Macroeconomics Determinants of Saudi Arabia's Inflation 2000-2016: Evidence and Analysis

Sana Naseem*

College of Business Administration, Al Yamamah University, Riyadh, Kingdom of Saudi Arabia. *Email: S_naseem@yu.edu.sa

ABSTRACT

This study deals with rising prices in Saudi Arabia from 2000 to 2016. Inflation in an open economy can be influenced by both domestic and global factors. The aim of the paper is to examine macroeconomics determinants of inflation in Saudi Arabia. The study has employed regression model, in which the dependent variable is inflation (consumer price index) and independent variables are money supply, fixed exchange rate against U.S dollar, oil prices, import value, export value and unemployment. Empirical result shown that Money supply, fixed exchange rate against U.S dollar, import value, export value, and oil prices have statistical significance with inflation in Saudi Arabia except unemployment that does not directly predict inflation rates in Saudi Arabia. It has been concluded that effect of domestic factors on Saudi inflation eroded over the last 13 years as Saudi inflation become more globalized.

Keywords: Saudi Arabia, Inflation, Macroeconomics Determinants, Global Factors
JEL Classifications: E60, E51, E31, F31

1. INTRODUCTION

Inflation can be defined as the continuous increase in the general level of prices of goods and services over time or, more simply, as too much money chasing too few goods. Inflationary periods bring about a continuous decline in the purchasing power of money. A rise in the rate of value added tax (VAT) would also be a cause of increased domestic inflation in the short term because it increases a firm's production costs. Historically inflation originated when a country's ruler such as the king would force his citizens to give him all their gold coins under the pretext that a new gold coin was going to replace the old one. In the process the king would falsify the content of the gold coins by mixing it with some other metal and return diluted gold coins to the citizens. On this Rothbard (2010) wrote "More characteristically, the mint melted and recoined all the coins of the realm, giving the subjects back the same number of "pounds" or "marks," but of a lighter weight. The leftover ounces of gold or silver were pocketed by the King and used to pay his expenses".

Historically, Saudi Arabian economy has experienced moderate inflation over a long period of time. It started accelerating in 2005

from very low levels to peak in the double digit in 2008. The rise was significant as average inflation was 0.3% in 2004 and 0.7% in 2005 which moved up to 9.9% in 2008. It peaked in July 2008 at 11.1%. Since then it has eased but remains at considerably higher levels compared to historical levels (Khan, 2012). A similar case happened back in 1973 when Saudi's inflation rate reached about 34% (Hasan and Alogeel, 2008). The years with negative inflation rates were primarily due to declines in export prices of petrochemical, which tend to move in tandem with oil prices.

Inflation in kingdom can be influenced by combination of both domestic and global factors. Inflation has remained relatively high, at an average of 4.54% in the period from 2007 to 2016. The problem of inflation is worse when we look into the main divisions of living costs; for example Inflation rates are affected by the changes occurring in the index's various sections. Classified by their influence rates on the general cost of living index, housing, water, electricity, gas and other fuels ranked first with 23.3% during Q3 2016 against 18.1% in the same quarter of the preceding year. Transportation came second with 22.3% compared to 17.4%, followed by miscellaneous goods and services with 21.1% compared to 4.2%, and finally clothes and footwear with

6.5% compared to 11.7% in the same quarter of the previous year. The total influence rate of the three major sections (housing, water, electricity, gas and other fuels; food and beverages; and transportation) stood at 50.3% during Q3 2016 (SAMA, inflation report 2016). Tobacco registered the highest y/y inflation rate of 20.5% in Q3 2016. In contrast, restaurants and hotels recorded the highest y/y deflation rate of 1.4%.

Inflation in the Kingdom is expected to pick up dramatically in 2018 to more than 5%, as the implementation of VAT and energy price reforms are enacted, according to a note from Jadwa Investment bank in Riyadh.

