

Wisdom of Crowds—or Madness?

By **Didier Darcet**

[didier.darcet@](mailto:didier.darcet@gavekal-intelligence-software.com)

gavekal-intelligence-software.com

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In *War and Peace* (Volume 3, Chapter I), Leo Tolstoy describes a crowd gone mad: « On the twelfth of June 1812, the forces of Western Europe crossed the Russian frontier and war began, that is, an event took place opposed to human reason and to human nature. Millions of men perpetrated against one another such innumerable crimes, frauds, treacheries, thefts, forgeries, issues of false money, burglaries, incendiarism, and murders as in whole centuries are not recorded in the annals of all the law courts of the world, but which those who committed them did not at the time regard as being crimes. »

In 2004, James Surowiecki publishes *The Wisdom of Crowds: Why the Many are Smarter Than the Few [...]*, with strong evidence that aggregate predictions are often more reliable than the output of any expert or group of experts.

So, who's right? Should we fear or trust crowds?

Our quant research in finance concluded that we should both fear and trust the common opinion. Hence, our research program is divided into two parts: «TrackMacro», which tracks the macroeconomic wisdom of crowds, and «TrackBehavior», which detects market abnormalities or signs of crowd irrationality.

The fundamental difference between the two states resides in a hidden variable: the degree of dependency between crowd members. And the conclusion falls within the scope of science, which can be approached, for instance, with Ising models, in statistical mechanics.

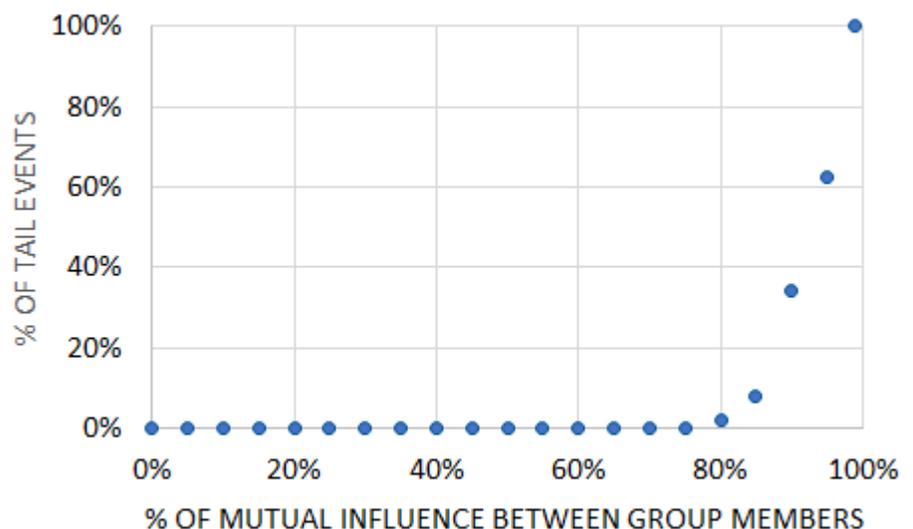
The Hidden Variable

Ising models, named after the physicist Ernst Ising, use discrete variables with local influences that shape clustering effects at the macro level, such as atomic spins in a lattice that interact with neighbouring spins. The Ising concept can be extended to social experiments to model regional concentrations of votes or population clusters in large cities for instance, and of course, to finance.

Let's take a simple Ising model comparing two groups of 100 market participants. The first group expresses free opinion, modelled as random drawings of binary views: zero or one. The distribution of the average opinion over time oscillates around 0.5 with a low volatility of 5% and no fat tails. This is a period of wisdom.

In the second group, all the members first question the others about their idiosyncratic views to balance out their own opinions. From no group influence, reaching up to an influence of 80%, the two groups are indistinguishable in their global response. Micro influences have no macro consequences. However, below a 20% autonomy of members' opinions, group response begins to flip violently between two radical states: unanimous 'zero' or unanimous 'one'. The percentage of tail events, defined as three standard deviations from the 0.5 average opinion, explodes.

Fig 1. Tail events as a function of group influence - Sample of 100 participants



Source: Gavekal Intelligence Software simulation

The agent model above is simplistic but enlightening. Market discontinuities, fat tails, sudden volatility spikes in finance may well be controlled by a hidden variable: the degree of mutual influence between participants. Such mutual influence is hardly visible in traditional correlation measures, until it's far too late.

