Monetary Policy Response to Rising Oil Prices

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All exact science is dominated by the idea of approximation. – Bertrand Russell

Muhammed Zeshan\(^1\)
Vaqar Ahmed

Since the last one and a half decade, the energy demand has exhibited an expansion which grew by 80% particularly for primary energy. More precisely, in 1995, the primary energy demand was 34 million Tons of Oil Equivalent (TOE) and it reached to 61 million TOE just in next 15 years.\(^2\) Pakistan depends heavily on fossil fuels to satiate her energy requirement; among these fuels, oil and indigenous natural gas are major energy sources that are contributing 35% and 45.4% respectively in total energy blend, (see Figure 1 for details). It presents various energy sources and their contribution in the energy mix. Due to a substantial share of imported oil in total energy blend, external oil price shocks gain much importance for Pakistan. Current global oil prices are once again showing upward volatility. For the first 9 months of the current fiscal year, 2011-12, the imported oil bill reached to a historical high level of $11.36 billion against $8.38 billion for the corresponding period of last year; indicating a rise of 38%.\(^3\)

![Figure 1 Primary Energy Demand in Pakistan](image)

Source: Ministry of Petroleum and Natural Resources, Pakistan

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\(^1\) Authors are Economists at Sustainable Development Policy Institute, e-mail at: zeshanqau.isb@gmail.com


In international literature oil price shocks are partially held responsible for recessions because most of the oil price shocks precede all major recessions.\(^4\) Pakistan is a net oil importer that makes her vulnerable to these shocks. For the first nine months of the fiscal year 2011-12, soaring oil prices have intensified Pakistan’s trade deficit by $4.4 billion. Furthermore, it pushes consumer prices because oil prices have a large weight in Consumer Price Index (CPI) which witnessed a growth of 52.5% over the last four years.\(^5\)

There are two channels through which oil prices impact the economy. The first channel is through commodity prices while the second channel is through production. Both channels ultimately lead to a higher cost of production for firm sector. Under the first channel, increase in oil prices causes firms to reallocate their resources; they can purchase less oil and other production inputs as before. Under second channel, the availability of less production inputs undermines production activity. It is obvious that most of the production losses occurred in large scale manufacturing which witnessed a 2.6% fall in production, and the resultant increase in industrial unemployment was 6.73% since the oil price shocks of year 2008. Fall in investment activities was very obvious-total investment decreased by 17.6%. Decomposition of different sectors indicated that most of investment losses were borne by construction, transportation and communication. Moreover, the manufacturing sector witnessed 36% loss in investment. This fall in production and investment activities further intensified the recessionary impact in Pakistan.\(^6\)

It is always a challenging situation for monetary authorities to overcome the recession as a result of oil price shocks. A tight monetary policy may moderate prices but at the cost of production losses. Change in interest rate operates through the demand channel, a higher interest rate would encourage people for savings and aggregate demand may fall.\(^7\) Prices will also fall and firms will lower output intensifying the recession. On the other hand, a loose monetary policy might lessen the production losses but it would boost inflation in the economy. When the interest rate is decreased by monetary authorities, people have lesser incentive for saving. It fosters aggregate demand and firms will raise their production to take the benefit of this higher demand. Nonetheless, the opportunity cost of stabilizing the output is higher future prices. For empirical analysis, only one study is available for Pakistan which quantifies output loss associated with oil price shocks and a resulting tight monetary policy. It asserts that an oil price shock contributes just 17% in recession whereas 83% in recession is contributed by a resulting tight monetary policy (Zeshan, 2012).\(^8\) Furthermore, Malik (2008) unearthes that monetary policy in Pakistan does not following any rule whereas a rule based policy can bring better macroeconomic discipline.\(^9\)


The debate over rule versus discretion is also very important in this scenario. If a central bank enjoys discretionary powers, it can freely exercise its decisions based on its own judgment. In contrast, a rule imposes restrictions on monetary authorities and every task is accomplished within specified boundaries. A central bank can achieve its goals in a better way by following specified rules. Explicitly defined rules are more important for the survival of macroeconomic system than discretionary powers (Taylor, 1993; Barro and Gordon, 1983). In addition, discretionary policies are time inconsistent while rule based polices are robust over time. At present, Pakistan lacks clearly specified rules to make monetary policy more responsive to output losses. This briefly investigates the optimal change in interest rate due to oil price shocks. It quantifies the impact of different changes in interest rate on macroeconomic variables and takes the help of the Taylor (1993) rule to achieve this end. Other than the Taylor rule based interest rate, simulated values of interest rate are calculated to find optimal change in interest rate that minimizes output loss arising from oil price shocks. Basically, this study is an extension of Zeshan (2012).

