

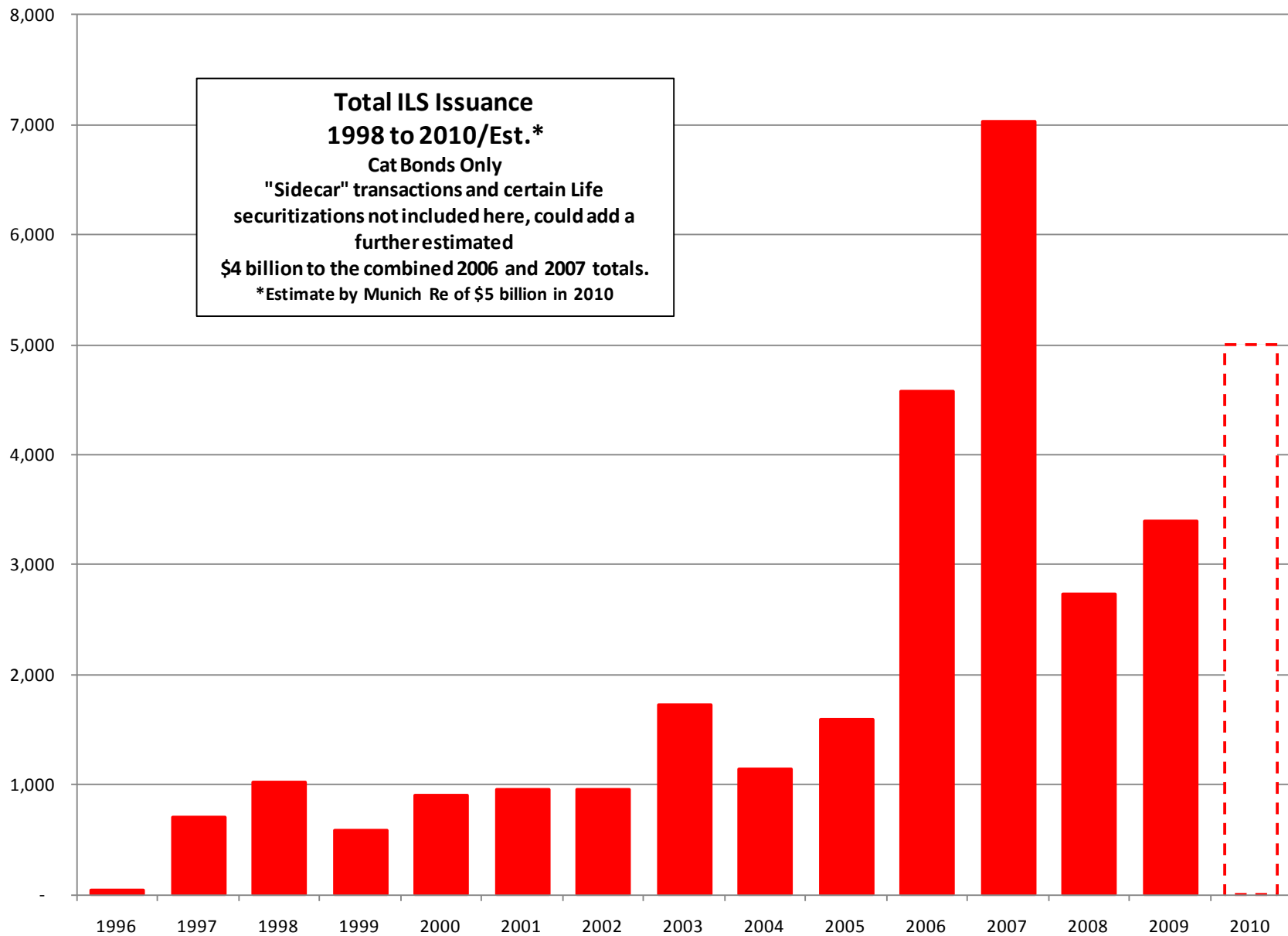
An Overview of the ILS Market

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CAS Rate Making Seminar
Fairmont Hotel, Chicago
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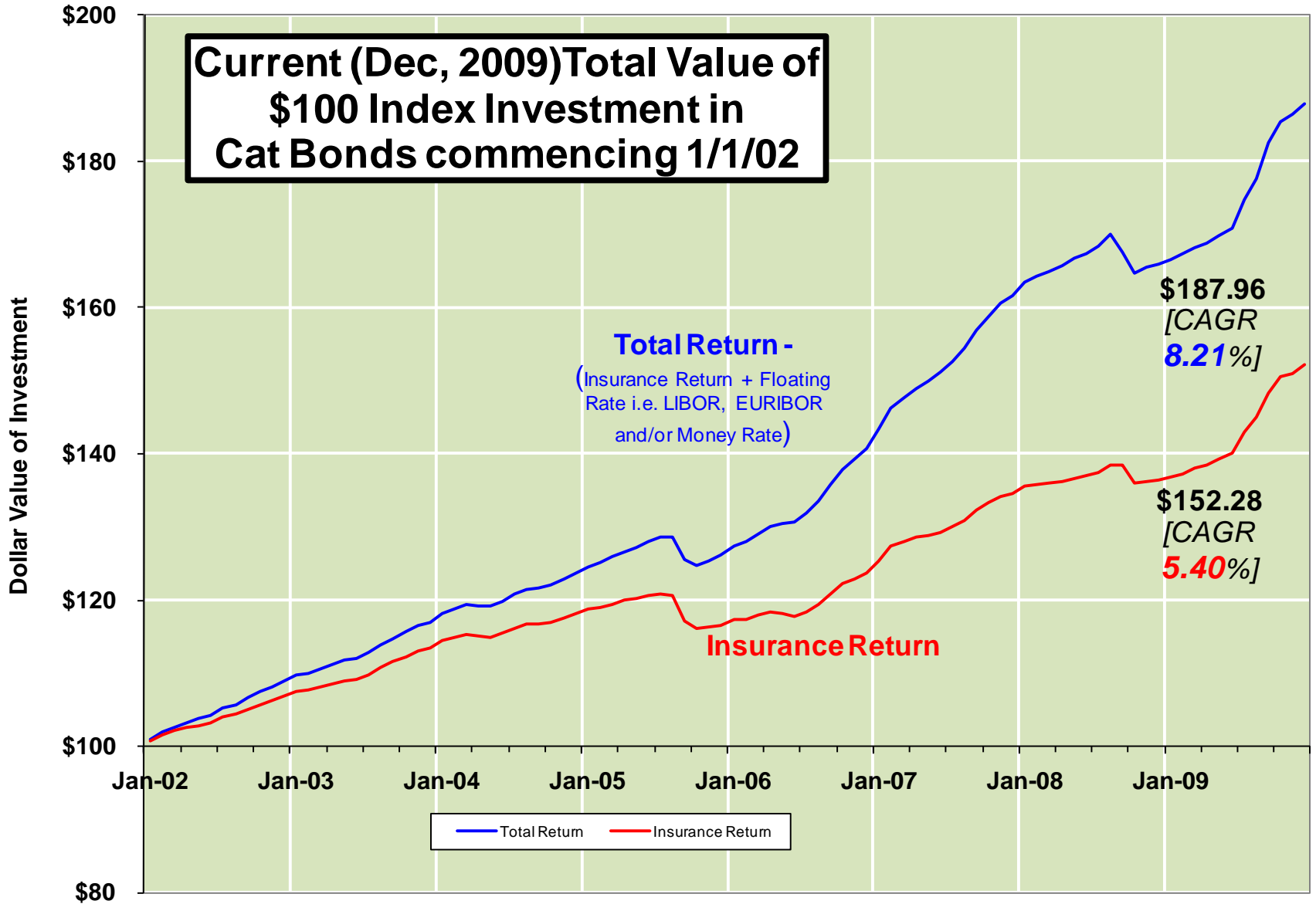
Investor Attraction

