By measuring alpha and beta using a relatively simple spreadsheet program we can utilize this typically long-term analysis to anticipate shorter-term price breakouts and create strategies to profit from them.

Alpha/beta: Is it the dog or the tail?

BY RON McEWAN

Alpha and beta are two important measures of a security's performance. They relate to the variability of other assets in the portfolio or the index of which the security is a part.

For example, XOM is part of the 30 stocks in the Dow Jones Industrial Index and it also is a component of a number of other indexes, including the S&P 500.

This means the alpha and beta depend on which index we measure the variability of from the individual stock. In other words, alpha and beta for XOM will be different when measured against the two different indexes. This is a simple concept, but it's critical to keep it in mind when you track these important attributes of a security.

Alpha is a measure of a security's performance (relative to the benchmark index or basket) in excess of what beta would predict, or how much of the returns cannot be explained by the underlying index. In statistical terms it can be defined as the intercept of an "ordinary least squares" (OLS) regression applied to our data series. In Microsoft Excel, the built-in function is "=Intercept()".

Beta is a bit different in that it measures the variability of a security's return vs. the total return of the benchmark. It is generally regarded as how much of the return can be attributed to the index. Sometimes it is compared to a measure of volatility. It has at times been mentioned as a measure of the degree a security will move relative to the index.

For example, a security with a beta of 1.5 could be said to move 1.5 times as much as the underlying index. While this is not exactly true, what is important to know is that a security with a Beta of 1.5 will exhibit more volatility than the underlying index through the period being measured.

In Excel, beta can be measured using the built-in function for the slope of the OLS regression, "=SlopeQ".

SHORTER-TERM TOOL

Alpha and beta are commonly used to describe the monthly returns of data relative to a portfolio of securities or a broader index. However, with a little bit of creativity, a tool can be created in Excel that will allow us to apply the two measures to shorter time frames including daily and intraday data.

Most users of Excel regularly use the built-in user functions. For example, you can create a moving average of a data stream with the "=Average()" function. However, some functions do not exist in Excel. Fortunately, it's easy to define custom user functions. This is an advantage for when it is necessary to define more complex or custom mathematical functions such as alpha and beta. The steps are fairly simple and straightforward and are summarized in "Custom creation" (right).

The code for our functions is simple:

```
Alpha function:
Function Alpha (security, market)
  Alpha =Application.Intercept
(security, market)

Beta function:
Function Beta(security, market)
  Beta — Application.Slope
(security, market)
```

These functions can now be applied to any data sequence desired, including

daily and intraday data.

ANALYSIS APPLICATIONS

Alpha and beta functions also can be used in identifying possible breakouts, or the beginning of short-term trading opportunities. Alpha measures returns in excess of beta, so high alpha securities tend to run ahead of the pack. Beta will identify securities that are more (or less) volatile then the benchmark index. In other words, alpha will show which stocks' movement is increasingly independent of the index, and beta will show how much of the return can be attributed the index.

Below are basic rules for using alpha and beta as tools for making better trading decisions. These rules are relatively simple, a trading strategy utilizing them should be thoroughly tested before real trading.

1. To identify bullish stocks, look for increasing changes in alpha with decreasing changes in beta.
2. Stocks with high beta (generally greater then 1.5) will exhibit greater volatility then the index. They tend to overshoot the returns of the index.
3. Stocks with high alpha readings and low beta readings move up faster than the index and possibly identify a breakout or short-term trade.
4. Increasing beta and alpha readings indicate strong moves with equivalent reversals as the increasing beta may be indicating increased volatility.

DOWN IN THE DOW

One application of this tool would be in the stocks of the Dow Jones Industrial Average index, using the index itself as the benchmark. We can apply the alpha/beta functions to the daily and 60-minute intraday data for the 30 DJIA stocks over a period of 15 days (daily) and 100 periods (60 minutes) intraday.

