Intelligent Stock Monitor

(by SHK Financial Data Ltd.)

Content

1. TECHNICAL ANALYSIS

1.1. CHART

1.1.1. Line Chart

A **Line Chart** is the simplest type of charts. The single line in this type of chart represents the security's closing price in a specified unit of period (e.g. on a daily, weekly or monthly basis). The beauty of this chart is its simplicity.

1.1.2. Bar Chart

A **Bar Chart** displays open, high, low and closing prices of a security in a specified unit of period (e.g. on a daily, weekly or monthly basis). The top and the bottom of each vertical bar represent the highest price and the lowest price that it traded during the period. A "tick" is displayed on the right side of the bar to show the closing price. They are signified by a tick on the left side of the bar if opening prices are available.

1.1.3. Candlestick Chart

Candlesticks are formed by the open, high, low and closing price of a security in a specified unit of period (e.g. on a daily, weekly or monthly basis). Candlestick charts cannot be drawn if no opening prices are available. If the closing price is below the opening price, then a filled candlestick is drawn (displayed as blue in our Java Charting System). On the contrary, if the closing price is above the opening price, then a hollow candlestick is drawn (displayed as white in our Java Charting System). The hollow or filled portion of the candlestick is called the body (or "real body"). The long thin lines above and below the body represent the high/low range of the period, which are usually called shadows (or wicks and tails).

1.2. TECHNICAL DRAWING SKILLS

1.2.1. Golden Ratio (Horizontal Line Analysis)

Fibonacci numbers (sometimes called Golden numbers) was discovered by a mathematician called Leonardo Fibonacci. The Golden numbers are a sequence of numbers in which each successive number equals the sum of the two previous numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 610, 754, etc.

After sequences of calculations, there are constant relationships that can be observed from the series. For example, if you divide the former number by the latter, the approximate value of them comes up with 0.618:

21/34 = 0.617647 ~ 0.618 34/55 = 0.618181 ~ 0.618

55/89 = 0.617977 ~ 0.618 89/144 = 0.618055 ~ 0.618

Furthermore, dividing the latter number by the former number gives another relationship from the sequence. The outcome yields approximately 1.618:

55/34 = 1.617647 ~ 1.618 89/55 = 1.618181 ~ 1.618

144/89 = 1.617977 ~ 1.618

With the use of these magic numbers, a series of horizontal lines can drawn at the Fibonacci levels of 0.0%, 23.6%, 38.2%, 50%, 61.8%, 100%, 161.8%, 261.8%, and 423.6%. In practice, it is more understandable and simple to draw within the range from 0% to 100% (e.g. 0%, 38.2%, 50%, 61.8% and 100%) for analyzing the trend of different stocks/sector indexes/market indexes/forex markets.

Nowadays, investors tend to have consensus that these magic numbers become their useful trading tools in finding the important support and resistance levels. The following examples show some of the typical practice of using golden ratio in the stock market.

As shown from the below Hang Seng Index (HSI) Chart, we had positioned the bottom found (around 6,900pts) in Jan 95 as the starting point and assumed that the HSI peaked in Aug 97 (around 16,800pts).

It could be observed that when the HSI peaked in Aug 97, it quickly retraced back to the 61.8% level of around 13,000pts (i.e. 6,900pts plus 61.8% of the total increased portion from 6,900pts to 16,800pts). Afterwards, HSI rebounded to around 15,000pts, which regained nearly 50% of the previous declined range of (16,800pts - 13,000pts). However, when HSI could not find its support in around 13,000pts, it further fell to find its support near the fibonacci levels, say 50% level and 38.2%. As observed from the above Chart, HSI moved around the 38.2% and 50% retracement levels for several months. However, the extremely negative market sentiment push the HSI further down to the starting point (i.e. around the level of 6,500pts to 7,000pts) in Aug 98.

In the second quarter of 1999, a Head-and-Shoulder bottom was established and the negative market sentiment started to reverse. An attempt was then made to break through the resistance levels (i.e. the previous support levels at around 11,000pts to 12,000pts). This trading pattern both confirmed the coming of the bull market and the magic explaining power of the golden ratio.

In our Java Charting System, you can easily use our interactive ruler, which is embedded with the function of automatically calculating appropriate support and resistance levels using the golden ratio.

You can use this powerful ruler with the following steps:

1. Click for an appropriate button *(i.e. Golden Ratio (Horizontal Line))* shown on the bottom of the left hand side on our Charting System;
2. Left click your mouse to set for your starting point as indicated by the cursor (it may be a major high or a major low);
3. Release the left button when you find the other point on the screen;
4. A clear view of the golden ratio analysis will be shown and if you wish to clear such ruler, just simply right click your mouse.

As shown from the above Chart, after plotting the starting point of the HSI at around 6,500pts and the finish point at around 18,500pts, the ruler can clearly show you that the retracement support level should be around 14,000pts (61.8% level) and 12,500pts (50% level).

1.2.2. Golden Ratio (Fan Line Analysis)

Fibonacci Fan Lines are displayed by drawing a trend line between two extreme points. The drawing methods are very similar to Speed Resistance Lines (SRL). The only difference is that three trend lines (rather than two trend lines in SRL) are drawn from the first extreme point passing through the invisible vertical line at the Fibonacci levels of 38.2%, 50.0%, and 61.8%.

You can plot your charts by simply clicking for an appropriate button *(i.e. "Golden Ratio (Fan Line)")* shown on the bottom of the left hand side on our Java Charting System. The drawing methods are just similar to the Speed Resistance Lines.

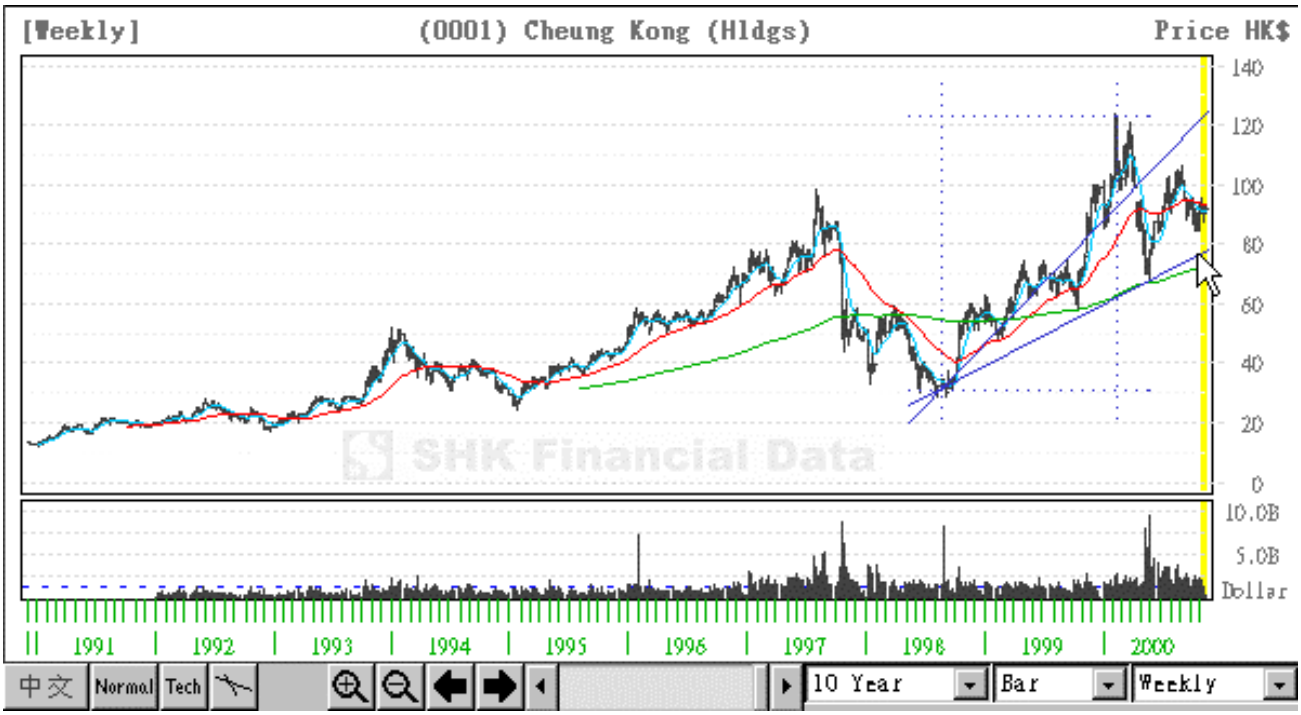
(For more details, please also see the Speed Resistance Lines)