Calendar Annual Returns, ALL Cat

<u>Year</u>	<u>Total</u>	<u>Insurance</u>	<u>Floating</u>	<u>Price</u>
2002	8.91%	6.86%	1.93%	1.23%
2003	7.41%	6.09%	1.25%	0.83%
2004	5.82%	4.26%	1.50%	-0.59%
2005	1.84%	-1.44%	3.31%	-6.22%
2006	11.69%	6.13%	5.27%	-0.68%
2007	14.86%	8.91%	5.50%	1.80%
2008	2.65%	1.28%	1.35%	-6.78%
2009	13.22%	11.65%	1.43%	4.45%

<i>Annual Average</i>	8.30%	5.47%	2.69%	-0.74%
<i>Std Dev</i>	4.78%	4.13%	1.79%	3.90%

**Current (Dec, 2009) Total Value of
\$100 Index Investment in
Cat Bonds commencing 1/1/02**



Basics of Cat Bonds and Overview of some Trends

Perils
Maturity
Ratings
Shelf Registrations
Indemnity

Basic Definition of Securitization

The term insurance securitization is taken to mean any instrument that transfers risk from the insurance and reinsurance market to investors in the capital markets.

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The purest form of insurance-linked security [**ILS**] is popularly known as a **Cat Bond**. It transfers catastrophe risk from insurers to investors. Typically the investor is provided with **probabilities** of loss from such catastrophes together with a spread over LIBOR.

More generally the term ILS can refer to risk transfers with similar characteristics and this might include **Sidecars** and **ILWs**.

While most of the initial securitizations have been done with catastrophe risk increasing amounts are being done in Mortality, Auto, Excess Liability, and several attempts at Longevity.

There have also been several attempts by official institutions –The World Bank and the International Monetary Fund to extend the concept to developing or less developed countries – e.g. the Caribbean Country Risk Insurance Facility, Mexico Multi-Cat.

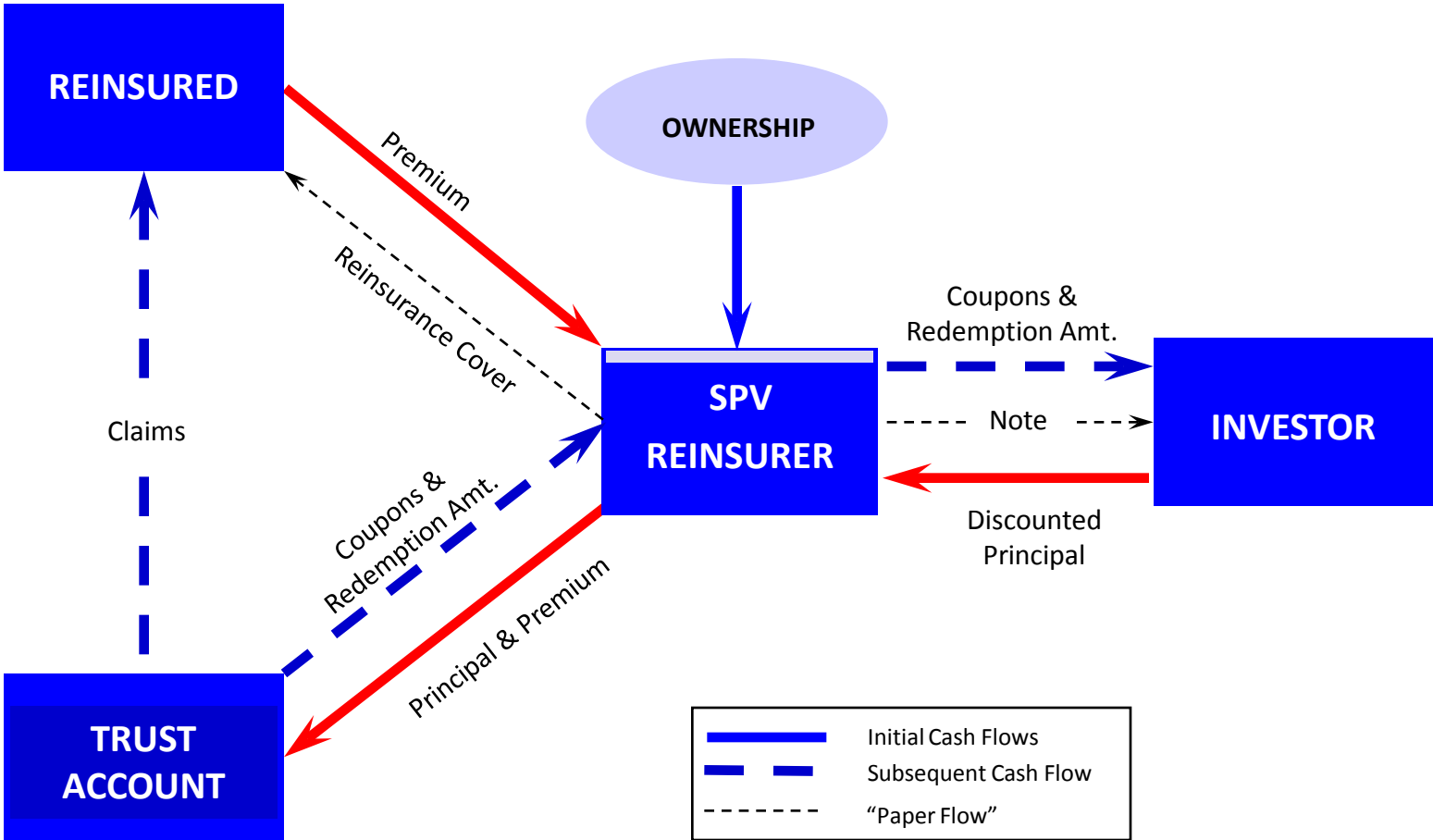
There are several other related types of securitization Triple XXX Embedded Value, and Life Settlements not discussed here.

