Globalized Saudi Inflation

Historically, Saudi Arabian economy has experienced moderate inflation over a long period of time. However, the middle of the last decade witnessed a structural change in inflation dynamics in the country. 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. In fact, in the last three years it has moved broadly in the range of 4% to 6%, currently being slightly below of this range. A combination of domestic and global factors plays role in influencing inflation in Saudi Arabia. Among domestic factors, output gap and money supply influenced domestic inflation. However, over the last decade, we find that the influence of domestic factors has diminished and global factors have started playing an increasingly important role in country’s inflation level.

Domestic growth dynamics: The growth dynamics had strong influence on inflation in decades of 1980s and 1990s. Inflation responded the movement in the output gap during these two decades. However, the relationship between inflation and growth dynamics in the country has weakened over the last decade. Responsiveness of inflation towards output gap seems to have become weaker.

Money supply: Periods of high inflation in Saudi Arabia also seem to coincide with accelerating growth in money supply. However, annual data of money supply and inflation do not exhibit strong relationship in the long term. The two data series have 48% correlation during a period of 1980 to 2011. However, monthly data available since 2000 provides us better relationship between the two. The period between 2000 and 2009 is characterized by strong relationship between the two. The correlation coefficient was almost 70%. The Granger Causality test also confirms the causal relationship between the two. However, this relationship reverses since 2010. The correlation between the two during January 2010 to October 2012 is -41% which is contrary to the expectation.

Global Factors: As the influence of domestic factors on domestic inflation in Saudi Arabia diminished over the last decade, it has got stronger degree of correlation with global inflation. The correlation between domestic inflation and global inflation jumped to 61% during 2002-2011 which was negative at 13% during longer period of 1980-2011. Saudi inflation has higher correlation with inflation in Newly Industrialised Countries in Asia (72%), Other Advanced Economies (excluding G7 and euro area) (77%) and Developing Asia (80%) during 2002-2011. Broader currency movement measured in terms of Nominal Effective Exchange Rate also have influence on inflation. Moreover, many individual components of Saudi inflation have stronger relationship with global price indices of the same commodities. A case in point is that the correlation between domestic food inflation and global food price index (IMF) is 70% during 2002-2011.
Domestic growth dynamics

Growth dynamics and inflation are generally positively linked in an economy. The economic growth in Saudi Arabia has been robust in the last decade. Average annual growth in real GDP was 4% in the period 2004-2011 compared to 1.6% in the period 1980-2003. Annual average growth in the non-oil sector in real terms was 5.1% during the first period compared to just 2.7% in the second period. The trend in economic growth rate has moved up as reflected through Hodrick-Prescott (H-P) trend. The H-P trend clearly shows that the trend growth in the country has been rising since early of the last decade. Accelerating growth in an economy puts pressure on resource prices.

Figure 1  Steady rise in trend growth in real GDP in Saudi Arabia

However, for inflation, output gap measured as actual GDP minus potential GDP denominated by potential GDP is important. Potential output is a level of output an economy can sustain for long term with existing resources without accelerating inflation. Therefore, positive output gap means economy is producing more than its potential which is generally inflationary. On the contrary, if actual output is less than potential, it has moderating effect on general price levels in an economy. However, it is a non-observable variable. H-P trend (mentioned above) for long term real GDP data provides a fair estimate of the potential GDP.

Historically, the output gap estimated as explained above provides a fair explanation of movement in inflation in Saudi Arabia. In early 1980s, when output gap plunged and remained negative for large part of the decade, inflation also sharply declined and turned negative. However, as output gap recovered in early 1990s, inflation also moved into positive territory. Similarly, in late 1990s and early 2000s, output gap was largely negative resulting into moderate to negative inflation. The period 2002 onward, the pattern remains similar but degree of relationship seems to have weakened. Output gap was moderately positive during 2004-08 when inflation sharply increased. In 2009-10 the gap again turned negative which resulted into moderation in inflation as well. This suggests that the relationship between output gap and inflation remains but weaker. This is confirmed by correlation analysis as the correlation coefficient between inflation and output gap was 61% during 1980-2002. However, it plunged to just 4% during 2003-11. On the other hand, Granger Causality test rejects the causal relationship between output gap and inflation. As we’ll see later in the report that global factors have started playing greater influence on domestic inflation 2002 onwards, the weakness in the relationship makes sense.
The relationship between money supply and inflation shows same pattern as in case of the output.

