MONEY GROWTH AND INFLATION: EMPIRICAL EVIDENCE FROM GCC REGION

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This study examines the relationship between money growth and inflation in GCC countries using cointegration and causality analysis. The study used annual time series data from 1970 to 2013, Johansen cointegration approach identify long run relationship. The empirical results confirm that in the long run money supply growth has significant and positive relationship with inflation. However, interest rates and import have positive and significant relationship with inflation but exchange rates and GDP have negative and significant relationship with inflation in the long run. The study concludes that for maintaining price stability and minimum rate of inflation, GCC countries needs to reduce money supply growth, improve GDP, reduce interest rate and impose strong import restrictions measures as well as exchange rate depreciation along with import substitution strategy.

1. Introduction

Generally, the monetary policy as a tool of macroeconomic administration is utilized for balance of payment equilibrium, economic growth, full employment and price stability. Nevertheless, in developing countries, central banks focus more on exchange rate stability because of its positive association with price stability. Through domestic credit supply, commercial banks focus directly toward exchange rate and price stability though they indirectly influence balance of payment surplus, reduction in unemployment and economic growth. Therefore, the main concern of central banks all over the world has become to stabilize the price through efficient monetary policy to control inflation rate [1].

It is normally believed which is true that high inflation rate negatively affect the purchasing power of the individuals. It likewise achieves instability concerning the future change in prices as not all these prices are hope to ascend in comparable rate and it will be hard for firms to make arrangements for future generation [2]. High inflation rate could destroy the competitiveness of a country which will further negatively affect domestic currency, exports and level of consumption for poor [3].

Previously economics have evaluated some factors of high inflation rate with respect to monetary & fiscal policy and balance of payment [4]. Monetary and fiscal point of view are different as according to monetary aspect, inflation cause excess money supply though fiscal aspect relate it to budget deficit. Nevertheless, due to budget deficit, developing economies try to fulfil the need of money through excess money supply. Therefore, it could be assumed that monetary and fiscal aspects are linked in this way. In the perspective of balance of payment (B.O.P.), exchange rate is its chief concern. High prices of imports leads to high inflation rate which are frequently as a result of wage indexation mechanism [4].

Owing to the inconsistency in these view points of the reasons of high rate of inflation, different remedies has been proposed by economists for adequate policy implication. Those who are in line with monetary point of view proposed that government should decrease lending to public corporation and diminish the financing budget deficit accordingly. However, the supporting views of balance of payment are dissimilar as they are in the favour of exchange rate depreciation for resolving the issue of trade deterioration and overvaluation. In addition, instead of further exchange rate adjustment, this view point propose a mixture of income policies, demand reduction measures and price control. Therefore, current literature is focusing on exchange rate for managing macroeconomic issue [4][5].

Inflation is a persistent raise in the general price level of goods as well as services in an economy within a given period of time. It seriously affects government and businesses as well as individuals [6]. It is regarded generally as a significant problem that needs to be solved and the top agendas of policymakers and politicians. To solve the problem of inflation, there is need to know a lot about the factors that cause it [6]. Consequently, the impact of inflation may take the form of deterioration in the purchasing power in any economy, uncertainty about the future of prices changes, redistribution of income by benefiting debtors at the expense of creditors, harms a country's competitiveness thereby leading appreciation of domestic currency and upset savers as prices increases [3].

Although, the countries with the group of Gulf cooperation council have enjoyed the economic stability in prior year but according to a report of Gulf News, they are facing very high inflation rate. For instance, according to GCC-Stat, the GCC region overall inflation rate has raised to 1.06% to 3.8%. In the same lines, Qatar faced the highest inflation rate, i.e. 3.8%. Additionally, increase in prices of Oman has raised to 1.06%, UAE 2.42%, Kuwait 2.71%, Saudi Arabia 2.8% and the inflation rate of Bahrain has raised to 3.1% respectively [7].