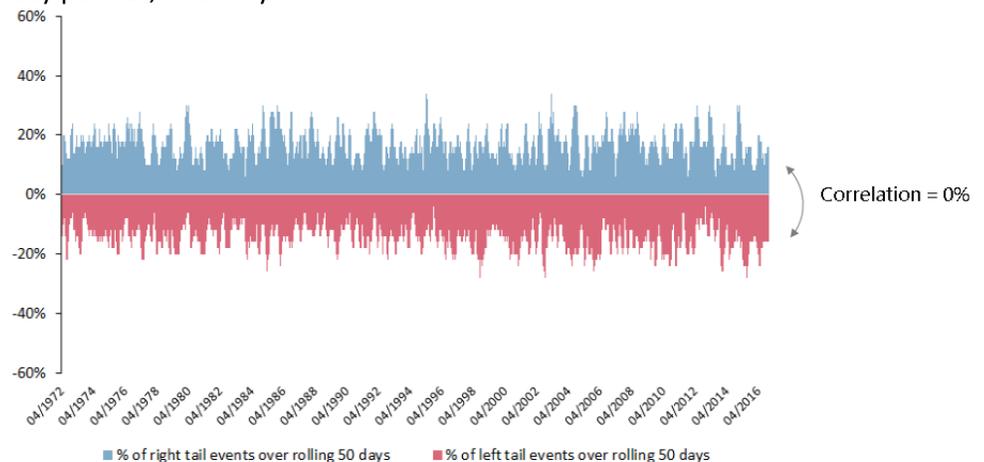
Social systems, like financial markets, are sensitive to self-reinforcing phenomena in a very non-linear manner. They tend to self-organise close to their critical points, where the crowd flips from wise to crazy, and vice versa.

Stochastic Madness

The first conclusion of our behavioural research is that the hidden variable can be detected in a satisfactory manner, but with a stochastic element. In simple words, tail events are mathematically predictable, but without the possibility of differentiating left and right, favorable and unfavorable outcomes. Mathematics help to detect instabilities, nothing more. TrackBehavior was designed for that purpose: anticipating tail events in equity markets, universally.

The following graph simulates the occurrence of left and right tail events on the MSCI world, assuming a wisdom of crowds. Tail events are defined by the 10% worst returns and 10% best returns on daily returns. Their time correlation is theoretically zero. The simulated outcome is however far from the observation.

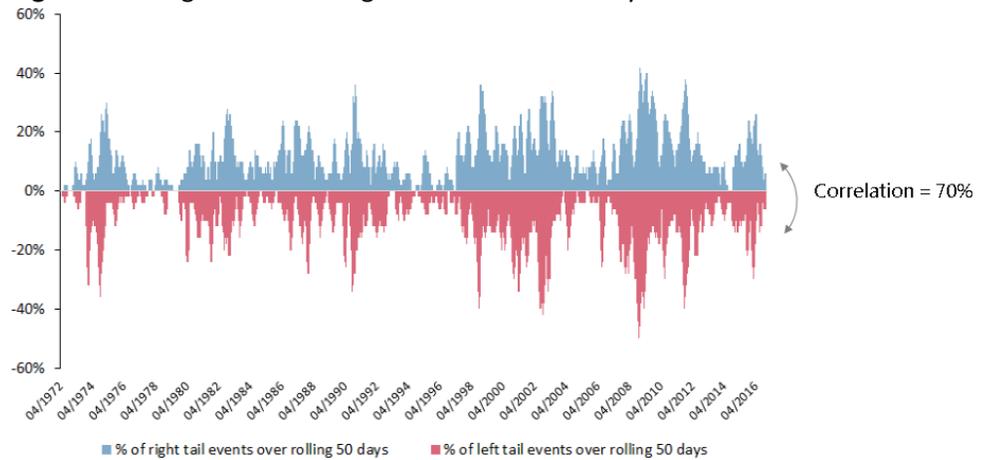
Fig 1. Percentage of left and right tail events on the MSCI World over rolling 50-day periods, in theory



Source: Bloomberg, Gavekal Intelligence Software simulation

In the real world, tail events are not stationary, they develop like macro waves and vanish. Furthermore, their time correlation is not zero but closer to 70%.

