

INDIA'S CAD HAS A COUNTERCYCLICAL SHOCK ABSORBER: FOR EVERY RUPEE DEPRECIATION SOFTWARE EXPORTS UP BY \$250MN; LIMIT INDIA'S CAD ~3% OF GDP IN FY23, EXPECT JUMP IN FX RESERVES BY AT LEAST \$5 BN AS SWAP TRANSACTIONS REVERSE & HENCE RUPEE WILL APPRECIATE

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The recent rate hikes by Fed and the subsequent media interaction has clearly laid out that more rate hikes from Fed are forthcoming and the *“ultimate level of interest rates will be higher than expected”*. Indian market, surprisingly, was much resilient and the exchange rate after declining initially in the aftermath of Fed rate hike decision has rebounded strongly. Against the background, there are now fears that the Federal Fund Rate already at 4%, could head higher than 5% benchmark. The fears of such primarily emanate from the fact that India's CAD in current fiscal was expected to breach 3.5% of GDP in FY23. However, Q1 FY23 BoP numbers have shown that a strong countercyclical buffer in the form of service exports and remittances. For example, in Q1, India's CAD was expected to breach \$30 bn / 3.8% of GDP, but the actual numbers came in at 2.8% of GDP. **The positive surprise was because of strong remittances and software exports, the CAD got a lift of 60 basis points. We expect that if such trends of strong remittances and software exports have continued (RBI data suggests software exports in Q2 was strong) in Q2, and India's CAD comes in below the threshold level of 3.5% of GDP in Q2, the CAD for FY23 could still be closer to 3% benchmark and not in excess of 3.5% of GDP. Also, forex reserves could jump by another \$5 bn as swap transactions reverse and thus having a positive impact on rupee as is being currently witnessed.**

To understand the factors that are impacting India's CAD, we have worked upon a Structural VAR (SVAR) model. Oil forms a 30% of our import bill. Thus, oil price has a major impact on our macro-economic variables. Increase in oil price has a direct impact on our trade deficit by increasing our import bill and consequently, our current account deficit is also widened. Additionally, inflation, particularly fuel inflation is impacted due to higher oil prices. Real growth of the economy is also impacted by changes in oil prices that has a feedback loop with the real economy via external sector dynamics and inflation. However, our SVAR model introduces a counter cyclical response to increased oil prices in the form of software service exports that is impacted positively because of a rupee depreciation. Although, remittances are positively impacted, we have not considered them in our SVAR model because of data volatility. The results of the SVAR model clearly give us an idea of the negative impact of oil price shock on CAD, inflation and growth in one direction and the positive impact of software exports on CAD as a result of rupee depreciation. In particular, a positive shock to oil prices leads to immediate and sharp increase in CAD, which dissipates completely in about 8 quarters. The trade deficit also increases upto two quarters after the initial positive oil price shock. **This implies that India's trade deficit may already have been adversely impacted for first half of the current fiscal because of the oil price shock. This is consistent with our forecasts of CAD for Q3 and Q4 of FY23 that shows a significant moderation.**

In case of GDP, positive shock to oil prices leads to immediate decline, which however starts reversing after 3rd quarter and completely dissipates after 7th quarter. **This implies that India's first half GDP growth in FY23 could have been impacted because of oil price shock.** Most interestingly, rupee dollar exchange rate also gets impacted and it depreciates slightly after increase in oil prices till three quarters following which it starts appreciating. **Again, this implies that the rupee outlook is likely to improve in Q4 of FY23.** CPI fuel inflation which is directly linked to oil price change also increases immediately after the positive shock to oil. **The impact however dissipates after 4 quarters, implying India's CPI inflation outlook for FY24 looks much better. This is also consistent with RBI forecast for FY24 at 5%.**

Crucially, India's software exports have been rising with the share of offsite mode of exports of software services by Indian IT service companies increasing to 88.8% in FY22 compared to 82.8% five years ago. The impact of a positive shock to software exports on our current account deficit, through the exchange rate channel is also analysed.

- (1) **\$10 increase in crude oil prices leads to 40 bps increase in CAD**
- (2) **\$10 increase in crude oil prices leads to 50 bps increase in fuel CPI**
- (3) **\$10 increase in crude oil prices leads to 23 bps decline in growth, with software exports acting as countercyclical buffer**
- (4) **The exchange rate pass through from variance decomposition method shows it is at least 10% for CAD, inflation & growth, but significantly stronger at 35% for software exports. For every rupee depreciation, software exports increase by \$250 mn**

