Revisions to the Prefiled Rebuttal Testimony and Exhibits of Dr. Jeffrey A. Dubin

However, forward contracts do exist going back to November 30, 2001 for natural gas to be delivered in March 2005. The settlement price for a NYMEX futures contract for natural gas delivery in March 2005 was $3.51 per MMBtu on November 30, 2001. By January 2, 2003, futures for natural gas delivery in March 2005 had risen to $4.18. As I explained above, one creates an average of forward prices by averaging the prices for a range of dates. For instance, a one-week average would include the forward prices on each day trading day of December 23, 2002 through December ~~31~~29, 2002 (four trading days), where prices ranged from $4.03 to $~~4.13~~4.08 on a daily basis, for a one week average of $~~4.07~~4.05.

Q. Does finance and economic theory postulate a relationship between forward and future spot prices?

A. Yes. As explained by Dr. Mariam at page 27 of his direct testimony, in a perfectly efficient market, a futures market equilibrium condition exists when the futures (or forward) price set today for delivery at some later date is the rationally expected or expected value of the spot price on that later date, given all available information at the time the expected value is formed. In mathematical terms:

$$ {}_tF_{t+j} = E(S_{t+j}|I_t) $$

where:

${}_tF_{t+j}$ is the forward price established at time t for delivery of the commodity at a later time $t+j$,

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delivery occurs between the parties who own the futures contracts and the parties who are short futures.

page 30 of his testimony, that this multivariate analysis supports his view that using up to three-month average forward prices is a sound method to estimate future spot prices.

Q. Are there problems with this analysis conducted by Commission Staff?

A. Yes. In addition to the errors of execution I discussed previously, this regression method cannot be interpreted in the manner done by Dr. Mariam.

Q. How has Dr. Mariam misinterpreted the results of this regression analysis?

A. The basic problem is that the explanatory variables in his regression are arithmetically connected. The two-month average is, for instance, the average of the prices in a two-month period. It, therefore, uses the information in the one-month average that is already an explanatory variable in the model. This leads to a problem in the interpretation of the regression results, because the explanatory factors are correlated in a specific fashion. I explain this in detail in Appendix A.

Q. Did Dr. Mariam reach reliable conclusions using his regression analysis in light of this problem?

A. No. I conclude that Dr. Mariam has misinterpreted his regression results to imply a pattern that is not present. Properly interpreted, his regression implies no greater significance to averaging forward prices over a longer term as opposed to averaging forward prices over a shorter term.

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month strip has 80 days, and the 6-month strip has 120 days. Finally, the 5-month strip has 100 days, but is programmed (at least through October 2001) to average over 1,000 days.

correction to replicate his results. These analyses produce similar, but not identical, results. For instance, I find the coefficient on the one-month average to be 0.905 when forecasting one-period into the future, whereas Dr. Mariam found it to be 0.907. These and other differences may be due to the incorrect manner in which Dr. Mariam formed his average prices (recall that Dr. Mariam's one month average only uses twenty days of data) or the subtle differences in the implementation of the auto-regressive procedure in the statistical software packages.

Q. What did you find in your regression analysis when forecasting for longer lead periods using the full dataset of 160 months of NYMEX prices?

A. Using the full dataset, I found a rather different pattern than Dr. Mariam found, even when forecasting one period into the future. My results indicate that averaging periods of one to six months have similar regression coefficients. For instance, the coefficients on the one through six-month averages were 0.95, ~~0.96~~0.95, ~~0.97~~0.96, 0.98, 0.99, and 1.0, respectively, with t-statistics of 33.8, 28.9, 26.5, 24.8, ~~and~~ 23.1, and 21.8, respectively. The R-squared values drop from 88% to 74%, due to incorporating "noisier" information in the short-term forecast.

Q. What is the importance of R-squared in this context?

A. R-squared is a statistic that represents the proportion of the variation in the dependent variable in a regression explained by the independent (or explanatory)

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forecasts are required.

ability of forward prices to accurately forecast forward spot prices.

Q. At page 31 of his testimony, Dr. Mariam advocated a compromise approach that used three-month rolling average forward prices from December 2003 through April 2004 to forecast the rate year spot price. What did Dr. Mariam do to calculate the likely level of rate year gas prices?

A. Dr. Mariam first calculated three-month averages of forward prices for the Sumas market for the period December 2003 through April 2004. The forward prices were NYMEX Henry Hub forward prices less an ~~constant~~ average ~~$0.504~~$0.572 per MMBtu to account for the difference between Sumas and Henry Hub pricing, for example, for March 2005. For instance, Dr. Mariam used forward prices for the period December 22, 2003, through March 22, ~~2003~~2004, to determine the 3-month average at March 23, ~~2003~~2004, while he used forward prices for the months of February, March, and April to calculate the three-month average for April 30, ~~2003~~2004. Dr. Mariam then calculated a simple average of the resulting three-month rolling averages for this period that~~, given the length of period (*i.e.* a lack of additional historical data),~~ resulted in nearly the same answer as if Dr. Mariam had applied a simple average of all the forward prices for the five month period. Hence, while Dr. Mariam paid lip service to his regression results, his recommended procedure ignored the regressions' results in several dimensions (including the nominal use of a three month average when his results suggested that two was better and, in fact, using a five month period, which was not at all supported by his regression results).

Q. Did Dr. Mariam exclude the months of May to July 2004 in forming his