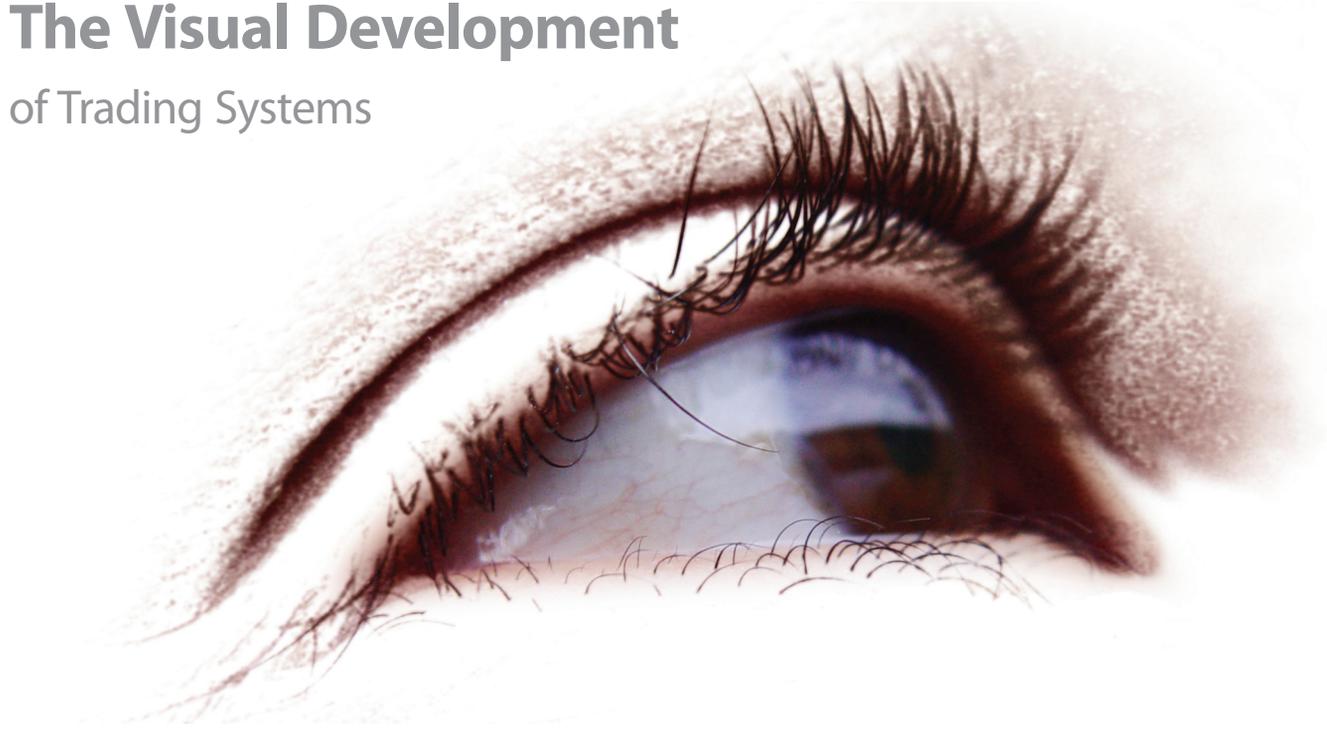


# The Visual Development of Trading Systems



*The basis of each lasting trading success lies in the description of the market. This allows you to identify the trading phases that are profitable to enter the market. Many beginners rely too much on indicators in their standard interpretation, for example, "buy when the RSI(14) is over 30," or, "handle long when the MACD is above its trigger-line." Then, an optimisation searches historical data for the most successful length of this indicator. This pure accounting performance is supposed to shorten the often laborious search for a promising trading idea. However, this procedure very rarely leads to a successful trading approach. Instead,*

*it typically results in an over-optimised indicator for one market, which not only tends to lose its significance in the future but can also generate severe losses in daily trading. This article describes a possible procedure to develop a reliable trend-spotter for a systematic trading approach, starting out from a random indicator. The emphasis of the development is placed on the interaction between the indicator and the market, the comprehension of the results in several markets, and finally, the test of these results with the assistance of a standardised entry and exit strategy.*

## ■ Recognition of the Market Phase

Without thinking too much about the market you wish to apply the trend-spotter to in the future, you should first focus on finding an indicator combination that identifies your preferred stock market phases in various markets. The correlation between market and indicator is presented graphically. Not only does this visualisation make it easy to spot the advantages and disadvantages of the selected indicator combination and its interpretation, but it also facilitates the intuitive tailoring of the set of rules.

For this article, I would like to show an exemplary procedure of a trend-following trading system. It should successfully trade on the long side in several markets, without having to adapt the chosen indicators' parameters for the market. Only when these criteria are met, will you be able to maintain a profitable system in the future.

