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The Electric Markets

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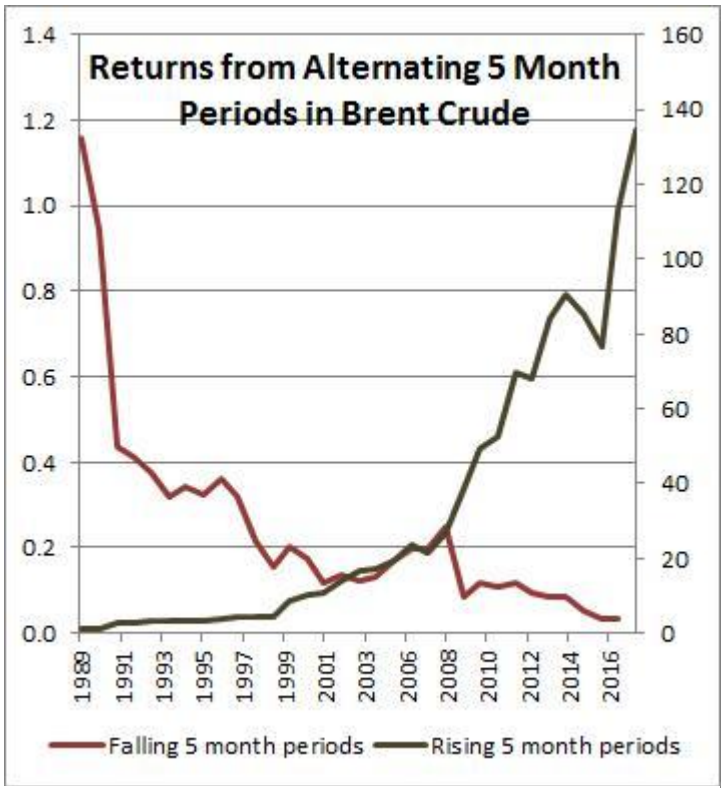
The Structure of Price Action – Brent Crude

Executive Summary

European Brent Crude spot prices display regular periods of rising and falling prices that repeat themselves at fixed intervals. No known political, seasonal or economic factor explains this behaviour. Instead we suggest the regularity is a function of the market's internal structure. Brent Crude shares this structure with all markets including currency, equity and other commodities. Trades based on an appreciation of this structure across a range of markets have delivered win rates >60% since 2014[1].

Brent's Base Frequency

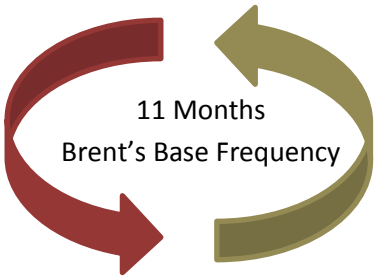


Cumulative returns from the 5 month periods of rising and falling prices in Brent Crude spot. Separate axis.

Brent Crude prices rise and fall at a fixed interval of just over five months. This means that Brent completes one cycle of rising and falling prices in around 11 months. [2]

Over the last 30 years there have been over 30 such cycles. Buying Brent during the rising cycle has returned an average of 18% per period with a 79% win rate and drawdown of -15%. Shorting Brent on the down cycle has produced an average return of 5% per period with a 58% win rate and a drawdown of -62%. A very simple strategy of combining the long and short periods would have delivered **a hundred times** the gain of the market since 1990.[3]

[1] http://www.kenton-dau.com/performance.html
[2] By way of comparison, Henry Hub Natural Gas has a base frequency of one month. Since 1992 a simple strategy trading this cycle would have produced an average return of 44% p.a..



What Causes the Cycle?

The 11 month base frequency of Brent is not the product of macro-economic conditions. No known economic driver produces such a phenomenon. Nor is it seasonal. Cycling around 11 months means, for example, that long periods can start during any month of the calendar year.

From years of researching Brent and other markets I suggest that Brent's base cycle is an expression of its internal structure. I model this internal structure as a torus or vortex. The model further suggests that the reason for the alternating periods of rising and falling prices is that the vortex is electrically charged. The vortex structure of Brent is rotating at an 11 month frequency. As the rotation encounters positively charged areas of the vortex prices tend to rise and when negatively charged areas are encountered prices tend to fall.

In order to provide some context for this model of structure in the it may be worth noting the following:

- Much of the physical world has a vortex structure. This can be seen in the shape of galaxies, the way plants grow, and indeed our own solar system[4].
- There is growing realisation, especially in astronomy that we live in an electrical universe. 99% of the entire universe is known to be composed of charged ions.[5]
- Electricity does not require wires. Electrical plasma has the ability to self-organise. This ability enables it, for example, to travel from the Sun to the Earth (the so-called solar wind) and create the Aurora Borealis or Northern Lights.[6]

The key point I have come to appreciate through the research is that markets are natural systems and are structured in the same way as other natural systems at every scale.