IMPACT OF OIL PRICES ON INDIA'S CAD: SVAR ANALYSIS

- ◆ Among the plethora of issues India has been grappling with in the last couple of years, there is one recent development which is most talked about. The spike in crude oil prices post Russia-Ukraine war has exerted huge pressure on India's external sector. It is important to understand how and to what extent this crude oil price affect the Indian macro economy and such evaluation is imperative for the policy makers and the private sector to help design the future course of action. In this research we study the effect of shock to oil prices on variables like growth, inflation, software exports and current account deficit by employing the structural VAR technique.
- ◆ Structural VAR approach allows the researchers to use economic theory to transform the reduced-form VAR model into a system of structural equations. The crucial difference between atheoretical and structural VARs is that the latter yields impulse responses and variances decompositions that can be given structural interpretations. The essence of structural VAR is the imposition of a theoretically relevant structure on observed disturbances to derive the orthogonal structurally interpretable shocks.
- ◆ The data are in quarterly frequency for the sample period Q1 FY13 to Q1 FY23. Variables included are crude oil prices (\$ per barrel), rupee-dollar exchange rate, CPI fuel inflation (f) (%), real GDP (Rs crore), software exports (se) (\$ million), trade deficit (% of GDP) and current account deficit (% of GDP).
- ◆ Oil forms a major import of our commodity basket, constituting around 30% of our import bill. Thus, oil has a major impact on our macro-economic variables. Increase in oil price has a direct impact on our trade deficit by increasing our import bill and consequently, our current account deficit is also widened. Also, inflation, particularly fuel inflation is increased due to higher oil price, so fuel inflation component of CPI is also taken into the model. Real growth of the economy is also impacted by change in oil price via external sector dynamics and inflation. Software service exports have also been included to see if and how they react to changes in oil prices.
- ◆ Real GDP series was seasonally adjusted. Log of each series, except CAD and TD, was taken. Further, as all the series except CAD were I(1) VAR estimate is done on their first difference.

Structural VAR: The Model

The system of equation representing dynamic structural models can be collected and written in the vector form as

$$A_0 = c + A_1 X_{t-1} + A_2 X_{t-2} + \dots + A_p X_{t-p} + \mu_t$$

Where X_t is an $n \times 1$ data vector, c is an $n \times 1$ data vector of constants and μ_t is an $n \times 1$ structural disturbances vector. μ_t is serially and mutually uncorrelated. p denotes the number of lags. 'A's is a $(n \times n)$ matrix whose row i , column j element is given by A_{ij} (s) for $=1, 2, \dots$.

Thus VAR in reduced form of a general dynamic structural model can be derived by pre-multiplying each side of above equation by A_0^{-1} . The structural disturbance μ_t and reduced form residuals ε_t are hence, related by

$$\mu_t = A_0 \varepsilon_t$$

To estimate the parameters from the structural form equations requires restrictions imposed on instantaneous relations between the variables coming from theory and should satisfy the order and rank condition.

Our identification scheme based on above equation is given below:

$$\begin{bmatrix} \mu_t^{oil} \\ \mu_t^{er} \\ \mu_t^{fuelcpi} \\ \mu_t^{gdp} \\ \mu_t^{se} \\ \mu_t^{td} \\ \mu_t^{cad} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{21} & 1 & 0 & 0 & 0 & 0 & 0 \\ \alpha_{31} & \alpha_{32} & 1 & 0 & 0 & 0 & 0 \\ \alpha_{41} & \alpha_{42} & 0 & 1 & \alpha_{45} & 0 & 0 \\ \alpha_{51} & \alpha_{52} & 0 & 0 & 1 & 0 & 0 \\ \alpha_{61} & \alpha_{62} & 0 & 0 & 0 & 1 & 0 \\ \alpha_{71} & \alpha_{72} & \alpha_{73} & \alpha_{74} & \alpha_{75} & \alpha_{76} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_t^{oil} \\ \varepsilon_t^{er} \\ \varepsilon_t^{fuelcpi} \\ \varepsilon_t^{gdp} \\ \varepsilon_t^{se} \\ \varepsilon_t^{td} \\ \varepsilon_t^{cad} \end{bmatrix}$$

- ◆ The model used has put certain restrictions based on theory. We assumed that crude oil price is purely an exogenous variable and thereby is not influenced by any of the other variables. Next the nominal exchange rate though not immediately impacted by oil prices but in due course as high oil price results in more demand for dollars by importers, the rupee dollar exchange comes under pressure. CPI fuel inflation is directly influenced by oil price and exchange rate. Real GDP is impacted by oil price, exchange rate and software exports. Further restrictions imposed is CPI fuel, real GDP, trade deficit and CAD do not affect software exports. For trade deficit, oil and exchange rate are taken as the major factors affecting the same.

