RisKontroller

Is the S&P 500 Crashing?
Recession Coming?

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We apply our bubble technology to the problem:

- It picks up crash/rally signals.
- It calibrates and maps out a normal price that the actual price oscillates about.
- Our technology paper has been published in
  - European Journal of Finance
  - Wilmott Journal
  - SSRN (In Top 10 downloads)
  - Swiss Finance Institute
  - Predicted Bitcoin crash in December of 2017 (Published)
  - See details on our website http://riskontroller.com/info-center/
- We are supplying signals to a large mutual fund in India.
- We have applied it to many asset prices.

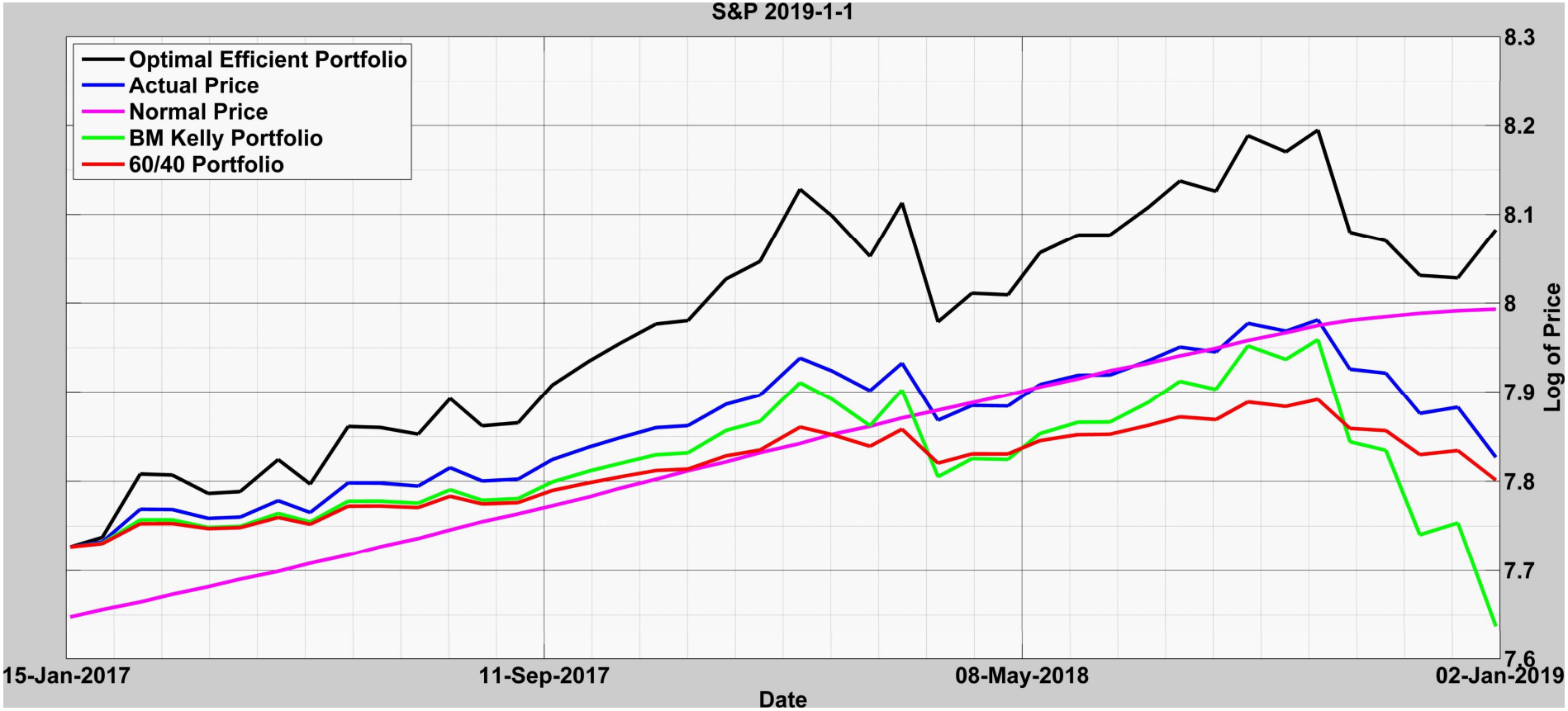
Our model picks up signals

- Those signals are generating by accelerating sells or buys that exhibit rapid decline or growth in asset prices.

