Economic crises: technology is the answer

Richard Olsen

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Outline

- Background
- High frequency finance
- Action items
- Outlook
- Conclusion

Background

- OANDA, market maker in foreign exchange
- Olsen Ltd, currency manager
- OFT, high frequency data of financial markets
- Centre for Computational Finance and Economic Agents, University of Essex

OANDA Businesses

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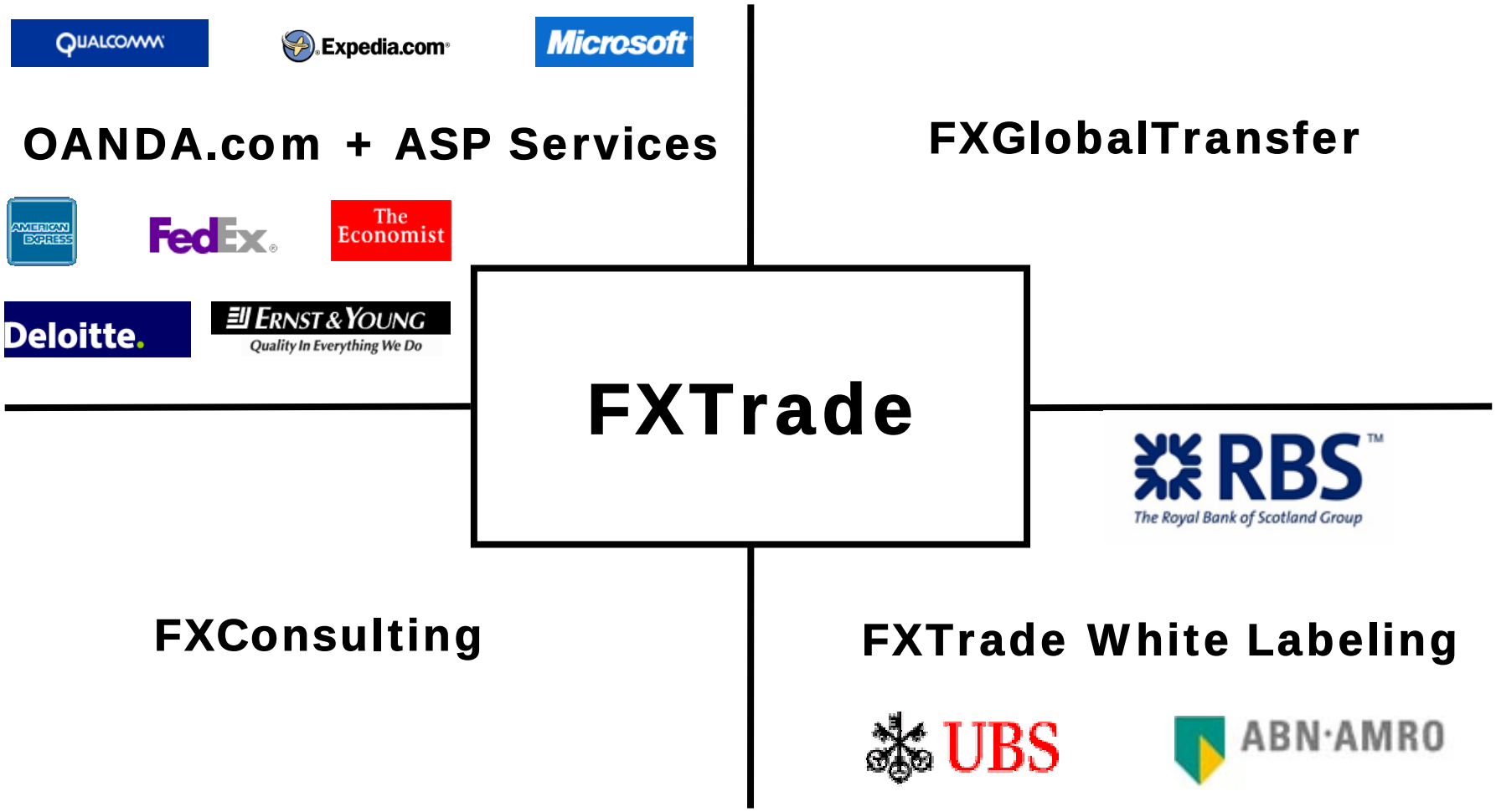
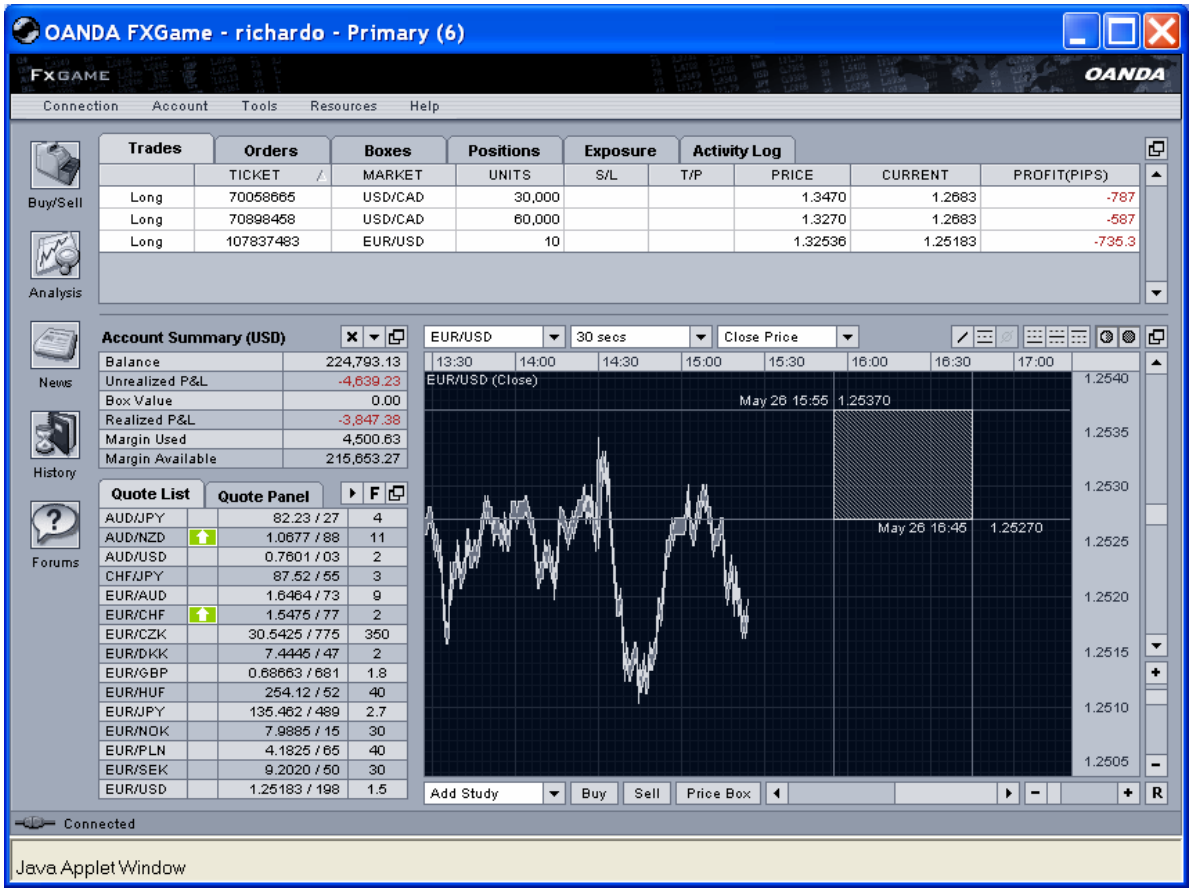