Next, we can rank the results of the alpha calculation from 1 to 30 and sort them into an output page in Excel. In this example, the stock AA ranked No. 1 (highest alpha) and GM ranked No. 30 (lowest alpha). This daily scan used a lookback of 15 days (see "Alpha/beta link," below).

The same techniques as in the alpha scans can be applied to the beta calculations. The rankings from this analysis also are shown in "Alpha/beta link." In this example of the daily scan, INTC ranked No. 1 (highest beta) and PFE ranked No. 30 (lowest beta). This also used a lookback range of 15 days.

We can chart these functions to show exactly what these rankings indicate for the stocks in question.

By plotting the 15 days of ranked results for the highest ranked alpha security (AA) against the ranked results for the beta calculations of AA, we can see the relationship of the changes in the two functions. "Up and down" (page 34) shows a rising alpha and a declining beta. This may be an indication of a stock being moved by something external from what is affecting the overall index.

We also can plot the 15 days for lowest ranked alpha security (GM) against the ranked results for the beta calculations of GM to demonstrate the relationship of these two functions on the data (see "Hanging lower," page 34). Here we have a falling alpha and a rising beta. This may be an indication of a stock falling out of favor by investors and becoming more volatile in its daily returns.

CUSTOM CREATION

Use these steps to create a user-defined function in Excel.

1. Open a new (or existing workbook)
2. Click on the Visual Basic Editor. You can use the shortcut Alt + F11 to do this.
3. When in the VBA Editor, click on Inset > Module to insert a new VBA Module into your workbook.
4. Add the code from the article for the Alpha and Beta functions to the module you have created. You can put both in the same module.
5. Close the VBA Editor (or use the shortcut Alt+Q).

Now when you are back in the spreadsheet you will have two new functions in the Function Dialog dropdown under "User Defined" (shift + F3). One for Alpha and one for Beta. These functions will be applied to the Log changes (Excel Function "=LN()") of your market and security data.

ALPHA/BETA LINK

These tables show the top and bottom stocks of the DJIA as ranked by alpha and beta.

ALPHA

Today > December 6, 2006

Benchmark > ^DJI 12309.25

Top 10		Bottom 10	
1	AA	21	UTX
2	HD	22	DD
3	T	23	GE
4	BA	24	AIG
5	DIS	25	HPQ
6	KO	26	JPM
7	CAT	27	WMT
8	MO	28	PFE
9	MCD	29	INTC
10	XOM	30	GM

Lookback Period > 15

BETA

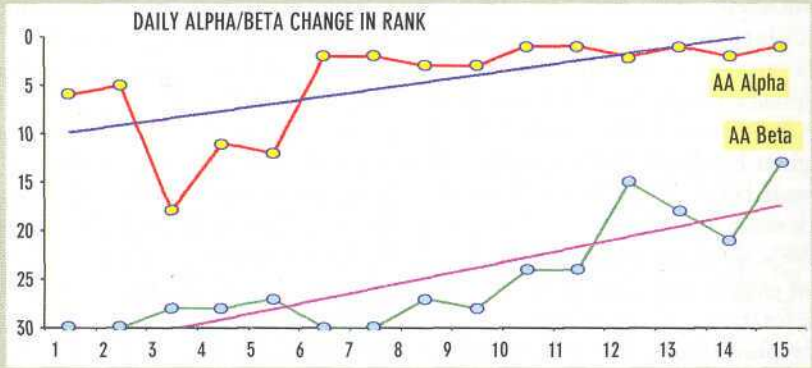
Today > December 6, 2006

Benchmark > ^DJI 12309.25

Top 10		Bottom 10	
1	INTC	21	MO
2	BA	22	VZ
3	IBM	23	DD
4	WMT	24	MSFT
5	MCD	25	GE
6	JPM	26	XOM
7	HPQ	27	T
8	HON	28	JNJ
9	GM	29	HD
10	MRK	30	PFE

