INET Workshop
Mathematics for New Economic Thinking
Fields Institute for Research in Mathematical Sciences   31 October 2013
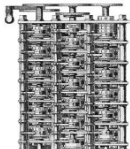
The True Cost of OTC Derivatives

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Commenting in 1998 on the proposed repeal of the 1933 **Glass-Steagall Act** *separating commercial and investment banking* " **an archaic set of restrictions**"

Lawrence Summers

US Secretary of the Treasury & Future President, Harvard University & Advisor, Citigroup

Bloomberg Business Week, 12th August 2013

"Commentators speak loosely about going back to **Glass-Steagall**. But the Glass-Steagall Act was **introduced to deal with a problem that no longer exists: the distribution of fraudulent securities to uniformed customers**"
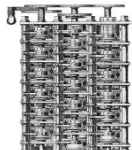
Martin Jacomb

Chairman, Share PLC & Former Chancellor, Buckingham University

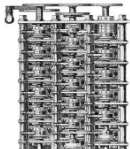*Financial Times*, 14th September 2011
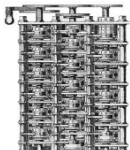
It is indeed the truth; one can do more fascinating things with
an option than an inventive boy can do with a set of Meccano *New Yorker* (1937)
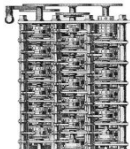
Outline

- **Financial Market Developments**
- **Rôle of Structured OTC Derivatives**
- **Cost of OTC Derivatives to Clients**
- **Pricing Methodology**
- **Evolving Regulation of OTC Derivatives**

Financial Market Developments 1980-2007

- **Technical changes** (market data, pricing calculations, spreadsheets, global communications, state-of-the-art computing hardware)

- **Regulatory changes** (Basel I and II)

- **Changing product paradigms** (risk transfer, transferring property, exchanging contractual obligations) leading to exponential growth of **over-the-counter** (OTC) **structured products**

Financial Services Trading Background 1980-2007

- From customer benefit to **shareholder benefit**

- Profits in **complexity of structured products**

- **Risk management** and **hedge portfolios**

- Risk-adjusted return on capital (**RAROC**)

- Ever **increasing leverage** due to global **lax regulation**

- Using **counterparty assets to preserve** banks' **regulatory capital**
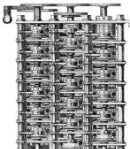
Power of OTC Structured Products for Clients

- Optimising **interest rate** and **FX liabilities** – options and swaps

- Hedging **default risk** - credit default swaps (CDSs) and collateralized debt obligations (CDOs)

- Profiting from **tax arbitrage** – cross-border leasing agreements
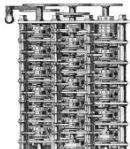
Financial Crises 1980-2013

- **Caused by**
  - **Inflation**
    - Russian default August 1998
  - **Currency crashes**
    - Mexican peso crisis 1995. After NAFTA (Canada, Mexico, US)
  - **Currency debasement**
    - Argentine default 2001. Failed US$ peg with horrifying domestic consequences
  - **Asset price bubbles**
    - South American debt crisis in the 1980s. Recycling 'petrodollars' in the 1970s
    - Black Monday October 1987. US credit expansion by Savings & Loans sector
    - Japanese crisis 1990. Property bubble fuelled by export led growth
    - Asian crisis 1997. Corporate debt burden financed by property bubbles & "hot" money
    - Internet bubble 2000. Irrational exuberance ?
    - US subprime crisis 2008. (Self) deception
    - Euro crisis 2010. Reality avoidance
    - China crisis 201**?**. Credit expansion to fuel export led growth
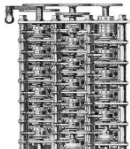
This Time It's Different

- **Financial crises have marked the development of capitalism since the Renaissance**

- **These have historically been connected with sovereign credit over the past 800 years   Reinhart & Rogoff (2010)**

- **In his famous book Kindleberger (1989) gives a detailed account of financial crises in Europe and North America from 1618**
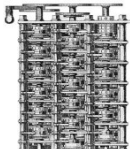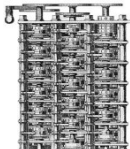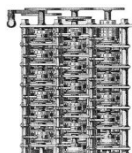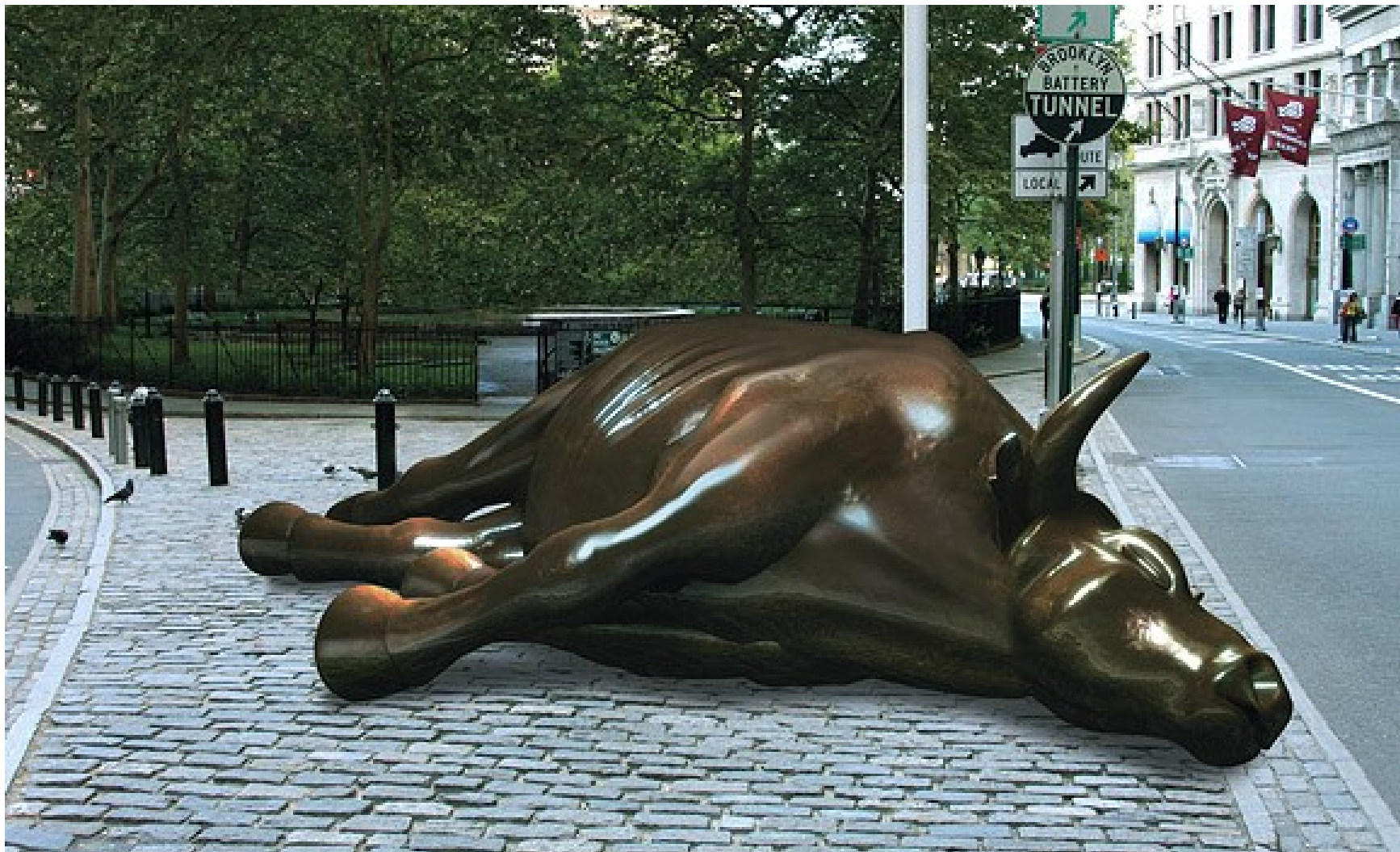
We have nothing to fear but fear itself

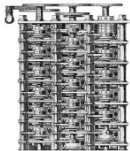32nd President of the United States   March 1933

This sucker could go down

43rd President of the United States   September 2008
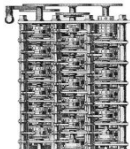
3. Rôle of Structured OTC Derivatives

Views on the Rôle of Derivatives

- **Guns don't kill people. People kill people!**   **US National Rifle Association**

- **Derivatives are weapons of mass destruction**   **Warren Buffet**

- **There are two types of derivatives – "bought" and "sold"**
  – in proportion   30% to 70%   **City MD**

- **Banking is the last industry to go "high tech" after aerospace, oil, manufacturing, airlines, logistics, film making, etc.**

Generic Rate Swap Structure

- Counterparty A converts from fixed to floating
- Counterparty B converts from floating to fixed
- Through an over the counter (OTC) product of a swap dealer who charges both parties a spread
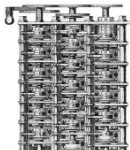
Evolution of the Swap Market

- Began in the early 1970's
  - Collapse of Bretton Woods: floating currency rates and FX volatility
  - UK exchange controls
  - Parallel/back-to-back loans
  - IBM-World Bank swap of 1981

- Regulation & standardization
  - International Swap Dealers Association (ISDA) formed in 1985
    - Development of Master Swap Agreement led to market takeoff
  - Capital Adequacy
    - Basle Accord (1987), Federal Reserve Guidelines (1989)
  - Risk Measurement: VaR G30 (1993)
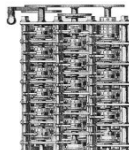
First Decade Market Growth

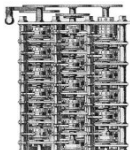Market volume by end 1997 about $17 trillion in notional principal and about $560 trillion now

Source: ISDA

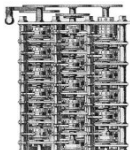Legend: 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997

IRS   Currency
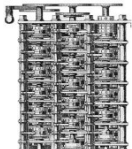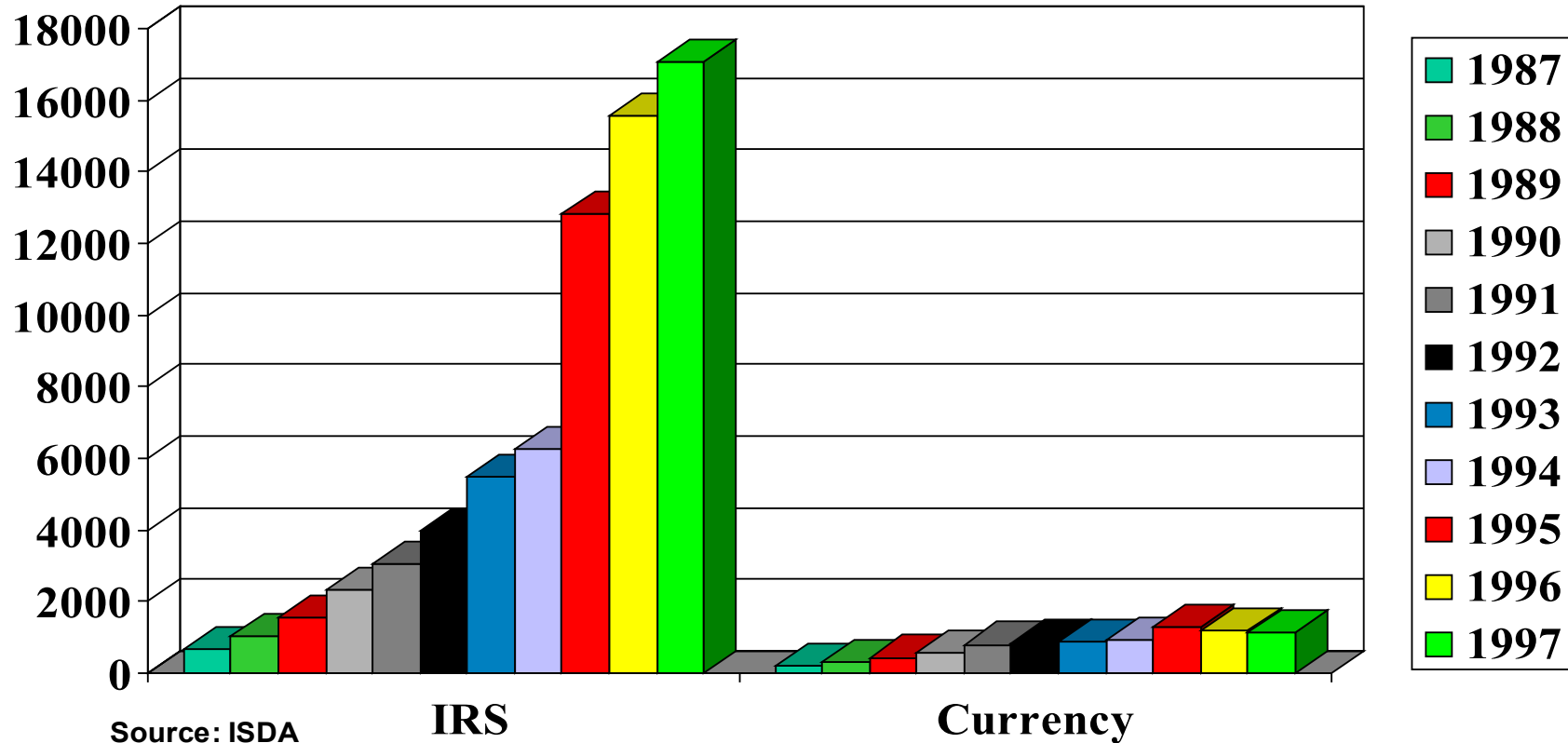
Current State of Derivatives Dealing

- **Structured fixed income and credit derivative instruments over the past two decades have enormously increased in value (c. $1 T notional CDOs issued in 2006 and 2007) and complexity (e. g. cash CDOs with 10,000 page contracts and no formal pricing)**

- **Their uses have been both good and bad!**

- **The ABS markets are reviving**

- **The cash CDO market has totally collapsed**

- **The synthetic CDO market has declined**

- **Swaps and CDS contracts are being moved to cleared exchanges and all OTC contracts severely regulated with substantial reductions in dealing profits**

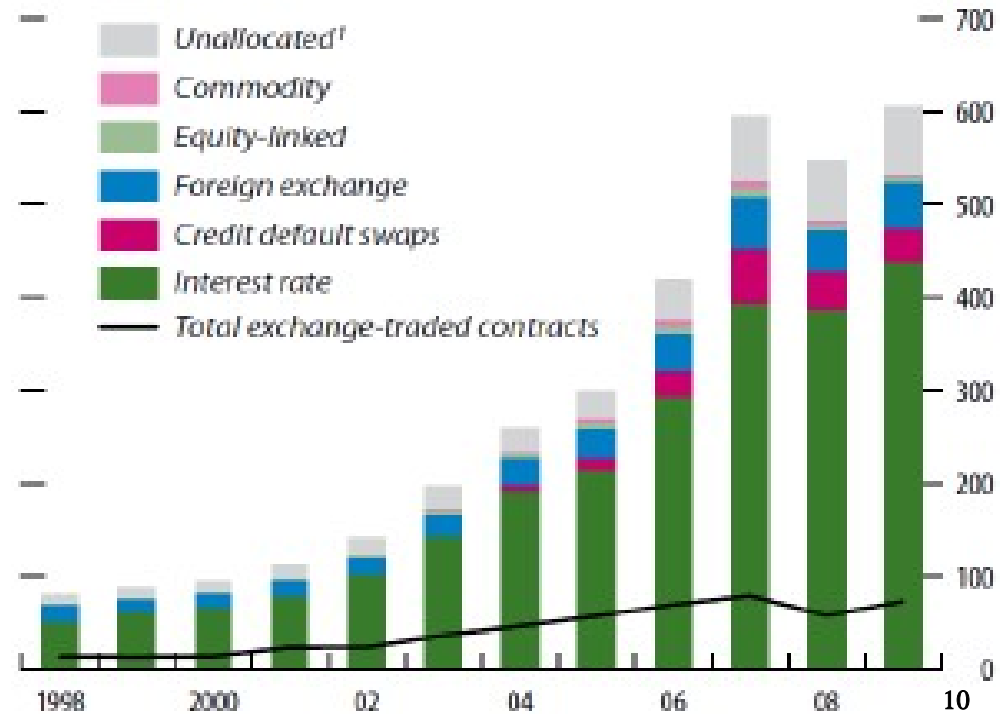# Asset Value Proportions of 2009 Global GDP