Monthly data on money supply and inflation show stronger positive relationship during 2000-09. However, contrary to the expectation, relationship turns negative since Jan 2010.

Domestic money supply

Periods of high inflation in Saudi Arabia seem to coincide with accelerating growth in money supply. The two data series have 48% correlation during a period of 1980 to 2011. However, relationship pattern between inflation and domestic inflation is similar to the pattern exhibited by the output gap. The relationship was stronger during 1980-2002 and weaker during 2003-11. The test of Granger Causality rejects any causal relationship between money supply and inflation in Saudi Arabia.

Figure 3 Relationship between inflation and M3 growth has also weakened

However, monthly data available since 2000 provides us stronger relationship between money supply and inflation. The period is characterized by two diagonally opposite relationships between the two variables. The period between 2000 and 2009 is characterized by strong positive relationship between the two. The correlation coefficient was almost 70%. The Granger Causality test also confirms the causal relationship between the two. The test results show that money supply (M3) does granger cause inflation with multiple lags. However, this relationship reverses since January 2010. The correlation between January 2010 and October 2012 is -42% which is contrary to the expectation. The Granger Causality test confirms this fact by rejecting the hypothesis of any causal relationship in this period.
The relationship between money supply and rent inflation exhibits similar pattern as in the case of headline inflation.

Global factors have increased influence on domestic inflation as proportion of import to non-oil GDP has jumped over the last decade.

Global Factors
Looking at two broader domestic variables (one real and another monetary) affecting domestic inflation in Saudi Arabia suggests that the relationship between inflation and domestic factors have somewhat weakened in the past years. However, the rising dependence of domestic consumption on import is reflected from the fact that total import to non-oil GDP ratio has jumped from around 33% in 2003 to 54% in 2011.

Linkages of domestic inflation with global inflation
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. However, this relationship is rejected in long term as the correlation coefficient between the two is -13% during the period 1980-2011. The result is supported by Granger Causality test which rejects any causal relationship between the two. However, three decades divided into three separate periods shows that the relationship between domestic inflation and global inflation was strong over the past decade (2003-2011). The correlation between the two was 61% during the period. The period is characterised by
similar average inflation and low volatilities in domestic as well as global inflation. Average inflation in Saudi Arabia was 3.9% with 3% standard deviation whereas global inflation was also 3% with just 1% standard deviation. This is in contrast with previous two decades where global inflation was too high with much higher volatility in 1990s.

Table 1 Statistical comparison between global inflation and domestic inflation in Saudi Arabia

<table>
<thead>
<tr>
<th>Periods</th>
<th>Correlation between Saudi and Global inflations</th>
<th>Average of Saudi inflation</th>
<th>Average of global inflation</th>
<th>Standard deviation of Saudi inflation</th>
<th>Standard deviation of global inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-2011</td>
<td>-13%</td>
<td>1.4%</td>
<td>12.3%</td>
<td>2.8%</td>
<td>9.5%</td>
</tr>
<tr>
<td>1980-1989</td>
<td>43%</td>
<td>0.1%</td>
<td>16.2%</td>
<td>2.5%</td>
<td>3.7%</td>
</tr>
<tr>
<td>1990-2001</td>
<td>28%</td>
<td>0.8%</td>
<td>15.9%</td>
<td>2.1%</td>
<td>12.2%</td>
</tr>
<tr>
<td>2002-2011</td>
<td>61%</td>
<td>3.3%</td>
<td>3.9%</td>
<td>3.1%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