Let us start with the simplest of all the technical indicators, the moving average such as the 200-day band. To this, we apply the old stock exchange wisdom: when the market trades above its 200-day band, one earns money on the long side. The 200-day band was selected because this indicator is commonly known and is available

in all charting programmes. In order to find a successful indicator combination, it is easiest if you graphically display the stock exchange phases in your own charting programme in accordance with the interpretation of the indicator. For this example, you simply colour all those days green on which the market is above the 200-day band.

For TradeSignal this can be quickly realised with the code line "if close > average(close,200) then drawbar(open,high,low,close)"; and respectively for TradeStation "if close > average(close,200) then plotpaintbar(open,high,low,close)".

Figure 1 shows all of the days coloured green when the market closed above the 200-day band. The aim now is to refine the set of rules thus far, until your chart only displays those days in green, when a long position could actually be successful. When this is fulfilled, you have reached a statistical advantage so that you will no longer trade long on the days that the indicators do not clearly identify a bullish market.

Now, take a closer look at the results of this first attempt with the 200-day band. You should direct your main attention to the cases where the market dips but the bars are coloured green regardless. On

## F1) The 200-Day Band as a Simple Trend-Spotter



All of the days the DAX trades above its 200-day band are coloured green. The most important upward trends are recognised, but swift changes in the trend are not. There are problems with sideways phases. Can this indicator create a reliable trend-spotter?

Source: Tradesignal

such days, it would be extremely unlikely to make money on a long position. For example, in 2002, the green days were not suitable market phases for long trades in the DAX Future, even though the DAX briefly made it above the 200-day band. The same is valid for 2006: you would have lost virtually all of the year's profits with this false interpretation of the indicator.

Once you have programmed and graphically displayed the previously mentioned rule, you could then visually test whether the length of the indicator has a decisive influence on the recognition of the correct stock market phase. You will quickly notice that upon altering the length of the indicator, you will improve the performance in one aspect, but worsen it in another. Especially when you employ this procedure to several markets, you will find no adjustment that leads to an improvement of the trend-spotter in all of them. In this manner, you will not always successfully be able to detect those market phases that are suitable for long trades. Have another look at the false statements of the trend-spotter and closely examine the correlation between indicator and market performance. We were able to detect a first weak point in the DAX Future in 2002. How does the false interpretation of market performance differ from the correct recognition of the upward trends between 2003 and 2006?

Well, from 2003 to 2006 both the market and the indicator rose, while in 2002 the market rose, but the indicator fell. If you spotted this, then you can alter the rule for chart colouring and require that bullish market phases only be recognised when the market trades above the 200-day band, and as well while the 200-day band rises (see Figure 2). Now, the false signal of 2002 does not show up any more, however, this has not yet eradicated the other weak points.

In general, you have several possibilities for the description of an indicator. For indicators lying directly on the chart, you can utilise the direction of the indicator (rise or fall) and the position of the market relative to the indicator (above or below). Examples are moving averages such as the ParabolicSAR. You can actually describe the direction of the indicator more precisely by checking the percentage it has risen or fallen within the last days. In the end, this is nothing

other than a rate-of-change on the indicator. You can also think about how far from the market the indicator is. As for indicators that have their own chart-windows, like the RSI or the MACD, you can also describe the direction of the indicator, its situation relative to the trigger-line or even its absolute value. Here, you can let your imagination run wild without thinking about how that indicator is being interpreted in literature. Only in this way, you will come up with independent solutions, and will be able to recognise those market phases in which the "flock" of market participants lies mistaken in their positions!

Now, before you try further to develop the trading rules of this example, verify the previous results in several other markets. Try them even in markets you do not want to trade later. If the rule works only in one market, then it is quite likely that it will cease to function in the future because you adapted too much to the historical behaviour of a market. Often, such carelessness in the development of your own market idea leads to heavy losses.

With the 200-day band, you can also detect bullish phases in both the Yen and the Euro. However, you will encounter similar problems as with the DAX Future 2006. Swift setbacks, for example, early 2004 with the Euro or early 2002 with the Yen, are not identified by this rule.

As before, in neither of these two markets will a change in the indicator's length bring about a sustainable improvement on the

## F2) Test in Several Markets



Some weak points of the trend-spotter in the DAX could be eliminated by requiring the market to trade above the 200-day band, while this is rising simultaneously. In other markets, the same weak points are present like in the DAX – quick trend changes are not being recognised. It is easy to spot which problems have to be worked on.

Source: Tradesignal

### F3) Visual Test of Trend-Spotting in Several Markets



With the help of two moving averages, phases suitable for long trades can be easily spotted. The method works in several markets, which is an indication for the future stability of the results.

