

USING
FIBONACCI RATIOS



TO FORECAST
PRICE AND TIME

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INTRODUCTION

What do the Great Pyramid, the dimensions of your credit cards, your teeth, Beethoven's 5th Symphony, moth wings, daVinci's Madonna and Child, the Panthenon, the geometrical arrangement of the solar system, and the exact way that seeds propagate on a flower (to name a few) have in common? The Golden Section, the Divine Proportion. Perhaps the most important single number in the universe - .618.

Leonardo Pisano, a 13th century mathematician, has many significant achievements but will probably always be remembered for his rabbit counting exercise which popularized the sequence of numbers known as the Fibonacci numbers. Leonardo Pisano was the son of Guglielmo Bonacci. The shortening of the Latin "filius Bonacci" (son of Bonacci) is how Leonardo Pisano came to be known as Leonardo Fibonacci, or more simply Fibonacci.

The Fibonacci numbers are 0, 1, 1, 2, 3, 5, 8, 13, 21, 34... The next number in the sequence is the sum of the prior two (i.e. $21+34 = 55$, $34+55 = 89$). As the sequence gets larger the relationship between adjoining numbers gets closer to the Divine Proportion or the Golden Ratio itself: $\pm 0.61803 39887...$ and $\pm 1.61803 39887$.

Even though this sequence of numbers will forever be known as the Fibonacci Numbers, it is not the values of the individual numbers themselves that are important. It's the ratio relationship between the Fibonacci Numbers that matters for financial forecasting, and especially for those ratios that derive directly from the Divine Proportion.

You could spend a lifetime exploring the intricacies and interconnectedness of the Divine Proportion. It's easy enough to go off in a tangent with this topic. For our purposes it's enough to say that we believe that the Divine Proportion is terribly important for forecasting the financial markets because the human brain is hard-wired to respond to it. Identify something that exemplifies stunning beauty. Chances are that the fingerprints of the Divine Proportion are all over it. The stock market, indeed, every publicly traded liquid market, is a never ending succession of action-reaction, rally-decline. We can use the Divine Proportion to discover how those growth-decay phases have related to each other in the past and how they may relate to each other, in both price and time, in the future.

The three categories of ratio relationships, and a self-definition of the way in which they are applied in financial forecasting, are: Retracement, Expansion, and Parallel Projection. The table shows the most important Fibonacci Ratios for financial forecasting. These ratios were derived by dividing, and by squaring, and by calculating the square roots of the ratios of adjacent and once removed Divine Proportion numbers.

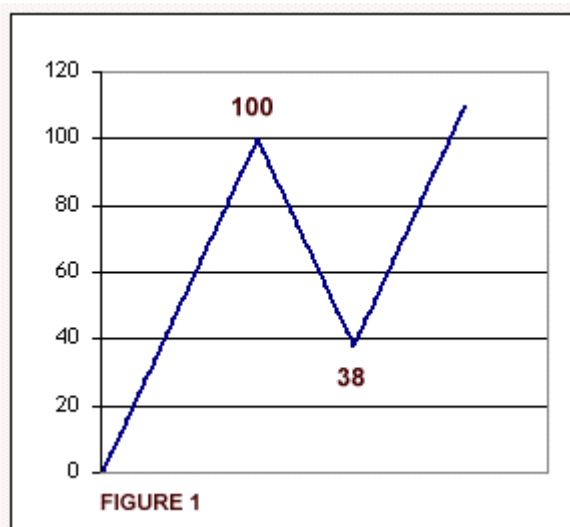
2.618	6.854	1.618
1.618	2.618	1.272
0.618	0.382	0.786
0.382	0.146	0.618

4.236 is another important Fibonacci ratio for growth projections. 1.00 and 2.00 are also important. .500 is not a Fibonacci ratio but we include it for forecasting because the 50% retracement has proven over time to be a recurring retracement percentage.

FIBONACCI PRICE RETRACEMENTS

Overview

Almost everybody is familiar with measuring retracements. A ticker advances 100 points and then declines by 62 points before taking off again in another rally leg.

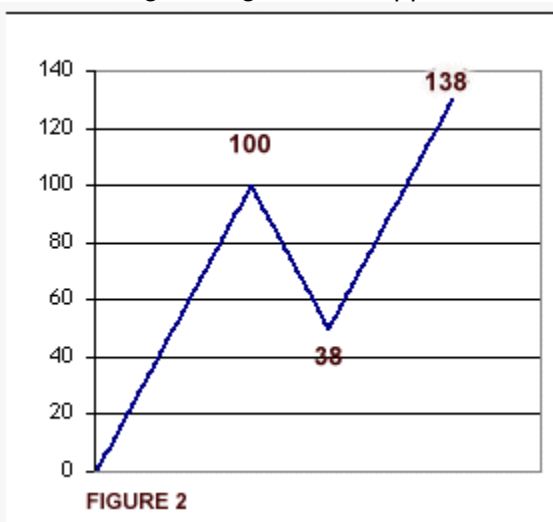


In this case the retracement is 62%. Along with 38% and 50% (which is not a Fibonacci number) these are the most common retracement levels. For many people this all they know about Fibonacci Retracements, and perhaps Fibonacci Numbers in general, and even for them this is a good piece of information to have. If your work tells you that this pullback is most likely a temporary decline before the beginning of the next upleg, when it appears likely that the top is in at 100 you can mark your charts and watch for a reaction at the different Fibonacci levels. We call this a Reaction or Decay Retracement. During this

Retracement phase Price is moving against the major trend, and if you are correct about the direction of the major trend, price should decay somewhere between 14.6% and 78.6% before resuming its move in the direction of the major trend. Easy enough.

But Fibonacci Retracements are not limited to the garden variety Decay type. Fibonacci Numbers appear so frequently in nature because they demonstrate the pattern of change and growth. And so too can this pattern of change and growth be applied to the financial markets. In the first illustration we limited ourselves to describing the likely extent of the pullback from the high at 100. In Figure 2, once the low point of decay is known, we can apply the Fibonacci growth ratios to the 62 point decline and project an advance from the retracement low price at 38 to about 100 (100%) or 117 (127%) or to 138 (162%).

For Fibonacci Retracements you always base your forecast from the measure of one swing or one leg of the swing if it's a complex pattern. In our illustration the measured swing was from 0 - 100. The Fibonacci Retracement was 62%. For the Growth Retracement the swing was from 100 - 38. We applied the 100%, 127% and 162% growth ratios to that 62 point swing to project future price targets.

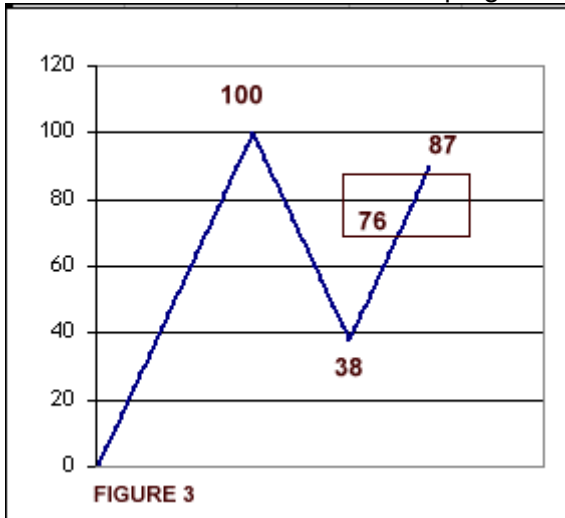


That's two applications of Fibonacci Retracement ratios for financial forecasting. These applications occur frequently enough across all price levels and time frames to have

genuine forecasting value.

Fibonacci Retracements have one more application. We use them to create what we call the "Death Zone." In Figure 2 we used the Growth Ratios to project likely targets for what we believed was the beginning of the next upleg in the direction of the major trend.

Needless to say things don't always work out as planned. From experience with the major stock indexes we never take a breath or start imagining what wonderful forecasters we are until the new upleg has safely cleared the Death Zone. The Death



Zone narrowly drawn is the 62% - 79% retracement measured from the low point of the initial decay phase. In this case it would be the 76 - 87 price area (see Figure 3). We call it the Death Zone because this is where many promising new swings die an early death. A broader application of the Death Zone has it from 50% - 79%.

The corollary application of the Death Zone Retracement is that any Decay Retracement that exceeds the 79% retracement level immediately becomes suspect as the start of a major change in trend and not a pullback as first believed. Under most pattern recognition methods,

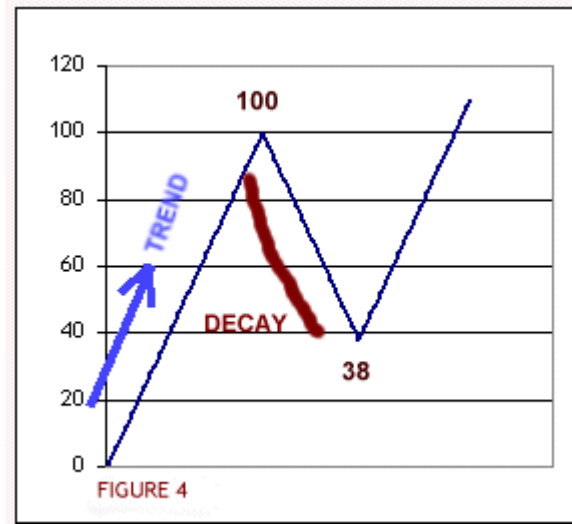
including Elliott Wave, retracements up to 100% of the prior swing are acceptable without causing a change in outlook. That's OK too. But we never, never take a suspected Decay Retracement that exceeds the 79% level as a normal event that can be ignored with impunity. Maybe this would be the time to lighten up on usual positions size when making the reversal trade off the suspected Decay Retracement low. All the examples we used cover retracements of a bull move. The exact same principles apply for bearish swing retracements.

DECAY PRICE RETRACEMENTS

A decay retracement, otherwise known as a pullback, is a move against the main trend. By definition, a move that exceeds the prior swing is a change in trend, so decay retracements will always be less than 100%.

**The Most Common Decay
Retracement Ratios are .382 .500 .618
and .786**

The most common decay retracement ratios are **.382**, **.500**, and **.618**. The **.786** retracement is also a common decay retracement ratio, but we give that particular ratio special prominence in our Fibonacci analysis as explained later.



Bull Trend Retracements

The US Dollar Index Daily Chart

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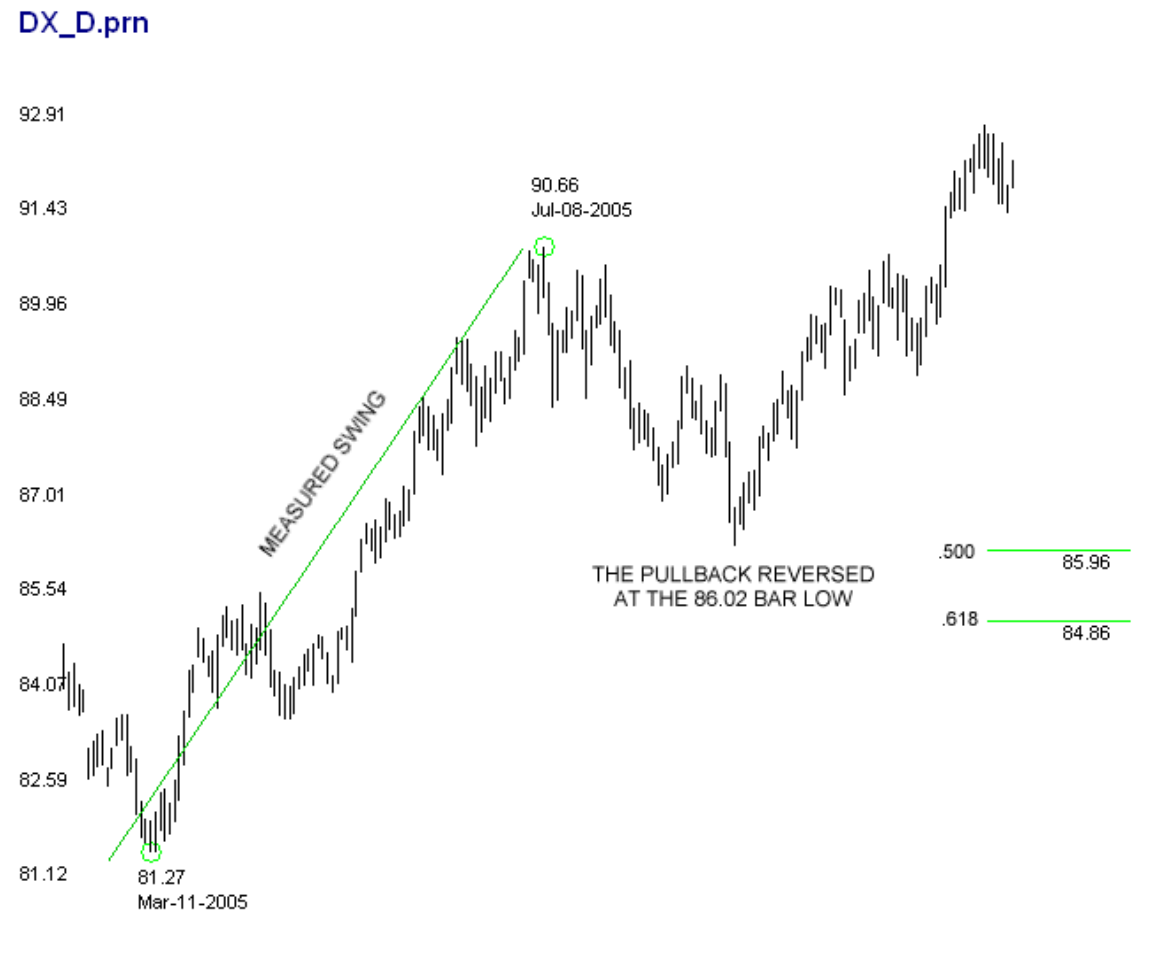


Chart 1

The US dollar, continuous futures contract (*Chart 1*) experienced a bull swing that lasted from March 14, 2005 to July 8, 2005 before its first significant pullback. If you had reason to believe that the July high was not the end of the bull trend, then you would use the decay retracement ratio technique to forecast where prices would be likely to end their pullback and resume the prior trend, which in this case was bullish.

The math involved using a ratio of .500 as an example is to subtract the March low at 81.27 from July high at 90.66 to determine the price range of the measured swing (9.39 points). Multiply the measured range by the selected ratio to determine that the .500 retracement ratio would be equal to 4.70 points. Subtract the ratio result from the July high.

Range: $90.66 - 81.27 = 9.39$
.500 Retracement: $9.39 * .500 = 4.70$
Price Projection: $90.66 - 4.70 = 85.96$

The actual pullback low on September 2, 2005 was 86.02, which is very close to the .500 retracement ratio price at 85.96. We could have used an example where the retracement low matched exactly with a Fibonacci retracement ratio, but that would be a disservice to the reader. We have found that the best results are obtained by creating a retracement price zone, usually using retracement ratios .382, .500, .618, and .786 and then watching for an event such as a reversal bar to signal that the pullback is probably ended, and the main trend has resumed. That Fibonacci cluster chart would look like this:

The Most Common Decay Retracement Ratios Create a Zone of High Probability

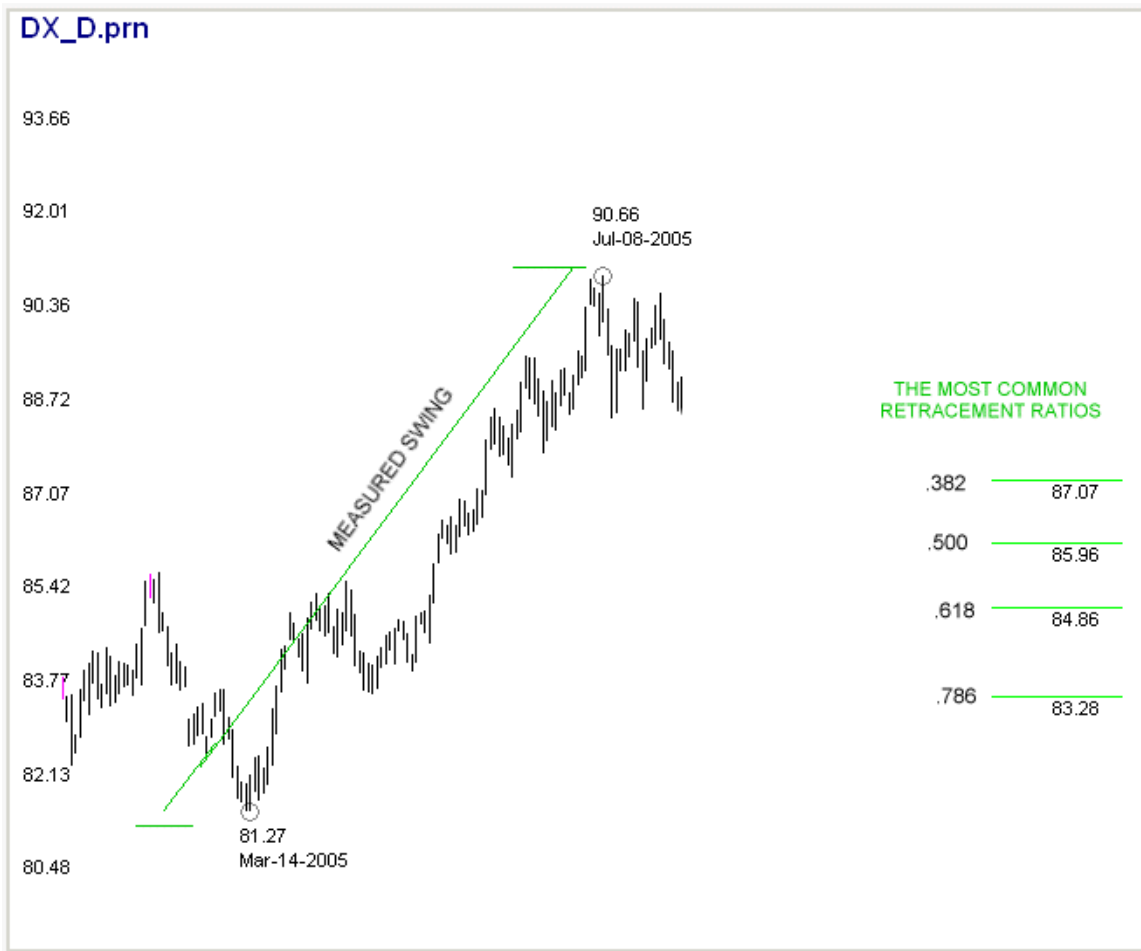


Chart 2

(Chart 2) For the remainder of July and into the first few days of August the July 8 high had not been exceeded so we could continue to assume that the pullback that we believed had begun on July 8 was still in force. In early August, 2005 prices were starting to poke around the beginning of our retracement zone starting at the 87 price level (.382 retracement) so we wanted to be specially alert to the occurrence of any bullish reversal bars beginning at that time. Later in the book we provide some methods

to help you determine, well in advance, which Fibonacci price clusters are most likely to be important.

