

ENERGY SECURITY AND ECONOMIC PERFORMANCE OF THE CASPIAN REGION: HOW VULNERABLE IS THE REGION TO FALLING OIL PRICE?

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Overview and potential significance of the Study

With population of approximately 254.1 million people in 2014, the Caspian region's importance lies in its strategic position and massive energy resources endowment. According to IEA, The Caspian Sea embodies vast volumes of oil and natural gas reserves (both in offshore and adjoining onshore fields) estimated at 48 billion barrels and 8.7 trillion cubic meters respectively in 2013. Similarly, BP statistics 2015 reveals that the region holds about 17.6%, 46.4% and 21.4% of global proven reserves of oil, natural gas and coal respectively. This accordingly positions Caspian littoral states (Azerbaijan, Iran, Kazakhstan, Russia and Turkmenistan) among the world's leading producers and exporters of oil and natural gas and their economy strongly depend on proceeds from hydrocarbons exports.

Russia has historically been the region's largest energy producing, consuming and exporting country followed by Iran, Kazakhstan, Turkmenistan and Azerbaijan (BP, 2015). BP estimates that the Caspian region produced an average of 17.2 million bbl/d of crude oil in 2014, around 19.4% of global supply. Around 63% of that came from Russia, 21% from Iran, with the rest produced in the remaining three coastal states. This signifies that over 80% of all Caspian region oil production comes from the region's two largest producers, Russia and Iran. Similarly, Caspian consumption estimated at 5.7 million bbl/d accounts for just 6.2% overall global oil consumption in 2012, bulk of which is consumed in Russia (56%) and Iran (35%). This however reveals a wide net export gap of about 11.5 million bbl/d which accordingly infers that the region (on the average) exports roughly 67% of the total production in 2014 with European and Asian markets as major destinations.

Moreover, the Caspian's economic growth driven primarily by commodity (energy) exports averaged 3.1% between 1991 and 2014, this thus makes the region extremely vulnerable to boom and bust cycles associated with volatile swings in global prices. Oil and gas revenue represented more than 50% of federal budget revenues and about 70% of total average exports in this region. The average GDP growth rate was about 4.3% in 2014 estimated at over \$2.63 trillion in current US dollar value (WDI, 2015). However, the recent precipitous downward trend in the global crude oil prices, reaching a record of below \$50 in January 2016, has attracted growing concern on the vulnerability of key net oil-exporting regions like Caspian given its heavy reliance on oil and gas revenues. The paper is arranged as follows: the introduction is followed by overview of the Caspian economy in section two. Section three presents the adopted analytical techniques while section four contains the empirical findings of the study. The last section of the study offers the conclusion

Methods

In achieving above objective, this study employs the Vulnerability Indicator (Ratio of Net Value of Oil Exports to GDP) to quantify Caspian's Vulnerability to Oil Price Shock.

- Vulnerability of Caspian Region to oil price shocks

$(NOEX/GDP) = P * ((\text{volume net oil exports}) / (\text{Total oil use})) * ((\text{total oil use}) / (\text{total energy use})) * ((\text{total energy use}) / GDP)$

Where: P is price of oil and GDP is the region's Gross Domestic Products

Vulnerability Impact = % price rise * (Share of oil exports in GDP)

Moreso, as degree of vulnerability is a combination of different factors; the study further examines the regions: Diversification of Primary Energy Supply (DPES) and Carbon Free Energy Portfolio (CFEP)

- Diversification of Primary Energy Supply (DPES): The index is calculated as; $DPES = \beta / \ln \eta$ but $\beta = - \sum (Q_i \ln Q_i)$

Where β is the Shannon's bio-diversity Index and Q is the share of energy source in TPES, Ln is the Natural log, i is the sources of energy and η is the number of energy sources used in the region.

- Carbon Free Energy Portfolio (CFEP)

This evaluates the degree of carbon concentration in the region's energy mix

$CFEP = [PES_{hydro} + PES_{nuclear} + PES_{renew}] / [TPES_{energies}]$ Discrete choice experiments.

Results

Firstly, the Vulnerability Indicator reveals that Caspian's net export portfolio is relatively high, an indication that the region largely depends on oil and gas proceeds to finance its economy and hence highly vulnerable to global oil shocks.

Secondly, the DPES suggests that the degree of diversification of primary energy supply (TPES) in the region is averagely low, as few energy sources are heavily relied upon (coal, oil and natural gas) to meet domestic needs. Hence, the region is vulnerable to energy supply security risk because of availability on few energy supply sources for its economy

Thirdly, the result reveals a low cum declining trend in the region's CFEP value owing to the rising dominance of fossil fuels in littoral states' energy consumption mix which reflects increasing potential of environmental degradation in the region

Conclusions

The Caspian region is one of the major oil-producing cum exporting regions in the world and consequently its dependency on oil proceeds is very high. With the recent rising decline in oil prices, the region's vulnerability continues to increase and adequate policy measures are necessary in response. Also, utmost priority should be given to the development renewable technologies to boost energy diversification and curb the rising environmental threats.

References

British Petroleum (BP) Statistical Review of World Energy 2015 at <http://www.bp.com/statisticalreview> (last visited 17 January, 2016)

WDI (World Bank's Development Indicator), 2015 at www.worldbank.org/ (last visited on 13th February, 2016)