The main purpose of this study is to enumerate the macroeconomics determinants of inflation in Saudi Arabia. Saudi Arabia has a very open economy that's why inflation in Saudi Arabia is generated not only by domestic sources, but also by global sources. The focus of this study is to analyse whether money supply, fixed exchange rate against US $, total import values (as% of GDP), total export values (as percent of GDP), Average oil prices and unemployment rate (u-rate) are the major reasons for causing inflation in Saudi Arabia.

2. REVIEW OF LITERATURE

Christensen (2001) said that money supply and inflation rate have a direct or positive relationship in long term. An increase in money supply in a money market will increase the demand for goods and services as well. Therefore, more amount of money chasing towards less amount of goods and services will results the problem of inflation. Alvarez et al. (2001) said that money supply has a positive relationship with inflation rate. This is because, when Central Bank decided to increase the money supply in market, undoubtedly it will decrease the interest rate at the same time. So, this situation will lead to problem of inflation as the money supply in market is increasing unlimitedly.

Kandil and Morsy (2009) while studying Gulf Cooperation Council (GCC) countries found that inflation in foreign countries have positively affected the prices in four of GCC countries, including Saudi Arabia, in the long run. Depreciation of domestic currency has also been found to be contributing to inflation in the long run in four of the countries including Saudi Arabia. The effect of government expenditure has been mixed one, but not significant in the case of Saudi Arabia. Similarly, effect of money supply has not been significant in the case of Saudi Arabia. In the short run, food prices and inflation in foreign countries have been found to be significant in the case of Saudi Arabia.

Theoretical framework to explain inflation is the well-known Phillips curve which was developed by Phillips (1958). He empirically investigated the relationship between the change in money wages and unemployment for Great Britain; he found that a negative correlation exists between these two variables. Samuelson and Solow (1960) have further investigated this relationship. They have modified this curve to represent the relationship between the rate of price change and the rate of unemployment. As a result, this curve has been utilized as a policy instrument by the policy

makers who have to make a compromise between unemployment and inflation rates.

Ramady (2009) has mentioned in his study that Saudi Arabia experienced double digit inflation in recent years, especially in 2007 and 2008, after decades of average annual inflation rate of < 1%. Empirical results indicate money supply, interest rate and the riyal depreciation (with the depreciation of the US dollar against major currencies) are the main causes of inflation in Saudi Arabia. However, these causes are all ultimately tied to the pegging of the riyal. In other words, Saudi Arabia experienced imported inflation.

Al Khathla (2011) mentioned in his paper that the Kingdom of Saudi Arabia has been witnessing a rise in prices for the past few years. This paper intends to examine the determinants of inflation, both in the long run as well as in the short run, using co-integration method developed by Pesaran et al. (2001). The result shows that inflation in world economy, depreciation of domestic currency and supply bottlenecks are the major factors influencing inflation in the long run. In the short run, money supply and supply bottlenecks have been found to be the major factors influencing inflation in the country.

Alhamad (2014) stated that the issue of inflation in Saudi Arabia is highly complex with is no single root cause, but rather, a group of key factors. Inflation in Saudi Arabia is not apparent when looking at the general figures of the consumer price index (CPI) index. The problem arises when examining the groups and subgroups that affect people's lives, such as food, rent, and housing in general. We find that the general index is much lower than some of the important groups, such as housing, and subgroups, such as rent, which make up a bigger part of an individual's income. Another interesting issue is that the CPI index for Saudi Arabia seems to be inconsistent with the GDP Deflator that is much higher, even in the long run, which is not the case in most developed economies. Finally, we believe that the CPI index used by Saudi Arabia should be revised to reflect the true increase of the cost of living. This could be an area of research that would greatly help the government and other institutions to better deal with the inflation problem.

Nazer (2016) investigates the impact of money supply, oil price, import values, U.S. interest rate, and Saudi Real GDP on Saudi CPI. First we followed the process of testing the credibility of our variables. The Unit Root Test shows that all level variables are non-stationary, however, the first difference shows that all variables are stationary and integrated of order one. Next, we have used Johansen's cointegration test, and we have found that our variables are cointegrated. As a result, we can use the level variables in our estimate. Using a multiple regression model, we found positive statistical evidence between CPI and money supply, and import values, and a negative relation between CPI and real GDP in Saudi Arabia. To carry on our analysis and investigation further, we preformed the causality test to confirm one way causality. The causality tests show that money supply, import values and oil prices cause Saudi's CPI, but not the other way around.