Are you going to get false positives? Sure. That is the nature of the beast. So far has we know, and we've done the research, there is no 100% accurate trading system, method, or technique. It is often said that success in trading is more the result of having and following a simple trading plan that allows you to deal objectively with risk and losses than a megabucks trading system that fosters illusory certainty. We agree.

Bear Trend Retracements

Decay price retracements work equally well with pullbacks against a bear trend. The following chart (*Chart 3*) shows Eurodollar continuous futures starting around December, 2004. The December, 30, 2004 high at 1.37 was potentially a very significant high and when prices fell off from that high there was reason to believe that the main trend had changed from bull to bear. Being able to objectively determine in advance the likely termination point of the initial pullback against the main trend would result in a low risk entry and a potentially very profitable trade.

Eurodollars Daily Chart - Retracement Zone Set-Up

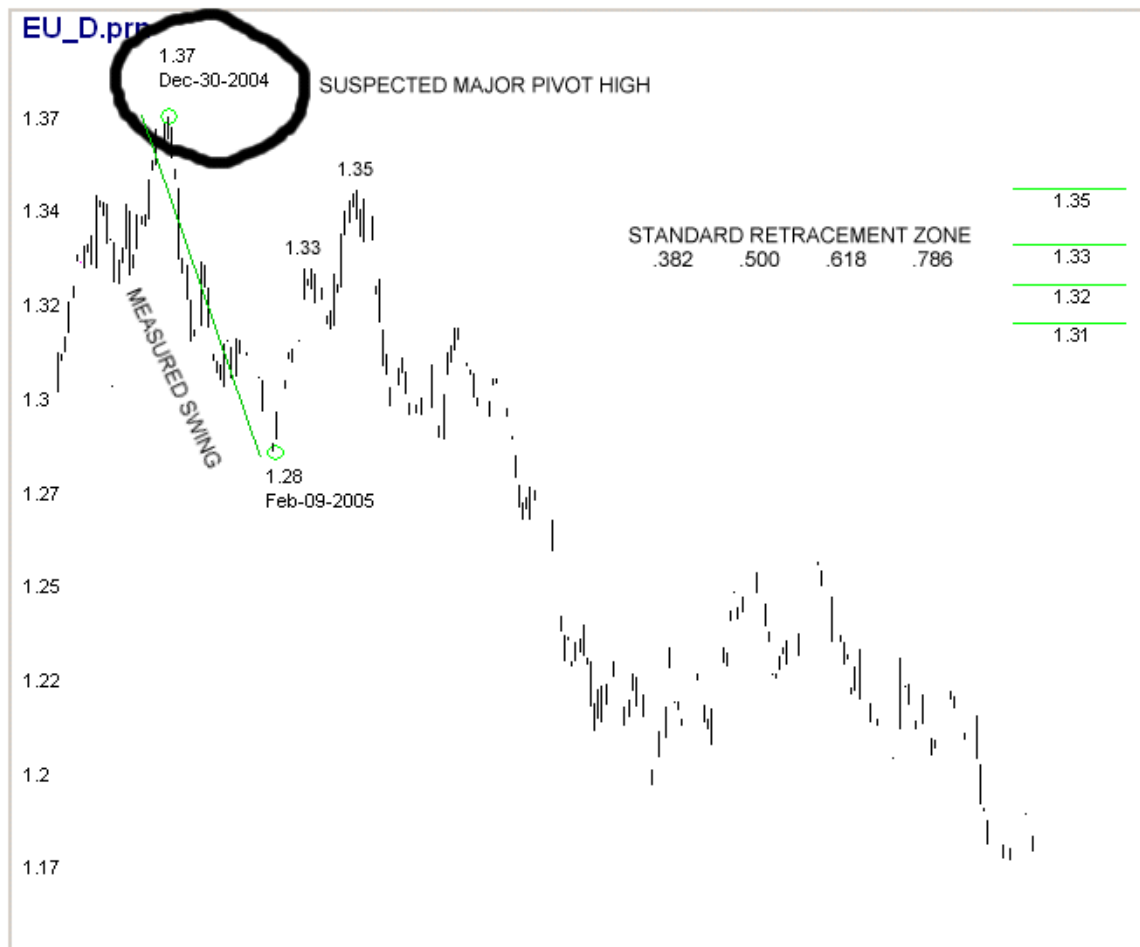


Chart 3

The Eurodollar chart shows the standard retracement zone set-up with prices that correspond to the retracement ratios of .382, .500, .618, and .786. In this case, Eurodollar prices pulled back to 1.33 at the .618 retracement ratio, declined for a few days, and then rallied up to 1.35 on March 14 at the .786 retracement ratio, where the pullback terminated.

The Death Zone

We mentioned that the .786 retracement ratio, although not uncommon, deserves special recognition. When a prior trend or swing has suffered a price reversal of close to 80% many assume that the current direction is not a pullback but the beginning of a new trend. Not an unreasonable assumption. This weekly chart of the QQQ (Chart 4) shows the bull trend that began in the fall of 2002. The December, 2004 high at 40.64 appeared to be a good candidate for the termination point of the entire two-year rally. For one thing, the weekly chart shows five distinct waves from the 2002 low ending in December, 2004. Even if you are not an Elliott Wave devotee you are probably still familiar with the five wave impulse pattern and the proposition that the end of the 5th impulse wave is very often a major trend reversal point.

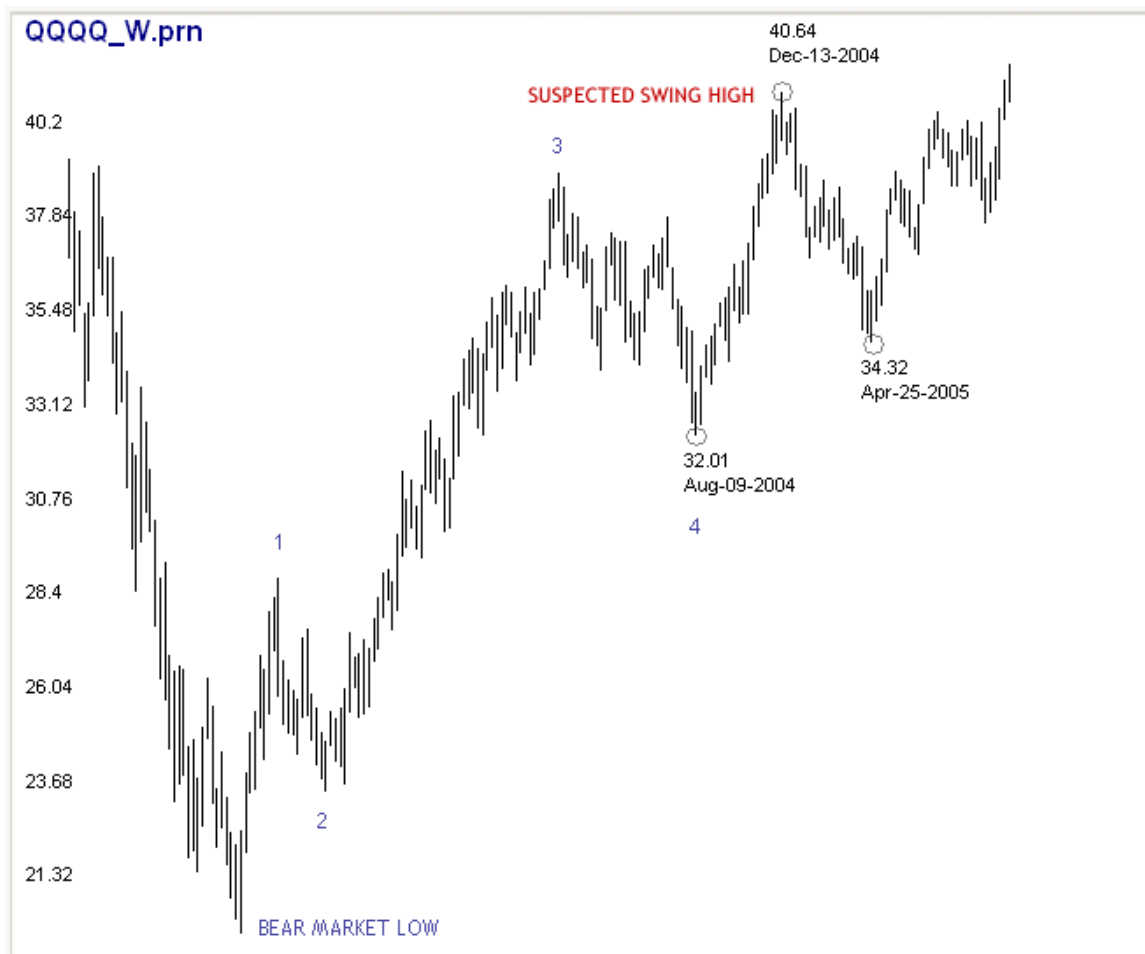


Chart 4

There were other reasons as well to have taken a short position off the high that occurred during the week of December 13, 2004. The next chart is a close-up of the August, 2004 to December 2004 swing that carried QQQ prices into the rally high. This was the last distinctive bull swing going into the suspected major high so we knew that if the major trend was changing from bull to bear that this swing would be the first to be retraced by more than 100%. That makes this swing the ideal candidate for the Death Zone set-up.

QQQ Weekly Close up - The Suspected Last Bull Swing



Chart 5

It is usually a good idea to plot the .618 and .786 retracement ratios on your working charts after you suspect that the trend has changed from bull to bear or bear to bull. The QQQ example is a very good illustration of the Death Zone, the retracement price area that seems to kill new trends. If you were aware of the Death Zone and knew where to plot it on your working charts you would have been more likely, in this case anyway, to have kept some of the profits from your short trade off the December, 2004 high. Hope is never a good plan and many traders gave it all back, plus some, when the suspected new bear trend was killed in the Death Zone and the QQQ went on to make a new rally high.

Here's another recent example from Bonds where proximity to the retracement Death Zone stopped what might have been played as promising rally leg. At a minimum you should avoid adding new positions until price successfully and convincingly clears the Death Zone. The Bond chart could also be a good example of measuring retracements in two degrees (not shown) as the .786 retracement from the spike high which occurred immediately before June 27 was within .05 of the false rally high.

Death Zone in US Bonds Weekly

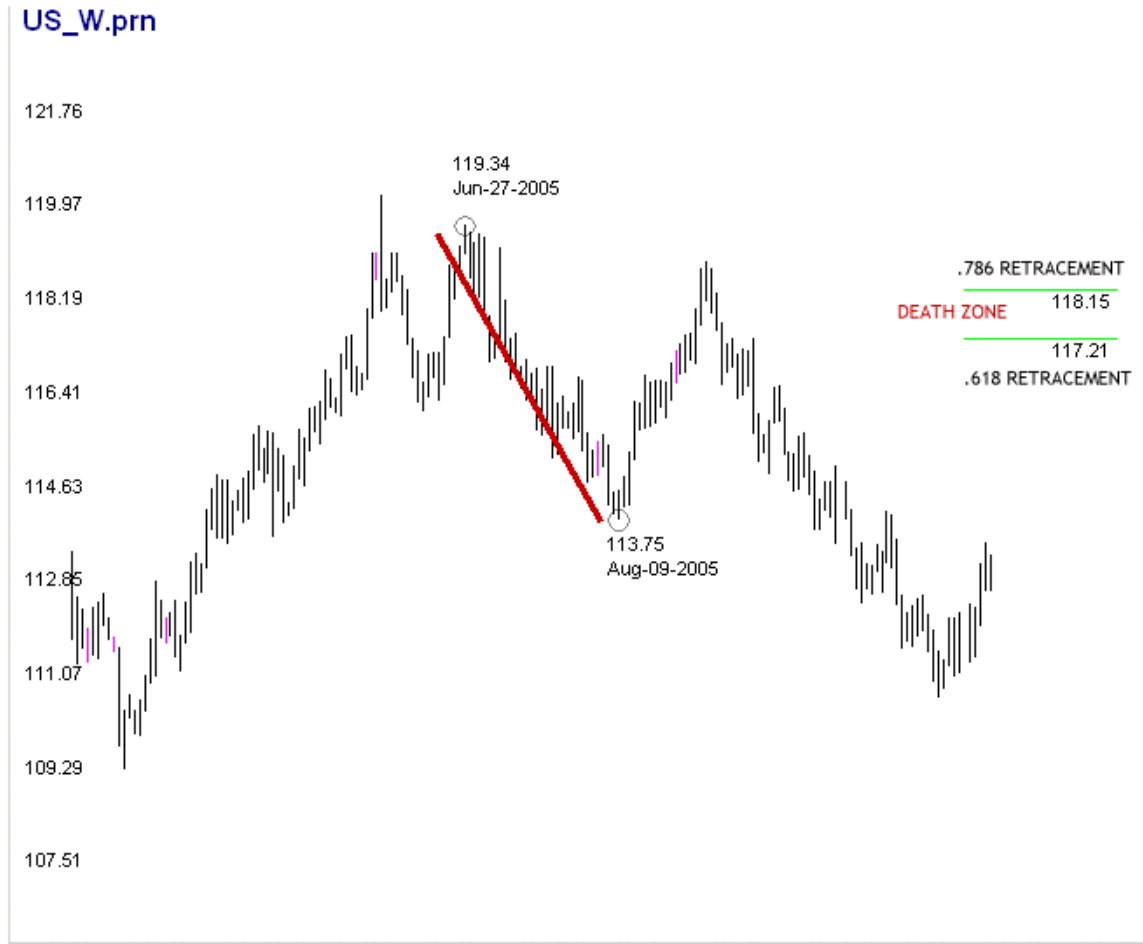
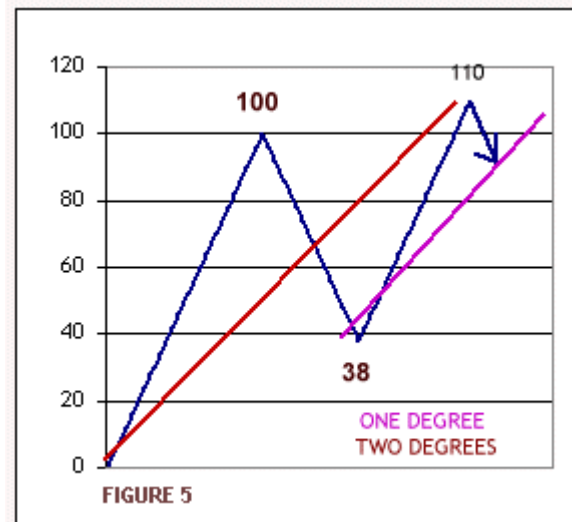


Chart 6

Use Retracements from Two Degrees of Swing

The question often arises about what swings to use to measure retracement ratios and other Fibonacci ratios. The short answer is that whenever possible you want to measure Fibonacci ratios in one and two degrees. *Figure 5* shows what that means.

In the hypothetical example (*Figure 5*) price rallied from 0 - 100 and then retraced to 38 before rallying again to new highs around 110. We can call the total move from 0 - 110 as one swing with two legs or two separate swings in a bull trend. Either definition would be correct but neither is particularly helpful on its own. *Figure 5* makes this concept more clear. if you wanted to measure decay retracement levels from the 110 high you would measure the swing from 0-110 and the swing from 38-110. The two measurements in the same direction of trend (or swing) is what we mean by using Fibonacci ratios from two degrees of swing.



The weekly QQQ chart (*Chart 5*) that illustrated the Death Zone is a real life example of how using two degrees of swing can reinforce a Fibonacci analysis. Although the Death Zone stands on its own as one of the most powerful applications of Fibonacci analysis to real world trading, you can see in *Chart 7* that the .382 retracement of the higher degree Feb 2003 to Dec 2004 swing reinforced the possible importance of the lesser degree price retracement into the Death Zone.