Spot trading and Boxoption



OANDA‘s business model

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- No price differentiation
- All customers trade on same price from 1 USD to 10 Mio USD tickets
- Second by second interest rate payment
- Straight through processing
- Instantaneous settlement
- Average ticket numbers per day, 500’000 tickets (peak 1.6 Mio)

Why OANDA's Business Model is Complex: Consider the Real Cost of Trading

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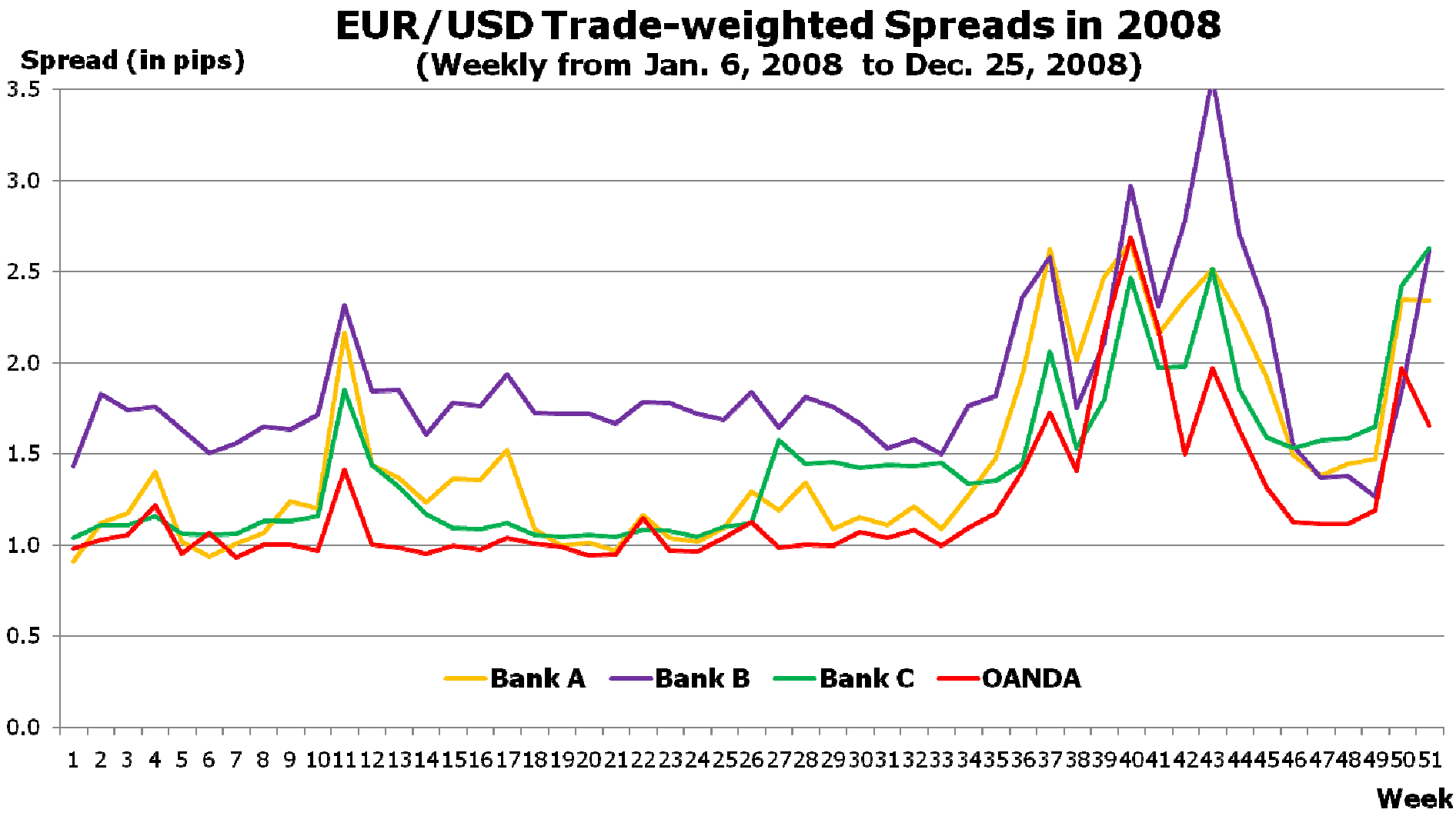