Akinsola and Odhiamb (2017) paper surveys the existing literature on relationship between inflation and economic

growth in developed and developing countries, highlighting the theoretical and empirical indications. The study finds that the impact of inflation on economic growth varies from country to country and over time. The study also finds that the results from these studies depend on country-specific characteristics, the data set used, and the methodology employed. On balance, the study finds overwhelming support in favour of a negative relationship between inflation and growth, especially in developed economies. However, there is still much controversy about the specific threshold level of inflation that is appropriate for growth. Most previous studies on this subject just assume a unidirectional causal relation- ship between inflation and economic growth. To our knowledge, this may be the first review of its kind to survey, in detail, the existing research on the relationship between inflation and economic growth in developed and developing countries.

3. METHODOLOGY

The study is entirely based on secondary data. Relevant data has been obtained from Saudi Arabia Monetary Agency (SAMA); *Annual Report*, Different issues; World Bank Report; International Monetary Fund (IMF), Journals and articles. In this study, data for a period of 16 years from 2000 to 2016 was used and the researcher used regression analysis with the dependent factor being the inflation, CPI (%), Inflation measured by CPI is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households. And independent variables (consisting of six) namely, (1) Money supply (M2); (2) Fixed exchange rate against US \$; (3) Import of goods and services (% of GDP); (4) Export of goods and services (% of GDP); (5) Average oil price (US\$); (6) Unemployment Rate.

Regression Analysis output or Regression Model:

INF (CPI) = B0 + B1 (M2) +B2 (EXCR against US \$) + B3 (IMP) + B4 (EXP) + B5 (OP) + B6 (U-Rate) + ui.

Where,

B0 is Intercept

INF (CPI) is Inflation (CPI)

M2 is Money Supply,

EXCR exchange rate,

IMP is import value,

EXP is export value,

OP is oil price,

U-Rate is Unemployment rate,

ui is an error term obtained from the data

4. DISCUSSION AND ANALYSIS

4.1. Inflation (CPI) and Money Supply (M2)

H_0: There is no significant difference between CPI and M2 at 5% level of significance.

H_a: There is a significant difference between CPI and M2 at 5% level of significance.

Since P value (0.007299) is < 5% (0.05) significant level, therefore alternative hypothesis is accepted [Table 1]. Money supply is potentially one of the most direct determinants of inflation. As more money circulates in the economy, more goods can be purchased and aggregate demand increases which pushes prices upward (Lipsey, 1999). The increase in money supply has coexisted with the increase in general price level. Such situation has escalated prices rising in the kingdom. According to monetarist theory, there is a positive relationship between inflation and money supply. If there is an increase on money supply, then there is an increase on inflation rate and vice a versa.

4.2. Inflation (CPI) and Exchange Rate

H_0: There is no significant difference between CPI and exchange rate at 5% level of significance.

H_a: There is a significant difference between CPI and exchange rate at 5% level of significance.

Since *P* value (0.002032) is < 5% (0.05) significant level, therefore alternative hypothesis is accepted [Table 1]. For the fixed exchange rate to be effective in reducing inflation over a long period of time it will be necessary that the country avoid devaluations. Devaluations come about because the central bank runs persistent balance of payments deficits and is about to run out of foreign exchange reserves. Once the devaluation occurs, the country will be able to support a much higher level of money supply which, in turn, will have a positive influence on the inflation rate (Suranovic, 1996). Saudi Arabian riyal (SAR) has been pegged to the U.S. dollar (SAR 3.75 per US\$) since 1986. With the continued weakening of the dollar during 2006-2008 against most major currencies, the Saudi riyal also weakened as it is 100% pegged with dollar. Depreciation of a country's currency is a cause of inflation because it becomes more expensive to import products from other parts of the world. In 2015, the Saudi riyal exchange rate remained fixe at SAR 3.75 per one US dollar in the spot market as a result of SAMA's policy that aimed at maintaining the stability of the Saudi riyal to serve the interests of the Saudi economy. Some fluctuations in the riyal against the dollar forward rate were noted in a limited number of