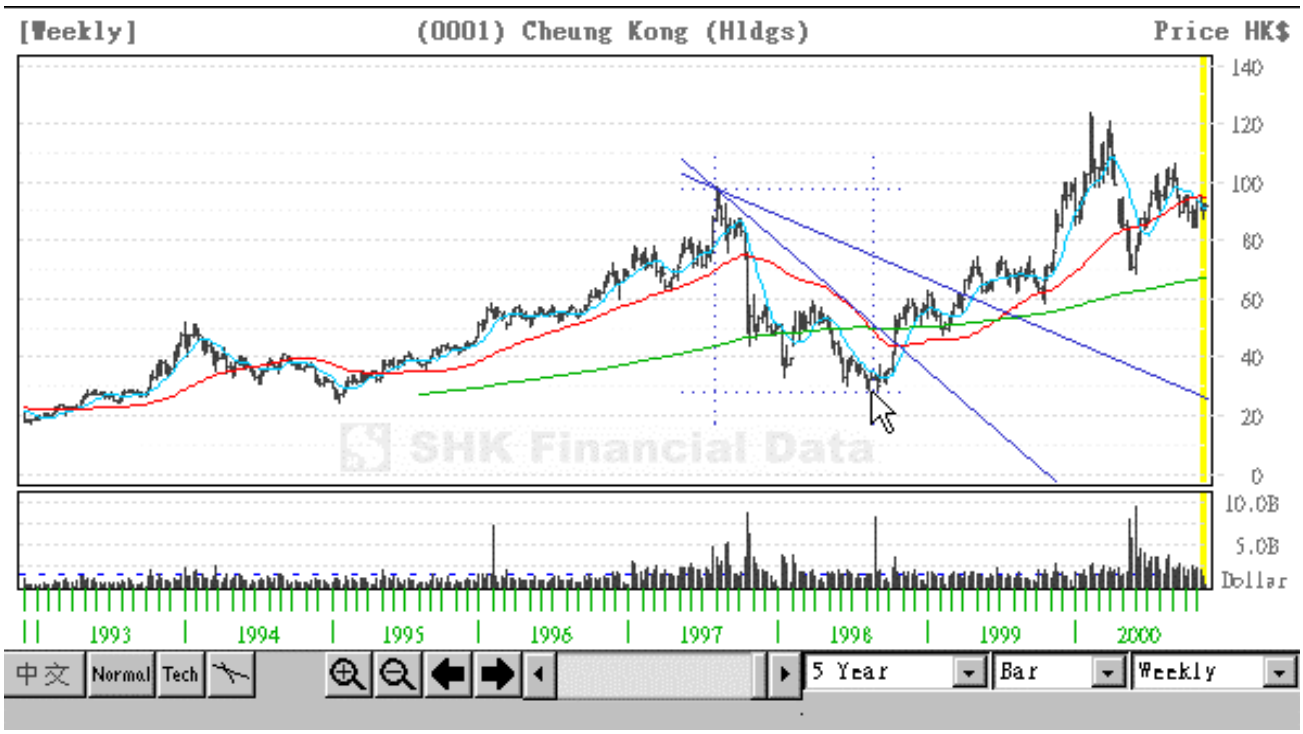
1.2.3. Speed Resistance Lines

Speed Resistance Lines display two trend lines and the slope of each line defines a different rate of change.

Without the help of computerized programme, you should draw the Speed Resistance Lines in the following ways:

1. Draw a line from a major low to a major high *OR from a major high to a major low* (Note: draw from the left hand side to the right hand side);
2. Draw a vertical line on the day the major high occurred (up to the major low level) *OR draw a vertical line on the day the major low occurred (up to the major high level)*; and divide this vertical line into thirds;
3. Draw lines from the major low to intersect the vertical line at the 1/3 and 2/3 levels *OR draw lines from the major high to intersect the vertical line at the 1/3 and 2/3 levels*.





The intuition behind the Speed Resistance Lines is that, when the price is falling, support should be found above the 2/3 line. When prices do fall below the 2/3 line, they should quickly drop to the 1/3 line where they should then again find support. On the contrary, when the price is rising, resistance should be found below the 1/3 line, when it successfully break through this level, the next resistance level should be below the 2/3 line.

With the help of our interactive drawing functions embedded in our Java Charting System, you can easily draw the above Charts in the following ways:

1. Click for an appropriate button (i.e. Speed Resistance Lines) shown on the bottom of the left hand side on our Charting System;
2. Left click your mouse to set for your starting point as indicated by the cursor (it may be a major high or a major low);
3. Release the left button when you find the other point on the screen (major low or major high);
4. A clear view of the Speed Resistance Lines will be shown and if you wish to clear such Fan Lines, just simply right click your mouse.

1.2.4. Support and Resistance Lines

Support Level is a price level at which there is sufficient demand for buying a security so that the downward trend can be halted and such demand force may even reverse the trend.

Resistance Level is a price level with a great supply of a security available to cause a halt in an upward trend and such supply force may even reverse the trend.

Volume is often considered to be a useful indicator to confirm the price direction. When the security price jump below or rise above the Support Level, together with a relatively large volume support. Then it may be a confirming indicator for the new direction. This also applies to the Resistance Level.

Usually, after a resistance level is penetrated, it becomes a support level. On the other hand, when a support level is penetrated, it often becomes a resistance level.

In practice, the Support Lines are drawn by joining the lowest points of the observed trend whereas the Resistance Lines are drawn by joining the highest points of the observed trend. The time horizon for these trend lines is just up to your investment strategies (short-term or long-term).

(Support Line for HSBC)

(Support and Resistance Line for Hang Seng Index)

In a long-term perspective, the above Chart shows that the price level in around 12,000pts is a strong resistance level for the period of around early 1994 to the 3rd Quarter of 1996. Thereafter, this resistance level became the support level for the stock market until the 3rd Quarter of 1997 when the financial turmoil occurred at that time. The 12,000pts level became the resistance level for the stock market again. It takes around one and a half year for the market to recover this lost ground and stayed firm above 12,000pts again.

You can plot your favorite trend line(s) in our Java Charting System in the following ways:

1. Click for an appropriate button *(i.e. "Line Drawing")* shown on the bottom of the left hand side on our Charting System;
2. Left click your mouse to set for your starting point as indicated by the cursor;
3. Release the left button when you find the ending point on the screen;
4. If you wish to clear such ruler, just simply right click your mouse.

1.2.5. Trading Channel / Band

When prices are running ups and downs within two parallel trend lines, we called it as a Trading Channel/Band. To draw this channel, we should draw the primary trend line first. This primary trend line is usually drawn below the troughs for an uptrend and above the peaks for a downtrend. Afterwards, we can draw a second line parallel to the primary trend line.

A channel can be used to identify opportunities for long-term or short-term profit. When there are not any substantial changes in the substance of the securities or changes in the market environment, securities prices tends to move within the Trading Channel. Otherwise, prices falling below the lower channel line may imply a weakening price pattern, whereas the breakout of the upper channel trend line may embark an acceleration of the existing uptrend. In other words, price moving beyond the range of the Trading Channel (e.g. 5%) may indicate a trend reversal.

The Trading Channel shown on the above chart can be drawn in our Java Charting System in the following ways:

1. Click for an appropriate button *(i.e. "Trading Channel")* shown on the bottom of the left hand side on our Charting System;
2. Draw the first straight line by: (i) left click your mouse to set for your starting point as indicated by the cursor; and (ii) release the button when you want to fix the appropriate line on the screen;

3. Then, you will observe another parallel straight line shown on the screen which is moving along with your cursor; you should simply left click your mouse again in order to fix the position of the parallel line;
4. If you wish to clear such ruler, just simply right click your mouse.