Spot Forex Market: market participants

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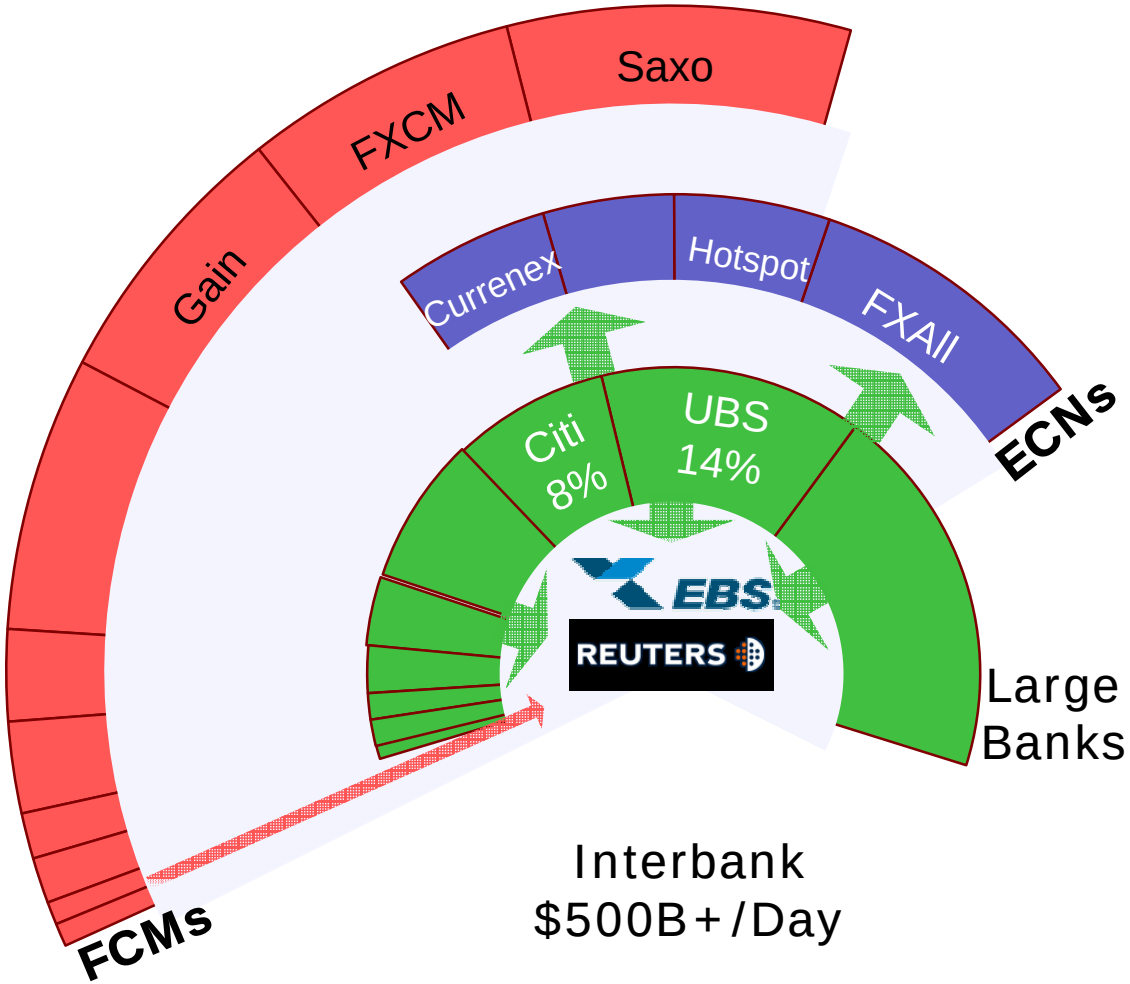

OANDA FXTrade in Operation

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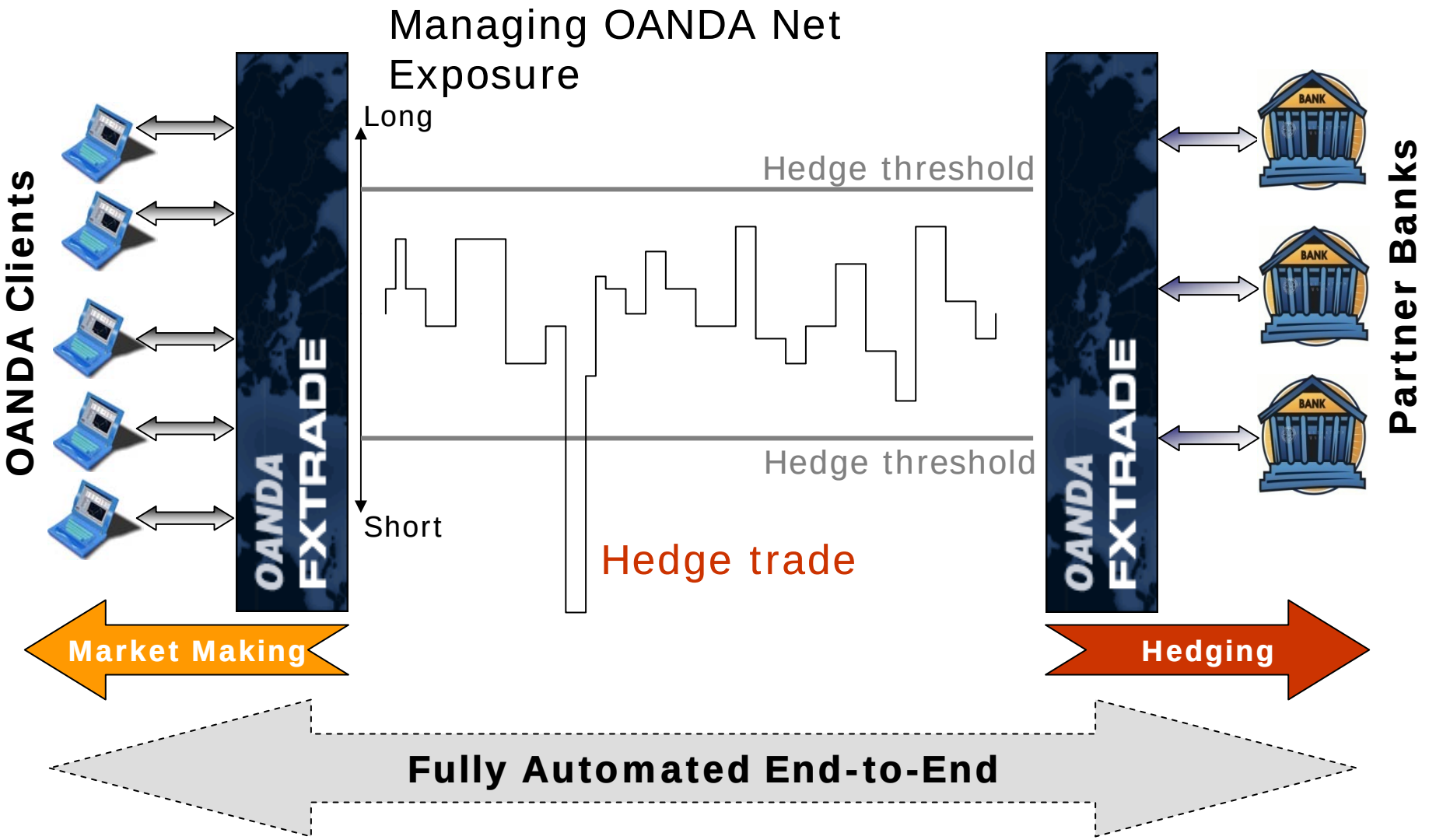

