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The Financial Crisis and ERM

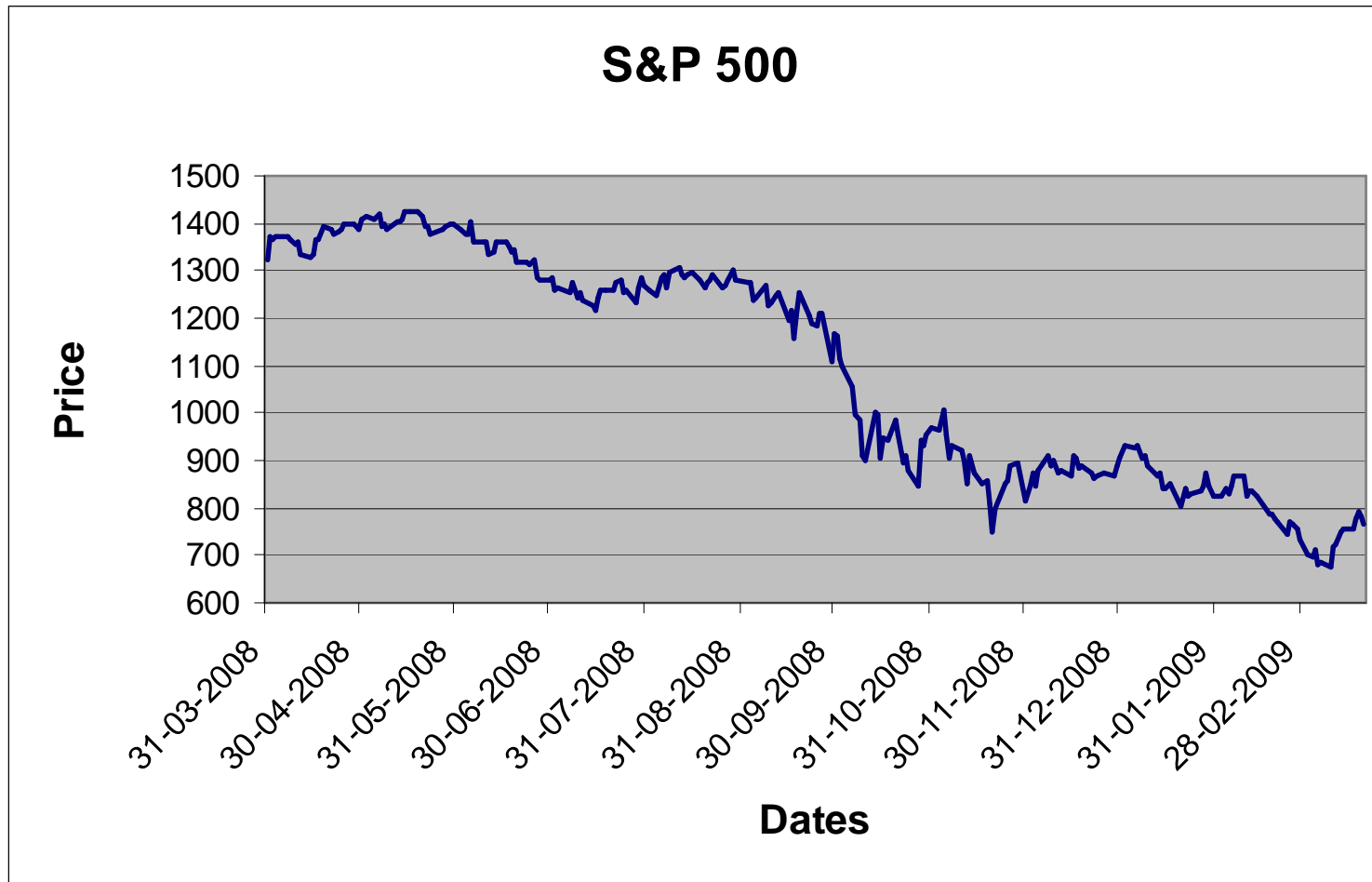
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Agenda

The 2008 Financial Crisis	2
<i>Is it the death or Risk-Management (VaR)?</i>	<i>5</i>
<i>What really failed</i>	<i>9</i>
<i>What to learn from the Crisis so far?</i>	<i>12</i>
<i>End Remarks</i>	<i>16</i>

The 2008 Financial Crisis - I



The 2008 Financial Crisis - II



- The subprime crisis evolved into a full market meltdown in the second half of 2008, which the result that all major Wall Street investment firms collapsed
- Some stylized facts about the crisis (S&P 500):
 - Oct 2008 (-20.4%) only exceeded by Nov 1929 (-26.9) and April 1932 (-23.9%) - Oct 1987 (-12.6% - in position 14)
 - Oct/Nov 2008 (-27.4%) only exceeded by Oct/Nov 1929 (-34.3%) and April/May 1932 (-33.1%) - Oct/Nov 1987 (-23.1% - in position 10) (Sep/Oct 2008 in position 6)
 - **Remark:** if the last week of november 2008 had not been positive, then Oct/Nov 2008 would have been the worst 2-months in the history!