Tobacco prices in Kuwait have inflated up to 12.42% and the utility and housing prices has gain to 7.9% and 5.4% in Qatar and Bahrain accordingly. In addition, the prices of beverages and food has also elevated currently. For instance, in Qatar, it is elevated up to 1.2%, 1.51% in Oman, 1.82% in Kuwait, 2.06% in UAE, 2.1% in Bahrain and 2.5% in Saudi Arabia. Among other GCC countries, an increase of almost 7.9% has observed in the category of utility prices and housing prices [7].

Growth of money supply is the wire life of all the economics activities henceforth, it has greater influence on the economic activities of any nation. A rise in money supply makes more money available in the hands of consumers and producers and thus inspiring consumption and investment. As the rate of money growth increases, prices begin to increase, particularly if the growth of output reaches full capacity [8]. The increase in growth rate of money is responsible by the following factors such as the huge monetization of the inflows of oil, wage and salaries minimum adjustment and the increase in budget deficit financing by the government through the Central Bank [9]. It is also observed that GCC countries have also increase their money growth and Qatar is leading in this perspective by 37.4% elevated in money growth [10].

It is generally agree that money growth changes affect the price level in the short run. Excessive money growth encourages aggregate spending and accordingly expansion in output, if the idle resources are available. Conversely, if the available output is inelastic, as a result of constraint in foreign exchange, technological limitation or low productivity. Increase in money growth endangers inflationary pressure. Although previously, the relationship between money growth and inflation has observed in some economies but according to the best knowledge of the author, there is previous study on this relationship in the context of Gulf Cooperation Council (GCC) countries.

Therefore, based on the conflicting and inconclusive findings of the previous studies, the present study intends to contribute to the existing body of knowledge there by examining and revisiting empirically the effects of money growth on inflation in GCC countries. The links between money growth and inflation will improve our knowledge concerning several interpretations, which have figured money growth and inflation both in practice and theory. Henceforth, the study will give some plausible arrangement suggestions base on the result of the investigation.

Moreover, from the point of view of the practical contribution, the findings of this research would be greatly significant to the government and the policy makers, because it will help them to understand the impact of money growth on inflation as well as developing policies that will help in achieving stability in the economy.

2. Objectives of the Study

The general objective of this study is to analyze the relationship between money growth and inflation in GCC countries by using analysis of time series data.

3. Literature Review

In the literature of economics, inflation concept has become an essential part of money, as quoted by Max "inflation is too much money chasing few goods". Inflation pronounced as an economic phenomenon when the supply of money is increasing faster than the production of goods as well as services in an economy [6]. Therefore, inflation could be describe as the persistent raise in the general price level of goods as well as services within an economy over a given period of time [11].

Recently there are three major schools of economics thoughts with regard to the causes of inflation; Structuralists, Neo-Keynisian and Neo-Classical/Monetarist. The Neo-Keynisian characterizes inflation with the law of diminishing return of production. This happens when the velocity of money increase and the investment is below the current consumption. While the Structuralism, on the other hand, characterize the causes of inflation in terms of the structural factors as well as the underlying features of an economy [12]. For example, in an emerging economy, particularly those with a mighty underground economy, excessive hoarding and hedging, individual expectation of a future increase in prices above the current prices and the goods and services demand are not transactionary but rather it is precautionary. This will manifest into a non-natural shortage of goods henceforth ignite inflationary pressure.

3.1 Theoretical Review of Inflation and Money Growth

Diverse hypothesis have been progressed by different theories for the past two centuries about the creation as well as the acceleration of inflation. Such remarkable effort revealed how inflation serves as a crucial concern to macroeconomists. However, regardless of this numerous literature on the theory of inflation, still there is no consensus among the economists from different school of thought with regard to the basic determinant factors of inflation. Therefore, numerous theories have developed to explain the diverse cause of inflation in order to understand the inflation process better. These different theories on the dynamic of inflation will be discuss and reviewed in this section.