1.3. TECHNICAL INDICATORS

1.3.1. Relative Strength Index (RSI)

A number of periods *(n)* should be chosen for calculation of the RSI (unit of the covered period are usually calculated in the form of daily, weekly, or monthly basis). Then, the RSI can be calculated using the following formula:

Ups = (Sum of gains over n periods) / *n*

Downs = (Sum of losses over n periods) / *n*

RS = Ups/Downs

RSI = 100 - [100 / (1 + RS)]

The RSI has a value between 0 and 100. A lower level and an upper level should be shown to indicate oversold and overbought levels. Typically, the upper and lower levels are recognized at 70 and 30, respectively. When the RSI moves below the lower level and reverses direction, a bullish buy signal appears. When the RSI moves above the upper level and peaks, a bearish sell signal occurs. The most commonly used time spans (n) are 10 days and 14 days. However, you can still enter your preferred time span in the top right hand side of our Java Charting System.

1.3.2. Moving Average

A moving average is simply calculated from the average price of a security at a given time. When calculating a moving average, you can specify the appropriate time span to calculate the average price (e.g. 10 days).

The most commonly used moving averages are 10 days, 50 days and 250 days. But you can still enter the appropriate time span in the boxes on the middle top of our Java Charting System.

1) Simple Moving Average (SMA)

SMA is calculated by adding the security's prices for the most recent "n" time periods and then dividing by "n." For example, adding the closing prices of a security for most recent 14 days and then dividing by 14. The result is the security's average price over the last 14 days. This calculation is done for each period in the chart.

2) Weighted Moving Average (WMA)

WMA is designed to put more weight on recent data and less weight on past data. WMA is calculated by multiplying each of the previous day’ s data by a weight. The weight is based on the number of days in the moving average (e.g. 10-day, 20-day, 50-day, 100-day, 250-day).

For example, a 5-day WMA will be calculated as follows:

	Closing Price	**Weight**	**Sum**
Day (n - 4)	10	1	10
Day (n - 3)	11	2	22
Day (n - 2)	12	3	36
Day (n - 1)	15	4	60
Day (n)	16	5	80
(where n = 5)	**Sub-total:**	15	208
	WMA(5) in day (n)	***= 13.87 (208/15)***	

3) Exponential Moving Average (EMA)

In order to reduce the lag in simple moving averages, technical analysts sometimes use exponential moving averages (EMA), or exponentially weighted moving averages (EWMA). To some extent, the intuition of EMA is similar to WMA as both of them reduce the lag by applying more weight to recent prices relative to older prices. The weighting applied to the most recent price depends on the length of the moving average. The shorter the EMA is, the more weight that will be applied to the most recent price. We should bear in mind that the EMA puts more weight on recent prices than older prices and thus it will react quicker to recent price changes than a SMA.

The formula for an EMA is:

X = (K x (C - P)) + P

X = Current EMA C = Current Price P = Previous period's EMA*

K (a smoothing constant) = 2 / (1 + N) N = no. of periods for EMA

*(*A SMA is used for first period's calculation)*

Moving average represents the consensus of investor expectations over a specific time span (e.g. 20 days). If the security's price is above its moving average, it means that investor's current expectations (i.e., the current price) are greater than their average expectations over 20 days, and that investors are becoming increasingly bullish on the security, and vice versa. Investors typically buy when a security's price rises above its moving average and sell when the price drops below its moving average.

1.3.3. Moving Average Convergence / Divergence (MACD)

MACD = Exponential Moving Average (12 days) - Exponential Moving Average (26 days)

A 9-day dotted exponential moving average of the MACD (the "signal line") is also plotted on the top of the MACD (Note: the time period can be adjusted in the box on the top right hand side of the Java Charting System).

When the MACD is above zero, it means the 12-day moving average is higher than the 26-day moving average. This is a bullish signal because it indicates that current expectations are more bullish than previous expectations. When the MACD falls below zero, it means that the 12-day moving average is less than the 26-day moving average, implying that a bearish force makes a shift in the supply/demand lines. The Chart shown as above is a typical example of divergence that appeared when the price was falling but the value of MACD was increasing continuously at the same time. That implied the falling trend should be reversed.

1.3.4. Moving Average Crossover (MAC)

The concept of Moving Average Crossover (MAC) is similar to MACD. The major difference is that MAC utilizes a long time horizon for calculating the difference between two moving averages in different time (i.e. 10-day and 50-day Vs 12-day and 26-day for MACD).

MAC (10) = 10-day MA - Close Price

MAC (50) = 50-day MA - Close Price

MAC (10-50) = 10-day MA - 50-day MA

MAC gives a clearer horizontal view of the moving average curves. It also shows whether the different degrees of tension that makes the price move from one extreme to the other extreme. The application of MAC is quite similar to MACD. For more details, please also see the MACD.

1.3.5. Stochastics (STC)

%K = 100*(CP - Lowest Low (n)) / (Highest High (n) - Lowest Low (n))
%D = 3-period moving average of %K
(n) = Number of covered periods used in calculation
CP = Current Closing Price

The Trigger Line (%D) is a smoothed version of %K. A 3-day simple moving average of %K is usually plotted alongside to act as a trigger line, called %D. Generally speaking, readings above 80 are considered overbought and readings below 20 are considered oversold. A more accurate and reliable signal occurs when the STC moves from oversold area back above 20 and from overbought area back below 80. Buy and sell signals can also be observed when %K crosses above or below %D. However, such crossover signals may be too frequent and can result in a lot of whipsaws. Thus, it is suggested to use the convergence/divergence (like the application in MACD) to further confirm the reverse of direction.

In our Java Charting System, the parameters of n and unit period for calculating the moving average of %K are defaulted as 14 days and 3 days respectively. You can also do your favorite adjustment in the appropriate boxes as shown below.

1.3.6. Oscillators (OSC)

This **oscillator value (OSC**) is simply interpreted as a rate of change against the exponential moving average. The interpretation of OSC is similar to another technical indicator, Momentum, which also measures the rate of change of the security price in a given period of time. The relevant formula is:

Current Oscillator Value = Current Closing Price / Exponential Moving Average (10 days)

Generally speaking, when the OSC is falling, it implies that the security is suffering from a weakening trend. When the OSC is increasing, it may imply the security price is becoming stronger. It will be more accurate to observe the reverse of trend when there appears a divergence between the trend of the price and the OSC value. In other words, when the price is falling but the OSC value is rising at the same time, it indicates that the trend may reversed in the near future, and vice versa. The Chart shown as below is a good example (i.e. ***"Cathay Pacific"***) to explain this phenomenon.

We have defaulted 10 days for the calculation of the Exponential Moving Average. You can also set your own defaults in the appropriate box as indicated by the cursor as shown below.

1.3.7. Momentum

Momentum Value (Current Day) = (Current Day's Closing Price / Closing Price in n periods ago) x 100

Momentum indicator can be used as a trend-following oscillator similar to the MACD. We can buy when the indicator bottoms and turns up, and sell when the indicator peaks and turns down.

In our Java Charting System, the closing price in n periods ago is defaulted as 10 days ago. You can also do your favorite adjustment in the appropriate boxes as shown below.

If the Momentum indicator reaches extremely high or low values (relative to its historical values), you should assume that the current trend is likely to continue. For example, if the Momentum indicator reaches extremely high values and then turns down, you should assume that prices would probably go still higher.

1.3.8. William %R

To find the Williams %R, we should first choose a period (N) as the lookback period and then using this formula to calculate the figure:

WLR = (High in period N - Today's close) / (High in period N - Low in period N).

If the price falls while the Williams %R is rising, trade long. Trade short whenever a price increase is accompanied by a decrease in the Williams %R.

In our Java Charting System, this parameter N is defaulted as 10. You can also do your favorite adjustment in the appropriate boxes as shown below and even compute a second William %R by entering an additional parameter in the empty box as shown below.

1.3.9. Bollinger Band

Bollinger Bands are displayed as three bands. The middle band is a normal moving average ($\overline{P}$).

The upper band and lower band are shifted up and down from the middle band by adding and subtracting the number of standard deviations (e.g., 2σ). The formula for calculating the standard deviation are shown as below:

$$\sigma = \sqrt{\frac{\sum_{t=1}^{n}(P_t - \overline{P})^2}{n}}$$, where $\overline{P}$ = SMA of closing prices in n units of time periods

In our Java Charting System, n is defaulted as 20 and the number of standard deviations for calculating the upper and lower bands is defaulted as 2.0. However, it is still flexible for you in entering a more appropriate figure in different time horizon.