IMPULSE RESPONSES AND VARIANCE DECOMPOSITION

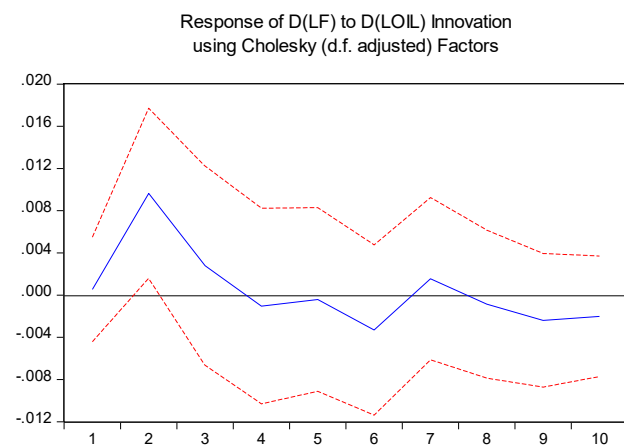
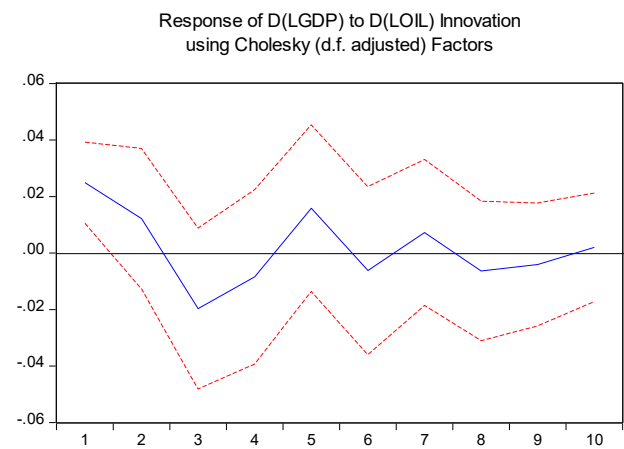
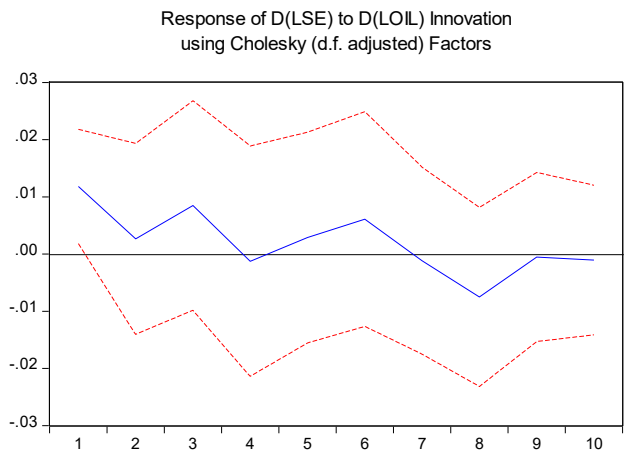
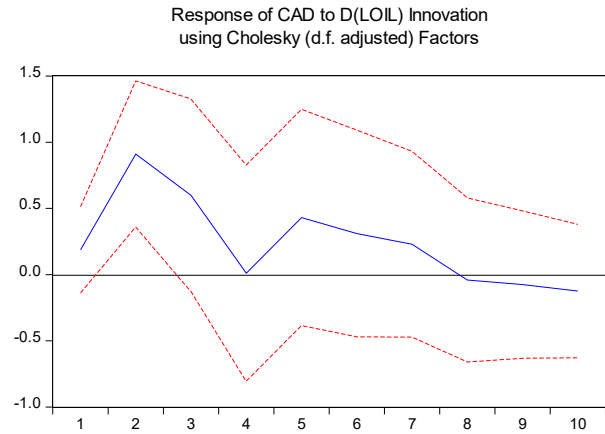
- ◆ Impulse response analysis and variance decompositions (together called **innovation accounting**) are useful tools to examine the relationships among economic variables.

Impulse Response

- ◆ Impulse response functions trace the dynamic impact to a system of a “shock” or change to an input. In our model we give 1 SD shock to all other endogenous variables and analyse the result.

The result shows that:

- ◆ A positive shock to oil prices leads to immediate and sharp increase in CAD, which dissipates completely in about 8 quarters. The trade deficit also increases upto two quarters after the initial positive oil price shock.
- ◆ There is no significant impact of oil prices on software exports.
- ◆ In case of GDP, positive shock to oil prices leads to immediate decline, which however starts reversing after 3rd quarter and completely dissipates after 7th quarter.
- ◆ Rupee dollar exchange rate also gets affected after increase in oil price. The results show that it depreciates slightly after increase in oil prices till three quarters after which it starts appreciating.
- ◆ CPI fuel inflation which is directly linked to oil price change also increases immediately after the positive shock to oil. The impact however dissipates after 4 quarters.
- ◆ India’s software exports have been rising with the share of offsite mode of exports of software services by Indian IT service companies increasing to 88.8% in FY22 compared to 82.8% five years ago. Thus we also analysed the impact of a positive shock to software exports on our current account deficit.