3.1.1 The Quantity Theory of Money

The quantity theory of money is among the most established enduring doctrines of economics. The theory has declared that changes in the overall price level are fundamentally set by alterations in the amount of money available in an economy. The theory framed the focal center of the 19th century analysis of the Classical monetarist, gave the foremost conceptual framework to interpret in modern financial events and shaped the intellectual basis of the orthodox policy remedy designed to sphere the gold standard. The classical economists as well as the few after them gave the first dynamic methodology analysis on how the effect of a monetary changes blowout from one segment of the economy into another, adjusting relative prices as well as the quantity in the process. Hume gave considerable extension, refinement and elaboration to the quantity theory of money, by identifying a direct relationship between the inflation and money supply [13].

The most prominent of the classical economists believed that such disequilibrium influences temporarily and is not important in the analysis of long run equilibrium [14]. Henceforth, as pioneer of the Balloonists, it is indicted that inflation in Britain was exclusively the consequence of the bank of England recklessness about the 1797 issue of money under the anxiety of the Napoleonic wars. Ricardo discourages dialogue on conceivable gainful of the employment and output impacts of monetary injection [14].

Fisher spelled out his eminent equation *MV=PT*. This and other different equations, for instance Cash Balance Cambridge equation that relates with the rising utilization of mathematics in the analysis of neo-economics, characterize unequivocally under the condition in which the proportionate assumption is valid [15]. Fisher and other economists, for instance Pigou of Cambridge revealed that the objectives of monetary policy control could be accomplished in a fractional reserve-banking system through the regulation of an exogenously determined amount of money in stock [16].

3.1.2 Monetary Theory of Inflation

Monetarism alludes to the adherents of Milton Friedman who believed that "only money matters", accordingly the instrument of monetary policy is stronger than the fiscal policy instruments in stabilizing the economy. As per the monetarist, supply of money is the "determinant though not exclusive" factor of both the prices and the amount of output in the short run, as well as the price level in the long-run. Therefore, in the long-run the amount of output is not determined by the amount of money supply.

The monetarist accentuated the role that money has. Modern quantity theory headed by Milton Friedman believes that "inflation is always and everywhere a monetary phenomenon" that occurs as a result of quick extension in the amount of money rather in total output. The earliest clarification of the theory where found in the modest quantity theory of money [17] [18].

3.1.3 Demand Full Theory

John Maynard Keynes as well as his supporters accentuated that the major cause of demand-pull inflation is the rise in aggregate demand. Therefore, the aggregate demand includes government expenditure, investment, consumptions as well as net export. If the level of aggregate demand surpasses the level of aggregate supply at the level of full employment, the resulting effect is the inflationary gap. Therefore, the greater the gap stuck between the aggregate supply as well as aggregate demand, the higher the rate of inflation.

Keynesian theory is focused around the analysis of short run that assumed prices to be fixed. In fact, non-monetary forces determined prices. Conversely, changes in investment expenditure largely determined output, which is assumed to be varied. The chain of Keynesian causation between the changes in prices and nominal money income is indirect via the interest rate. If the amount of money increase, it will first affect the interest rate to fall. Investment will increase because of a fall in interest rate, which will in turn lead to increase in aggregate demand. An increase in aggregate demand would affect output first not the price as long as unemployed resources are available. When the available resources remain unemployed, a greater raise in aggregate demand would meet some certain restrictions. Certain factor input will be in short supply and hence non-substitutable. This would have a multiplier effect of increasing factor cost and the prices [19].

According to the Keynisian theory, a policy that would decrease every component of aggregate demand is more effective and more reliable in reducing demand pressure and inflation. Government expenditure can be decrease through the increase in tax and management of money supply alone or together, this can be efficient in reducing aggregate demand as well as inflation control [18].

3.2 Empirical Relationship between Money Growth and Inflation

Previously many researchers have conducted several studies on the relationship between money growth and inflation as well as the proposition of the quantity theory of money, which is one of the theories that have been extensively studied by previous researches. The studies employed many techniques of econometrics such as Ordinary Least Square (OLS) method, the Granger causality test, the Johansen Cointegration test, the Vector Error Correction model (VECM) as well as the Vector Autoregressive (VAR) model. Henceforth, these studies have come out with conflicting findings on the relationship between inflation and money growth. For instance, a study by Friedman and Schwarts has shown that positive relationship exist between inflation and money supply growth [20].