The 2008 Financial Crisis - III



- What about the 4. Quarter of 2008?
 - Oct-Dec 2008 (27.9%) (only exceeded by 2. Quarter 1932 (-42.5%), 4. Quarter 1929 (-31.6%) and 4. Quarter 1931 (-29.2%)) - 4. Quarter 1987 (-24.4% - in position 6)
 - **Remark:** It is also worth mentioning that the start of the 2. World War in 2. Quarter of 1940 is only in position 11!
- Lets us now look at the whole year of 2008. The total loss was: -40.7%, which is only exceeded by the year 1931 (-45.9%)
 - Remark: 1987 is not in "top" 10. However the .com bubble (2002) is now in position 6. Furthermore, now the years 1973/1974 are in "top" 10 (in positions 7/4)

It is the death of Risk-Management? - I



- There has been some claims that the financial crisis is a failure of risk-management, here are some examples:
- Maurice Greenberg, former chairman and CEO at AIG, blamed AIG's 2008 meltdown on the failure of internal risk management (see also next slide)
- Robert P. Hartwig, president of Insurance Information Institute, lashed out at the current enterprise risk management frameworks when he said that *"the financial crisis is the result of a failure of risk management [in the banking and securities markets] on a colossal scale... We may literally have to tear up the manual of enterprise risk management and start over. How did so many major financial players miss or overlook such huge, systematic exposures?"*

It is the death of Risk-Management? - II



- Some limit the "attack" claiming that it is the failure of **quantitative** risk management, here are some examples:
- On "algotrades", Richard Dooling wrote: *"Somehow the genius quants - the best and brightest geeks Wall Street firms could buy - fed \$1 trillion in subprime mortgage debt into their supercomputers, added some derivatives, massaged the arrangements with computer algorithms and - poof! - created \$62 trillion in imaginary wealth"*.
- AIG again... The problem for AIG was that the internal risk models did not include market risk - it was focused on the likelihood of default.
- *"We would like society to lock up quantitative risk managers before they cause more damage"*, Taleb said.

VaR - why is it so "popular"? - I

- The popularity of VaR can probably be summarized as follows:
- VaR's great appeal, and its great selling point to people who do not happen to be quants, is that it expresses risk as a single number!
- VaR is however not one model but rather a group of related models that share a mathematical framework. In its most common form it measures the boundaries of risk in a portfolio over short time-horizons, assuming a "normal" market. One reason for VaR to become so popular was that it is the only commonly used risk measure that can be applied to just about any asset class. It takes into account a huge number of variables, including diversification effects, leverage and volatility
- Another reason VaR is so appealing is because it can measure both individual risks and firmwide risk. Top executives usually know their firms daily VaR number short after the market's close
- Risk managers are using VaR to quantify their firms risky positions to the board. The Basel Committee further validated VaR by saying that firms and banks could rely on their own internal VaR calculations to set their capital requirements

VaR - why is it so "popular"? - II

- Given what has since occurred it is natural to ask one-self - can we use VaR - is VaR dead?
- *"Risk modelling did not help as much as it should have"*, says Aaron Brown (former risk manager Morgan Stanley)
- *"VaR is a limited tool"*, says Marc Groz (Risk Consultant)
- *"This is like an air bag that works all the time, except when you have a car accident"*, says Nassim Taleb
- David Einhorn (founder of Greenlight Capital) has recently written that VaR was *"relatively useless as a risk management tool and potentially catastrophic when its use creates a false sense of security among senior managers and watchdogs"*

What really failed - I

- The epicentre of the market crisis was sub-prime mortgages and structured credit products. With them came Innovative financing - asset-backed CDOs. From these arose even more potent instruments, like CDO² and synthetic CDOs (CDOs combined with CDS)
- Risk were often under-estimated, mainly due to product complexity and an over-reliance on quantitative analysis
- Mark-to-market accounting amplified price gaps and volatility among these typically illiquid assts

What really failed - II



- The declining house prices followed by the "crash" in stock prices has had a substantial impact on wealth - which all in all has a negative influence on consumer spending
- Bad risk management did play a role. There may have been over-reliance on the models used
- It is though not the case that one can blame risk management in every case. In many cases banks and companies did their best based on the available data within sample periods, often however they experienced out-of-sample events when the economy moved into new territory. Out-of-sample events are notoriously hard to deal with!

