Contents

1. Chart-Indicators

1.1 Accumulation/distribution line (ADL)

This is not to be confused with the A/D line (Advance/Decline line) which shows the ratio of increased to decreased shares of an Index/Market. The Acc/Dis line is a trend indicator which is supposed to show the existence or the stability of market trends. This indicator is not a timing indicator.

The calculation is based on the volatility of the trading day. The difference between the closing price and the day's low/day's high is calculated. The difference between the two values is then divided by the distance between the day's low and day's high (difference). This value is subsequently multiplied by the day's trading volume (weighted). The result can be positive or negative and is added to the value of the previous day. Owing to this calculation, the indicator shows similarities to other "cash flow" indicators (On-Balance-Volume). It is in effect supposed to show the liquidity flow.

To interpret this indicator, one has to look at the divergences between the share price development and the indicator. If, for example, the share price increases further and the indicator does not follow this movement, this is regarded as a sign that the share price movement is not backed by sufficient liquidity/volume and thus cautious trading is recommended. The indicator therefore has a "confirmative role" – timing notifications are not possible/do not make sense.

1.2 Aroon indicator, Up/Down (ARUD)

A concept closely related to the RSI. This indicator does not measure the distance between the current share price and the high/low of a period, but the time which has elapsed since the last high/low instead. Thus, it is basically a variation of the well-known RSI. Upward trends are displayed by the Aroon-Up if they reach specific indicator values, downward trends are displayed in the Aroon-Down if they reach specific indicator values. At the same time the points of intersection of the indicators are also used as signals. The periods of time used as parameters show quite an extensive range (between 1 and 500 days – although in most cases they are used for short-term trends with parameters up to 30)

1.3 Aroon Oscillator (ARO)

The Aroon Oscillator simply describes the difference between the two Aroon indicators, similar to the way the difference between two moving averages can be used to calculate oscillators. However, as

opposed to many other oscillators, this indicator does point out trends: values above the zero line indicate an upward trend, values below the zero line indicate a downward trend.

1.4 Average directional (movement) Index (ADX)

This is a further variant of a different indicator. The ADX is a simple smoothing of the DMI (directional movement index). It is a well-known trend indicator. However, the ADX does not forecast a trend – it only measures the intensity or the existence of a trend.

An inclining ADX line is interpreted as being the beginning of a trend or as increased intensity of a trend. However, no statement is made with regard to the direction of the trend. A declining ADX indicates the end of a trend or decreasing intensity of the trend.

The most useful thing about the ADX is that no oscillators based on price fluctuations/tertiary trends are used to show a strongly dominant trend.

During a dominant and powerful trend the user is prevented from following false signals which oscillators would send out if they were applied. However, should the ADX display that there is no strong trend (usually shown by a sideward movement with largely varying prices), the use of an oscillator is

more promising.

1.5 Average true range (ATR)

The Average True Range is calculated from the average of the respective maximum: the period's high minus the low of the previous period, the period's high minus the closing price of the previous period and the period's low minus the closing price of the previous period. Extreme values of the ATR point to exaggerations and thus to potential turning points of a trend.

1.6 Bollinger bands

By calculating the so-called "Bollinger bands", an attempt is made to define an area around the chart in which the share prices will most probably move. In order to define this area, lines called "bands" – in the English-speaking world often also referred to as "envelopes" – are calculated. These bands run above or below the actual graphs. The calculation of these bands is quite simple: the standard devia-

tion of a moving average of the share price chart is calculated (upper band = moving average + standard deviation, lower band = moving average / standard deviation). The standard deviation is an expression of the average deviation from the average share price – the bands describe an area in which a certain percentage of share prices can be found in a certain time period. If the intensity of oscillation/volatility of the share price movement increases, the distance between the lines also increases. If the volatility decreased, the bands converge.