FXTrade: Server Architecture

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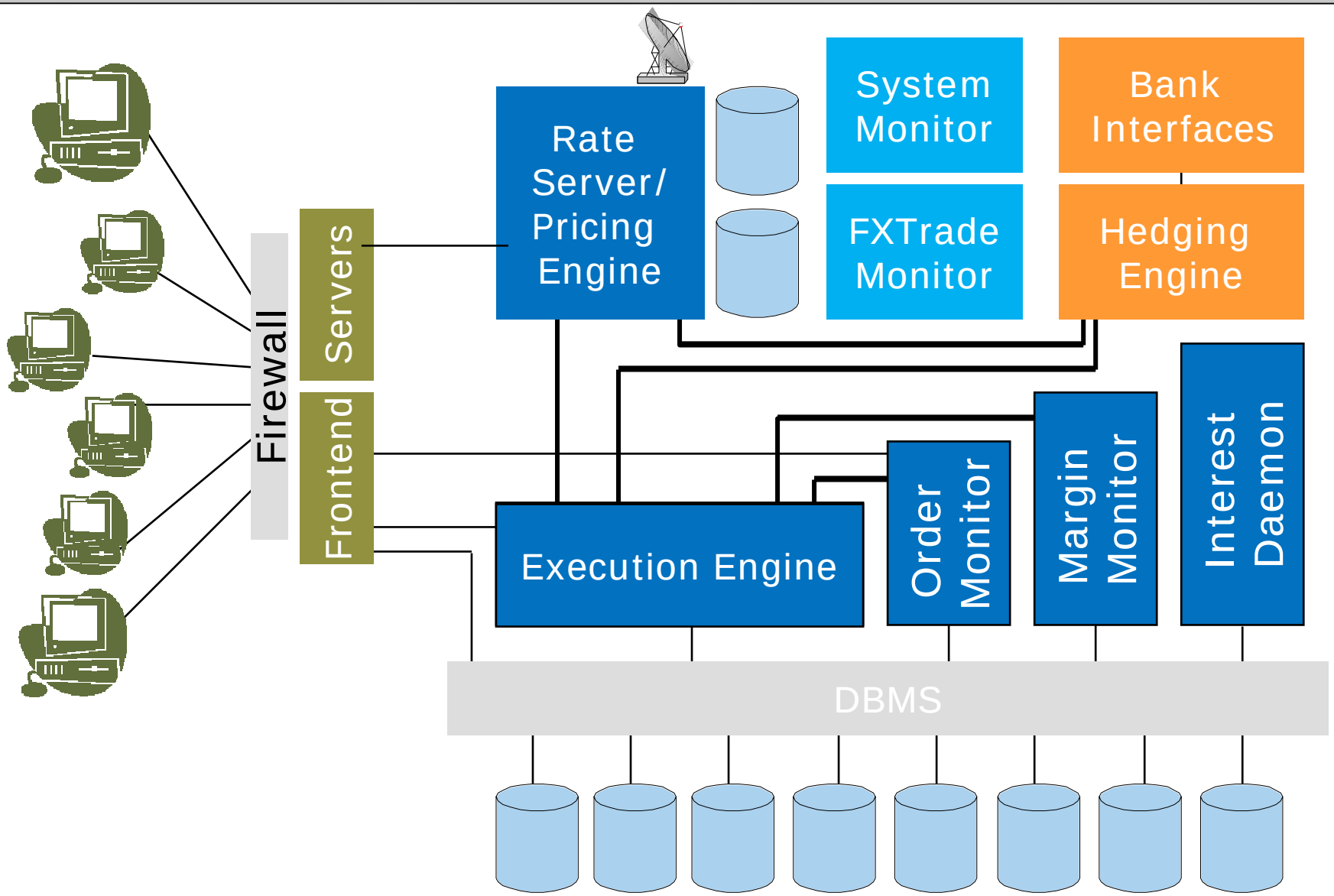
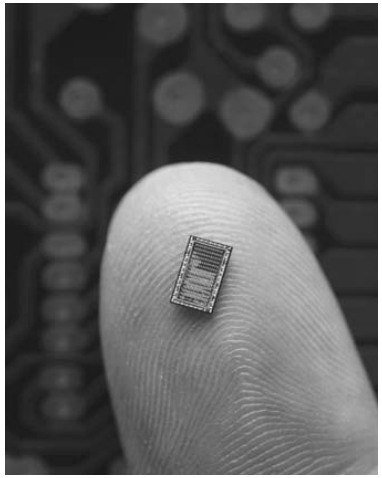
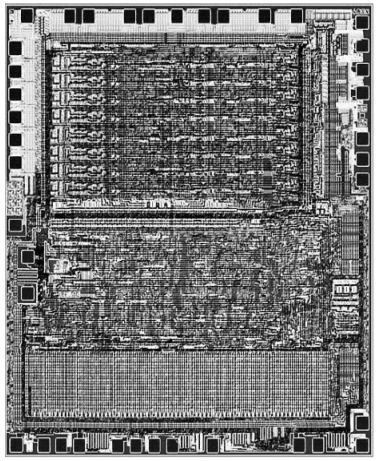


Objective





- other industries have succeeded, *why not finance?*
- human beings, complexity, unforeseen events.
- *is there an answer?*
- 25 years of research, high frequency finance, new concepts, a long road of discovery.
- *definite recommendations*

You only see what you look at

	Daily Data	High-Frequency Data
1 day	1	25‘000
1 year	250	5‘000‘000
10 years	2‘500	50‘000‘000
100 years	25’000	500’000’000

One day of high frequency tick by tick data is equivalent 100 years of daily data.

Within a 24 hour time window, the world is more or less the same, so one day of tick data is more valuable than 100 years of daily data.

