

Big Data: Neues Business Modell für KMUs

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The Crisis of 2007-2009

US Secretary of the Treasury Hank Paulson in September 2008 (when Lehman Brother filed for bankruptcy):

*“The problems at Lehman have been known for many months. The counterparties have had ample opportunity to adjust their exposure. Therefore, we can **safely** let Lehman go down.”*

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That statement was not based on

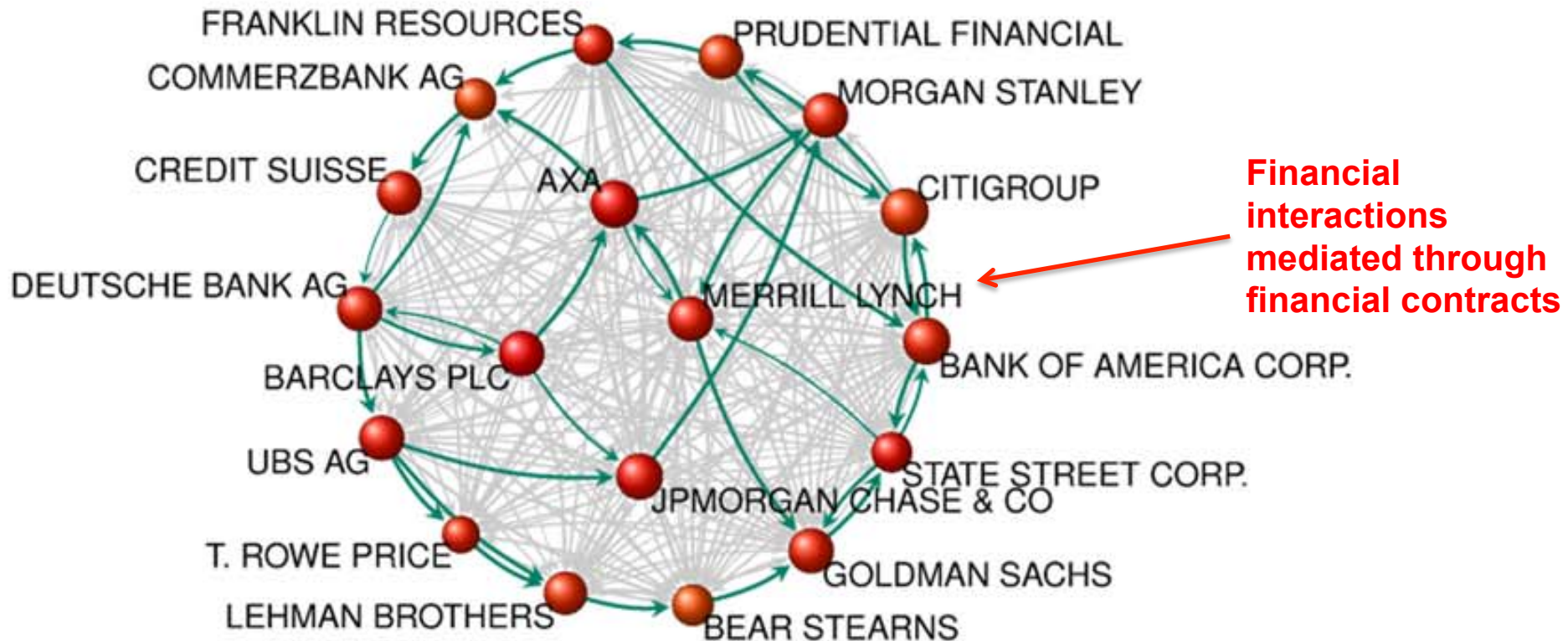
- any data illuminating the interconnectedness of institutions in the financial markets,
- any empirically based analytics.

At most, it was **based on theories or assumptions** about how markets work.

Response of the British Academy to the Queen's question why nobody had foreseen the financial crisis:

