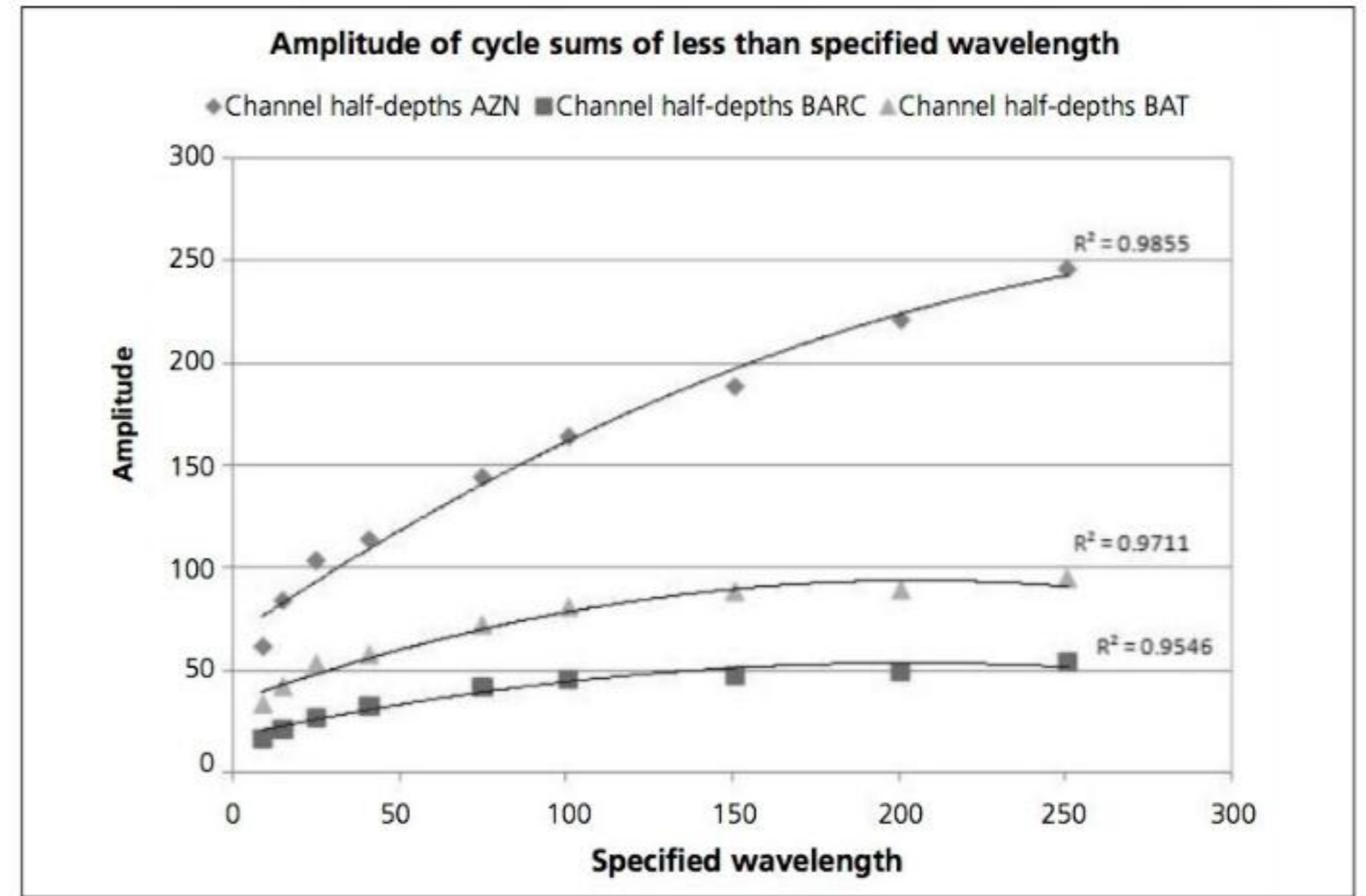


Why Does Channel Analysis Work?

We have seen that we can use the extreme excursions of intra-channel short-term trends to establish the path of the channel itself. The extreme excursions are of course caused by the short-term cycles responsible for the short-term trends reaching their maximum amplitude, or rather the percentage of maximum amplitude allowed by the overlap of data points. This interaction would not be possible if the trends were independent of each other, or rather if the sums of cycles causing these trends were independent of each other. Although as noted previously the wavelengths of the cycles present in each set of market data are independent of each other, the fact remains that the amplitudes are not. This is easily demonstrated by an experiment of taking increasingly large periods for the centred moving average used to construct channels and plotting the resulting channel depths.

The result of doing this is shown in Figure 12.26 for three securities in the London market. Similar results are obtained for other stock, currency and commodity markets.

Figure 12.26 – Cycle sums determined from channel depths plotted for AstraZeneca (AZN), Barclays (BARC) and British American Tobacco (BAT). Quadratic curve fitting routines have been used to show the trends in each security, with a high degree of goodness of fit as can be seen from the R².

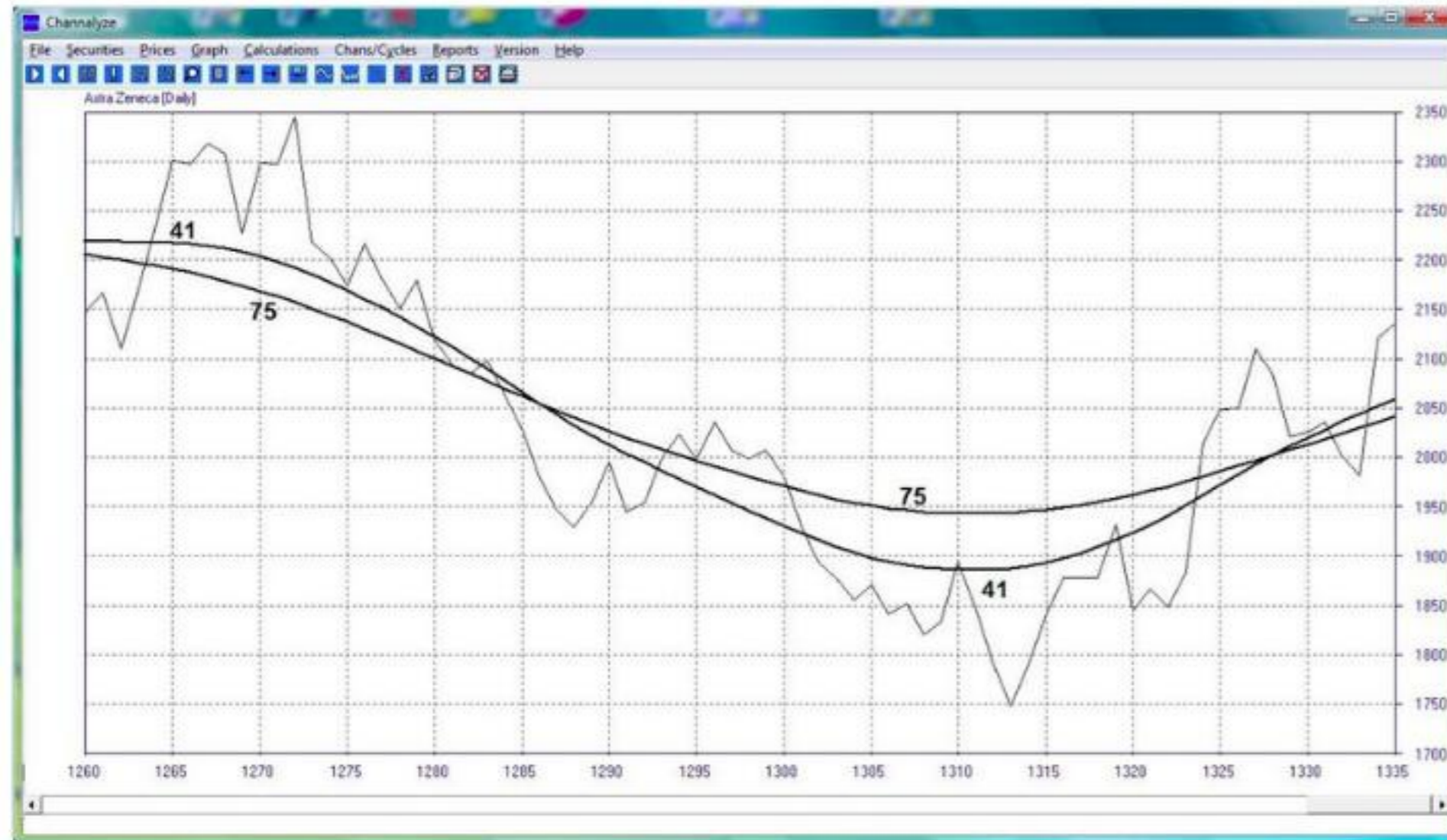


It can be seen quite clearly that the channel depths, which represent the amplitude of the cycle sums contained within each channel, are related to each other as shown by the fitted quadratic curves. The values used in the centred moving average were periods of nine, 15, 25, 41, 75, 101, 151, 201 and 251 days. This covers a sufficient range of cycle wavelengths that the conclusions drawn from the study are perfectly valid.

Since the cycle sums are interactive from the perspective of their amplitudes, two of these are shown in Figure 12.27 to enable their relationship to be discussed. The two averages

are 41-day and 75-day centred averages. For all the reasons discussed throughout this book these are presented as centred averages. As such, the fact that the shorter-term averages oscillate around longer-term averages is obvious. If the averages are presented with no lag, then this relationship is lost.

Figure 12.27 – This shows the 41-day and 75-day centred moving averages of AstraZeneca data. The oscillations of the shorter 41-day average around the longer 75-day average are limited by the relationship between them shown in Figure 12.26.



As shown in Figure 12.27, just as was the case with the actual stock data oscillating around a centred average, there is a limit to the extent to which short-term averages oscillate around longer-term averages. Thus the two averages are interactive, so that a change

in the amplitude of one average and hence its vertical position at a point in time must be compensated by a change in amplitude and hence the vertical position of the other average. Of course, when the term 'average' is used, what is really meant is the trend for which that particular average is a proxy, which also means the sums of cycles with wavelengths less than the period of the average.

So far, this discussion has only concerned the oscillation of two averages around each other. As can be seen from Figure 12.26, most securities will contain many sums of cycles, so that we can arrive at a very complex situation. However, the complex situation is characterised by a very simple proposition – a change in the amplitude of one cycle so as to take it towards its maximum amplitude will cause all other cycles to change position.

WHICH ARE THE DOMINANT CYCLES?

Is it the shorter-term cycles?

In Chapter 11 we saw how using the extremes of the intra-channel cycle sum enabled us to determine the position of the channel boundary and hence the position of the longer-term trend represented by the period used for the average from which the channel was constructed. Thus the cycles of shorter wavelengths have resulted in an adjustment of the cycles of longer wavelength. The conclusion is therefore *Yes!*

Is it the longer-term cycles?

In the earlier part of this chapter we saw that determining the position of the channel boundaries enabled us to determine turning points in the intra-channel cycle sum. Thus the cycles of longer wavelength have modified the position of the peaks and troughs in the cycles of shorter wavelength. The conclusion is therefore *Yes!*

Although in my earlier books on channel analysis I addressed the concept of dominant

channels, the above conclusions would indicate that it is not correct to take this view. The interaction between all cycles and cycle sums means that any cycle can be dominant in the sense that if it changes, it will force a change on all other cycles, however small.

If a choice has to be made as to whether short-term or longer-term cycles instigate such a change, then it could be argued that the short-term are the more likely. This is because bad news for a company will manifest itself in an instant response in its stock price. Since this is a short-term response, short-term cycles will react sooner than long-term cycles.

Readers will have their own views. In a sense, though, which of the cycles present in the security is responsible is irrelevant. What is relevant is to use the information to perform the best analysis possible on the implications for the position of a channel and the intra-channel movement.

13. Cycles and Sums of Cycles

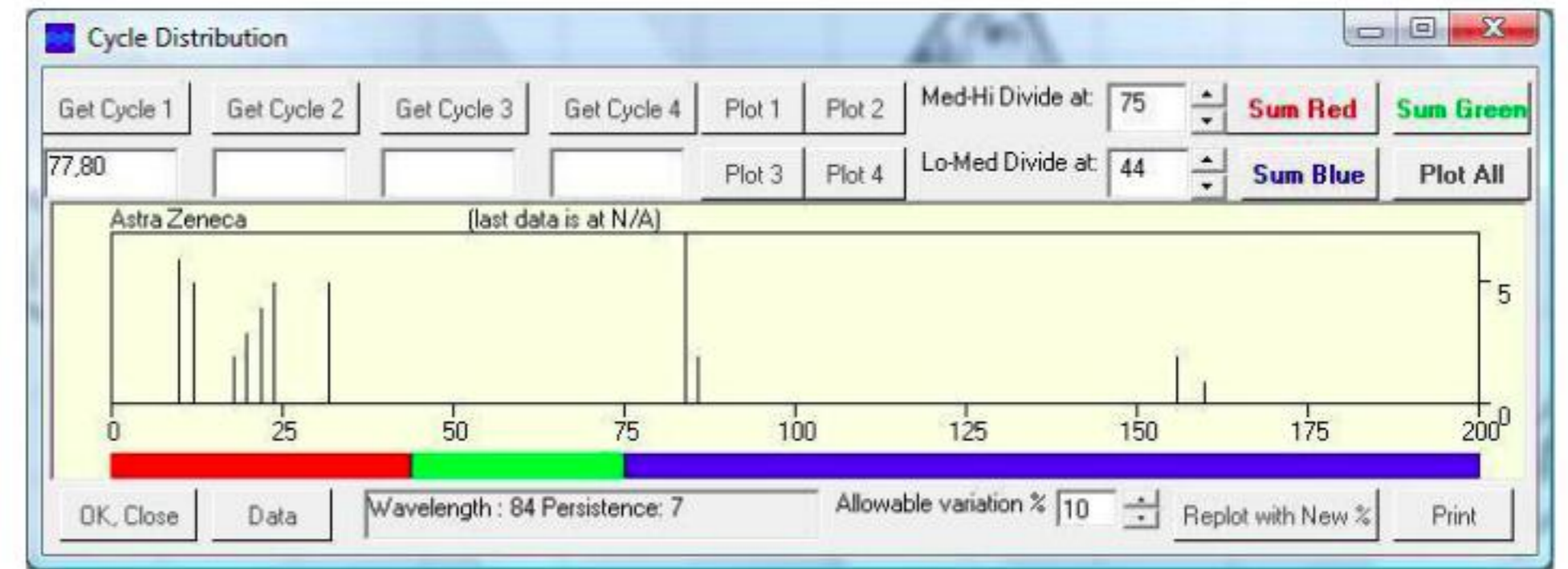
We discussed the properties of cycles and how they appeared in market data in Chapter 6. It was clear that market cycles are constantly changing in amplitude, wavelength and phase, going through periods when a nominal cycle is reasonably stable and longer periods when it is not. It was also shown that a cycle only remains stable for around three to five complete sweeps, after which it reverts to its unstable behaviour.

The phrase '*reasonably stable*' is used because we will never see a situation in which the amplitude and wavelength remain virtually constant for the duration of these three to five complete sweeps. We will have to limit ourselves to an allowable variation in these parameters, otherwise we will make no progress in our attempt to use market cycles in a predictive sense.

A good starting point where we would expect cycles to remain reasonably stable is the two stocks studied in Chapter 12, where the 51-day channels continued in the same direction for quite a long period of time.

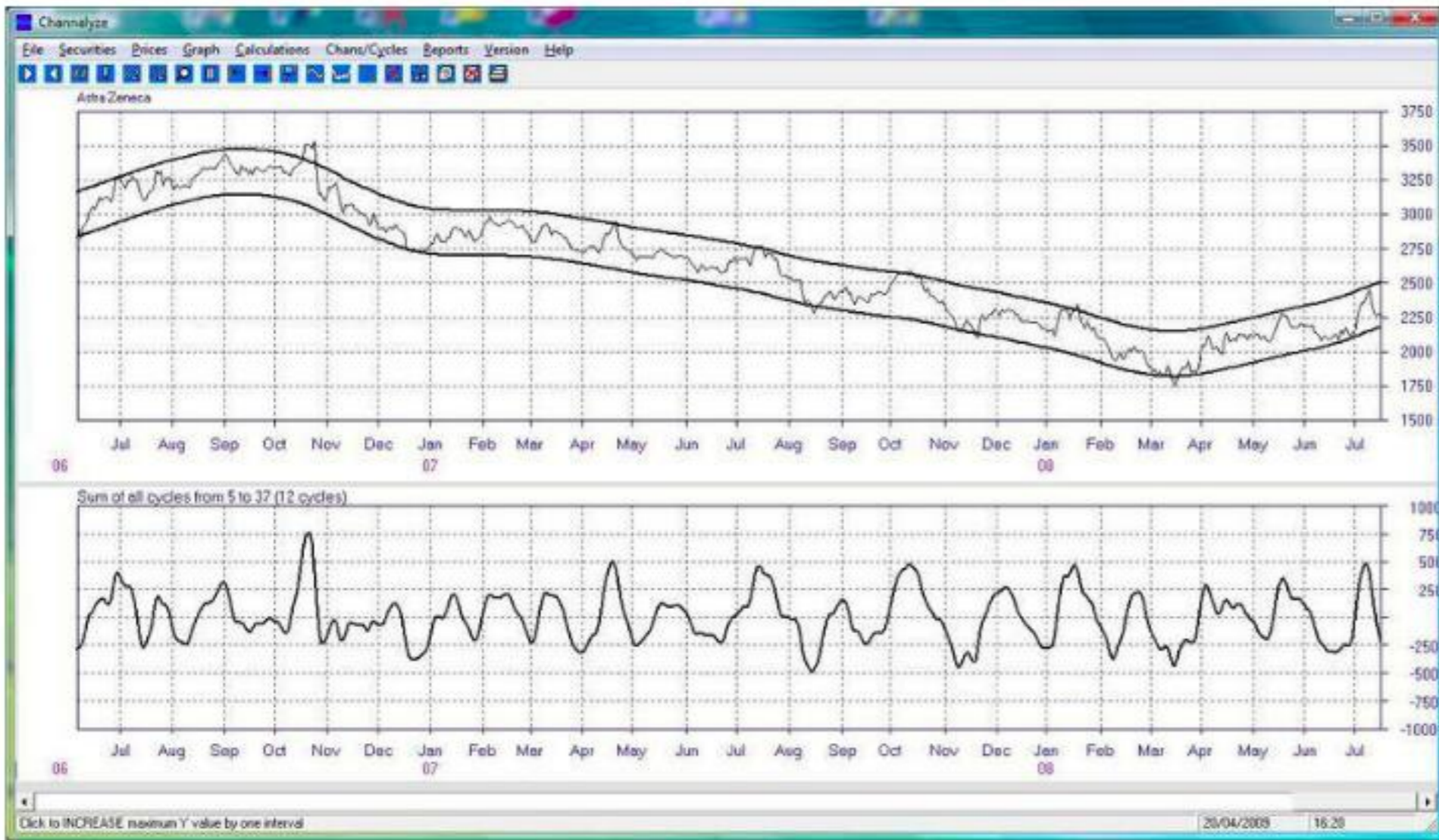
Figure 13.1 shows the distribution of stable cycles in AstraZeneca. These are the cycles present in the historical data for the last five years. It can be seen that the most persistent cycle is the one around the middle of the chart and this has a wavelength of 86 days. There is also a group of shorter wavelength cycles with wavelengths between 11 and 37 days. There is also a longer-term cycle with wavelength 156 days.

Figure 13.1 – The distribution of stable cycles in AstraZeneca. The most persistent cycle is that with wavelength 86 days.