- **Derivatives** (notional)   1012%   **$ 600 T**   80%

- Debt & ABS   129% $ 77 T   10%

- Broad Money   115% $ 69 T   9%

- Money   9% $ 5 T   1%

Global OTC Derivatives Markets

(In trillions of U.S. dollars; notional amounts of contracts outstanding)

Legend:
- Unallocated[1]
- Commodity
- Equity-linked
- Foreign exchange
- Credit default swaps
- Interest rate
- Total exchange-traded contracts

Source: Bank for International Settlements.
Note: Over-the-counter data through June 2009; exchange-traded data through December 2009.
[1]Includes foreign exchange, interest rate, equity, commodity, and credit derivatives of nonreporting institutions.
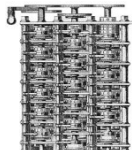
Current Derivative Valuations

## Table 19: Amounts outstanding of over-the-counter (OTC) derivatives

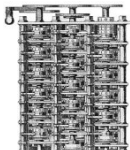**By risk category and instrument**
In billions of US dollars

BIS Semiannual Report (2013)

Risk Category / Instrument	Notional amounts outstanding					Gross market values				
	Dec 2010	Jun 2011	Dec 2011	Jun 2012	Dec 2012	Dec 2010	Jun 2011	Dec 2011	Jun 2012	Dec 2012
Total contracts	**601,046**	**706,884**	**647,777**	**639,366**	**632,579**	**21,296**	**19,518**	**27,278**	**25,392**	**24,740**
Foreign exchange contracts	**57,796**	**64,698**	**63,349**	**66,645**	**67,358**	**2,482**	**2,336**	**2,555**	**2,217**	**2,304**
Forwards and forex swaps	28,433	31,113	30,526	31,395	31,718	886	777	919	771	803
Currency swaps	19,271	22,228	22,791	24,156	25,420	1,235	1,227	1,318	1,184	1,247
Options	10,092	11,358	10,032	11,094	10,220	362	332	318	262	254
Interest rate contracts	**465,260**	**553,240**	**504,117**	**494,427**	**489,703**	**14,746**	**13,244**	**20,001**	**19,113**	**18,833**
Forward rate agreements	51,587	55,747	50,596	64,711	71,353	206	59	67	51	47
Interest rate swaps	364,377	441,201	402,611	379,401	369,999	13,139	11,861	18,046	17,214	17,080
Options	49,295	56,291	50,911	50,314	48,351	1,401	1,324	1,888	1,848	1,706
Equity-linked contracts	**5,635**	**6,841**	**5,982**	**6,313**	**6,251**	**648**	**708**	**679**	**645**	**605**
Forwards and swaps	1,828	2,029	1,738	1,880	2,045	167	176	156	147	157
Options	3,807	4,813	4,244	4,434	4,207	480	532	523	497	448
Commodity contracts	**2,922**	**3,197**	**3,091**	**2,994**	**2,587**	**526**	**471**	**481**	**390**	**358**
Gold	397	468	521	523	486	47	50	75	62	53
Other commodities	2,525	2,729	2,570	2,471	2,101	479	421	405	328	306
Forwards and swaps	1,781	1,846	1,745	1,659	1,363					
Options	744	883	824	812	739					
Credit default swaps	**29,898**	**32,409**	**28,626**	**26,931**	**25,069**	**1,351**	**1,345**	**1,586**	**1,187**	**848**
Single-name instruments	18,145	18,105	16,865	15,566	14,309	884	854	958	715	527
Multi-name instruments	11,753	14,305	11,761	11,364	10,760	466	490	628	472	321
of which index products	7,476	12,473	10,514	9,731	9,663					
Unallocated	**39,536**	**46,498**	**42,610**	**42,057**	**41,611**	**1,543**	**1,414**	**1,976**	**1,840**	**1,792**
Memorandum Item:										
Gross Credit Exposure						3,480	2,971	3,912	3,668	3,626

c. 6% global GDP
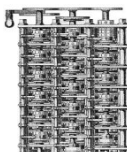
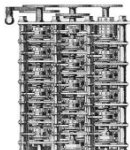
Cui Bono? Whose Risk Is It Anyway?

- **Hedging bank** interest rate and forex **strategies** with swaps

- **Managing banks' counterparty risk** with cross-border leasing deals incorporating credit default swaps

- **Who's insuring whom?** – collaterized debt obligations (CDOs) in the **retail market**

- **Playing poker against the client** – swaps with **issuers' cancellation rights** and CDOs with **issuers' substitution rights'**

Different Rules for Derivatives?

- Structured derivatives which lead to problems are not directly comparable with normal market commodities because they tend to be individually customized and thus largely outside the purview of the ideal market mechanism – namely open price competition in which caveat emptor applies

- Pricing over-the-counter (OTC) structured derivatives is usually beyond the scope of anyone other than investment banks or specialist corporations

- Thus in modern financial markets there may be many situations where clients are in principle unable to apply pricing competition

  - This is recognized by regulatory measures such as the division of clients into *retail*, *professional* and *eligible counterparty* and concepts such as (non-)complex instruments (MiFiD and Dodd-Frank)

- But the **implications** have **not so far** been adequately **recognized by courts**
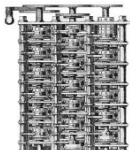
3. Cost of OTC Derivatives to Clients
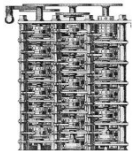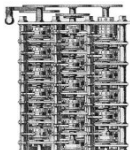
Caveat Emptor Revisited

- It has been said that 30% of OTC derivatives are bought and 70% are sold (recently revised to 20 vs. 80%)

- Meaning that only 30% of deals are between counterparties who are professionally able to assess the risks involved while 70% involve counterparties who have no idea of what they are buying

- A rule of thumb is that such a counterparty should never accept a restructuring of an existing losing deal but rather cut their losses then and there

Representative OTC Derivative Deals

- Issued by banks in the 2004-2006 boom period through the crisis to the **present** with deals issued last year and this

- Deals with maturities from 6 months to indefinite (*consol bonds*)

- Clients are governments, second tier banks, SME's, local authorities and wealthy individuals in Europe and the UK

- Contracts involve structured versions of swaps, bonds raising capital for financial institutions and foreign exchange (FX) hedging programmes

- Representation of the risks involved to clients is typically stated as "*unlimited*" and/or ignores egregious features of the contract structuring like *one-sided cancellation options without compensation* Dempster, Medova & Roberts (2011)

Stylized Features of OTC Derivative Deals

- Each deal represents a play by the issuing bank that exploits their superior knowledge of possible future market evolution relative to the client's

- Issuers are usually the client's commercial bank and the term sheets/contracts usually bear a feminine bank signature

- Often the bank **requires** the deal as a condition of a loan, refinancing or bond flotation

- Most recently loan rollovers contain "embedded" derivatives which charge the borrower the high break costs of the bank's possibly nonexistent interbank market risk hedge

- Each deal is structured to have the enticement of a short term client "sweetener" which can sometimes be very subtle

- Often enticement can be buried in a programme of successive similarly structured deals which only in the latter stages become egregious – playing the "fish"

- Due to severe asymmetry of information the client is in no position to understand the relative risks to client and bank which are often extreme for the client

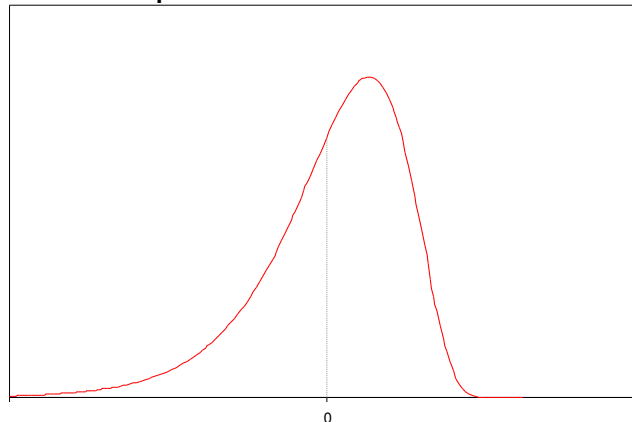- When a deal begins to go wrong for the client the bank offers to postpone the agony by restructuring the deal(s) to one even worse!
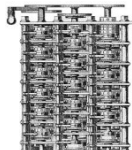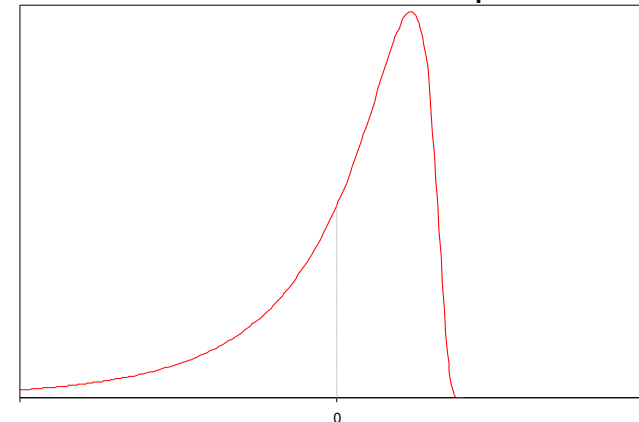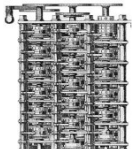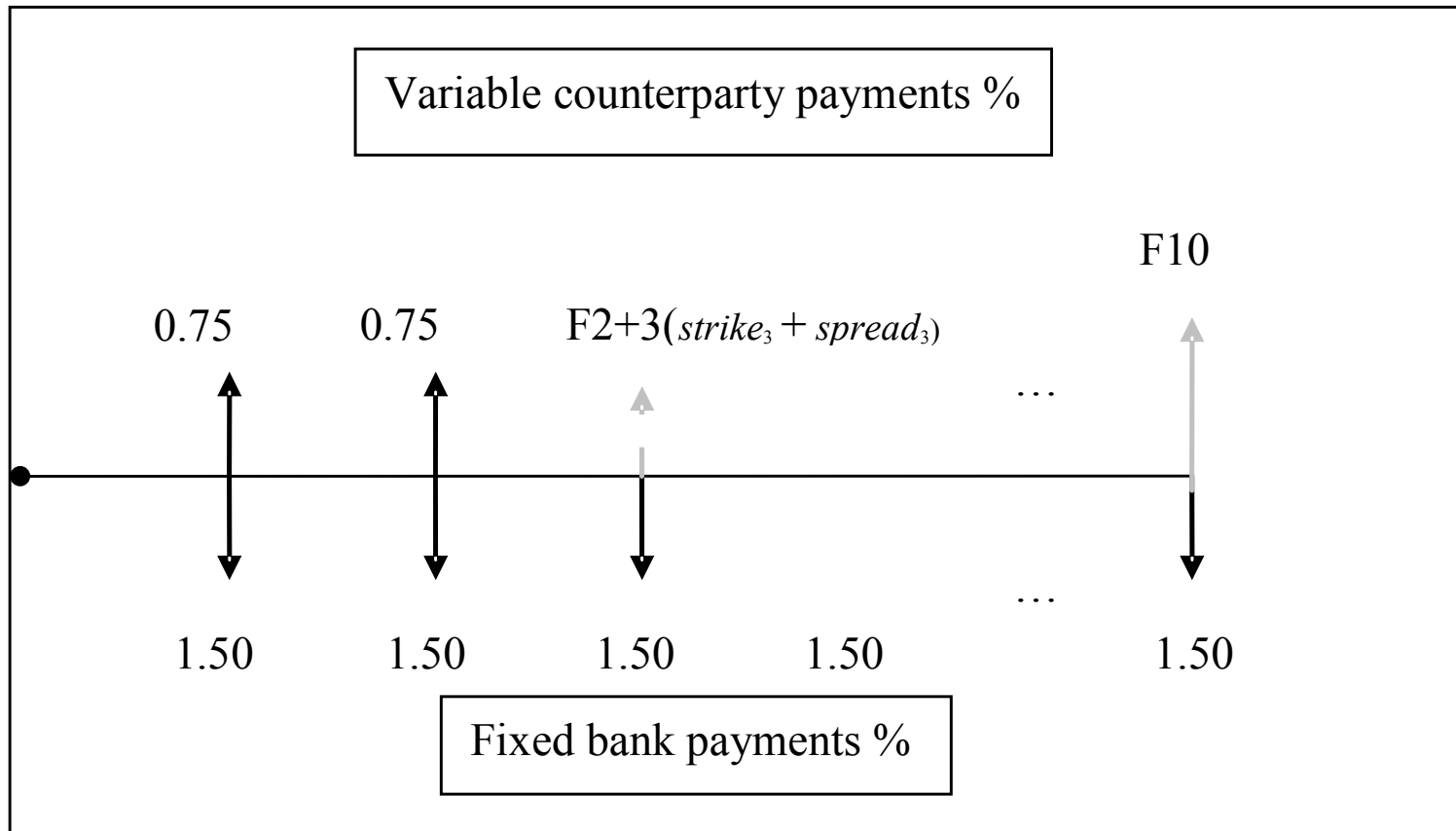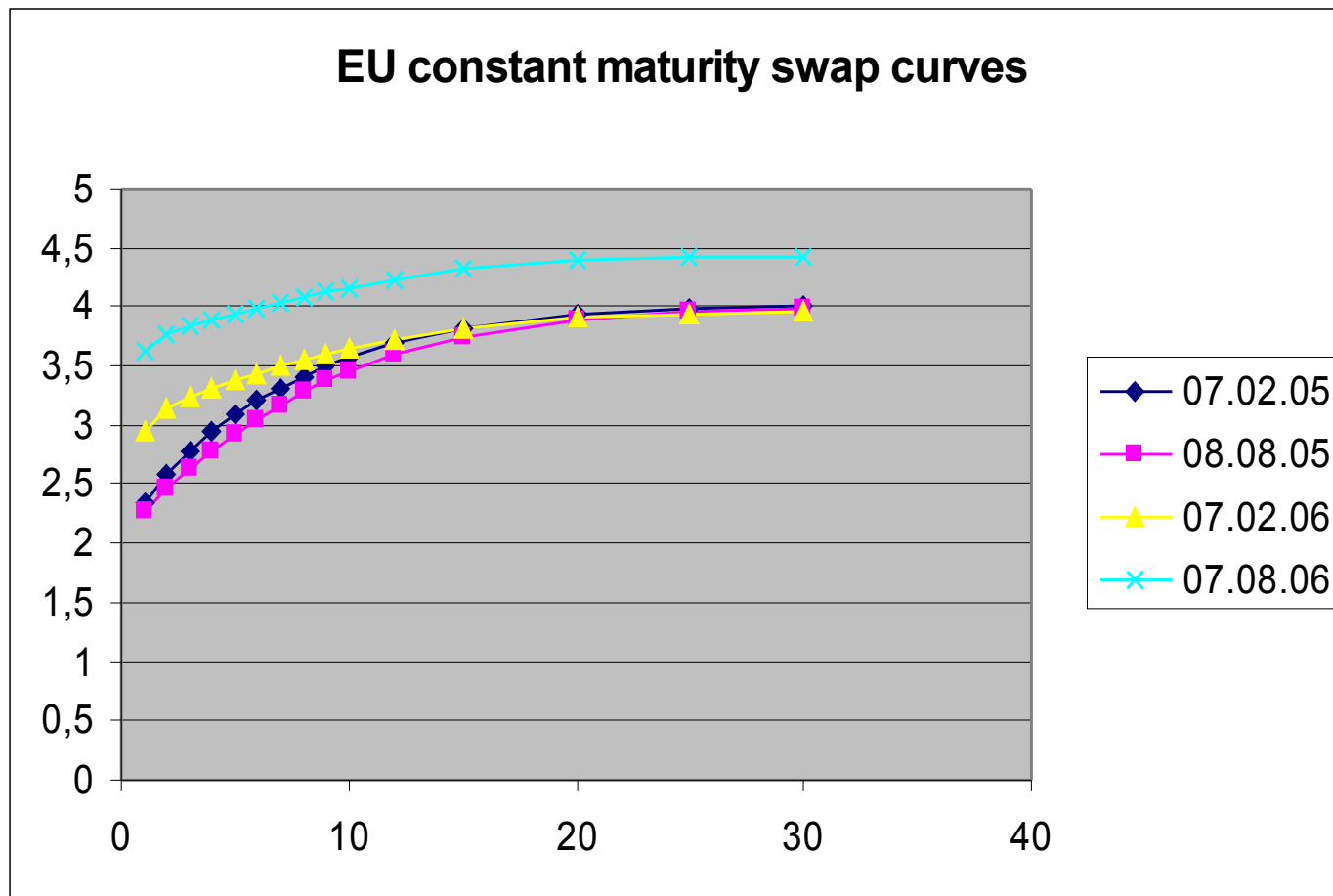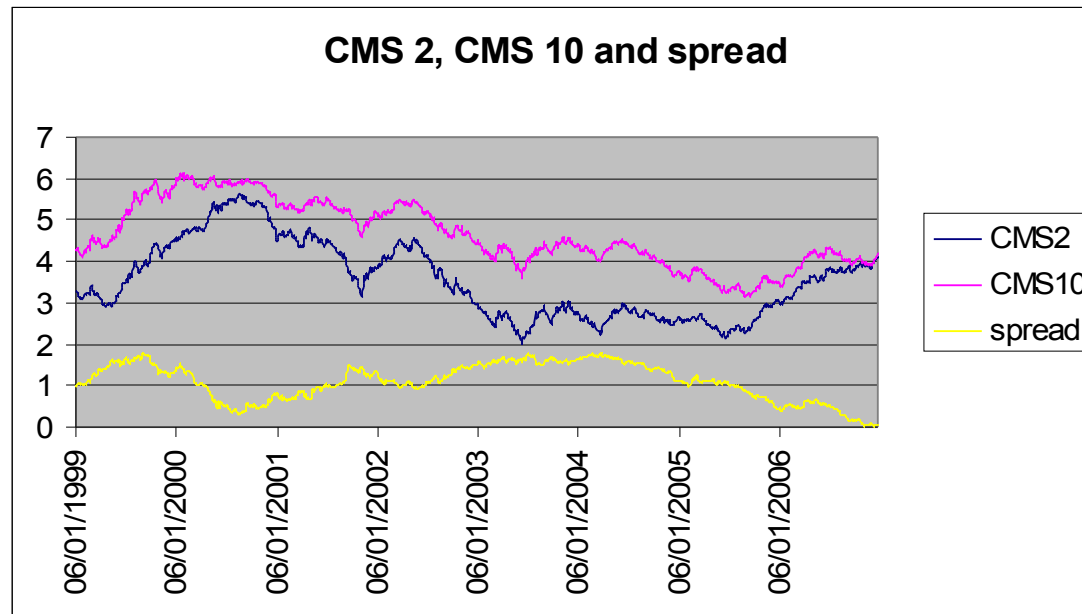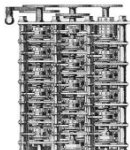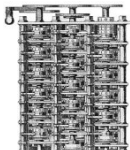
Swap NPV Distributions
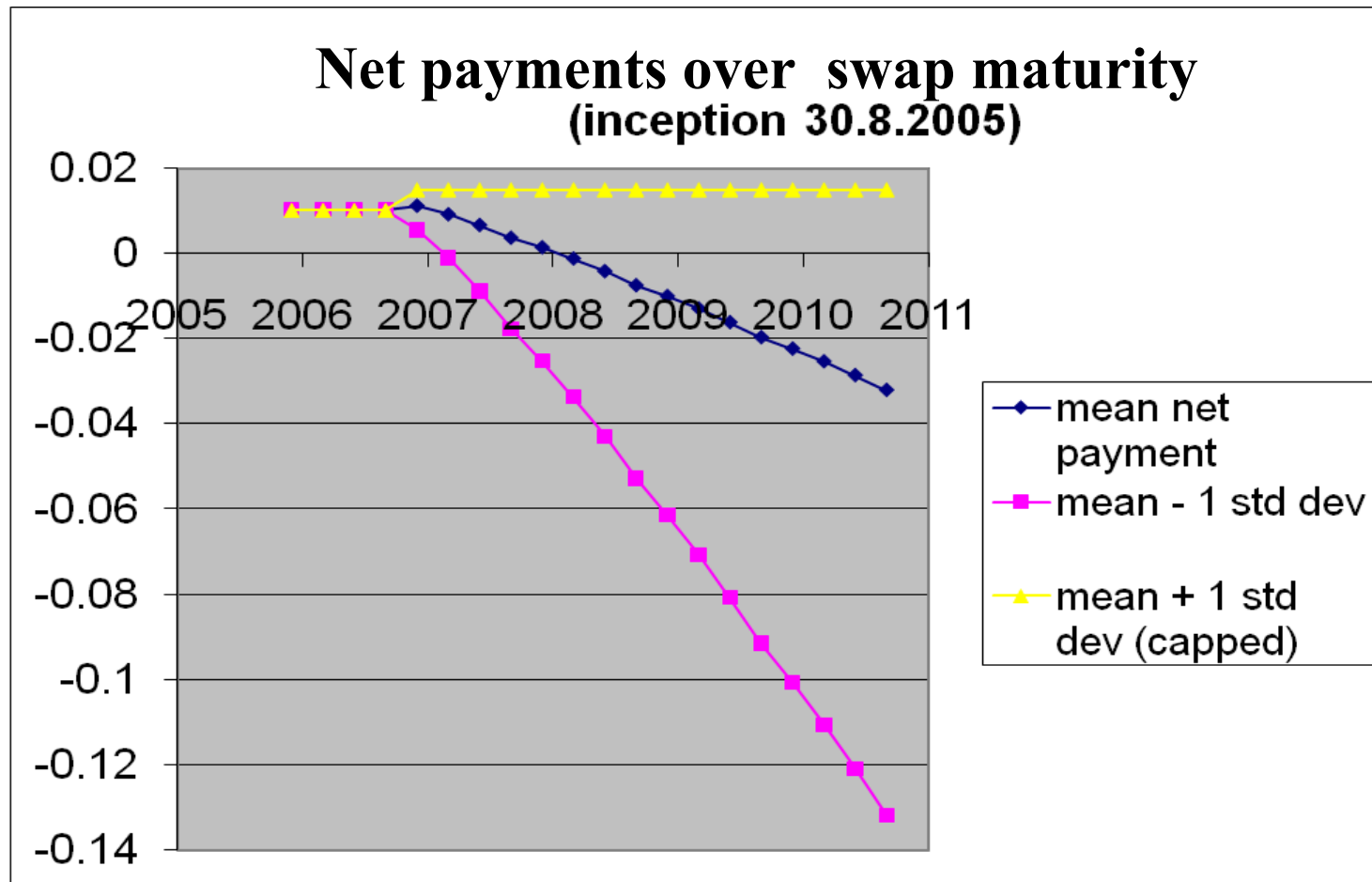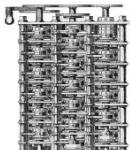