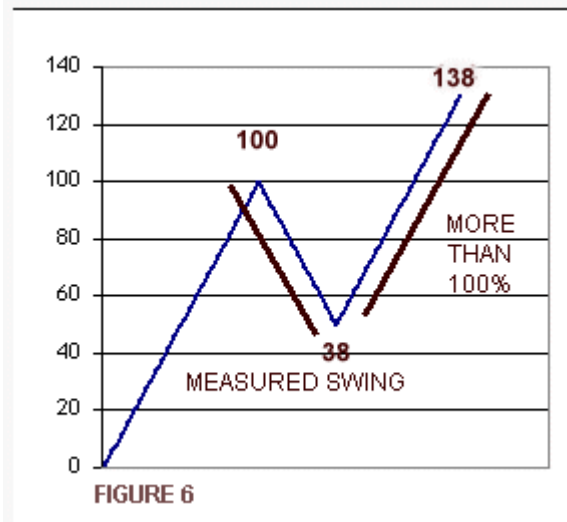
Two Degrees of Retracement Reinforced the Death Zone Set-up



Chart 7

GROWTH PRICE RETRACEMENTS

Decay retracements, which are also known as pullbacks and internal retracements, are by definition always less than or equal to 100% of the measured swing.



Growth retracements as the name implies are used to project termination points of swings which exceed the range of the measured swing. Growth retracements are also called external retracements because they exceed 100% of the range of the prior swing.

The most common growth ratios are **1.272**, and **1.618** for measurements of one degree. The growth ratios **2.618**, **4.240** and **6.854** occur more often for measurements of two or more degrees.

In *Figure 6*, once the low point of decay is known, we can apply the Fibonacci growth ratios to the 62 point decline of the

bear swing from 100 to 38 and project an advance from the retracement low price at 38 to about 100 (100%) or 117 (127%) or to 138 (162%).

In *Chart 8* once the Bonds rally off the February - March bear swing exceeded the .786 retracement you would plot the growth ratios 1.272, and 1.618 as shown on the Bonds chart.

US Bonds Daily - 1.272 Growth Retracement Ratio



Chart 8

The earlier June 3 high (119.94) also provided a hit at the 1.272 retracement as the Bonds made a double top after rallying for several months. Unfortunately there is nothing inherent in Fibonacci price analysis that would alert you to the possibility of a double top as experienced by the Bonds in June, 2005. Both tops did provide you with bearish reversal bars at the Fibonacci price targets.

Soybeans continuous futures show where the 1.272 growth retracement price level provided a valuable exit zone for a short trade following the June high.

Soybeans Daily - 1.272 Growth Retracement Ratio

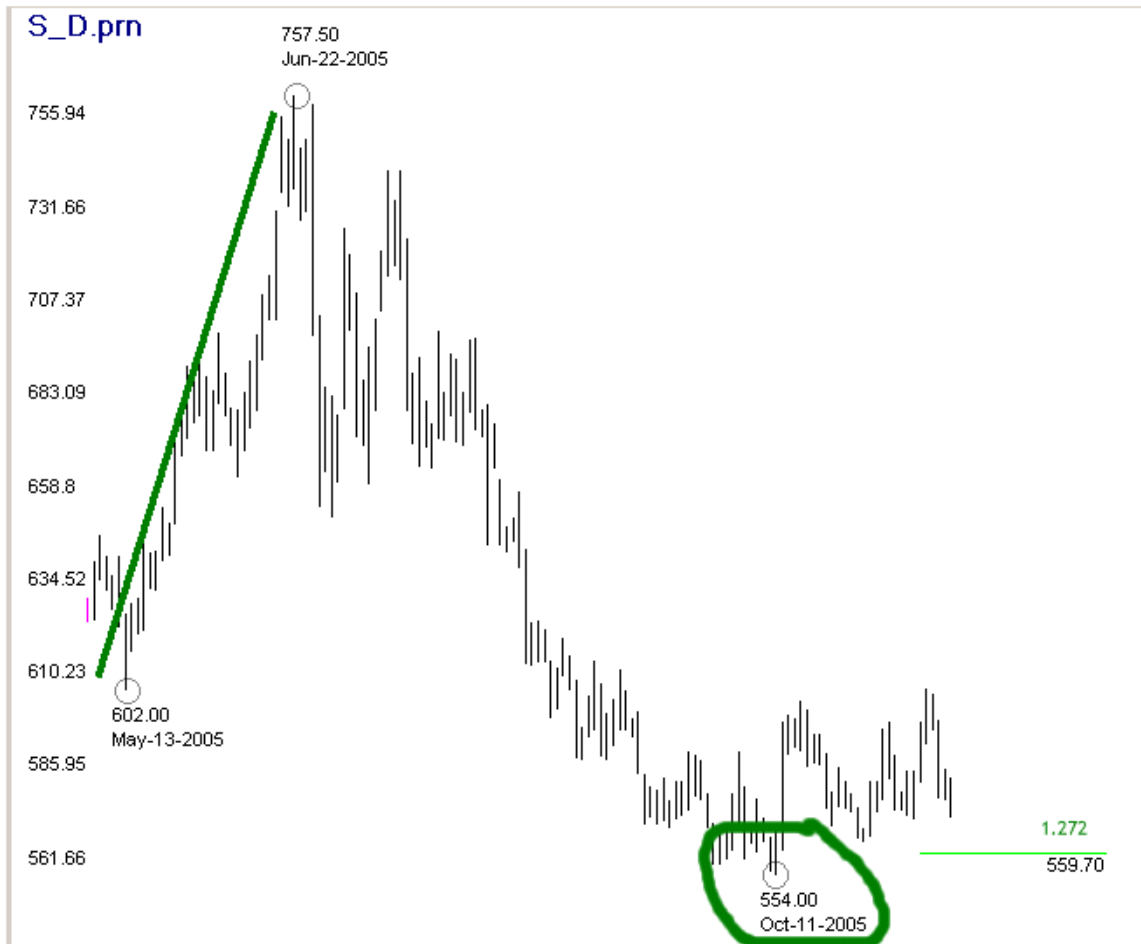


Chart 9

The following Beans chart shows another six months of trading from the previous chart. A decay or internal retracement (less than 100%) of the major swing from 498.50 to 757.50 provided another Fibonacci target that was smack into the growth or external retracement price zone we calculated from the June 22 high. For actual trading you want to use all the Fibonacci techniques, Retracement, Expansion, and Parallel Projection, in one and two degrees, to create clusters of target prices that become your High Alert Zones.

Soybeans Daily - Decay Retracements Add Density to the Fibonacci Zone

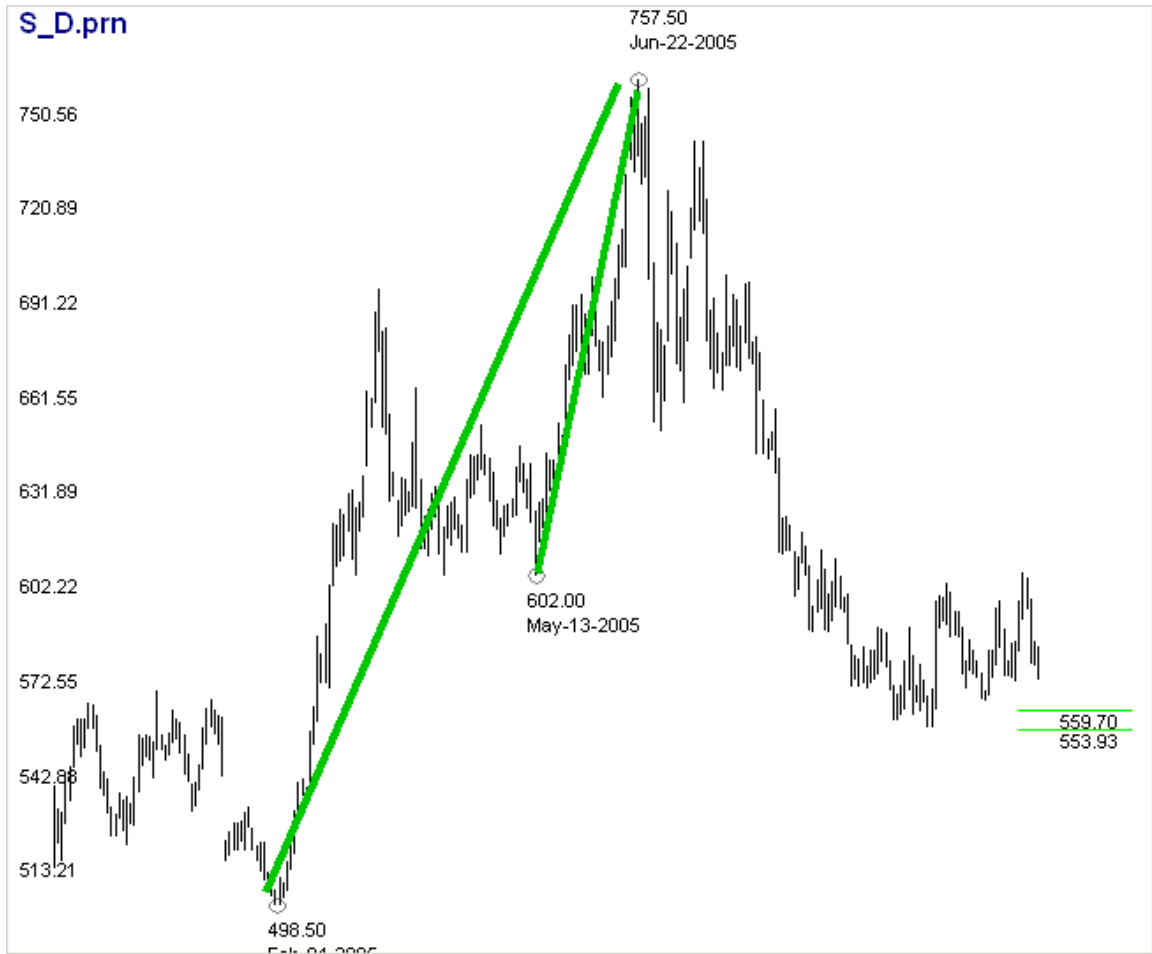


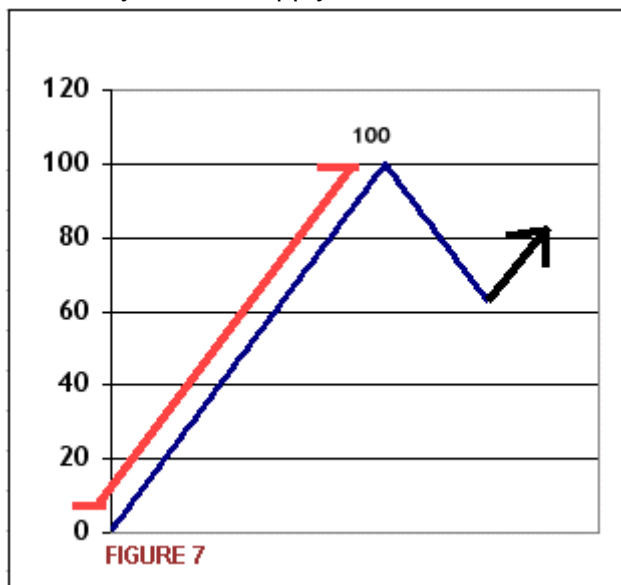
Chart 10

FIBONACCI PRICE EXPANSIONS

Overview

Fibonacci price expansions are the simplest technique to apply. Use the analogy of an extension ladder. When you pull the rope a single section expands to double or maybe even triple its length. Fibonacci expansions use a single swing (one degree) or multiple swings in the same direction (two degrees) to expand the price range. The most important Fibonacci expansion ratios are **.618**, **1.00**, **1.272**, **1.618**, **2.00**, **2.618**, and **4.236**. As a general rule trending moves rarely exceed 4.236 of their first distinctive swing. Not appearing as frequently, but not to be forgotten either, are **.500** and **6.854**.

In our illustration (*Figure 7*) prices advance from zero to one hundred and then experience a pullback. So far as the expansion ratio technique is concerned the depth of the pullback from the measured swing is not relevant although it would be in real trading because you would apply the retracement technique in conjunction with the expansion



technique to determine if you got a cluster or price zone.

To apply the expansion technique determine the measured range, in this case 100, multiply that range by a Fibonacci ratio, we will use .618 in this example, and add the product of that multiplication to the ending price of the measured range. The result is a Fibonacci projection of 162.

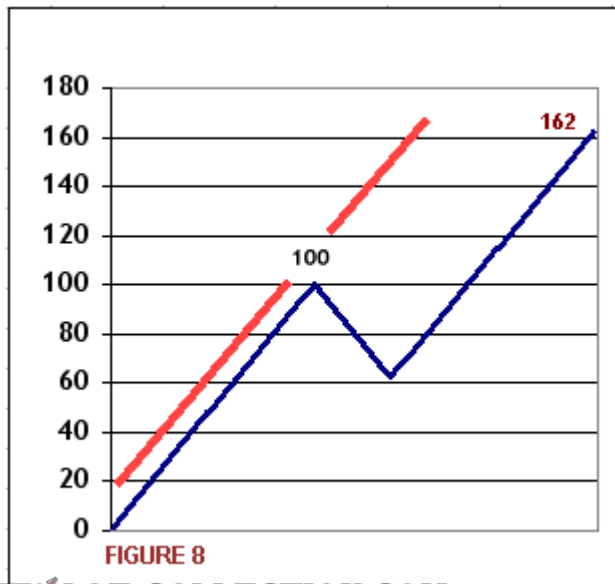
The math looks like this:

$$\begin{aligned}\text{Range: } & 100 * .618 = 61.8 \\ \text{Target: } & 100 + 61.8 = 161.8\end{aligned}$$

For a bear move projection you would subtract from the low point of the

measured range instead of adding to the high point of the range. *Figure 8* graphically illustrates the bullish expansion concept.

Some Fibonacci analysts downplay expansions as somehow less worthy than retracements and parallel projections. That may be a mistake from two perspectives: one is that you can easily find dozens of cases where Fibonacci expansions were dead-on in projecting the end of a move, the second is that Fibonacci analysis is an inseparable bundle of techniques - retracement, parallel projection and expansion. For actual trading you want to use all these



techniques, all the time, from one and two degrees. The idea, always, is to create tight clusters of Fibonacci targets which form a price target zone. The more dense the cluster the more likely that price will change within or around that cluster.

Fibonacci Expansions of .618 and .500 on S&P 500 Weekly Chart



Chart 11

Two expansions, a .618 expansion that started from the all time high in March, 2000 and a .500 expansion that started from the rally bounce-back high in May, 2001 did a very good job projecting the bear market lows in the Summer and Fall of 2002. This chart is another example of always using multiple Fibonacci ratio projections to create a cluster of price forecasts.

The following Soybeans chart (*Chart 12*) shows how multiple Fibonacci expansions from an earlier congestion zone were used to project the next congestion zone at lower prices.

Multiple Fibonacci Expansions on Soybeans Weekly Chart

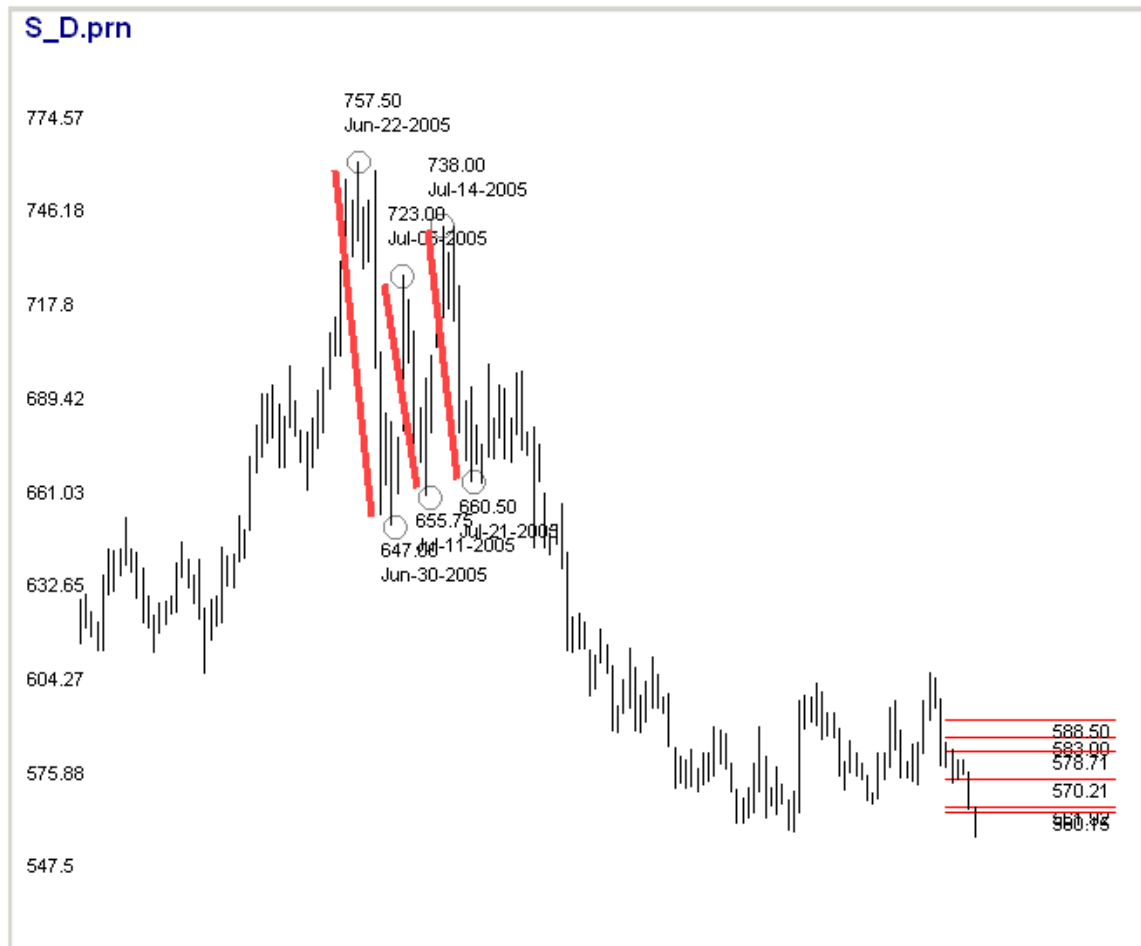


Chart 12

Fibonacci retracements from prior swings added density to the expansion cluster (*Chart 13*). We do not show it here but there are also parallel price projections from the June and July highs that also add density to the cluster.