However, Grauwe and Polan used the panel and cross-section analysis for testing the quantity theory of money from the period 1969-1999 in 116 countries. Their study finds a robust positive relationship between inflation and money growth in countries with a high inflation rate [21]. However, such relationship is weak in countries with low level of inflation rate. Correspondingly, Moroney tested the quantity theory of money ability to clarify the inflation differences among 81 countries [22]. He found the modern quantity theory to provide a complete clarification of inflation in countries that have high rate of inflation. However, in those countries where the inflation rate is low money can explain only about 70 percent of inflation changes as reported from the result. These findings is in support of the stock of money as a guide in directing policies for achieving price stability in those countries with high inflation rate but not in countries where the inflation rate is very low [22].

In addition, another group of studies was conducted in the form of time series investigation to test the validity of the eminent statement of the Friedman Milton that says, "Inflation is always and everywhere a monetary phenomenon". For instance, a study examined whether inflation in South Africa is a monetary or structural phenomenon over the period of 1965 to 2006. He used Two Stages Least Square (2SLS) method, cointegration analysis, Granger causality test, Fully Modified Ordinary Least Square (FMOLS) method and ECM. The statistical result of the study shows that broad money supply does not significantly affect inflation in the short-run while in the long-run broad money supply significantly affect inflation. The result from the Granger causality shows the presence of unidirectional causal relationship running from inflation to broad money supply. The study concludes that inflation is both monetary as well as structural phenomenon in South Africa. Therefore, policy makers should moderate inflation by considering both structural as well as monetary aspects of inflation [23]. The finding of this study is more theoretically sound and more applicable for generalization than the results of other related studies [24] [25] [26].

Furthermore, Mirbagherijam analyzed the dynamic nature of money growth and inflation in Iran. He used a data on quarterly time series from the period of 1990 to 2011. In order to study the interaction among the variables, the study employed the techniques of ECM. The result from the study indicated that cost-push factors are the major factors that lead to inflation in the long run. Therefore, the result of the study concluded that in Iran inflation is not a monetary phenomenon. The finding of this study is against the eminent statement of Friedman Milton that "inflation is always and everywhere a monetary phenomenon" [25]. The main weaknesses of this study is that cointegration analysis does not perform so long run relationship among the variables is not identified unlike the studies by other related studies [23] [27] [28] where long run relationship between the variables are estimated. Therefore, the findings of their studies will be in line with theories than the findings of this study.

Some researchers have also conducted the related studies in the context of GCC countries separately. For instance, a researcher examined the determinant factors of inflation in Saudi Arabia both in the short run and in long run as well. The study used annual data of time series from the period of 1980 to 2009. He employed the techniques of ARDL model, cointegration test as well as the unrestricted ECM. The result of the study reveals that money supply as a determinant factor of inflation has significant impact on inflation rate in the long run as well as the short run, nonetheless the effect is relatively higher in the short run than in the long run because of the liquidity increase in the economy of Saudi Arabia [29]. The findings of this study is reliable and accurate because the study employed different techniques of analysis, so different nature of relationship among the variables are obtained unlike the study of Maku and Adelowokan who depends only on ARDL techniques in his analysis [30].

Similarly, Ramady examined the factors that cause and determine inflation in Saudi Arabia. He used annual data based on time series from the period 1986 to 2007. Thus, the study analyzed the data using correlation and regression analysis. The result from the statistical analysis shows that money supply has significantly affect inflation in Saudi Arabia [31]. The use of correlation analysis in achieving the objectives of the study is erroneous because the method alone is not sufficient to analyze the relationship among the time series variables. Nevertheless, the studies on other GCC countries is almost nonexistent.