Par Swap
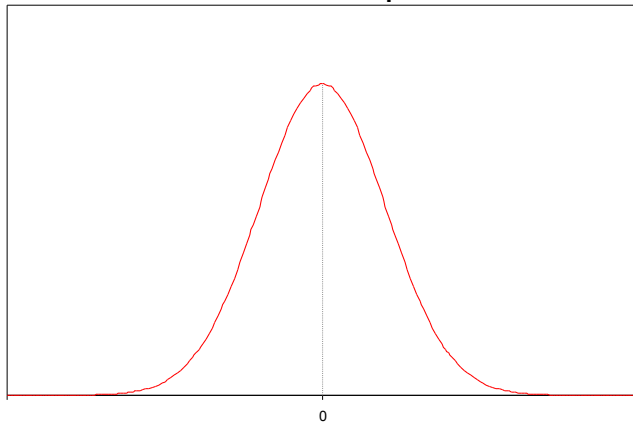
Swap with Bank Cancellation

Euribor Ladder Swap

CMS Spread Ladder Swap

Variable counterparty payments %

F10

0.75   0.75   F2+3($strike_3 + spread_3$)

1.50   1.50   1.50   1.50   1.50

Fixed bank payments %

Play on the Flattening Yield Curve

EU constant maturity swap curves

Legend:
- 07.02.05
- 08.08.05
- 07.02.06
- 07.08.06

Play on Declining Spread From Increasing Short Rates

CMS 2, CMS 10 and spread

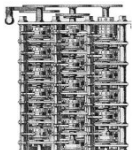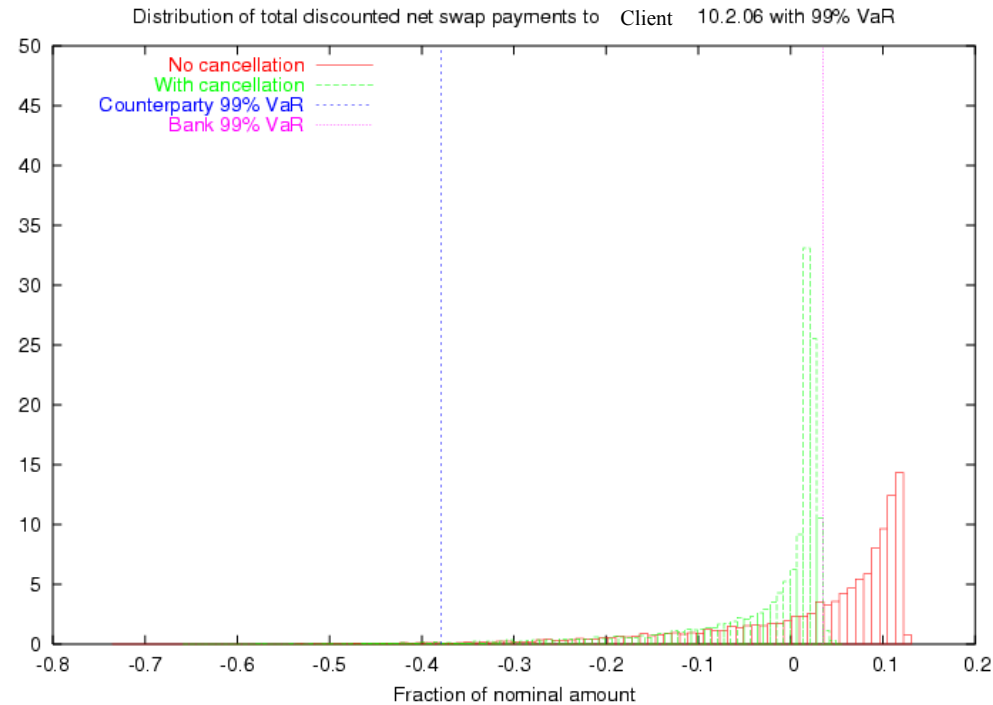# Declining Spread Increases Client Payments

Net payments over swap maturity
(inception 30.8.2005)

To Result in Serious Potential Losses

Distribution of total discounted net swap payments at 11.2.05 with 99% VaR

Which Just Get Worse

Distribution of total discounted net swap payments to Client 10.2.06 with 99% VaR
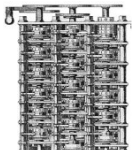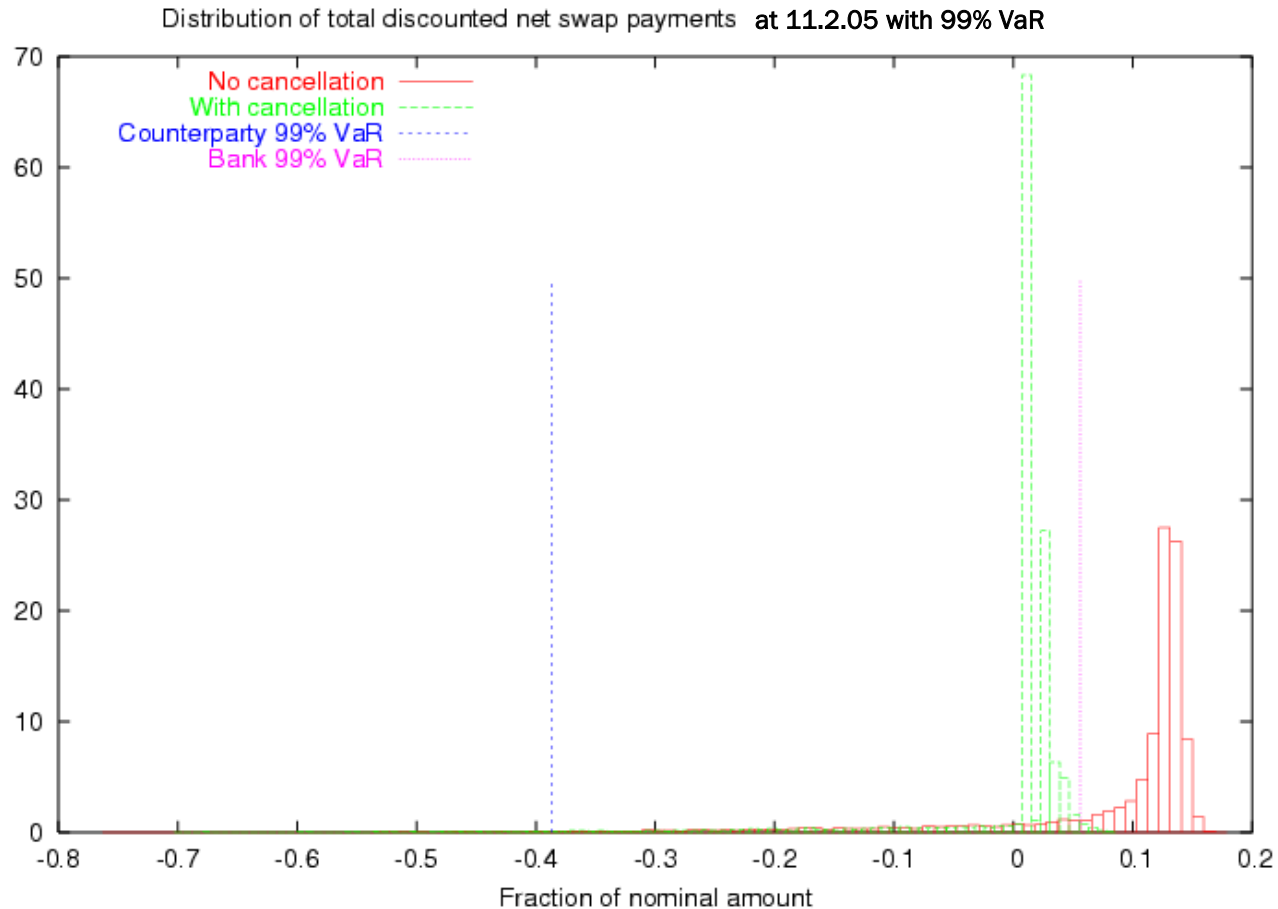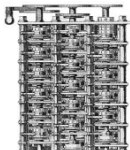
Structured Capital Raising Callable Bond Coupons