There are a couple lessons to be learned from these Soybeans charts. One is that you will use only a fraction of the value of Fibonacci analysis if you restrict yourself to forecasting only single bar highs and lows. The Soybeans charts tell us that dense Fibonacci clusters are also very useful for forecasting price congestion zones that are very difficult to trade successfully and should probably be avoided until a breakout from the zone occurs. Another lesson is that we do not need "to-the-decimal" precision to make Fibonacci price projections useful. You will have many experiences where a Fibonacci price projection will be exact or nearly so but you should avoid making to-the-decimal precision a requirement of your trading plan.

Fibonacci Retracements on Soybeans Weekly Chart Add Density to the Cluster



Chart 13

Fibonacci Expansions of 1.272 and 1.618 on Palladium Daily Chart



Chart 14

Fibonacci expansions of two prior bullish swings created a price zone around which you would be alert to a change in the bullish trend in Palladium. If we expand the Palladium chart to include more trading days (*Chart 15*) you can see where .500 and .618 retracements from a prior swing high added density to the Fibonacci cluster derived from the Fibonacci expansions.

Palladium Daily



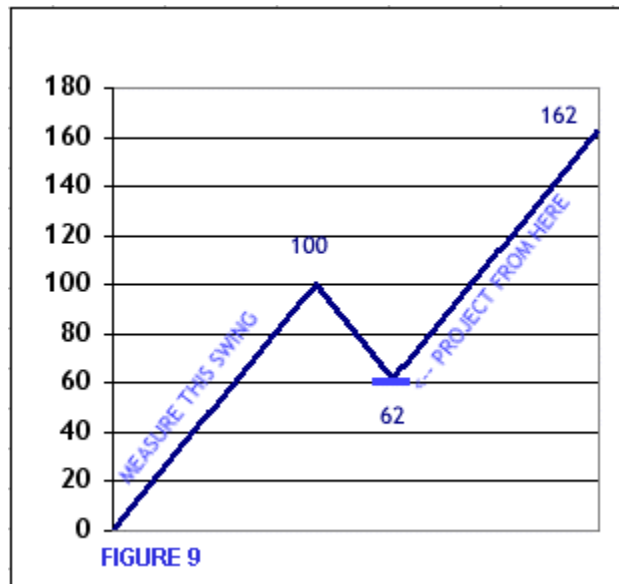
Chart 15

FIBONACCI PARALLEL PROJECTIONS

Overview

Parallel projections are similar to expansions in that you measure the range of a swing in the same direction as the trend you are forecasting and proportion that range with a Fibonacci ratio. With the parallel projection instead of adding (or subtracting) the proportioned range from the end of the measured swing, you jump over to the beginning point of the next swing, or the one after that, and measure from there.

Figure 9 shows the concept. The bullish swing from 0-100 is measured and (in this case) proportioned with the Fibonacci ratio 1.000. The proportioned range (100 points or $1.000 * 100$) is then projected from the start of the next swing at the 62 price level. In Elliott terms you would be projecting Wave 3 from the end of Wave 2.



The most common Fibonacci Parallel Projection ratios are **.618**, **1.000**, **1.272**, **1.618**, **2.00**, **2.618** and **4.236**.

Fibonacci Parallel Projections of 1.272 and 1.618 on MSFT Daily

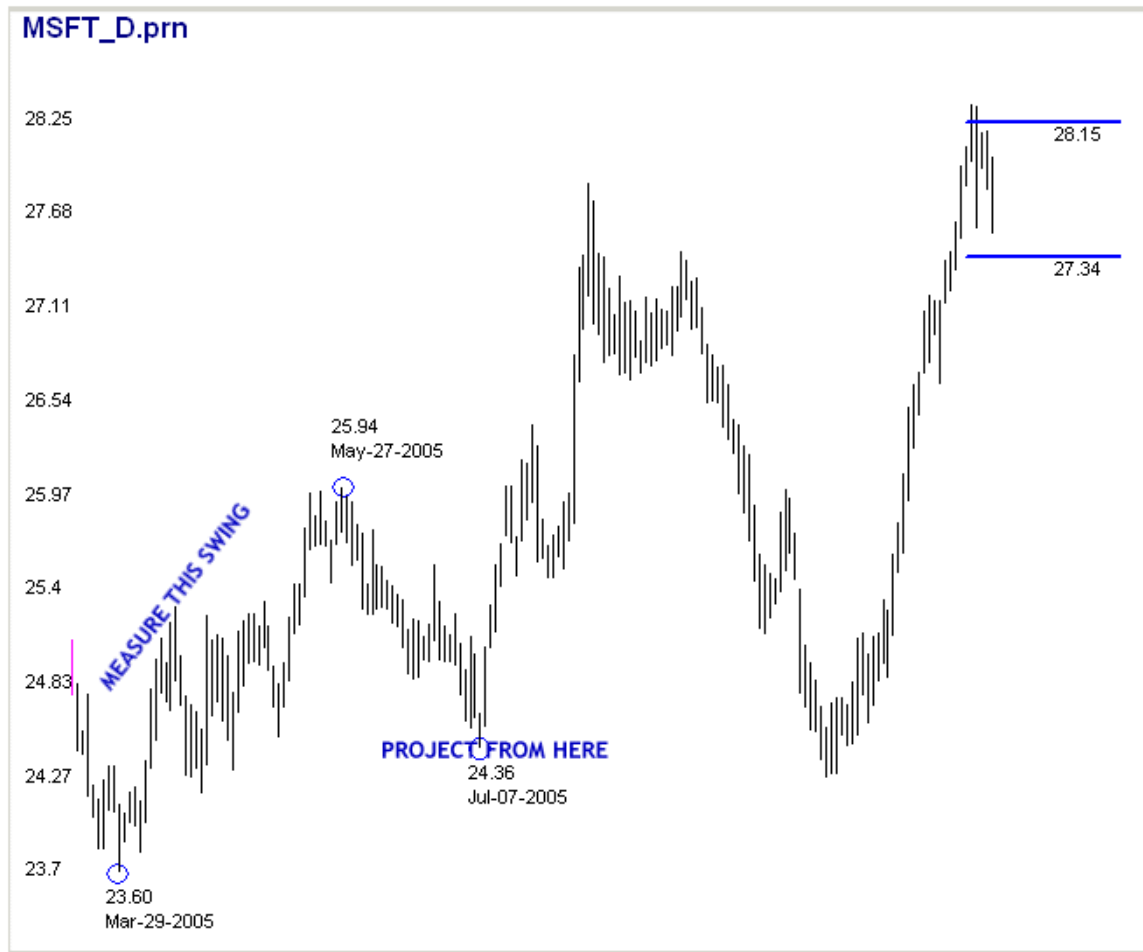


Chart 16

In *Chart 16* we measured the bull swing from March 29 - May 27 and proportioned it with the Fibonacci ratios of 1.272 and 1.618. The proportioned range was projected from the low on July 7. The 1.272 ratio put us in the price zone that terminated the July 7 swing and also provided us with information that would become useful several months later.

Fibonacci Parallel Projections of 1.000 and 1.272 on MSFT Daily

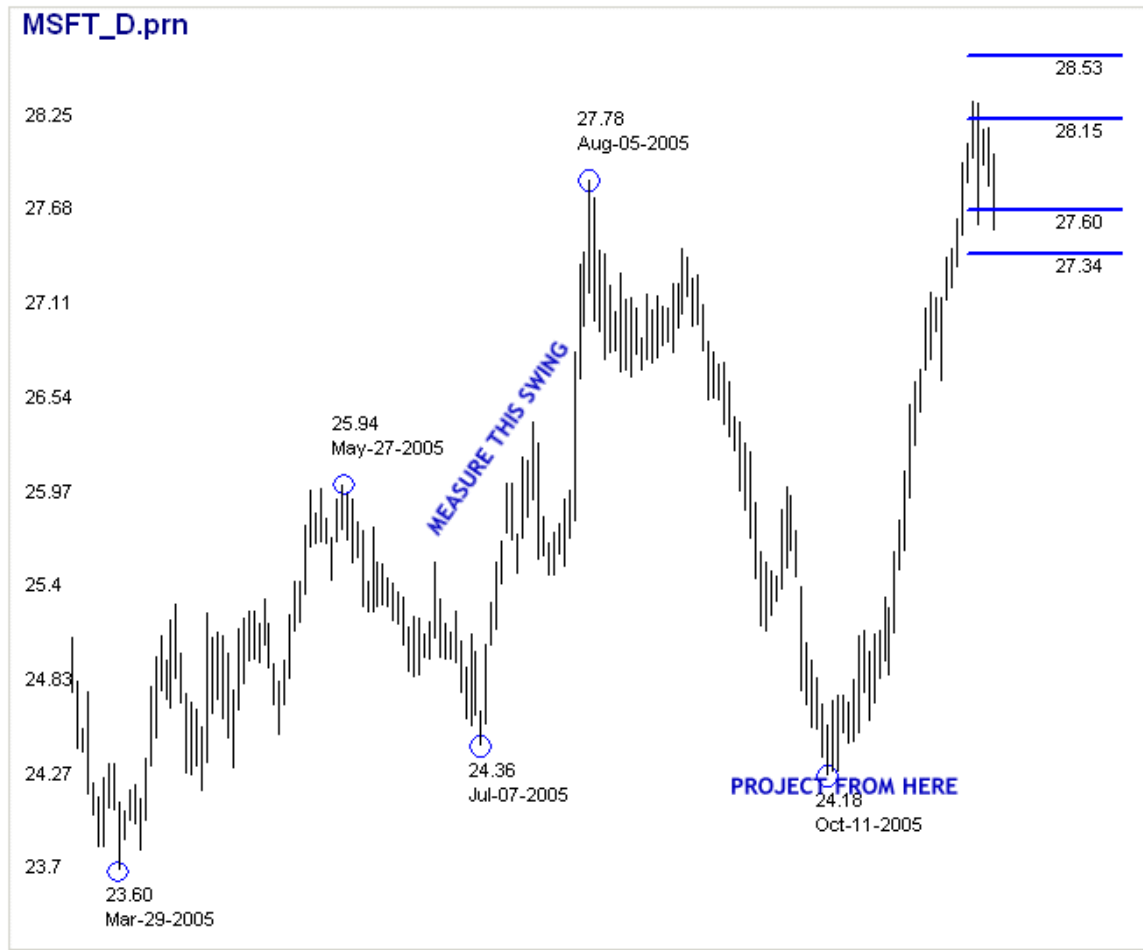


Chart 17

In *Chart 17* we proportioned the July 7 - August 5 bull swing and projected it from the October 11 low. The combination of parallel projections from the two swings shown in *Charts 16 and 17* created a Fibonacci cluster within which we would be looking for a consolidation or a change in trend in MSFT.

Parallel Projections of 1.272 and 1.618 in Eurodollars Daily



Chart 18

The 1.272 and 1.618 parallel projections forecast the congestion zone in Eurodollars following a substantial bear move. The initial bear move low, and the beginning of the congestion zone, was smack on the 1.20 price projection.

Parallel Projections of 1.272 and 1.618 in US Bonds Daily

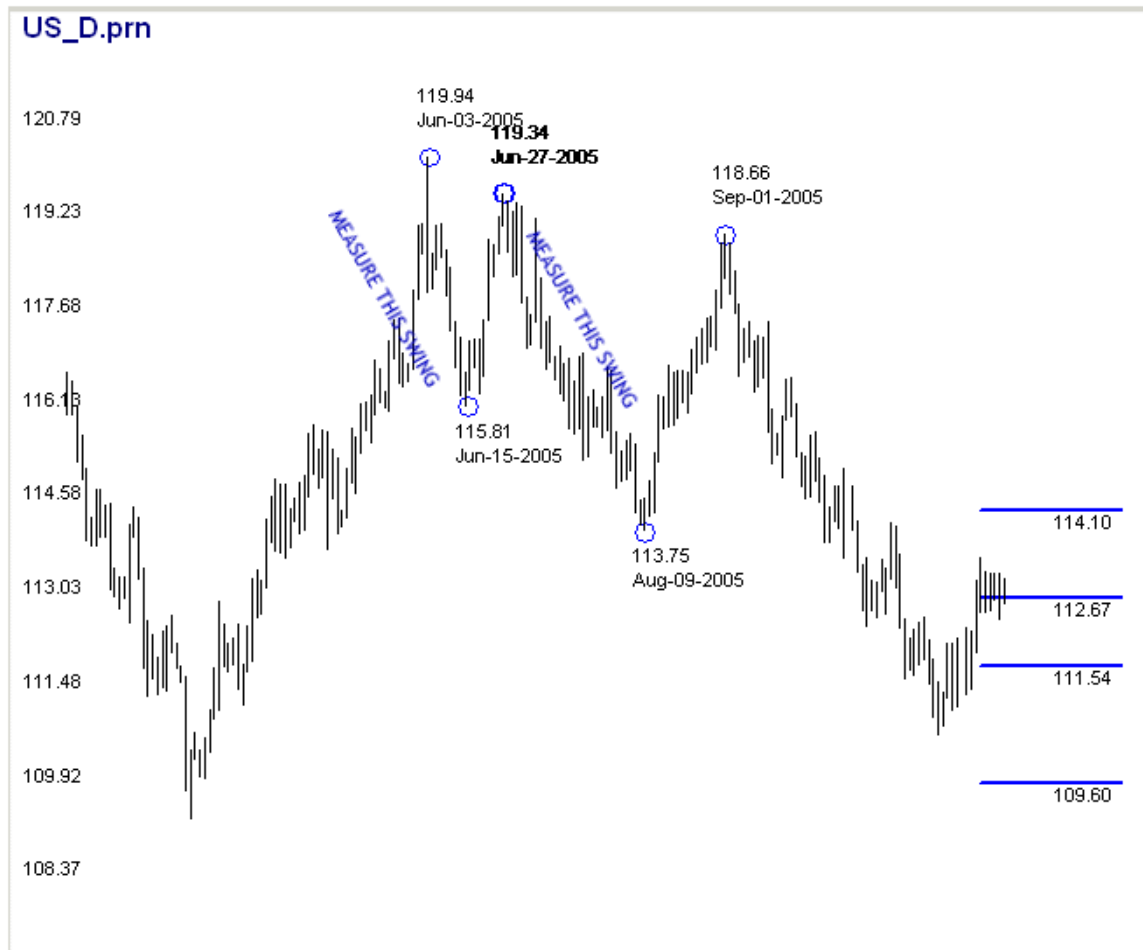


Chart 19

Bonds changed direction, for at least the short term, within a parallel projection cluster. We would be reluctant to use such a wide cluster if it could not be tightened with either additional parallel projections from other swings or made tighter and more dense with retracements or expansions. The next chart (*Chart 20*) provides the necessary reinforcement of credibility to the parallel projection cluster with two retracements from a greatly expanded chart.

.382 Retracements of Prior Swings Tighten the Cluster in the Bonds Chart

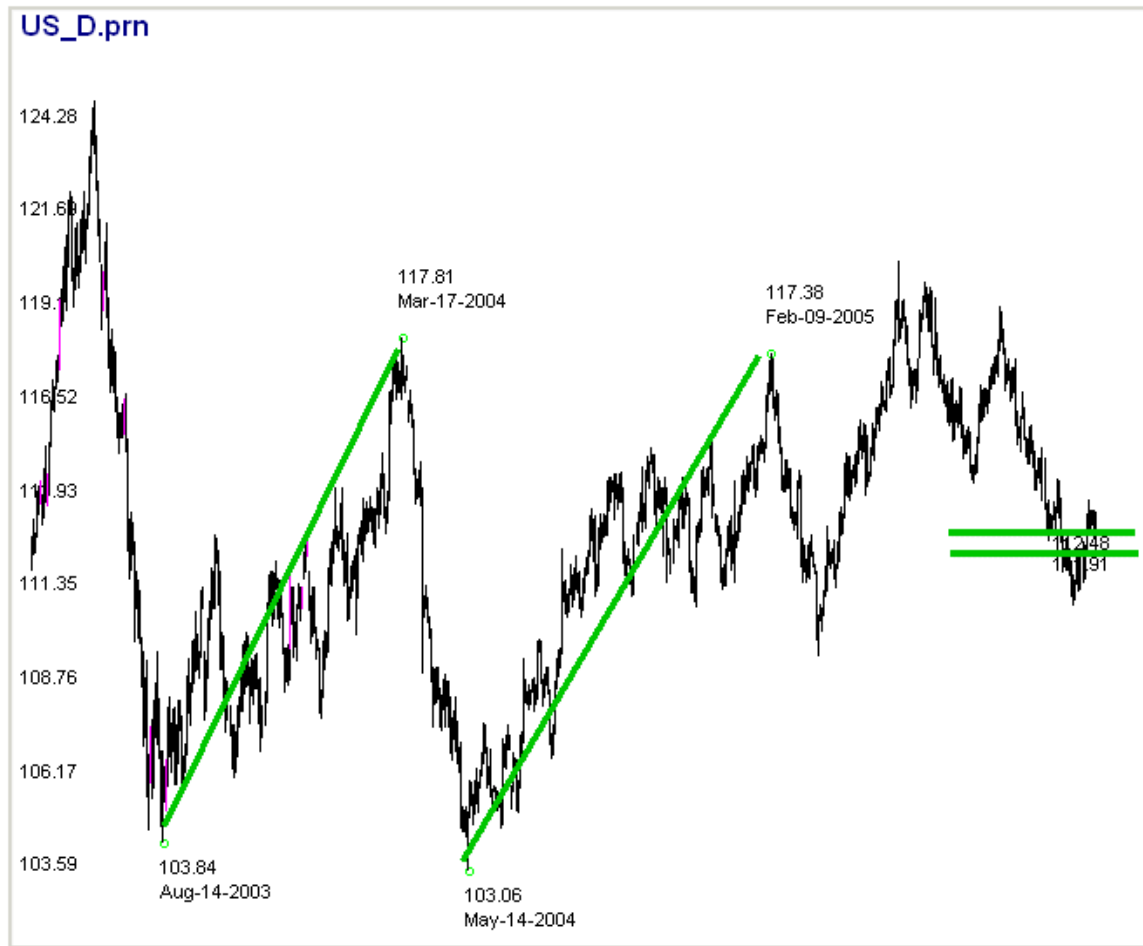


Chart 20

WILL A FIBONACCI PRICE CLUSTER BECOME IMPORTANT?

