**Oil Revenue Shocks and Government Spending Behavior in Iran**

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## Overview

The Iranian economy largely depends on petrodollars. About 90% of foreign exchange revenues are gained through exports of oil and gas (CBI, 2010). Oil revenues are the main source of financing government expenditures and imports of products. Increasing oil prices in the past years have boosted populist expenditures, especially under the government of Ahmadinejad. The current Iranian government is challenging international agreements and conventions on nuclear energy issues and increasing domestic expenditures on populist policies through higher oil prices. This study examines the dynamic effects of shocks for Iranian oil revenues on different categories of government expenditures in Iran. Such an analysis has important implications for international organizations trying to minimize the negative social effects of future sanctions on the Iranian oil industry, targeting the military expenditures of the Iranian government. To our knowledge, this is the first study of dynamic effects of oil revenues shocks on sub-categories of government expenditures in an oil rich economy. It is important to examine to what extent the shocks to Iranian oil exports affect the military and non-military expenditures of the Iranian government.

Chun (2010) estimates the elasticity of demand of military spending in five oil rich economies, namely Iran, Kuwait, Saudi Arabia, Venezuela, and Nigeria. He concludes that each of these countries shows a mainly inelastic demand for military spending. These inelastic relationships between oil revenues and military spending are estimated using data of 10 years from 1997-2007. Based on his elasticity analysis, Chun suggests that “*attempts to limit defence spending by tinkering with a producer of oil revenues are likely to fail*”. He thus opposes the economic sanctions which target the oil exports of Iran. He further mentions that “*forcing oil* *exports may artificially pit Washington against other oil importers*”. In contrast to his results for the case of Iran, our VAR analysis, that uses data for the past 50 years on oil revenues and various areas of government spending, shows the statistically significant response of military spending. While the Iranian government’s military spending response is positive and significant to a one unit increase in oil export revenues per capita, responses of other areas of spending such as health, education and culture are insignificant. Stock and Watson (2001) suggest that “*since VARs involve current and lagged values of multiple time series, they capture comovements that cannot be detected in univariate or bivariate models*”. This may explain the shortages of elasticity of demand analysis for such an examination. Furthermore, techniques such as impulse response functions and variance decomposition analysis in VAR models are powerful tools to trace the dynamic effects of oil revenues innovations on different groups of government expenditures. Such effects may not be captured in a static analysis such as elasticity of demand.

## Methods

To examine the dynamic effects of oil revenues shocks on the structure of the Iranian government spending, we made use of six variables: oil export revenues per capita (and/or oil prices, *oilexppc*), military expenditures (% of total expenditures, *milexp\_texp*), disciplinary services expenditures (% of total expenditures, *dsexp\_texp*), education expenditures (% of total expenditures, *eduexp\_texp*), health and medical services expenditures (% of total expenditures, *healthexp\_texp*), and cultural and recreational services expenditures (% of total expenditures, *cultexp\_texp*). The expenditure figures are in constant prices of 1997. The sample comprises of annual observations from 1959-2007[[1]](#footnote-1). Furthermore, we take the effects of the Iranian revolution (1979), and the Iran-Iraq war (1980-1988) into account by using two dummy variables. The source of the oil export revenues per capita is OPEC (2008). Oil prices are taken from BP (2010). The government expenditure data is from the Iranian annual national accounts published by the CBI (2010). All variables are in logarithmic form.

The dynamic effects of oil export revenues on different kinds of government expenditures are investigated through a multivariate unrestricted vector autoregressive (VAR) model. In a VAR model developed by Sims (1980), changes in a specific variable such as government spending in education are explained by its own lags and the past information of other variables in the system. The VAR model is a dynamic simultaneous equation system which is free of a prior restriction on the structure of the model. The unrestricted VAR models are superior to the structural VAR model since the latter models are “*very often misspecified*” (Tijerina-Guajardo and Pagán, 2003). There is a high level of integration between oil revenues and government spending which makes endogeneity of the employed variables a critical issue (Tijerina-Guajardo and Pagán, 2003). The dynamic response of different kinds of government spending to innovations in oil export revenues can be examined through IRFs. Through IRF we can observe the magnitude and statistical significance of such responses to one standard deviation increase in oil market related variable error (see Stock and Watson, 2001 for more details on IRF). In addition to IRF, we also use the VDC tool. VDC is slightly different from IRF. VDCs examine the relative importance of oil export revenues shocks in the volatility of other variables in the system. A shock to the oil export revenues variable will of course directly affect the variable itself, but it will also transfer to other variables in the VAR system. VDC measures the share of the movements in a respected variable (e.g. government expenditures) that are due to their own shocks and at the same time shocks to other variables (e.g. oil export revenues). IRF and VDC analyses are based on the estimation of the following unrestricted VAR model with the order of p:

 (1)

where *yt* is a vector of endogenous variables, *Xt* is a vector of exogenous variables which their values are determined outside of the VAR system (e.g. there are not equations in the VAR system with an exogenous dependent variable), *Ap* and *B* are coefficient matrices and p is the optimum lag number.

## Results

The main results show that the government’s military and security spending responds positively and statistically significantly to shocks in oil revenues (or oil prices). Other social spending of the Iranian government does not show a significant response to oil shocks. Furthermore, using an asymmetric definition of oil and gas rents per capita, a one standard deviation absolute increase in “negative changes” of energy rents causes a significant and negative response on the side of military and domestic security spending, also indicating a high sensitivity of Iran’s military efforts to unexpected negative shocks.

## Conclusions

The policy implications of these results are straightforward. Those sanctions aiming to restrict the Iranian government’s oil export capacities and consequently oil export revenues may affect the military spending of Iran and not the social, education, and health efforts. Unexpected shocks in negative changes of energy rents even force the Iranian government to expand the non-oil economy, investing more in education and health sectors.

## References

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1. Higher frequency data (e.g. quarterly or monthly) may produce more precise results than annual data on some special occasions. National Accounts of Iran (produced by the Central Bank of Iran) only present annual figures on government expenditures based on different kinds of function. The quarterly data is only available for aggregated general government expenditures from 1988 onwards. This is because governments do not usually adjust their annual approved budgets for expenditures significantly in response to monthly or quarterly shocks in oil markets. In such a context, annual observation can capture the dynamic response to shocks in oil revenues-government expenditures nexus adequately. [↑](#footnote-ref-1)