If the sum of the short-term cycles is plotted at the same time as the 101-day channel, as shown in Figure 13.2, we can see that the peaks and troughs in these cycles are aligned perfectly with the touching points in the 101-day channel shown in the upper panel. We use this value of 101 rather than the 51 used in the previous chapter to enable cycles of wavelength 86 days to be studied as intra-channel cycles.

Figure 13.2 – The sum of the short-term stable cycles with wavelengths 11 to 37 days in AstraZeneca. Note how the peaks and troughs are aligned with the touching points within the channel.



If we take an expanded section of the plot from Figure 13.2, we can see more clearly the relationship between the two (Figure 13.3). The sum of the short-term cycles in the lower panel can now be seen to be much smoother than the intra-channel movement. This is partly because the lower panel does not contain cycles of less than a wavelength of 11 days, while the intra-day movement does. In fact it contains movement down to wavelengths of two days (we will not class one-day movements as cycles). Secondly, not all cycles with wavelengths between 11 days and 37 days are represented in the cycle sum in the lower panel, but only the stable ones whose wavelength and amplitude variation is below the limits of 20%.

Figure 13.3 – An expanded section of the plot from Figure 13.2. It can now be seen that

there is much more very short-term random movement within the channel. The extrapolated part of the channel is that to the right of the vertical line in the upper panel. The extrapolated part of the cycle sum is that to the right of the vertical line in the lower panel.

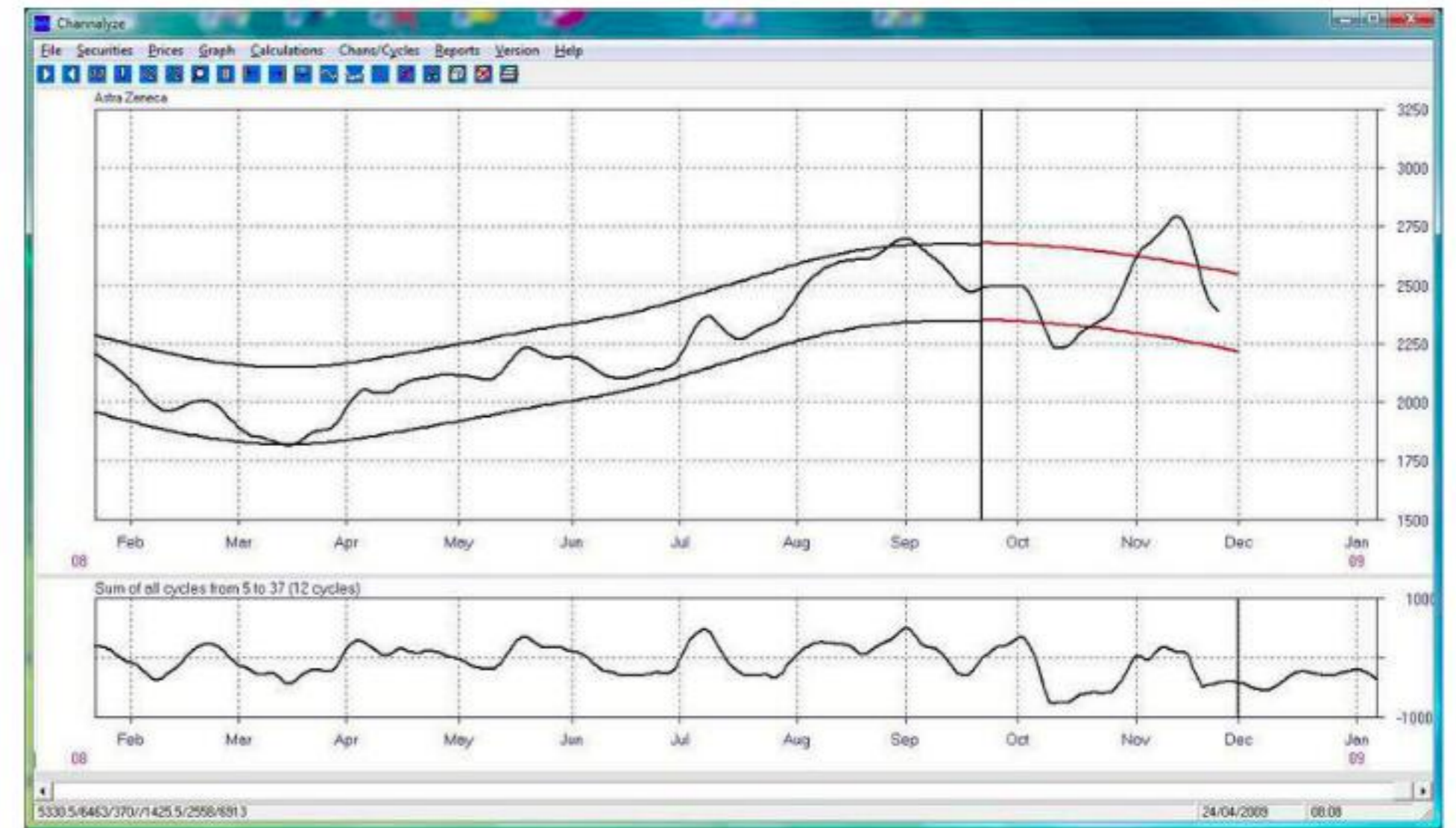


Extrapolation of Cycles

Note that just as is the case with channels, the cycle calculation terminates in the past. The higher the wavelength of the cycle, the further back is the last true calculated point and the longer the extrapolation. In the case of a cycle sum, the extrapolation is that needed for cycles of longest wavelength. Thus in Figure 13.3 this extrapolation is shown as being from a point in late October. This is a very important point, because it will be seen in later examples that the calculation of cycle sums can give an astonishingly accurate estimation of the path of a trend over long periods of time.

To provide a better comparison between the intra-channel movement and this cycle sum it is necessary to smooth out the intra-channel movement by removing cycles of less than 11-day wavelength. This is done by using a nine-point centred average (an 11-point average would remove cycles of wavelength 11 days, which is not what we want to happen). For ease of comparison, the price data itself is removed from the plot shown in Figure 13.4.

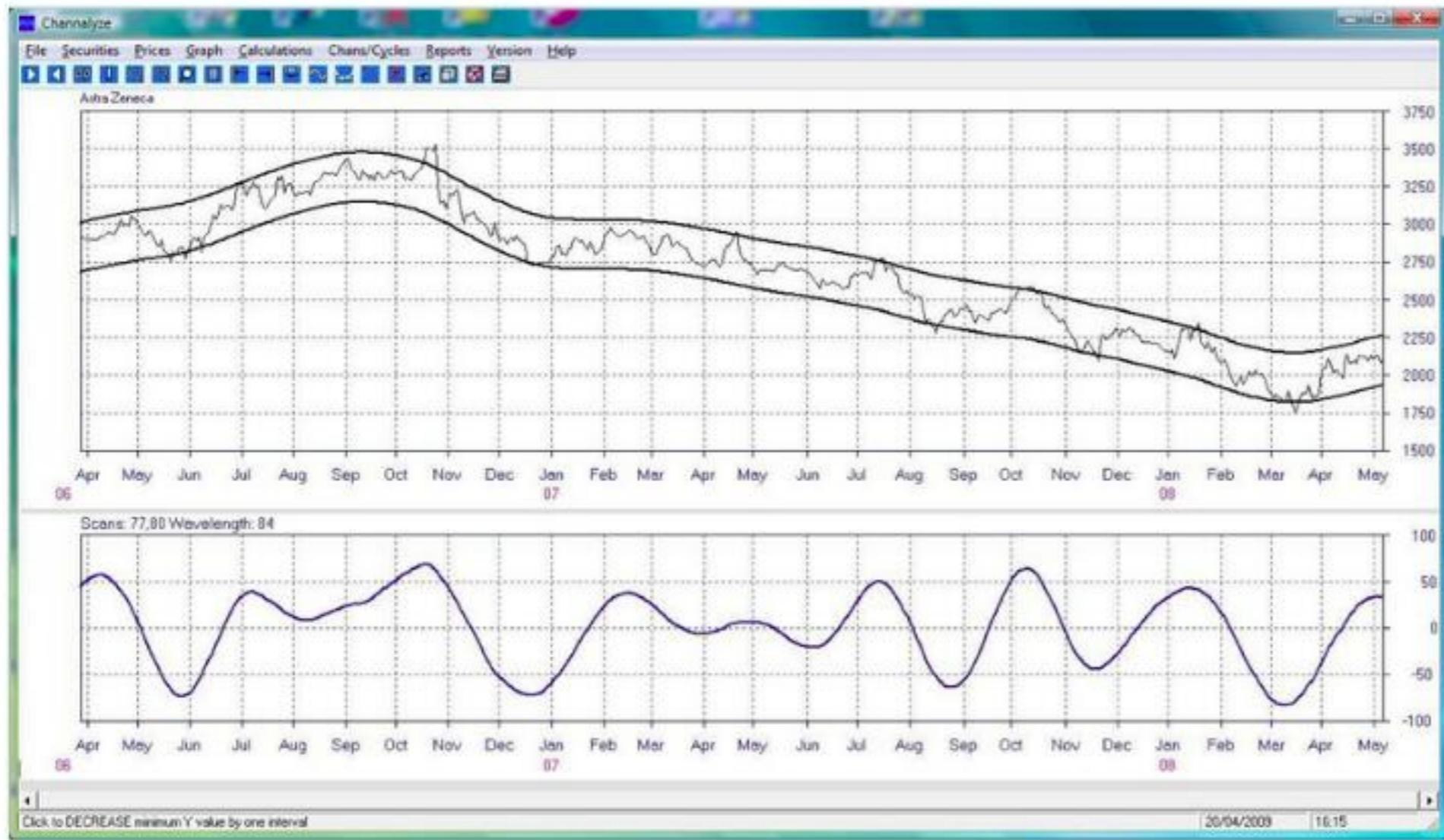
Figure 13.4 – The intra-channel movement has now been smoothed by using a nine-point centred average. The actual price data has been removed to aid the comparison with the cycle sum in the lower panel.



It can now be seen that up to the extrapolated part of the channel, the cycle sum and the nine-point average are very similar. However, there is a difference between these two over the last section of the plot. Why is this?

The answer lies in the fact that the properties of moving averages mean that the intra-channel movement in the case of this 101-day channel is the sum of all cycles of wavelength 101 days or less. We have left out an important cycle from the cycle sum and that is the cycle of wavelength 84 days. This cycle is shown in Figure 13.5

Figure 13.5 – The cycle of wavelength 84 days is shown in the lower panel. The peaks and troughs are mostly aligned with the major touching points in the channel.



The peaks and troughs in this cycle are mostly aligned with the major touching points of the intra-channel movement. However, it should be noted that this cycle is present in the distribution plot shown in Figure 13.1 because it is stable when determined at the position of the latest data point, which is further on in time than the position shown in Figure 13.5. Thus between April 2006 and July 2007 the cycle is obviously in an unstable state, while from July 2007 onwards it is in a more stable state. If the distribution had been determined in early July 2007, this cycle would not have appeared. Only those cycles which are currently stable at the time that the distribution is determined are isolated. Now we can see how a plot of all cycles from wavelengths 11 to 84 will compare with the nine-point centred average. This is shown in Figure 13.6.

Figure 13.6 – The cycle sum in the lower panel now contains all cycles of wavelengths up to 96 days.



There is a reasonable fit between the cycle sum and the nine-point average until a point about a third of the way along the extrapolated portion of the cycle sum. Then we can see that the cycle sum has bottomed out at a point when the nine-point average is still falling. The average is of course terminating half of its span in the past, but even allowing for that, these two plots are now out of synchronisation. If we take the sum of all of the cycles up to a wavelength of 300 days we get the position shown in Figure 13.7. Because of the large gap which has to be filled by extrapolation of these large wavelengths, this extrapolation covers almost all of the plot shown in the

figure. Even so, it can be seen that there is a good comparison between the extrapolated values and the actual intra-channel movement.

Figure 13.7 – The cycle sum in the lower panel now contains all cycles of wavelengths up to 300 days. Because of this large wavelength, the extrapolation of the cycle sum starting from the first vertical line in the lower panel covers almost all of the plot. Note how good the comparison is over most of the plot until the last few weeks. The vertical line in the upper panel is the start of the extrapolation of the channel.



The Comparator

In order to check how reliable a calculation of the cycle sum is as a proxy for the trend, we need to be able to confirm that it is still valid up to as recent a point in the past as possible. We have already used a nine-day centred average to smooth out the very short-term fluctuations in Figures 13.4 to 13.7. The advantage of this particular value is that the gap between the last calculated point and the present time is only four days. Thus if we see our predicted trend is in line with this centred average right up until four days ago, then we have high confidence that it is still valid today and should stay valid for the immediate future. **This is a fundamental issue in using cycle sums for trend prediction.**

Using this approach will rapidly discount those situations where the cycle sum is no longer valid and enable more time to be spent on the analysis of the situations which are valid. **Experience shows that only around 10% of stocks are in a phase where the cycles are currently stable enough to be good predictors of future trend movement.**

The comparator is actually the trend which we would like to estimate into the future since, as we showed earlier in this book, the price oscillates about the trend. The shorter the span of the average, the tighter the oscillations around this average. Thus a reasonable restricted range for a future price level will be the result of estimating a future trend based on a nine-day average.

Our daily test, therefore, of the value of using cycle sums is to check the accuracy of the prediction of the nine-day average right up to the point at which it terminates four days back in the past. If this prediction is not accurate, then the future prediction will not be accurate. At some point, the trend and the position of the price relative to the trend will be in a favourable position for the trader to open a position.

There are three reasons why a cycle sum is no longer valid:

1. One or more of the cycles may have changed wavelength and/or amplitude slightly so that the prediction of its future position will be in error.
2. One or more cycles which were stable have now become unstable, so that they are no longer included in the cycle sum.
3. One or more cycles which were unstable have now become stable.

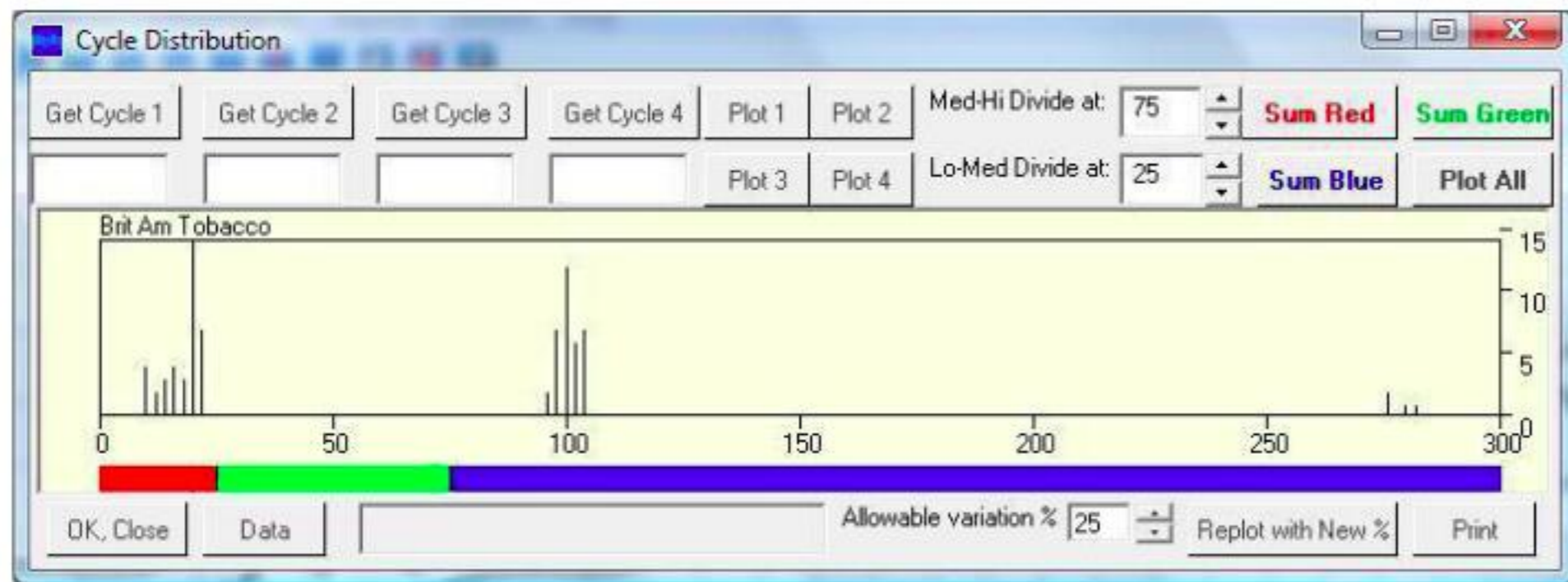
In a program such as Channalyze, this can be checked by studying the distribution of cycles each day as new data arrives. If the distribution remains the same, then that is a positive outcome. However, it is still necessary to check the amplitude and wavelength of each stable cycle to check for consistency.

NUMBER OF DIFFERENT CYCLES

Small number of cycles

The analysis of the stable cycles present in a stock price movement may show anything from just two major ones up to around 20 within the range of five days to 300 days. Figure 13.8 shows the distribution of cycles in the British American Tobacco stock price.

Figure 13.8 – The distribution of stable cycles in British American Tobacco. There are two main groups of cycles. One is centred around a wavelength of 100 days, while the other is centred around a wavelength of 25 days. Cycles within the 100-day group are essentially the same.

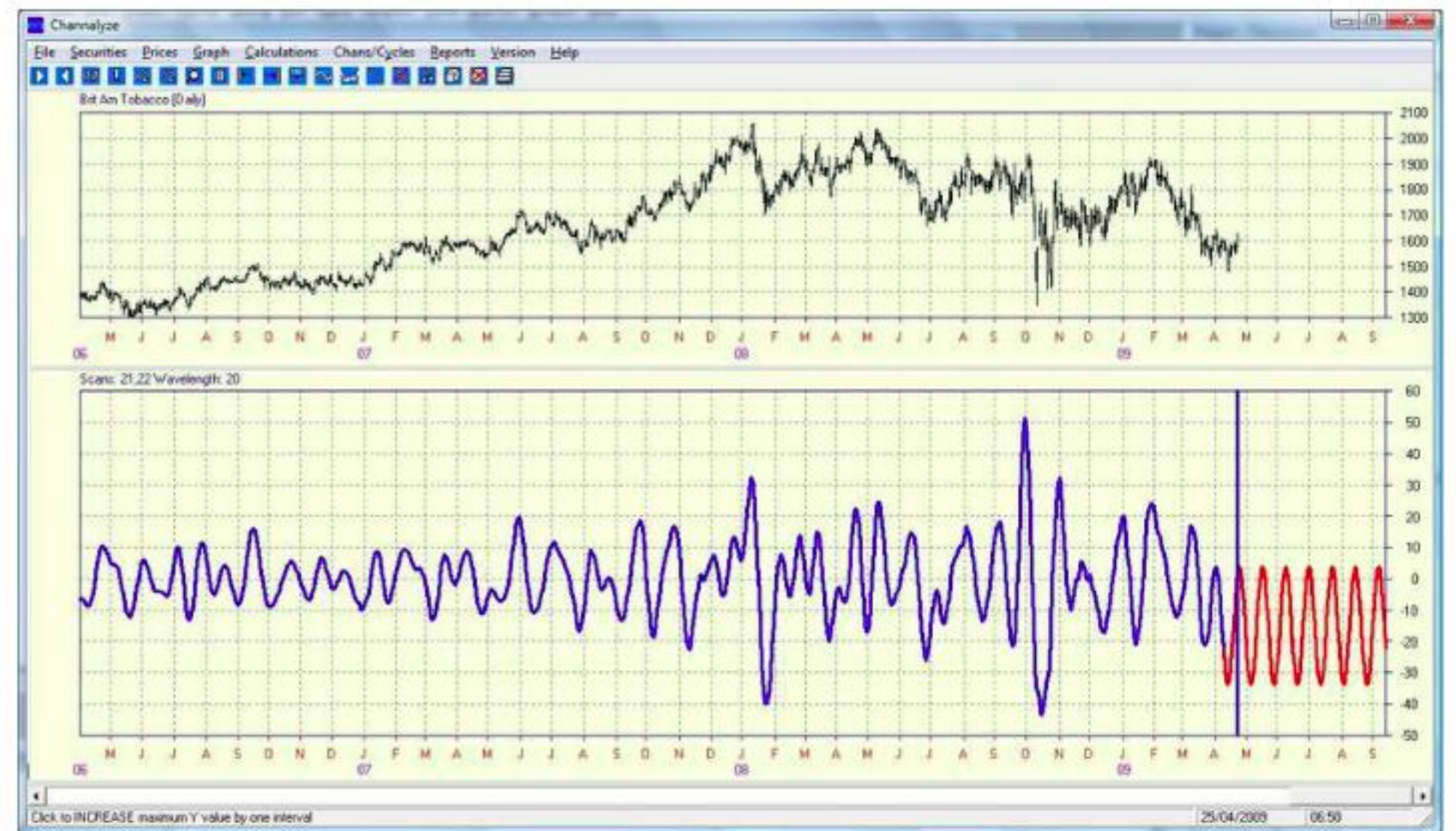


There are two main groups of cycles present. The group around a wavelength of 100 days is essentially the same cycle with a small change of a day or so in the estimation of wavelength from adjacent scans making it appear as multiple cycles. The same applies to the group at around 25 days. However, in this case, a change of one day in wavelength is of course a much larger percentage, so that each cycle in this group will bottom out or top out at different points.