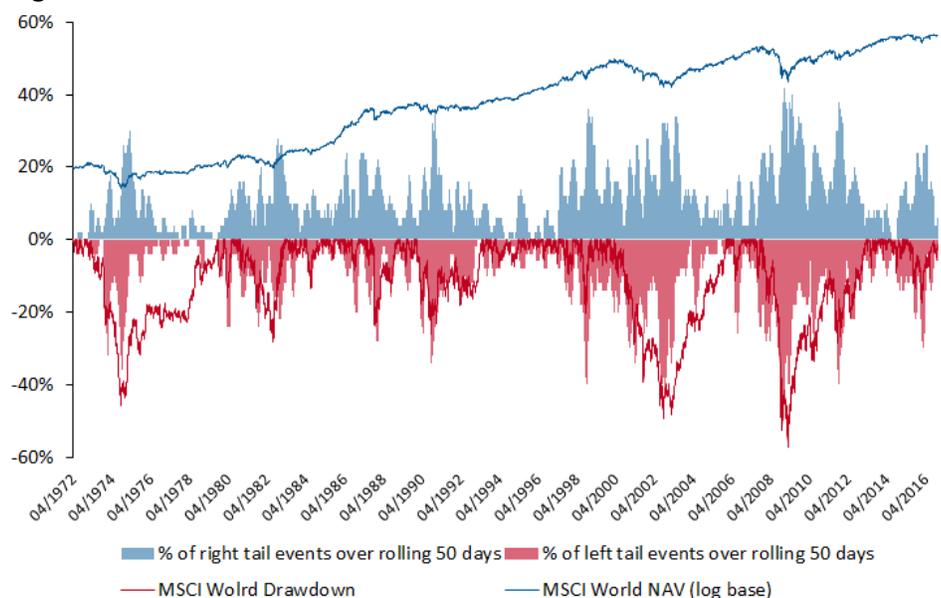
Fig2. Percentage of left and right tail events in reality



Source: Bloomberg

If we now plot market drawdowns on the same graph, we observe that severe market crashes do match times of crowd madness. TrackBehavior plays the role of a 'seat belt' to protect investors from catastrophic scenarios, despite its inability to grasp market rationality or direction.

Fig 3. Tail events and market drawdowns - MSCI World



Source: Bloomberg

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The Wise Origins of Madness

A few months ago, we decided to let both models confront their observations to decide on risk allocations in investment programs:

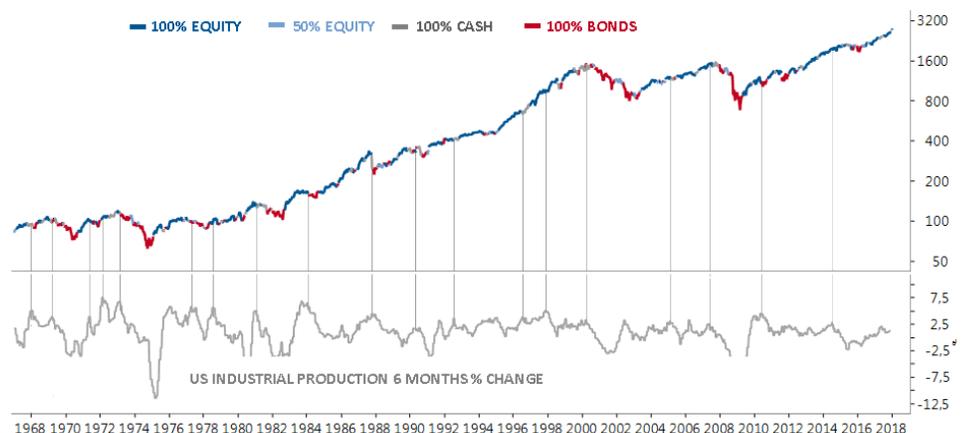
- During times of wisdom, TrackMacro leads: the system trusts the crowd's opinion, measured by macro variables such as growth, inflation, liquidity, trade, valuations, competitiveness etc.
- In times of havoc, TrackBehavior leads: the system always reduces risk exposures, either partially or fully.

The implicit intuition is that fear or exuberance result from a critical situation from a wise viewpoint, but massively amplified. This is, indeed, what seems to happen in the market, as illustrated in the following two graphs.

The upper graph shows the S&P price since 1967, in four colors, controlled by the combination of TrackMacro and TrackBehavior. Dark blue anticipates a positive, 'wise' market (message: invest in equities), grey a negative 'wise' market (message: invest in cash), light blue a positive 'mad' market (message: reduce equities), dark red a negative 'mad' market (message: sell all equities and turn to government bonds).

The lower graph is the six-month rolling industrial production in the US. TrackMacro warning signals (grey) anticipate local maxima of industrial production, sometimes followed by TrackBehavior warning signals when the market enters times of panic.

Fig 4. S&P500 Price colored by TrackMacro and TrackBehavior models and US industrial production



Source: MacroBond, Gavekal Intelligence Software

Where Are We Today?

TrackMacro turned negative in all major equity markets throughout the world for two months in a row, apart from a few commodity exporters. The underlying wisdom is based on simple observations: (i) inflationary pressures, (ii) the probable end of the acceleration phase in the growth cycle, (iii) global liquidity shrinking, (iv) expensive price of oil, (v) doubts on world trade.

TrackBehavior, which has been dormant for a long time, is waking up in the Euro zone, the UK, Canada, China and Japan.

It's time to fasten our seat belts. Entering April, financial crowds may well be about to flip from wisdom to madness.