Bollinger Bands have the following characteristics: (1) prices moving outside the bands imply a continuation of the current trend; (2) sharp price changes tend to occur after the bands tighten; (3) bottoms and tops made outside the bands followed by bottoms and tops made inside the bands call for reversals in the trend; and (4) a move that originates at one band tends to go all the way to the other band. The above Chart representing the price movements of ***"China Mobile"*** shows most of the characteristics of Bollinger Bands.

1.3.10. On Balance Volume (OBV)

OBV was one of the most popular indicators to measure volume flow. The concept behind this indicator is "volume precedes price". OBV is a simple indicator that adds a period's volume when the close is up and subtracts the period's volume when the close is down. OBV Line is then formed by a cumulative total of the volume additions and subtractions. This line can then be compared with the price chart of the underlying security to look for divergences or confirmation of the price direction. In other words, when there appears a downward price pattern accompanied by an increasing OBV, then it may indicate that the security has found a support and rise in the near future. On the contrary, if there is an upward price pattern followed by a decreasing OBV, then it may imply that the security price may become fragile and turn down in a short time.

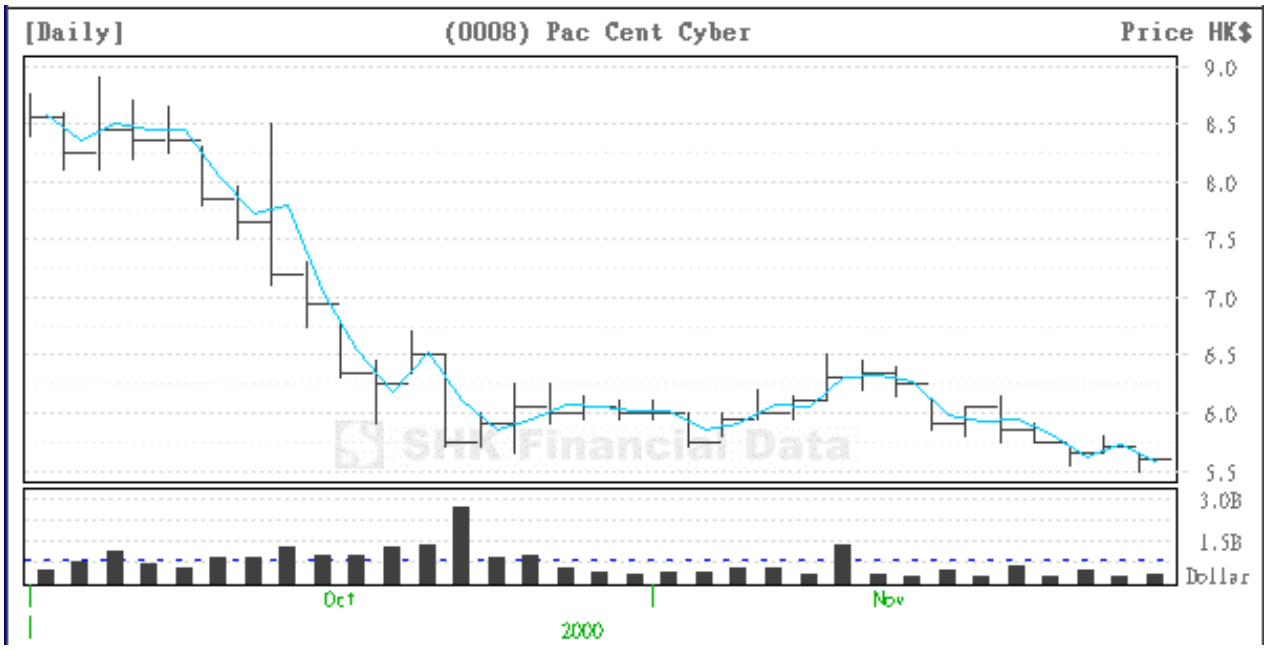
1.3.11. PE Band

PE Band is computed from the historical patterns of the Price Earnings Ratio (PE Ratio) for each individual stock. The advantage of the PE Band is its consideration for both the fundamental factor (i.e. profitability) and the historical trading pattern of a stock. The line plotted from the average highest PE will form the upper PE Band, whereas the average lowest PE will form the lower PE Band. The middle PE Band will be derived from the mean of the Upper and Lower Band. In our Java Charting System, appropriate PE Bands have been computed. But if you need to adjust to your favorite PE Band, you can still enter the PE figures in the three boxes as indicated by the cursor as shown below.

The use of PE Band is especially meaningful for listed companies, which have profitable track records. For a stock with stable earnings, its price tends to move within the PE Band. In other words, the stock price in one extreme tends move to the other extreme within the Band. The chart shown as above represents the past ten years' records for ***"Wheelock and Co".*** This Chart shows the typical characteristics of a PE Band Chart. We can observe that the price movements of "Wheelock and Co" were moving within the upper and lower PE Band for most of the time. Market expectations about the Group's earnings usually bring an influential effect on the directions of the stock. Thus, sometimes, the price of the stock may run outside the Band. However, when the ultimate outcome of the results announced turns out to be unexpected, market forces will normally drive the price to a reasonable PE level.

1.3.11. Median Price

Median Price Curve is simply plotted by joining the middle points (means) of the Day High and Day Low Trading Prices for each trading day. This curve helps us to reduce the illusion brought by the large daily fluctuation of prices. It sometimes serves as a more objective price line in a fluctuating environment.



1.3.12. Directional Movement Index (DMI)

Directional movement compares a security's trading range for one day to the trading range on the previous day. Positive directional movement (+DM) occurs when today's high is greater than yesterday's high, while negative directional movement (-DM) appears when today's low is less than yesterday's low.

Based on the average of positive and negative directional movement over a certain time period, a positive directional movement indicator (+DI) and a negative directional movement indicator (-DI) can be plotted.

Calculation Method:

Let $+DM_t$ represent the positive directional movement for Day t and $-DM_t$ represent the negative directional movement for Day t.

Then, $+DM_t = H_t - H_{t-1}$ [if $H_t > H_{t-1}$]

$-DM_t = L_t - L_{t-1}$ [if $L_t < L_{t-1}$]

TR ("true range"for the security on Day t) is calculated as follows:

$TR_t = H - L$ [if $L_{t-1} \geqq L_t$]

$H_t - H_{t-1}$ [if $L_{t-1} < Lt$]

$L_{t-1} - L_t$ [if $H_t < H_{t-1}$]

Then, $+DI = [(+DM_1) + (+DM_2) + \cdots + (+DM_t)] / (TR_1 + TR_2 + \cdots + TR_t)$

$-DI = [(-DM_1) + (-DM_2) + \cdots + (-DM_t)] / (TR_1 + TR_2 + ... + TR_t)$

In our Java Charting System, we have defaulted 10 days to be the selected time horizon for calculating these indicators. The box on the top right hand side is open to you for entering any preferred time horizon (e.g. 14 days).

When the +DI crosses the -DI to the upside, it generates a long signal. On the contrary, a short signal is generated when the +DI crosses through the -DI to the downside. The above chart showed that this trading strategy works quite well for ***"i-Cable Communications"*** in Jul-Nov 2000.