We have shown you the three Fibonacci ratio techniques for projecting individual prices and price clusters that may become predictive, or at least relevant, in determining a change in trend or a congestion zone. Once you start loading your chart with retracements, expansions, and parallel projections from one two or three degrees it is easy enough to imagine that you will have a chart littered with so much data that you will have little information.

The question arises then "How do I know which Fibonacci clusters may become important in the future?" There is nothing inherent in Fibonacci analysis itself to provide an answer. Experience with a particular ticker may provide enough background information to know which Fibonacci ratios have been important for that ticker in the past, and which may continue to be important in the future.

You may also combine your Fibonacci analysis with another, independent technique or method to identify coincidences of pattern price and time from both your independent method and your Fibonacci analysis. We provided information on three such independent methods, and tell you how to immediately implement a fourth method, which is both elegant in its simplicity, and which has been shown to have predictive value.

ELLIOTT WAVE

The Elliott Wave and Fibonacci analysis are joined in at the hip. In its broadest terms, the Elliott wave describes the mathematical progression and decay that occurs constantly in publicly traded financial markets. A bull market subdivides into five waves, and a bear market subdivides into three waves. This highest order 5/3 relationship = .600 ratio. Each wave of a bull market itself divides into a 5/3 relationship and each of those five waves further divides into a smaller scale 5/3 relationship. An idealized bull market would consist of 89 bullish waves and 55 bearish waves, a 55/89 relationship, which equals .618. The Golden Ratio.

Even if you have no present desire to implement Elliott Wave analysis in your trading we recommend that you take the [Elliott Wave Tutorial](#) at Elliott Wave International. It's free to Club EWI members and there is no cost to join Club EWI. Three of the ten lessons are devoted to Fibonacci and the Golden Ratio and each is explained with the breadth and depth for which Robert Prechter and his staff are known world over. Highly recommended.

The Appendix contains trading guidelines for combining Fibonacci and Elliott Wave analysis.

J.M. HURST CYCLE TRADING METHOD

J.M. Hurst was an aerospace engineer who in 1970 applied his engineering wizardry to trading the stock market. His book was not for the mathematically challenged but he did provide a kernel of knowledge that will allow anybody with rudimentary spreadsheet skills or access to many of the generalized trading programs to make consistent and reliable price and time forecasts. The description of the method is proprietary to

Tradingfives and we offer it in our book *J.M. Hurst Cycle Trading without the Rocket Math*, which is available on the [Tradingfives website](http://Tradingfives.com).

Chart 20 is a Daily MSFT chart overlaid with our Hurst cycle trading method. The yellow circle is a price and time forecast made in early July, 2005. The relevance of this particular forecast will become apparent in a few paragraphs.

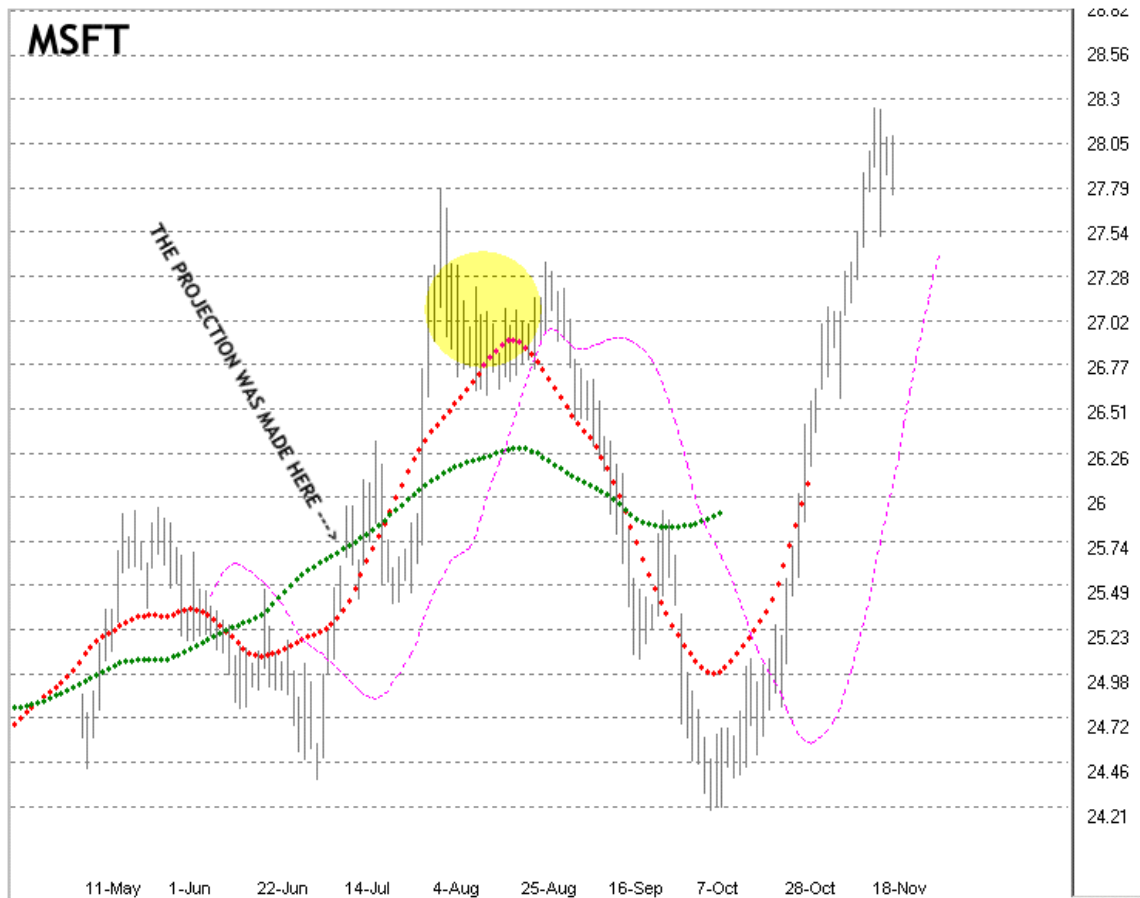


Chart 21

ROADMAP CHARTS

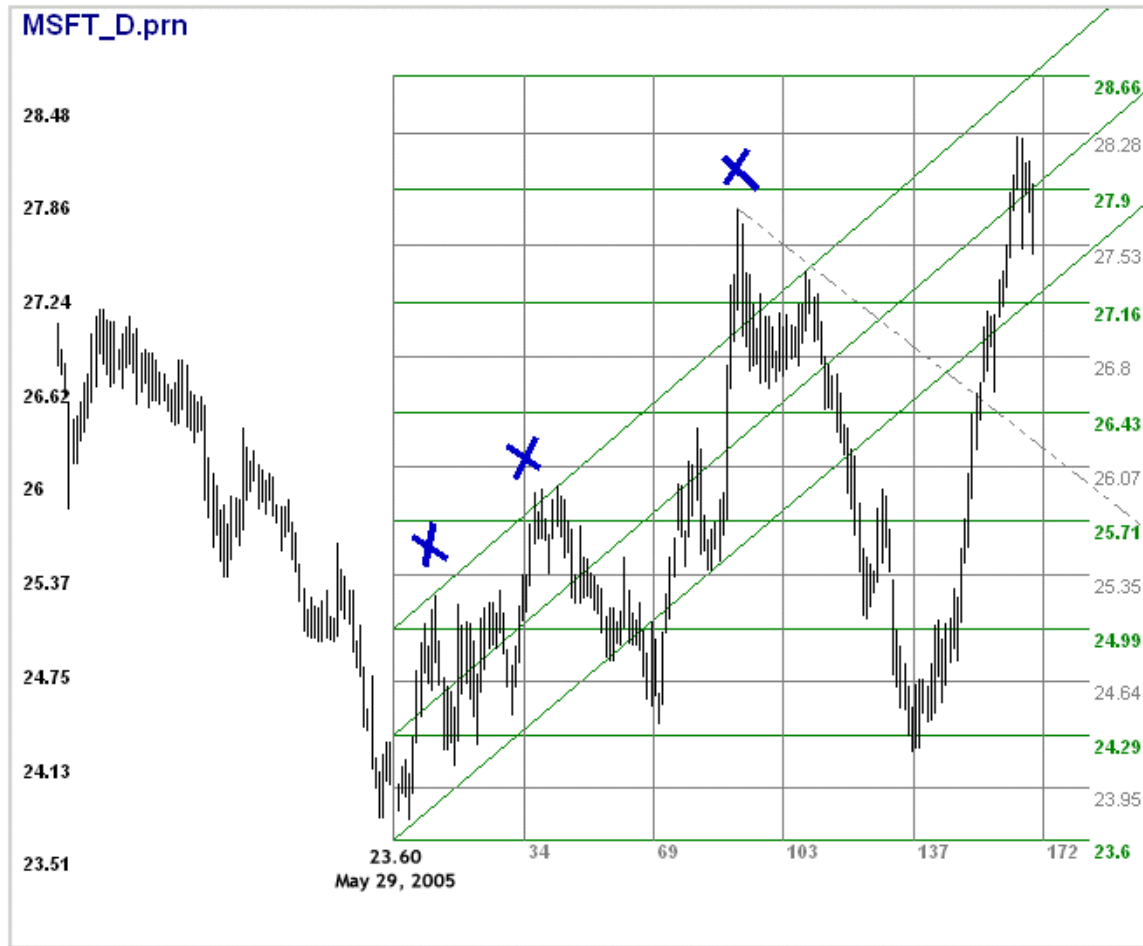


Chart 22

Roadmap Charts are another Tradingfives creation. They resulted from our search for a way to make W.D. Gann's Square of Nine useable. Roadmap Charts are unique in that the trading channels are drawn immediately after a suspected pivot high or low has occurred. Often on the same day. In many cases the trading channels will contain and precisely define a trend for weeks or months. Volatile tickers, like MSFT in the example in *Chart 21*, will sporadically run out of the channels. One of the implementing guidelines of Roadmap Charts is that the trend is likely to continue without any significant pullbacks in the direction of the channel until price hits the opposite channel boundary. That happened three times ("X" marks the spot) in the MSFT chart. Fibonacci clusters that occur at channel boundaries are likely to become more significant. Roadmap Charts are more complete graphical application of the next method.

THE FOURTH METHOD - SQUARE ROOTS

The Square Root Theory holds that stock and other publicly traded instrument prices move over the long and short term in a square root relationship to prior highs and lows. In the 1950s, William Dunnigan developed two stock trading systems called the Thrust method and the One-Way Formula. Both methods had several advantageous entry

techniques, but each lacked a reliable exit technique. Dunnigan unearthed the Square Root Theory and applied it to his systems which became highly acclaimed for their effectiveness. He went so far as to call square roots, the "Golden Key" and received recognition from some economics and statistical trade journals of the era. Norman Fosback republicized. the theory in a 1976 trading letter called Stock Market Logic. The founder of the Templeton mutual fund family disclosed that one of his 22 principles for start market investing was that stock-price fluctuations are proportional to the square root of prior prices.

Long before any of these stock market researchers, probably starting in the early 1900's W.D. Gann was using square roots as the cornerstone of his still unduplicated stock and commodities price forecasts. Gann used an ennegram, a diagram of numbers constructed in such a way to show square and square root relationships. Gann's ennegram is what has come to be known as the Square of Nine from the Greek root "enneas" which relates to the number nine. The Square of Nine method is more complex than calculating squares and square roots but they are an important part.

What does this have to do with Fibonacci ratios? Here is the MSFT chart again with only square root information added to it.

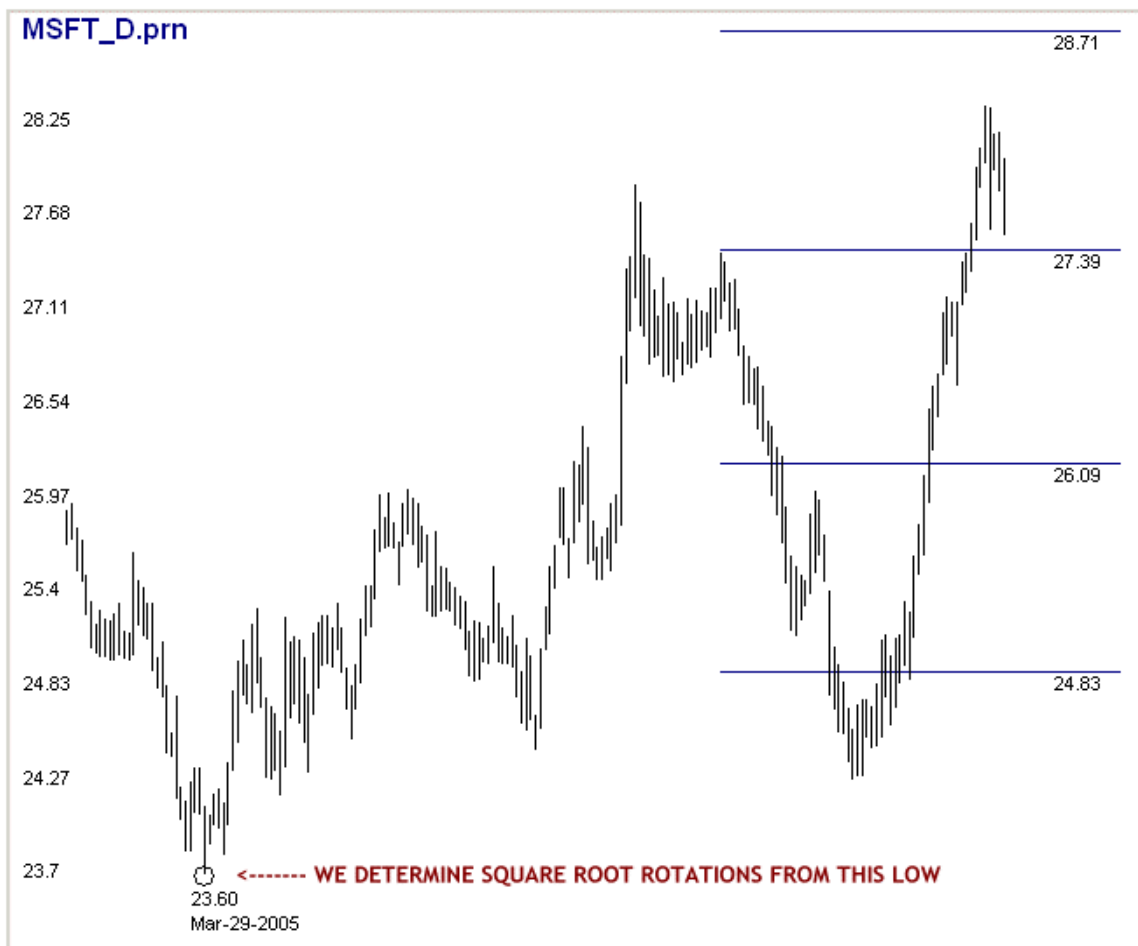


Chart 23

The square root information, which could have been determined with precision as early as the close of trading on May 29, the date of the low, immediately gives us specific reference points for our Fibonacci analysis. The Fibonacci clusters we got in *Charts 16 and 17* around the 27-28 price area now have some meat on their bones. We are no longer shooting in the dark and can know, with a high degree of reliability, very early in the new swing, which Fibonacci ratios and Fibonacci price clusters deserve the most attention.

Here is a review of a few of the most recent charts we've used as demonstrations of the various Fibonacci techniques with just the square root information added.