We calibrate our model on a parsimonious set of four parameters

- We calibrate our parameters by optimizing them over a small finite set and pick the parameter values that give the best outperformance of the efficient portfolio. The efficient portfolio is made of the asset plus a risk-free rate and either can be leveraged up to 100%. See papers for details.
- The following graph maps out the log of the asset price and normal price.
- The portfolios consist of:
  - The optimal efficient portfolio
  - A 60/40 portfolio: asset/risk-free
  - The classical Kelly method of picking the asset and risk-free rate.

Log of actual S&P price and normal price along with logs of portfolio values



Notes on the graph

- The optimal efficient portfolio provides a total return over the two years of 42.76% versus 10.54% for the S&P500.
- The optimal efficient portfolio beats other portfolios.
- The asset price is tracking the normal price for a good part of 2018.
- The asset price begins a decline in October 2018.

- What is missing from this graph is a signal correlated with the change in the optimal efficient portfolio.
- We also have to say whether or not we think the price is crashing.
- **We do these things next.**

What is a crash or rally?

In order to understand our graphs we need to be precise by what we mean by a crash or rally.

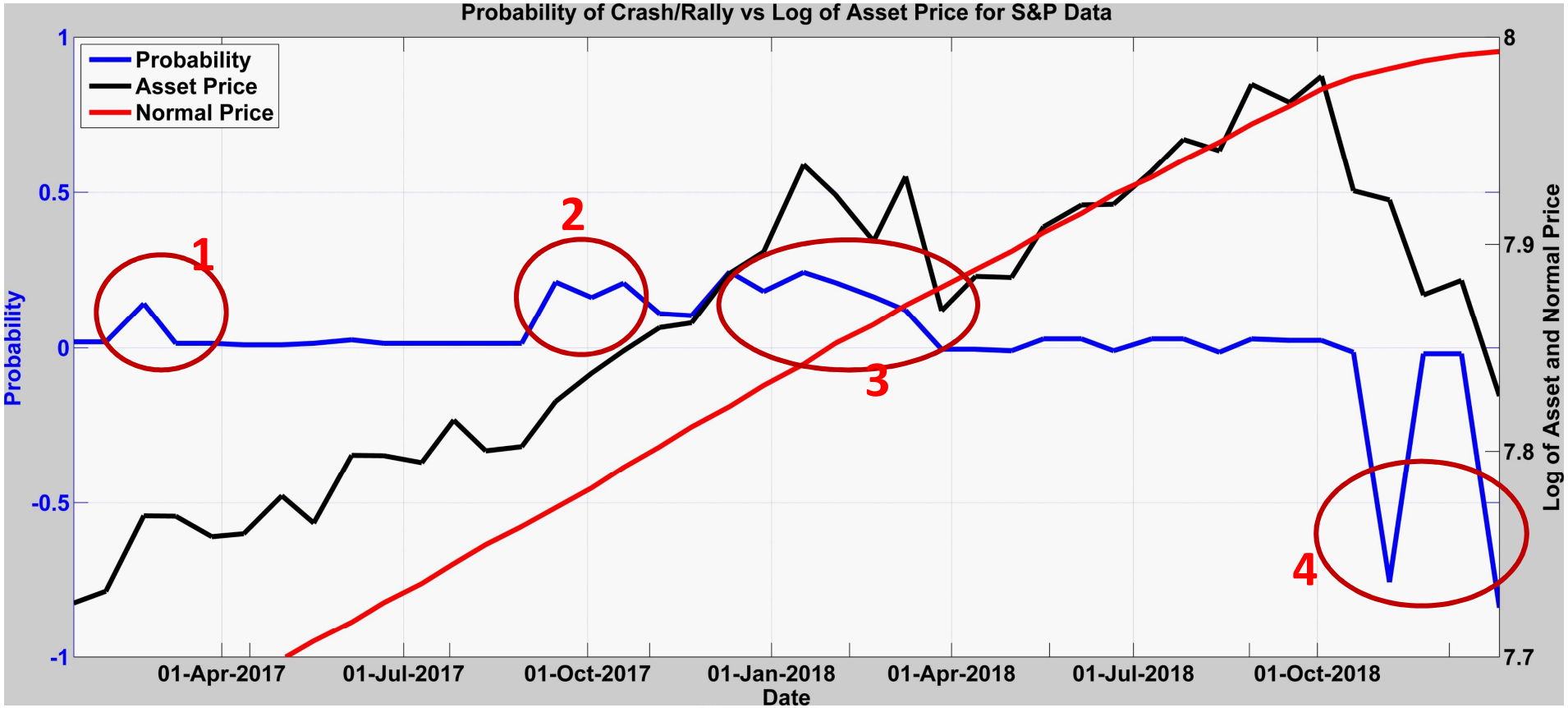
We simply mean a price movement over a short period of time (usually days) where the movement is not explained by Brownian motion but rather by a jump. This does not need to be big in size.