1.4. Performance Comparison for Stock/Sector/Index/Forex

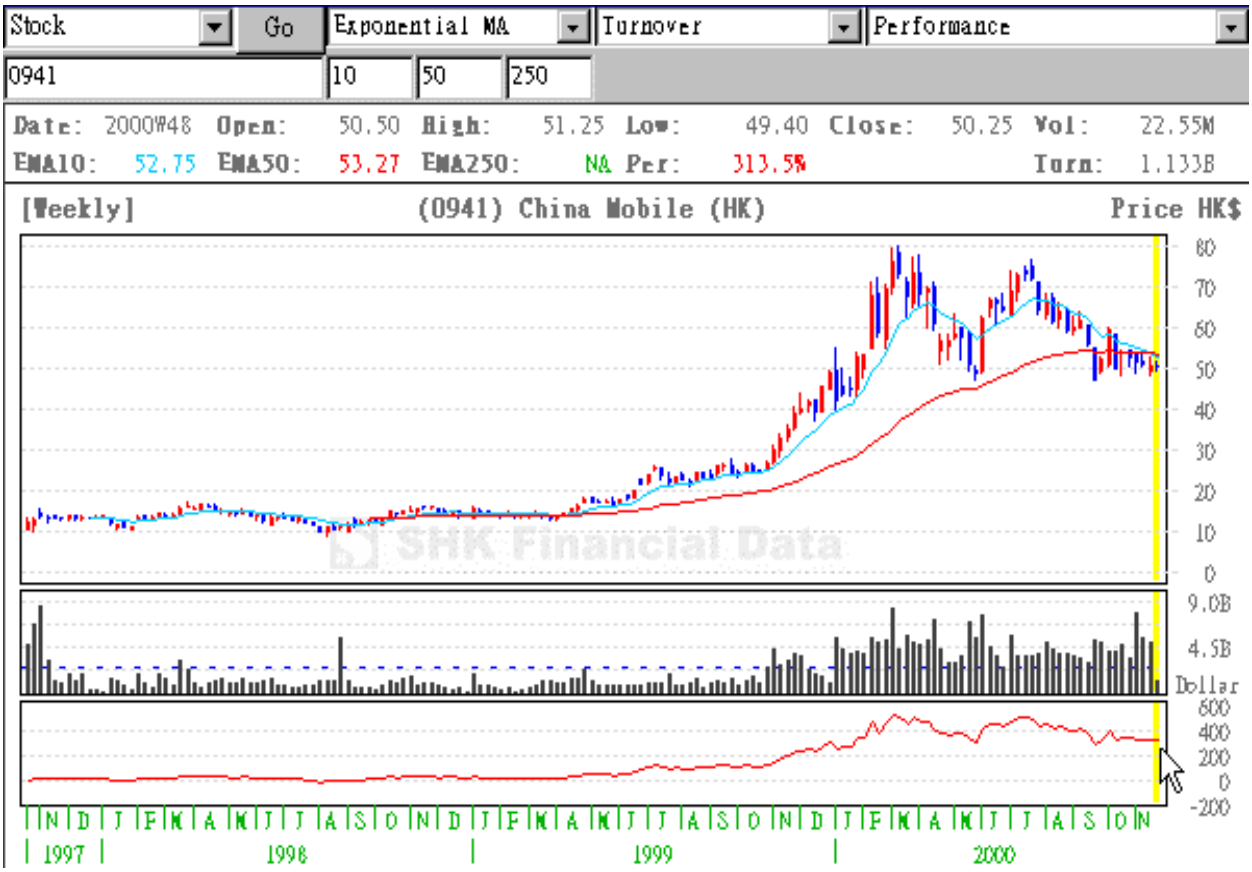
Individual Performance:

When you select the item **"Performance"** in our Java Charting System, you can obtain the automatic computation of the historical performance of your selected stock/sector/index/forex.

Today's Performance = [(Today's Closing Price - 1st Day's Closing Price) / 1st Day's Closing Price] X 100%

(Note: 1st Day's Closing Price represents the first trading day shown on the selected time horizon in the Chart)

The following chart showed that ***"China Mobile (HK)"*** had an outstanding price performance. Although it had dropped from a high price of HK$80 to around HK$50 in mid-Nov 2000, the performance chart clearly showed that it still recorded a sharp increase by about 313.5% (i.e. over 4 times) since its listing on the Stock Exchange of Hong Kong.



Other relative performance items available in our Java Charting System include:

Relative (HK Index)

Relative Value = Performance for Selected Stock / World Index / HK Index / Sector / Forex

- Performance for *selected HK Index for Comparison*

Relative (World Index)

Relative Value = Performance for Selected Stock / World Index / HK Index / Sector / Forex

- Performance for *selected World Index for Comparison*

Relative (Sector)

Relative Value = Performance for Selected Stock / World Index / HK Index / Sector / Forex

- Performance for *selected Sector for Comparison*

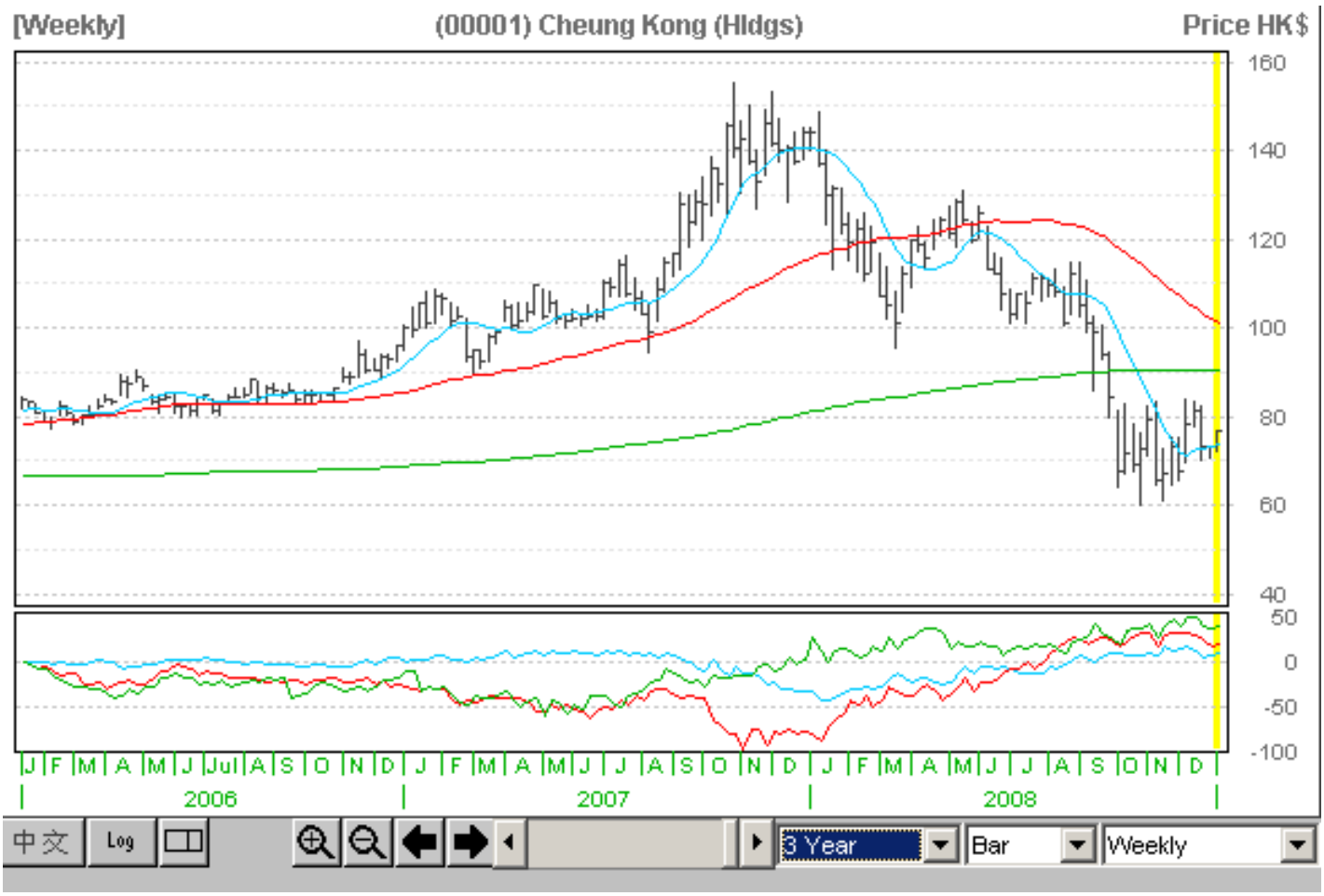
Relative (Stock)

Relative Value = Performance for Selected Stock / World Index / HK Index / Sector / Forex

- Performance for *selected Stock(s) for Comparison*

In the boxes as indicated by the cursor shown on the following chart, you can select up to three stocks for comparison purpose. Also, the exact performance figures are shown will be shown on the top of the Chart.

Intelligent Stock Monitor



2. FUNDAMENTAL ANALYSIS

2.1. FINANCIAL STATEMENTS

Financial Statements provide useful financial information to investors and creditors for predicting, comparing and evaluating potential cash flow of a company in terms of amount, timing and related uncertainty. The main body of financial statements are composed of (i) Profit & Loss Account, (ii) Balance Sheet and (iii) Cash Flow Statement.

