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El blog del FMI sobre temas económicos de América Latina



An employee walks on a bridge on an offshore oil rig about 65 miles from Ciudad del Carmen in Mexico. (photo: Claudia Guadarrama/Polaris/Newscom)

## To Hedge or to Self-insure? The Benefits of Mexico's Oil Hedging Program

By [Fabian Valencia](#)

Policies to manage the risks associated with commodity-price swings, including oil prices, are critical in strengthening macroeconomic resilience, particularly in commodity-exporting countries.

Sharp fluctuations in oil prices have coincided with substantial variations in economic activity and inflation in many countries. For net oil exporters, the negative consequences of oil-price declines, such as the 2014-16 episode, are also often amplified by rising borrowing costs for the sovereign.

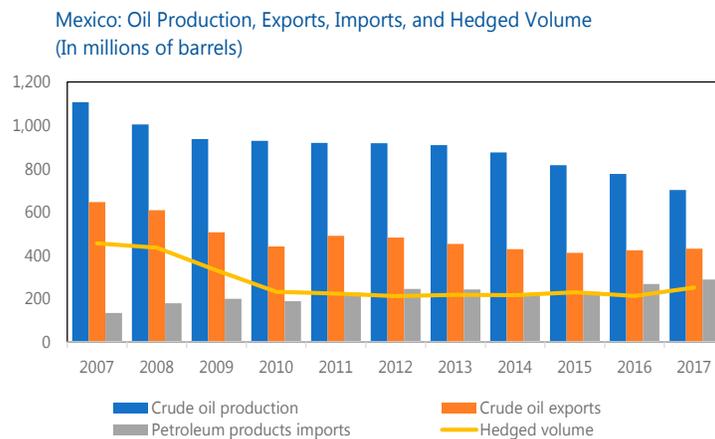
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When discussing how to better manage these risks, policymakers often start with Mexico, given its longstanding practice of hedging oil-price risk through put options.

Every year, the Mexican treasury purchases put options—the right to sell oil at a pre-determined price (strike price)— to protect its public finances from unexpected declines in oil prices. But is this practice preferable to relying entirely on self-insurance? [Our analysis](#) suggests that it is.

### How does Mexico do it?

The Mexican treasury purchases put options with a strike price close to the oil price assumed in the fiscal budget. While the importance of oil-related revenues for Mexico’s public finances has declined over the years, they still represented 17 percent of total fiscal revenues in 2017, down from an average of 34 percent over 2004-16. Because Mexico also imports petroleum products, the Mexican treasury has hedged on average only 29 percent of total production over the past 10 years.

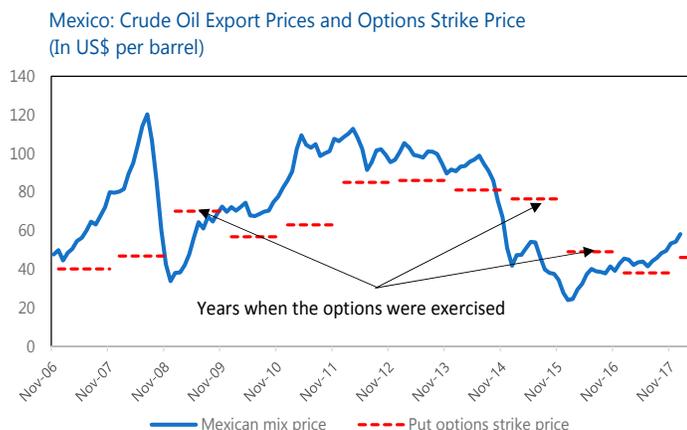


Source: Inegi and Auditoria Superior Federal

Mexico uses Asian put options which are exercised when the strike price exceeds the average oil price over a pre-determined period (one year for Mexico). This strategy allows the Mexican treasury to lock in a minimum average price for its oil for the entire fiscal year. The hedging program is executed through dozens of transactions involving foreign banks as counterparts.

As part of the design of the program, the Mexican treasury needs to choose the type of oil whose price will be used as reference in the options—the underlying asset. Most of the contracts use Maya oil as underlying asset, a type of Mexican heavy crude oil that represents about 80 percent of Mexico’s export volumes. Because options with Maya oil are not standard in financial markets, Mexico relies on over-the-counter options—instruments that are tailored to Mexico’s needs—for its hedging operations.

Since 2001, Mexico has spent on average 0.1 percent of GDP annually in purchasing the options. The options were exercised only in three occasions: 2009, 2015, and 2016, generating revenues for the federal government of about 0.5, 0.6, and 0.3 percent of GDP, respectively. But assessing the benefits of the program is more complex than just looking ex post at these cumulative flows of money.



### Hedging through put options: benefits and costs

Hedging is comparable to buying insurance. It provides the Mexican treasury the assurance that at least part of the income loss from unexpected declines in oil prices will be compensated. In doing so, it provides a peace of mind by removing part of the uncertainty associated with fluctuations in oil prices.

In addition, hedging may facilitate financial transactions between the insured and creditors—analogueous to when mortgage lenders condition mortgage or home equity loans on the homeowner having insurance. Creditors of the Mexican treasury may be willing to provide more favorable lending terms when they see that part of the risk associated with oil prices has been transferred elsewhere through financial hedges.

But buying insurance includes tradeoffs. The purchase of put options implies incurring an upfront cost regardless of whether the risk materializes or not, resources that could be devoted to other purposes. Returning to the homeowners' insurance example, one pays annual premiums even if a fire never happens, in which case no payout is ever received. However, one may still prefer to choose that predictable and manageable loss (i.e. the annual premiums) rather than suddenly losing one's home.

The cost of insurance is a key determinant of whether the net benefits from hedging are positive. This cost depends on the risk that a bad outcome materializes and its consequences—the expected loss. The counterpart of the options (i.e. the insurer) may demand a price for the options that is larger than necessary to compensate for this expected loss to earn a reasonable profit.

## **To hedge or not to hedge?**

To assess the net benefits for Mexico from hedging we consider all the above elements: the benefits of hedging generated by a smoother stream of oil-related income; external creditors pricing in the risk that Mexico defaults considering the exposure of its public finances to oil-price risks; and the costs of the options.

We find that hedging is preferable to relying entirely on self-insurance. It turns out that the most important benefit accrues through improved borrowing terms for the Mexican treasury. Creditors see Mexico's public finances protected against the risk of lower oil prices and therefore demand a smaller compensation for the risk of default. Our analysis suggests that Mexico's sovereign borrowing costs would be 19 basis points higher in the absence of hedging.

The benefits of hedging decline as the cost of the options increase well above what is needed to ensure a reasonable profit to the counterparts of the options. Nevertheless, our analysis suggests that this excess cost would have to be substantial for hedging to be a bad financial decision.

## **Conclusions**

Mexico's hedging program has been beneficial for the country. Other countries exposed to commodity price risk could also benefit from increased reliance on market insurance to protect themselves against swings in commodity prices. Yet, only a few countries have used market insurance. The reason may lie in political economy constraints.

These political economy considerations make the decision at the country level a more complex issue than at the individual or at a company level. At the country level, it requires a buying in from society through Congress, whose members may have different priorities. For instance, a representative of a particular jurisdiction whose local economy does not depend on oil may prefer that the budget allocation for hedging be re-directed to building more schools in that jurisdiction. At the household level, this decision-making process is simpler since it involves much fewer people with incentives that are better aligned.

Mexico seems to have found a good balance between these political economy constraints and the benefits of market instruments to hedge oil price risk.