As will be seen shortly, the best way forward in these situations is to sum the cycles in each of these groups to average out the variations.

In Figure 13.9 is shown the 20-day cycle. For much of its history it can be seen to have been unstable.

Figure 13.9 – The 20-day stable cycle in British American Tobacco. The vertical line shows the last calculated point of the cycle. The extrapolation to the right of this is a sine wave based on the recent wavelength and amplitude. The extrapolation is only valid for a few sweeps of the cycle and not for several months as shown here.



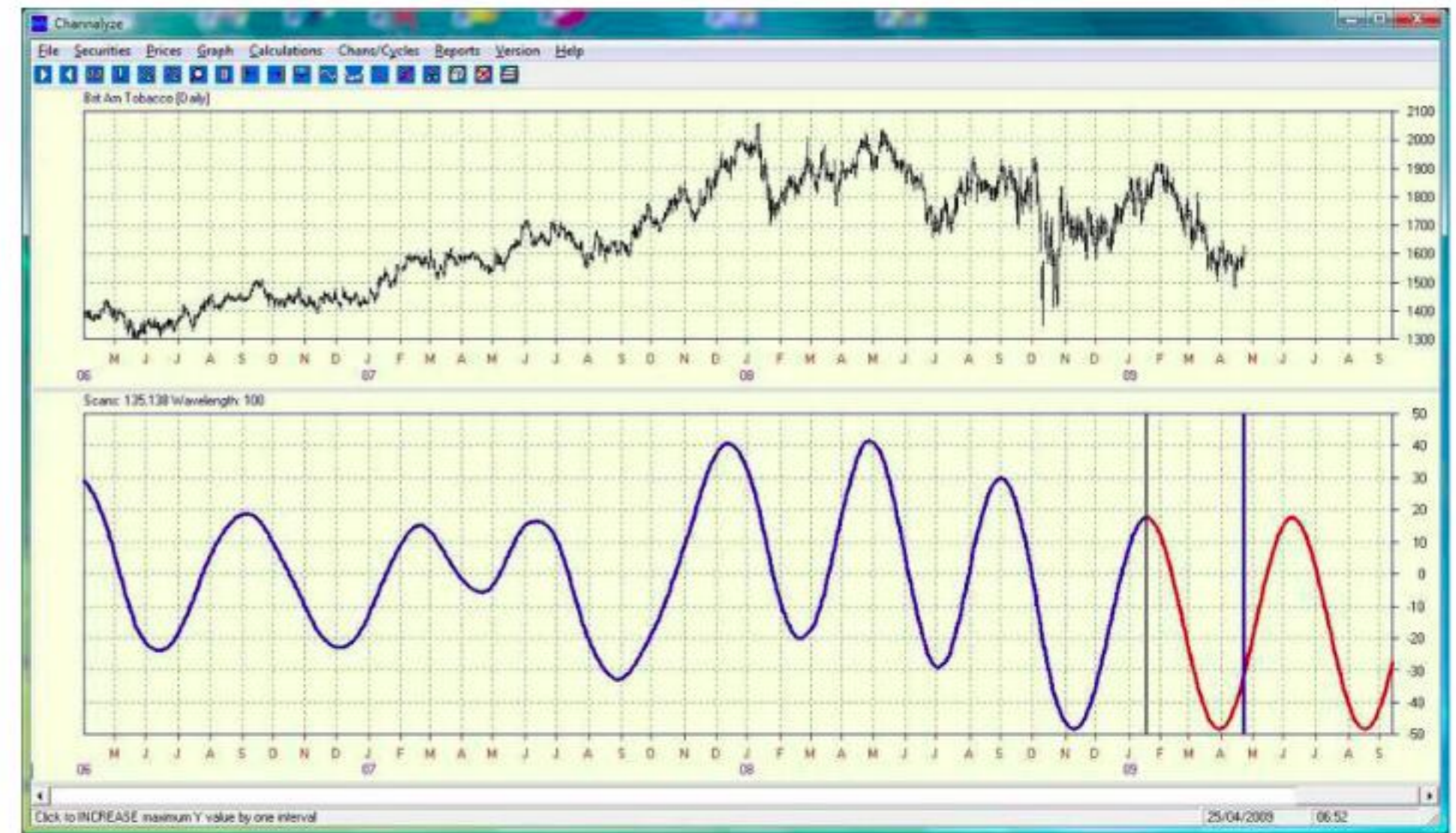
A better impression of its more recent stable phase can be obtained from the expanded chart shown in Figure 13.10. It can be seen now that the cycle has only been stable for two sweeps and that before that point it was very unstable. The message from this particular cycle is that its extrapolation is only going to be valid for a short period of time into the future.

Figure 13.10 – An expanded section of Figure 13.9 now shows the behaviour of the 20-day cycle in British American Tobacco more clearly. The left-hand vertical line shows the last calculated point of the cycle. The right-hand vertical line shows the position of the latest data point. The extrapolation goes from the left-hand vertical line and into the future.



The 100-day cycle is a different matter, as can be seen in Figure 13.11. Here we have an excellent example of a cycle which has been stable for the whole of 2008. The extrapolation of the cycle from the last true calculated point (shown by the left-hand vertical line) now has a high degree of confidence in its future position. The extrapolation suggests that the cycle has already bottomed out on 1 April 2009 and is on the way up at the position of the latest point, which is 23 April 2009. It should top out on 9 June 2009.

Figure 13.11 – The behaviour of the 100-day cycle in British American Tobacco. The right-hand vertical line shows the position of the most recent data point. The left-hand vertical line shows the point from which the extrapolation of the cycle commences.



The sum of all stable cycles is shown in the lower panel of Figure 13.12. For ease of comparison the data has been left out of the plot in the upper panel, which now just shows the comparator of the nine-day centred average. The cycle sum is almost an exact replicate of the comparator up to the point where the comparator terminates four days in the past.

Figure 13.12 – The sum of all stable cycles in British American Tobacco. The nine-day centred average comparator is shown in the upper panel. The left-hand vertical line shows the point from which the highest wavelength cycle has been extrapolated. The middle vertical line shows the point from which the shortest wavelength cycle has been extrapolated. The right-hand vertical line is the position of the latest data point. A rise in

the trend in the near future is forecast.

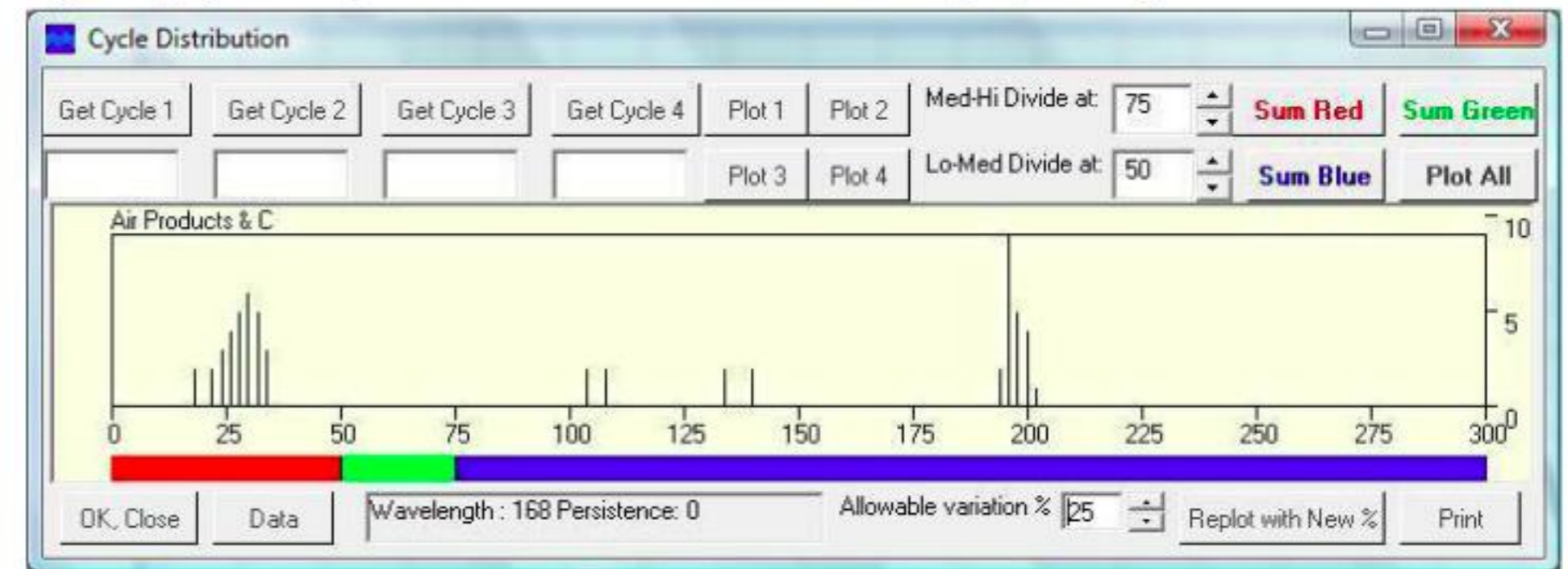


Remarkably, this replication is valid for some seventeen months. There must therefore be a very high probability that the estimation of the path that will be taken by the comparator, i.e. the nine-point average, in the near future will also be correct.

The trough on 14 April which has just been formed in the nine-day cycle is replicated in the cycle sum, which can be seen to have risen from this trough to the present time and is still forecast to continue to rise in the near future. Not shown in Figure 13.12 is the expected topping out of the cycle sum around 1 June 2009. This is in advance of the topping point for the 100-day cycle (9 June) because the short-term cycles are expected to top out prior to this date and the additive effect brings the maximum to this point.

It should be noted that since we have seen that the short-term cycles are only expected to be valid for a short time, this exact top determined from the cycle sum will be subject to a degree of uncertainty. However, the positive message from this cycle sum is that we can expect the trend to be rising until at least late May. Since this analysis was performed on 23 April, this means that the trader can expect around a month of rising trend. Naturally, as pointed out elsewhere in this book, the price itself will oscillate around this trend. Channel analysis will help to pin down buying and selling points over this future period. It needs to be pointed out that just because there are only a few cycles present in the data, it does not follow that the extrapolation of the trend will be consistent with the comparator. Figure 13.13 shows the distribution of the cycles in Air Products. It can be seen that there are mainly two groups of cycles, with wavelengths around 26 days and 198 days. A few other cycles can be seen with wavelengths between 100 days and 150 days.

Figure 13.13 – The cycle distribution in Air Products at 23 April 2009.



The cycle sum from this distribution is shown in Figure 13.14. It can be seen quite clearly

that although there was an excellent correlation between the cycle sum and the comparator up to the position of the trough seen in mid-March, from this point onwards the cycle sum does not replicate the comparator up to 23 April. Thus the prediction beyond the last data point and the near future is not valid and must not be trusted.

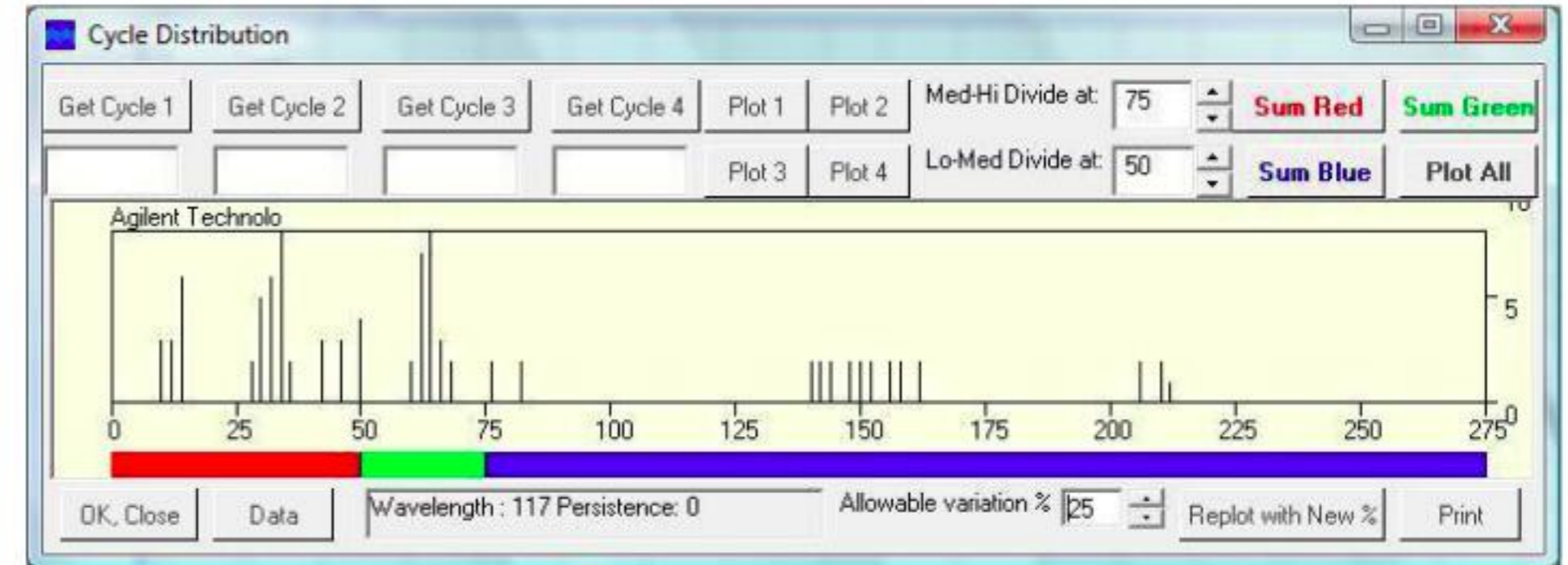
Figure 13.14 – The sum of all stable cycles in Air Products as at 23 April 2009. The nine-day centred average comparator is shown in the upper panel. The left-hand vertical line shows the point from which the highest wavelength cycle has been extrapolated. The vertical line at the right is the position of the latest data point.



It would now be logical to assume that the cycle sum only replicates the comparator on those few occasions when there are only a few cycles present. Where there are a large

number of cycles it would be logical to think that there is a greater chance of some of these becoming unstable in their extrapolated portion, so that any prediction will not be valid. The large number of cycles present in Agilent Technology is shown in Figure 13.15.

Figure 13.15 – The cycle distribution in Agilent Technology at 23 April 2009. There are a great many cycles present.



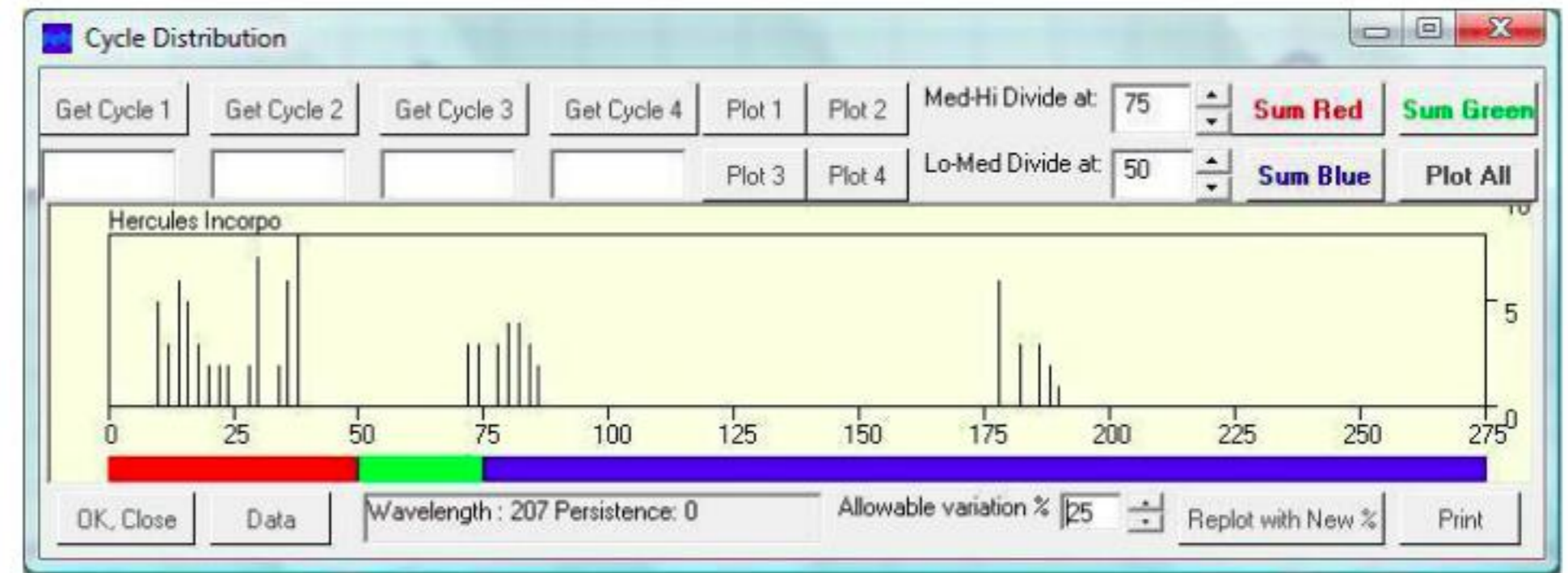
It is not surprising, therefore, that the cycle sum does not replicate the comparator from late in March until the last data point on April 23 (Figure 13.16). The cycle sum is seen to be falling while the comparator was rising until it terminated four days in the past. The explanation for the failure of the cycle sum to follow the comparator right up to the cut-off point in the comparator in both Air Products and Agilent Technology must be that an important stable cycle has now become unstable. Since the cycle sum will be more reactive to a change in the wavelength and hence the position of the next peak or trough, the assumption must be that a short-term cycle has now changed, in fact it might have disappeared altogether.

Figure 13.16 – The sum of all stable cycles in Agilent Technology as at 23 April 2009. The nine-day centred average comparator is shown in the upper panel. The left-hand vertical line shows the point from which the highest wavelength cycle has been extrapolated. The vertical line at the right is the position of the latest data point.



While it is logical to assume that a large number of stable cycles implies that the extrapolation is subject to a large error, this is not always the case. Thus in Hercules Inc. there is a large number of cycles of short wavelength, as well as some groups with wavelengths around 75 days and another of around 175 days, as can be seen in Figure 13.17.

Figure 13.17 – The cycle distribution in Hercules Inc. at 23 April 2009. There are a great many cycles present, especially those with short wavelengths.