History

- **First proposal 1992 AIG Merrill Lynch**
- **Experiments 1995-1996 Reliance, Hannover, St Paul**
- **First Large deal USAA \$500 million 1997, Now \$4 bn Shelf**
- **Persistent Issuance about \$ 1.0+ billion per year, Now \$5 to \$7 per year**
- **Mostly Catastrophe Risk, but increasingly other lines**

How it Works

TYPICAL SECURITISATION STRUCTURE



How it Works

- Often an interest rate swap is added to structure to stabilize spread received and accommodate cash flow
- Note that “ownership” used to be quite an issue. On whose books if any, should the SPR be consolidated
- Originally ignored, then conservative accounting put it at 3% because that is what other Asset Backed Securities structures required. Not so much an issue these days
- Guernsey, Barbados, Bermuda, Cayman Islands all used
Must be *flexible* and *tax neutral*. Timing.

Advantages Of Securitization

To Cedents:

- ◆ Access to more capital providers
- ◆ Greater security, no credit risk or reinsurance recoverables issues
- ◆ Substitutes “designer” capital for permanent general capital. Improves RoE.

To Investors:

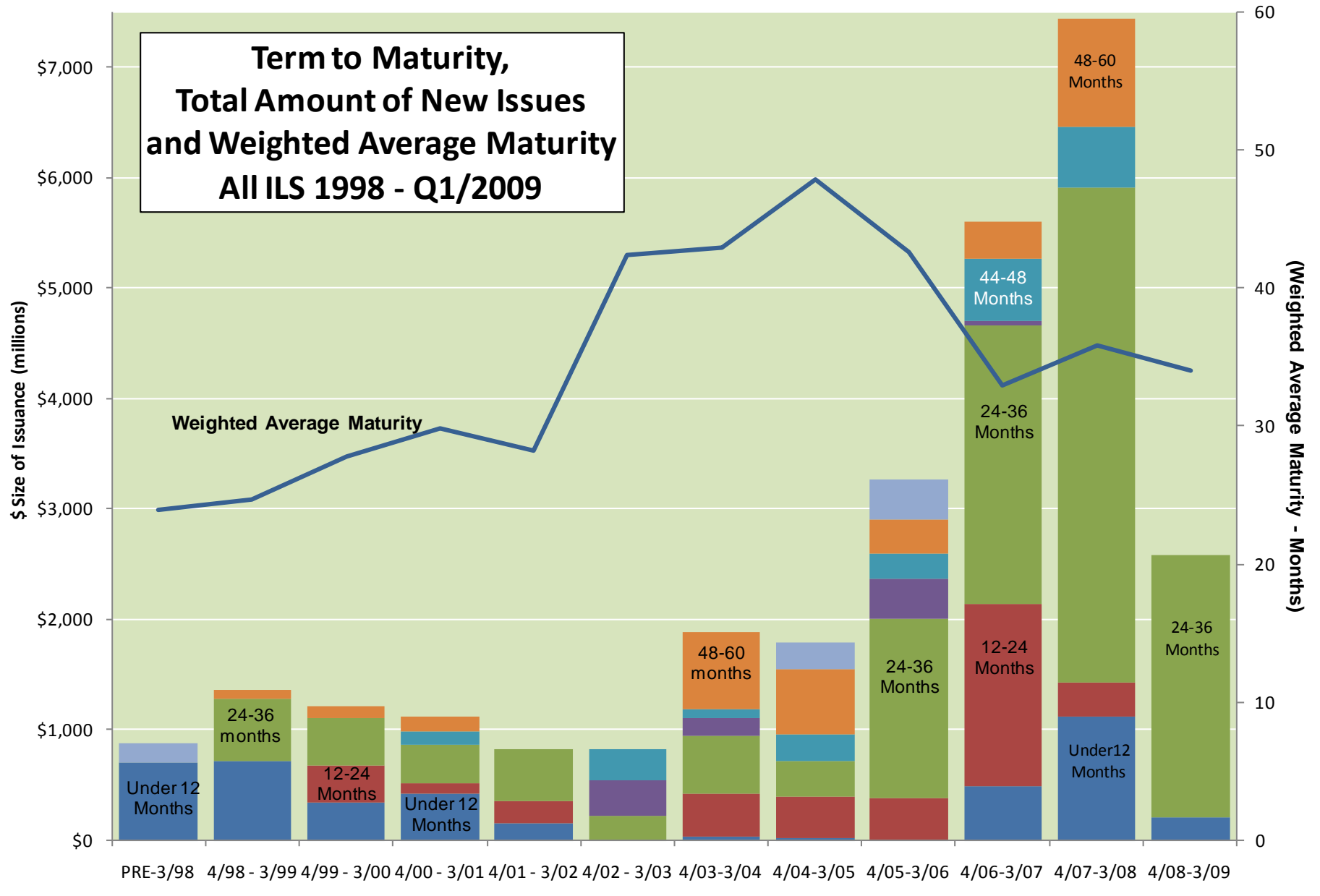
- ◆ High Excess returns
- ◆ Diversification, non-correlated asset
- ◆ Direct investment in risk, not management, market multiples nor investment philosophy.

An ILS Security's Structural Decisions

- **Term of the risk. Mostly annual initially. Should depend on cycle. Multi-period Exposure, Term of 'development' period**
- **Amount, Limit, Currency, Investment Banker/Placement Agent Underwriter? Book Runner/Lead**
- **Other service providers; Risk Modeler AIR, EQEcat, RMS Rating agency (s) Moody's, Standard and Poor's, Fitch.**
- **Fiscal Agent, Administrator, Indenture Trustee, Reinsurance Trustee, Reinsurance Trust, Investment manager, Claims Reviewer, Attorney, Agent, Accountant**