The interpretation of the indicator does not identify clear timing signals. It is generally assumed that the values are seldom found outside the bands. Instead, the share price chart has the tendency to be "repelled" by the band. However, this behavior does not generally indicate a signal for action although conclusions with regard to the increasing/decreasing strength of a share price movement are possible (example: if the current share price movement runs in the direction of a band, you can assume that the increase/decrease is more likely to lose strength)

Experience has shown that the interpretation of divergences (different direction of indicator/share price) between share price and band barely yields any exploitable results.

1.7 Chaikin oscillator (CHO)

The Chaikin is fully based on the idea of Acc/Dis lines. It is calculated from the difference between two moving averages of different lengths, generated on the Acc/Dis line. With this construction principle, the Chaikin is a typical oscillator which oscillates around a reference line. The idea of the oscillator is to show trend changes in the Acc/Dis line, i.e. in the cash flow before they take place.

In line with an old TA slogan, Chaikin pointed out that signals should always only be used in direction of the trend ("Trend is your friend"). Accordingly, only react to buying signals during an uptrend and vice versa.

1.8 Directional movement indicator (DMI)

The DMI attempts to detect trend changes. It is calculated on the basis of two different indices which are designated +DI, a line for upward swings, and -DI, a line for downward swings. The underlying concept is based on the assumption that today's high will be greater than yesterday's high if there is an upward trend, and that today's low will be lower than yesterday's low if there is a downward trend. Days on which this occurs are called outside/inside days.

The greater the difference between +DI and -DI, the greater the DMI and the stronger the respective

trend is, an upward trend being characterized by +DI being greater than -DI and a downward trend be-ing characterized by -DI being greater than +DI. The point at which +DI and -DI cross can also be in-terpreted as a trade alarm indicator, whereby it is considered to be a "buy" signal when the rising +DI graph crosses the -DI line. The opposite situation is then considered to be a "sell" signal.

1.9 Envelopes

Envelopes (similarly to Bollinger bands) are two share price bands which are traced at a predefined identical distance above and below a moving average.

First of all, a moving average is calculated, then the envelopes are calculated by adding and subtract-ing an absolute or a percentile value to and from this. Whenever the share price crosses an envelope, this can be used to generate signals, but normally envelopes tend to be interpreted in such a way that they are able to indicate signals for reversal points. When the price approaches a band, this indicates that a price swing is already quite far advanced. Exact timing signals can hardly be expected from these, the interpretation is more similar to the procedures with OB/OS indicators.

1.10 Exponential moving averages

These are moving average share prices. As opposed to the standard average values, the share prices being used to calculate the averages are all weighted differently.

This is based on the assumption that the more recent prices have a greater effect on future quotes than the prices achieved in the distant past. They are therefore weighted differently. The weighting factor is reduced exponentially with the age of the share price data. For a 38-day average, the highest weighting factor is applied to the most recent share price and the lowest factor is applied to the T-38 price (i.e. the price achieved 38 days before the calculation date).

Moving average graphs are technical indicators that are very easily calculated and understandable without being any less useful. Their simplest interpretation is that it can be deemed to be a buy/sell signal whenever a value crosses its moving average graph. The number of days used as a parameter is taken from a standard publication on technical analysis (Edwards/Magee: "Technical Analysis of Stock Trends") and is derived from the Dow-theory which is explained in that book. This theory, first postulated by Charles Dow, was the first to describe stock market trends/cycles of different lengths which are superimposed on economy cycles. Dow identified so-called primary (long periods > 2 years), secondary (medium periods: 2 months to 2 years) and tertiary cycles (short periods: up to 2

months). He also defined the 200-day line which is still in use today, the 100-day line as well as a 38-day line which correspond to the above long, medium and short cycles periods.

1.11 Fast stochastics (STOF)

Fast Stochastics is an oscillator function developed by George C. Lane. It comprises two graphs, called K% and D% lines, respectively. D% is the smoothened version of K%.

These two graphs crossing in the oversold or overbought range can be interpreted as being a buy or sell signal, respectively.

Fast stochastics are often used to analyze markets in a sideways phase when there is no noticeable trend.

1.12 Historic volatility (HV)

Volatility is a descriptor for the intensity of variations in quotes/equity prices within a specified period. A volatility can be calculated for various periods and is normally based on a full year.