Compare with US Bonds Charts 19 and 20

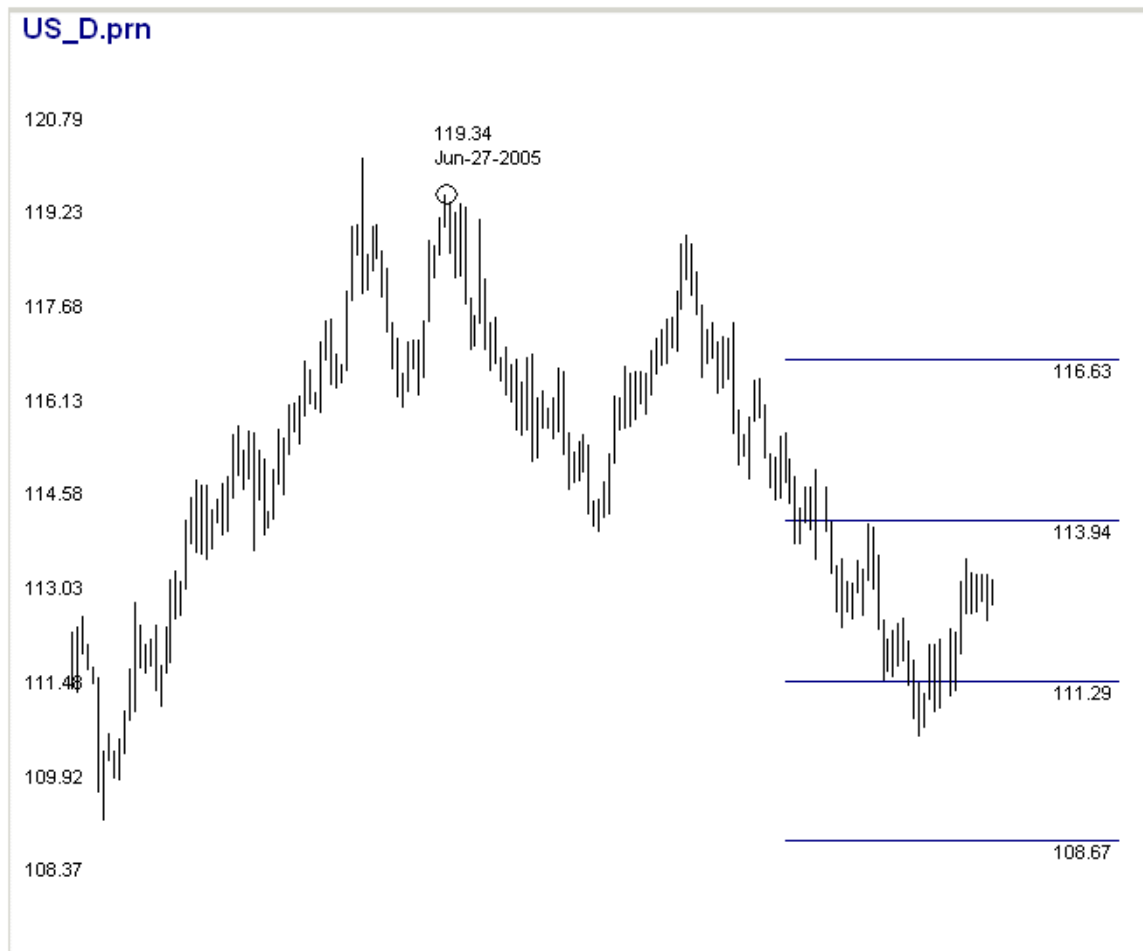


Chart 24

Compare with Soybeans Charts 12 and 13

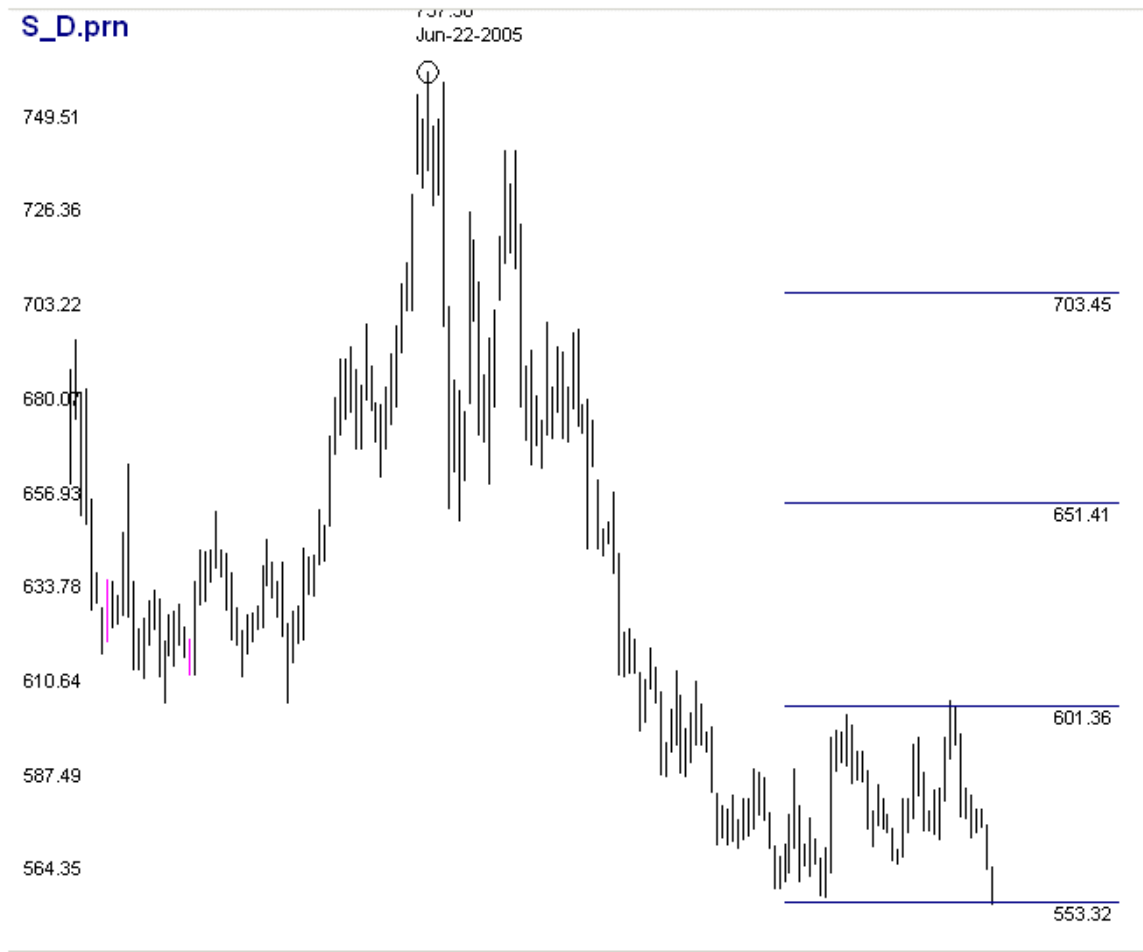


Chart 25

Compare with Palladium Charts 14 and 15

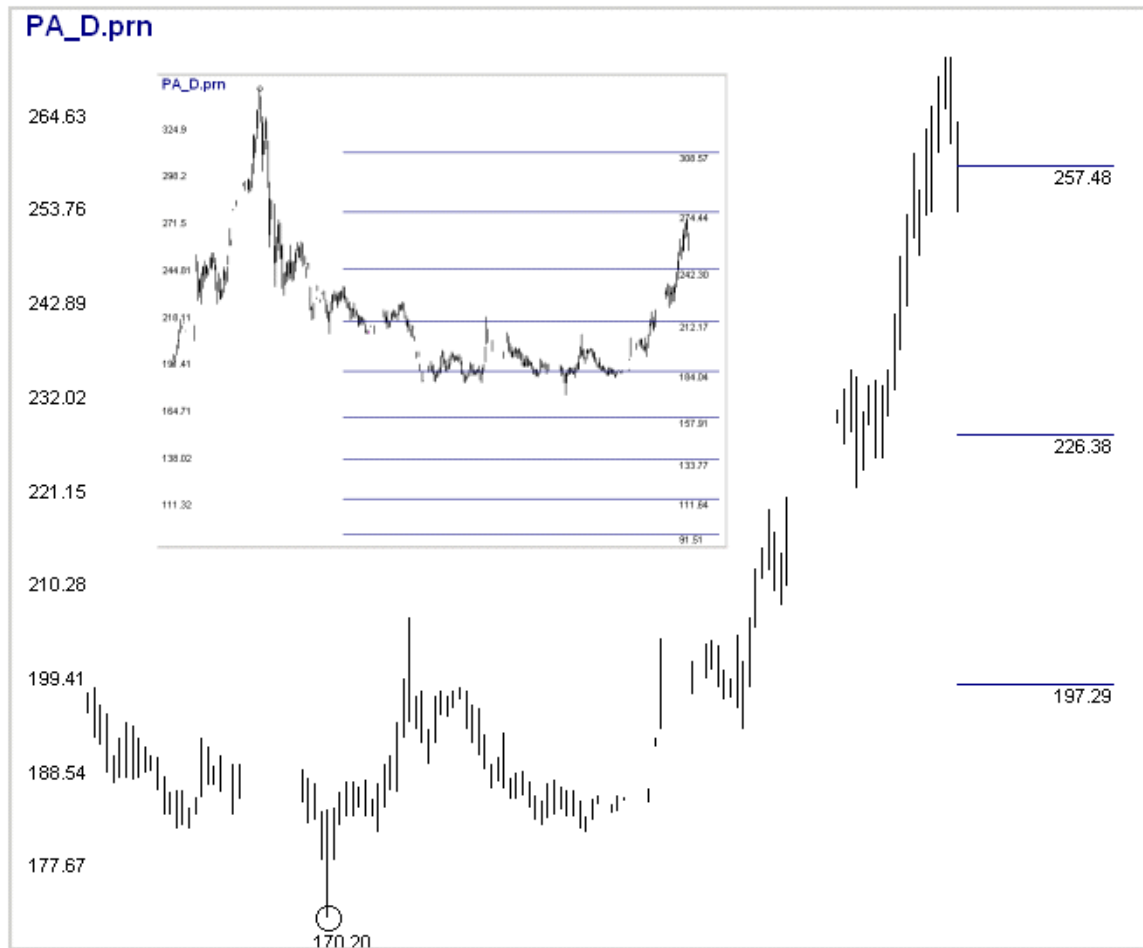


Chart 26

HOW TO DO THE MATH

Implementation of the Square Root Theory is straightforward. You calculate the square root of a high or low pivot price, subtract from or add to that square root calculation, and square the result. Plot that result on your chart. It's fairly intuitive.

What may not be so intuitive, however, is the exact amount you use for the addition or subtraction. Without going into a lengthy explanation of the reasons why, the most frequent amounts you will use for these additions and subtractions are: **2**, **1**, **.500**, **.250** and **.125**. The guideline is to use the largest number that will produce visible results on your chart.

If you want to know more about why these particular numbers are commonly used visit our website at www.tradingfives.com and follow the links *Roadmap Charts* and *The Square Root Theory*.

Bullish Example

We'll use the MSFT chart again for the bullish example. The May 29, 2005 low at **23.60** was a major pivot point so we can assume that square root relationships to that low are likely to become more significant than more minor swing highs or lows. The square root of 23.60 = 4.857

Add .125 to 4.857 = 4.982. Square the result = **24.83**.

Add (2 * .125) to 4.857 = 5.107. Square the result = **26.08**.

Add (3 * .125) to 4.857 = 5.232. Square the result = **27.37**.

Add (4 * .125) to 4.857 = 5.357. Square the result = **28.70**.

Bearish Example

Bonds made a major high at **119.34** on June 27, 2005. The square root of 119.34 = 10.924.

Subtract .125 from 10.924 = 10.799. Square the result = **116.62**.

Subtract (2 * .125) from 10.924 = 10.674. Square the result = **113.93**.

Subtract (3 * .125) from 10.924 = 10.549. Square the result = **111.28**.

Subtract (4 * .125) from 10.924 = 10.424. Square the result = **108.66**.

It so happens that both these examples responded well to using .125 as the active number. Generally, the higher priced the ticker the larger the active number will be, and *vice versa*. Very low priced tickers like Eurodollars with a natural price sometimes under \$1.00 respond better to very small divisions of 1.00 like .0625 or .03125. The current volatility of the ticker also plays a role in determining the active number. The calculations are so quickly and easily done that just a few minutes of experimentation with your favorite tickers should be sufficient to achieve useful results.

FIBONACCI TIME PROJECTIONS

You have seen many examples of how Fibonacci ratios can be used to forecast individual price highs and lows, and more importantly clusters of prices. Fibonacci ratios can also be used to successfully forecast time. The procedure is very similar to that used in the price projection techniques.

Fibonacci Time Retracements

Time retracements are conceptually similar to internal price retracements. We measure the time that has elapsed between the extremes of a single swing (low-to-high or high-to-low), proportion that time measurement with a Fibonacci ratio less than 1.00, and project the result forward in time from the most recent in time bar in the measured swing.

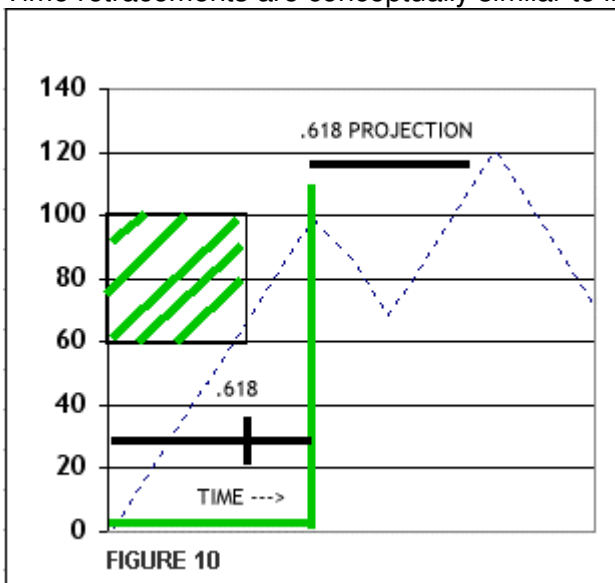


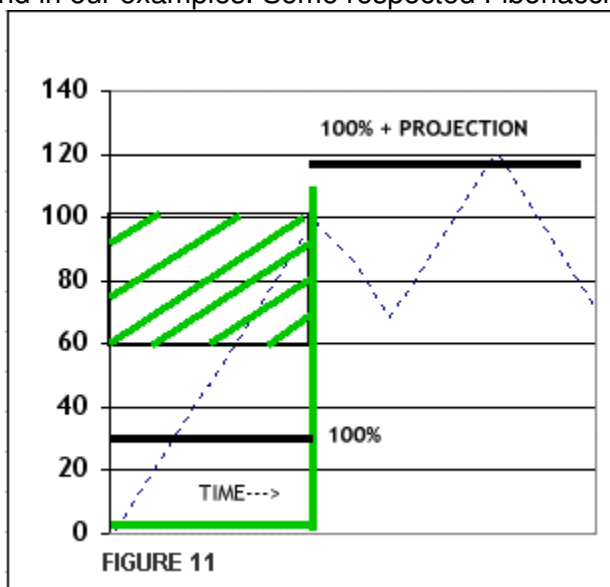
Figure 10 displays the concept. In the illustration we use the .618 Fibonacci ratio to measure the time of the 0-100 swing. The projection is made from the bar at the swing high at 100.

The most reliable time retracement ratios are **.500** and **.618**. The **.382** ratio is also reliable when used to measure the longer swings.

We use trading days in the illustrations and in our examples. Some respected Fibonacci analysts prefer calendar days. Fact is, the difference between Fibonacci time projections using calendar days and Fibonacci time projections using trading days seldom differ by more than 1,2 or 3 days depending on the duration of the measured swing. The reason for the less than expected difference is that calendar day projections take the outside lane by counting weekends and holidays. Trading day projections take the faster inside lane and arrive at the finish line (a specific bar on the chart) at about the same time.

Fibonacci Time Expansions

Time expansions are procedurally identical to time retracements. The difference is that in time expansions the measured swing is proportioned with a Fibonacci ratio of 1.00 or



greater. The forward projection is made from the same location, the most recent bar in the measured swing. Figure 10 displays that difference.

The most reliable time expansion ratios are considered to be **1.00** and **1.618**. The ratios **2.00** and **2.618** are also useful. For your own trading use terms like the "most reliable" and "useful" only as a starting point. There are thousands and thousands of individual tickers bought and sold on dozens of local, national, and international exchanges. Your favorite tickers may very well display personalities radically different from the usual examples. If .786 or 1.272, for example, has been a reliable time forecaster in previous swings then keep using it.