Identification of Oil Price Shocks

At this point, it would be important to discuss the behavior of the interest rate in Pakistan. For the period of 1992-2010, the average interest rate was 12.78%; it reached the historical high of 20% in October 1996. It was recorded at its minimum level 7.5% in November 2002. A detailed graphical representation of these facts follows below. The historical rise took place in the fourth quarter of the year 2000 with a rise in 540 basis points. Such spikes are very obvious, and the most notable examples are fourth quarter of year 1996 and fourth quarter of year 2000. Such large movements in interest rate are very detrimental because investment is sensitive to change in interest rate. First, it creates uncertainty in the economy because all previous investment decisions become suboptimal. Second, it discourages the new investment because cost of doing business increases in case of higher interest rate.

Now we move on to look at the pattern of oil prices. Historical data reveals eight oil price shocks in Pakistan during the period of analysis. Furthermore, four of them were more devastating in terms of their relative change; see Figure 2 and Source: Author calculated based on SBP data. for movements in oil price shocks and resultant adjustments in

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12 Taylor rule can be defined as: \( i = r^* + \pi + 0.5(\pi - \pi^*) + 0.5(y - y^*) \)
where \( i \) = nominal interest rate, \( r \) = real interest rate, \( \pi = \text{inf lation rate} \), \( y = \log \text{arithm of real output} \), \( r^* \) is real interest rate, \( \pi^* \) is target inflation rate, and \( y^* \) is logarithm of potential output.

macroeconomic variables.\textsuperscript{15} It is evident that there are production losses when ever an economy is hit by an oil price shock. It seems as if oil price shocks are causing loss in production but the role of interest rate cannot be ignored at this stage. The State Bank of Pakistan (SBP) raises its discount rate to overcome inflationary expectations that might arise from oil price shocks; see Figure 3Source: Author calculated based on SBP data. which indicates the movement in interest rate, inflation and GDP over time.\textsuperscript{16} This tight policy response by SBP might be the source for stable inflation in most of the episodes. It is important to note that domestic oil prices are linked with international oil price since the last decade.\textsuperscript{17} It is a challenge for policy makers to overcome the negative aspects of oil price shocks because in Pakistan it is more vulnerable to oil price shocks after linking the domestic market with international oil prices. That is why the oil price shock of 2008 was the most devastating compared to previous oil price shocks resulting in overall terms 25\% inflation, 15\% discount rate and a meager 2\% GDP growth rate.

\textbf{Figure 2 Oil Price Shocks (in \%)}

![Figure 2 Oil Price Shocks (in %)](image)

Source: Author calculated based on SBP data.


\textsuperscript{16} Call Money rate (CMR) is used as a proxy of Discount rate.

Figure 3 Behavior of Important Macroeconomic Variables
Optimal Change in Interest Rate

As discussed previously, monetary policy can perform better if it follows some rule. For this purpose, this section compares the performance of rule based monetary policy with actual monetary policy adopted by SBP. These simulations are conducted by a 25 basis points (denoted by cmr25) increase in interest rate up to a maximum increase of 200 basis points (cmr200). It provides a range of policy simulations which are helpful for finding the optimal change in interest rate. Results indicate that actual policy rate is quite deviant from the Taylor rule. However, a rule is adopted such that interest rate increases up to 25 to 50 basis points and is consistent with the Taylor rule. Hence, it can be concluded that a rule of 25 or 50 basis points rise in interest rate provides robust results over time. This change in interest rate assures a minimum and certain variation in the policy rate which lowers uncertainty in country. The least variation in the policy rate warrants least uncertainty which keep economy stable on the face of oil price shocks. This is shown in Figure 4 where a policy rate within the range 7% to 11% brings us close to the Taylor rule.

![Figure 4 Simulated and Taylor Rule Interest Rates (in %)](image)

Now we may move ahead to quantify the output losses resulting from changes in interest rates as a response to oil price shocks. From Figure 5, it is evident that production loss in minimal if policy rate is increased by 25 basis points while it becomes maximum if policy rate is raised by 75 percent, (see Figure 5 for details). Production loss decreases if interest rate is increased more than 75 basis points indicating asymmetric behavior of the GDP with the change in interest rate. On the other hand, fall in prices is minimal if interest rate is raised by 25 basis points whereas fall is maximum if there is 150 basis points increase in interest rate. For a developing country like Pakistan where unemployment is a major problem, a minimal production loss is more favorable with a moderate fall in prices. On these grounds, the present study suggests raising the interest rate by 25 basis points if oil prices increase by 15% to 20% (as expected by most forecasts).
Figure 5 Production Losses and Fall in Prices (in %)