What really failed - Risk Management Failures

- Not properly recognizing counter-party risk!
- A misconceptions on the unique nature of CDO ratings and how they differ from the ratings of other debt - this may have caused investors to underestimate CDO risks. If not all, then most of the fault here lies with the rating agencies!
 - For example S&P, Moody's and Fitch did not issue a warning that CDO ratings was not comparable to identical ratings for other bonds (62% BBB (or less) rated MBS/ABS was turned into AAA-rated CDO tranches)
- A misunderstanding of the concept of rating. Saying that an asset is AAA-rated, does not in any way imply anything about the stability of its market pricing or its liquidity
- Risk models are only as good as their inputs and assumptions, and a model's output is rarely "the answer".
 - Underlying assumptions usually went unchallenged
 - Crucial assumptions was not fully thought through

What to learn from the Crisis so far? - I

- Lack of accountability!
 - Historically people sought mortgages to buy a primary residence
 - In recent times (prior 2007/2008), due to the increasing property values, people have sought mortgages to fund investment properties
 - As a leveraged investment financing vehicle, mortgages create an updated set of "walk away" rules
 - People do not vacate their primary residences in periods of property value declines
 - Investors will abandon their interest - "turn in the keys" - when investment does not produce value - this is our "Lack of Accountability". This was further magnified by the expansion of mortgage availability with regard to terms (e.g. IO payment pattern, less money down) and creditworthiness of applicants
- Remark: Leverage!

What to learn from the Crisis so far? - II



- There is no free lunch!
 - When for example insurance companies originate loans themselves, they can access the creditworthiness of the borrowers and have control over underwriting
 - Now investors in MBS/ABS and especially CDO would have no idea about whether the borrowers could repay the loan or not - there is no gatekeeper guaranteeing the loan quality!
 - Lack of appropriate modelling capabilities. MBS with credit default is very complex to model accurately and CDO with multiple sector exposures are even more challenging! And illiquidity does not help!
 - It is clear that securitization has promoted liquidity and enhanced mortgage financing - however there is talk about shedding more light on the opaque structures and make them more transparent. For investors the lesson is clear - there must be a gatekeeper!
 - Investors will however need to invest in the capability of analyzing structured financial securities - models, technologies and risk management tools!

What to learn from the Crisis so far? - III

- "Beware of geeks bearing formulas", Warren Buffet 2008
 - "If it looks like a loan, acts like a loan, and performs (at least in the beginning) like a loan, it's probably a loan", unknown origin
- If Institution A makes a loan, a certain amount of capital is required to support that loan - the amount of capital should be related to the likelihood of repayment of the loan
- If Institution A offloads that loan to Institution B, regardless of how this offload is structured, the same amount of capital (at least) is still required to support that loan
- If Institution B breaks up the loan into little pieces and packages the pieces with pieces of other loans it has required and then sells the package to institution C, the same amount of capital (at least) is still required to support that loan

What to learn from the Crisis so far? - IV

- If Institution C, and all other Institutions that end up with pieces of the loan originated by Institution A, repackage all or part of their respective shares, recharacterize the resulting whatcha-ma-call-its, rename those same whatcha-ma-call-its, and resell them to Institution D, the same amount of capital (at least) is still required to support that loan
- You get the idea! No matter how the original loan is sliced, diced, packaged, wrapped and marketed, the same amount of capital (at least) is still required to support that loan
- Somewhere in the CDS assembly line that little piece of fact was lost, ignored or re-defined out of existence. The lesson of the current debacle ought to be that the risk inherent in a financial transaction cannot be made to go away by the mere act of repackaging that transaction and renaming it!
 - The sow's ear is still a sow's ear, despite all attempts to make it otherwise

Some closing Remarks

- The Financial Modelers's Manifesto (Derman and Wilmott 2009)
 - *I will remember that I didn't make the world, and it doesn't satisfy my equations*
 - *Though I will use models boldly to estimate value, I will not be overly impressed by mathematics*
 - *I will never sacrifice reality for elegance without explaining why I have done so*
 - *Nor will I give the people who use my model false comfort about its accuracy. Instead, I will make explicit its assumptions and oversights*
 - *I understand that my work may have enormous effects on society and the economy, many of them beyond my comprehension*

- Summarizing the current situation, we end with the following quote:
- "We have met the enemy and he is us", Walt Kelly (1970), [http://en.wikipedia.org/wiki/Pogo_\(comics\)](http://en.wikipedia.org/wiki/Pogo_(comics))