1.618 Time Expansion in the S&P Daily

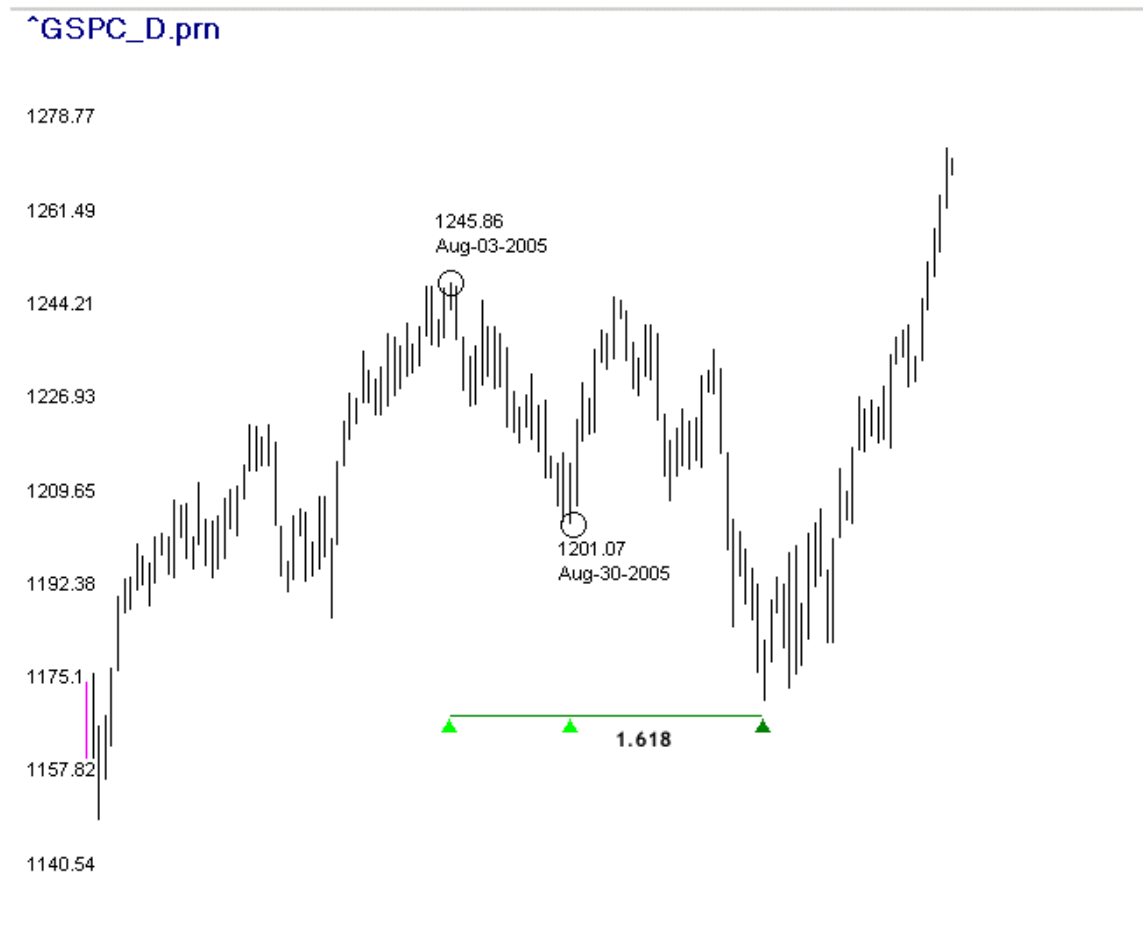


Chart 27

The duration of the August 3 - August 30 bear swing proportioned by the Fibonacci ratio of 1.618 was smack on the October 13 low that launched a powerful bull move.

Internal Time Retracements in the US Dollar Index

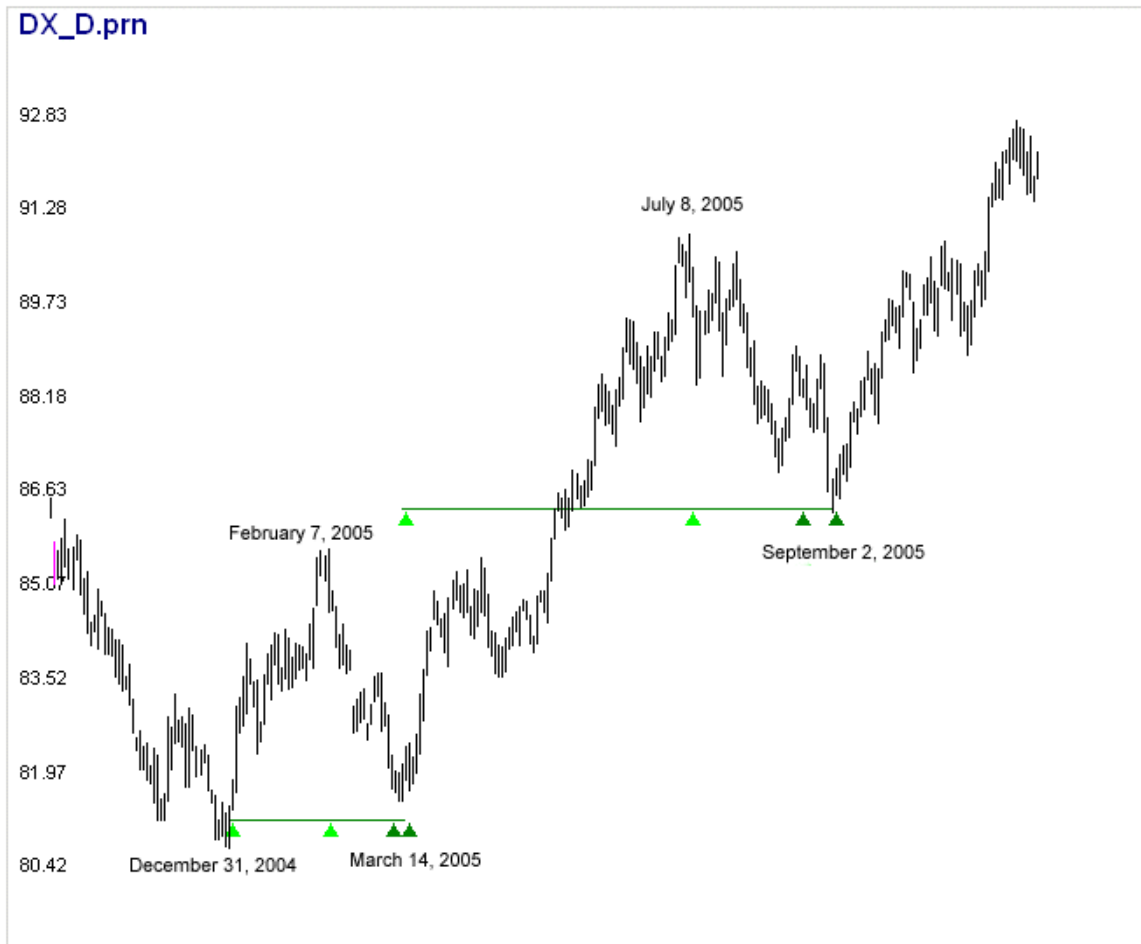


Chart 28

Multiple Time Retracements in Natural Gas

.XNG_D.prn

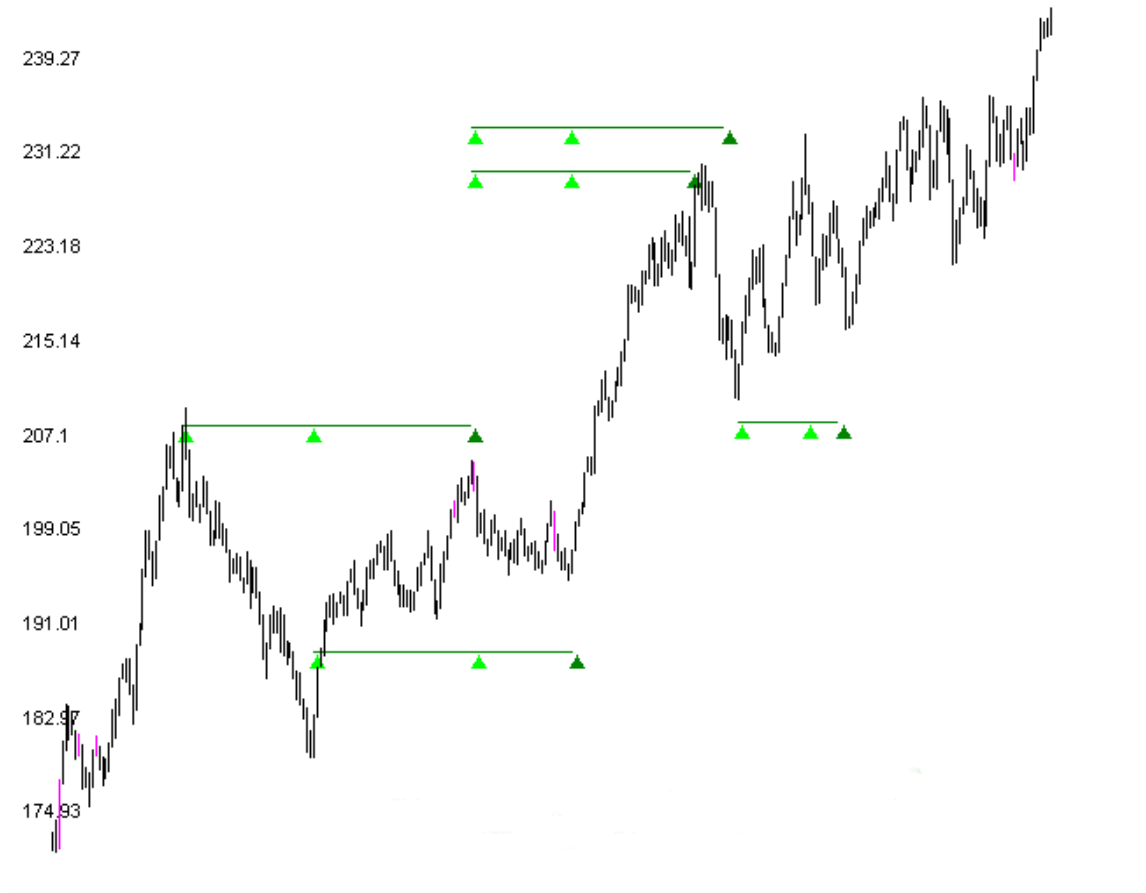


Chart 29

PARALLEL TIME PROJECTIONS (I & II)

We will use the actual Nikkei chart to illustrate the two techniques related to Parallel Time Projections. Time Retracements and Expansions are measured on a single swing, how-to-low or low-to-high. If you were using our training software a Time Retracement or Expansion would take only two mouse clicks. A Parallel Time Projection, just like a Parallel Price Projection, always takes three mouse clicks.

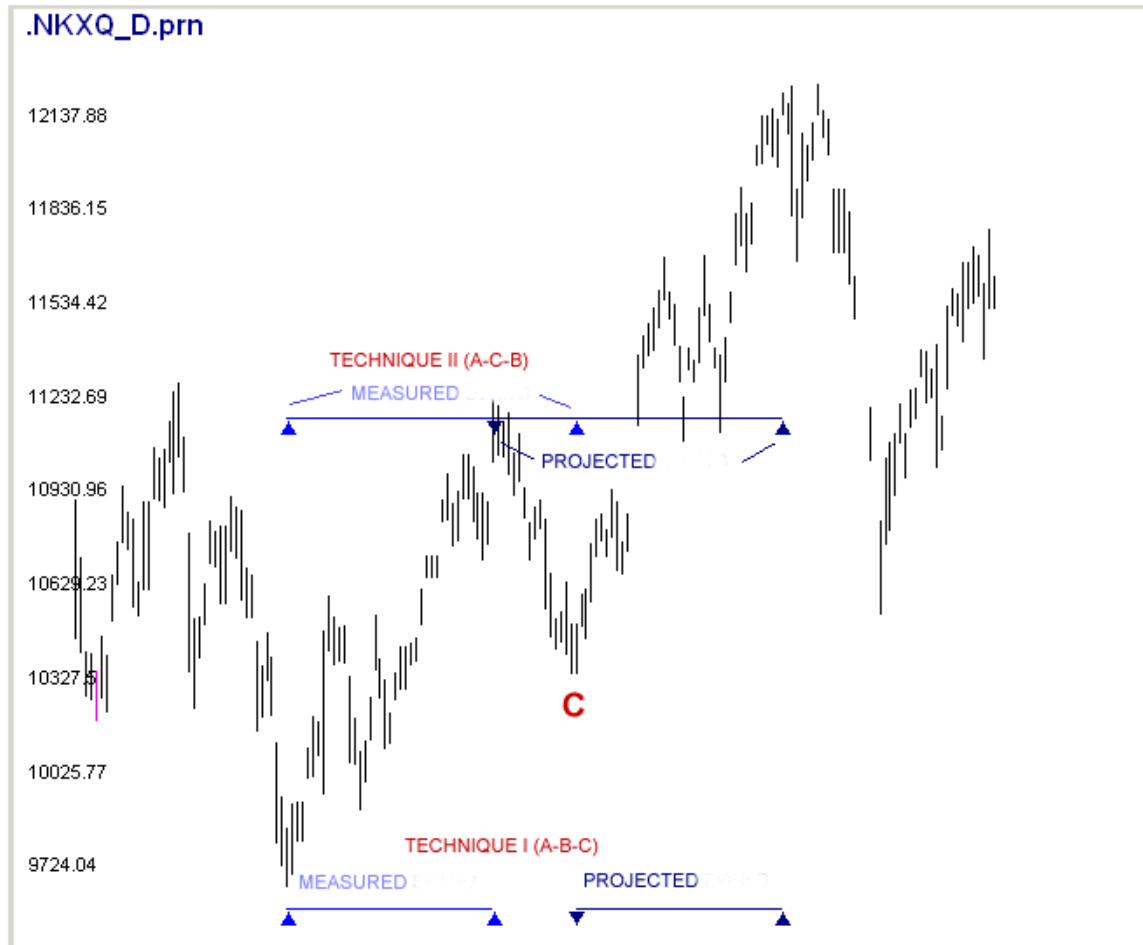


Chart 30

The three click locations in *Chart 30* are labeled **A-B-C**. We will use the click locations to differentiate between Technique I and Technique II.

Technique I

Technique I mimics a Parallel Price Projection. The **A-B** swing is measured and projected (after being proportioned by a Fibonacci ratio) from point **C**. For clarity the measured points are marked with lighter blue triangles and the projected points marked with dark blue triangles. An upside down dark blue triangle symbol is located at the start of the projection.

Technique II

For Technique II points A-C are measured and projected from point B. If we have a favorite Fibonacci time projection it would be Technique II.

Technique II in the S&P Daily

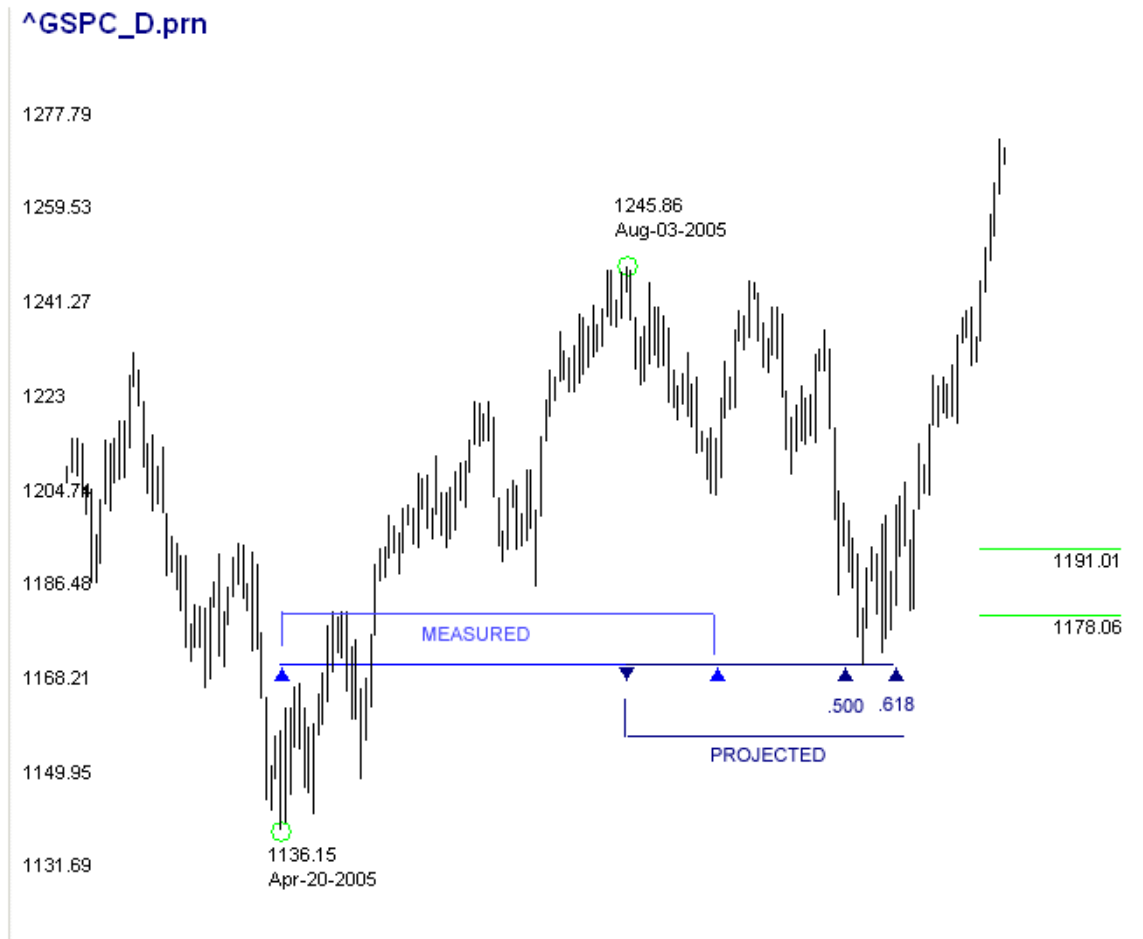


Chart 31

Techniques I & II in CSCO Daily

CSCO_D.prn

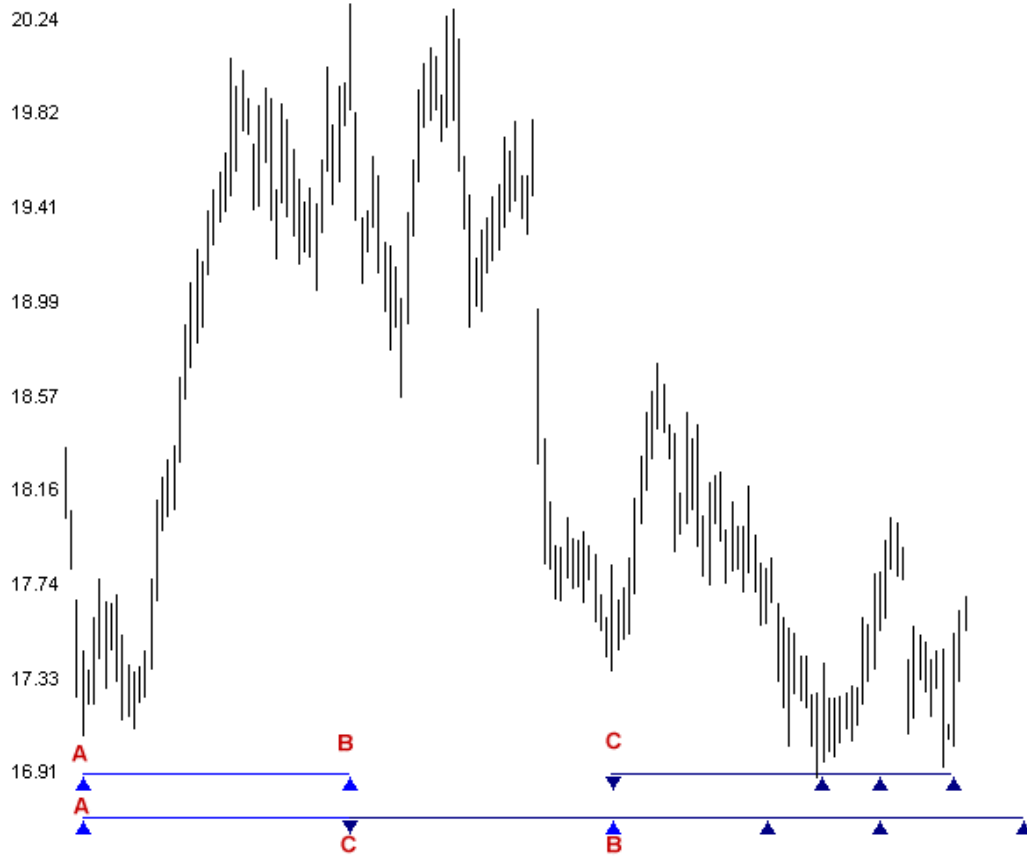


Chart 32

Chart 32 is legended with the A-B-C click sequence to show the difference between the applications of the two Parallel Price Projection techniques. As a practical matter the way the techniques are used together in the CSCO chart should be the norm.

