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# NATURAL GAS STORAGE: COMPETITIVE STORAGE VS. STRATEGIC BEHAVIOUR

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## Overview

Natural gas storage in Europe has come to the center of attention mainly due to very cold temperatures in winter 2005/06 and the price increases during that time period, especially the UK. Natural gas in Europe is due to several regulations, but storage remains unregulated so far. However, storage system operators follow the guidelines of good practice by the Madrid Forum. Nevertheless, according to industry there seems to be no working market for natural gas storage. The importance of natural gas storage increases with higher import dependency, construction of LNG terminals and the overall supply portfolio optimization of a country or company.

Fundamentally, there are two different regimes under which natural gas storage is operated within Europe: on the one hand there is a competitive market for (seasonal) natural gas storage in the UK benefiting from a functioning spot market for the commodity. As a result, operation of natural gas storage works similar to other functioning markets, hence quantities injected or withdrawn from facilities do not impede prices on the spot market. On the other hand, storage facilities in continental Europe remain to be operated by market incumbents. Moreover, the lack of functioning spot markets is limited to Zeebrugge in Belgium, where some maturity has been reached, but still remains unsatisfactory. With the majority of storage facilities operated following the "old" regime of monopoly behavior in the natural gas industry and a lack of competitive trading places the use of natural gas storage is likely to follow a different pattern. Quantities taken from the market and injected into storage potentially have a significant impact of prices at trading places, as well as additional quantities put into the market. Therefore, we test the hypothesis of strategic storage operation in continental Europe against 'true'competitive storage in the UK.

## Methodology

We first develop a simple framework determining the theoretical optimal use of natural gas storage facilities in which a storage operator maximizes profits, which is a function of spot and forward prices and costs of storage, subject to the technical characteristics of natural gas storage facilities (injection and withdrawal rates, required cushion gas, total storage capacity). Following, we use data from National Grid (UK) and a continental European storage facility to determine the explanatory power. The main hypothesis we will investigate in this paper is that storage operators/owners holding capacities in a competitive market differ in their use of natural gas capacities from companies active in less advanced markets.

## Expected Results

We provide empirical evidence that storage in the UK is managed more arbitrage-oriented than continental storage. This might indicate strategic behavior of market players active in natural gas storage in Europe. In contrast, operation of Rough Storage (UK) seemingly follows market forces. Natural gas is injected into storage during periods of low spot prices and withdrawn when it is economic to do so.

## Conclusion

Results derived from an application of a simple theoretical model to real time data exhibit potential shortcomings in the progress of creating an internal market for natural gas in Europe. Progress so far has been made in the UK, but is very limited in continental Europe. The policy relevant implications from these result lead to suggesting the adoption of a European legislation of natural gas storage facilities harmonizing regulation across all member states.

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