float exchange rate system in a developed country whereas a monetary policy was effective in a developing country which follows a managed float exchange rate regime. In free floating exchange rate regimes, it was found that in developed countries monetary policy had superior effectiveness than fiscal policy, in developing countries also the monetary policy has superior effectiveness which was accompanied by effectiveness of interest rates. In fixed exchange rate regimes, monetary policies were found to be more effective to bring back the external and internal balance. Thus, monetary policy is more or less prominent in the steps being taken by various governmental institutions to maintain balance. Thus, monetary policy is playing an increasingly significant role in today's growing open economies and markets and fiscal policy is playing a significant role in stabilizing the open economies. Scope for further research relating to the same area is abundant. This study assessed the effectiveness of monetary and fiscal policy on money supply, interest rate, government spending, taxation and exchange rate. It is suggested that this study can be extended to other variables like fiscal deficit, current account deficit and also on socio economic variables like poverty, unemployment and infrastructure development. Also the study can be extended to multi-country analysis or comparative study of two countries.

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