risk

By Cynthia Kase

A Divine Tool

In this article we highlight two techniques for estimating market moves and using an interesting number called *phi* or *f.*

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 *phi* or *f* and is one of a class of numbers, called transcendental numbers by mathematicians, also shared by the natural log (*e*) and by pi (*p*). The ancient Romans were familiar with *f* 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 *phi*. The same is true for the spiral trajectories 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 *f.*

The first technique uses *f* and 1 − *f* to calculate retracements—the extent of a 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 to $8.005 but also had some swings along the way, such as $4.388, $5.08, $5.80 and $5.97. To view a chart with the swing lows as well as the retracements discussed below, see http://www.kaseco.com/images/NGJune05.htm.

The retracements for each of these points to $8.005 are shown in the table. 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% and 62% retracements are in italic. The table indicates that a price of around $6.23 is important support. As of this writing, on May 23, a

low of $6.225 was made as shown, followed by a sizeable bounce.

June 2005 retracements 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**	6.42
89%	3.96	4.79	5.40	6.04	**6.19**

The second method using *f* has to do with "extensions." These are targets of existing waves that very often "extend" by 1.38, and 1.62 (called "intermediate" and "larger than" targets, respectively).

For the example move from 0 to $100, assume a reversal to $50 has taken place. The larger than is $212, calculated as $L = (1 + f)*(100 − 0) + 50 = 162 + 50$, or $212, where *L* is the larger than target. Defining a wave as *x – y – z*, the calculation is $L = 1.62 (y − x) + z$.

For June gas, let's take the example of the wave off the high: $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, 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 closer 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 *f* works and draw your own conclusions of the significance of this "golden" number, the divine proportion. •

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