4. Model of the Study

Since the determinants of inflation differ across different countries, several studies have developed diverse form of inflation models. The econometric model used in this study has been developed based on the quantity theory of money model, but the model is modified to accommodate other independent variables that influence inflation. Previous researchers used the variables that have been selected and included in the model commonly. Therefore, numerous studies have been done for both developed and developing countries [8] [4] [27] [30] [32] [33]. These mentioned studies have used almost similar variables in their analysis. Therefore, econometrics technique of OLS method is applied to the variables used in this study, such variables are GDP, nominal exchange rate, real interest rate and the value of import as a control variables, while inflation and money supply growth are the focused variables. All these variables are specified in a regression model for simple estimation and better result as shown in the equation below:

$INF_t = \alpha_0 + \alpha_1 MS_t + \alpha_2 GDP_t + \alpha_3 EXR_t + \alpha_4 INR_t + \alpha_5 IMP_t + \varepsilon_t$

INF = Inflation Rate (annual %)

MS = Broad Money Growth (annual %)

GDP = Gross Domestic Product (current US $)

EXR = Real Effective Exchange Rate

INR = Real Interest Rate

IMP = Import of Goods and Services (current US $)

5. Data

This study utilized the secondary type of data based on annual time series covering the period of 1970 to 2013 of all GCC countries. The data were obtained from the World Development indicators website (2014). The data used in this study contained 43 observations and is reasonably sufficient to perform time series estimation.

6. Method of Analysis

This study used the modern time series techniques of analysis in order to analyze and estimate the relationship between the selected macroeconomic variables. The techniques of time series analysis employed in this study include the unit root test, Johansen Cointegration techniques, ECM and the Granger causality.

7. Results and Discussion

This study examines the analysis of time-series results of this study. It discussed the descriptive statistics first. The clarification of the developed model of inflation rate in GCC countries is followed that has been empirically analyzed using the techniques of Cointegration, VECM and the Granger causality test.

7.1 Descriptive Statistics

The variables descriptive statistic results are presented in Table 1. The table shows that among the variables of the study, MS has the largest variation between the minimum and the maximum values, where the maximum value is 30.341 and the minimum value is –20.702 respectively. Therefore, MS has the highest standard deviation that is 2.912 when compared with the other variables. This implies that from the mean of MS the dispersion is more spread for MS than the other variables.

Table 1
Descriptive Statistics

	INF	IMP	GDP	EXR	INT	MS
Mean	1.349	24.519	22.881	2.152	2.109	25.492
Median	1.013	24.302	22.884	2.293	2.276	25.094
Maximum	4.823	26.861	25.204	5.059	3.146	30.341
Minimum	-2.301	22.940	20.947	-0.604	0.981	20.702
Std. Dev.	2.411	0.935	1.107	2.269	0.626	2.912
Observations	43	43	43	43	43	43

7.2 Unit Root Test

The ADF test have been employed to perform the unit root test for all the variables. The unit root test result for all the variables are presented in Table 2.

Table 2
The Unit Root Test Results

Variables	Level		First Difference	
	Constant	Constant and trend	Constant	Constant and trend
EXR	0.304[0]	**- 2.061[0]**	**- 5.102[0]**	**- 5.051[0]**
	(0.956)	(0.551)	(0.000)*	(0.001)*
GDP	0.459[0]	**- 0.481[0]**	**- 5.331[0]**	5.342[0]
	(0.983)	(0.980)	(0.000)*	(0.000)*
IMP	- 0.787[0]	**- 1.503[0]**	**- 4.622[0]**	**- 4.216[2]**
	(0.812)	(0.812)	(0.000)*	(0.010)*
INF	- 0.503[1]	**- 2.301[1]**	**- 3.183[0]**	**- 3.884[1]**
	(0.871)	(0.424)	(0.029)*	(0.025)*
INR	**- 1.728[0]**	**- 0.880[0]**	**- 6.328[0]**	**- 6.540[0]**
	(0.419)	(0.948)	(0.000)*	(0.000)*
MS	**- 0.231[2]**	**- 2.379[2]**	**- 4.011[0]**	**- 3.982[1]**
	(0.926)	(0.384)	(0.003)*	(0.018)*

The result of the test reveals that at level the Mackinon's critical values are greater than the τ-statistic values for all the variables. Therefore, H0 should be failed to be rejected meaning that the variables are non-stationary at five percent level of significance. This means that all the variables are non-stationary at level.