Table 1: Result of regression analysis

Variables	Coefficient	Standard error	t-statistics	P-values
M2	0.294732	0.092805	3.175831	0.007299
Exchange rate	66.93185	16.19213	4.133603	0.002032
Export	0.180594	0.053334	3.386107	0.004871
Import	0.354989	0.083895	4.23134	0.000981
Oil price	0.067949	0.018122	3.749539	0.00243
U-rate	−0.37209	1.285767	−0.28939	0.776845

transactions due to forecasts by some speculators that the Saudi economy will be effected by low oil prices (SAMA 2015).

4.3. Inflation (CPI) and Import Value (% of GDP)

H_0: There is no significant difference between CPI and import value at 5% level of significance.

H_a: There is a significant difference between CPI and import value at 5% level of significance.

Since P value (0.000981) is < 5% (0.05) significant level, therefore alternative hypothesis is accepted [Table 1]. Imports of goods and services also play an important role in determining inflation in Saudi Arabia. Consumption basket of Saudi consumers comprises large number of items which are imported from other countries. Therefore, it is obvious that domestic inflation is likely to get influenced by global inflation. Asian economies and other developed economies (excluding US and euro area) are source of more than 40% of Saudi imports (Khan, 2012).Cost of many goods will be directly affected by changes in the exchange rates of the Saudi riyal against other currencies except those goods coming from the U.S.A as Saudi riyal is pegged with US dollar. Importers had to pay more riyals to buy the same amount of goods, and transferred an extra cost to the consumers by raising their domestic prices.

4.4. Inflation (CPI) and Value of Export and Oil Prices

H_0: There is no significant difference between CPI and export & oil prices at 5% level of significance.

H_a: There is a significant difference between CPI and export & oil prices at 5% level of significance.

Since P values of export (0.004871) and oil prices (0.00243) are < 5% (0.05) significant level, therefore alternative hypothesis are accepted in both cases. Oil prices has remained relatively high, at an average of 91.94% in the period from 2008 to 2016. Saudi industries major factor of production is an oil as Saudi economy is oil based economy. Increase in crude oil prices leads to an increase in refined oil product, increase in cost of petrochemical industries and electricity fuel cost also increases. All that lead to domestic inflation in Saudi Arabia. Export values were also impacted significantly when oil prices fluctuated.

4.5. Inflation and u-rate

H_0: There is no significant difference between CPI and u-rate at 5% level of significance.

H_a: There is a significant difference between CPI and u-rate at 5% level of significance.

Since P value (0.776845) is > 5% (0.05) significant level, therefore null hypothesis is accepted here. This shows there is no statistical significance relation between u-rate and inflation. According to Philips curve, unemployment and inflation are inversely related: As levels of unemployment decrease, inflation increases. To solve the unemployment issue in Saudi Arabia, the Ministry of Labor has implemented several programs that have helped to reduce unemployment and in turn to push salaries up. The first intervention was Nitaqat (saudization), introduced in June of 2011 by the new Minister of Labor to encourage the employment of Saudi nationals in the private sector of Kingdom of Saudi Arabia. This caused a high demand for Saudis overnight, and companies had to pay higher wages to attract them. Dr. Abdul Hamid Al-Omari, a member of the Saudi Economic Association, criticized decisions of the Ministry of Labor, he said to Arab news that false Saudization rates boost unemployment and negatively influence Saudi citizens. Al-Omari pointed out that the high salaries of the fake Saudization rates amounted to billions of Saudi riyals, which cause inflation: "The companies don't lose anything but consumers will suffer from the rising cost of living." Others claim their financial situations will be threatened by employing unqualified Saudis. Economist Dr. Mohammed bin Dulaim Al-Qahtani said to Arab news that companies waste SR585 millions on monthly salaries without any productive returns because of fake Saudization. "Companies will suffer over the next few years from a lack of liquidity and poor productivity" (Arab News, 2015). The second intervention was the minimum wage ordered by King Abdullah in September of 2012, which made the minimum wage $800 per month for any Saudi working in the public sector. The third, and most drastic, intervention was the deportation law that caused 20% of foreign labor to leave the country. This supply shock caused the wages of the remaining workers to go up, adding to the problem of wages (Alhamad, 2014).