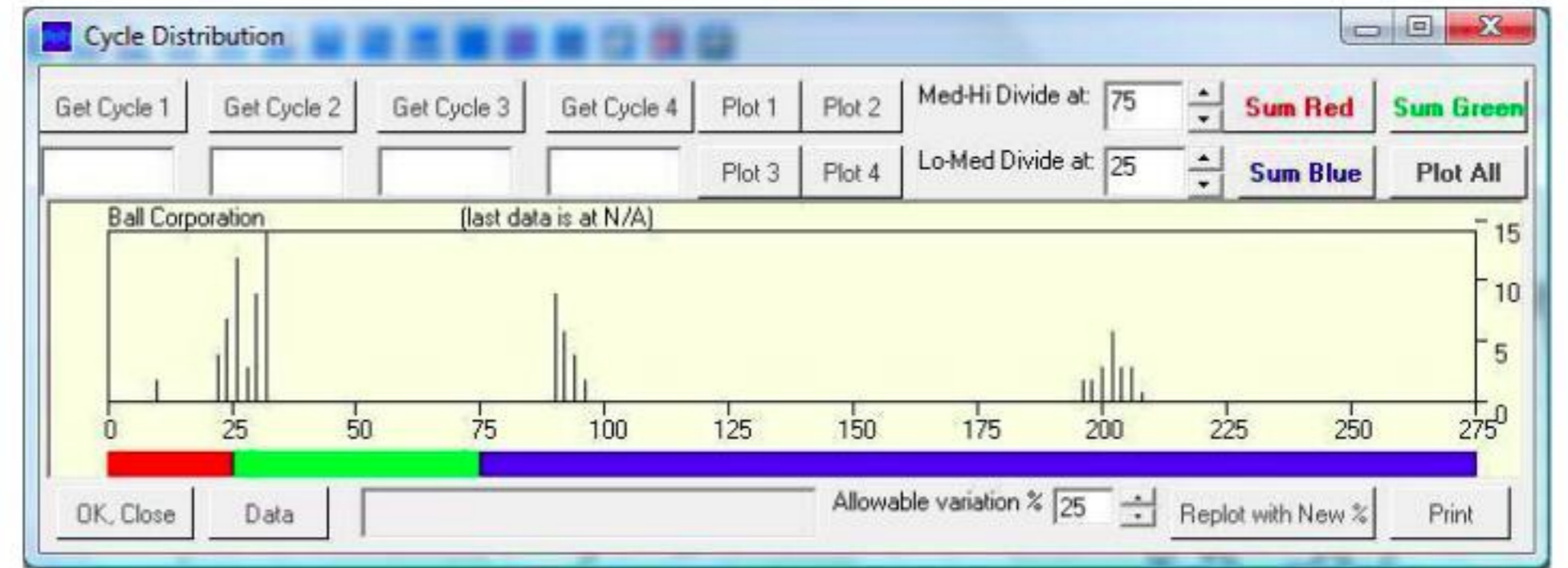
However, the cycle sum as shown in Figure 13.18 is a very good replicate of the comparator over the very long period from July 2007 to November 2008. While the prediction is for a small downturn within the next few days, followed by a rise, the influence of the large number of very short-term cycles extends much further into the near future than it is sensible to extrapolate. The reason for this lengthy extrapolation is because the cycles of wavelengths around 175 are normally extrapolated for about one wavelength into the future, taking us to June 2009. Because of the large number of short-term cycles, this extrapolation would only be taken to be valid for the next few weeks.

Figure 13.18 – The sum of all stable cycles in Hercules Inc. as at 23 April 2009. The nine-day centred average comparator is shown in the upper panel. The left-hand vertical line shows the point from which the highest wavelength cycle has been extrapolated. The vertical line at the right is the position of the latest data point. See text for comment on the future extrapolation.



The ideal situation for summing stable cycles is when we have a small number of tight groups of cycles. This position is exemplified by the distribution shown for Ball Corporation in Figure 13.19.

Figure 13.19 – The cycle distribution in Ball Corporation at 23 April 2009. There are three distinct cycles present. This is an ideal distribution.



The expectation here is that the cycle sum will be extremely reliable. The plot of the cycle sum is shown in Figure 13.20. Our expectation is seen to be correct, since the cycle sum is almost a perfect replicate of the comparator. Note also the small range of oscillation of the price data around the comparator. This means that a good prediction of the future trend will give an excellent prediction of the range within which the price will be contained when the probability methods are employed.

Figure 13.20 – The sum of all stable cycles in Ball Corporation as at 23 April 2009. The nine-day centred average comparator is shown in the upper panel. The vertical line at the right is the position of the latest data point. All of the cycle sum trace to the left of this line is the result of extrapolation.

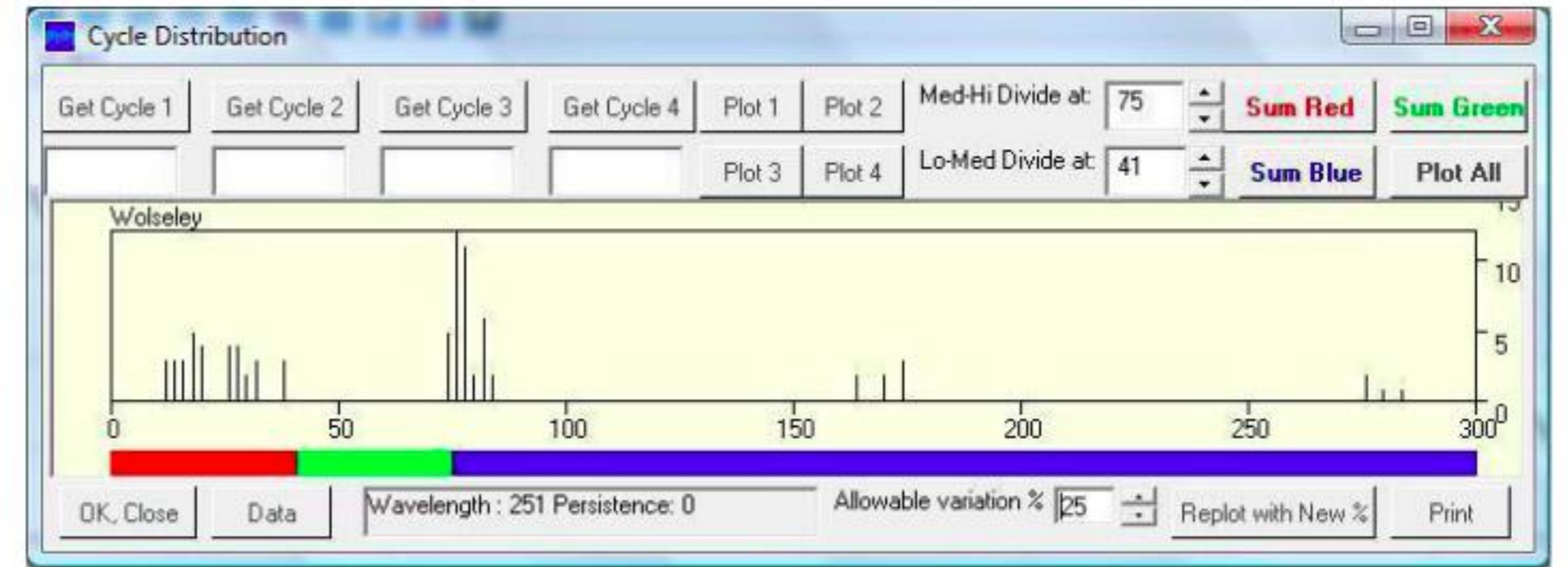
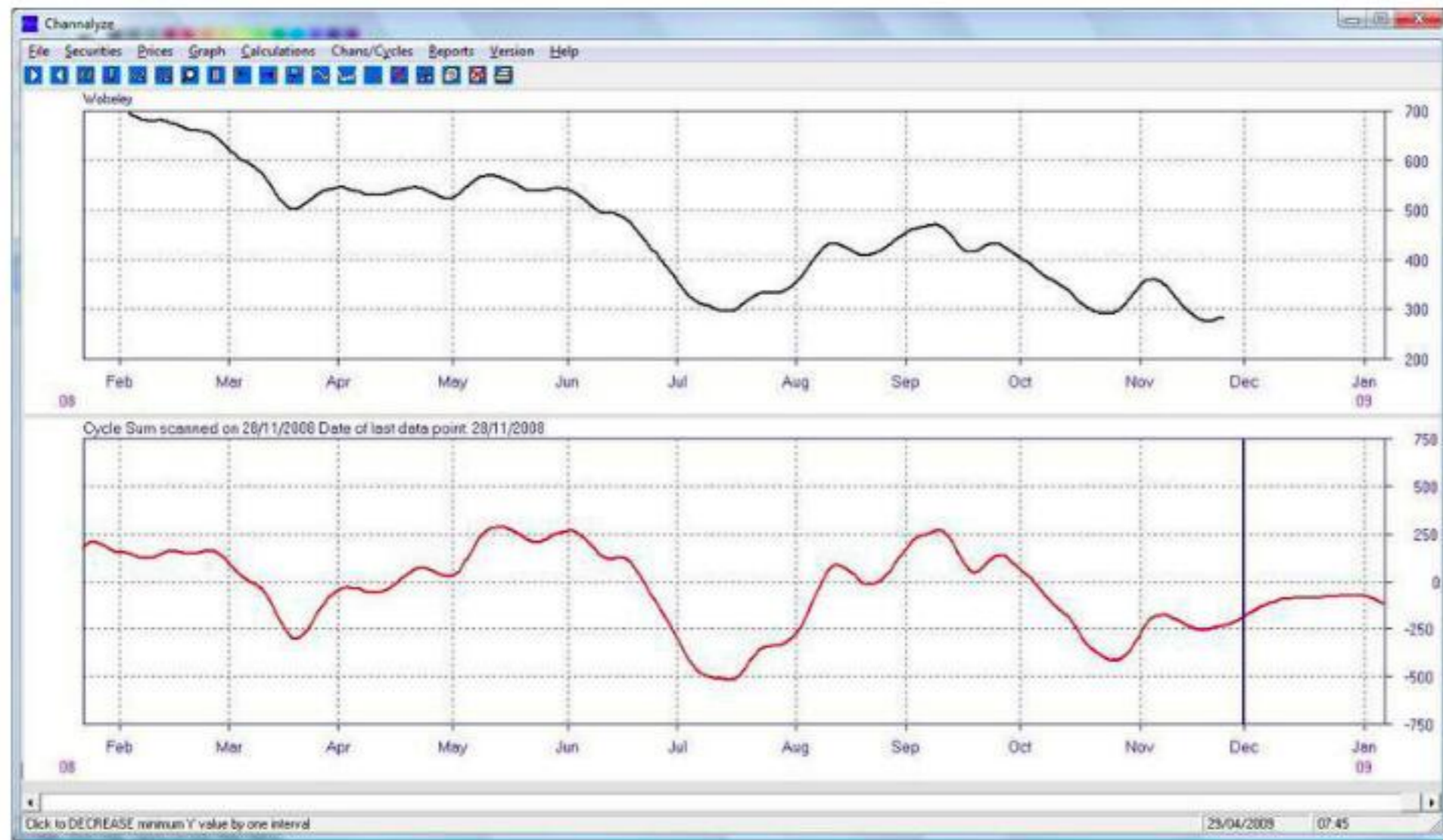


Figure 13.22 – The cycle sum for Wolseley calculated on 28 November 2008. The comparator is shown in the upper panel. The vertical line at the right in the lower panel is the position of the latest data point. The section of the cycle sum shown above is extrapolated.

It is helpful in these examples to show how valid the extrapolation of the cycle sum, and hence the trend, was at the time by calculating the comparator far enough in the future that we have the true values for the trend as given by the nine-day average. This situation is followed for Wolseley in Figures 13.21 to 13.24.

It can be seen in Figure 13.21 that while the important group of cycles is grouped around a wavelength of 70-80 days, there are also high wavelengths present within the range 150 to 300 days. At this point in time (November 2008) the cycle sum agrees very well with the comparator, as shown in Figure 13.22.

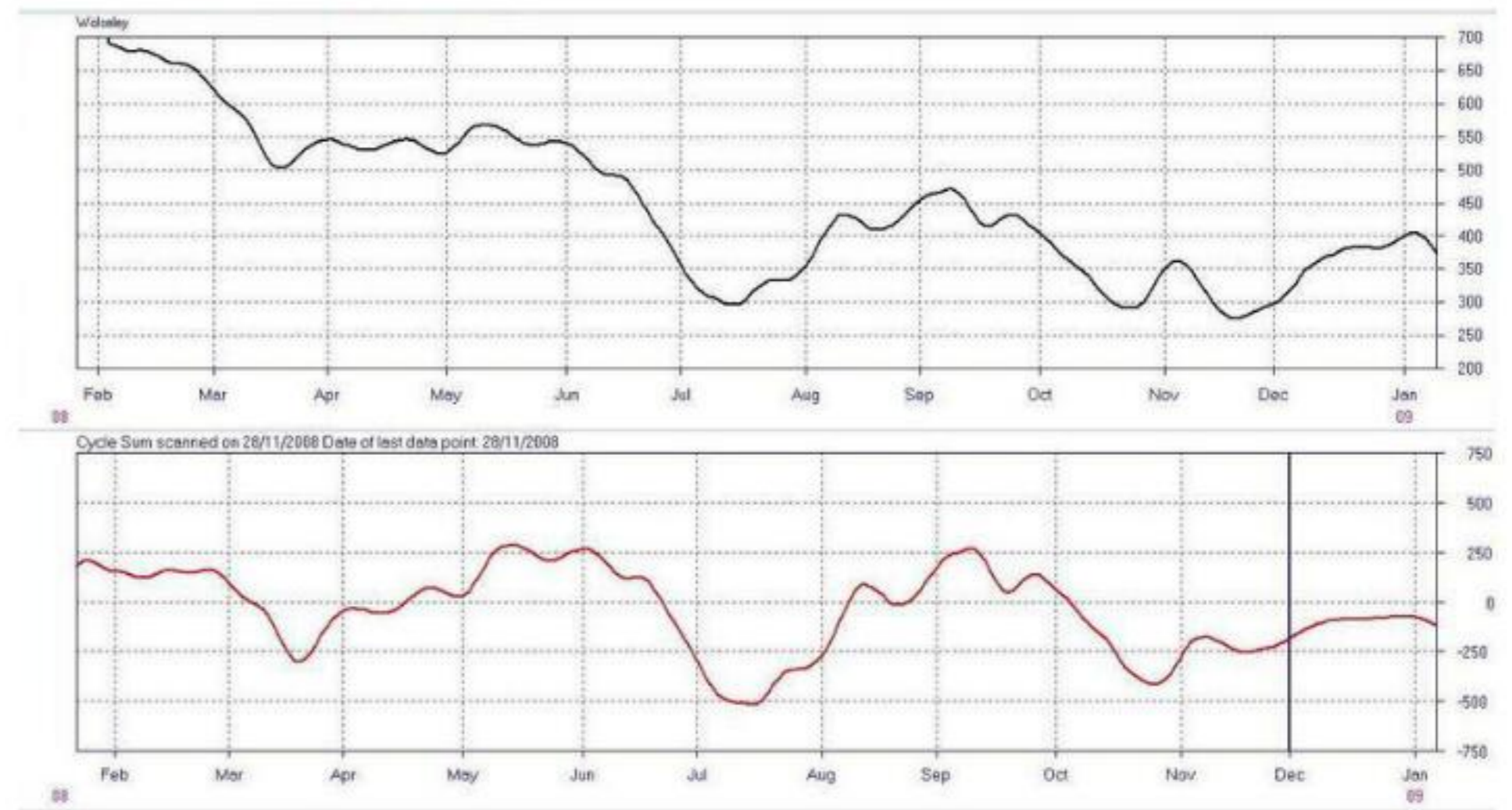
Figure 13.21 – The cycle distribution in Wolseley at 28 November 2008.



Viewed at from a much later point in time (23 April 2009), where we now have the benefit of the true calculation of the comparator, it can be seen that the extrapolated cycle sum in the lower panel of Figure 13.23, taken from Figure 13.22, is almost identical with the true comparator shown in the upper panel of Figure 13.23.

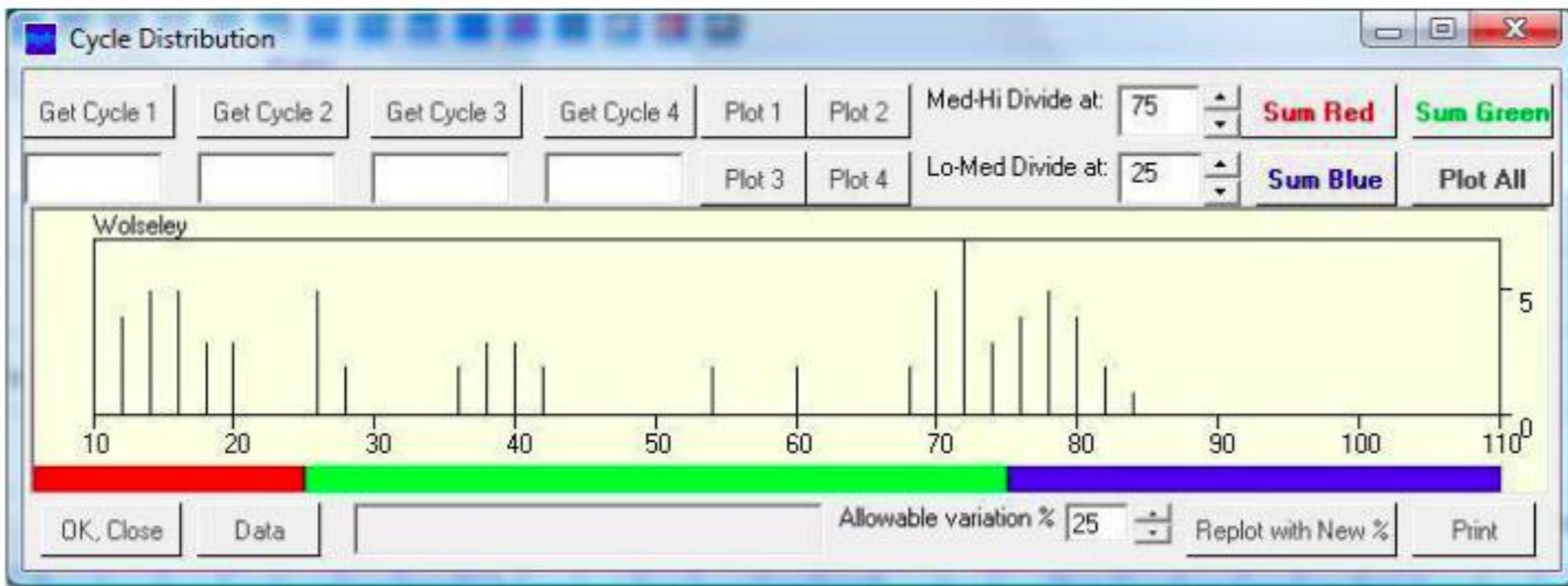
This is an excellent example that confirms the usefulness of this method of trend prediction.

Figure 13.23 – The upper panel shows the true value of the nine-day average calculated at 23 April 2009. The lower panel shows the cycle sum calculated in November 2008. The two plots are of almost identical shape. Note that the vertical scales are of necessity different.



It is interesting to see the cycle distribution calculated on 23 April 2009. This is shown in Figure 13.24. The wavelength axes are now different for the reason that the high wavelengths remarked on earlier are now absent. However, the group of cycles of wavelength between 70 and 80 days remains essentially the same while there are some new cycles of wavelengths between 50 and 60 days.