Source: CDSI, IMF, Al Rajhi Capital

The high level of global inflation in 1980s and 1990s was mainly due to abnormally high inflation in Latin American countries and other emerging economies. This prompted us to look at relationship between inflation in Saudi Arabia and that in major economic regions (classified by the IMF in World Economic Outlook data base). We found that Saudi inflation has higher correlation with inflation in Newly Industrialised Countries in Asia (72%), Other Advanced Economies (excluding G7 and euro area) (77%) and Developing Asia (80%) during 2002-2011. This further suggests that the domestic inflation started getting correlated with inflation in other parts of world only in the last decade. We did not find any significant correlation coefficient with any of the regional inflation indices for the period 1980-2002. This suggests that domestic inflation was largely unaffected by global inflation during that period. Note that Asian economies and other developed economies (excluding US and euro area) are source of more than 40% of Saudi imports. The share has largely remained similar as it was 42% in 1985 and 1990, 34% in 1999 which jumped back to 44% in 2011.

The effect of currency movement on inflation

As domestic inflation exhibits higher correlation with global inflation in the last decade, currency movement also seems to have an effect on the domestic inflation. The correlation between Nominal Effective Exchange Rate (NEER) and domestic inflation rate is -78% during January 2000 to April 2012. The correlation coefficient further improves to -80% when we adjust NEER series to three months lag of inflation series. This means that change in exchange rate in January has higher degree of relationship with inflation in April. Granger Causality test also approves that NEER does have causal relationship with inflation. NEER Granger causes inflation with multiple lags ranging from 1 to 6 months. This also confirms that the movement in exchange rate have effect on the domestic inflation with some lag as well.
NEER is trade weighted index of Saudi Riyal against major trading partners of the country prepared by the Bank of International Settlements. Higher the value of index means broadly currency has appreciated against currencies of trading partners. On the other hand lower value of index means that the currency has depreciated. That is why correlation between the index and inflation is negative.

**Figure 7  Domestic inflation seems to get affected by exchange rate movement**

![Graph showing the relationship between NEER and domestic inflation](source)

**The effect of global prices on individual category**

As we find some evidence that the domestic inflation in Saudi Arabia has grown higher linkage with global inflation, certain components in domestic inflation such as ‘food and beverages’ and ‘other expenses and services’ which have higher proportion of imports have even higher degree of global link. For instance, the correlation between domestic food inflation and global food price index (IMF) is 70% during 2002-2011. This particular component has positive correlation even in longer period.

**Figure 8  The relationship between global food prices and domestic food prices has strengthened over the last decade**

![Graph showing the relationship between global and domestic food prices](source)

Another component which has higher proportion of imported items is ‘other expenses and services’ which has high correlation coefficient with global inflation. The correlation coefficient between the two is 68% during the period 2002-2011. However, the correlation coefficient is negative for longer period. On the other hand, correlation coefficient between...
'other expenses and services’ and global industrial raw materials including agriculture raw materials and metal prices has been 58% during period of 1980-2011.

Figure 9 Other expenses and services have also strong relationship with global input prices

![Graph showing correlation between global industrial inputs and other expenses and services in KSA](image)

Source: CDSI, IMF, Al Rajhi Capital

**Conclusion**

During 1980s and 1990s, domestic factors were primarily influencing inflation in Saudi Arabia. However, the influence of domestic factors seems to have weakened over the last decade as Saudi inflation attains more globalized characteristics. This is obvious progression as domestic consumption basket increasingly comprises imported items. Increasing import to GDP ratio confirms rising global influence on domestic prices. Statistical analysis shows that degree of relationship between general inflation in the country and global inflation has grown stronger over the last decade. Inflation in economic regions with higher degree of trade relation with the country has stronger correlation. Moreover, many components of domestic inflation have high correlation with global price indices of same commodities.
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