Chapter 9
Projecting Oil Prices

ABSTRACT

This model projects oil prices in the presence of "nonrandom" market mechanisms. Historical daily oil prices are listed. The absolute price changes fit a nonnegative distribution, and the best-fitting distribution is the exponential distribution to simulate future absolute price changes. Each of these price changes can be positive or negative, and two rules are used to determine (randomly) the direction of each price change, which are: First if the current price is near prescribed minimum and maximum limits, the direction of the next price change tends to be away from the relevant limit. Second, for prices not too near the limits, there is a tendency to have a positive price change if the average of the most recent 50 days is greater than the average of the most recent 200 days, and there is a tendency to have a negative price change otherwise.

INTRODUCTION

Projecting Oil Prices

Crude oil holds a prominent position in the global commodities market because oil price changes affect the global economy. Thus, those countries or groups that produce crude oil also impact economies worldwide.

Oil prices are largely dependent on two factors: geopolitical developments and economic events. These two variables can lead to changes in oil demand and supply levels, which drive oil price fluctuations from one day

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to the next. For instance, the 1973 Arab oil embargo, the 1980 Iran-Iraq war, the 1990 Gulf War, the Asian financial crisis of 1997, and the global financial crisis of 2007 to 2008 are some of the historical geopolitical developments that have significantly affected oil prices.

- Oil prices are driven by many factors including supply and demand.
- Member countries of the Organization of the Petroleum Exporting Countries (OPEC) produce about 40% of the world's crude oil.
- OPEC's oil exports represent about 60% of the total petroleum traded internationally.
- OPEC (especially Saudi Arabia) has the upper hand in determining the direction of oil prices, but Russia has also become a key player.
- Evidence is inconclusive as to whether non-OPEC countries are influential in determining crude oil prices.

Organisation of the Petroleum Exporting Countries (OPEC) is an organization that sets production targets among its members to manage oil production. OPEC member countries produce about 40% of the world's crude oil. Additionally, OPEC's oil exports represent about 60% of the total petroleum traded internationally, according to the United States Energy Information Administration.

Because of this market share, OPEC's actions have a huge influence on international oil prices. In particular, OPEC's largest producer of crude oil, Saudi Arabia, has the most frequent effect on oil prices. Historically, crude oil prices have seen increases in times when OPEC production targets are reduced.

Countries involved in global oil production are either members of OPEC, OPEC+, or non-OPEC nations. OPEC has 13 members: Algeria, Angola, Congo, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, the United Arab Emirates, and Venezuela.

Ten non-OPEC nations joined OPEC to form OPEC+ in late 2016 to have more control over the global crude oil market. These countries were: Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Oman, Russia, South Sudan, and Sudan. Not surprisingly, OPEC+ has a level of influence over the world economy that is even larger than OPEC's.

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