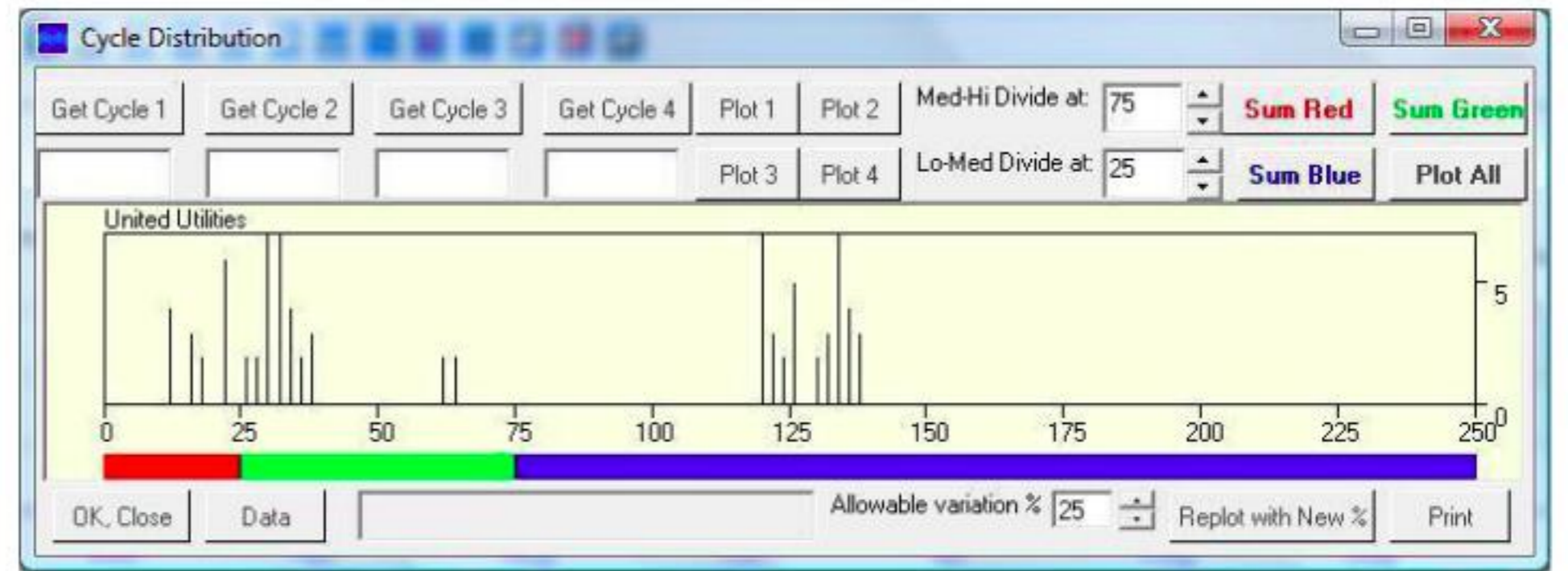
Figure 13.24 – The cycle distribution in Wolseley at 23 April 2009.



This change in the distribution would be expected to affect the cycle sums, making them differ from the true value. However, the change in the stable cycles shown in Figure 13.24 did not happen until March 2009, so that the original cycle distribution remained in effect for around four months. Thus the prediction in November remained valid.

The cycle distribution in United Utilities is shown in Figure 13.25. Again, we have the favourable position that there are only a few groups of cycles and the main groups are quite widely separated in wavelength. We would therefore expect that the cycle sum would replicate the comparator quite closely. This is indeed the case as shown by the plots in Figure 13.26.

Figure 13.25 – The cycle distribution in United Utilities at 28 November 2009.



What is interesting about this chart (13.25) is that the prediction is for the cycle sum to bottom out and then rise for a short period, fall back and then rise again.

Figure 13.26 – The cycle sum in United Utilities on 28 November 2008.



By 23 April 2009, the actual progress of the comparator enables a comparison to be made with the predicted cycle sum shown in Figure 13.27.

Figure 13.27 – The cycle sum in United Utilities on 23 April 2009. The comparator can now be compared with the predicted cycle sum in Figure 13.26.



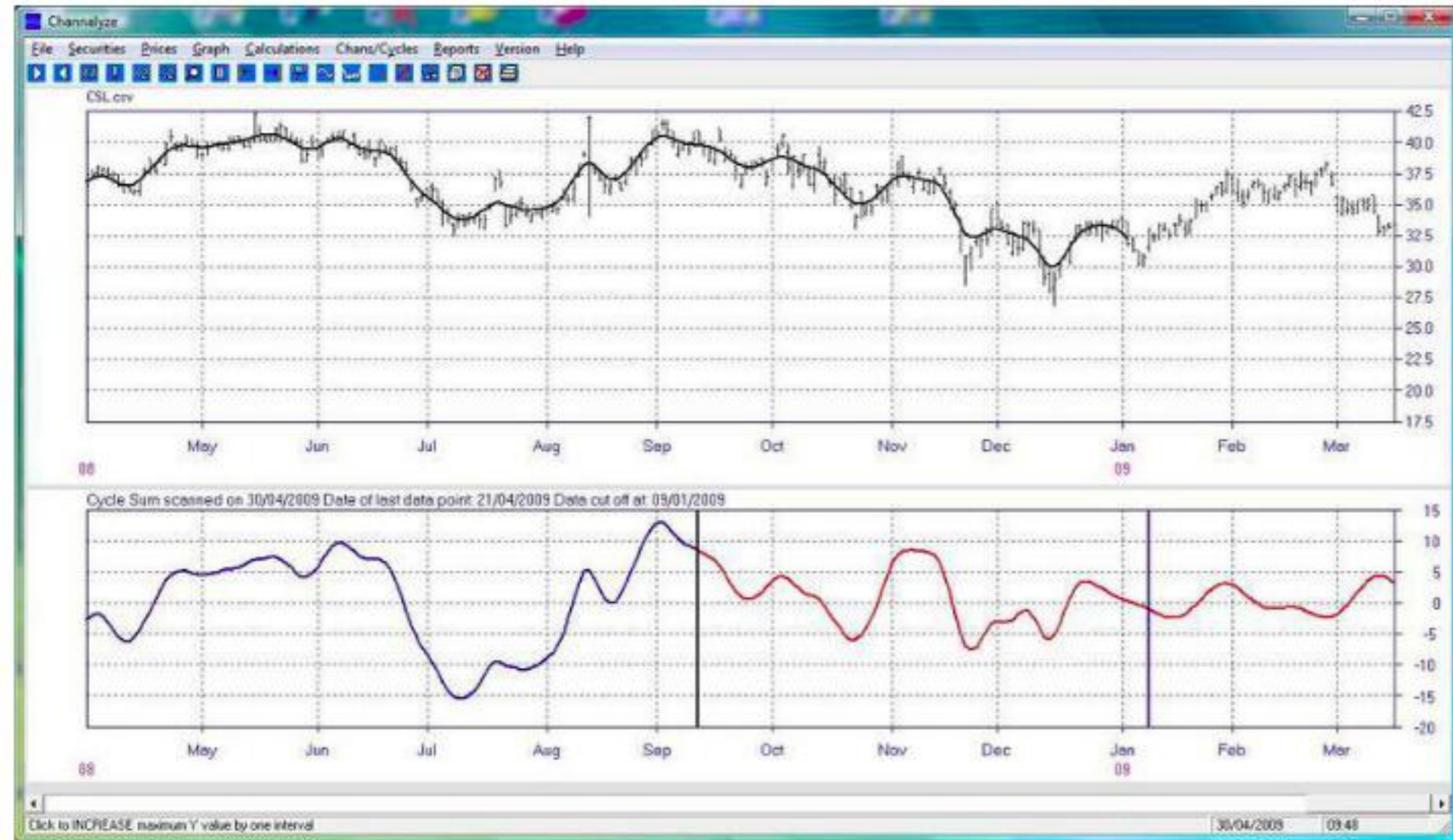
The predicted turning points in the cycle sum are compared with the actual turning points in the comparator nine-day centred average and are shown in Table 13.1. Bearing in mind that the prediction was carried out in November the agreement is astonishing, with some predictions being exactly right and those that are incorrect are only a few days out, even as far into the future as the end of January.

Table 13.1 – Predicted turning points in the cycle sum compared with actual turning points in the nine-day centred average.

Cycles are present in all markets and the value of cycle sums in predicting future trends is equally valid whatever the market, with the proviso that in most markets only around

10% of the securities are passing through a phase where their cycles are predictable. Thus in the Australian market we show the position in Figure 13.28 of CSL Ltd, a bio-pharmaceutical company, at three different points in time in 2009.

Figure 13.28 – The cycle sum for CSL Ltd calculated on 9 January 2009. The vertical line at the right is the position of the latest data point. The section of the cycle sum between the two vertical lines is extrapolated.



We can see from the subsequent movement of the price data after 9 January that the predicted trend is compatible with the price movement. The comparator is also in agreement with the cycle sum. Thus the cycles in CSL are remaining stable. This is also the case for the position in February 2009 (Figure 13.29) and April 2009 (Figure 13.30).

Figure 13.29 – The cycle sum for CSL Ltd calculated on 4 February 2009. The vertical line at the right is the position of the latest data point. The section of the cycle sum between the two vertical lines is extrapolated.



Figure 13.30 – The cycle sum for CSL Ltd calculated on 21 April 2009. The vertical line at the right is the position of the latest data point. The section of the cycle sum between the two vertical lines is extrapolated.



Failure of Extrapolations

It is interesting to study the changes which occur in the number and wavelengths of the stable cycles between two points in time which are reasonably far apart. In the case of Rolls-Royce, the position on the 23 April shown in Figure 13.31 can be compared with the position six months earlier on 2 February 2009 in Figure 13.32.

FIGURE 13.31 – THE DISTRIBUTION OF STABLE CYCLES IN ROLLS-ROYCE ON 23 APRIL 2009.

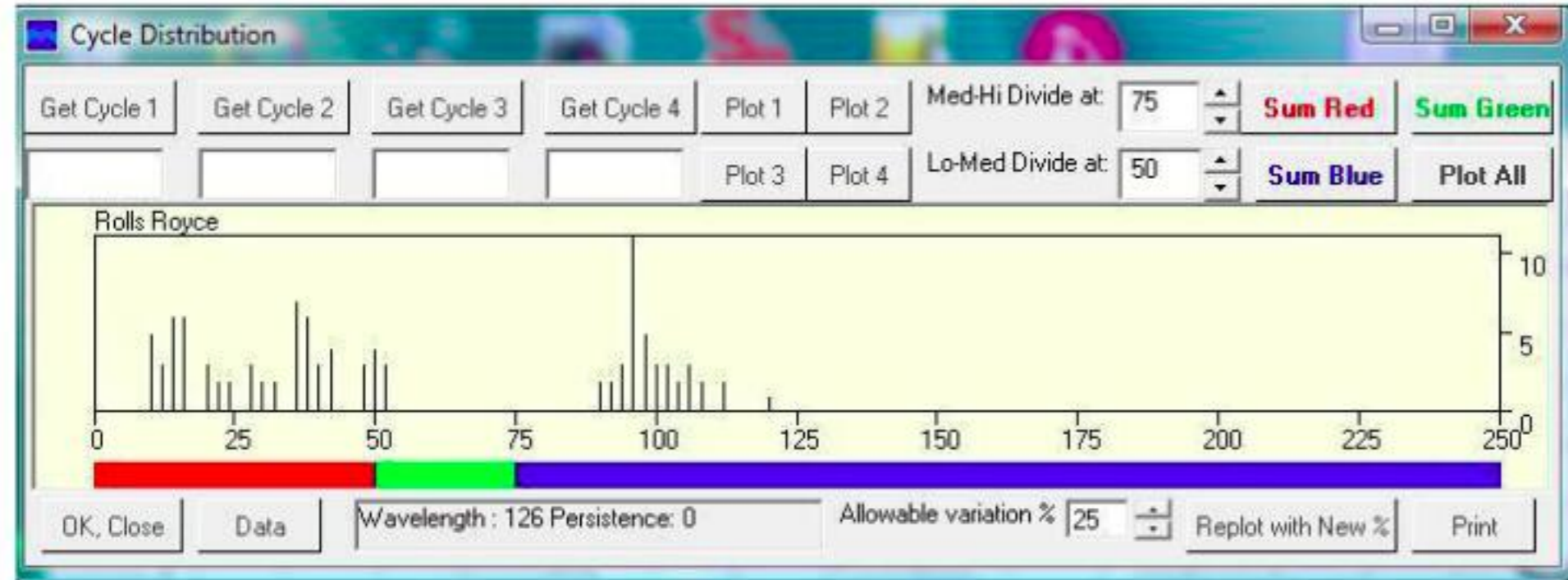
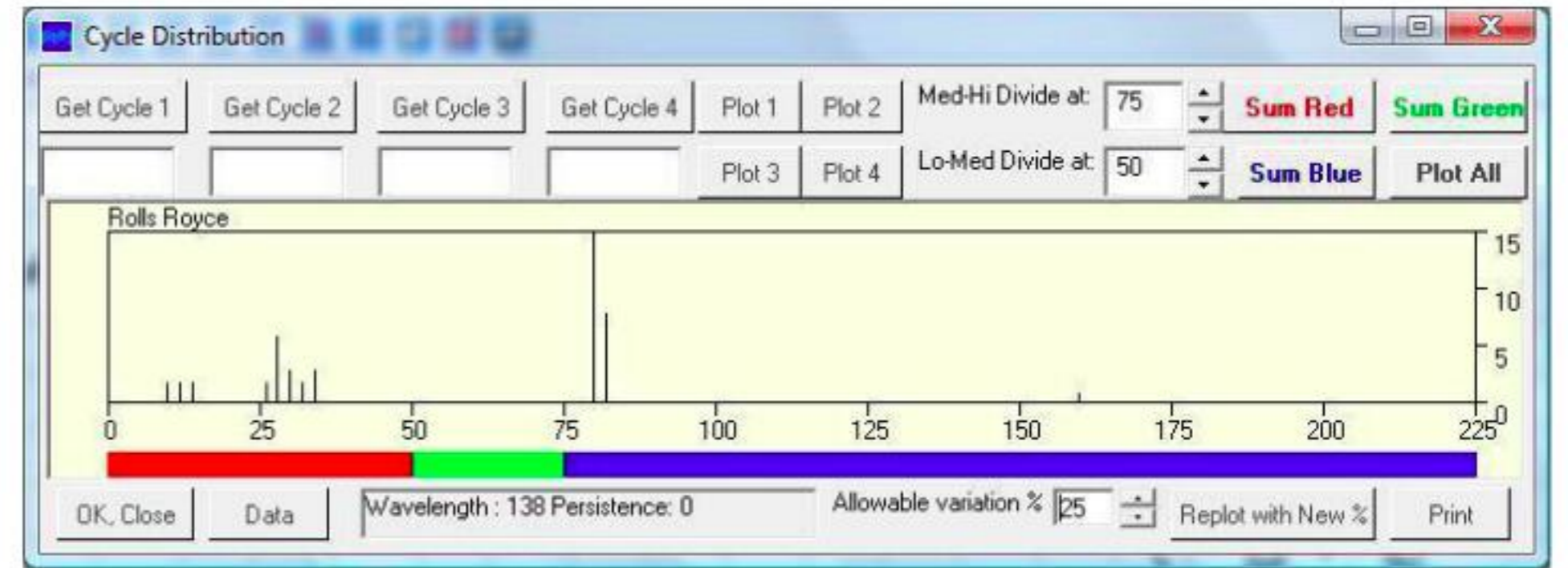
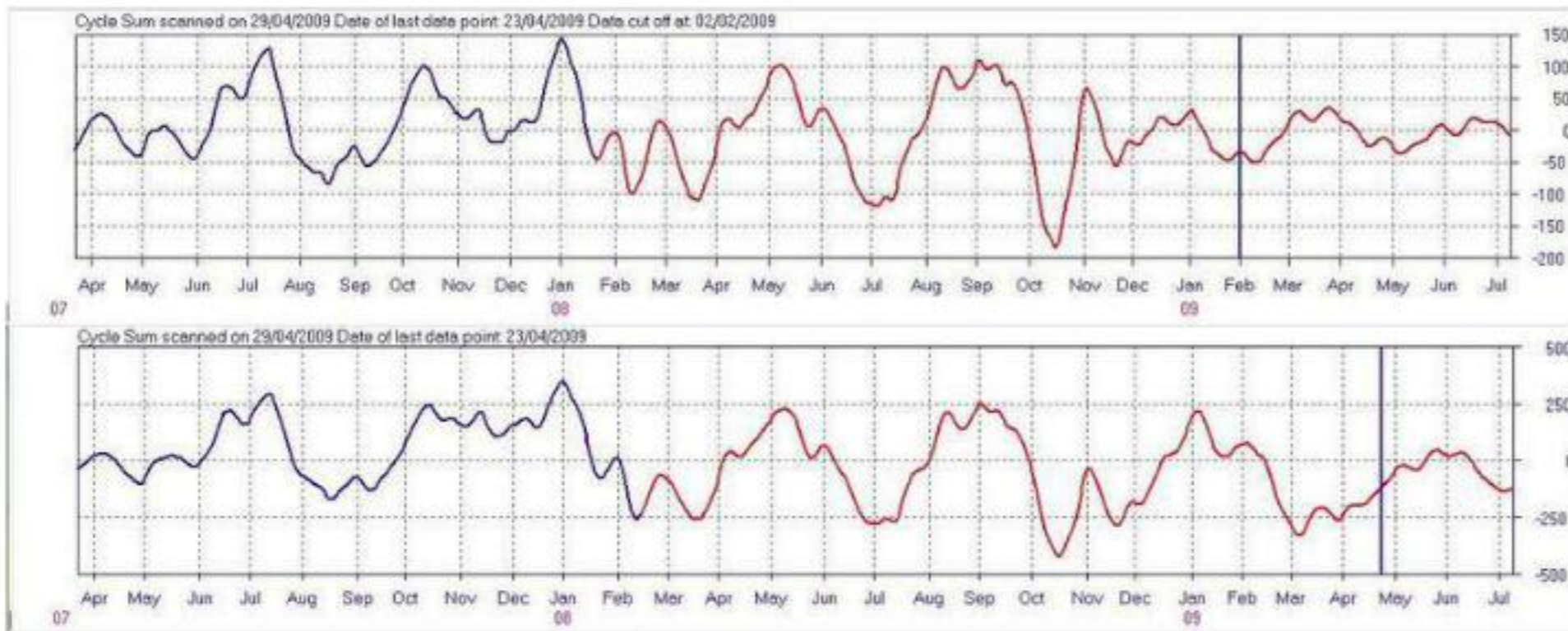


FIGURE 13.32 – THE DISTRIBUTION OF STABLE CYCLES IN ROLLS-ROYCE ON 2 FEBRUARY 2009.



It can be seen that there is such an enormous difference between the two cycle sums that they would appear not to be from the same security. The peaks grouped around a wavelength of 96 days in April were totally absent in February, as were the peaks of wavelengths less than 25 days. On the other hand, the peaks of wavelengths 80 and 82 present in February are not present in April. It is not surprising therefore that with such a drastic difference in the number and wavelength of stable cycles between the two points in time that the two extrapolations of the cycle sums are also quite different. These two are compared in Figure 13.33.

FIGURE 13.33 – THE CYCLE SUM ON 2 FEBRUARY 2009 (UPPER PANEL) COMPARED WITH THE CYCLE SUM ON 23 APRIL (LOWER PANEL).



The predictions couldn't be more different. In February the prediction is for a small fall followed by a rise, whereas in April the prediction for the same section of time is for a large fall. It will of course be several months into the future before the true value for the comparator can be obtained.

When the cycle sum obtained in February is judged against the comparator (Figure 13.34), it is seen to be consistent. The peak on 5 January in the sum occurs two days before the peak in the comparator, but this is only a minor difference. Thus there is no reason to believe at this point that the prediction for a rise in the trend in the near future is other than correct.