2.1.1. Profit & Loss Account

Profit & Loss Account, also called Income Statement, is a summary of a company's revenues, costs, and expenses within an accounting period. It shows how much money was made and presents the company's result of operations during that period of time.

2.1.2. Balance Sheet

Balance Sheet, listing all the assets and liabilities of a company, and the difference between the two (i.e. the shareholders'equity), is a statement of a company's relative wealth or financial position at a given point of time. It states what a company owns and owes and presents its financial position at that given point of time.

Assets mainly comprise Fixed Assets, Current Assets, Intangible Assets and Investments. Fixed assets include leasehold land and buildings, plant and equipment, etc. Current Assets include cash & equivalents, securities, accounts receivable, inventories, short-term investments, etc. Intangible Assets include goodwill, trademark, patent, etc.

Liabilities mainly comprise Current Liabilities, Long-term Liabilities and Minority Interests. Current Liabilities include accounts payable, notes payable, accrued expenses, short-term borrowings, current portion of long-term debt and lease obligations, etc. Long-term Liabilities include long-term debt, convertible loans, etc.

Shareholders'Equity mainly comprises share capital and reserves. It is the difference between the assets and liabilities.

2.1.3. Cash Flow Statement

Cash Flow Statement is a summary of the sources and uses of cash of a company over an accounting period, which classifies cash receipts (i.e. cash inflows) and cash payments (i.e. cash outflows) of the company into returns on investments and servicing of finance, taxation, operating activities, investing activities and financing activities. It reflects a company's liquidity and solvency and presents changes in cash position of the company during that accounting period.

> **Returns on investments and servicing of finance** include cash receipts of interest and dividends, and cash payments for interest and dividends.
>
> **Operating Activities** include cash receipts from customers, cash payments to suppliers and employees, and other payments for operating expenses.
>
> **Investing Activities** include cash receipts and payments arising from the purchase or sale of property, plant, and equipment; acquisition or sale of equity, investments or debt instruments (including acquisition or sale of subsidiaries but excluding cash equivalents); and advances and loans made to, or repaid from, related parties.
>
> **Financing Activities** include cash receipts and payments arising from an issue of shares or other equity securities (i.e. equity financing) and payments made to redeem these securities; proceeds arising from issuing debentures, loans and notes (i.e. debt financing), and repayments of these securities. They are transactions whereby the resources are obtained from, or repaid for, owners and creditors.

Cash Flow Statement eliminates the long-term provisions and other allocations associated with accrual accounting, and depicts the historical cash generating or cash absorption mechanisms of an entity. In conjunction with Profit & Loss Account and Balance Sheet, Cash Flow Statement provides comprehensive information on liquidity, validity and financial adaptability of a company.

2.2. RATIO ANALYSIS

Ratio Analysis is used as a way of analyzing the performance of a company. It covers five major areas, namely, (i) Liquidity, (ii) Leverage, (iii) Profitability, (iv) Efficiency and (v) Market Value.

2.2.1. Liquidity Ratios

Liquidity Ratios are used to measure the short-term solvency of a company. They show the ability of the company to quickly convert its assets into cash to pay its short-term debts. The higher the ratios, the more liquid the company and the less likely the company experience financial distress in short-term basis.

Current Ratio = Current Assets / Current Liabilities

Interest Coverage Ratio = Earnings before Interest and Tax (EBIT) / Interests

Quick Ratio = (Current Assets -Inventory) / Current Liabilities

2.2.2. Leverage Ratios

Leverage Ratios are used to measure the extent of the company's financing with debt relative to equity and its ability to cover interest and other fixed charges. They address the company's long-term ability to meet its financial leverage. The higher the ratios, the more indebtedness the company owes, which signals the possibility the company will be unable to earn enough to satisfy its debt obligations.

Long-term Debt/Equity Ratio = Long-term Debt / Equity

Total Debt/Equity Ratio = (Short-term Debts + Long-term Debts) / Equity

2.2.3. Profitability Ratios

Profitability Ratios measure the overall earning performance of a company and its efficiency in utilizing assets, liabilities and equity.

Net Profit Margin = Net Profit after Taxation / Turnover

Operating Profit Margin = Operating Profit / Turnover

Return on Equity = Net Profit after Taxation / Equity

Return on Total Assets = Net Profit after Taxation / Total Assets

Return on Capital Employed = Net Profit after Taxation / (Total Assets - Current Liabilities)

2.2.4. Efficiency Ratios

Efficiency Ratios demonstrate how efficiently the company uses its assets and how efficiently the company manages its operations.

Inventory Turnover = Turnover / Inventory

Assets Turnover = Turnover / Total Assets

2.2.5. Market Value Ratio

Market Value Ratios are used for value comparison. These Ratios are not contained in financial statements and they can only be calculated from publicly traded companies.

Price Earning Ratio = Current Stock Price / Earnings Per Share (EPS)

Market-to-Book Ratio = Market Value of Equity / Book Value of Equity

2.2.6. Ratios for Banking Sector

The following ratios are used to assess the adequacy of the liquidity of the banks and ensure the banks have adequate cash flow to meet all obligations in a timely and cost-effective manner.

Capital Adequacy = Capital Base (Tier I + Tier II) / Risk-weighted Assets

Core Capital Ratio = Tier I Capital / Total Assets

Liquidity Ratio = Liquefiable Assets / Qualifying Liabilities

Cost-to-Income = Operating Expenses / Total Operating Income

Pursuant to the consolidated basis required by the Hong Kong Monetary Authority (HKMA) and the Banking Ordinance, all the banks in Hong Kong should have Capital Adequacy over 8%, Core Adequacy Ratio over 4% and Liquidity Ratio over 25%.

Liquefiable Assets mainly comprise net amount of 1-month inter-bank deposits, HK Dollar or foreign currency notes and coins, gold, marketable securities and advances maturing within one month.

Qualifying Liabilities are mainly net 1-month inter-bank liabilities and the total of other 1-month liabilities.

Tier I Capital includes common equity, retained earnings, paid-in capital and disclosed capital reserves.

Tier II Capital includes loan loss reserve or undisclosed capital reserves, preferred stocks with maturity of at least 20 years, certain revaluation reserves and general loan provisions, subordinated debt with an original maturity of at least 7 years.

2.3. Risk Assessment

2.3.1. Beta

Beta (β) means the sensitivity of a stock's return to the return of the market as a whole. It is a measure of the systematic risk of a stock in relation to the market, or an alternative benchmark. For example, if the stock has a beta of 1.5, when the market goes up 10%, the stock is expected to go up 15%. The higher the beta of a stock, the greater the degree of correlation between the movements of the stock and the overall market, and vice versa.

The beta of the market is always equal to one. Therefore, a stock with beta of one moves in perfect tandem with the market, i.e. a 10% rise in the market index will lead to a 10% rise in the stock's price. If a stock has a beta greater than one, the stock is more volatile than the market index. On the contrary, a stock is less volatile than the market index if its beta is less than one.

Keep in mind that beta is calculated based on past price performance, it does not necessarily indicate the future performance of a stock.

The following is the formula for calculating the beta:

$$\beta = \mathbf{cov\ (X, m)} / (\sigma_m)^2$$

where cov (X, m) = covariance between Stock X and the market index

σ_m = daily standard deviation of the market index

Adjusted Beta

As the average beta of all stocks is equal to one, the best forecast of the beta of a stock would be one. When we are trying to estimate the beta coefficient over a particular sample period, an estimation error would be incurred. Given the beta has a tendency to evolve towards one, we would smooth the estimation error by taking the sample beta and average it with one, then using the weights of 2/3 and 1/3:

Adjusted β = 1/3 x (1) + 2/3 x (β)

2.3.2. Delta

Delta is the change in the option price with respect to a change in the underlying asset price. The option delta is a measure of the slope of the prior-to-expiration option price valuation function. In other words, delta is the slope of the curve that relates the option price to the underlying asset price.

When the option is out-of-the-money, the slope of the price function will be flat and the delta will be close to zero. Hence, for out-of-the-money options, the option price does not change much for a given change in the underlying stock. When the option is in-the-money, the slope of the price function is relatively steep, the delta is close to one and the option will change almost one-for-one given a change in the underlying stock price.

The delta for a call option will range from zero to positive one, whereas the delta for a put option must range from zero to negative one.