Source: Tradersignal

results. You would only find a different ideal historical adjustment for each market. Trying to recognise phases that can be utilised for long trades does not mean that you have to find all upward phases. There is no disadvantage if you cannot colour the recovery of the DAX in 2001 green. It is far more important that you do not display the whole chart in green when the market falls, so you would lose money when trading on the long side.

A simple possibility to eliminate the known weak points is to insert the same indicator again, but this time equipped with a markedly different length. In the example shown, you are already using the 200-day band as a trend-spotter for a longer time frame. Accordingly, to recognise short-term and swift trend changes you need a faster indicator. Use for example the 50- or even 20-day band. This quicker moving average complements – not replaces – the interpretation of the 200-day band.

In a first attempt, use the same set of rules for the quick indicator as for the slow one. Therefore, in the given example, the market has to be above the 200-day band as well as above the 50-day band. Furthermore, both bands must rise. Only under those conditions will a bullish phase be recognised. By inserting the exact same indicator only with different parameters facilitating the development so that you can fall back on the experiences you already gained. If you were to use a completely different indicator, then you would have to find a new way of interpretation as well. However, both alternatives ultimately reach their goals.

The chart in Figure 3 makes us speculate the problem of a swift trend change could indeed be solved with this amplification of the set of rules. However, the results in one market are worthless if they are not confirmed in several other markets. The amplified set of rules

also displays the desired success in the Yen as well as in the Euro market. Strong upward trends are being recognised in time, as well as the swift trend change. In sideways phases there were not too many false signals. If you have eliminated the largest weak points of the trend-spotter, and you can recognise bullish trends in time in several markets, then you can move on to the next step. You can expand the visual analysis of the indicator with a statistical one.

### Entry and Exit

In this phase of the development work, the trend-spotter will be tested as to its own historical success. You have already assessed the idea in a visual manner, but quite often, one's eyes may be deceived. Therefore, a few statistics can support the decision as to whether the selected procedure is reasonable. The test will use standardised entries and exits, so that you may rapidly judge whether the results of the trend-spotter are indeed significant.

You can run a first test of the trend-spotter by taking a simulated position at the opening on all those days the trend-spotter has identified an upward trend. Terminate it again at the close. With this strategy, you will receive an equity curve describing the sum of all days recognised. If too many falling days have been identified, then your equity curve shows strong drawdowns. In a chart, you might not be able to recognise the loss potential of those particular days that quickly.

When working with simulated positions in this entry and exit strategy, you have to consider two important aspects: First, this procedure is not exactly fit for practical use. That is to say that the results are only usable within the frame of this test practice. Second, you can only take the position the day after the trend-spotter has switched to green. The trend-spotter's condition was that at closing, the market trades above the moving averages. However, you cannot know this at the opening of the day. If you incorporated the future into the test results, they would become entirely worthless.

### F4) Test of the Trend-Spotter



The curves show a historical equity curve if one had purchased upon the opening of the portrayed "long days", and closed the position in the evening. Drawdowns portray those phases extremely clearly, in which the recognition does not yet function flawlessly. Despite all weak points, a positive performance could be achieved in the test markets.

Source: Tradersignal

Look at the results. Note that in all four markets tested, you have attained a positive result. As can be expected, the bearish market phases are left out and the upward trends are utilised. Naturally, this is not yet a trading system for practical use, but you can see that the trend-spotter works and brings positive results in different markets. Now, if you analyse the losing phases within the individual markets, you will notice that you have two possibilities for improvement. On one hand, you can try to implement a further refinement to the trend-spotter. On the other hand, you can begin to think about an improved entry and exit strategy.

If you wish further to refine the trend-spotter, that is to say, analyse the drawdowns more thoroughly, then proceed as described previously. Start by figuring out the similarities between the individual drawdowns in the reviewed markets. Then describe these similarities and test the new trend-spotter once again with the afore-mentioned entry and exit.

Do not make the mistake of focussing too much on one single market at this stage of the system's development. Even if you wish solely to trade the DAX Future for example, the very basis of the system should be able to attain similar results in several different markets. If not, you most certainly fall into the back-test trap and over-optimize the system for one market only. In doing so, you obtain pretty good results on paper - but in real trading you will pay a high price for this carelessness. Procedures that only function well in one market are generally not stable and scarcely yield any positive results in the future.

When you are satisfied with the results of the trend-spotter in every tested market, then you can start with the development of entries and exits. This should result in a further reduction of drawdowns, without cutting too deeply into the profits attained in the first test run. Naturally, the trading style you prefer greatly determines which entry and exit combination on which you decide.

The trend-spotter shows you when you have a clear advantage on the long side. Whether you use it in intraday trading or as a trend-follower is of no importance. The personal trading style is the determining factor.

In the next article of this series, we will show you some tricks you can use to attain a profitable and reliable mechanical trading approach.

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