The volatility frequently indicates whether there is a trend or not (volatility decreases in very strong trends as there will not be many price swings opposing the trend direction).

Frequently a strong increase in the historic volatility is observed at times of a trend reversal. This reflects the market participants' intense insecurity with regard to future price developments, which leads to their activities causing strong upward and downward price swings.

1.13 Momentum (MOM)

Momentum indicators are among the absolute "classical" technical analysis elements. The assumption underlying the calculation is that price variations will decrease at times when a correction or a possible trend reversal is due. Frequently it can be observed that the driving forces or acceleration of price changes increase at the start of price changes but decrease as the change period comes to an end, and this effect can be explained theoretically by behavioral psychology aspects. The core of this assumption is that groups of buyers and sellers "jump on the bandwagon" when prices start changing, therefore amplifying the change, and when the change rate diminishes again, the opposite occurs. In standard publications on technical analysis, this is often exemplified by the metaphor of an apple which is thrown up in the air. The speed of the apple decreases until it reaches the apex of its trajec-

tory then increases again. The theory postulates that share prices should behave in a similar manner. The momentum value is an attempt to describe or model this deceleration and acceleration effect. A momentum value, in mathematical terms, is nothing other than the absolute or percentile difference between the current value and a historical value. This is calculated on a daily basis and plotted against a scale. Momentum indicators can be interpreted in different ways. On the one hand, one can monitor the divergence of prices from the momentum development; on the other hand, momenta are often used in the same way as oscillators. Frequently it is considered to be a signal when the baseline is crossed. However, better results are often obtained by calculating and applying a "trigger/release/signal" graph which is calculated as a simple moving average of the original momentum. Crossovers/reversals can generate signals. As with most of the technical indicators, a certain amount of practice and acquaintance with the methods of interpreting these tools improves the results. An analyst must, by observing the indicator, gradually develop a feeling for the most probable developments – if he knows how the data are calculated and knows the latest price developments he can then anticipate the emerging indicator scenario.

1.14 Moving average convergence / divergence (MACD)

The MACD, too, is a classical technical indicator. This indicator expresses the distance (difference) between two moving averages (exponential MAs) calculated for different periods. Usually a further moving average (also exponential) is calculated in addition to the MACD in order to obtain a trigger graph. Signals are generated by reversals and intersections. This is a derivative of the momentum concept: convergence of the averages is interpreted as being a "value" of the increase / decrease of the price variation intensity. As with all indicators of this type, the parameter values are oriented on the length of the predominant trends. This is accompanied by the danger that a sudden structural discontinuity or changed trend situation cannot be detected correctly – a risk that is characteristic of all concepts of this kind – and that this might lead to erroneous signals. As a rule, MACDs are preferably used for assessing medium to long-term trends. In this case, a greater distance from the median line indicates a more intense trend. Already the fact that the indicator is calculated using the difference between two moving averages implies that it is not possible to deduce any short term signals that make sense.

1.15 On-balance volume (OBV)

The on-balance volume is intended to indicate whether liquidity is being added to a market or equity or is being withdrawn from it. The OBV is similar to the accumulation/distribution line. To this end, the transaction volume is subtracted from the previous day's OBV if the share prices have dropped, or added to it if the share prices have risen.

The OBV is monitored as an OBV trend change and is supposed to indicate an impending trend change in the underlying instrument price. Primarily, the convergence/divergence between the OBV graph and the share price graph of the underlying instrument is monitored. If a new index maximum or minimum peak is not confirmed by a corresponding maximum or minimum in the OBV graph, an im-pending trend swing is probable.

1.16 Parabolic

The parabolic indicator is a typical trend tracing indicator. The concept on which the calculation is based is to determine so-called trailing stops. This means that stop prices are calculated continuously, or are tracked back to the share price. An acceleration factor is applied to control the distance be-tween the stop and the share price graphs. If the share price exceeds or drops below the trailing stop price, the trader "changes sides", a stop-loss turns into a stop-buy. These indicators are often also called "SAR" indicators since Welles Wilder mentioned this indicator being a "Stop and reverse sys-tem" = SAR.