Quite clearly, since the subsequent movement of the price is in the opposite direction, we would have made a major mistake in basing a trading decision on the position on 2 January.

FIGURE 13.34 – THE CYCLE SUM FOR ROLLS-ROYCE ON 2 FEBRUARY 2009 (LOWER PANEL) IS CONSISTENT WITH THE COMPARATOR (UPPER PANEL).



It is always necessary to recalculate the cycle sum each day as the new daily close value becomes available. This will usually show immediately when the cycle sum no longer agrees with the comparator. However, in the case of Rolls-Royce this did not happen. For the next ten days or so, the extrapolation of the cycle sum gave the same prediction of a minor peak followed by a longer rise.

The question therefore arises as to how we can avoid such situations in which the cycle sum is giving the wrong prediction. The problem is that there is nothing in the properties of the stable cycles themselves which will give an indication of the wrong prediction. The answer lies in confirmation of the prediction by using probability and channel analysis, as discussed in the next chapter.

14. Bringing it All Together

Although the primary predictive tool is the cycle sum, we saw in the last chapter that it is dangerous to rely on just this when taking a trading decision. There is a logical sequence that must be followed if consistent success is to be obtained.

Four Key Steps

If you have a software package that will calculate cycle sums and channels, the steps are:

1. Get the cycle sum, as discussed in Chapter 13, and make sure that the cycle sum is as close as possible in shape to the comparator nine-day centred average. As we mentioned previously, only about 10% of the securities in any one market will satisfy this test.
2. If the cycle sum agrees with the comparator, construct the 51-day and 101-day channels. Analyse these using the principles discussed in Chapters 11 and 1. We are looking for a value of the security having just retreated from a boundary. Retreat from the lower boundary signifies a probable rise; retreat from the upper boundary signifies a probable fall.
3. If the channel analysis confirms the outcome expected from the cycle sum, use the probability analysis method discussed in Chapter 4 for the estimated price range five days into the future.
4. If the estimated position of the trend of interest five days into the future lies within the probable price range and somewhere near the middle, then all probabilities are favourable to take a position.

If you do not have a software package that will calculate cycle sums and channels, the steps are:

1. Use the methods described to obtain three key cycles. Good general values are 25-day (use the difference between 21- and 29-day triangularly weighted centred

averages), 75-day (use the difference between 65- and 85-day triangularly weighted centred averages) and 151-day cycles (use the difference between 131- and 171-day triangularly weighted centred averages). Many packages will allow you to create your own indicators so that you can take the difference between two centred averages. Make sure that you take the correct difference – it is the value of the shorter-term average minus the value for the longer-term average at each point in time. Also plot the nine-day centred average as the comparator.

2. Use your software package to plot the 51-day and 101-day centred averages. Using a piece of paper and a pencil on a printout of this chart, draw lines an equal distance above and below each average so as to end up with channels which contain the vast majority of the day-to-day movement of the security. Your paper-and-pencil channels can be analysed in exactly the same way as discussed in Chapters 11 and 1.
3. If you have the time and patience, you can construct the five-day distributions of the price changes and estimate the probable price range five days into the future.

You will now have replicated, as closely as possible, the procedure followed by readers who have a package which calculates cycle sums and channels.

Although we have frequently mentioned that only about 10% of securities will pass the first test of having stable, predictable cycles, this should be a large enough pool to end up with several securities that have passed all of the tests for a high probability near-future movement.

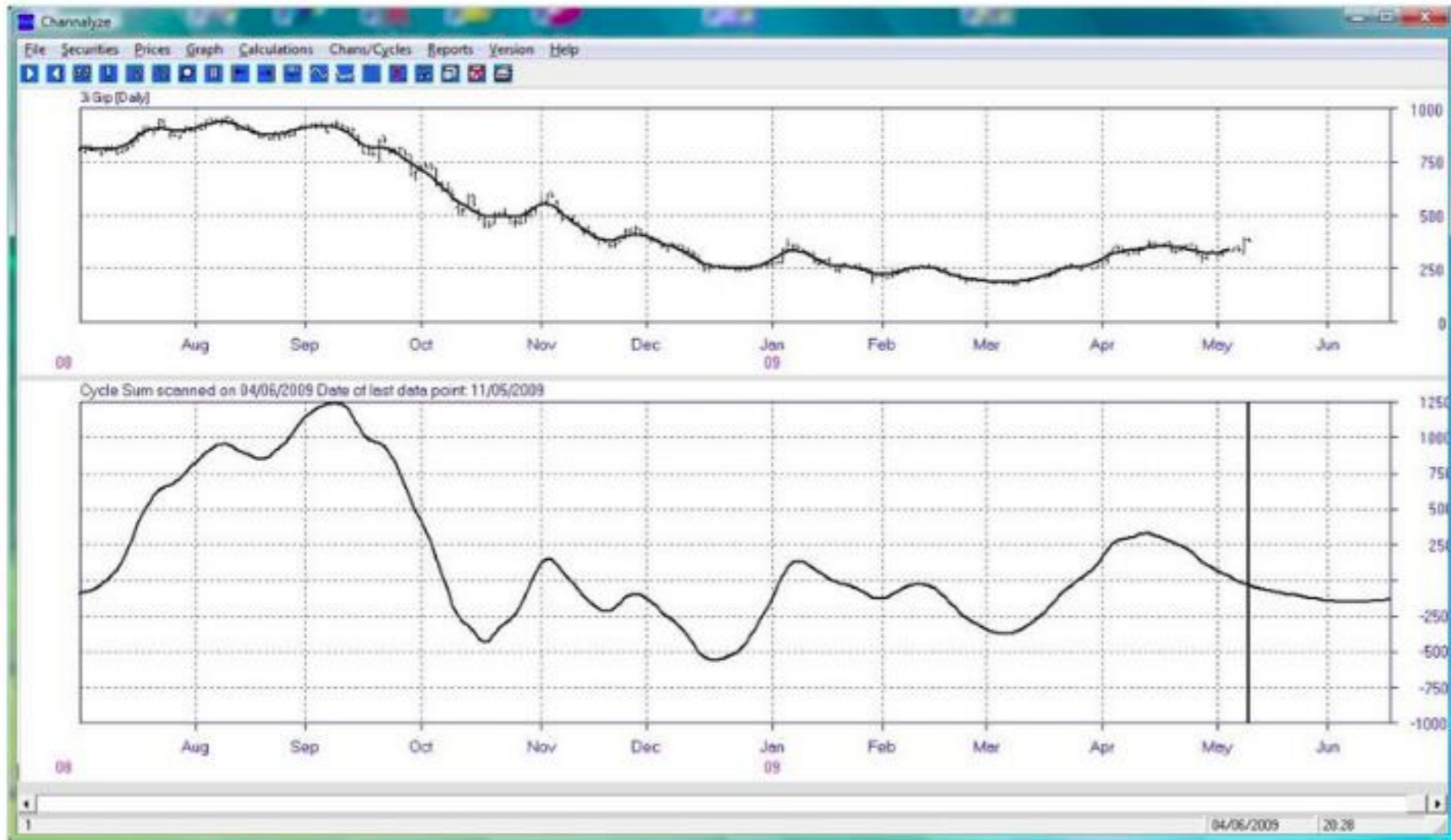
The rest of this chapter will look at various examples. In some of these, only the first one or two tests will be passed, whereas others will pass all of the tests.

SECURITIES FAILING TEST #1

Using cycle sums – 3i Group (London)

Figure 14.1 shows the position in 3i Group (London Market) on 11 May 2009. Quite clearly there is no correlation between the cycle sum and the comparator over the last few weeks. There is a trough in the comparator on 30 April which is not replicated in the cycle sum. This stock therefore fails at the first test and no further analysis would be carried out at this point in time.

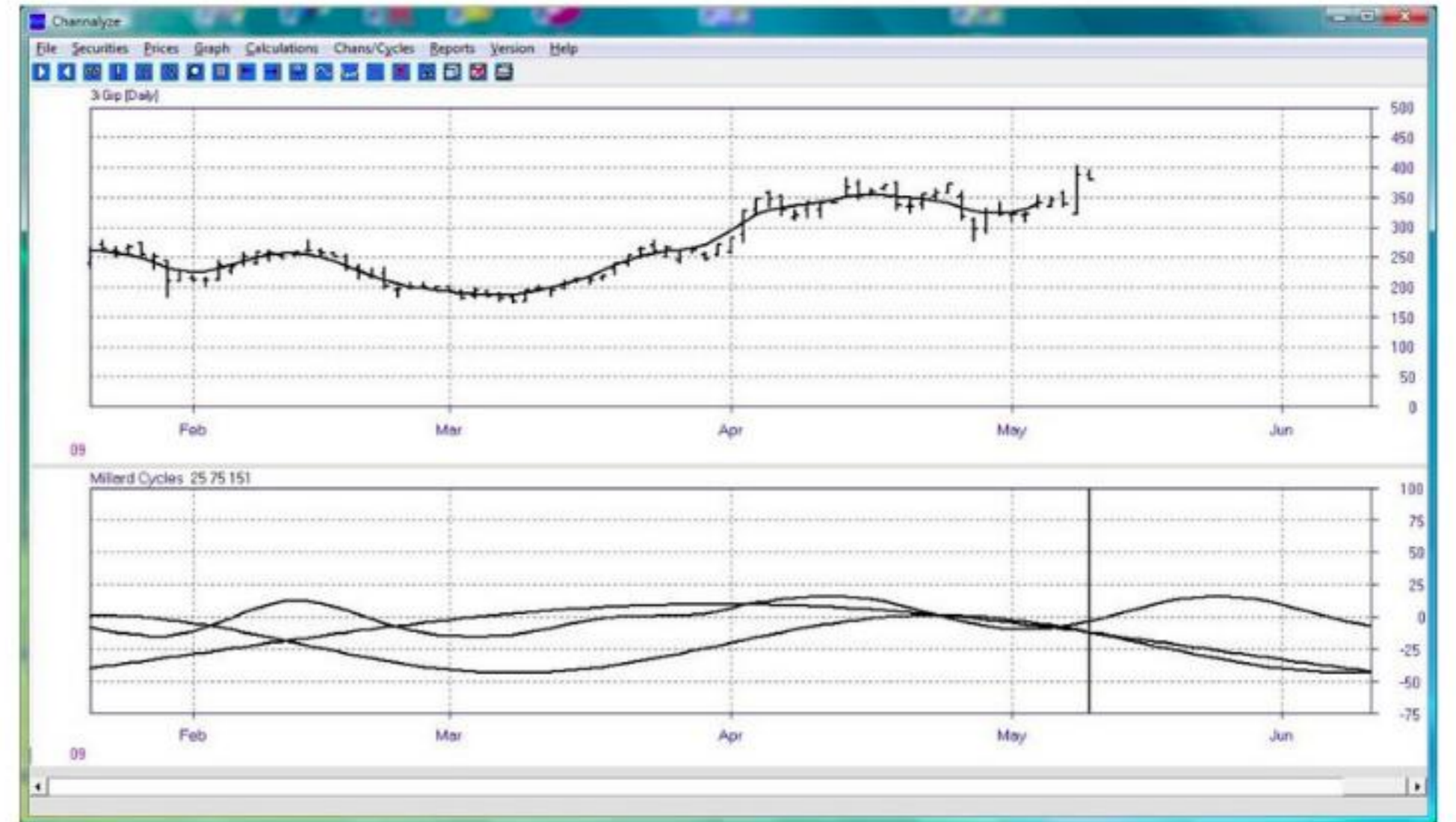
Figure 14.1 – The cycle sum in 3i Group as determined on 11 May 2009. There is no correlation between the recent cycle sum and the nine-day centred average used as the comparator. This security would not be taken forward as a possible trading situation.



In the absence of cycle scanning software, a plot of the three key cycles will also help to decide if the security fails the first test. As mentioned earlier, those software packages which allow the user to define their own indicators will provide these data.

A plot of these for 3i Group is shown in Figure 14.2. The point of interest is the fact that the comparator turned up at the very end of April.

Figure 14.2 – The 25-day, 75-day and 151-day cycles in 3i Group as determined on 11 May 2009. Visually it can be seen that the sum of these three cycles over the previous month should continue to fall, and the upward turn in the comparator at the very end of April would not be replicated in the sum of the three key cycles. This security would not be taken forward as a possible trading situation.



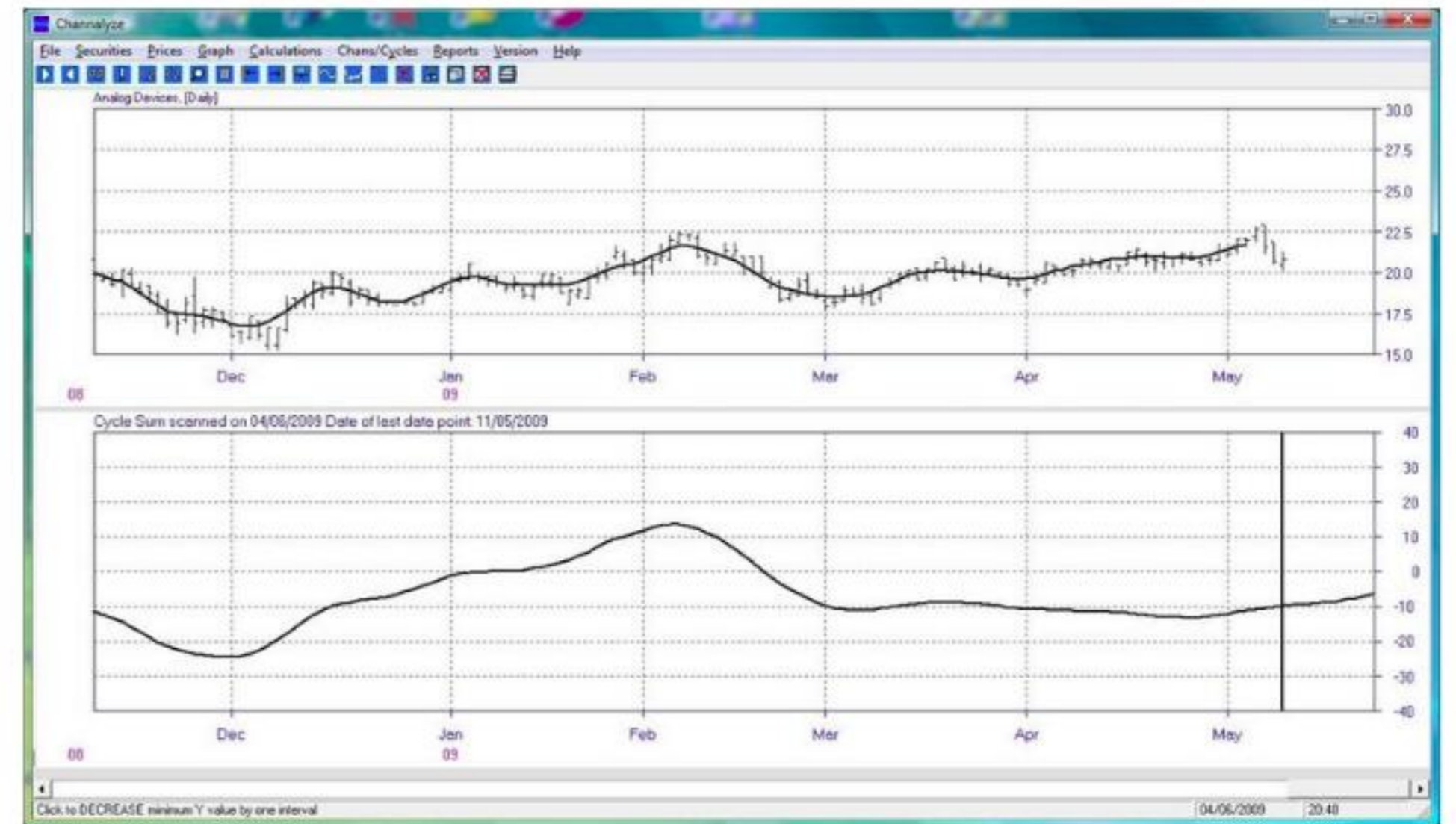
Using key cycles – 3i Group

A visual estimate of the sum of the three key cycles shown in the lower panel of Figure 14.2 would produce a falling trend, not replicating the behaviour of the comparator. This method therefore also removes this stock from further consideration.

Using cycle sums – Analog Devices (New York)

A plot of Analog Devices from the New York market is shown in Figure 14.3. Between April and May the cycle sum can be seen to be gently falling, while the comparator is gently rising.

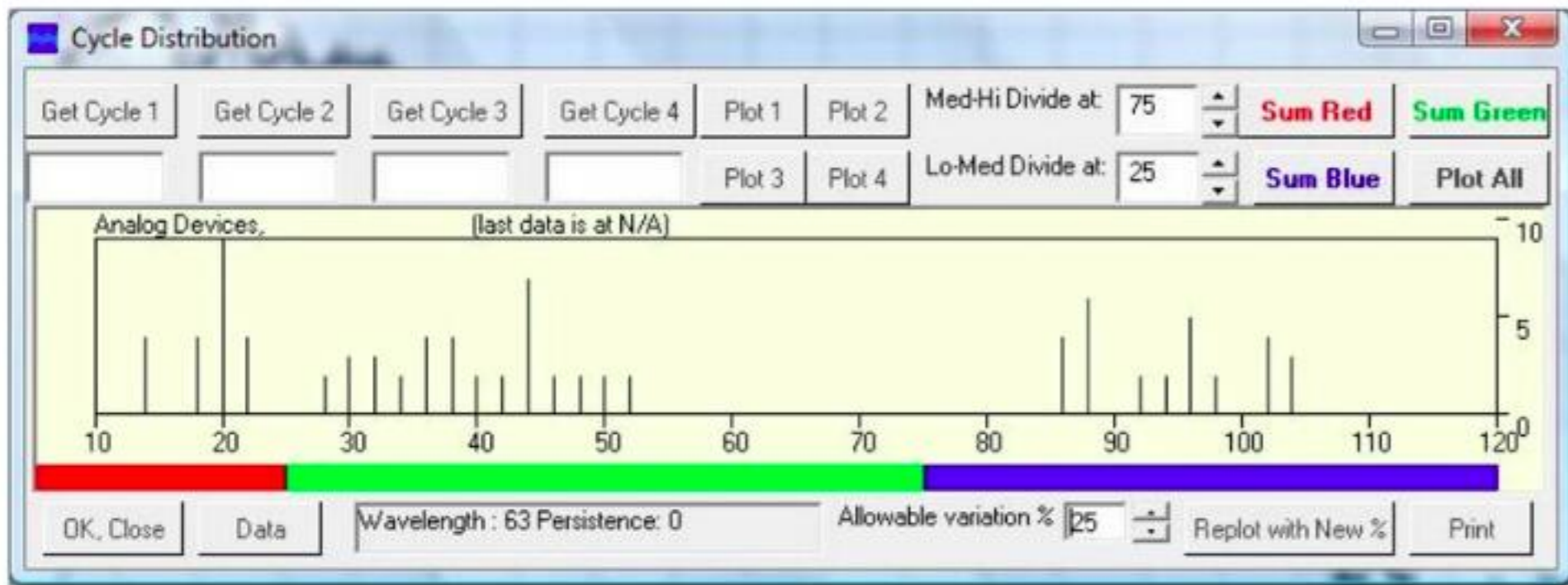
Figure 14.3 – The cycle sum in Analog Devices as determined on 11 May 2009. There is no correlation between the recent cycle sum and the nine-day centred average used as the comparator.



There is also the point that over the last four days the data itself is falling. This would be expected to have caused a minor blip in the cycle sum at this point, and this is not present. This stock therefore also fails at the first test and no further analysis would be carried out at this point in time.

When the distribution of cycles is examined, it can be seen (Figure 14.4) that there are a great many cycles present from a wavelength of seven days up to a wavelength of 104 days. As was mentioned in Chapter 13, this type of cycle distribution is to be avoided.