Net payments by Bank **over bond maturity (at inception 15.2.2005)**

Legend:
- Mean net payment
- Mean - 1 std dev capped
- Mean + 1 std dev, capped

Worse With No Floor

**Net payments by Bank over bond maturity
(at inception 2.3.2005)**

Legend:
- Mean net payment
- Mean - 1 std dev capped
- Mean + 1 std dev, capped
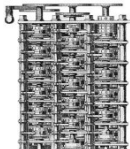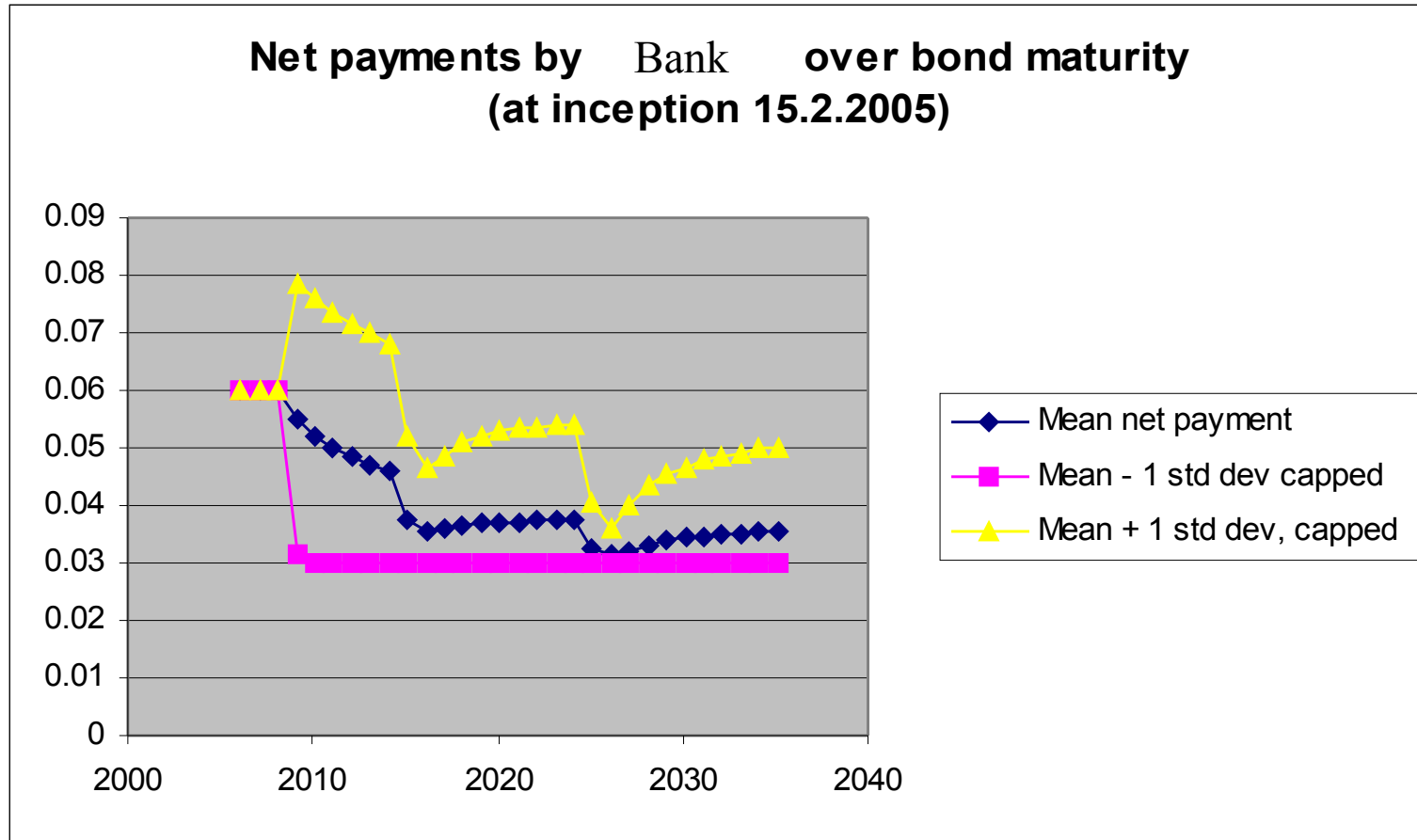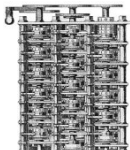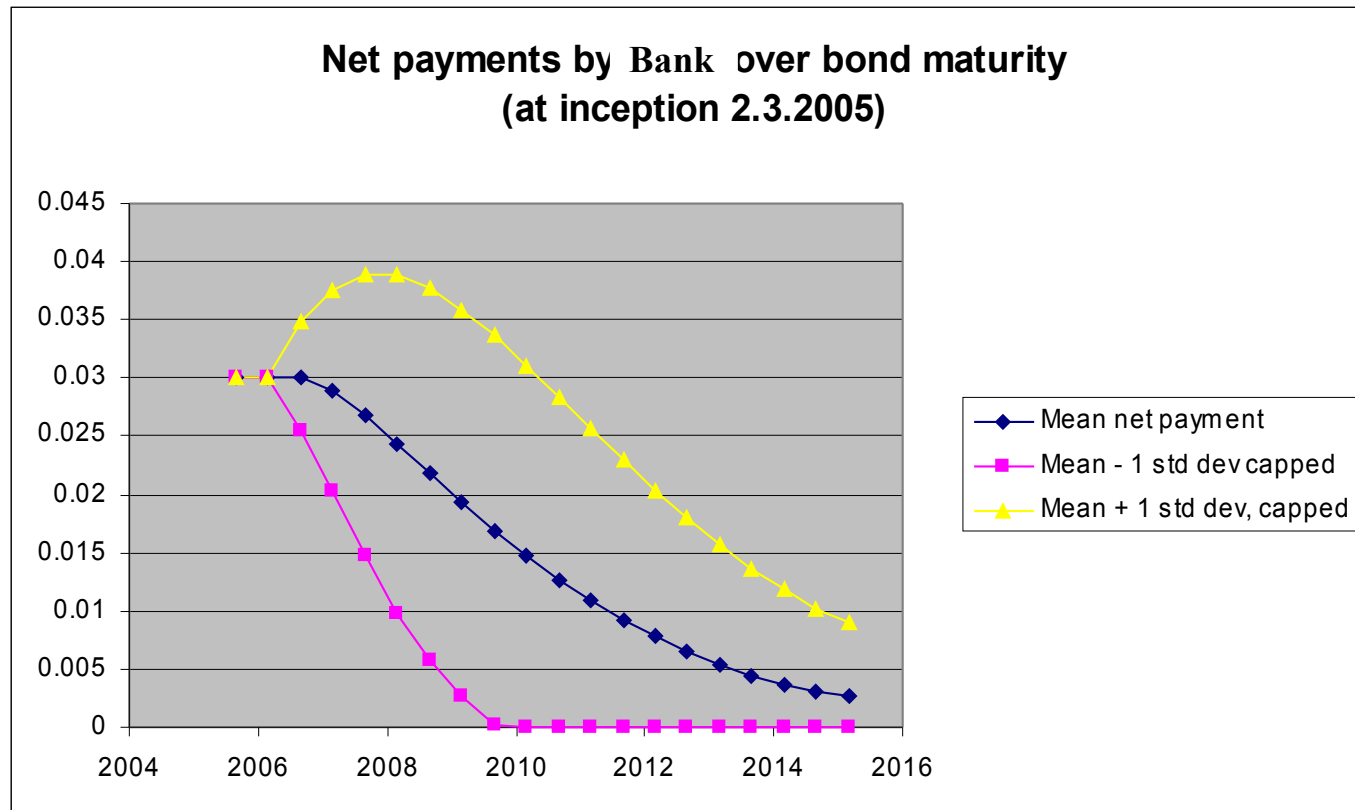
Discounted PV of Callable Bond Cash Flows at Inception

Distribution of NPV of total payments made by Bank at 2.3.05
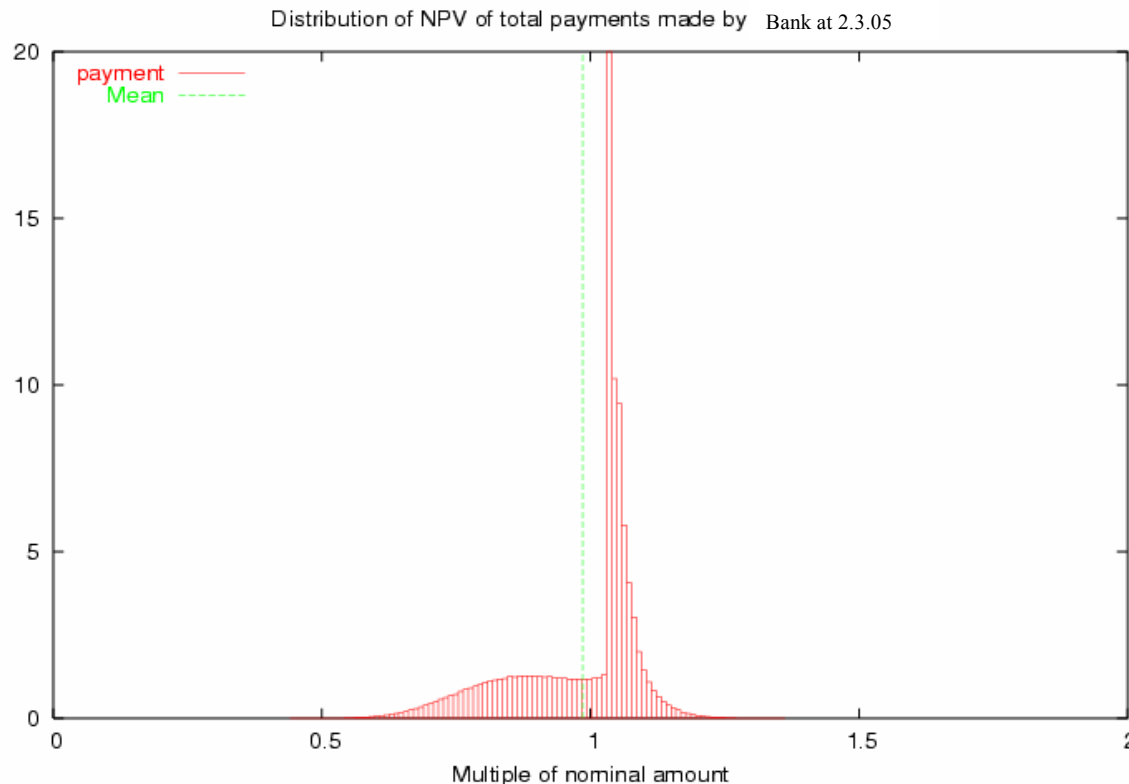
Which Gets Worse Over Time

Distribution of NPV of total payments made by Bank at 11.11.08
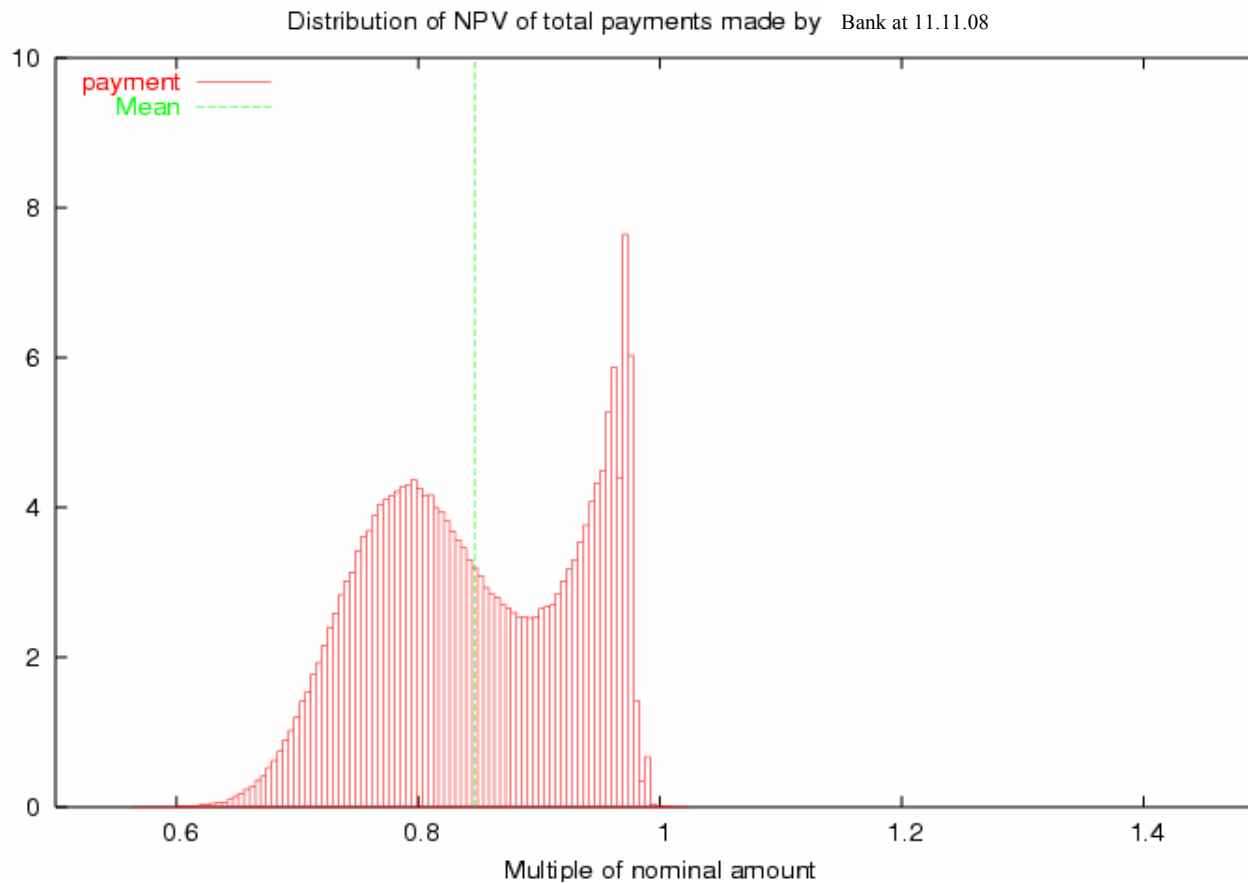
Client FX Hedging Programme

- **Over 70 option pairs** over a 33 month period in which 26 struck between March 2007 and February 2008 resulted in *substantial losses*

- **Mispricing** of both paired options involving *negative smile corrections*

- **Multiple restructurings** *incorporating losses in notional* and *improving knock-in points* for bank amounting to 28% of client losses

- **Contract exercise changes** involved in a total of **€ 30.5 M** losses on 26 losing deals which were billed over 5 days to the client when some *European options* had *not yet expired*