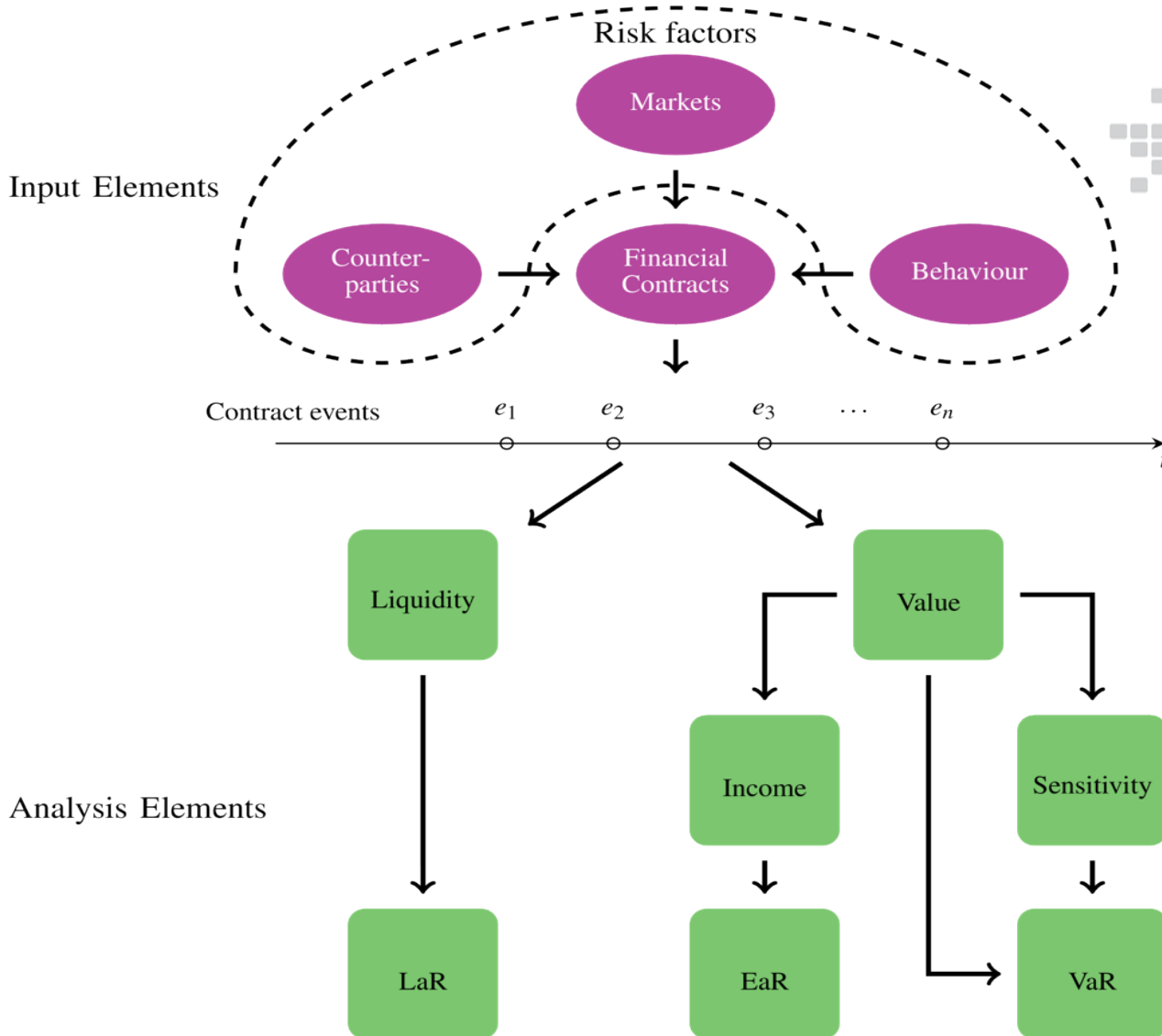
“Everyone seemed to be doing their own job properly on its own merit. And according to standard measures of success, they were often doing it well. The failure was to see how collectively this added up to a series of interconnected imbalance. Individual risks may rightly have been viewed as small, but the risk to the system as a whole was vast.”

Interactions in the Banking Network



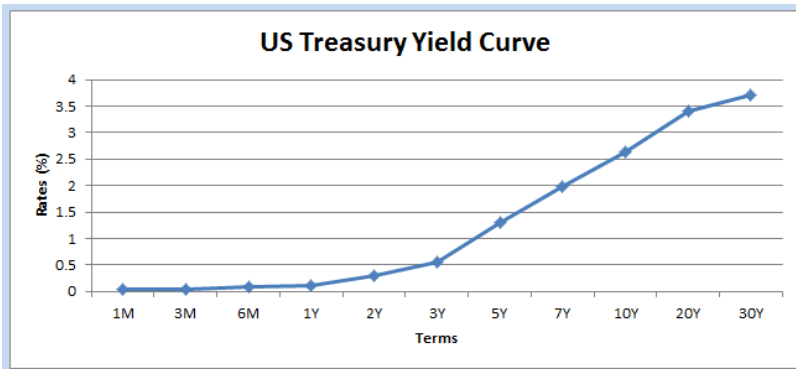
Source: Vitali, Glattfelder, Battiston, The Network of Global Corporate Control. Open Access **6** (10), e25995 (2011).
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0025995>. Accessed April 2014.

