

The impact of oil price volatility on welfare in the Kingdom of Saudi Arabia: implications for public investment decision-making

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The uncertainty surrounding the economic growth rate has a social cost, usually determined as the loss of welfare that a representative agent is willing to incur to get rid of fluctuations in his consumption. Though this cost may be negligible in certain economies, this may not be the case for countries whose domestic income depends significantly on the market price of an exported commodity. For public investment decision-making in such countries, this raises the question of the risk premium associated with the price of the exported commodity. In other words, when assessing a public project's net present value, by which amount do the expected commodity-price-related cash flows need to be adjusted? This risk-premium quantifies the social cost – or benefit – generated by the correlation of these cash flows with economic growth. For projects generating additional commodity exports, the risk premium quantifies the cost of increased dependence on commodity revenues. For projects turning the commodity into products whose prices are less correlated with the economy, it quantifies the benefit from reducing the aggregate risk in the economy.

Until now, no empirical assessment of such risk premia could be found in the literature. Our paper assesses the risk premium associated with crude oil price when evaluating public projects in Saudi Arabia. A significant part of the considerations and methodology presented here can be easily transferred to other resource-rich countries, like other OPEC members.

Since Saudi Arabia is the world's largest oil exporter, a considerable portion of its gross domestic income and government revenues depends on the crude oil price. We first examine how past Saudi aggregate consumption and domestic income have been volatile and correlated with crude oil price. In this respect, to become a measure of domestic income, the real GDP has to be adjusted for improvements (or deterioration) in the Kingdom's terms of trade. A simple framework for public-investment decision making is used to derive the (standard) risk-premium formula. Practical issues for the assessment of the risk premium are discussed. In particular, the risk-premium value depends on expectations about future aggregate consumption and oil price. We show that over a one-year horizon this risk premium could range between 1.3% and 5% of the expected oil-related cash flow, with much higher premia for longer planning horizons. Even if profitable at current oil price levels, public investment opportunities in alternative forms of energy or energy efficiency may therefore be less profitable than might appear at first sight. The magnitude of this risk premium suggests that similar computations should be performed for other resource-rich nations. We discuss the implications of these calculations for energy-related public projects in Saudi Arabia and, more generally, for public decision-making in resource-rich countries.