Security Structural Decisions - Term

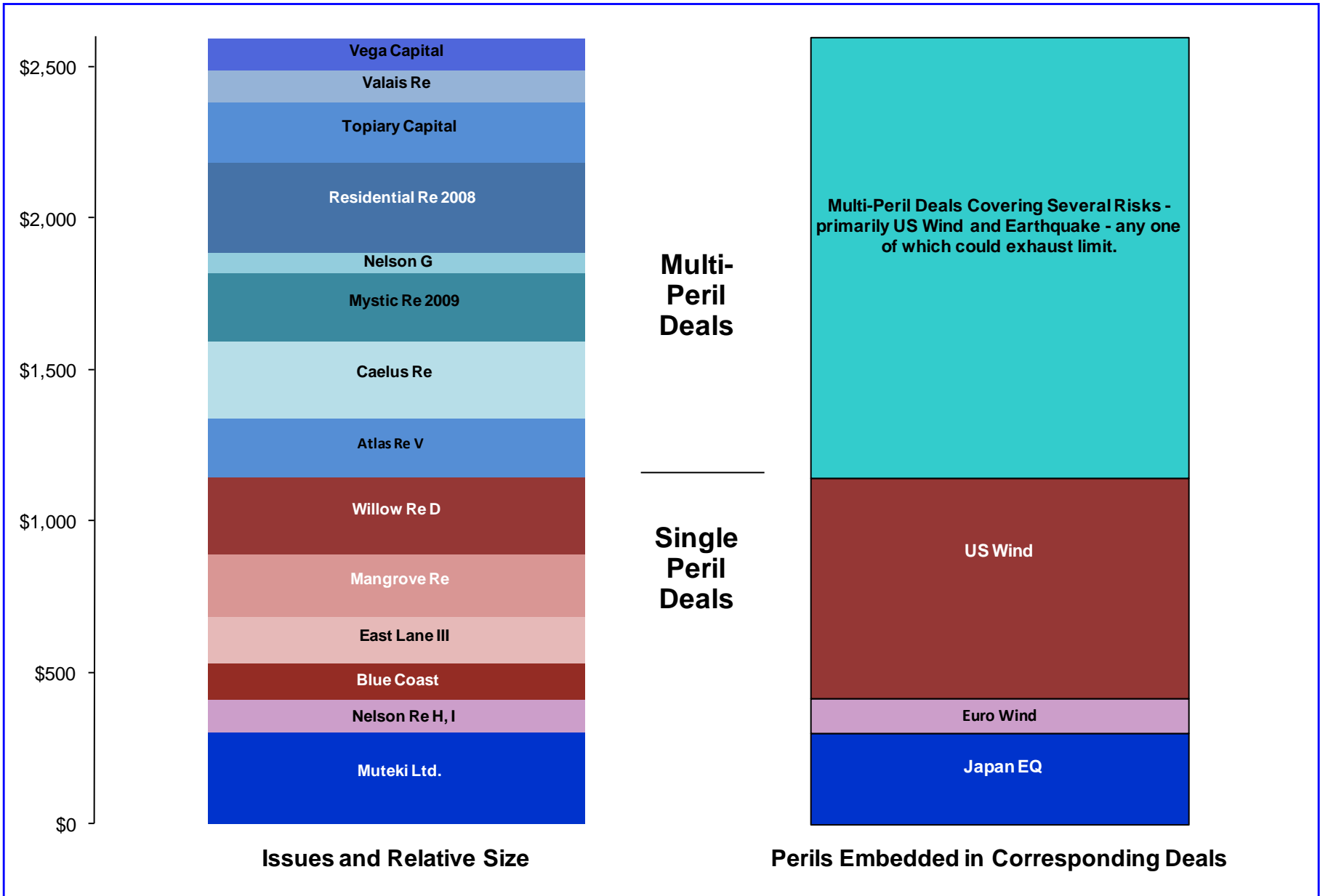
**Term to Maturity,
Total Amount of New Issues
and Weighted Average Maturity
All ILS 1998 - Q1/2009**



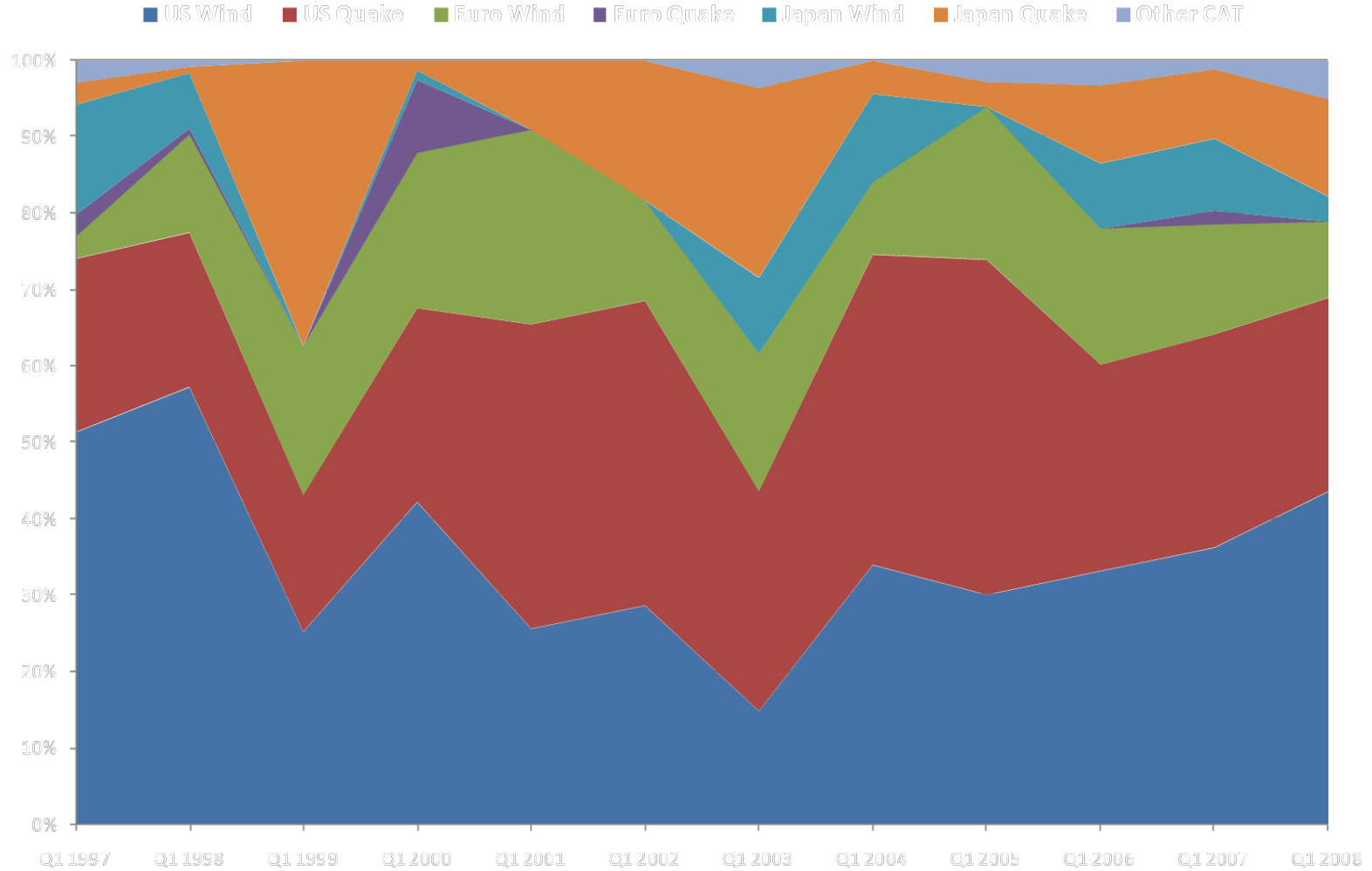
Cost Saving through Maturity Extension – multiyear deals

An ILS Security's Structural Decisions

- **Perils to be covered, Catastrophe Wind and Quake in US, Europe and Japan**
- **Other Perils; Weather, Auto Residual Value, Space, Aviation, Life, Longevity, Excess Liability**
- **Single, Multiple, Joint, Contingent.**
 - Single – one risk one region.**
 - Multiple – Portfolio of singles risks (leveraged)**
 - Joint – several perils, each of which can exhaust limit**
 - Contingent – must fulfill another contingency before being on risk**
- **Occurrences; Single event, Multiple events, Aggregate**