The ACTUS Engine: Decoding Contracts into Contingent Cash Flows



Brammertz, Akkizidis, Breymann, Entin, Rustmann, *Unified Financial Analysis*. Wiley, Chichester, 2009.

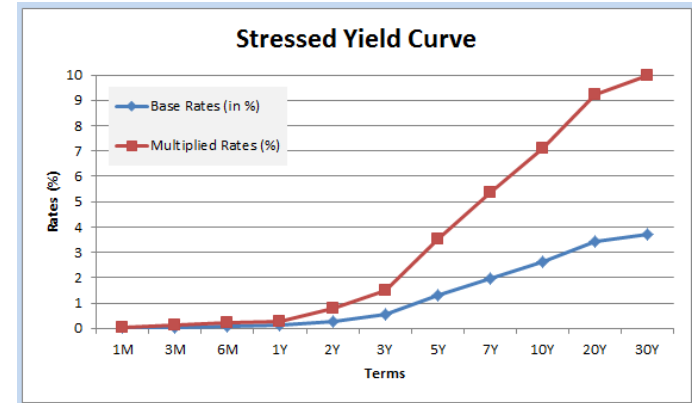
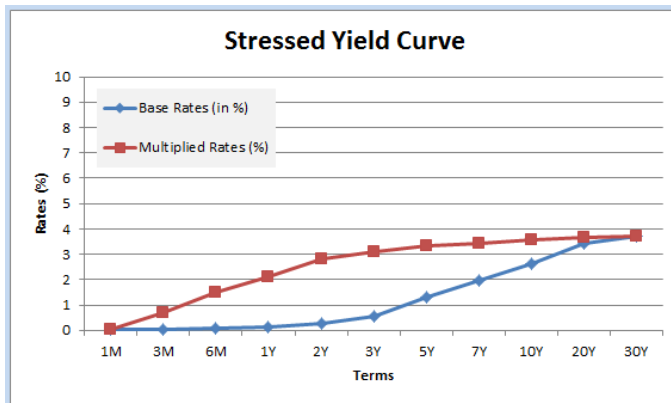
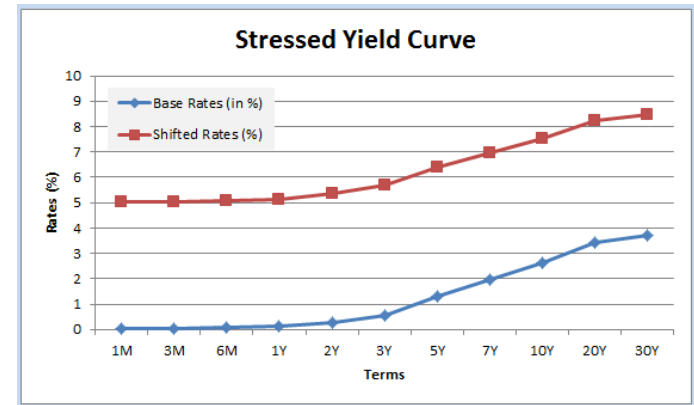
Financial Analysis: Risk – Stress Test Szenario



Szenario 1 →

Szenario 2 ↘

Szenario 3 ↘



Main Data Challenges

- Using **Monte Carlo simulation** to estimate **cash flows** of all financial contracts generates **Petabytes** of data!
 - Need scalable system architecture
- Simulations should finish **within one day**:
 - Need highly efficient parallel algorithms
- System should allow **ad-hoc data analysis**:
 - Need cloud architecture to elastically scale up and down CPU and storage resources

- Industry Partner: The logo for ARIADNE BUSINESS ANALYTICS features a red square icon with a white maze-like pattern on the left, followed by the word "ARIADNE" in a large, blue, sans-serif font, and "BUSINESS ANALYTICS" in a smaller, grey, sans-serif font below it.
- ZHAW:
 - Prof. Dr. Wolfgang Breymann
 - Nils Bundi

Conclusions

- Also small to medium sizes companies can do **Big Data projects**
- **Simulation** typically generates large amount of data
- **Applications** in many areas:
 - Finance
 - Fintech
 - Industry
 - Research
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