2.3.3. Standard Deviation

Standard Deviation (σ), the positive square root of variance, is a measure of the fluctuation of a stock's actual return over its average return, i.e. the dispersion of the actual returns of a stock from its average return. The larger the difference between the actual returns and the average return, the higher the standard deviation and the higher the volatility. The smaller the actual returns dispersed from the average return, the lower the standard deviation and the lower the volatility. The formula for calculating the standard deviation is shown as below:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(R_i - \overline{R})^2}{T-1}}$$

2.3.4. Correlation

Correlation is a standardized measure of the dependence of two variables (e.g. stocks X and Y). It is defined as the covariance of two variables divided by the product of their standard deviations, i.e. $\frac{\mathrm{cov}(X,Y)}{\sigma_x \sigma_y}$, where σ_x and σ_y are the standard deviations of X and Y and cov(X,Y) is the covariance between X and Y.

Covariance is a measure of the degree to which the two variables move together. It is defined as $E[(X-\overline{X})(Y-\overline{Y})]$, where $\overline{X}$ and $\overline{Y}$ are the means of X and Y, and E is the expected value. A

positive covariance implies stocks X and Y move in the same direction, whereas a negative covariance implies stocks X and Y move in the opposite direction.

However, the covariance doesn't tell about the strength of the relationship between the returns on the two stocks. In order to indicate the strength of the relationship, we have to find out the correlation, i.e. dividing the covariance by the product of standard deviations of the two stocks.

2.3.5. Value at Risk (VAR)

Unlike other historical risk measures like Beta (β) and Standard Deviation (σ), Value at Risk (VAR) estimates the risk of a portfolio for a specified future period with some degree of uncertainty by using history as a benchmark. It is the maximum potential loss from an adverse market movement over a period of time at a given confidence level, which quantifies the worst-case downside risk of a portfolio. VAR is a useful tool for measuring, managing and controlling the market risk, setting limits and allocating capital.

To determine the VAR, we have to know the notional amount of the underlying asset, the confidence level (i.e. the number of standard deviation required) and the volatility (i.e. the market price fluctuation during a specific period of time). For example, if the notional amount of a portfolio is HK$8 million and its volatility is 2% per day, then the daily VAR at 95% confidence level can be calculated as follows:

HK$8mn x 1.65 σ = HK$8mn x 1.65 x 2% = HK$264,000

The daily VAR at 95% confidence level is HK$264,000 and it interprets that the loss will be less than HK$264,000 in 19 out of 20 days, and could lose at least HK$264,000 in 1 out of 20 days. That is, there is 5% probability that the value of the portfolio will decrease by HK$264,000 or more. However, we should bear in mind that the VAR only tells the potential loss in 19 out of 20 days (95% confidence level). It doesn't tell the potential loss in the remaining single day.

2.3.6. Hedging

Hedging is the practice of taking an offsetting position of the spot market to minimize the price risk from adverse price movements. By taking an offsetting position in the futures market, the hedger is able to protect himself from unfavorable price changes while he is giving up the opportunity to benefit from favorable price changes. In other words, any loss realized from one position, either in the spot or futures market, will be offset by the gain on the other position.

Hedging can be classified into **Long Hedge** and **Short Hedge**. In a long hedge, the hedger has committed to buy a stock at some time in the future and he wants to lock in a price now. Thus the

hedger should buy a futures contract to protect against an increase in the price of the good. If the price rises, this will lead to a profit in the futures market, which could offset the loss in the spot market.

In a short hedge, the hedger currently owns a stock and he has committed to sell it at some time in the future. Thus the hedger should sell a futures contract to protect against a decline in the price of the stock. If the price falls, this will lead to a profit in the futures market, which could offset the loss in the spot market.

2.3.7. Delta Hedging

Delta is the change in the option price that results from one dollar change in the underlying asset price. In other words, delta is the slope of the curve that relates the option price to the underlying asset price.

Delta Hedging is used to make the option price insensitive to any small change in the underlying asset price. A position with a delta of zero is referred to as a delta-neutral position, which has no sensitivity to small changes in the underlying asset price.

Suppose there is a call option with a delta of 0.5, and the option price is $10 while the stock price is $100. Assume the time value of the option is insignificant. If an investor has written 20 option contracts, i.e. options entitled to buy 2,000 shares, he can hedge his position by buying 0.5 x 2,000 = 1,000 shares approximately. Therefore, the gain on the option position could be offset by the loss on the stock position, or vice versa. Let say, if the stock price increases by $1 (i.e. a gain of $1,000 on the shares purchased), the call option price will increase by 0.5 x $1 = $0.5 approximately (i.e. a loss of $1,000 on the options written). On the other hand, the option price will approximately decrease by $0.5 (i.e. a gain of $1,000 on the options written) if the stock price decreases by $1 (i.e. a loss of $1,000 on the shares purchased).

In this example, the delta of the investor’s option position is 0.5 x (-2,000) = -1,000 (the negative sign means that the investor is in the short position). In other words the investor will lose $1,000 when the stock price increases by $1. Since the delta of the stock is defined as 1, thus the long position in 1,000 shares has a delta of +1,000. As a result, the delta of the investor’s overall position is zero. The delta of the asset position offsets the delta of the option position.

2.4. Other Fundamental Indicators

Earnings Per Share (EPS) = Net Profit after Taxation / Issued Common Shares

Dividends Per Share (DPS) = Dividends / Issued Common Shares

Net Asset Value (NAV) = (Total Assets - Total Liabilities) / Issued Common Shares

3. DERIVATIVE SECURITIES

Derivative Securities (or Derivatives) are financial instruments with contractually specified payoffs whose values are uncertain when contracts are initiated and which depend on, or derive from, the values of the underlying assets (stocks, indexes or commodities). There are many types of derivative securities and the most common ones are futures, forwards, options and warrants.

Derivatives are used to hedge risks, to lock in arbitrage profit and to reflect a view on the direction of the market. There are mainly three kinds of participants in the derivative markets, namely the hedgers, the speculators and the arbitrageurs. Hedgers are risk-averse and they use derivatives to avoid uncertainty in price movement. Speculators use derivatives to take advantage of price movement in which they are buying to profit from a price increase and selling to profit from a price drop. Arbitrageurs use derivatives to lock in a riskless profit by simultaneously buying and selling the same, or similar, financial products in different markets.

3.1. Futures

A futures contract is a legally binding agreement to buy or sell an underlying asset at a pre-determined price (i.e. the futures price) on a specific date (i.e. the settlement date) in the future. It is a standardized contract with specifications in the quality, quantity and delivery date. Futures contracts are traded on organized exchanges and they are usually guaranteed by the clearing house.

Futures contracts are marking-to-market daily at their end-of-date settlement prices. They are often settled by closing out the futures position prior to maturity, rather than requiring physical delivery of the underlying asset or final cash settlement. They can also be terminated by entering into an offsetting position, i.e. an equal and opposite position to the opened position.

Margins are an important aspect of futures markets. Any investor in the futures market is required to keep a margin account, which is adjusted daily to reflect the gains or losses that arises due to marking-to-market. There are two types of margins, namely, initial margin and maintenance margin. Initial margin is the total amount of margin required when a futures position is opened while maintenance margin is the minimum level at which the margin account must be maintained. A margin call will be issued if the margin account falls below the maintenance level because of the adverse price movement and funds must be added to bring the margin account back to the initial margin level.

The most common type of futures in Hong Kong is the“Hang Seng Index Futures”(HSI Futures).

Its contract months are the spot plus the next month, then the next two quarterly months. For

example, if the current month is December 2000, the contract months of the HSI Futures will be January 2001, April 2001 and July 2001. The contract size of HSI Futures is the Hang Seng Index (HSI) times HK$50. The last trading date of HSI Futures is the next day to last business day of the contract month while the settlement date is the first business day following the last trading date. The settlement price of HSI Futures is the arithmetic average of 5-minute HSI on the last trading date, and the contract can only be settled by cash.

3.2. Forwards

A forward contract is a private agreement (i.e. not a standardized contract) between two counterparties to buy or sell an underlying asset at a pre-determined price (i.e. the forward price) on a specific date (i.e. the settlement date) in the future. Forward contracts are traded over-the-counter and they are not guaranteed by the clearing house.