Usually when we are explaining these movements we provide information on the timing, size, and probability.

There are two main signals; one is the probability of a crash/rally and the other is the size of the crash/rally.

- The next graph maps the probability of a crash/rally with the asset price and the normal price.
- A crash is associated with a positive probability.
- For a rally we make the sign of the probability negative.
- The probabilities are computed by assuming our rational expectations condition as described in out paper and by implementing a method to estimate acceleration in the asset price (super-exponential).
- The numbered and circled items on the graph are explained next.
- There are other indicators in the paper that we will not discuss in this presentation.

The graph of the log of the asset price and normal price along with the probability of a crash or rally. Positive probability for a crash and negative for a rally.



The numbered items explained.

1. The probability of a crash jumps up a bit here prior to the downturn. But it is not a major correction.
2. The probability jumps up a bit here but there is no downturn.
3. In this case the probability of a crash moves up for some time until the downturn is finally realized.
4. The asset price then proceeds along the normal price for a little over 6 months until the downturn occurs. The probability of a rally jumps but falsely until a short time later it jumps down again to an 84% probability of a rally on December 31, 2018. We shall see in a subsequent slide what happens.

The regions of near zero probability suggests little chance of jumps especially between 3 and 4 where the price tracks the normal price.

The lesson

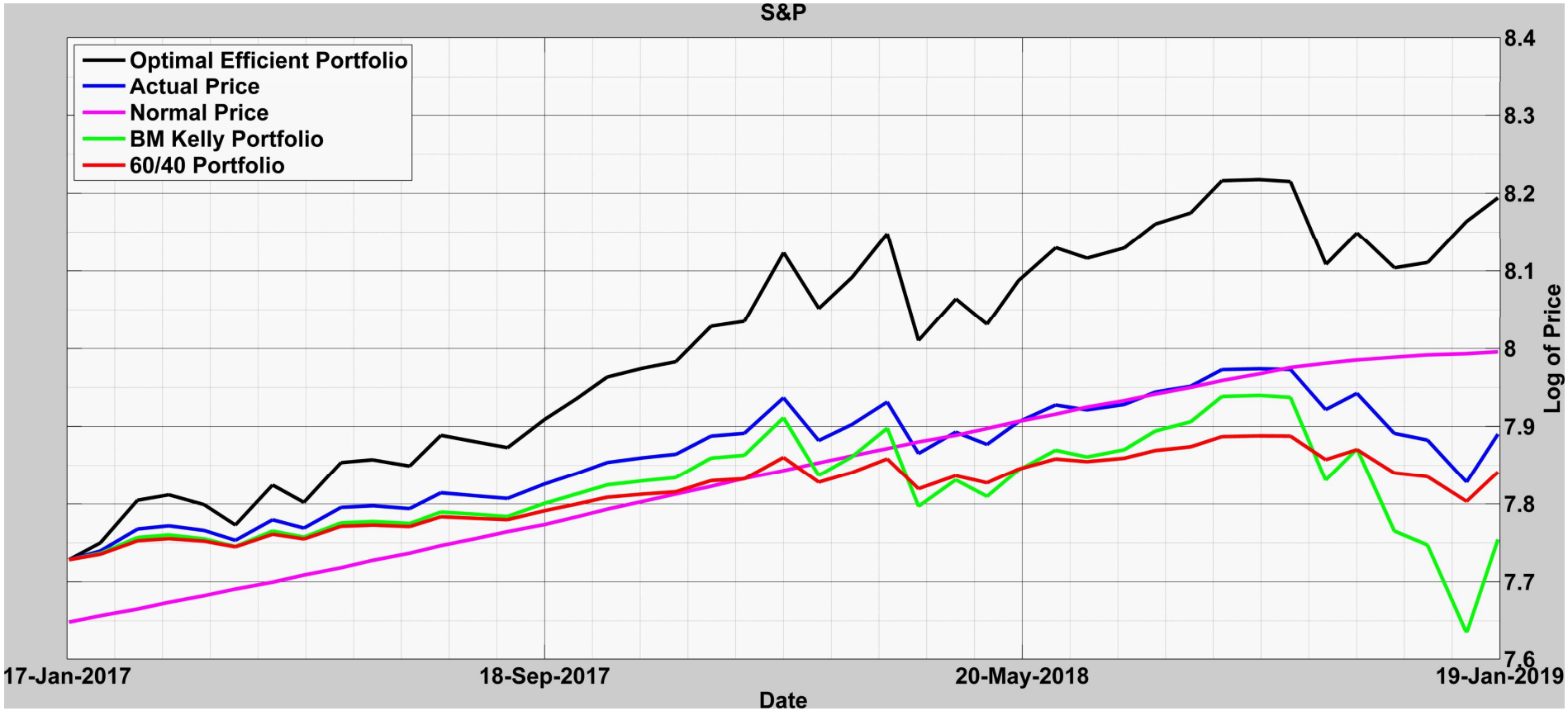
The signals are probabilistic. You need to make a bet based upon not only the probability but the size of the jump. Then over several trials you will outperform.

This is the basis of the Kelly method. We here have extended that method to asset prices with jumps AND where the distributions of jumps is dynamic and changes over time and that is the crux of our method.

That is the rational of the optimal efficient portfolio exhibiting outperformance.

The next graph shows what happened between December 31, 2018 and January 18, 2019.

The graph of the log of the asset price and normal price for S&P 500 extended to January 18, 2019.