Share of Exposure by Potential Limits All Cat ILS 1997 – Q1 2009



An ILS Security's Structural Decisions

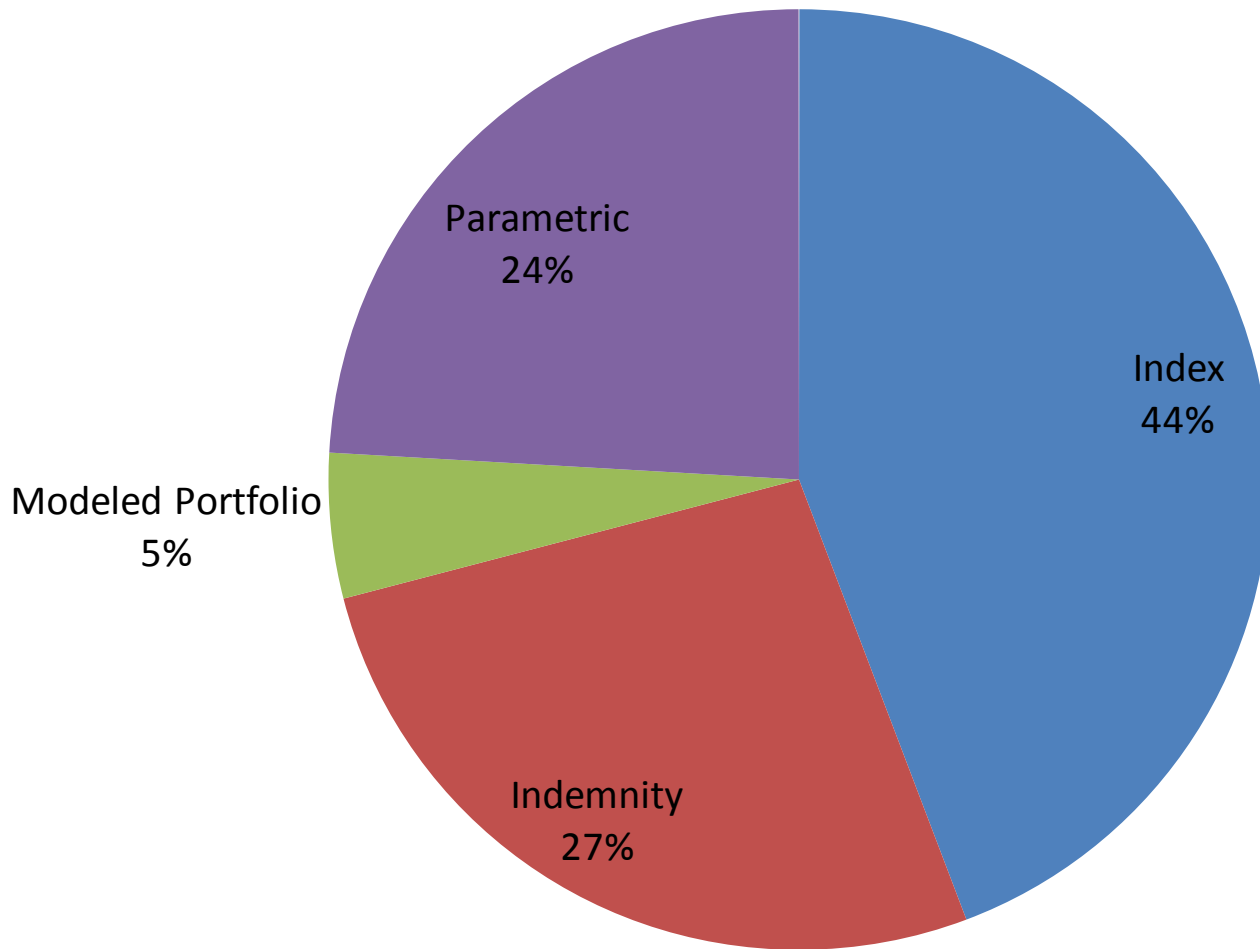
- Denominating the Loss measure
- Indemnity Loss – Replacing the exact loss of the cedent
Moral hazard issue, revealing the book, changing the book, co-insurance. Alignment of interest essential. Exit Prices.

Basis risk with any approximate loss replacement.

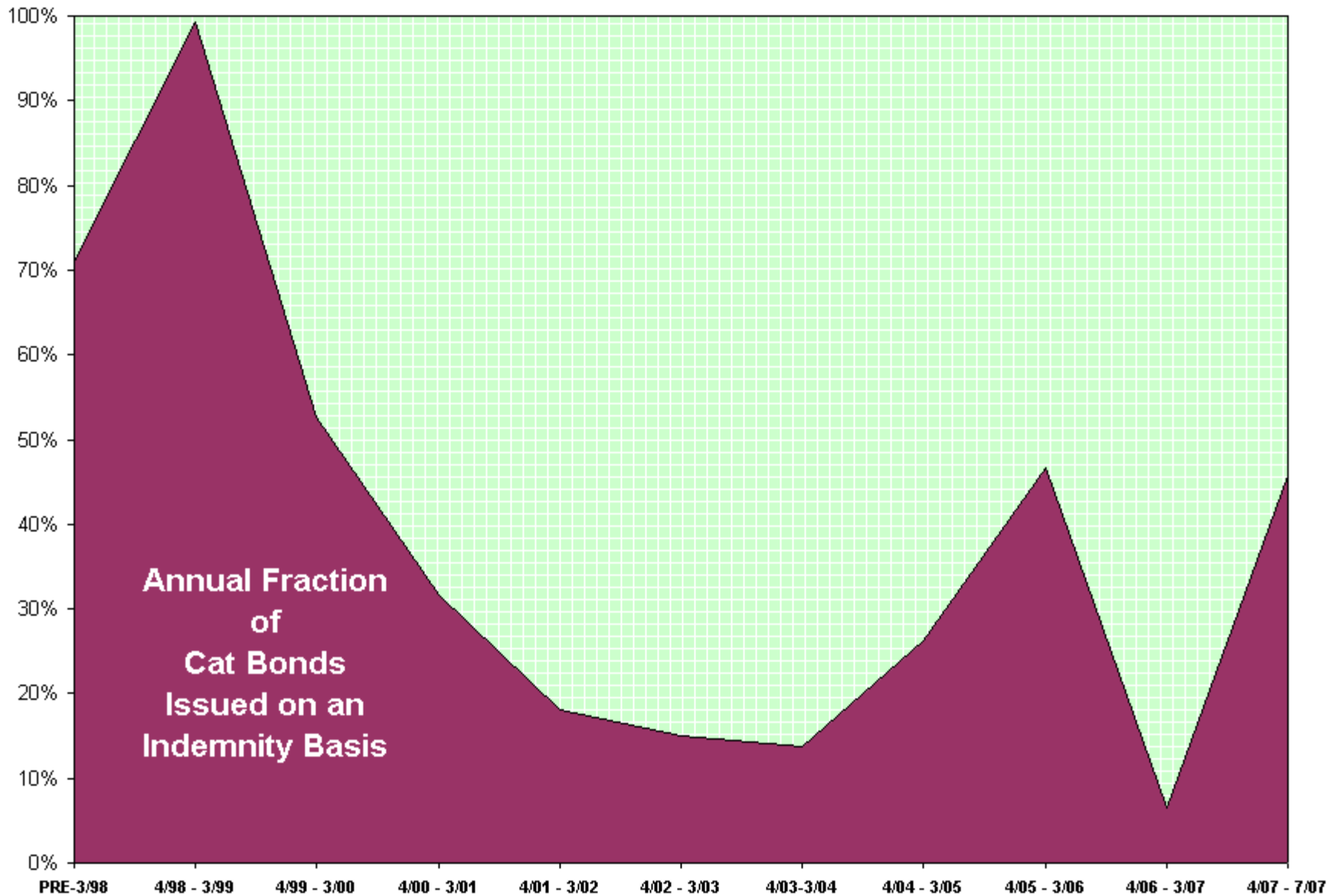
- Index Loss – Usually Industry loss, in US Property Claims Service (PCS), Industry Services Office (ISO) NatCat SERVICE (Munich Re), Sigma (Swiss Re), Perils.
- Modeled Loss – Various. Stored and run after event or risk period based on event parameters.
- Parametric Measure – Geo Physical, Richter Scale for Region Japanese Meteorological, Wind Speed
- Hybrids