USD-EUR Evolution

USD-EUR exchange rate
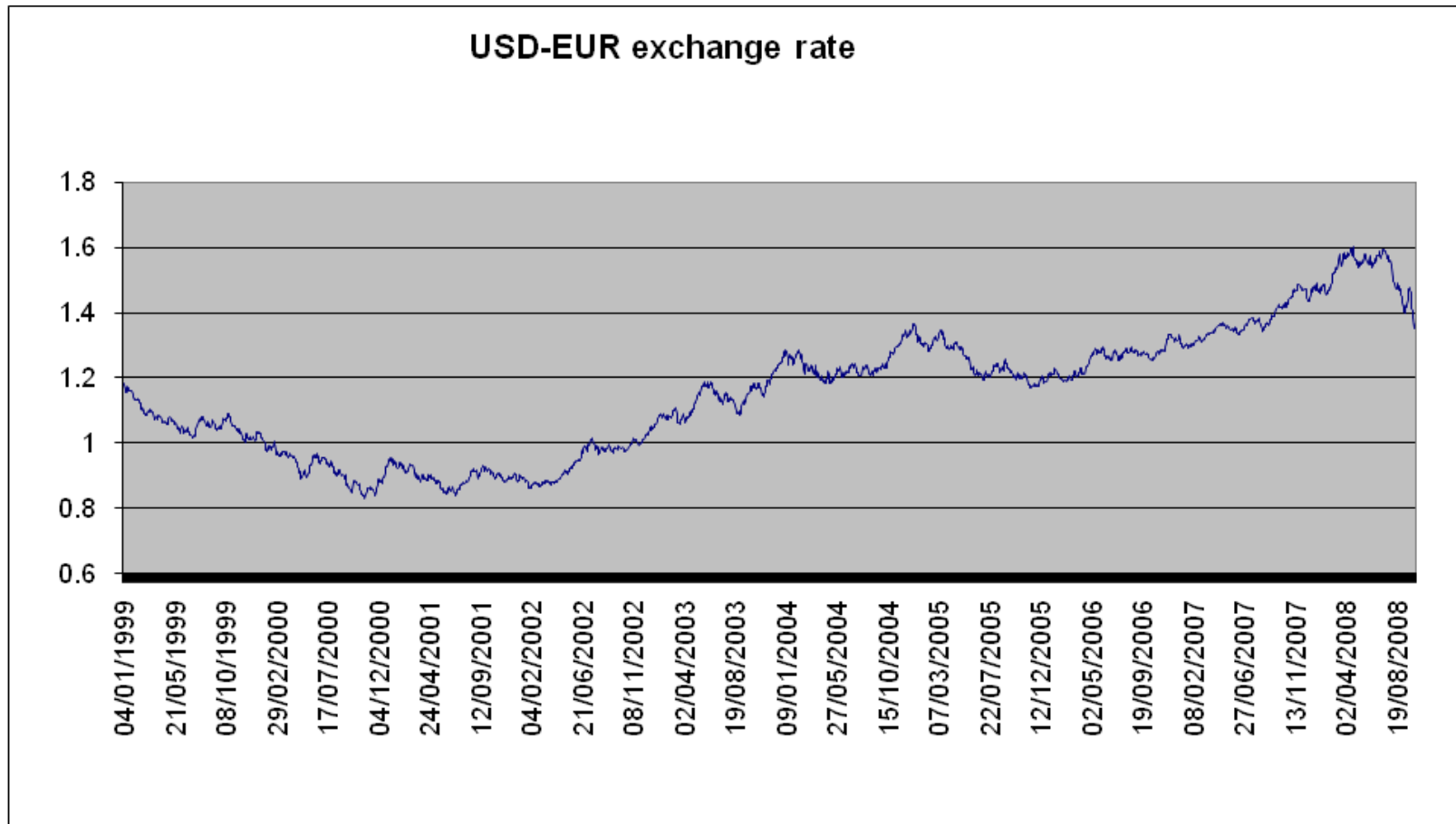
4:1 Asymmetric Option Pair Payoffs (Later 6:1)
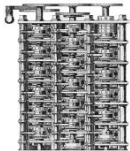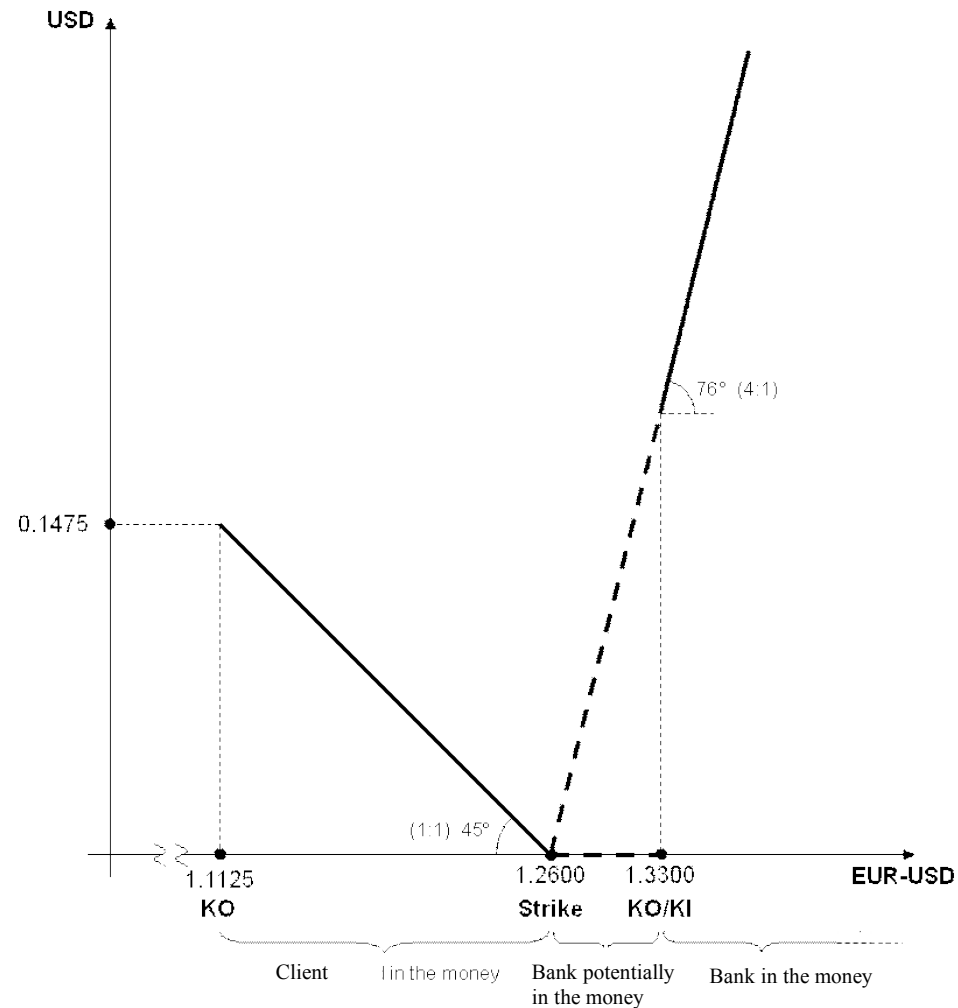
36% Average Initial Client Option Overvaluation

Initial Client Option Overvaluation Using Bank's Implied Volatility

Bank Plays Seen More Recently

- As Lehman's and other bank's positions worsened over 2008 and short rates dropped precipitously CMS spread ladder swaps began to be based on yield curve *steepening*

- Projected drops in the Eurostoxx50 as the crisis deepened based on earlier internet bubble behaviour of the index

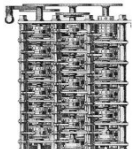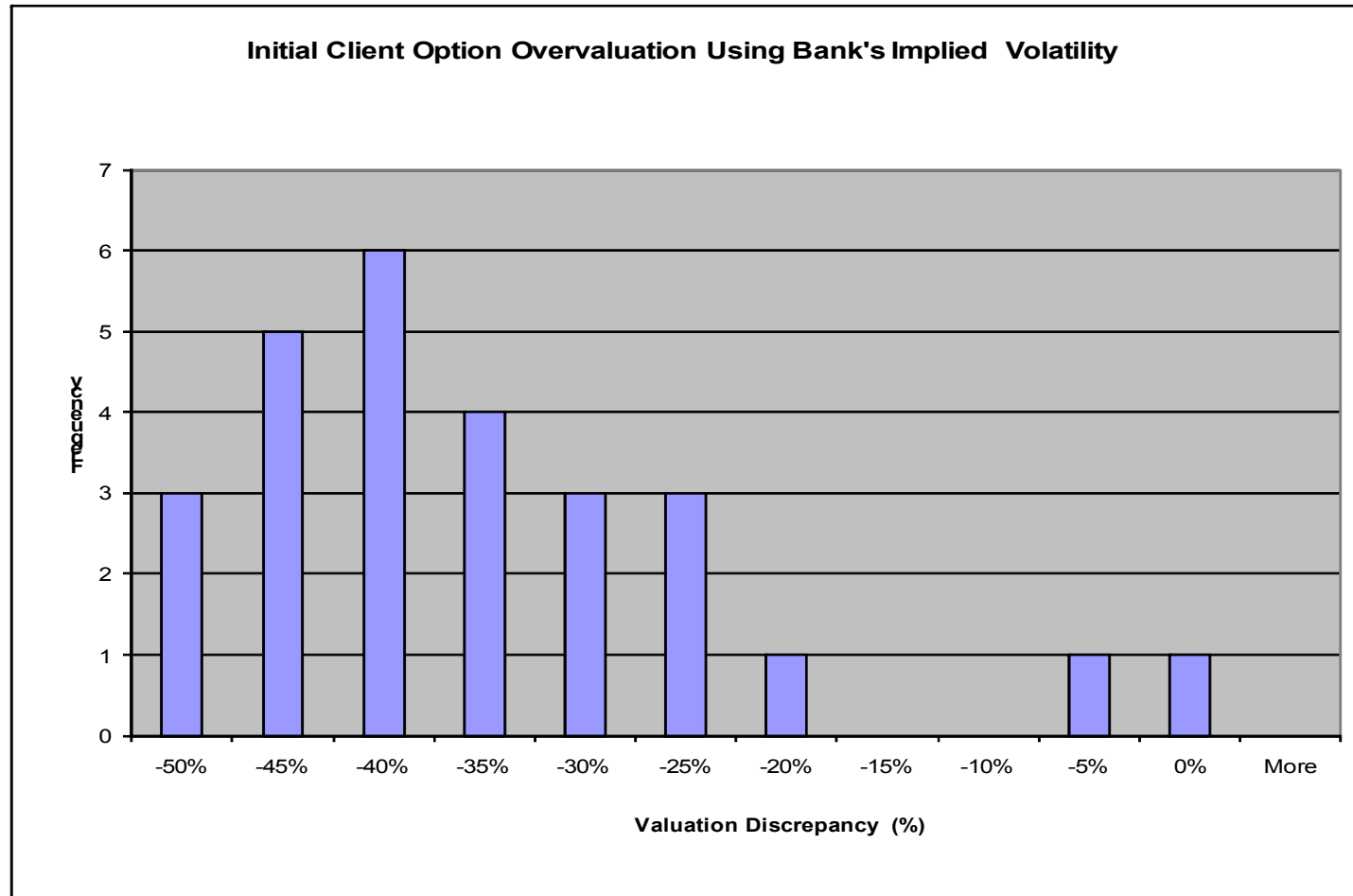- UK banks sold vanilla fixed floating swaps to retail customers – or **required** them as "hedges" on loans! – with no warning of the imminent downside short rate risks

- (Slightly) more sophisticated clients were sold structured collars

- Many cross currency or currency related swaps with clients were based on the strengthening of the Swiss franc against other currencies with the "flight to quality" as the euro crisis developed

- Projected drops in the 10 year constant maturity swap rate CMS10 as the crisis deepened with current artificially low rates due to quantitative easing (QE)

- Projected strengthening or currently (Abe) weakening of the JPY-USD exchange rate with short maturity high frequency structured target profit forward contracts

EuroStoxx50 Evolution
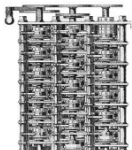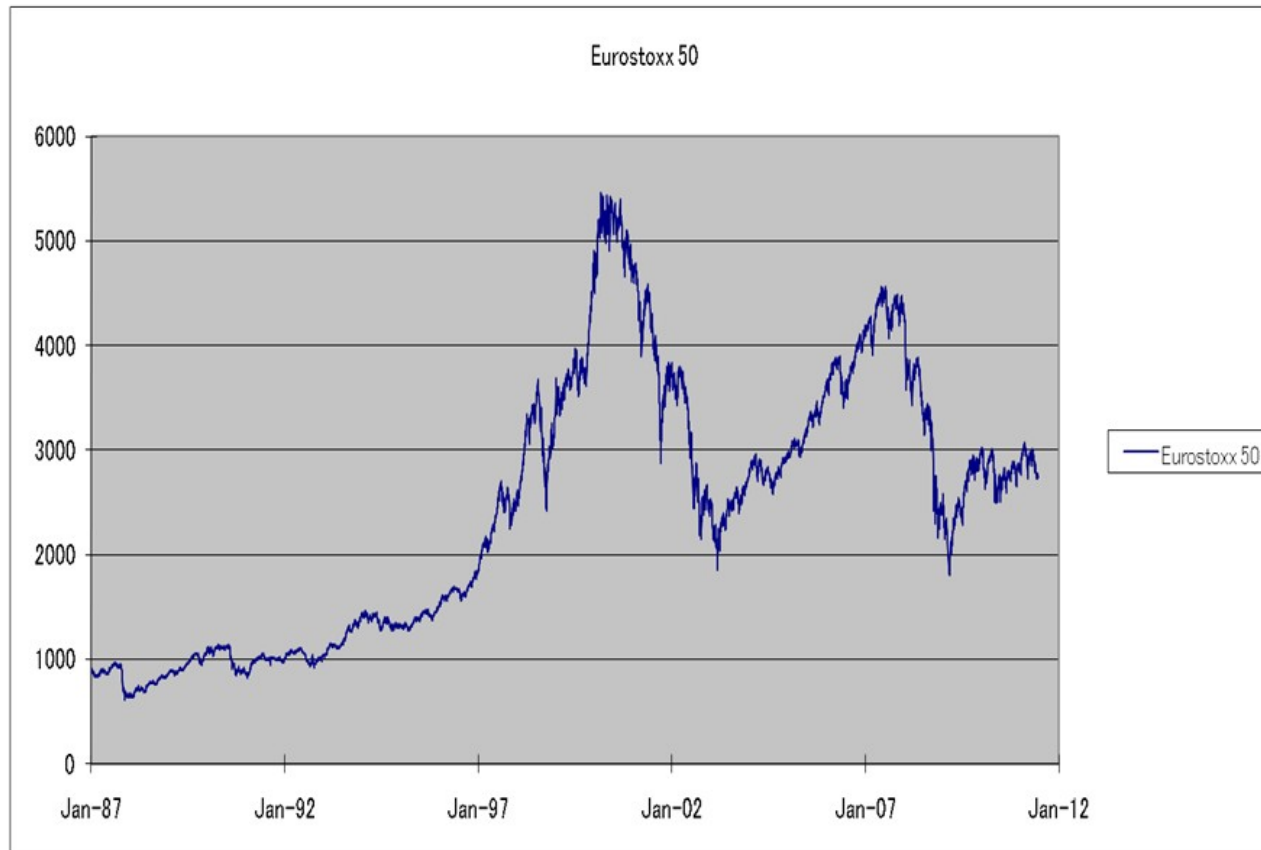
UK Base Rate Evolution

RBS Base Rate fit
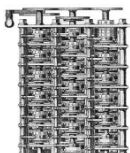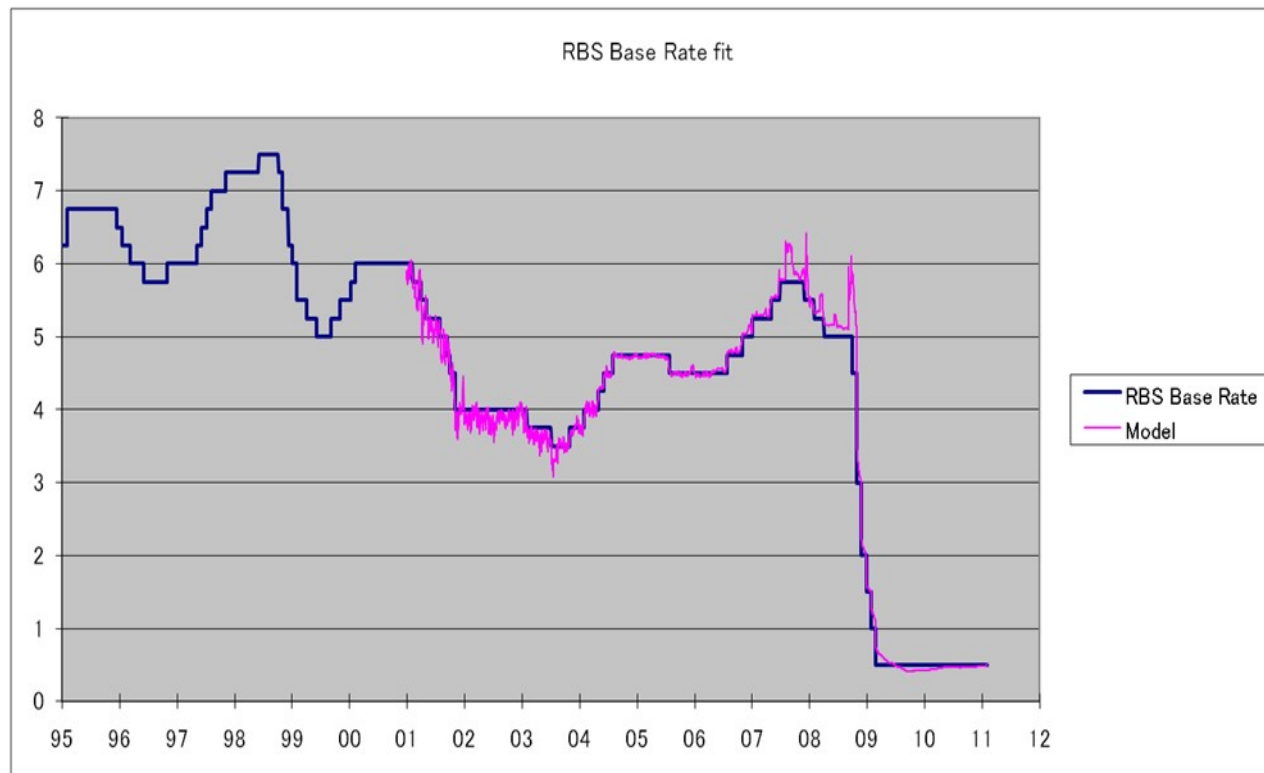
EUR-GBP, GBP-CHF & EUR-CHF Evolution
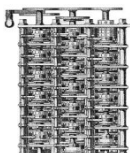
FX rate evolution