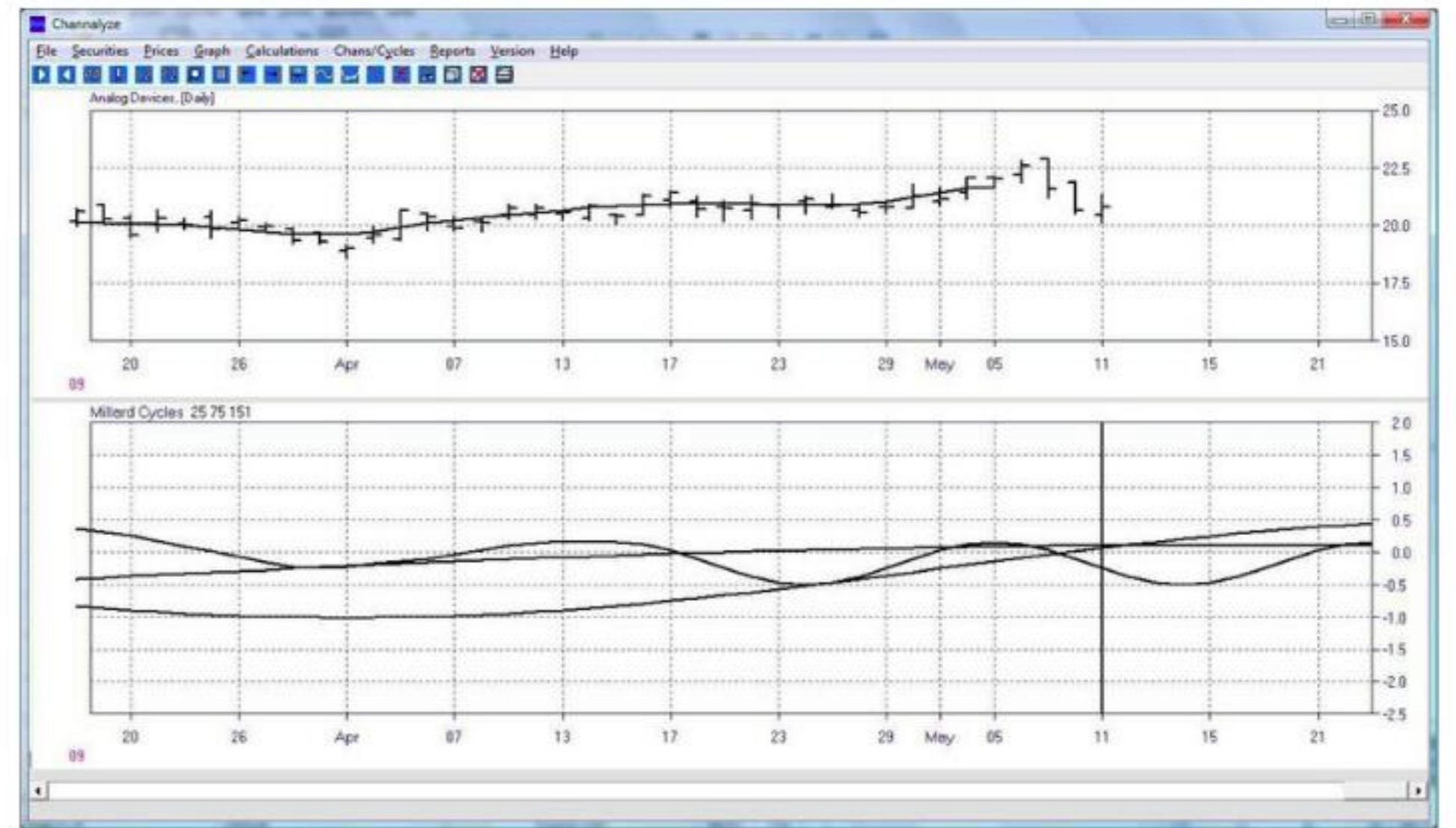
Figure 14.4 – The stable cycle distribution in Analog Devices as determined on 11 May 2009. Securities with so many stable cycles should be avoided.



Using key cycles – Analog Devices

When the three key cycles are plotted as shown in Figure 14.5, we might reach a different conclusion.

Figure 14.5 – The recent section of the 25-day, 75-day and 151-day cycles in Analog Devices is shown in the lower panel as determined on 11 May 2009. A visual estimation of the recent sum of these three cycles would give a similar profile to that of the comparator.



A simple visual estimate of the sum of the three key cycles which are shown in the lower panel would lead to the view that this sum is gently rising, in accordance with the comparator. We also see that the fall in the stock price over the last four days is confirmed by the fall in the more responsive 25-day cycle in the lower panel.

Traders using this approach would therefore need to perform the second test using channels.

The 51-day channel is shown in Figure 14.6, along with the 75-day cycle. It can be seen that while the trough in the cycle and the trough in the channel are not quite aligned in time, the implication is that the channel is rising as shown. The alignment will not be exact, of course, because while the 75-day cycle plot is showing only that cycle, the

channel is showing the sum of all cycles with wavelengths greater than 51 days.

Figure 14.6 – The 51-day channel is now shown for Analog Devices on 11 May 2009. The lower panel shows just the 75-day cycle. The relationship between the price level and the lower boundary is now at a critical point.



More important is the fact that the price has approached the lower boundary of the channel. It will be a few more days before it will become clear whether the price will penetrate the lower boundary. If it does, then the boundary will have to be adjusted downwards. If this is the case then no decision should be taken – never initiate a trade when a boundary has had to be adjusted. If the price does not penetrate the lower boundary and instead bounces upwards, then there is the potential to open a trade.

SECURITIES FAILING TEST #2

Using cycle sums – Associated British Foods (London)

Figure 14.7 shows the cycle sum for Associated British Foods, determined from data which terminated on 11 May 2009. It can be seen quite clearly that the cycle sum is a good replicate of the nine-day centred average used as the comparator. This security therefore passes test #1, and attention will now pass to test #2, using channel analysis.

Figure 14.7 – The cycle sum in Associated British Foods as determined on 11 May 2009. The cycle sum over the recent past replicates the comparator.

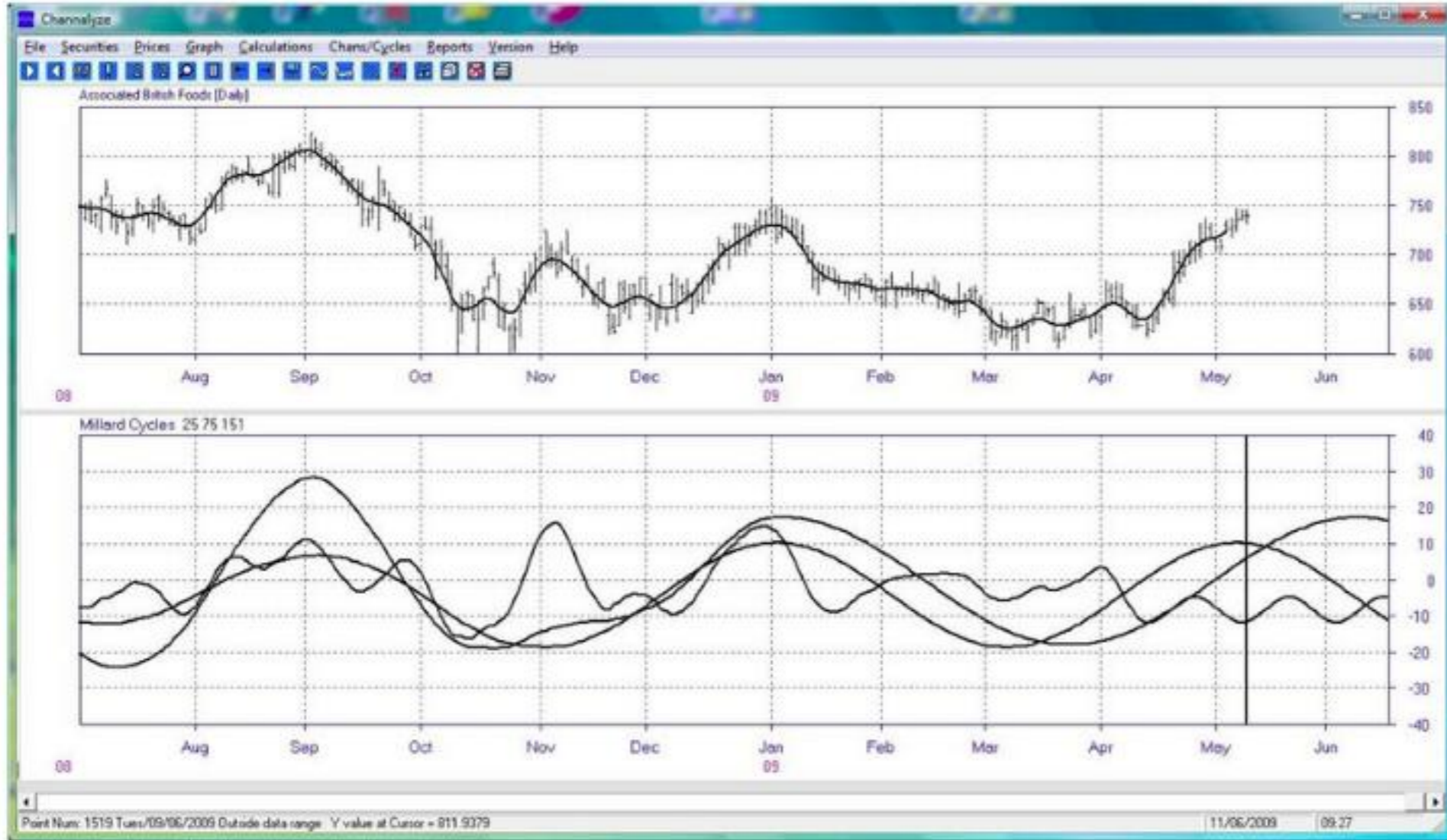


Using key cycles – Associated British Foods

Figure 14.8 shows the three key cycles of wavelength 25, 75 and 151 days. Quite clearly a

visual summation of these three will be in broad agreement with the comparator, so that the security passes test #1. Again attention will pass to test #2, using channel analysis.

Figure 14.8 – The recent section of the 25-day, 75-day and 151-day cycles in Associated British Foods is shown in the lower panel as determined on 11 May 2009. A visual summation would agree with the comparator.



Channel analysis – Associated British Foods

The 51-day channel is shown in Figure 14.9. The extrapolation of the channel to the latest date gives no indication that it is about to top out, whereas the cycle sum shown in Figure 14.7 does indicate that we are near the top of the trend. Although the channel could be adjusted by the methods discussed in Chapter 12, the current set of data would lead to

a range of possible adjustments. One extreme would be to increase the upward bend even more to bring the latest price value to the lower boundary, while the other extreme would be to decrease the bend in the channel to cause the recent high value at the end of April to approach the upper boundary. In such an ambiguous situation, no decision would be taken.

Figure 14.9 – The 51-day channel is now shown for Associated British Foods on 11 May 2009. There is no indication that the channel is about to top out, as predicted by the cycle sum shown in Figure 14.7.



Using cycle sums – Cape Lambert Iron Ore (Sydney)

The cycle sum for this security as determined on 4 June 2009 is shown in Figure 14.10.

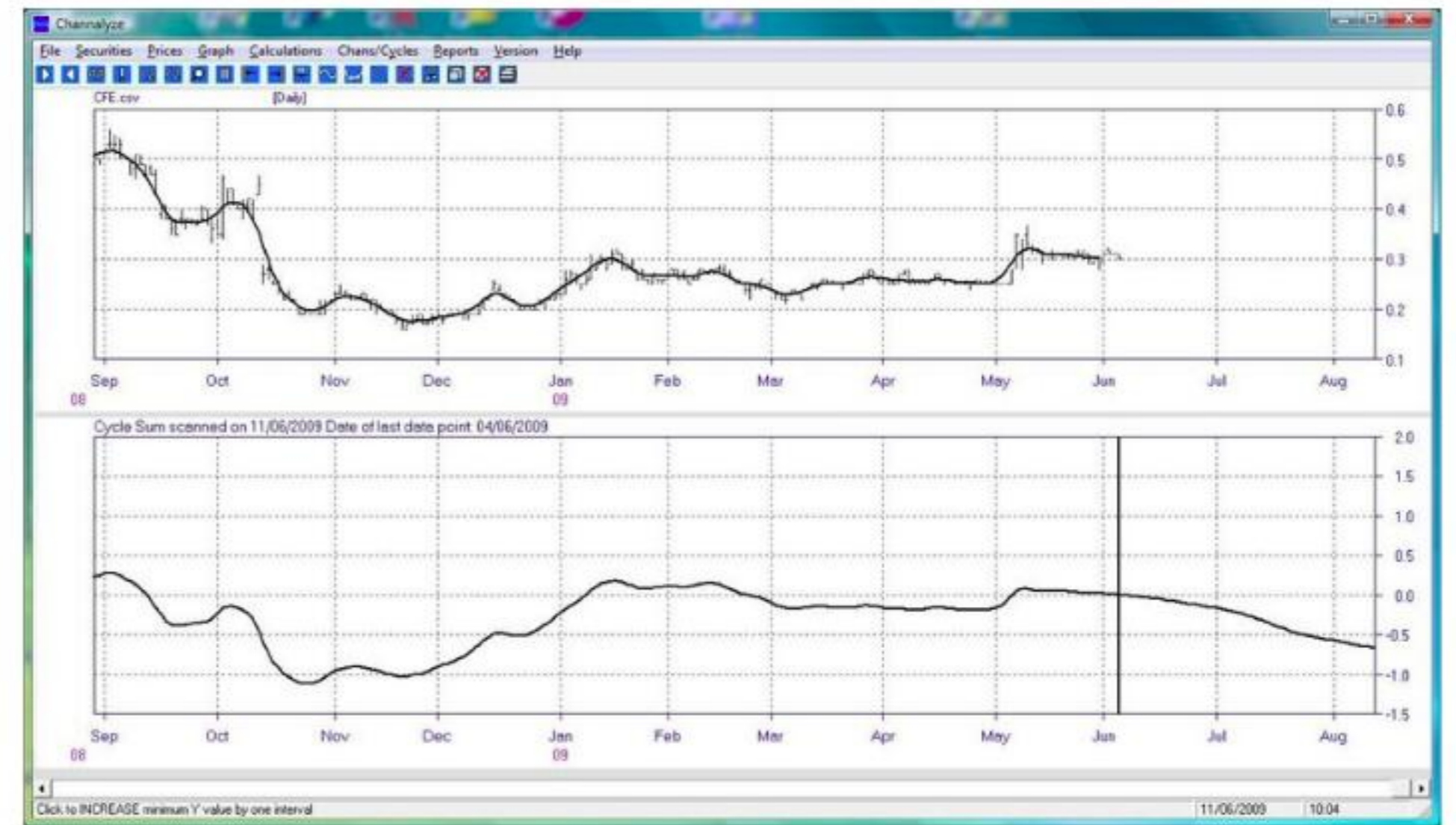
As can be seen, the cycle sum is a good replicate of the comparator over the whole time period covered by the plot. The extrapolated trend is headed downwards.

Since this security has passed test #1, it is now necessary to carry out test #2, which is an analysis of the channel. We expect the channel to follow the direction of the extrapolated cycle sum.

Using key cycles – Cape Lambert Iron Ore (Sydney)

The three key cycles for this security are shown in Figure 14.11. It can be seen that a visual summation would give a reasonably close agreement with the comparator which is shown in the upper panel.

Figure 14.10 – The cycle sum in Cape Lambert Iron Ore as determined on 4 June 2009. The cycle sum over the recent past replicates the comparator.



The small peak in the 25-day cycle around the middle of May is also seen in the comparator, and the fall in the comparator after that peak is obviously echoed by the fall in both the 75-day and 151-day cycles. Therefore this security passes test #1 and has to be checked against test #2.

Channel analysis – Cape Lambert Iron Ore

The 51-day channel of this security is shown in Figure 14.12. It can be seen that the extrapolated section of the channel from the vertical line is rising and is expected to do so over the immediate future.

Figure 14.11 – The 25-day, 75-day and 151-day cycles in Cape Lambert Iron Ore on 4 June 2009. A visual summation would be in reasonable agreement with the comparator.

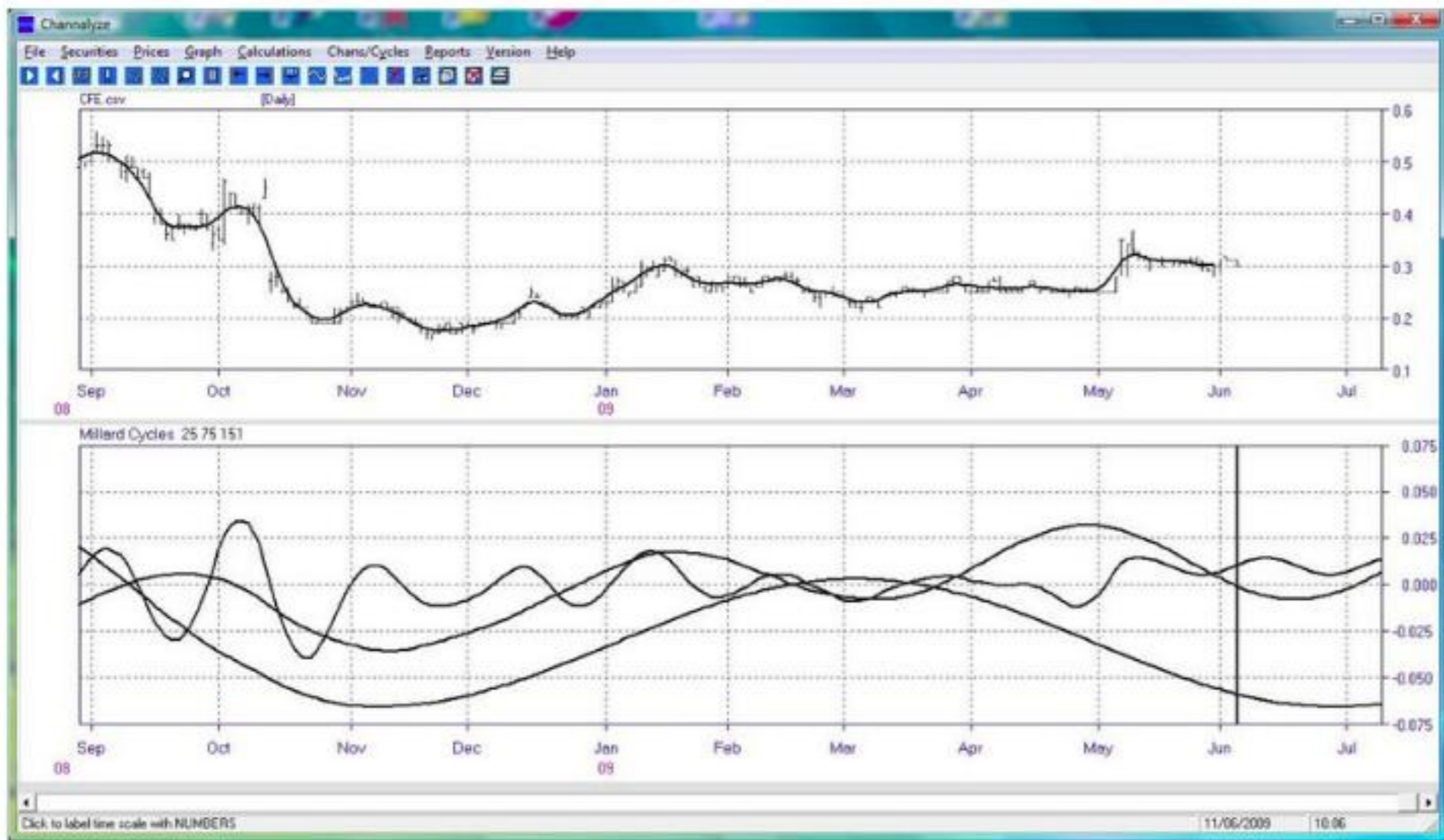


Figure 14.12 – The 51-day channel is now shown for Cape Lambert Iron Ore on 4 June 2009. There is no indication that the channel is about to top out, as predicted by the cycle sum shown in Figure 14.10.



