



# IMF Working Paper

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## Optimal Oil Production and the World Supply of Oil

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## IMF Working Paper

Research Department

Optimal Oil Production and the World Supply of Oil

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### Abstract

We study the optimal oil extraction strategy and the value of an oil field using a multiple real option approach. The numerical method is flexible enough to solve a model with several state variables, to discuss the effect of risk aversion, and to take into account uncertainty in the size of reserves. Optimal extraction in the baseline model is found to be volatile. If the oil producer is risk averse, production is more stable, but spare capacity is much higher than what is typically observed. We show that decisions are very sensitive to expectations on the equilibrium oil price using a mean reverting model of the oil price where the equilibrium price is also a random variable. Oil production was cut during the 2008–2009 crisis, and we find that the cut in production was larger for OPEC, for countries facing a lower discount rate, as predicted by the model, and for countries whose governments' finances are less dependent on oil revenues. However, the net present value of a country's oil reserves would be increased significantly (by 100 percent, in the most extreme case) if production was cut completely when prices fall below the country's threshold price. If several producers were to adopt such strategies, world oil prices would be higher but more stable.

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Contents	Page
I. Introduction .....	<a href="#">4</a>
II. Related Literature .....	<a href="#">5</a>
A. Optimal Oil Production .....	<a href="#">5</a>
B. Numerical Solutions for Real Options .....	<a href="#">6</a>
III. Model Formulation and Numerical Solution .....	<a href="#">7</a>
A. Model Formulation .....	<a href="#">7</a>
B. Numerical Solution .....	<a href="#">8</a>
IV. Oil Price and Extraction Costs Models.....	<a href="#">10</a>
V. Learning the Size of Reserves.....	<a href="#">12</a>
VI. Application .....	<a href="#">13</a>
VII. Results .....	<a href="#">14</a>
VIII. Limitations of the Model.....	<a href="#">18</a>
IX. Determinants of Production Policies during the 2008–2009 Crisis.....	<a href="#">19</a>
X. Concluding Remarks and the World Supply of Oil .....	<a href="#">21</a>
Tables	
1. Parameters of the Oil Price Process (OLS on Yearly Data for the Period 1957–2008) .....	<a href="#">10</a>
2. Parameters of the Schwartz-Smith (2000) Price Process Estimated on Futures Data .....	<a href="#">11</a>
3. Annualized Parameters of the Extraction Cost Process (OLS on quarterly Data for the Period 1999–Q1 to 2009–Q1 .....	<a href="#">11</a>
4. Model for Proven Reserves (Standard Errors in Parentheses .....	<a href="#">14</a>
5. Oil Production Capacity.....	<a href="#">15</a>
6. Added Value by Expanded Capacity.....	<a href="#">16</a>
7. Added Value by Expanded Capacity and Increased Access to Reserve.....	<a href="#">17</a>
8. Determinants of Cuts in Production During the Crisis of 2008–2009.....	<a href="#">20</a>
References.....	<a href="#">23</a>