Loss Basis

- All Cat ILS 1997- Q1 2008



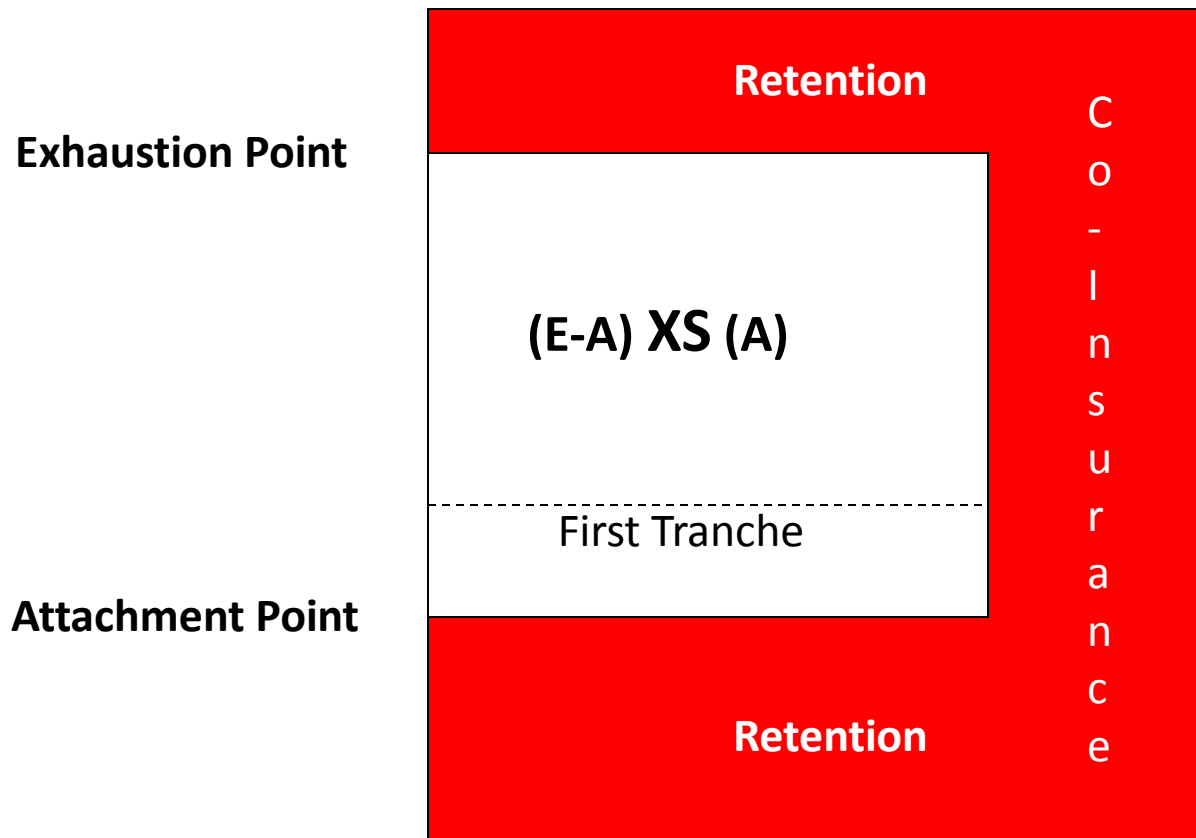
An ILS Security's Structural Decisions



An ILS Security's Structural Decisions

- **Tranching; Single or Multiple**
- **First Loss Position as Equity, Non consolidation considerations.**
- **Horizontal Tranches, how many and why, ratings thereof and price thereof?**
- **Vertical Co-Insurance**
- **Non adjacent tranches**

An ILS Security's Structural Decisions



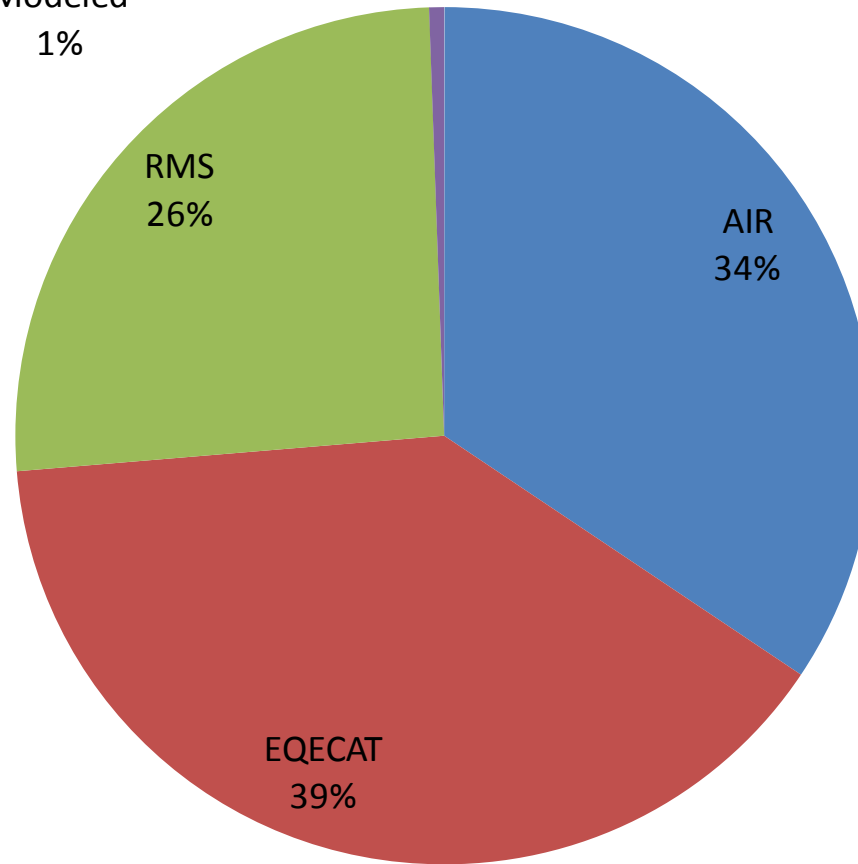
Security Structural Decisions

- **Risk analysis**
- **Applied Insurance Research (AIR) Boston 1987**
- **EQEcat Earthquake origins, Oakland, California**
- **Risk Management Solutions (RMS) Newark, California, Stanford Origins 1988**