Mechanics of market making

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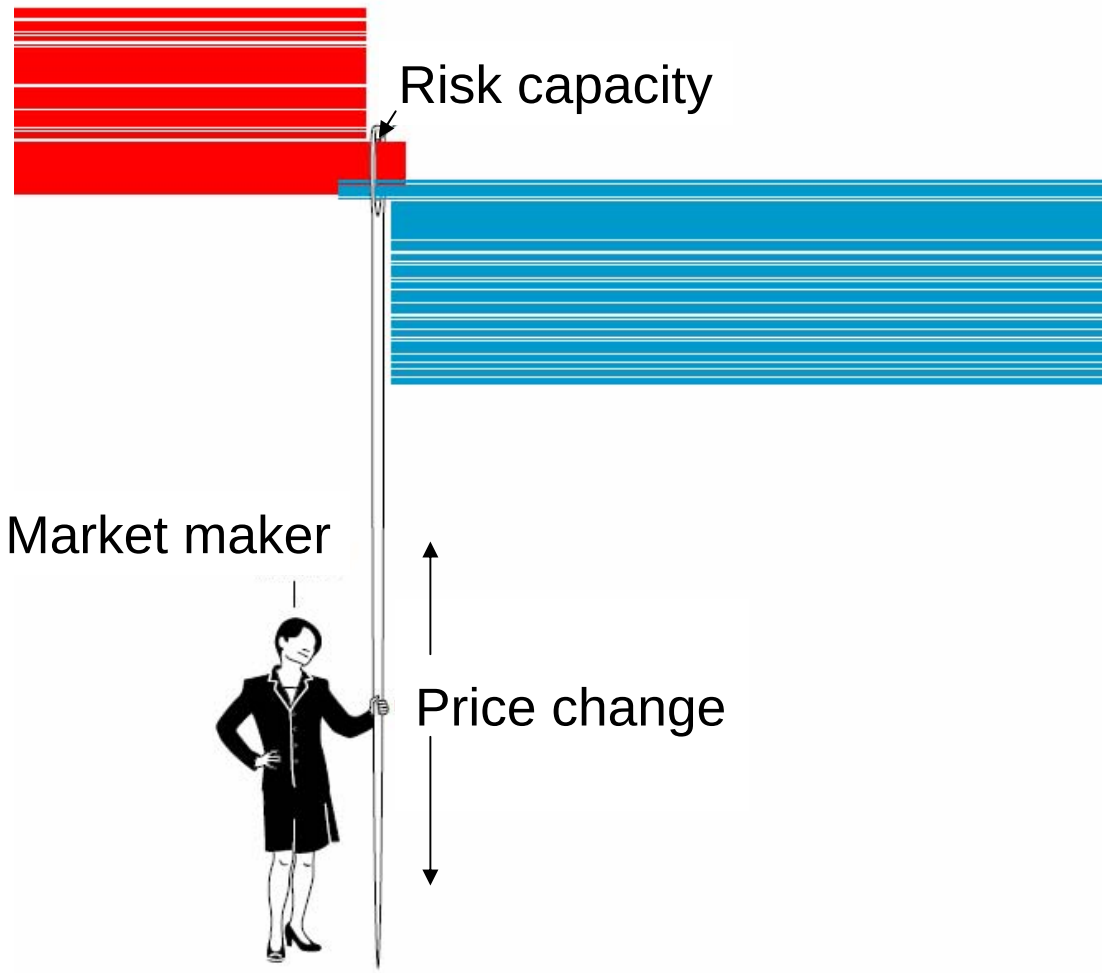

Market maker sets the market price

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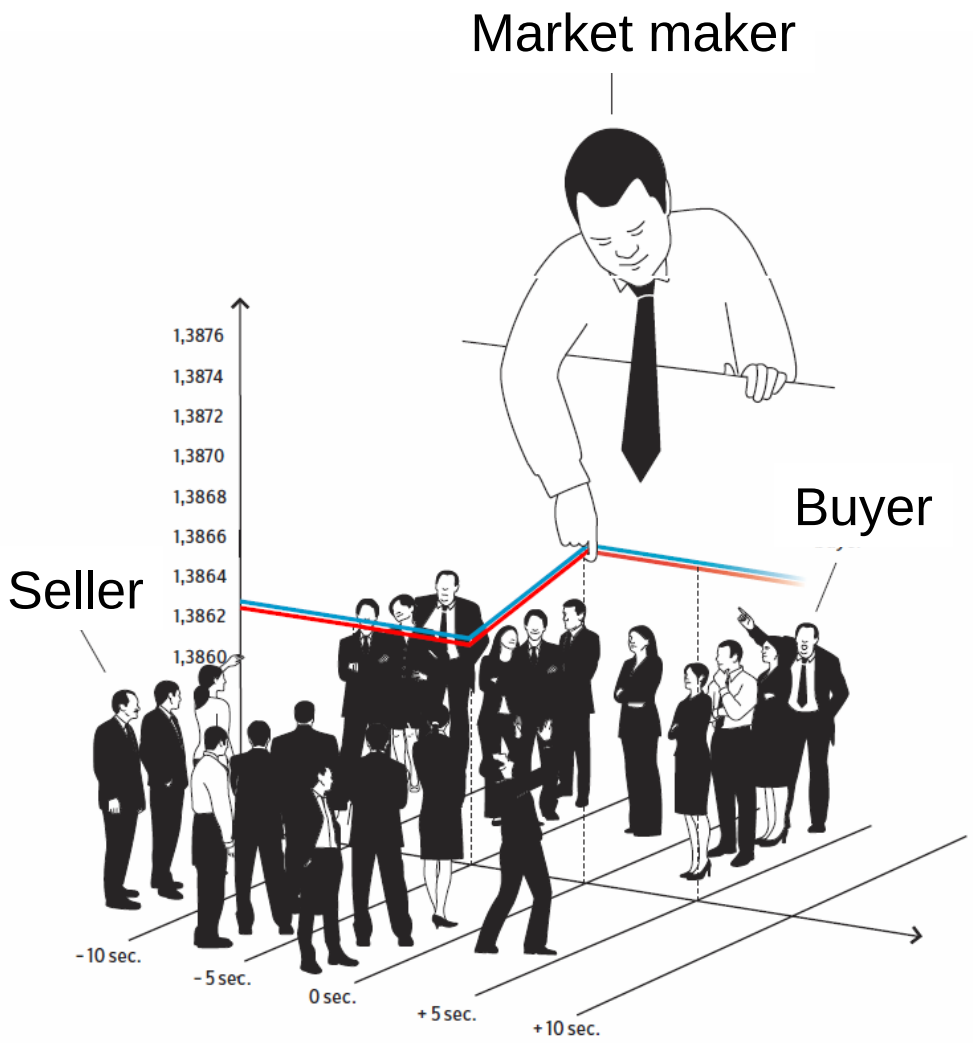
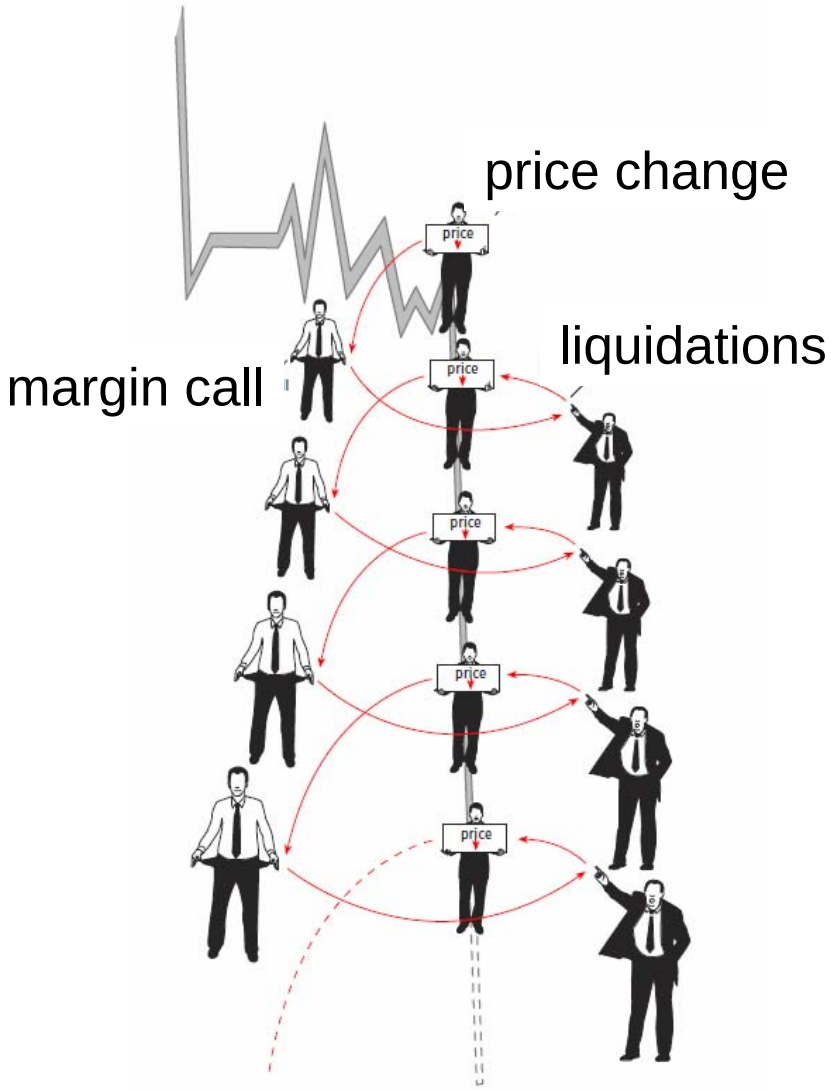