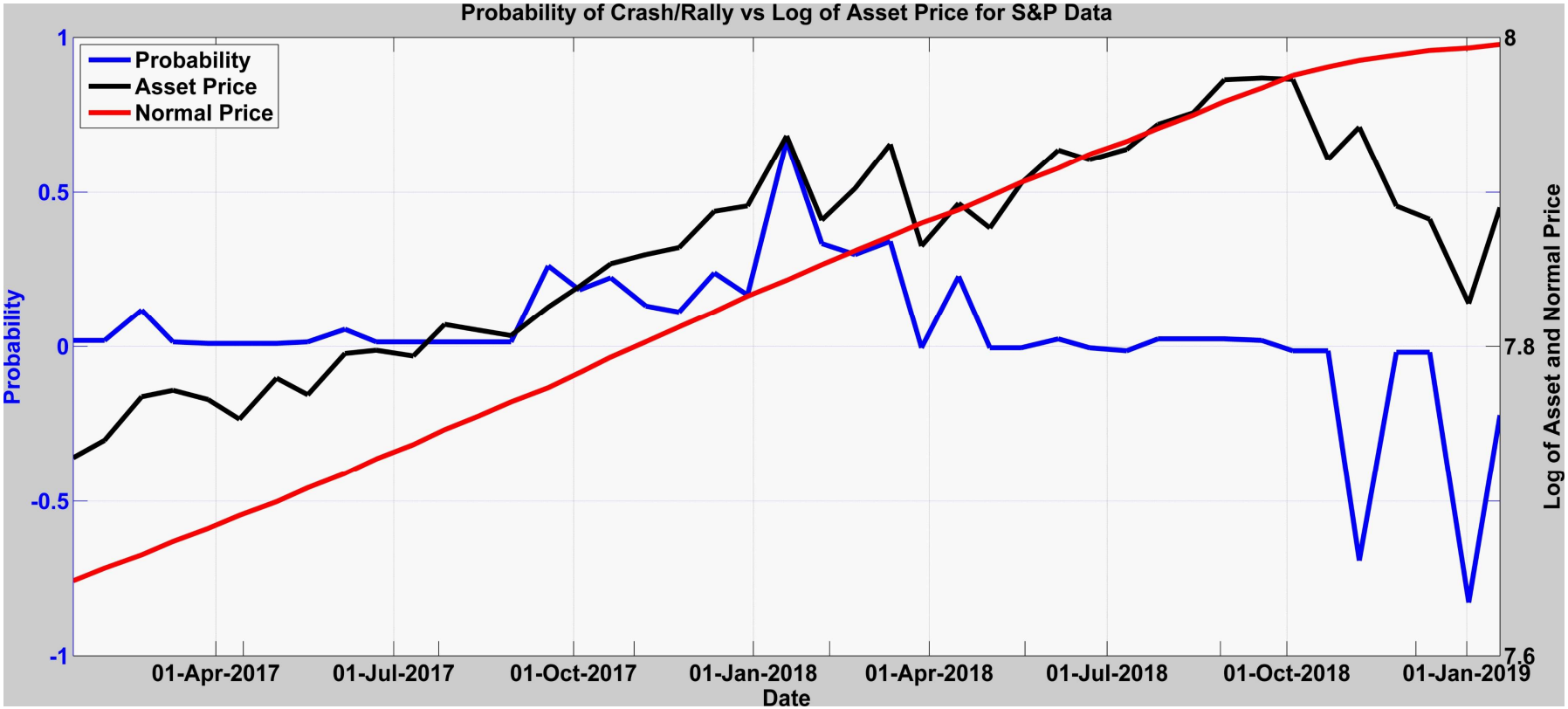


Notes on the graph.

- Note that the asset price is recovering after Dec 31.
- Also, the optimal efficient portfolio is moving in the same direction.
- See the next graph where the probability of a rally is very high (84%) prior to the upturn but then drops to 22%.
- Will the asset price move back to the normal price? We can't tell. But other measures point to the acceleration back to the normal price as slowing.
- **The probability signals worked. The method says invest more when the odds are in your favor and less when they are not.**

- But what about a crash? We give our opinion next.

The graph of the log of the asset price and normal price along with the probability of a crash or rally. Positive probability for a crash and negative for a rally.



We detect no signal for a sustained crash.

Rather a slight continuing to the normal price.

HOWEVER. Our analysis does not consider:

- Political risk and chaos
- Geopolitical tensions
- Trade issues and disputes
- China recession
- A rapid rise in global long-term real interest rates (we will be monitoring)
- Debt growth (we will be monitoring)

Include RisKontroller as a part of your investment tool kit

- We will be telling you how to interpret and apply details of outputs including timing, size, probability, normal price return, expected returns from rational expectations condition, and other indicators.
- Crash mitigation and rally advantaging are critical in outperformance.
- We are developing apps for crash/rally alerts for major markets that can be customized to clients needs.
- Personal investors as well as institutional investors can profit from this technology.
- We continue research and development of this technology.
- Write us for more info : info@RisKontroller.com

Summary

- Our method is probabilistic.
- It applies to institutions and persons.
- You can create an outperforming portfolio that mitigates crashes and advantages rallies for institutions and individuals.
- But we do not take into account all possible risks. We measure the movements based solely on analysis of the price movements.

See http://riskontroller.com/info-center/ for several papers.

Remember this as you read these papers. They may seem complex but only complex enough to solve the problem. We make them as simple as possible but no simpler.

So keep in mind the cartoon on the next and last slide.

Thank you for your time