Model Companies

-All Cat ILS 1997- Q1 2008

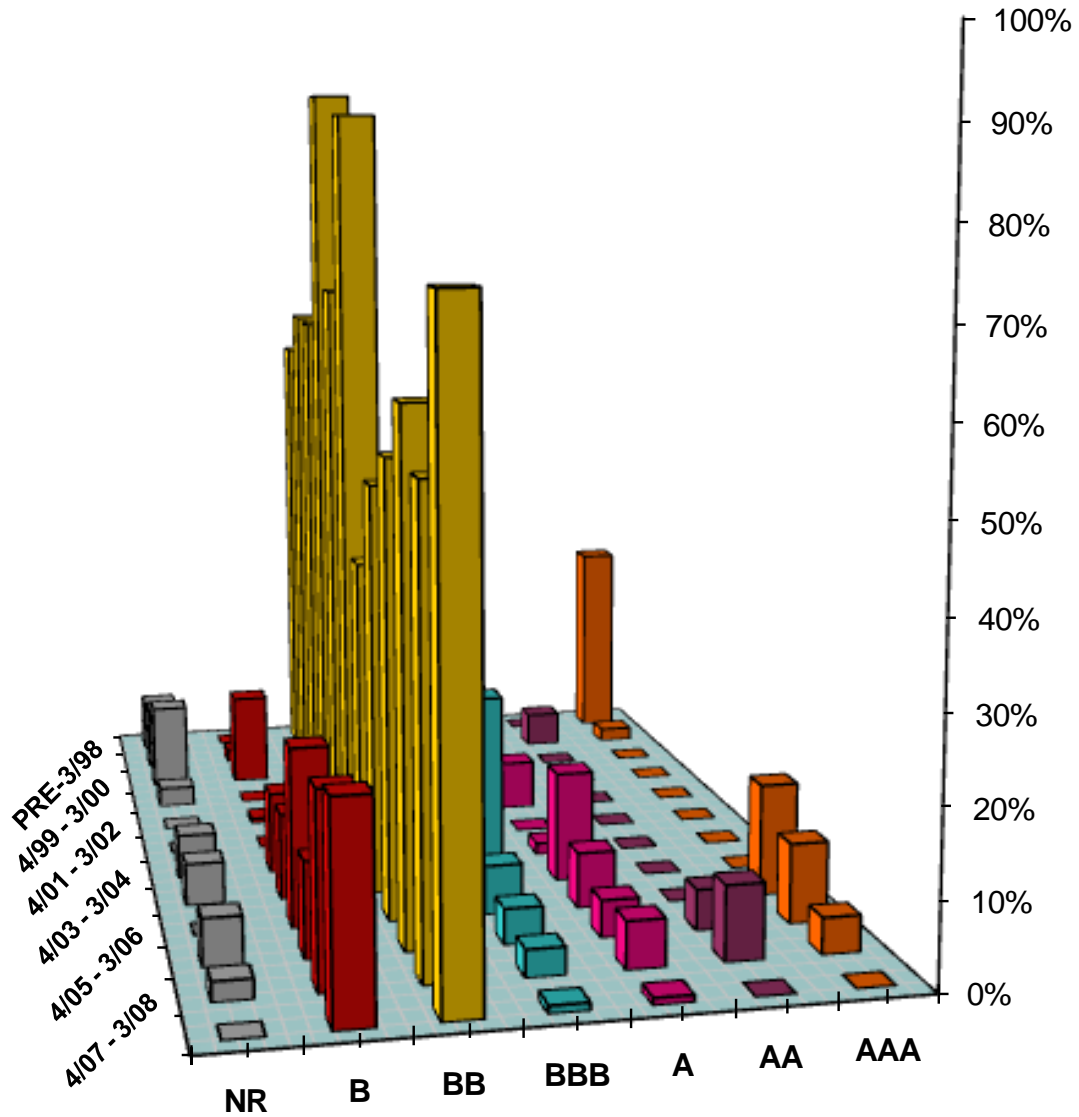
Other or Non-
Modeled
1%



An ILS Security's Structural Decisions

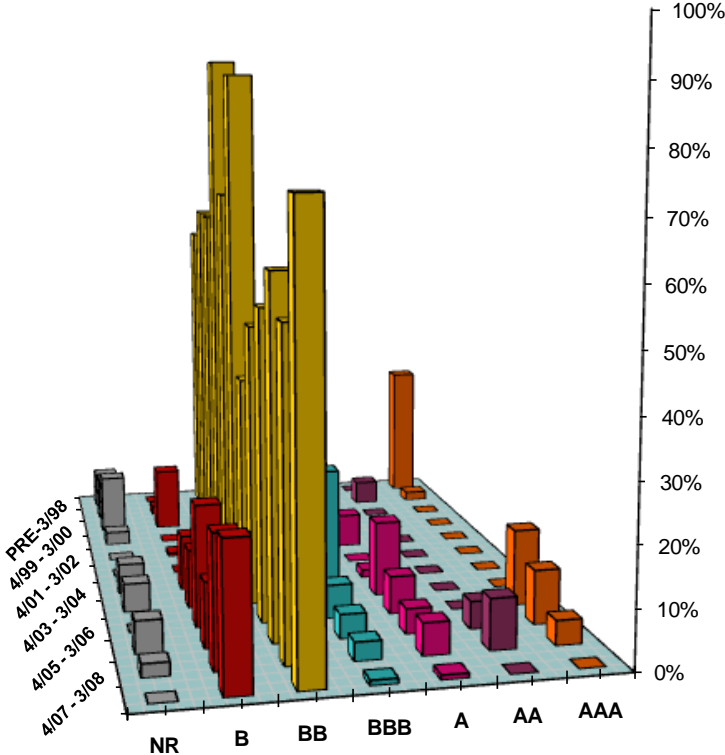
- **Ratings Agencies Issuer Financed**
- **Moody's; Alpha Numeric code Relies on Expected Loss – Ba3**
- **Standard and Poors; Letter Rating- main focus will be Probability of Default. - AA+**
- **Fitch-IBCA; Letter Rating, Mix of Expected loss, Probability of Loss and Probability of Exhaustion.- B+**
- **No Buyer Financed Rating Agency so far utilized e.g. Egan-Jones Rating.**