Margin calls trigger cascading price moves



Large price trends are the result of cascading margin calls.

Example: recent USD upmove is result of everyone getting it wrong....

Example: EUR_USD price action Friday 9th Jan 2009

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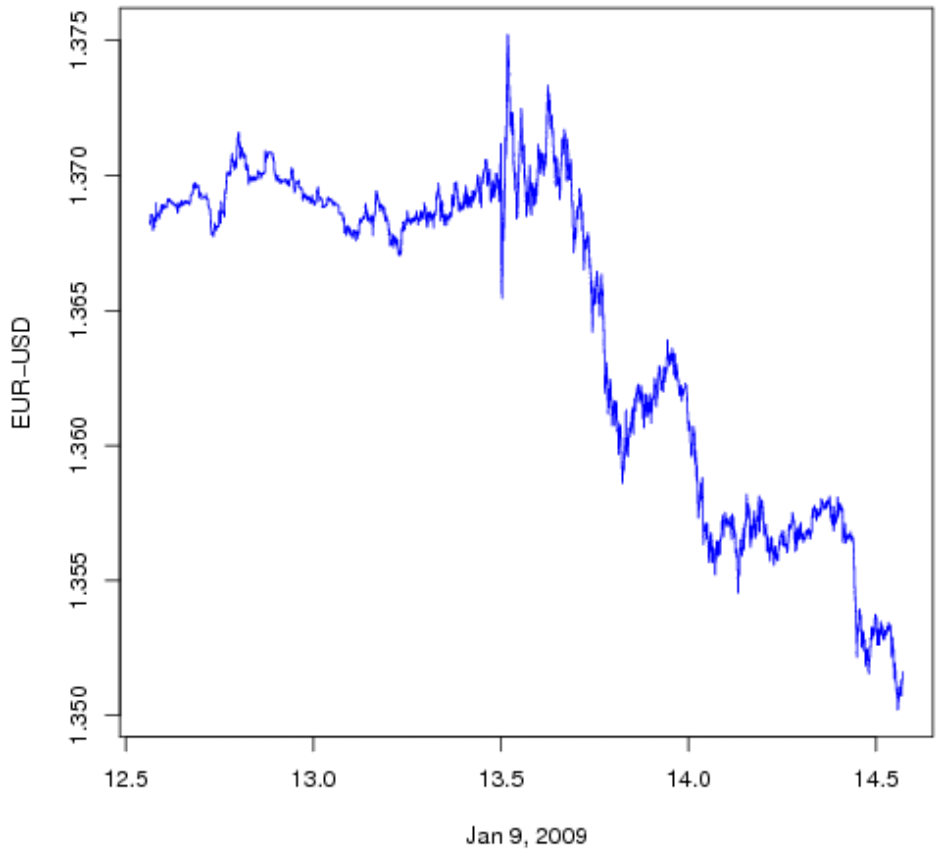

Non-Farm Payroll data: 598‘000 jobs lost.