However, after taking the first difference for all the variables, the standard τ-critical values are less than the τ-statistics values for all the variables. Therefore, H0 should be rejected that the variables are non-stationary at five percent level of significance. This means that all the variables are stationary after taking the first difference.

Table 3
The Johansen Co-integration Test Result

Hypothesized No. of CE(s)	Eigenvalue	Rank Test (Trace)			Rank test (maximum eigenvalue)		
		Trace Statistics	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.868	210.565	95.754	0.000*	78.856	40.078	0.000*
At most 1 *	0.684	131.709	69.819	0.000*	44.929	33.877	0.002*
At most 2 *	0.621	86.782	47.856	0.000*	37.865	27.584	0.002*
At most 3 *	0.545	48.916	29.797	0.000*	30.669	21.132	0.002*
At most 4 *	0.323	18.247	15.495	0.018*	15.185	14.265	0.036*
At most 5 *	0.075	3.061	3.841	0.08	3.061	3.841	0.0802

Notes: *denotes significance at five percent level

The result of the trace test as well as the maximum eigenvalue test both indicates five cointegrating equation at five percent level of significance as shown in Table 3. This means that there is conformity among the different test statistics.

In order to stipulate the finest linear regression for the long run amongst the cointegrating equation Ghatak et al. (1997) contended that although the presence of multiple cointegrating vectors is viewed as a single equation identification problem of cointegrating estimation. Therefore, in practice this problem might be solved by selecting the specific cointegrating vector where the estimates of the long run is close (in both sign and magnitude) to those envisage by the economic theory as well as those acquired by other alternate techniques of long run estimation. Choudary (1995) and Thornton (1998) also clarified the selection of single error correction term from the cointegrating equation that has multiple cointegrating vectors. The Normalize cointegrating coefficients of the interested macroeconomic variables are presented in Table 4.

Table 4
Estimated Long Run Coefficients

Independent variables	Coefficient	Standard error	t-statistic
GDP	1.661	0.142	11.729*
IMP	- 0.618	0.149	-4.151*
EXR	0.711	0.079	8.952*
INR	- 1.043	0.137	-7.612*
MS	- 1.347	0.076	-17.788*

Notes: * denotes significance at five percent level.

The focus variables of this study are *MS* and *INF* while the other macroeconomic variables such as *GDP*, *EXR*, *IMP* and *INR* are included in the model as a control variables. As presented in Table 4, the result of the study reveals that money supply growth is statistically significant at the conventional level of five percent and is positively related with inflation. This implies that one percent increase in *MS* would lead to 1.35 percent increase in *INF*. This result support the theory as well as the previous studies [2] [8] [27] [34] [35] [36].

However, the results from Table 4 reveals that interest rate is statistically significance at five percent level and positively related with *INF*. This is because one percent increase in *INR* would lead to 1.04 percent increase in *INF*. The result also shows that *IMP* is statistically significant at five percent level and related positively with inflation rate. Conversely, the results for *GDP* is statistically significant at five percent level but negatively related with *INF*. Same in the case of *EXR*.

8. Conclusion

It is clear from the result that all the variables have effect on inflation rate in the long-run. In the long run, Imports, Interest rate and money supply growth have significant positive relationship with interest rate. However, exchange rate and GDP have significant negative relationship with interest rate. Therefore, controlling money supply, improvement of *GDP*, reducing interest rate, strong import restrictions as well as the depreciation of exchange rate along with import substitution industrial strategy that will encourage the production of goods that were imported before are compulsory for price stability and inflation control. Consequently, external factors are also essential in determining inflation in GCC countries and they were not analyzed in details in this study.

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