UP AND DOWN

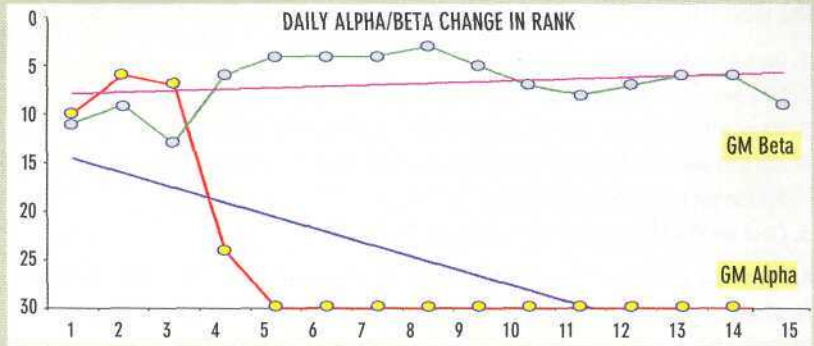
When alpha is rising and beta is falling, it might tell us that a stock index is being affected by something outside the broader influence on the index.



Source: Yahoo Finance

HANGING LOWER

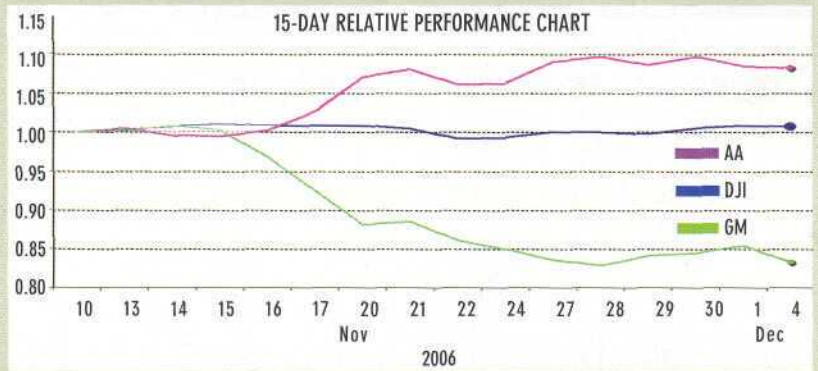
When alpha is falling and beta is rising, investors may be dumping a stock that is becoming more volatile in its daily returns.



Source: Yahoo Finance

DIVERGING FORTUNES

Here we can see how the stocks at each end of the alpha/beta spectrum for our 15-day look back period performed quite differently in terms of market return through that time.



Source: Yahoo Finance

Finally, we can look at a 15-day relative return chart to see how these two stocks, which have demonstrated different alpha/beta relationships to the benchmark index, have performed for their investors (see "Diverging fortunes," below).

INTRADAY EXAMPLES

When ranked on an intraday basis using 60-minute data, the stock KO moves to the top of the alpha rankings, and INTC moves to the bottom. Again, a lookback period of 15 is used (about two days on 60-minute data). For the record, applying the scan to the beta calculations, MRK moves to the top and MSFT drops to the bottom.

Although the charts aren't shown here, we can look at the accompanying values for our top and bottom stocks, ranked by alpha, for a better idea of their position relative to the index.

For KO, we see a rising alpha and a rising beta. This may be an indication of a stock being moved by something external from what is affecting the markets overall return on an intraday basis. The rising beta also may be an indication of increasing volatility.

For INTC, we have a falling alpha and a high, but declining, beta. This may be an indication of a stock falling out of favor by investors and becoming less volatile in its short term returns.

Using the custom Excel user functions for alpha and beta, we can apply them to any time frame, specifically daily and 60-minute data. This can improve a trader's perspective on underlying market dynamics.

Alpha values can be fleeting, however, dropping as quickly as it rises. Because of this, with extreme readings, attempts should be made to determine the root cause of the excess returns.

Equities tend to react as much to each other as to individual fundamentals. Better understanding alpha and beta will help you determine what is driving those moves. 'FM

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Fonte: Futures, v.36, n.4, p. 32-34, 12 Mar. 2007.