Example: trader action on Friday 9th Jan 2009

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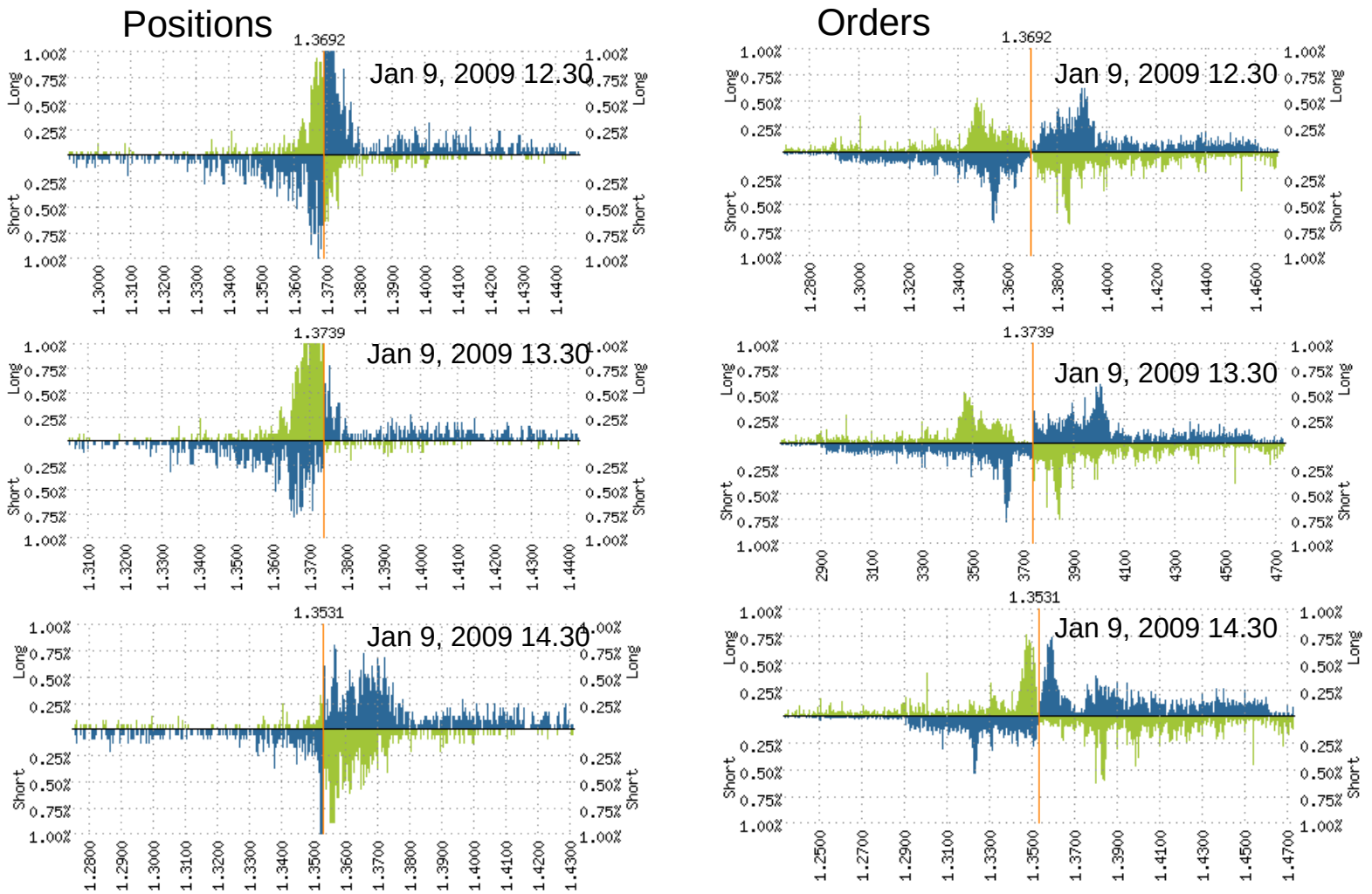
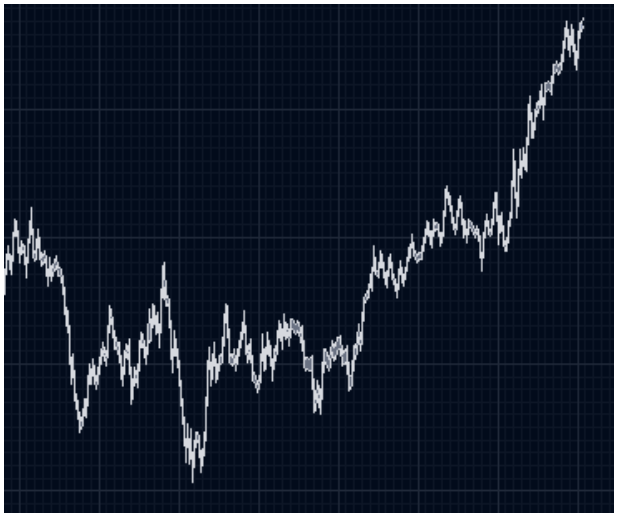
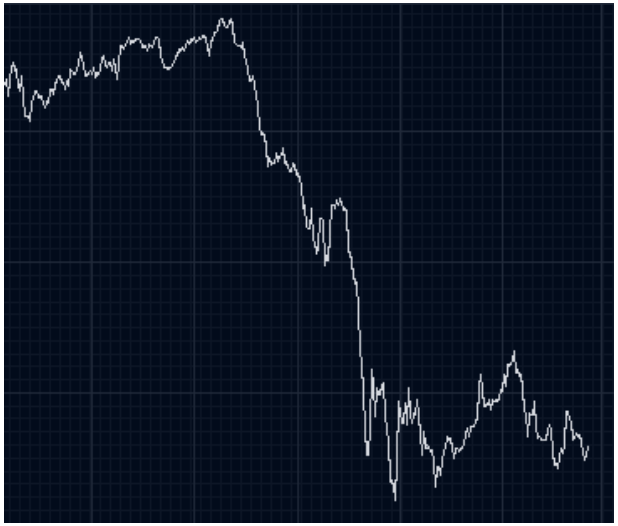


Complimentary OANDA service, see http://fxlabs.oanda.com

Theory of fractals



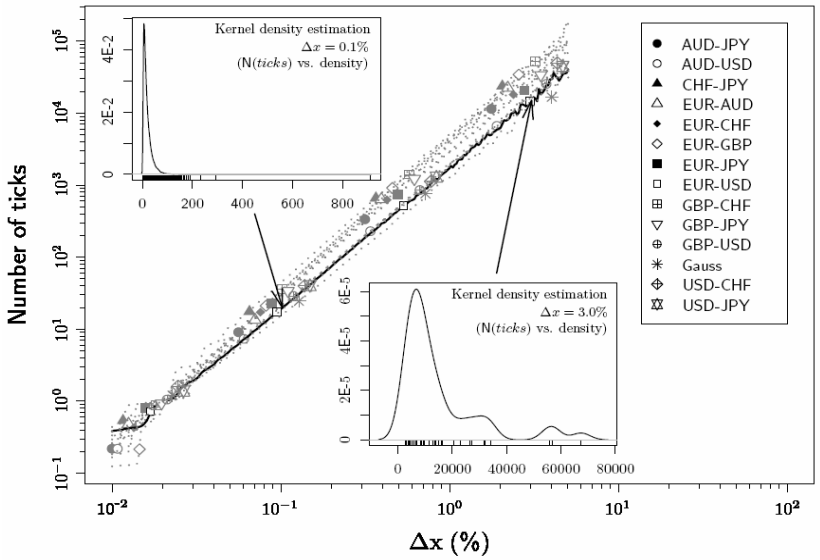


Financial markets are fractal:
statistical properties are self similar.

Conclusion: tick data tell us a lot
about future.