5. CONCLUSION AND RECOMMENDATIONS

Saudi Arabia has a very open economy with few restrictions on commodities and assets, that is why inflation in Saudi Arabia is generated not only by domestic sources, but also by global sources. The main objective of this study is to enumerate the macroeconomics determinants of inflation in Saudi Arabia. For achieving this objective, the study has employed regression model. Empirical result shown that Money supply, fixed exchange rate against U.S dollar, import value, export value, and oil prices have statistical significance with inflation in Saudi Arabia except unemployment that does not directly predict inflation rates in Saudi Arabia. Effect of domestic factors on Saudi inflation eroded over the last 13 years as inflation in Saudi economy become more globalized.

Following are the recommendations:
1. SAMA can take appropriate measure to reduce money supply. Expenditure cut will be needed for this.
2. To control the global inflation, government should overseer the business of private sector regarding import process.
3. SAMA should rethink regarding pegged exchange rate Saudi riyal against U.S dollar.

REFERENCES

Akinsola, F., Odhiamb, N. (2017), Inflation and economic growth: A review of the international literature. Comparative Economic Research, 20 (3), 41-56.

Al Khathla, K. (2011), Inflation in the kingdom of Saudi Arabia: The bound test analysis. African Journal of Business Management, 5 (24), 10156-10162.

Alhamad, S.H. (2014), The high cost of living in Saudi Arabia: Growth and inflation in a macroeconomic perspective. Inquiries Journal Student Pulse, 6 (9). Available from: http://www.inquiriesjournal.com/a?id=918.

Alvarez, F., Robert, E.L., Weber, W. (2001), Interest rates and inflation. American Economic Review, 91 (2), 219-225.

Arab News. (2015), Unemployment, Inflation Rise Due to Faulty Policies, Sunday 5 April 2015.

Christensen, M. (2001), Real supply shocks and the monetary growth-inflation relationship. Economics Letters, 72 (2001), 67-72.

Hasan, M., Alogeel, H. (2008), Understanding the Inflationary Process in the GCC Region: The Case of Saudi Arabia and Kuwait, IMF Working Papers. p1-37.

Kandil, M., Morsy, H. (2009), Determinants of Inflation in GCC. IMF, Working Paper, 9/82, Washington.

Khan, M.R. (2012), Globalized Saudi Inflation, Economic Research Thematic Report, Al Rajhi Capital, December 2012.

Lipsey, R. (1999), Economics. USA: Addison-Wesley.

Nazer, Y. (2016), Causes of Inflation in Saudi Arabia. The Business and Management Review, 7 (3), 147-54.

Pesaran, M.H., Shin ,Y, Smith, R.J. (2001) , Bound resting approaches to the analysis of level relationships, Journal of Applied Economics, 16, 289-326.

Phillips, A.W. (1958), The relationship between unemployment and the rate of change of money wage Retes in the United Kingdom, 1861-1957. Economica, 24, 283-299.

Ramady, A.M. (2009), External and internal determinants of inflation: A case study of Saudi Arabia. Middle East Journal of Economics and Finance, 2 (1-2), 25-38.

Rothbard, M. (2010), What Has Government Gone to Our Money? Auburn, AL: Ludwig Von Mises Institute. Available from: http://www.mises.org.

Samuelson, P., Solow, R. (1960), Analytical aspects of anti-inflationary policy. American Economic Review, 50, 177-194.

Suranovic, M.S. (1996), Inflationary Consequences of Exchange Rate Systems. International Trade Theory and Policy, by The International Economics Study Centre. Available from: http://www.internationalecon.com/Finance/Fch110/F110-2.php.