

Forecasting Oil and Gas Prices

Using Special Numbers to Predict Future Behavior

In this article, Cynthia Kase, the energy market's premier short-term forecaster, highlights two techniques for estimating market moves and using an interesting number called Φ or *phi*.

To calculate Φ , take any two non-negative integers and form a number sequence by adding them, such as "3" and "8" for: 3, 8, 11 (3+8), 19 (8+11), 30 (11+19), etc. Divide one number by the next (here 3/8, then 8/11). The ratio converges to 0.618. Divide one number by the one twice removed (3/11, 8/19). The ratio converges to 0.382 or (1-0.618).

The number 0.618 is Φ and is one of a class of numbers called transcendental numbers by mathematicians also shared by the natural log (*e*) and by π (*pi*). The ancient Romans were familiar with Φ and used it in grand architecture. They called it the golden mean or the divine proportion, thinking it both beautiful and evidence of the divine first mover. The ratio is found in many natural growth rates, such as the nautilus shell that increases on each spiral by Φ . The same is true for the spiral trajectory of electrons as viewed in bubble chambers and many other analyses performed by physicists- just look up "electrons" and "phi" on the Internet.

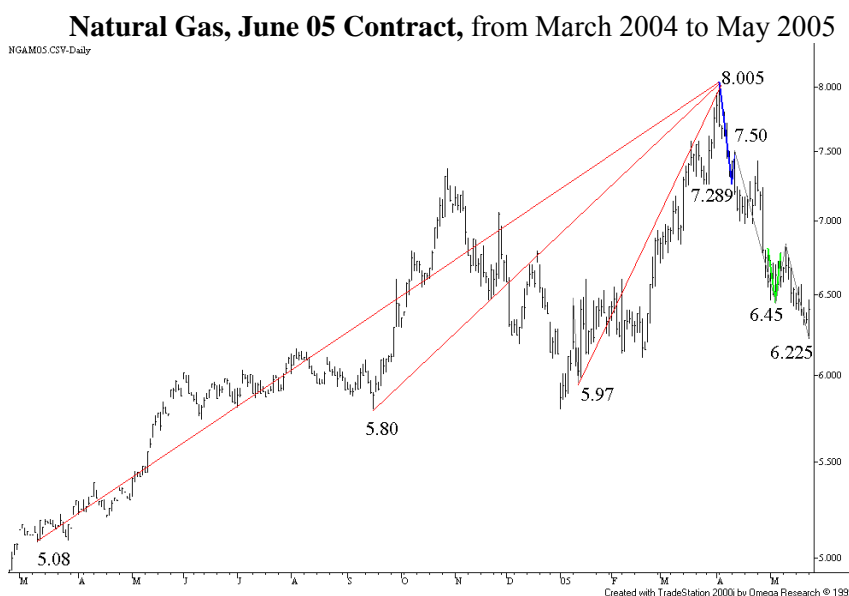
So what does this have to do with markets? Quite a bit because along with natural physical phenomenon, other segments of the universe, such as human behavior- the way that we react to market prices, handle fear and hope, to making or losing money- is also described by Φ .

The First Technique – Retracements

The first technique we will examine uses Φ and 1- Φ to calculate retracements- the extent or size of a reversal, which is a market move against the trend. In an up market, prices "retrace" down and vice versa. The retracement target "Z" for a market move from X to Y, is $Z = Y + P*(X-Y)$, where "P" is the percent retracement. For example, if prices were to rise from 0 to \$100, the 38.2% retracement would be \$61.8 and the 61.8% retracement would be \$38.2.

In actual practice, retracements are not only calculated from the low to the high, but also from intermediate swing lows. For example, the June 2005 natural gas contract rose from \$3.465, which took place in October of 2002, to \$8.005 but also had some swings along the way, such as \$5.08, \$5.80 and \$5.97. The chart with the swing lows of \$5.08, \$5.80 and \$5.97 are shown in red in the chart, right. The retracement from the lows prior to \$5.08 are not shown because they go back another eighteen months and do not fit easily on the chart.

The retracements, as they would have been calculated on April 4, 2005 for each of the points just mentioned to \$8.005 are shown in the table on the next page. An average price of \$6.23 is found in a diagonal cascade (in bold) across the grid (viewed with other retracements not highlighted in this article). The 38 percent and 62 percent retracements are in italic.



Natural Gas, June 05 Contract,
from lows shown to \$8.005

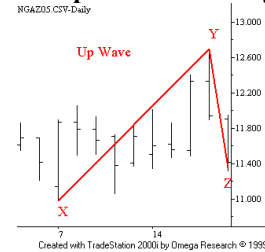
From:	3.465	4.388	5.08	5.80	5.97
38%	6.28				
50%	5.74	6.20			
62%	5.19	5.76	6.19		
78%	4.46	5.18	5.72	6.29	
89%	3.96	4.79	5.40	6.04	6.19

The table indicates a price of around \$6.23 is important support. This is followed by \$6.04, which, apart from the importance as the next retracement that would be tested below \$6.23, is always significant because it is an even dollar level. Some eight weeks later, on May 25, 2005, just four days prior to expiration, the contract made a \$6.225 low, expiring having hit \$6.03.

The Second Technique – Extensions

The second technique using Φ has to do with “extensions.” These are targets calculated by determining the existing vertical magnitude of existing waves and then calculating extensions from the retracement points of these waves. A schematic of this is shown in the chart to the right. The XY distance is the vertical magnitude and point Z is the price from which a new wave would “extend” upwards. Commonly, waves “extend” by 1.38, and 1.62 (the points to which they extend are called intermediate targets – designated by I - and larger than targets – designated by L - respectively).

Example XYZ Labeling



For the example, in a market that rose from 0 to \$100, assume a reversal to \$50 has taken place. The larger than is \$212, calculated as $L = (1 + \Phi) * (100 - 0) + 50 = 162 + 50$, or \$212, where L is larger than target. Defining a wave as X – Y – Z, the calculation is $L = 1.62 (Y - X) + Z$.

For the June contract, the waves down off the high for which extensions would be calculated are shown following the \$8.005 high. Lets first calculate the extensions for the wave that is shown in blue, which is $\$8.005 - \$7.259 - \$7.50$. The two next swing lows of \$6.45 and \$6.225 are within a few cents of the I (1.38) and L (1.62) targets of \$6.47 and \$6.29.

Once the \$6.45 was met, smaller waves within the pattern, such as the wave 6.809 – 6.45 – 6.78, shown in green, could be used to confirm previously calculated targets. This wave’s L target was \$6.20. Averaging the two L targets at this point leads to an adjustment of the earlier \$6.29 target to \$6.245 by adding new data as prices declined, bringing the forecasted price close to the actual \$6.225 met as the market converged on the target.

The techniques discussed above are those that we have used every week for almost 15 years to forecast natural gas and crude oil, and are typical and unexceptional. You can use them to estimate prices, see how Φ works and draw your own conclusions of the significance of this “golden” number, the divine proportion. For a no charge trial of Kase’s weekly forecast on natural gas or crude oil, or for any other information, call us at 505-237-1600 or contact kase@kaseco.com.