Technique II in the FTSE Daily

FFI_D.prn

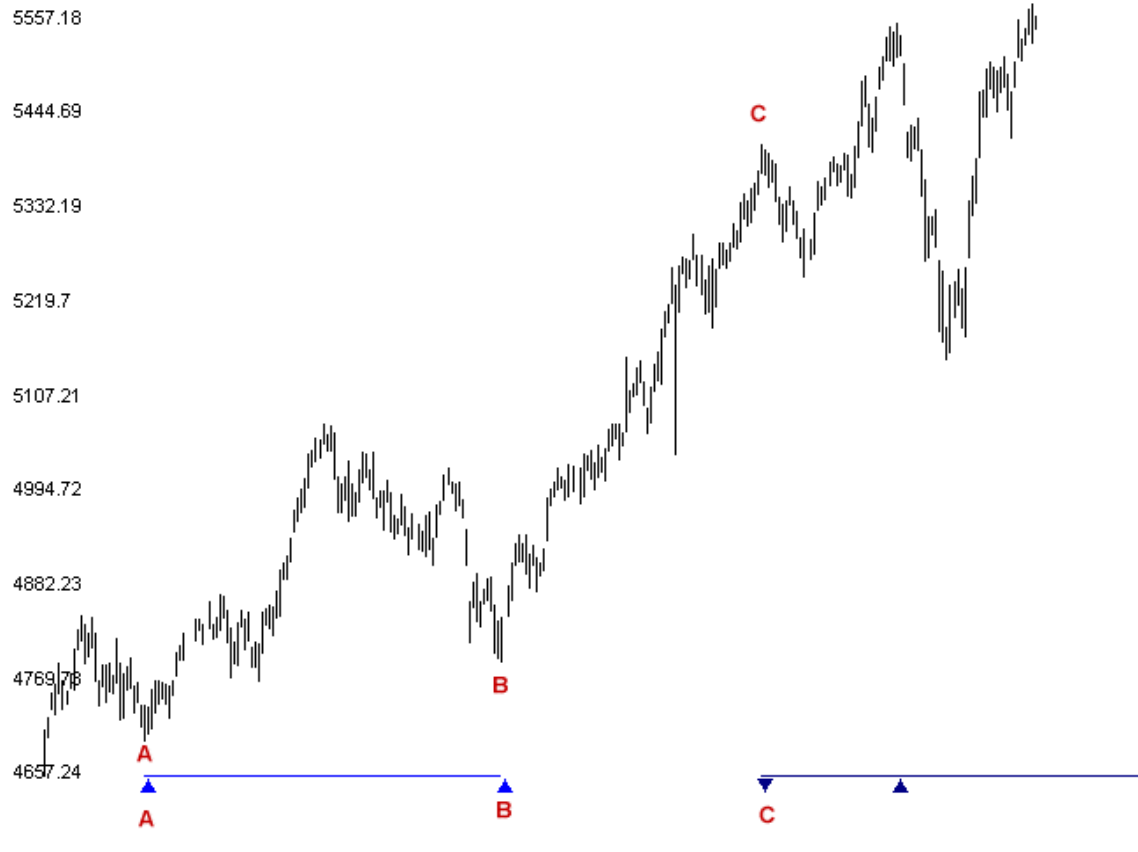


Chart 33

To spice things up a bit the **C** click in a Technique II projection doesn't have to be related in any way to the **A-B** swing or even adjacent to it. In *Chart 33* the **C** click is separated from the **B** click by almost four months of daily trading yet was smack on in forecasting the high that occurred two months after that.

Time Projection Summary

Fibonacci Time Projections should be clustered in projections of one two and three degrees using Retracements, Expansions and Parallel Techniques I and II. The most reliable Time Projections will occur when a time projection converges with a Fibonacci price cluster which has itself been focused with the Square Root Focuser.

The Square Root Theory also has some applicability to focusing Fibonacci Time Projections. It can be more complicated to implement as natural prices must often be converted by multiples of 10 before it can be applied. The square root of a natural price of 1.21, like in Eurodollars for example, will not be useful without the conversion. This technique does not have the across-the-board reliability as it does with square root price

calculations although you will find that certain time frames converge very well with certain tickers. We have not included this time feature in the initial version of the training software although it may be implemented in later versions.

You can review the Roadmap Chart references on the www.tradingfives.com website for more information about how the Square Root Theory is applied to time.

APPENDIX

FIBONACCI AND THE ELLIOTT WAVE TRADING GUIDELINES

When do you enter the trade? How do you determine reasonable and objective stop-loss levels upon entry and as the trade progresses? The table describes the trading signals that can be objectively determined by blending Fibonacci and Elliott Wave analysis.

SIGNAL	CONDITIONS	IMPLICATIONS
Reversal Alert Aggressive Trade Entry	A coincidence of pattern, price and time has come together to mark a suspected major pivot that we have identified as the 5 th of a 5 th wave. The trend is about to change.	The suspected high or low tick at a major pivot point is the ideal entry point. This entry has the least capital risk because it is closest to the initial stop loss point - the pivot. The trade off is that there will be a higher percentage of losses. The market does not always reverse where we want it to! The pivot point is Wave Zero.
Wave 1 Alert	Wave 1 is the first swing in the new trend from the pivot. We can identify five wave of smaller degree. Wave 1 almost always overbalances prior countertrend swings of the same degree in price and time.	This an alert signal only. No action taken. We use the extreme of Wave 1 to project price and time targets for a Wave 2 entry. What we suspect is Wave 1 of a new trend can be the first wave in a correction. Three swing patterns occur frequently. Very often the third swing relates to the first by a multiple of .62 to 1.00. That often makes the third swing tradable even when the first swing's final status as an A wave or Wave 1 of a new trend is in doubt.
Wave 2 Entry	The second swing must not exceed Wave Zero. You can identify three waves of lesser degree.	A Wave 2 entry is positioned for the upcoming Wave 3 or Wave C and what is usually the

Wave 2 has retraced at least 50% but not more than 79% in price of Wave 1.

most profitable leg of the trade. Maximum stop loss point is Wave Zero.

Wave 2 is usually >50% and <162% in time of Wave 1.

Wave 3 Potential

Wave 3 has exceeded the level where $W.3 = W.1$. The price distance traveled by Wave 3 is greater than the price distance traveled by Wave 1

Maximum stop loss levels can be raised to the extreme of Wave 2. The assumption is that once Wave 3 exceeds the distance traveled of Wave 1 that the new trend is confirmed. If Wave 3 has completed five waves of smaller degree and has not exceeded this level then there is a strong possibility that this potential Wave 3 is a Wave C and not an impulse wave in a new trend

Cleared Death Zone

The new swing has exceeded the .786 retracement level of the entire length of the last countertrend swing of the same degree.

The Death Zone is the 62%-79% retracement zone of the entire last countertrend swing. If, despite appearances, the new swing from Wave Zero is not impulsive in the direction of a new trend, the Death Zone is the most likely area where the new swing will get killed.

Wave 3 Extension

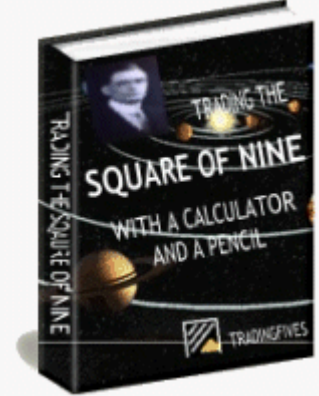
Wave 3 has exceed Wave 1 in price distance by 162% .

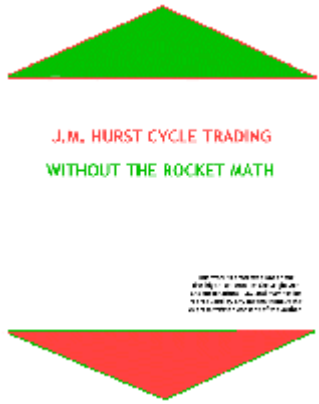
Trail stop loss point closer to the market. No more than 2-3 trailing high or low.

Wave 3 is commonly 162%-262 of Wave 1 and it is in the exhaustion stage where it could come to an unexpected end.

<p>Wave 3 Reversal Alert</p> <p>Trade Exit</p>	<p>Wave 3 has completed at least five waves of lesser degree and is within a Fibonacci price and time cluster.</p>	<p>Wave 3 almost always exceeds Wave 1 in time and often equals Wave 1 and Wave 2 combined in time.</p> <p>Trailing stop loss point should be moved very close to the market. No more than 1 or 2 bar trailing stop.</p>
<p>Wave 4 Entry</p>	<p>Wave 4 has not violated the price territory of Wave 1. Usually Wave 4 will retrace >38% of Wave 3. Wave 4 alternates in pattern with Wave 2. Wave 4 is in a Fibonacci price and time Zone. Wave 4 is not overbalanced in time to previous waves of the same degree. Wave 4 has retraced at least 62% of the price range of Wave 2.</p>	<p>The initial stop loss for the upcoming Wave 5 trade is the extreme of Wave 1. Wave 4s are often complex and the most frequent home of triangles and the dreaded "X" wave. <u>Do not be overanxious to take a Wave 5 trade if Wave 4 has retraced more than 50% of Wave 3</u> or if it is so overbalanced in time that it exceeds the time consumed in any correction of one larger degree. On the other hand, if Wave 3 is easily identifiable as such and Wave 4 has retraced 38% or less of Wave 3 in a simple A-B-C, then new Wave 5 highs are very probable.</p>
<p>Wave 5 Reversal</p> <p>Trade Exit</p>	<p>Wave 5 has completed at least five waves of lesser degree and is in a Fibonacci price and time cluster.</p>	<p>When the extreme of Wave 3 is exceeded the maximum stop loss should be raised to the Wave 4 extreme.</p> <p>Wave 5 extremes seldom exceed the 424% expansion of Wave 1. If Wave 4 had exceed >50% retracement of Wave 3, the possibility of a 5th wave failure is increased.</p>

OTHER TRADINGFIVES PUBLICATIONS

	<p>Trading the Square of Nine with a Pencil and a Calculator</p> <p>The purpose of this work is to explain concisely and in detail simple mathematical and graphical techniques for applying WD Gann's Square of Nine to real world stock, stock option, and forex trading situations. The Square of Nine is not your usual method of technical analysis. It's like nothing you've ever seen. A completely unrelated technique that either confirms or contradicts your usual methods can be invaluable when making decisions. The Square of Nine may not be the magic bullet, although it can sure seem like it at times. Free training software is available.</p>
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	<p>J.M. Hurst Cycle Trading without the Rocket Math</p> <p>This ebook shows you everything you need to know to apply our modification of J.M. Hurst's displaced moving average technique to consistently and reliably project price and time turning points in the financial markets. We consider this booklet a perfect complement to the Square of Nine and Fibonacci techniques because each method provides unique price and time projections by completely independent methods. Free training software.</p>
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TradingFives has a strict Privacy and Anti-Spam Policy. We will not send you any notifications of updates or revisions unless you have specifically given us permission to do so. You can do that by providing your email address in the form located at www.tradingfives.com, or you can send a blank email message to our list manager tradingfives@aweber.com.

TRAINING SOFTWARE INFORMATION

HISTORICAL DATA COLLECTION

Hourly data is readily available from a number of on-line sources. www.quote.com has a \$9.95/month service with a feature to export several intraday time frames to Excel where they can be saved in ASCII format.

You can also get 5 minute interval stock files at moneycentral.msn.com for free. You will need a MSN Passport, which is also free. You have to download manually and jump through a few hoops in Excel to get the msn data in useable condition, but it is available.

EOD data collection is a strong point of AnalyzerXL which easily collects free stock, index, mutual fund and futures data from exchanges across the world. Data collection is only one module in AnalyzerXL which can better be described as a trader's tool in an Excel environment. Other modules include charting with 146 built-in indicator and expert system macros, real time quotes, and option data collection. You can download a 30 day free trial of AnalyzerXL at the TradingFives website at this URL:

<http://www.tradingfives.com/analyzerxl.htm>

REQUIRED DATA FORMAT FOR THE TRAINING SOFTWARE

The number one problem users have with our training software is data formatting. The training software uses only ASCII data files. Most data collection software has an export function that allows the user to convert the software's proprietary format into ASCII.

The required ASCII format for the training software is as follows:

DATE	TIME	OPEN	HIGH	LOW	CLOSE	VOLUME (optional but not used)
mm/dd/yyyy	hhmm					

Every data file needs a time field even if End of Day. Use 1600 for EOD data if the time field has to be manually inserted.

The data delimiter can be a comma, space or tab. The software would prefer to see a comma delimiter, which has been the standard since the first main frames, but spaces and tabs will also work.

With the exception of .prn, which is reserved for AnalyzerXL exports, there is no limitation on the name of the file extension. .txt, .asc, .dat, and any other combination (with the exception of .prn) will work equally as well.

Yahoo Finance

You can download and use 'as is' historical price downloads from <http://finance.yahoo.com>. The training software will fill in the required time field with 16:00. There is a quirk (at least as of this date). When presented on the Yahoo site with the choice to "Open" or "Save" the historical data, always choose "Open." This causes the data to open in your spreadsheet. You can rename the file and save it to your ASCII data directory from there.

Do not sort by dates in the spreadsheet. The training software will automatically reverse the native sorting and if you do it yourself it will do it again - wrong.

AnalyzerXL

We use AnalyzerXL for all our EOD stock, index, mutual fund and futures data. The file extension .prn is reserved exclusively for this exact set-up. AnalyzerXL has an automatic export macro which makes data collection very easy indeed. Here's a screenshot of the AnalyzerXL data collection set-up. It is difficult to read at normal viewing size but still conveys the simplicity of the procedure. The data format for AnalyzerXL exports is different from regular ASCII but that exception is handled automatically by the .prn extension.

	A	B	C	D	E	F	G	H	I	J	K
1	Ticker	Start Date	End Date	Periodicity	Data Direction	Data Location	Data Beginning	Data Source	Data Fields	Autorun Macro	Last Status Message
2	Defaults	28.03.2003	22.12.2005	Daily	FTB	AUTO	A1	Prin	DTOHLCL	ExportData("Metastock","C:\Exported Data")	

The corollary is that unless your data export is going to look *exactly* like this do not use the .prn file extension.

```
<TICKER>,<PER>,<DTYYYYMMDD>,<TIME>,<OPEN>,<HIGH>,<LOW>,<CLOSE>,<VOL>,<OPENINT>
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^GSPC,D,20030616,000000,988.61,1010.86,988.61,1010.74
^GSPC,D,20030617,000000,1010.74,1015.33,1007.04,1011.66
^GSPC,D,20030618,000000,1011.66,1015.12,1004.61,1010.09
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Filename: fibonacci.doc
Directory: C:\Documents and Settings\M. Peter\My Documents\Fibonacci Book
Template: C:\Documents and Settings\M. Peter\Application
Data\Microsoft\Templates\Normal.dot
Title: INTRODUCTION
Subject:
Author: M. Peter
Keywords:
Comments:
Creation Date: 11/22/2005 12:01:00 PM
Change Number: 391
Last Saved On: 07/08/2006 7:24:00 PM
Last Saved By: M. Peter
Total Editing Time: 5,233 Minutes
Last Printed On: 07/08/2006 7:27:00 PM
As of Last Complete Printing
Number of Pages: 53
Number of Words: 7,774 (approx.)
Number of Characters: 44,312 (approx.)