

The value of saving oil in Saudi Arabia

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Executive summary

Saudi Arabia is taking measures to reduce its high energy consumption, one of the world's largest in per capita terms. In 2016, the country substantially increased its domestic prices of gasoline and electricity, increasing them again in 2018 in an attempt to further align these prices with international market prices. In this context, a relevant policy question is, what is the value of saving a barrel of oil in Saudi Arabia? The instinctive answer is that it is the difference between the international market price and the domestic price. However, this answer is insufficient in calculating the value of oil saved from domestic consumption for the following reasons: First, domestic agents buy oil at a price set by the government that is below the international market price, which leaves room for improving economic efficiency by saving oil. Second, the rest of the world's demand for Saudi oil is not perfectly elastic, which impacts the revenues from exporting the oil saved. Third, there are various ways to reduce the domestic consumption of oil.

This study analyses different policies that aim to reduce the domestic consumption of oil in the long run and, thus, increase oil exports in a general equilibrium model calibrated for Saudi Arabia. The policies considered in this study are:

Policy 1: Increasing the production of oil.

Policy 2: Increasing the share of natural gas used for electricity generation through LNG imports.

Policy 3: Increasing the efficiency of natural gas power plants.

Policy 4: Deploying renewable technology.

Policy 5: Increasing the administered price of domestic oil.

Policy 6: Increasing the efficiency of electricity in energy services.

Policy 7a and 7b: Increasing the efficiency of oil and oil products in energy services.

A relevant consideration is whether any oil saved would be exported immediately or left in the ground for future extraction and production. Our analysis focuses on the long-term impacts and for this reason, we assume that any barrels of oil saved are exported. However, we recognize that adjusting the level of production to current and future market conditions is critical for maximizing the value of Saudi oil. The figure below summarizes the results of our analysis of these different policies in terms of the impact on welfare, public revenues, and GDP.

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The analysis therefore suggests that:

- Policies designed to curb oil consumption have positive impacts in terms of households' welfare and on Saudi carbon emissions. The cost of the policies and their impact on productivity are also critical.
- The fall in the international price due to the increase in oil exports reduces the potential welfare gain from these policies.
- Policies aimed at increasing energy efficiency have limited scalability, and, consequently, the potential positive impacts at macroeconomic scales are relatively small.
- Shifting power generation from oil to natural gas has a positive impact on the Saudi economy even if the natural gas is imported.
- The gross welfare gains of energy efficiency projects, either in the use of electricity or in transportation, are higher than those aimed at replacing the use of oil for power generation with natural gas or renewables. However, energy efficiency projects tend to be more expensive than initiatives to reduce oil in power generation.
- Welfare gains for all the policies studied range between a minimum of \$6 and \$56 per barrel of oil saved. These policies reduce the level of domestic CO₂ emissions by around 370 kg per barrel saved, excluding the policy that increases the share of natural gas in the generation mix.

Although our analysis considers the individual implementation of each policy, the government could carry out a number of programs simultaneously. The implementation of any of the policies changes the domestic consumption of oil across different activities and sectors, altering the potential benefits of the other policies. Consequently, further work is needed on the optimal combination of policies.