17 new scaling laws

Tick scaling law



Scaling law indentifies fixed relationship between averages of two variables.

Example: trend scaling law
trend of 1% will on average continue for another 1%,
trend of 2% for another 2%.

Scaling laws establish definite frame of reference for financial modelling.

New technology

- New generation of risk management models
- Forecasting models with significant predictive power.
- Trading models as alpha generators: 3% return per unit of leverage.
- New financial products (all technology based)
- State of technology: comparble to computers in 1968...Moore‘s law of finance: doubling of efficiency every two years.

Big picture

- High debt levels create instability.
- Macroeconomic models do not correctly factor in negative multiplier of deleveraging and declining economic activity.
- Long-term interest rates will explode, if investors go on strike.
- Over the past 8 months market liqudity has declined 90% and micro volatility is 10 higher than its historical peak.
- Big FX moves are in the coming....due to phenomenon of cascading liquidations they can be counter-intuitive.
- Today, situation is more dangerous than during Great Depression.

Key insight

- Financial markets do not work ‘automatically’
- Market economy is complex machine, where details matter.
- What needs to be done:
  - Bottom up research: high frequency finance
  - Digital financial markets
  - Online information system
  - Stability investing

Nuts and bolts of financial system

- Financial system operates with market conventions developed prior to the computer age and internet connectivity:

  - 2 day settlement,
  - delivery of individual legs of transactions,
  - complex securities in lawyer speak with Excel spread sheets

- Consequences:

  - Counter party risk
  - Uncertainty
  - Calls for additional regulation
  - Changes in short-term interest rates impact real economy

Digitalize financial system

- Real time settlement with second by second interest payments

  Consequences:

  - Yield curve from 1 second to n years
  - Financial system is better equipped to absorb shocks through changes of ultra-short interest rates,
  - Delivery risk confined to p/l risk
  - Reduction of uncertainty, more efficient usage of collateral

- Financial securities programming language:

  Consequences:

  - Concise risk modelling
  - Increase of transparency
  - Reduction of uncertainty
  - Substitute for regulation

Global information system

- System does not exist...Reuters, Bloomberg and other services provide raw data. Analytics are basic.
- We need integrated source of information that combines up to date fundamental data and analysis of complex market dynamics.
- Scope:
  - Consolidation of fundamental data
  - Processed tick by tick data with contour map of positions of market participants.
  - Output: definite recommendations on risk profile of market and likely scenarios for broad spectrum of users.

Example of marketquake scale

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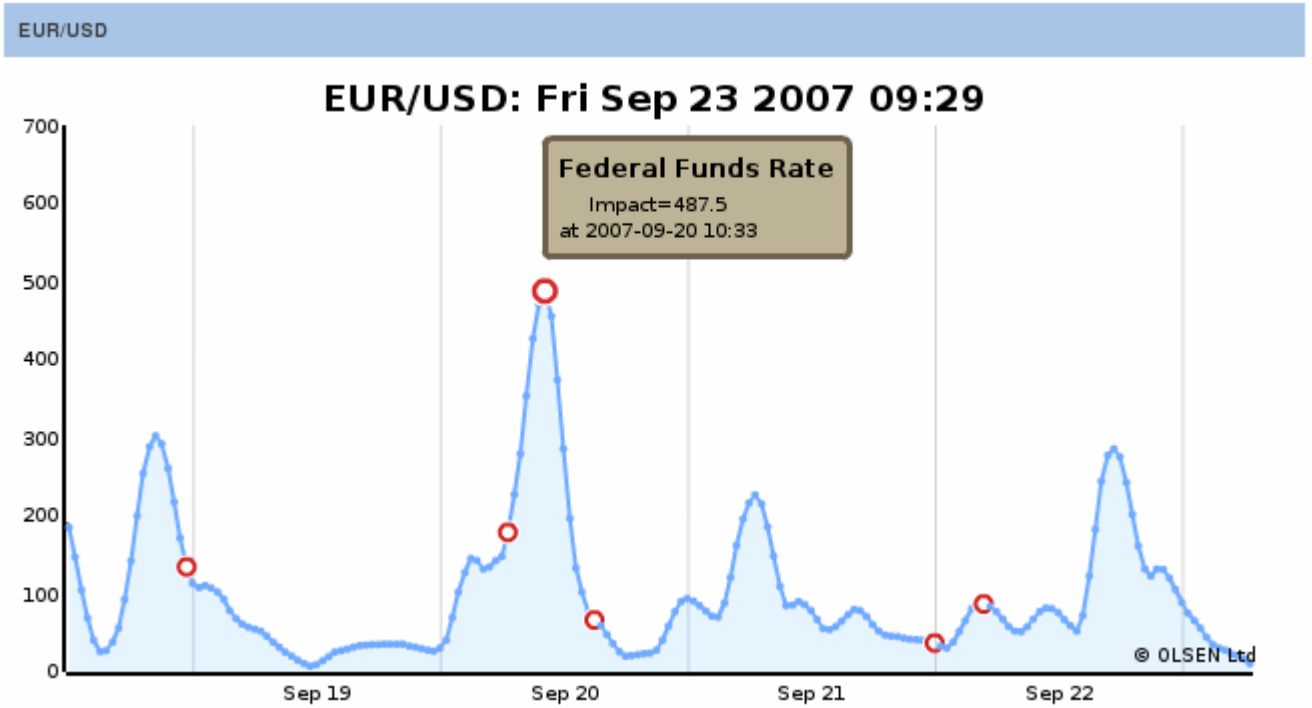

- Today: regulators cannot precisely measure impact of their actions.
- Marketquake scale provides definite answers of how the market responded to their actions.
- Marketquake scale reduces uncertainty....
- See www.olsenscale.com

Liquidity investing

- Clear message from high frequency finance:

  Big market trends are result of cascading liquidations....

- How can big trends be capped?

  – Information system...warns market participants of dangerous buildup of positions.

  – Liquidity investing balances supply and demand and thus caps price spikes reducing the likelihood of cascading margin calls.

Fully automated liquidity investment strategy

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- Computer models monitor markets second by second.
- Algorithms analyze market data for imbalances and decides on how to balance supply and demand?
- At every price spike system opens counter-trend position and closes position on rebound.
- Liquidity investing is substitute for central bank currency intervention. It targets volatility and not specific price levels.

Example: USD/CHF

Conclusion

We need new answers:

Proposal to leverage the power of technology:

1. Digitalize financial markets

2. Online information system of state of economy and its financial markets

3. Liquidity investing to balance supply and demand and stabalize the market.

High tech financial engineering is cost efficient solution.