1.17 Rate of change (ROC)

There are many variations/types of momentum indicators. The most puritanical form is the simple rate of change (ROC - often also called "ROC indicator"). The rate of change oscillator describes the change of a price over a specified period as a percentage. The rate and direction of the price changes are determined by the location and amplitude of the indicator. As in other momentum indicators, oscil-lator reversal points are a sign of decreasing trend intensity. A ROC that is not smoothened is nor-mally poorly suited for determining trends or generating signals.

1.18 Relative strength index (RSI) according to Welles Wilder

Note: This indicator is not related to the relative strength, i.e. calculating the ratio of two

share price changes. The present index is a momentum indicator which is supposed to describe/model the internal strength of a financial instrument within a certain period and which is calculated only from the actual series of share prices. The original period parameter value selected by Wilder was 14 days.

The ratio of upward movements in this period to the downward movements of the same period is an indicator with a value between 0 and 100. A value of zero shows that the financial instrument has no "internal strength" whatsoever, a value of 100 extreme "internal strength". Standardization or, if desired, a normalization of the indicator by defining the variation and keeping it constant, is advantageous for interpreting this indicator.

This indicator is normally used to identify so-called "overbought/oversold" situations, i.e. boundary situations in which one can expect that the evaluation of the instrument by market stakeholders will change in the near future. It is not possible to deduce exact timing recommendations, but the reaching or departure from the extreme zones (20/80) are nevertheless often used for generating signals.

1.19 Simple moving average (SMA)

A simple moving average is the simplest available trend tracing indicator. A SMA is defined as the moving arithmetic average of the market prices. Intersections of the SMA and market price graphs or of two SMA graphs are possible sources for the generation of buy and sell signals.

1.20 Slow stochastics (STOS)

The Slow Stochastics is an oscillator developed by George C. Lane. The indicator has three parameters and includes two graphs, '%k' (a smoothing of the fast stochastics) and '%d' (a smoothing of %k). The Fast Stochastics %k is a simple moving average (SMA) of the 'Stochastic Oscillator'. The first parameter is the period of the 'Stochastic Oscillator' and the third parameter is the period of the SMA. In turn, %d is an SMA of %k, with the second parameter being its period.

A common approach to using this indicator is to buy when the oscillator (either %k or %d) falls below the oversold level and to sell when the oscillator rises above the overbought level. Other market trend indicators must also be used to confirm the market trend. Another use of the oscillator is to buy when %k rises above %d and sell when %k falls below %d.

1.21 Ultimate oscillator (UO)

The ultimate oscillator was developed in an attempt to adapt indicators to various trend lengths. Instead of tuning the parameters of individual oscillators to trends with different lengths, the ultimate oscillator is used as an attempt to create a weighted overall indicator from three individual oscillators with different time structures. It is interpreted in a similar manner to other oscillators.

1.22 Volume (VOL)

The "volume" is defined as a regularized version of the volume traded in a period. To regularize the indicator, those period volumes are capped which would exceed the average volume of the investigated periods plus a standard deviation.

1.23 Williams % R (WILL)

This indicator is attributed to Larry Williams – but actually it was devised by George C Lane. Williams, however, provided such an extensive description of this indicator in his book that he was believed to be the originator. The indicator is simply another oscillator variant and is closely related to the stochastic indicators and RSI. Therefore it is interpreted according to the well-known overbought/ oversold schemata. Overheating/undercooling zones are defined as moving averages that can be used for signal generation. This indicator also describes the distance of the current closing share price within the range of highs and lows in a period, but in this case in terms of a percentage (which is why it is called Williams %R).

1.24 ZigZag

The ZigZag is not an indicator as such, as the position and direction of the ZigZag can subsequently change. A ZigZag is therefore only suitable for demonstrating and simplifying share price movements and is often used for Elliot-Wave analysis. The ZigZag percentage determines at which price changes a counteracting "Wave" is traced.