There is nothing in the placement of the data within the channel that gives any indication that the channel will begin to bend downwards. In fact, an interpretation of the expected price movement within the channel would be for a bounce upwards from the lower boundary.

Thus there is a complete disagreement between the message being given by the channel (whether it has been drawn by the program or drawn by hand) and that being given by the cycle sum.

Cape Lambert Iron Ore would therefore be abandoned at this point in time and attention would turn elsewhere.

Using cycle sums – Atagas Income Trust (Toronto)

The plot of the cycle sum in this security on 4 May 2009 is shown in Figure 14.13.

Figure 14.13 – The cycle sum in Atagas Income Trust as determined on 4 May 2009. The cycle sum over the recent past replicates the comparator.



Once again, it can be seen that the cycle sum replicates the behaviour of the nine-day centred average used as the comparator. The peak in the middle of April in the comparator was replicated faithfully in the cycle sum, so that quite clearly this security passes test #1.

Using key cycles – Atagas Income Trust

The plot of these is shown in Figure 14.14. It should be noted that in this case the 151-day cycle terminates back in time. This is because in the period off to the left of the chart this

cycle was irregular and could not be extrapolated up to the latest point in time. In spite of this, it can be seen that both the 25-day and 75-day cycles have been falling since mid-April and are expected to continue to fall over the next week or so.

Figure 14.14 – The recent section of the 25-day, 75-day and 151-day cycles in Atagas Income Trust is shown in the lower panel as determined on 4 May 2009. A visual summation would be in reasonable agreement with the comparator.



Channel analysis for Atagas Income Trust

The 51-day channel for Atagas Income Trust is shown in Figure 14.15. Quite clearly, the extrapolation of this channel from the cut-off point shown by the vertical line shows it to be rising. This extrapolation is a smooth continuation of the previous rate of bend of the

channel. This upward direction for the channel is the opposite behaviour to that of the cycle sum which, as shown in Figure 14.13, was falling and predicted to continue to fall.

Because of this difference between the two tests, this security would be abandoned at this stage and another one sought which will pass the two tests.

Figure 14.15 – The 51-day channel is now shown for Atagas Income Trust on 4 May 2009.

There is no indication that the channel should have topped out in mid-April, as predicted by the cycle sum shown in Figure 14.13.



SECURITIES PASSING TESTS #1 AND #2

Using cycle sums – Dover Corporation (New York)

A chart of Dover Corporation is shown in Figure 14.16. The data were acquired on 11 May

2009. The cycle sum in the lower panel is a good replicate of the comparator shown in the upper panel. The trough in early March in the comparator appears in the cycle sum at the same point in time, as does the peak in mid-April.

Figure 14.16 – The cycle sum in Dover Corporation as determined on 11 May 2009. The cycle sum over the recent past replicates the comparator.



Since that point it can be seen that the cycle sum and the comparator are now rising. The cycle sum is estimated as continuing to rise for the next month or so. This security looks a good prospect for a rise from its present level, although the rise is not expected to be a rapid one, but rather a gentle upward progress.

Using key cycles – Dover Corporation

The three key cycles are shown in Figure 14.17. The 75-day cycle has not been extrapolated because it has an irregular appearance in the time span prior to that shown and the wavelength has varied more than the allowable amount. Even so, the 25-day cycle follows the path of the comparator over the last month, and the 151-day cycle appears to be bottoming out. Because of this the security would be taken to an analysis of the channel.

Figure 14.17 – The 25-day, 75-day and 151-day cycles in Dover Corporation on 11 May 2009. A visual summation would be in reasonable agreement with the comparator.



Channel analysis – Dover Corporation

As can be seen from Figure 14.18, the price is about to bounce up from the lower boundary, and the channel itself is rising. This means that the effect of the short-term trend and that of the longer-term trend are added, thereby increasing the potential gain.

Figure 14.18 – The 51-day channel is now shown for Dover Corporation on 11 May 2009. The indication is that the price is about to bounce upwards from the lower boundary of the channel which is itself rising, increasing the potential gain to be made.



This security has therefore passed both of the tests for initiating a trade.

The final issue which can be addressed is the question of the probable price range five days ahead. Using the Millard version of the Monte Carlo simulation gives a range of

\$29.39 to \$37.39 at the 90% level as discussed in Chapter 5. This range is shown in Figure 14.19.

Figure 14.19 – The vertical line shows the 90% probable price range for Dover Corporation predicted for five days ahead from 11 May 2009.



It can be seen that if the channel continues upwards on its predicted path, the 90% price range will make it very unlikely that the price will reach the top of the channel within this five-day period. There is also the probability that the price may fall below its current level. If that happens then of course the channel boundaries will have to be adjusted downwards to accommodate any price fall. As always, once a trade has been opened, the price movement must be followed very carefully on a daily basis.

Using cycle sums – Addax Petroleum (Toronto)

In Figure 14.20 is shown the cycle sum for Addax Petroleum on 4 May 2009. There is a good correspondence between the cycle sum and the comparator and it can be seen that the cycle sum is predicted to continue to rise over the next few weeks before topping out again. The peak in the comparator in mid-April is also replicated in the cycle sum, giving confidence in its validity.

Figure 14.20 – The cycle sum in Addax Petroleum as determined on 4 May 2009. The cycle sum over the recent past replicates the comparator.



Using key cycles – Addax Petroleum

Two of the key cycles, the 25-day and 75-day, are shown in Figure 14.21. In this case there

was not enough data present to be able to isolate and extrapolate the 151-day cycle. The message from these two cycles is that the short-term 25-day cycle is about to turn up, while the longer term 75-day cycle is expected to top out very soon. The additive effect of these two is that a short-term rise is in the offing, but that its rise will be limited by the fact that the long-term trend is about to end. Thus there is a potential for profit and the position of the channels in this security can be examined.

Figure 14.21 – The 25-day and 75-day cycles in Addax Petroleum on 4 May 2009. A visual summation of these would be in reasonable agreement with the comparator.



Channel analysis – Addax Petroleum

In Figure 14.22 is shown the 51-day channel for Addax Petroleum, determined on 4 May

2009. The price has just bounced up from the lower boundary, and if the position of the upper boundary is correct, the potential is for a rise to around CAN\$38 over the next week or so. However, as we saw from the cycle sum, the longer-term trend will top out very soon. Because of this, the channel, which also reflects the long-term trend, is unlikely to continue for long in the direction indicated by the extrapolation. It should be remembered that all initial extrapolations of channels are simply the continuation of the curvature of the last few points of the actual channel. They do not take into account any change in direction which might become apparent when a closer inspection of the short-term features within the channel is carried out (as we saw in Chapters 11 and 12).

Figure 14.22 – The 51-day channel for Addax Petroleum on 4 May 2009. The indication is that the price is about to bounce upwards from the lower boundary of the channel.



Another point to make is that the extrapolated channel is curving upwards at a slightly increasing rate. As such, therefore, it will never reach a maximum. Since all trends eventually change direction, while the immediate path of this channel makes sense, it cannot reflect the true picture for more than a week or two into the future.

In order to clarify this difficulty, a longer-term channel is needed, such as the 101-day channel shown in Figure 14.23. The message from this channel is more in line with the message from the cycle sum – that while there is a rise due in the short-term trend contained within the channel, this will take it to the upper boundary much sooner than was anticipated with the 51-day channel. Thus a position could be taken in Addax Petroleum with the proviso that the upper limit reached is probably CAN\$36 to CAN\$37.

Figure 14.23 – The 101-day channel is now shown for Addax Petroleum on 4 May 2009. The indication is that the price will shortly retreat from the upper boundary.



Finally, in Figures 14.24 and 14.25 we show the estimated price range five days ahead, along with the last few extrapolated boundaries of the two channels. As far as the relationship to the 51-day channel is concerned, we can see that there is no indication that the price five days hence will be at any particular point within the channel. In the case of the 101-day channel, we can see that it is very unlikely that the price will be near the lower boundary within five days. This use of the 90% probability range five days into the future is extremely valuable in adding more information to the behaviour of the short-term trends which are contained within the channel.

Figure 14.24 – The vertical line shows the 90% probable price range for Addax Petroleum predicted for five days ahead from 4 May 2009. Also shown is the 51-day channel.



Figure 14.25 – The vertical line shows the 90% probable price range for Addax Petroleum predicted for five days ahead from 4 May 2009. Also shown is the 101-day channel.



In some cases, as shown in Figure 14.25, it can put a restriction on the possible intra-channel movement which can occur in the immediate future. This is very helpful in deciding on the potential profit which might be made from a position and is a vindication of the necessity to study the three components of cycle sum, channels and probability range.

Using cycle sums – Coca-Cola Amatil Ltd (Sydney)

Figure 14.26 shows the cycle sum for Addax Petroleum on 9 June 2009. There is a good correspondence between the cycle sum and the comparator, and it can be seen that the cycle sum has already topped out and is predicted to continue to fall over the next few weeks. The peak in the comparator at the beginning of May is also replicated in the cycle

sum. There is a difference in amplitude between the recent peak at the beginning of June in the cycle sum and the peak that appears to be in the process of formation in the comparator, but the general shape of these two plots is comparable.

Figure 14.26 – The cycle sum in Coca-Cola Amatil Ltd as determined on 9 June 2009. The cycle sum over the recent past replicates the comparator.



Using key cycles – Coca-Cola Amatil Ltd

The message from a plot of the three key cycles supports the conclusion obtained from the plot of the cycle sum. These cycles are shown in Figure 14.27. The 25-day cycle can be seen to be responsible for the peak in early May and the most recent one in early June. The fact that, overall, the long-term trends have topped out is confirmed by the behaviour

of the 75-day and 151-day cycles, which both reached their maximum in the middle of May. Thus we expect an overall fall in the price of this security over the next few weeks.

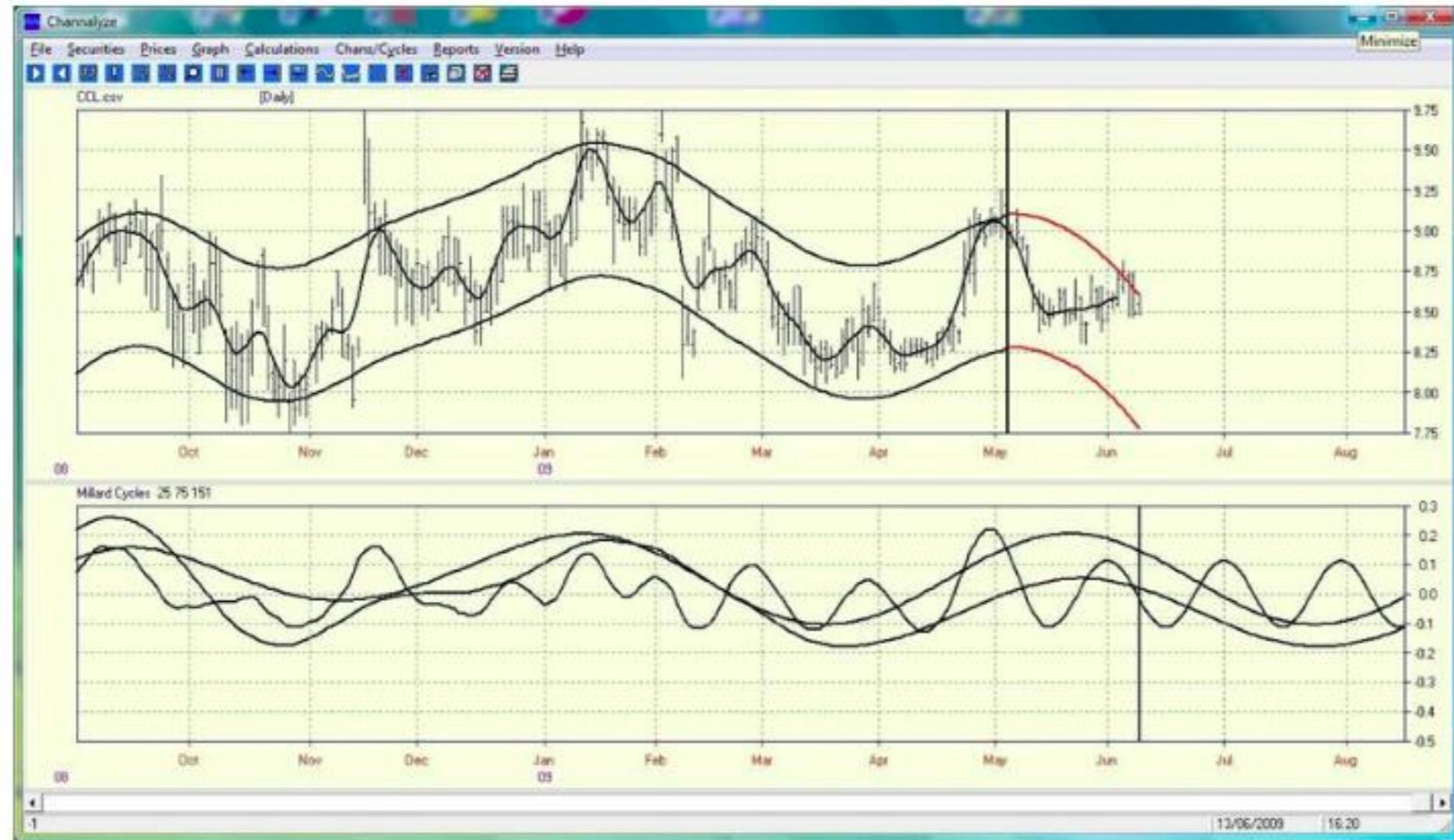
Figure 14.27 – The 25-day, 75-day and 151-day cycles in Coca-Cola Amatil Ltd on 9 June 2009. A visual summation of these would be in reasonable agreement with the comparator. Overall, the longer-term trends illustrated by the 75-day and 151-day cycles have topped out.



Channel analysis – Coca-Cola Amatil Ltd

The 51-day channel for this security is shown in Figure 14.28. Also shown in the lower panel are the key cycles, which were also shown in Figure 14.27. The vertical line in the upper panel, as always, denotes the start of the extrapolation of the channel.

Figure 14.28 – The 51-day channel for Coca-Cola Amatil Ltd on 9 June 2009. The indication is that the price is about to bounce downwards from the upper boundary of the channel.

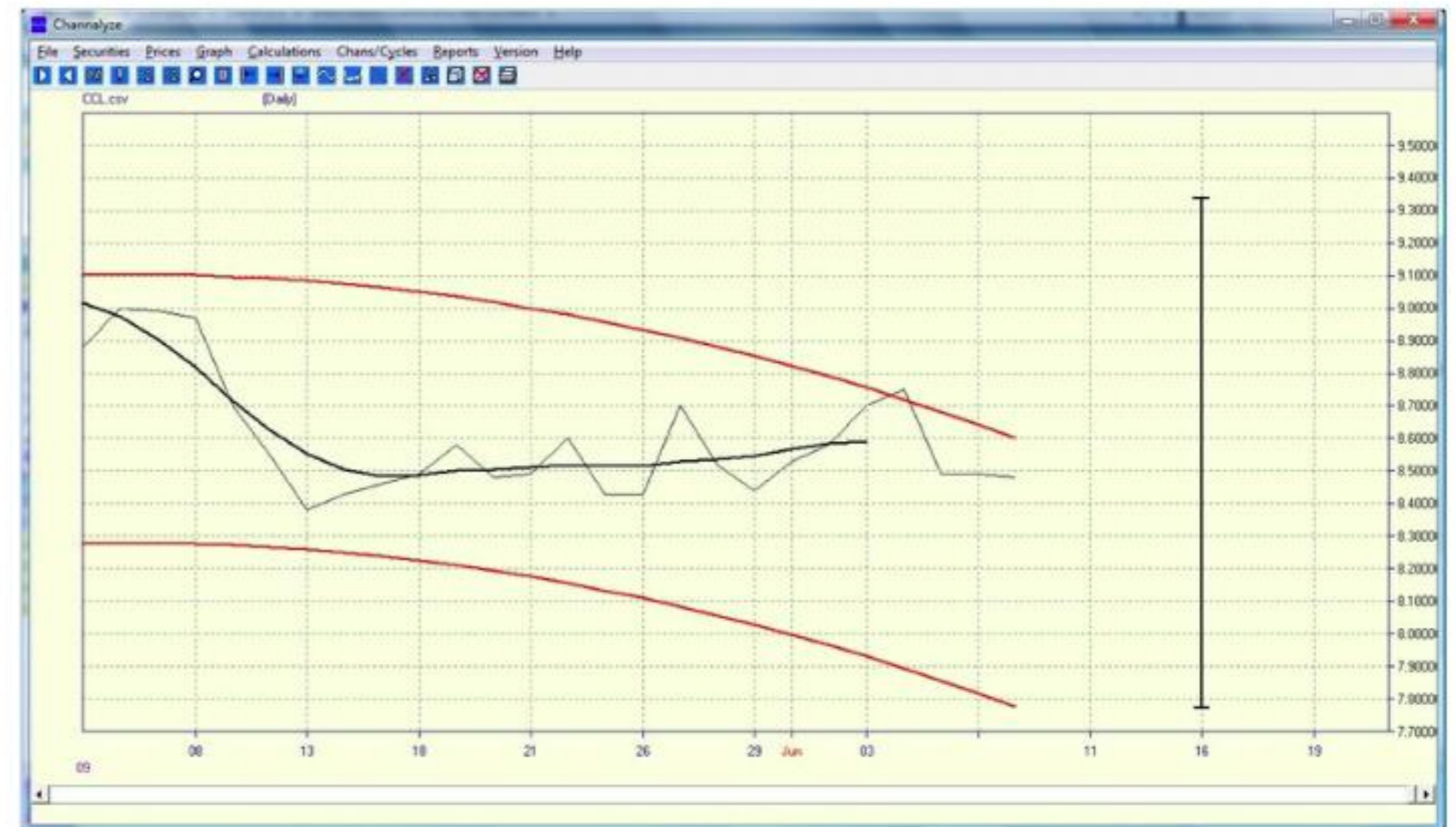


It can be seen that the extrapolation matches very closely the shape of the 75-day and 151-day cycles, giving added confidence that the channel position is valid. The only slight difference is that the peak in the channel formed by the extrapolation is slightly in front of the peaks in the cycles.

This coincidence of the channel and the long-term cycles at the time of writing is a strong indication of a fall in the price of this security from its current position over the next few weeks.

The plot of the 90% probable price range five days ahead as predicted by the Millard version of the Monte Carlo simulation is shown in Figure 14.29. A fall in price over the next five days would bring the price towards the lower end of this predicted price range. This is acceptable because the price of the security would still be contained within the extrapolated section of the channel.

Figure 14.29 – The vertical line shows the 90% probable price range for Coca-Cola Amatil Ltd predicted for five days ahead from 9 June 2009. Also shown is the 51-day channel.



Conclusion

The examples in this chapter, taken from a variety of stock markets, will have shown the improvement obtained in the prediction of future price movement when all three components of the probability methods are employed together. While the general view of technical analysts is that virtually all securities can be analysed for future movement, the work in this book shows that this is not the case. Only a small number, around 10%, have cycles which extrapolation shows to be currently in a stable state and which therefore would appear to be predictable. However, the use of channel analysis will draw attention to those instances where the extrapolation is no longer valid, since one or more of the crucial cycles have become unstable over the period of extrapolation.

Finally, all extrapolations of cycles and channels are subject to error. It is the use of probability methods that will alert the trader to those situations in which probable movement is not in line with the movement predicted from cycle and channel analysis.

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