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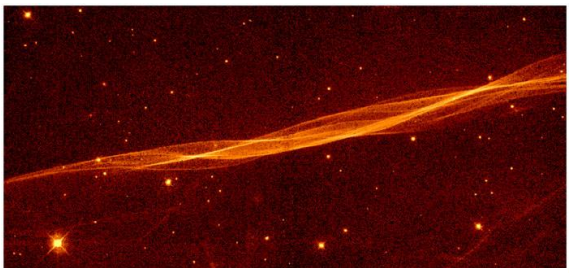
[3] Actual returns listed in appendix 1.
[4] For example: https://www.youtube.com/watch?v=0jHsq36_NTU
[5] The Electric Sky, Donald E. Scott, Mikamar Publishing 2006
[6] The Electric Universe, Wallace Thornhill & David Talbott, Mikamar Publishing, 2007

Filaments

The vortex of a market is composed of filaments that spiral around the shape, passing through the centre in the same way that someone may wind multiple wires around a donut. Filamentation is a well-known feature of the way electrical current flows without wires. It is created by the ability of charged plasma to self-organise in order to improve its flow rate. The phenomenon can be produced in the laboratory and photographed in space.



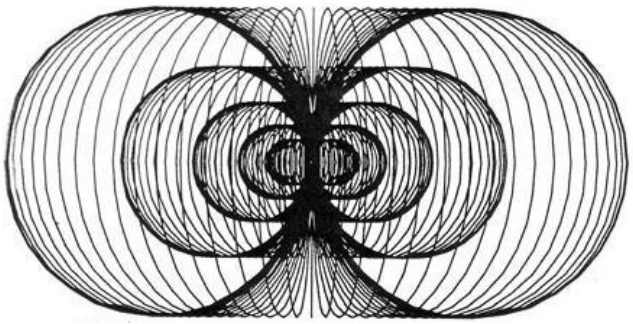
Filaments of current in space. Image credit: W. P. Blair, R. Sankrit (Johns Hopkins University / NASA

My experience has been that in a market not all the filaments carry coherent charge. I see this as similar to not all the horses on a merry-go-round having a rider. The filaments that carry charge are one of the ways a market defines its own unique characteristics out of the common vortex structure.

The filaments that do carry charge are able to maintain their coherence for extended periods of time. For example, one 5 month filament within the Brent vortex has traded 18 times since 1988 for an average gain of 18% from a win rate of 79% and maximum drawdown of 5%.

Harmonics

A second feature of a market's structure is that more than one frequency is involved. These other frequencies are connected to the base frequency in relationships governed by harmonics and the Golden ratio of 1.618. Again these are common features of natural systems.



Markets are structured as multiple vortices in harmonic or Golden ratio with each other.

In the case of Brent Crude prices the harmonics of the markets are particularly clear. For example a filament at the second harmonic, (a quarter the base frequency) displays an average price fall 21% across the 7 times it has traded since 1988. All trades have been successful.

At one eighth the base frequency (third harmonic) one filament has traded 32 times for an average gain of 5.5%. The win rate has been 72% with a maximum drawdown of -8.5%.

One sixteenth the base frequency, or the fourth harmonic, has filaments that have also maintained their coherence over 32 trades. One filament of positive charge has returned an average of 4.4% with a 74% success rate and a maximum drawdown of -12.5%. A filament of negative charge has returned 5% for a 78% win rate and maximum drawdown of -10%. The coherence of filaments at

harmonic intervals enables a market such as Brent to be traded more frequently over shorter periods and with greater consistency than relying on the base frequency alone.

Examples of the stability of filaments in Brent Crude at different harmonics from the base frequency of 11 months

Harmonic	Number of Trades from 1988	Direction	Average Return per Trade	Wins	Maximum Drawdown
1st	14	Long	18%	79%	-4.7%
2nd	7	Short	21%	100%	Nil
3rd	32	Short	5.5%	72%	-8.5%
4th	32	Long	4.4%	74%	-12.5%
4th	32	Short	5%	78%	-10%
4th	31	Long	3.9%	69%	-12.5%

Space Weather

I have found that one reason why not all filaments in a market's torus display coherent price action is the influence of our electrical environment. The Sun, an electrically charged body, continuously feeds current to the Earth. This current is measured by agencies such as NASA. Using this data it is possible to filter some filaments so that their coherence becomes visible once more.

For example, in one filament at the third harmonic Brent prices rise when the current from the Sun also increases. This has produced a return of 12% across 9 trades since 1988. All trades are now successful.

The Earth is also an electrically charged body. Its electro-magnetic field is constantly monitored by scientific stations around the world. Changes to this field can also influence the filaments. Most spectacularly falls in the Earth's electro-magnetic field signal five month periods (first harmonic) of price falls in Brent Crude. Since 1998 there have been 4 such periods, all successful, producing an average price fall of 38%. At the second harmonic falls in the Earth's electro-magnetic field have produced average falls of 9% across 7 periods with a maximum drawdown of -1.4%.