EUR-CHF Evolution
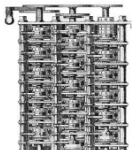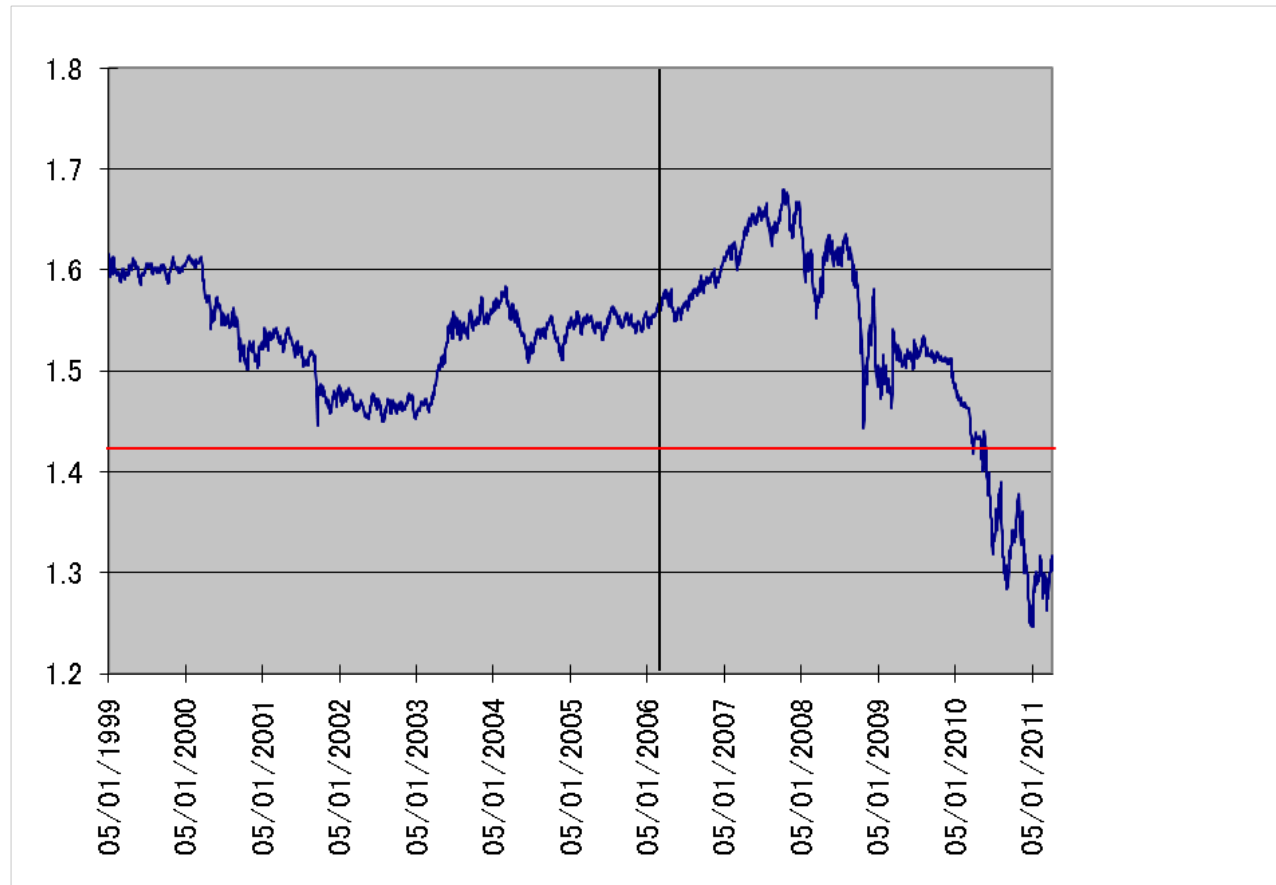
NPV VaR of a Restructured Currency Swap

CMS10 Rate Evolution

10y EUR swap rate

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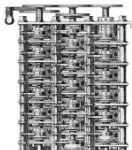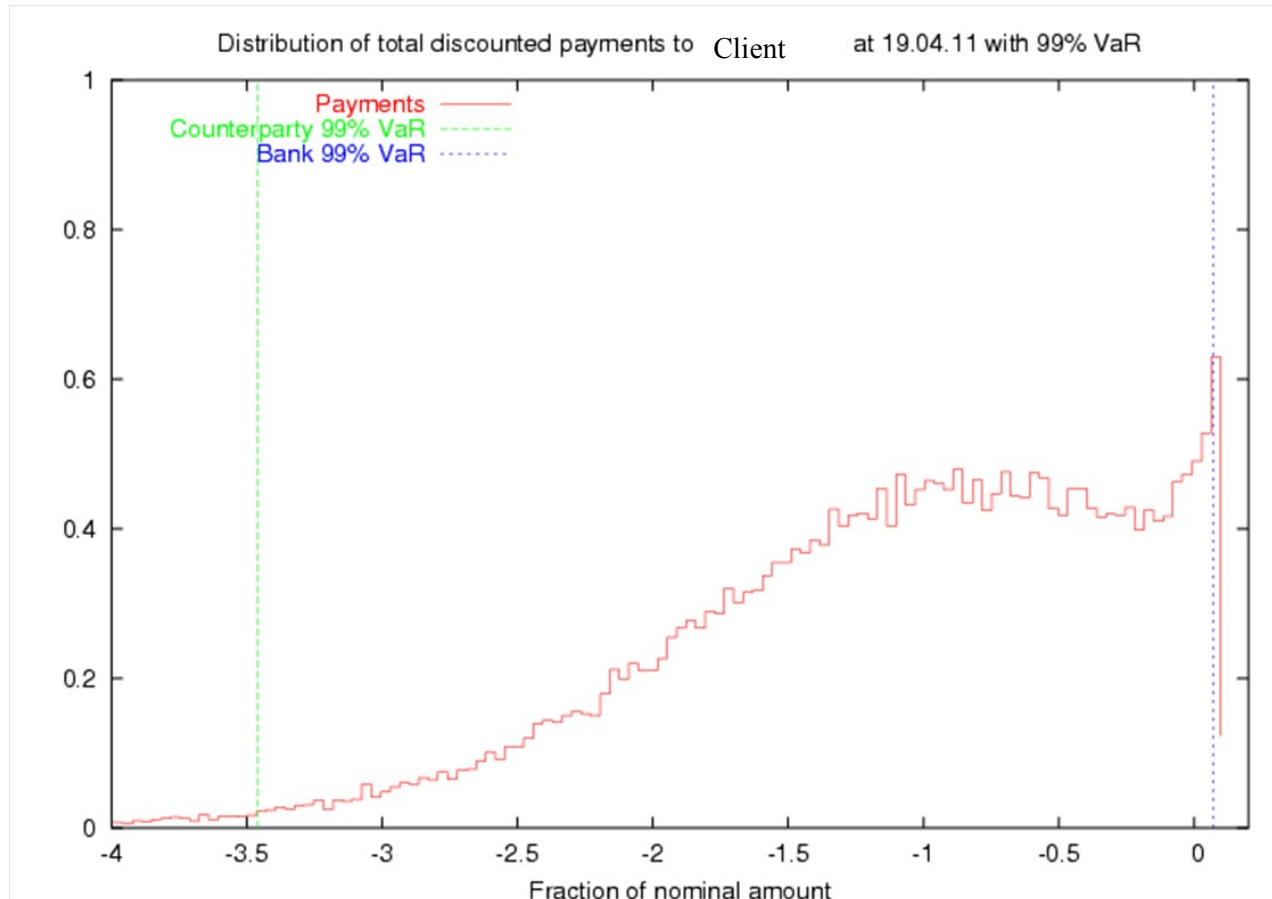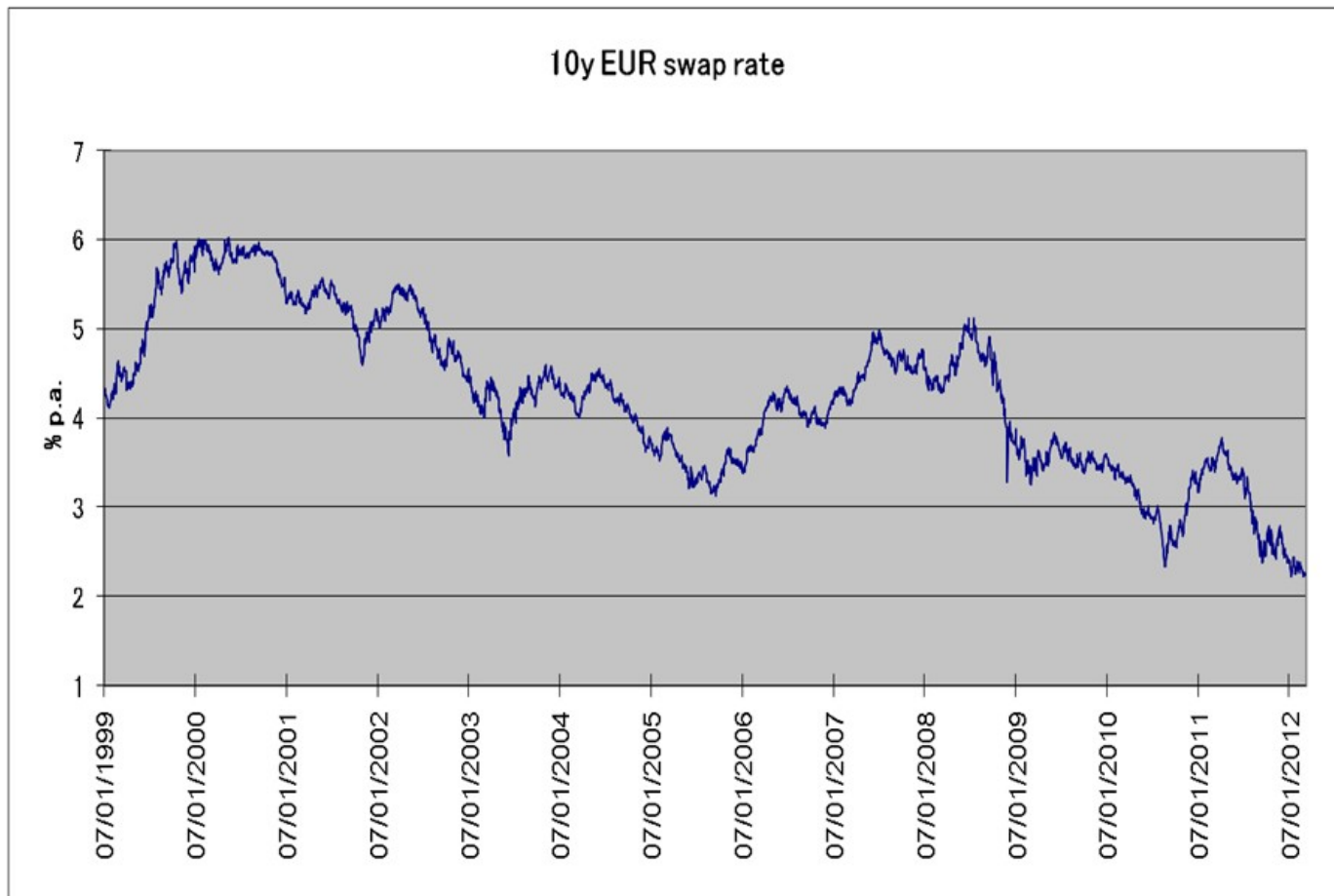
2ⁿᵈ Restructured CMS10 Memory Swap Amortised NP €10.5M

Net payments to **Client** over maturity
(recently 29.02.12)

