The Natural Gas Announcement Day Puzzle

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The natural gas market has undergone massive changes throughout the last decades, starting with its deregulation in the 1980s, the inception of the futures market in 1990, the inflow of financial investors at the beginning of the twenty-first century, and recent shifts in supply and demand due to shale gas, a growing industry for liquefied natural gas (LNG) as well as increased attention related to climate change. Natural gas storage levels have always been an important indicator of changes due to their natural role as a buffer between supply and demand. As such, release of the Weekly Natural Gas Storage Report by the Energy Information Administration (EIA), which contains information about the current storage level, draws attention from all market participants. When new information is released to an efficient market, participants adjust their expectations and prices accordingly. More than 50% of the annual return of natural gas futures is generated on weekly EIA announcement days. Therefore, returns on natural gas futures are significantly different on EIA announcement days compared to non-announcement days. However, after controlling for the information of the announcement this difference should disappear.

This article documents a significant difference between the average returns observed on EIA announcement days and non-announcement days. Puzzlingly, this difference in returns between announcement days and non-announcement days cannot be explained by the information content of the announcement. Indeed, we find a strong significant negative relationship between natural gas futures returns and the announcement surprise, but we cannot explain the return difference between announcement and non-announcement days. This result is robust after augmenting the model with supply and demand measures, spillover effects from options, energy or equity markets as well as commodity specific variables such as the slope of the futures curve, hedging pressure, liquidity or volatility measures.

At the intraday level, we decompose the return within a two hour window surrounding the announcement into a pre- and post-announcement part. Curiously, the overall return divides equally into the pre-announcement part (49.4%) and the post-announcement part (50.6%). Albeit modest evidence for the leakage of information, this can only be a partial explanation as there is still a significant effect from the announcement. Lastly, we document that the pre-announcement return is entirely realized on days where the announcement surprise is positive, i.e., the published inventory exceeds analysts' expectations. The asymmetry of this result casts doubt on a simple explanation based on informed trading.

From the perspective of an investor, this puzzling result raises the question whether the newly documented premium is economically large once transaction and funding costs are accounted for.

Our results show that the simple strategy of opening a short position 90 minutes before the announcement and closing it 30 minutes afterwards yields a significant annual return of 12% (t- stat = 2.93) translating into a Sharpe ratio of 1.76 after transaction and funding costs. However, the time series of strategy returns and the accuracy of analysts' forecasts suggests that the anomaly has de-

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creased in magnitude and efficiency has returned to natural gas markets, leaving open the possibility that our strategy was new to investors who are now arbitraging it away.