Forward contracts are settled at the end of the contracts, rather than marking-to-market daily. They are usually settled in cash or by physical delivery of underlying assets, whereas futures contracts are usually settled by closing out the position.

3.3. Options

A option is a contract that gives the holder the right, but not an obligation, to buy or sell a fixed quantity of an underlying asset at a predetermined price (i.e. the exercise price or the strike price) on or before a given date (i.e. the expiry date).

Call Option - a contract that give the holder the right, but not an obligation, to buy the underlying asset at the strike price on or before the expiry date

Put Option - a contract that give the holder the right, but not an obligation, to sell the underlying asset at the strike price on or before the expiry date

American Option - a contract that give the holder the right to buy or sell the underlying asset on or before the expiry date

European Option - a contract that give the holder the right to buy or sell the underlying asset on the expiry date only

3.3.1. Some Basic Terms about Options

Option Premium - the price that the buyer needs to pay to acquire the right of an option in which the price is determined by the supply and demand of the option, i.e. the purchase price of an option

Intrinsic Value - a measure of the value of an option if immediately exercised

Time Premium - the amount by which the option price exceeds its intrinsic value

At-the-money - a term used to describe an option in which its exercise price is equal to the current trading price of the underlying asset

In-the-money - a term used to describe an option that has a positive value if immediately exercised

Out-of-the-money - a term used to describe an option that has no intrinsic value

Volatility - a measure of the variability of future stock prices

3.3.2. Some Basic Concepts about Options

Option Premium = Intrinsic Value + Time Premium

Intrinsic Value of a call option = Max [0, S - X]

Intrinsic Value of a put option = Max [0, X - S]

Time Premium for a call option = Call Premium - Intrinsic Value of a call option

= C - Max [0, S - X]

Time Premium for a put option = Put Premium - Intrinsic Value of a put option

= P - Max [0, X - S]

where S = the current price of the underlying asset

C = the current price of an associated call

P = the current price of an associated put

3.3.3. Factors Affecting Option Prices

There are mainly six factors affecting the price of an option: (i) the current stock price, (ii) the exercise price, (iii) the time to expiration, (iv) the volatility of the stock price, (v) the risk-free interest rate and (vi) the dividends expected during the life of the option.

(Note: The following factors are specified for those who“purchase”the options.)

Current Stock Price (S)

The higher the current stock price, the higher the value of the call options and the lower the value of the put options

Exercise Price (X)

The higher the exercise price, the lower the value of the call options and the higher the value of the put options

Time to Expiration (T)

The longer the time to expiration, the higher the value of both American call and put options as the options has a greater chance to move "in-the-money", whereas the value of both European call and put options does not necessarily increase with the time to expiration

Volatility of Stock Price (σ)

The higher the volatility of the stock price, the higher the value of both call and put options as increased volatility increases the chance of upside gaining whereas the downside loss is limited to the option premium paid

Risk-free Interest Rate (r)

For call options, the higher the risk-free interest rate, the lower the present value of the exercise price to be paid out when exercised, and thus the higher the value of the options.

For put options, the higher the risk-free interest rate, the lower the present value of the exercise price to be received when exercised and thus the lower the value of the options

Dividends (D)

The higher the present value of expected cash dividends from the underlying stocks, the lower the future stock price, and thus the lower the value of the call options and the higher the value of the put options

The most common type of options in Hong Kong is the“Hang Seng Index Options”(HSI Options), which is traded in the Hong Kong Futures Exchange. Its quantity is 50 times of Hang Seng Index (HSI) and its expiry date is the second day to the last business day of the contract month. The settlement price of the HSI Options is the average of 5-minute HSI prices on the last trading date and the contract can only be settled by cash.

3.4. Warrants

A warrant is an option entitling the holder the right, but not obligation, to buy or sell an underlying asset (stock, index or commodity) at a pre-determined price (i.e. the exercise price) on or before an expiry date. The major difference between warrants and options is that warrants are issued by the company itself or financial institutions (e.g. investment banks) while options are traded by the market makers, which are appointed by the exchanges and they act as the intermediates between the buyers and sellers. Moreover, the expiry date of a warrant is usually longer than that of an option. A warrant may have a maturity of several years while an option may only have a maturity of several months.

Equity Warrants (or **Company Warrants**) and **Covered Warrants** are the two major types of warrants. There are also other types of warrants, e.g. **Index Warrants** and **Basket Warrants**.

> **Equity Warrants** - warrants issued by the company that permits the holder to buy its common stocks
>
> **Covered Warrants** - listed securities issued by investment banks, to provide an efficient tool to for the holder to manage his investment portfolio
>
> **Index Warrants** - warrants on stock indexes, issued by either corporate or sovereign entities and guaranteed by an option clearing corporation
>
> **Basket Warrants** - warrants on a group of stocks that is formed with the intention of either being bought or sold all at once to diversify the risk

Warrants are in two different forms: **Call Warrant** and **Put Warrant**. These two forms of warrants are also classified into two different styles: **American Warrant** and **European Warrant**.

> **American Call** - give the holder the right to buy the underlying asset at the exercise price at any time up to the expiry date
>
> **American Put** - give the holder the right to sell the underlying asset at the exercise price at any time up to the expiry date
>
> **European Call** - give the holder the right to buy the underlying asset at the exercise price at the expiry date only
>
> **European Put** - give the holder the right to sell the underlying asset at the exercise price at the expiry date only

3.4.1. Some Basic Terms about Warrants

Amount Outstanding - the total amount of warrants that have been issued

Conversion Ratio - the number of warrants required to exchange for one share of the underlying asset

Expiry Date - the date on which the warrant will expire

Gearing - the scale of exposure to the underlying asset

$$Gearing = \frac{spot\ \ price}{warrant\ \ price \times conversion\ \ ratio}$$

Implied Volatility - the volatility implied by the warrant price observed in the market

Last Traded Price - the latest price on which a warrant is traded

Parity Ratio - the ratio of the spot price of the underlying asset to the exercise price of the warrant

$$Parity\ \ Ratio = \frac{spot\ \ price\ \ of\ \ the\ underlying\ \ asset}{exercise\ \ price\ \ of\ \ the\ \ warrant}$$

Premium - the percentage by which the stock price needs to move before reaching the break-even price of the warrant at the expiry date

$$\text{Premium of a call warrant} = \frac{\left[strike\ \ price + (warrant\ \ price \times conversion\ \ ratio)\right] - spot\ \ price}{spot\ \ price}$$

$$\text{Premium of a put warrant} = \frac{spot\ \ price - \left[strike\ \ price - (warrant\ \ price \times conversion\ \ ratio)\right]}{spot\ \ price}$$

(Note: Negative premium means that the warrant has a discount)

3.4.2. Warrant Valuation

Black-Scholes Pricing Model

Black-Scholes Pricing Model is used to calculated the theoretical prices of European call and put options. The theoretical price is the "fair" value of an option and it may be different from the market price of that option.

$$C = SN(d_1) - Xe^{-eT} N(d_2)$$

$$P = Xe^{-eT} N(-d_2) - SN(-d_1)$$

$$where\ d_1 = \frac{In(S/X) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{In(S/X) + (r - \sigma^2/2)T}{\sigma\sqrt{T}} = d_1 - \sigma\sqrt{T}$$

C = call price

P = put price

N(d) = the cumulative probability density of a standardized normal variable

S = stock price of current day

X = exercise price of the specific linked warrant

r = annualized risk-free interest rate

T = time to expiration

s = volatility of stock price

Delta

Delta is the change in the warrant price that results from one dollar change in the underlying asset price.

$$Delta\ (\Delta) = \frac{Dollar\ change\ in\ warrant\ price}{Dollar\ change\ in\ underlying\ asset\ price}$$

In other words, delta is the slope of the curve that relates the warrant price to the underlying asset price. For example, if the delta of a call warrant on a stock is 0.6, when the stock price changes by a certain amount (e.g. $10), the warrant price will change by about 60% of that amount (i.e.$6).

The delta of a call warrant is positive, implying that an increase in the underlying asset price would result in an increase in the call price. On the contrary, the delta of a put warrant is negative, implying that an increase in the underlying asset price would result in a decrease in the put price. The followings are the formulae to calculate the delta of a call warrant and a put warrant:

Delta of a call warrant = $N(d_1)$

Delta of a put warrant = $N(d_1) - 1$