- mean net payment
- mean - 1 std dev
- mean + 1 std dev

NPV of 2nd Restructured CMS10 Memory Swap

Distribution of total discounted payments to Client 29.02.12 with 99% VaR
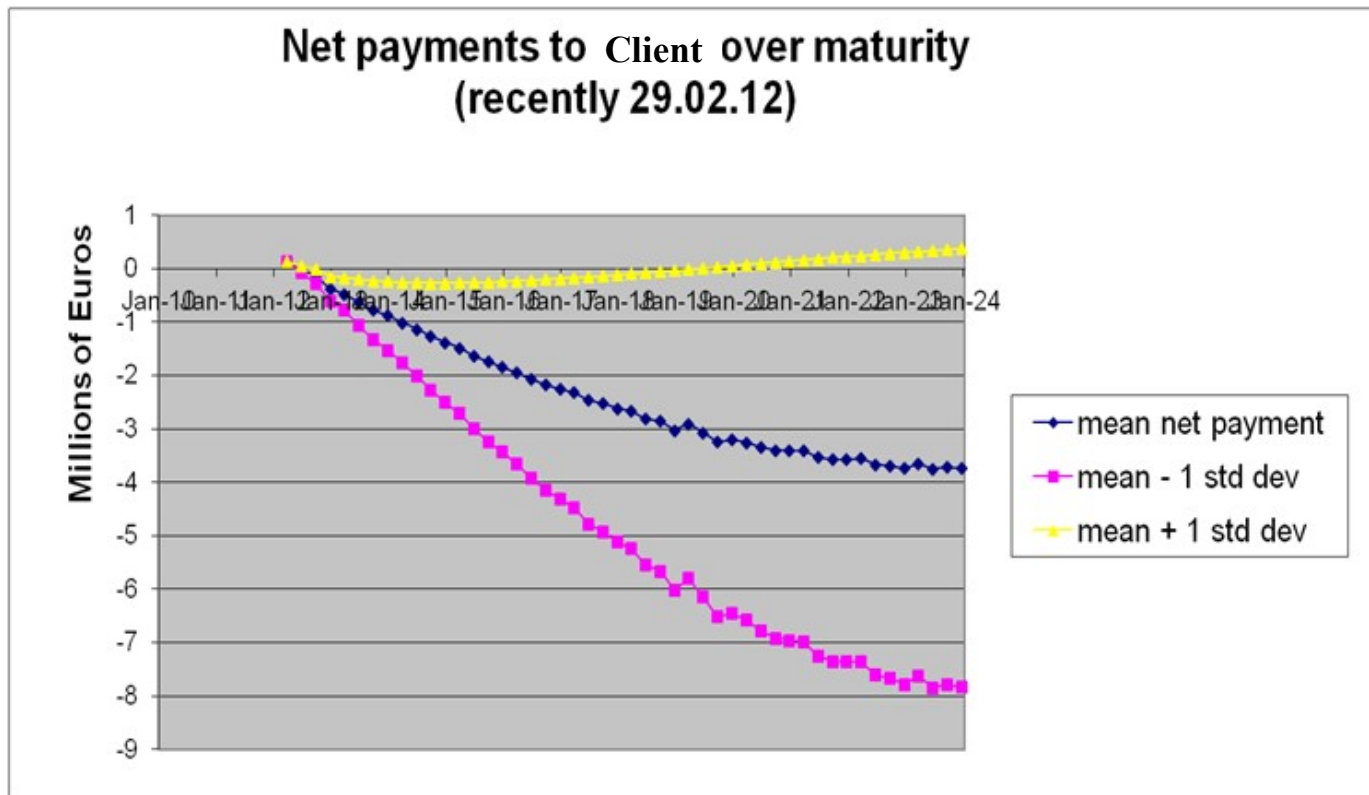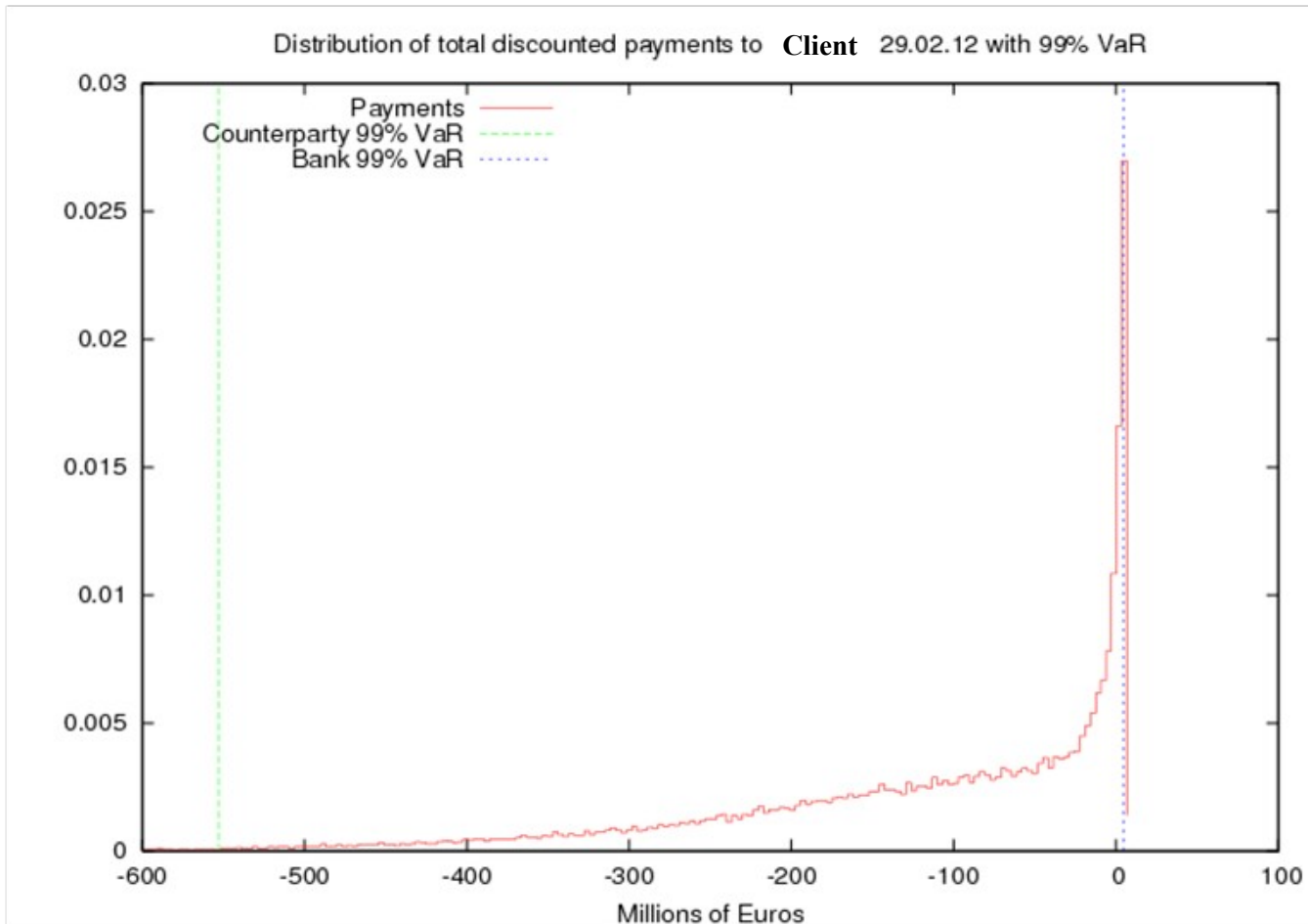
JPY-USD Evolution
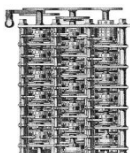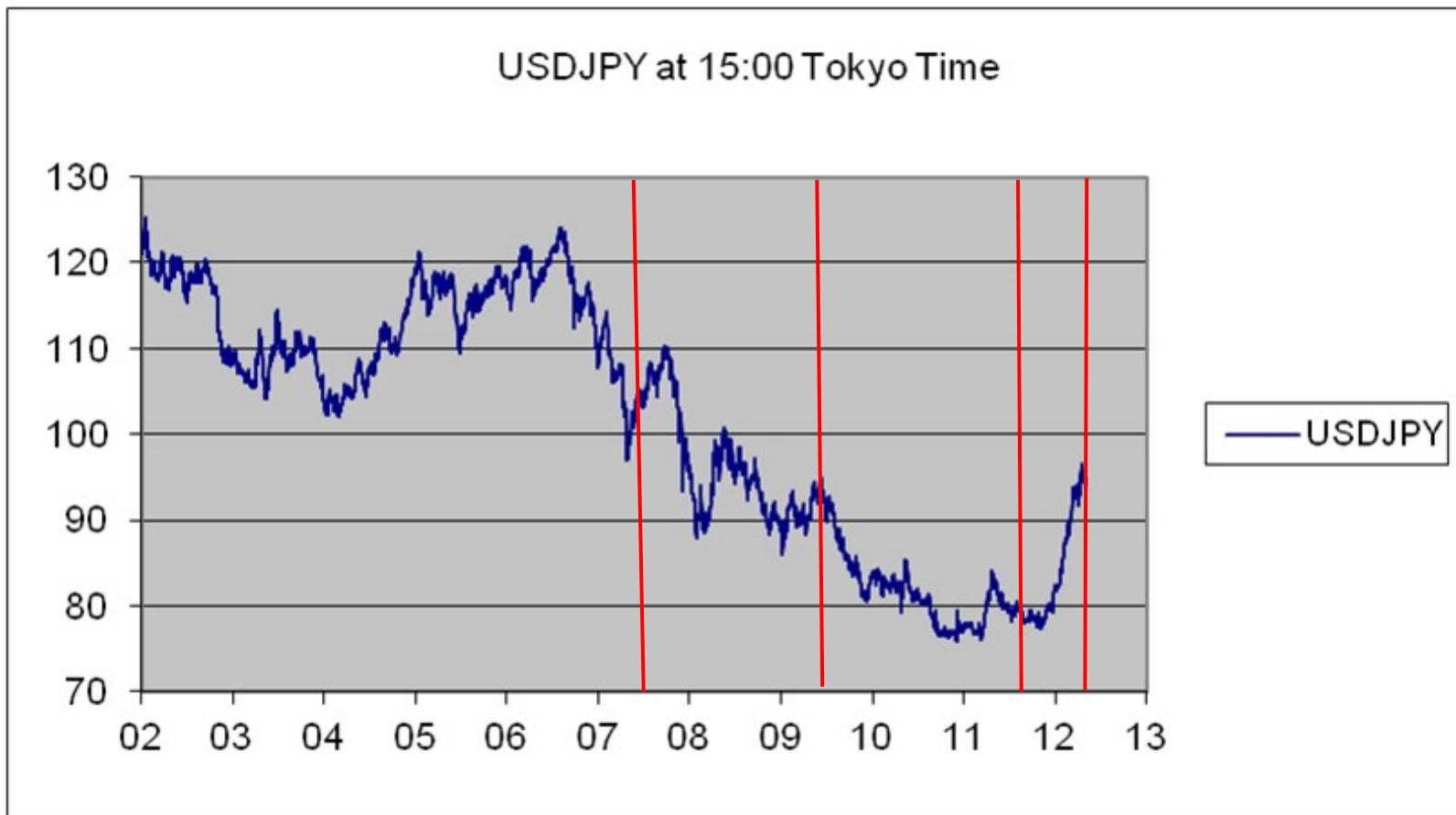
Bank Issuance of OTC Derivative to Clients Summary

- Products are invariably mispriced in favour of the bank at inception and get worse over time

- It's like going to the track having fixed the horse race

- You are not absolutely guaranteed to win but you surely have an edge on the punters!
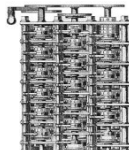
4. Pricing Methodology
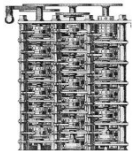
Economic Factor Model

- A 3 factor extended Vasicek Gaussian model specified under P by

$$dX(t) = (\mu_X - \lambda_X X(t) + \gamma_X \sigma_X)dt + \sum_{j=1}^{3} \sigma_{1j} dW_j(t) \qquad \text{Long rate}$$

$$dY(t) = (\mu_Y - \lambda_Y Y(t) + \gamma_Y \sigma_Y)dt + \sum_{j=1}^{3} \sigma_{2j} dW_j(t) \qquad \text{Minus Slope}$$

$$dR(t) = \{k[\underline{X(t) + Y(t)} - R(t)] + \gamma_R \sigma_R\}dt + \sum_{j=1}^{3} \sigma_{3j} dW_j(t)$$

Unobservable instantaneous short rate

- Its discretization is estimated from CMS swap data with many observed yield curve points – rates – from 1 day (Libor) to 30 years (Treasury) using the EM algorithm which iterates Kalman filtering and maximum likelihood estimation to convergence

- Specifying the constant market prices of risk in terms of volatility units solves the *X* & *Y* identification problem and setting them to zero generates the pricing factor process

- This workhorse model has been used for pricing complex products and ALM using daily to quarterly frequency data in US, UK , EU and Japanese jurisdictions
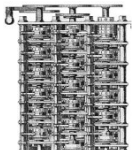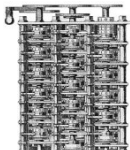
Calibrating the EFM Model

- Given the vector of parameters θ this Gaussian extended Vasicek model has zero coupon bond yields for maturity $\tau := T - t$ of the form

$$y(t,T) = \tau^{-1}[A(\tau,\theta)R_t + B(\tau,\theta)X_t + C(\tau,\theta)Y_t + D(\tau,\theta)]$$

- We interpolate the appropriate swap curve linearly to obtain swap rates at all maturities and then use 1, 3 and 6 month LIBOR rates and the swap curve to recursively back out a zero coupon bond yield curve for each day from the basic swap pricing equation

- This gives the input data for model calibration to give the parameter estimates $\hat{\theta}$

- Calibration is accomplished using the EM algorithm which iterates successively Kalman filtering and maximum likelihood estimation from an initial parameter estimate

- At each iteration multi-extremal likelihood optimization in θ is accomplished using a global optimization technique followed by a quasi-Newton algorithm

- The procedure is run on a Dell 44 Intel core system using parallelization techniques and we are currently investigating the use of cloud computing for these calculations

Goodness of Fit to Historical Yield Curves
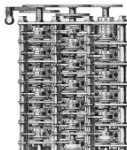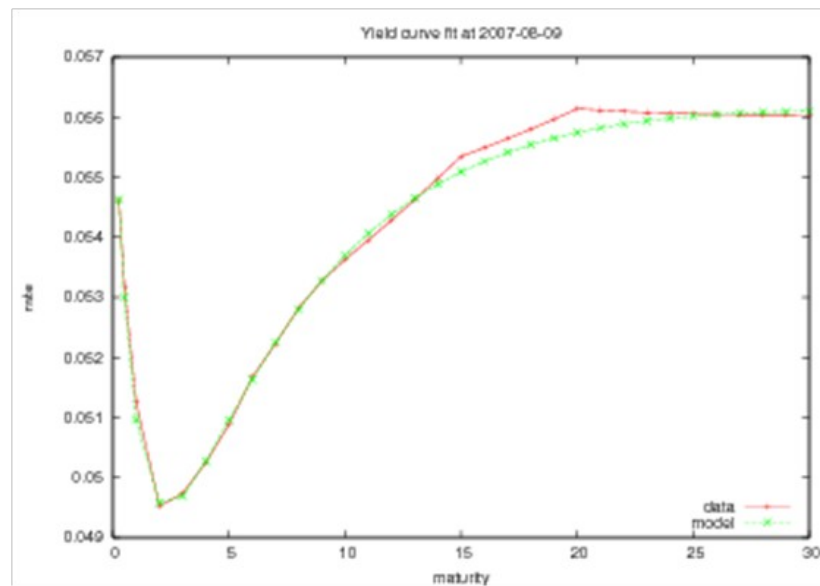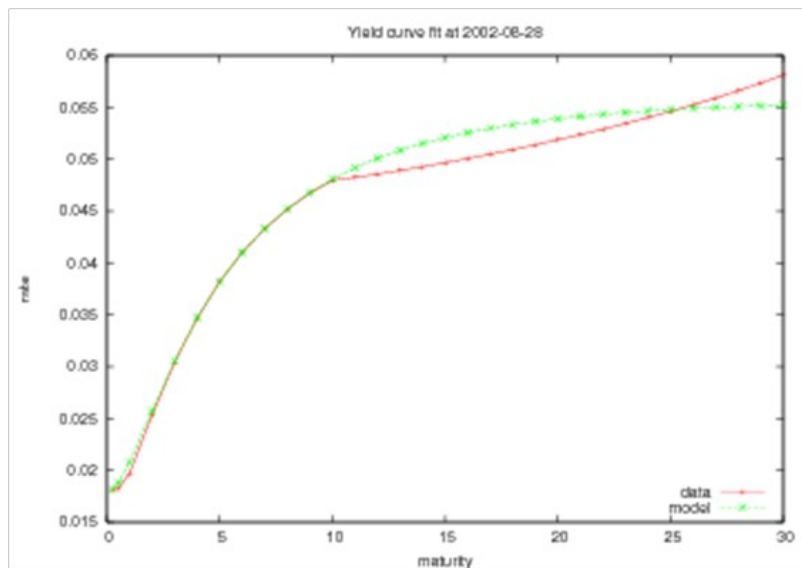
Monte Carlo Structured Deal Valuation

- OTC deal valuation may require *several* yield curve estimates together with CMS swap rates and cross currency rates which are all assumed correlated with *fixed* values

- The estimated factor dynamics of (**X,Y,R**) are simulated forward under the Q measure for pricing with the fixed market prices of risk set to 0

- The corresponding curves and FX rates are simulated to maturity together with a daily time step from respectively the valuation day yield curve estimates and FX data using 10,000 paths

- For OTC client deals optionality is typically in the form of bank cancellation rights (without compensation) at prescribed dates – usually at all reset dates after some initial period from inception

- We use an augmented version of a sub-optimal cancellation rule due to Andersen (1999) which relies on a score function $s_t(x, y, r)$ and cancels if $s_t \prec s_t^*$

- The exercise thresholds s_t^* are determined by a separate set of 10,000 paths for (**X,Y,R**) as the discounted value of all the remaining net payouts to the bank along the average factor path

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EFM Model EU Yield Curve Prediction 2003
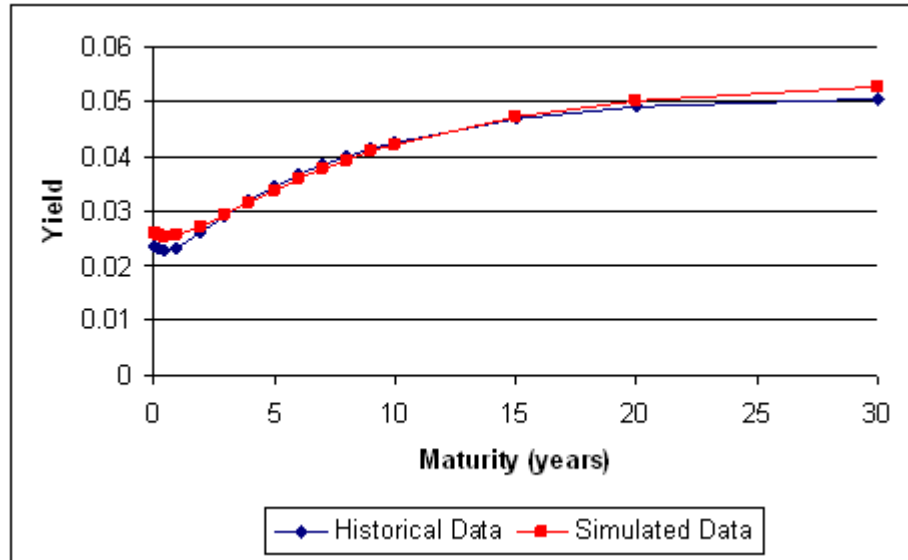
Mean level of yields over 2003 for historical and simulated weekly data
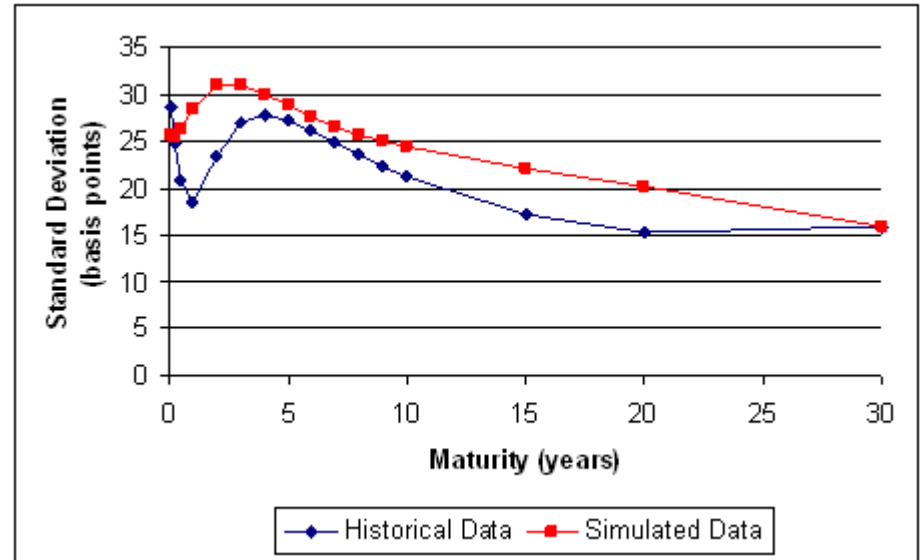
Weekly standard deviation of yields over 2003 for historical and simulated data