Human Behaviour

Price action in any market is the result of human behaviour. Markets are the creation of buyers and sellers. Not surprisingly then human activity, expressed by the standard deviation of returns, is another environmental factor that influences the coherence of some filaments of a market.

In Brent Crude filtering filaments by changes in the standard deviation of daily prices can restore coherence to filaments of negative and positive charge. For example, a filament at the second harmonic demonstrates price rises when standard deviation is also rising. This has produced an average return of 21% across 9 trades since 1988, all successful. Conversely, falling standard deviation in another filament at the second harmonic produces an average fall of 20% per trade across 9 periods, once again, all successful.

Examples of directional stability in Brent Crude vortex filaments when environmental factors are taken into consideration.

Harmonic	Number of Trades from 1988	Direction	Average Return per Trade	Wins	Maximum Drawdown	Filter
3rd	9	Long	9%	100%	Nil	Sun's Electric Current
1st	4	Short	38%	100%	Nil	Earth's Electro-magnetic Field
2nd	7	Short	9%	88%	-1.4%	Earth's Electro-magnetic Field
3rd	10	Long	12%	80%	-1.5%	Earth's Electro-magnetic Field
2nd	9	Long	21%	100%	Nil	Standard Deviation
2nd	9	Short	20%	100%	Nil	Standard Deviation

Summary

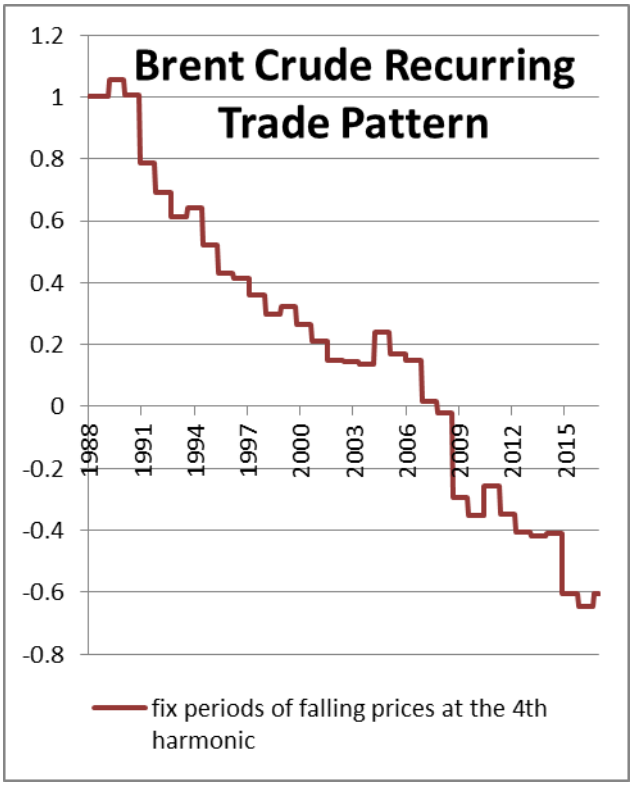
Financial markets display naturally occurring periods of rising and falling prices. These repeat themselves at fixed intervals.

The periods are not the result of external political or economic factors. Instead I suggest they are the result of a market's internal structure.

I model this structure as a torus or vortex. This aligns the structure of markets with many structures seen in Nature at every scale.

The vortex of a market rotates at a set frequency – its base frequency. Within this vortex are smaller vortices in harmonic or Golden mean proportion to the base frequency.

All vortices of a market are composed of filaments. These filaments can be electrically charged. A



32 fixed period trades at the 4th Harmonic in Brent Crude

negative charge is inferred by falling prices. A positive charge is inferred by rising prices. These filaments can demonstrate stability over extended periods of time – in the case of Brent Crude for 30 years.

Not all filaments display coherent directional price movement. However in some cases coherence can be restored by taking environmental factors into account. These include changes in the electric current emanating from the Sun and changes to the Earth's own electro-magnetic field. Investor activity, measured by the standard deviation of returns, can also restore coherence enabling a filament to be successfully traded.

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Appendix – Historical Returns of alternating 5 month periods in Brent Crude ordered by size of return.

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Rising 5 month periods	Falling 5 month periods
1.66	0.38
0.94	0.29
0.47	0.27
0.45	0.27
0.32	0.16
0.28	0.16
0.28	0.13
0.25	0.10
0.24	0.10
0.24	0.09
0.20	0.07
0.19	0.00
0.18	-0.01
0.18	-0.03
0.13	-0.05
0.13	-0.05
0.10	-0.06
0.09	-0.09
0.08	-0.10
0.07	-0.10
0.06	-0.12
0.05	-0.14
0.02	-0.15
0.02	-0.19
0.02	-0.21
0.01	-0.28
-0.02	-0.31
-0.03	-0.32
-0.04	-0.37
-0.06	-0.41
-0.10	-0.53
-0.10	-0.66