- ◆ The results show that with increase in software exports our current account deficit falls for certain quarters.

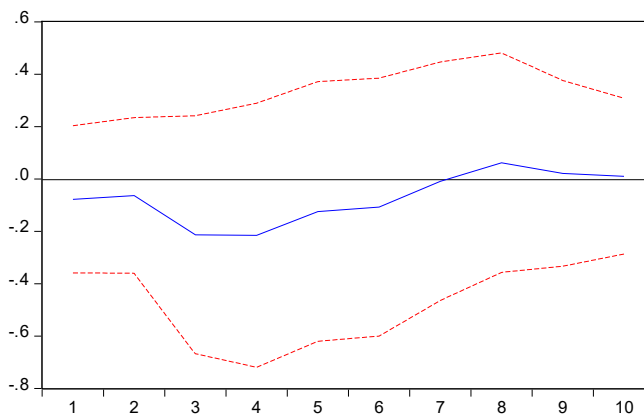
Variance Decomposition

- ◆ The variance decomposition indicates the amount of information each variable contributes to the other variables in the autoregression. It determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks (in our case oil prices) to the other variables.
- ◆ *Our results are very interesting:*
- ◆ In case of fuel CPI, 22% variation is due to crude oil and 10% is due to exchange rate. This indicates that **every \$10 increase in crude oil prices leads to 50 bps increase in fuel CPI.**
- ◆ Exchange rate is the major contributor to software exports growth and 40% of its variation is explained by exchange rate. If we translate these numbers in actual terms, **depreciation of Rs/\$ exchange rate by Re 1 leads to increase in software exports by ~\$250 million.**
- ◆ In Q1 FY22 also the CAD came at 2.8% of GDP, which is a positive surprise. This positive surprise came in the form of increase in software exports. **As per our estimates the magnitude of this positive shock is around 25 bps.**
- ◆ Obviously, merchandise trade deficit will be impacted by both exchange rate and crude and ~40% of variation in this is due to these two factors. 40% of variation in CAD is due to crude oil only. This implies that **every \$10 increase in crude oil prices leads to 40 bps increase in CAD.**

REPLENISHING INDIA'S FX RESERVES

- ◆ Interventions by central banks globally to support their local currencies have wiped foreign-currency reserves close to \$1 tn, or ~8% this year to around \$12 tn (end Sept'22), the largest drop since data compilation by Bloomberg began in 2003. Asian economies, from Singapore to South Korea to Japan have fought the Dollar aggression by resorting to reserves accumulated for rainy days.
- ◆ The latest jump in India's FX reserves by \$6.56 bn for the week ended 28 Oct revealed a trend reversal which can partly be attributed to drop in DXY level during end October, giving a respite to currencies like GBP and Euro. However, we understand, a good part of this boisterous reversal comes from deft cross-currency swap trades by the mint street as it has engaged in Buy/Sell swaps to shore up liquidity while protecting rupee from extreme volatility.

Response of CAD to D(LSE) Innovation using Cholesky (d.f. adjusted) Factors



SVAR: Variance Decomposition			
Variable		Explained By	
		Crude Oil	Exchange Rate
Variation in	Fuel CPI	22%	10%
	Software Exports	12%	35%
	Trade Deficit	29%	10%
	CAD	38%	11%

Source: SBI Research

Direct Impact (ceteris paribus)		
Impact of every \$10 increase in crude oil price	On Fuel CPI	+50 bps
	On CAD	+40 bps
Impact of every Re 1 depreciation in USD/INR Exchange rate	On software exports	+\$250 mn
Memo: Net Impact on GDP Growth		
For every \$10 increase in crude oil price	-23 bps	

Source: SBI Research

- ◆ Going forward, we believe RBI would roll over the maturing B/S swaps, while resorting to S/B swaps on a need-only basis which is likely to cement the FX reserves further (provided the forward march of king Dollar does not significantly derail other currencies in near term).
- ◆ Given the uncertainty surrounding the asset classes and the Greenback hyperbole eclipsing major weighty currencies, it would be a safe gambit to explore asset diversification, over the FCAs through increased holdings in gold whose moderated levels against a hostile dollar provides a good buying opportunity to accumulate in tranches.

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Contact Details:

Dr. Soumya Kanti Ghosh
Group Chief Economic Adviser
State Bank of India, Corporate Centre
M C Road, Nariman Point, Mumbai - 400021
Email: soumya.ghosh@sbi.co.in, gcea.erd@sbi.co.in
Phone:022-22742440
🐦 : kantisoumya