Dempster, Medova & Villaverde (2010)

- Longer term out-of-sample yield curve prediction has been independently found recently to be superior to the arbitrage-free Nelson-Siegel model of Christensen, Diebold & Rudebusch (2009) widely used by central banks

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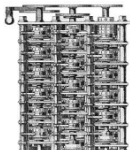
Nonlinear 3-Factor Black Model

- In a posthumously published paper Fisher Black (1995) suggested correcting *a priori* a Gaussian short rate model for a shadow short rate *r* to give the actual short rate as

$$r_{actual,t} := \max[0, r_{shadow,t}]$$

- Applied to an affine 3-factor Gaussian yield curve model such as that of our EFM model or JSZ this yields a hard nonlinear estimation problem
  Joslin, Singleton & Zhu (2011)

- Such models have been studied in the 2-factor case by the Bank of Japan and Stanford but their discount bond pricing (rate) methods do not easily extend to 3 factors
  Ichuie & Ueno (2007)   Kim & Singleton (2011)   Christensen & Rudebusch (2013)
  Kim & Priebsch (2013)
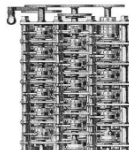
Black Model 10 Year Gilt Rate
50 Year Predicted Distribution 2011-2061
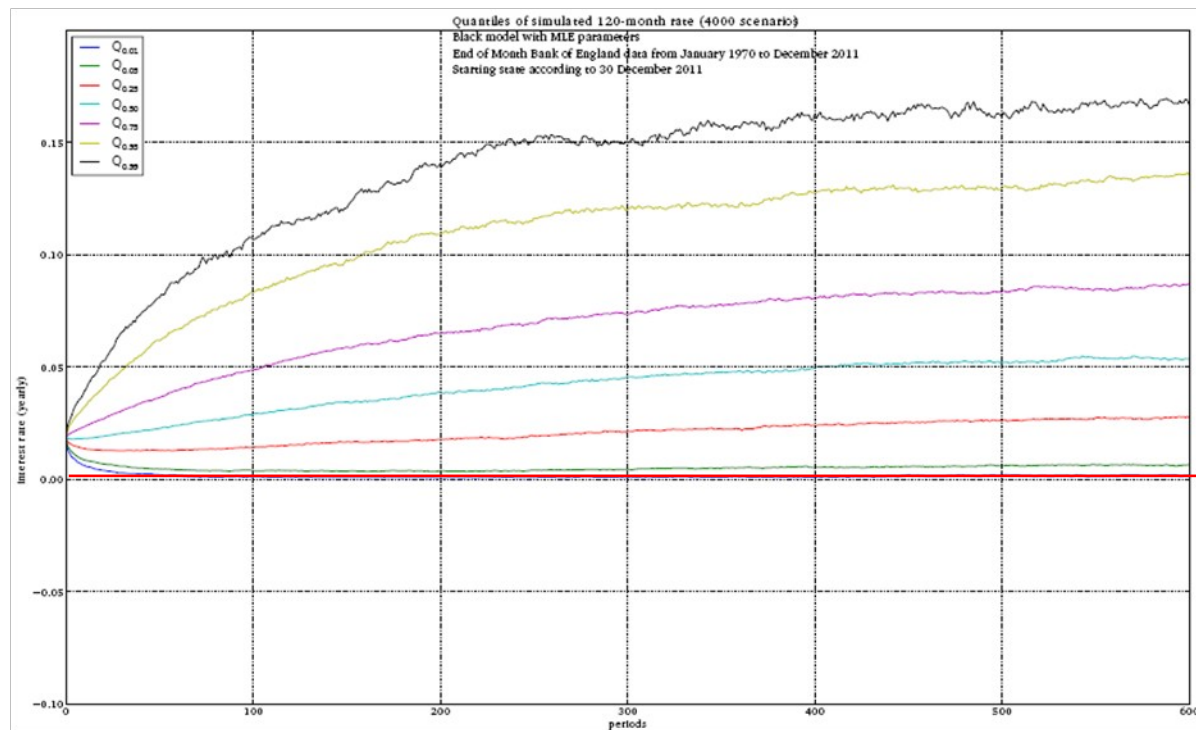
3-Factor Black Model Stylized Properties

Stylized Fact Properties	Yield Curve Model					
	CIR	BDFS	Vasicek	JSZ/HW	JSZ/HW/BRW	Black
	$A_3(3)$	$A_3(3)$	$A_3(3)$	$A_1(3)$	$A_0(3)$	$A_0(3)$
Mean Reverting Rates	Yes	Yes	Yes	Yes	No	Yes
Nonnegative Rates	Yes	No	No	No	No	Yes
Stochastic Rate Volatility	Yes	Yes	No	No	No	Yes*
Closed Form Bond Prices	Yes	Yes	Yes	Yes	Yes	No
Replicates All Observed Curves	No	Yes	Yes	Yes	Y es	Yes
State Dependent Risk Premia	No	No	No	Yes	Yes	Yes
Good for Long Term Simulations	No	No	No	No	No	Yes
Slow Mean Reversion Under Q	No	No	No	No	No	Yes
+ve Rate/Volatility Correlation	No	No	No	No	No	Yes
Effective in Low Rate Regimes	No	No	No	No	No	Yes

Table 1. Properties of evaluated yield curve models with regard to stylized facts

*Rate volatilities are piecewise constant punctuated by random jumps to 0 at rate 0 boundary hitting points.
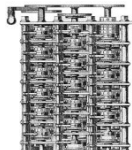
Monte Carlo Bond Pricing

- Calibration of the nonlinear Black model with any underlying 3 factor Gaussian shadow rate model is **more** computationally intensive than for this underlying affine model

- Currently cloud facilities and Monte Carlo are used with a JSZ 4 yield curve point model

- In more detail:
  - For short rates the closed form numerical rate calculations of Kim & Singleton (2011) are used
  - For long rates the averages of Monte Carlo forward simulated paths -- which automatically take account of the convexity adjustment otherwise required for this model – are used

- With this approach filtering a multi-curve EFM model for OTC structured derivative valuation becomes **very** computationally intensive

PDE Bond Pricing

- A possible key to calibration of both the JSZ and EFM models is the efficient solution for discount bond prices $P(\tau)$ of all maturities τ at each time t of a 3-dimensional parabolic partial differential equation (PDE) of the form

$$\partial P_t(\tau) / \partial \tau = \sum_{i,j=1}^{3} a_{ij} \partial^2 P_t(\tau) / \partial y_i \partial y_j + \sum_{i=1}^{3} b_i \partial P_i(\tau) / \partial y_i + c P_t(\tau)$$

- Kim and Singleton's 2-dimensional alternating direction implicit (ADI) solution method will not cope with the 3-D case
  Kim & Singleton (2011)   Lipton (2013)

- Rather than simulation-based techniques we are currently investigating applying a fast robust 3-D PDE solver based on an interpolating wavelet-specified irregular mesh implicit method that we have developed for complex derivative valuation
  Jameson (1998)   Carton de Wiart & Dempster (2011)

Unscented Kalman Filter Bond Pricing

- We are also investigating calibrating the Black EFM model with our current EM algorithm approach with the unscented Kalman filter to handle the "hockey stick" nonlinearity and cloud computing   Julier & Uhlmann (1997)

- Working with yields directly as we do rather than bond prices computed or approximated numerically from integrals of the instantaneous short rate as in the previously cited references to Black model calibration significantly accelerates computation

- Putting the EFM 3-factor yield curve dynamics in state-space form shows that the factor state dynamics remain linear Gaussian while the Black nonlinearity may be directly applied to each observed maturity yield in the shadow rate affine measurement equation – longer maturity yields typically need no correction

- With this approach the 13 sigma point duplicate calculations of the unscented Kalman filter at each daily time step may be mindlessly parallelized to handle the Black nonlinearity in essentially the same running time as the calibration of the underlying EFM model using basic linear Kalman filtering

5. Evolving Regulation of OTC Derivatives
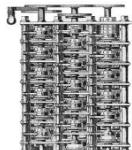
Why Do Clients Sign OTC Contracts? Theory

- In over-the-counter markets "buyers and sellers and sellers negotiate terms privately, often in ignorance of the prices currently available from other potential counterparties and with limited knowledge of trades recently negotiated elsewhere in the market ... (illiquidity) premia are higher when counterparties are harder to find, when *sellers* have less bargaining power, when the fraction of qualified owners is smaller, and when risk aversion, volatility, or hedging demand is larger"

  Based on random search by rational risk neutral investors and the central limit theorem

  Duffie (2012)

- Structured investment products offer no gain after fees to such investors and **appear** to do so only if investors misestimate outcome likelihoods by overweighting favourable relative to unfavourable outcomes – a theory of gullability?

  Hens & Rieger (2013)
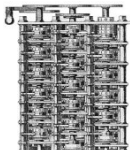
Why Do Clients *Actually* Sign OTC Contracts?

On a scale from the honest weak to the powerful

- **Desparation**
  - City of Detroit
- **Coercion**
  - Bank loan or loan rollover *requires* accompanying "hedge" derivatives (UK & US SMEs)
- **Trust**
  - Ille Papier v DB German Supreme Court case (2011)
- **Gullability**
  - German Landesbanken (unknown B €)
  - Austrian National Railways (€ 90 M)
  - Milan, Pisa, Sicily, Monte Casino, ... (600 municipalities, over 1000 global deals, c. € 2.5 B lost)
- **Complicity**
  - Italian (1999) (c. € 31 B to 2012) and Greek (2001) (unknown B €) governments for Eurozone entry
  - Monte dei Paschi di Sienna (c. € 8.4 B)
  - Stichting Vestia Group (€ 700 M)
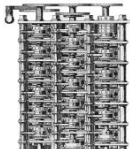
US Dodd-Frank and Consumer Protection Acts

- Much media attention has been focussed on the **Volker rule** which **partially restores** the **Glass-Steagall Act** of 1933 separating commercial and investment banking (broker-dealers) and **moving OTC derivative trading to cleared exchanges** under the direction of the Commodity Futures Trading Commission

- Specifically **investment banks** must **cease proprietary trading** (i.e. on their own account) and **divest** themselves of **solely-owned hedge and private equity funds**

- The SEC and CFTC have detailed the *implementation* of these acts in July 2013 but much must still be done internationally and it remains to be seen how much teeth they will have

- However clear rules enforcing **duty of care** and **separating advice and trading with clients** specifically for ***all*** *governmental entities*, *pension funds* (Erisa entities) and *foundations* have been overlooked or played down by banks and the media – especially possible retroactive application

- In essence this is the motivation behind the **US government's law suits** of **18 global derivative issuers over CDO's**
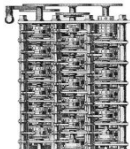
Basel III

- The Basel Committee recommends imposing a 4.5% of risk weighted assets core Tier 1 (equity and retained earnings) capital ratio on banks with a further 2.5% cushion which when not met would preclude dividends and executive pay increases

- Although these proposed reforms have been ratified by the G20 they must be enacted into law by the 27 national governments of the Basel agreement only from January 2013 through January 2019

- The Committee also endorsed a further 2.5% requirement in boom years to the basic capital charge and a possible 1.5% systemic risk charge to global institutions to cushion loss at a downturn although such losses through the 2007-09 crisis actually amounted to 7% globally on average

- Although many leading global banks currently have core Tier 1 capital ratios of over 10% a number of well known institutions still need to raise capital to meet Basel III requirements including Barclays, Lloyds and RBS in the UK, Société Générale and Crédit Agricole in France, Deutsche Bank, Commerz, Hypo Real and all the Landesbanken in Germany and UniCredit and Banca Intesa IMI in Italy

- European bank stress tests are widely mistrusted as their past stress scenarios have ignored the deteriorating sovereign credit of peripheral EU nations like Greece, Ireland, Portugal and even of Spain and Italy – in Germany such sovereign bond holdings were initially not even reported

Client Protection?

The fog clears

- Moving some OTC structured products to cleared exchanges mainly addresses **interbank** derivative trading to which most current regulation is addressed

- **Client** problems could be alleviated by regulation to require the *visual display* by banks of the *asymmetric risks* involved in remaining OTC structured products along the lines of the diagrams we have shown for swaps, bonds and FX contracts – unfortunately unlikely for the ongoing Dodd-Frank implementation by the CFTC

- This would result in **fairer products** and encourage the widespread **proper** use of derivatives by clients for hedging various risks

- The concomitant would be a much **smaller margin for banks!** Perhaps the BIS recommended **1.5%** rather than the average **10%** ?
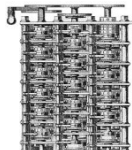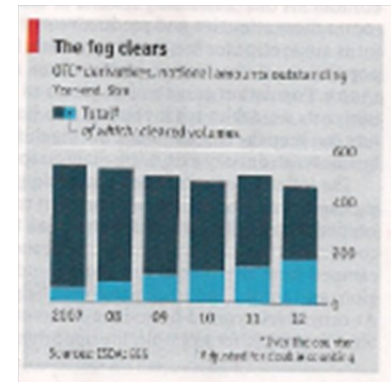
Barclays Balance Sheet 2012

Assets £ M **Liabilities £ M**

Derivatives
469,146

6,679   net

Loans
425,729

Other
509,270

Cash 86,175

£ 1,490,322 M

Derivatives
462,468

Deposits
385,707

Other
579,190

Equity 62,957   **4.2 % 24:1**

£ 1,490,322 M

£ 1.5 T or **61%** of **UK £2.44 T GDP**

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Systemic Consequences of Derivative Practice

- S&P estimated in 2011 that the top 20 derivatives dealers with 90% of the OTC market (those sued by the US government plus UniCredit and Intesa) currently have over $500 B each in these assets – a staggering total of **$10 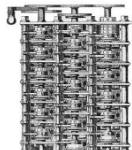T** and over 3 times the $3 T global bank *eventual* markdowns estimated at the end of 2008 which are still being realized

- The BIS total estimate as of end 2012 was **$ 21.1 T** gross hedged mark-to-market interbank and corporate plus a further **$3.6 T** net MTM of un-hedged credit exposure – in large part due to deals of the type we have discussed – at 80% **$ 2.9 T** or 4% of the $ 71.7 T 2012 global GDP!

- What would be the systemic consequences if a significant part of these cash flows and profits were to disappear due to regulation/litigation/default? Exit from serious investment banking is already underway for UBS and under discussion at Credit Suisse and Barclays

- Does Jamie Dimon, CEO of JP Morgan Chase, know something that we don't (even after the 2012 JPM $ 6.2 B loss and the recent $ 13 B US government settlement)? On 12th September 2011 he was quoted in the *Financial Times* as saying "It could be '10 years' before the (financial) industry emerges from lawsuits brought by investors seeking compensation"
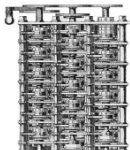
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