Fraction of Issuance in each Credit Rating 1998 - 3/2009

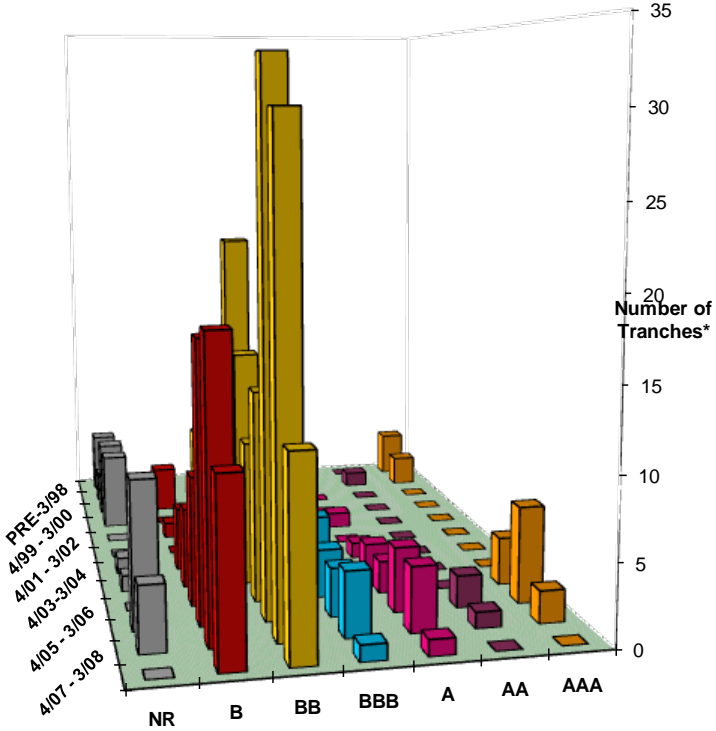


An ILS Security's Structural Decisions

Fraction of Issuance in each Credit Rating
1998 - 3/2009



RATINGS CHANGES OVER TIME
(by Number of Rated Tranches)
1998 - 3/2009



*Each issue of a various program

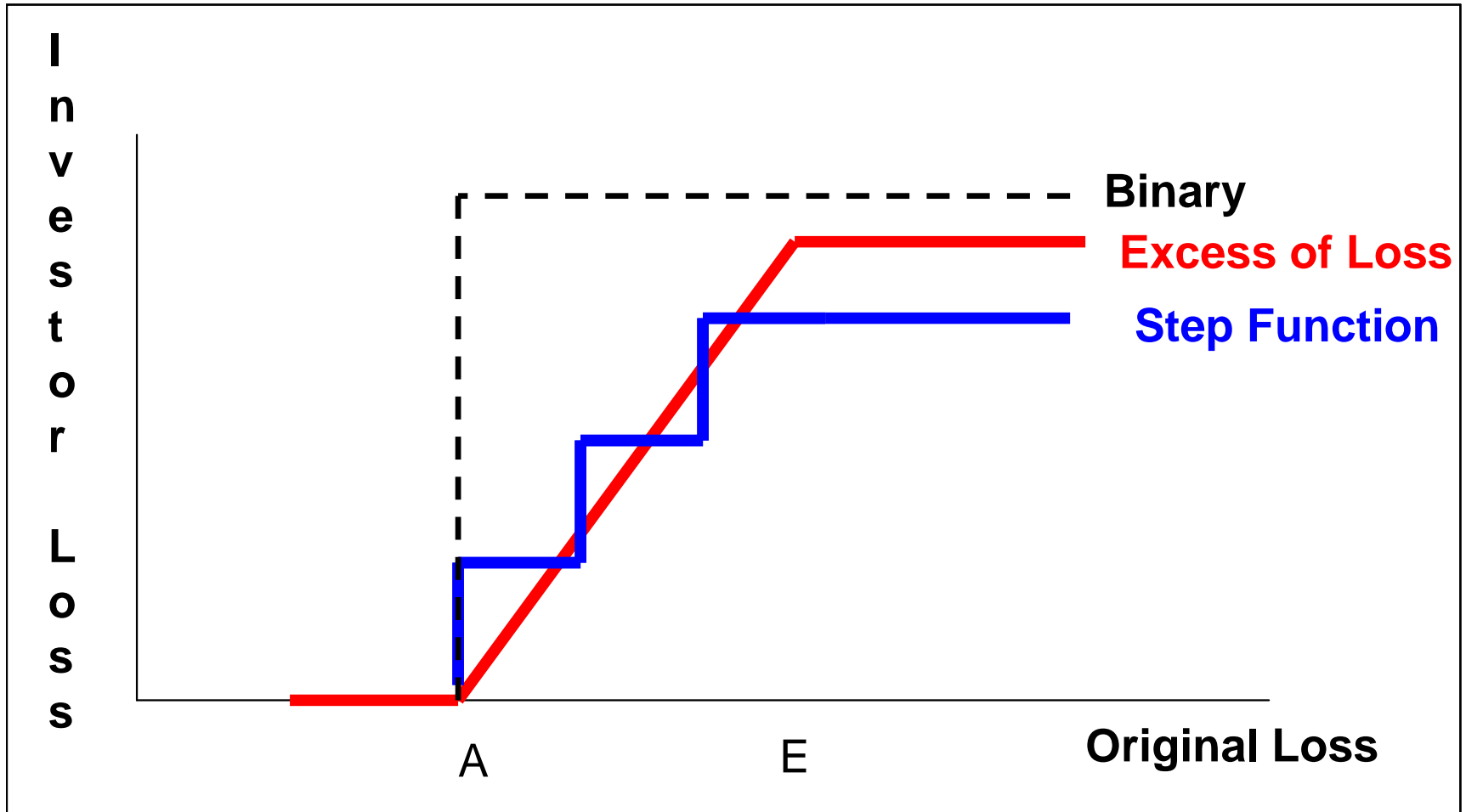
An ILS Security's Structural Decisions

- **Optionality** - Other Structural Choices
- **Embedded Options** - Extensions of term
 - Drop Downs
 - Callable
 - Puttable
- **Explicit Options** - Contingent upon Event Occurrence
 - Mandatory
- **Implicit Options** - Deductibles

An ILS Security's Structural Decisions

- **Payout Formulas**
- **Proportionate as in Excess of Loss, or Conventional Option**
- **Binary – Full Payout upon Trigger**
- **Step Function**

Security Structural Decisions



An ILS Security's Structural Decisions

Cost of Issuance

Estimated Cost of Typical Insurance-Linked Security

Note: There can be considerable variation in cost depending on the structure, peril, trigger complexity and other business factors. Figures in \$000's.

• Structuring/Investment Banking	\$400 - \$800,	one time
• Risk Modeling	\$200 - \$400,	one time
• Legal	\$300 - \$600,	one time
• Rating Agency	<u>\$ 50 - \$150,</u> [\$ 950 - \$1950]	one time
• Accounting/Audit	\$10 - \$20	per year
• Administration	\$15 - \$25	per year

Estimated Cost of Typical Insurance-Linked Security

Note: There can be considerable variation in cost depending on the structure, peril, trigger complexity and other business factors. Figures in \$000's.

- Loosely, for a \$100 million issue total cost might be [\$1 million - \$2 million]
- i.e. [100 – 200] basis points
- If the term is 3 years, that is an annual equivalent of [30 – 60] basis points
- Traditional annual brokerage on coverage with an [8% -12%] premium at 5% would be [40 – 60] basis points
- Clearly costs are comparable
- ILS issuance costs will tend to be lower when a) term is long and b) premium is high

CASE STUDY I - USAA

- **Flexibility in the original issue market**

USAA - A user of indemnity bonds

- **13 year Program**
- **Shows flexibility**
- **Cost minimization**
- **Smoothing**

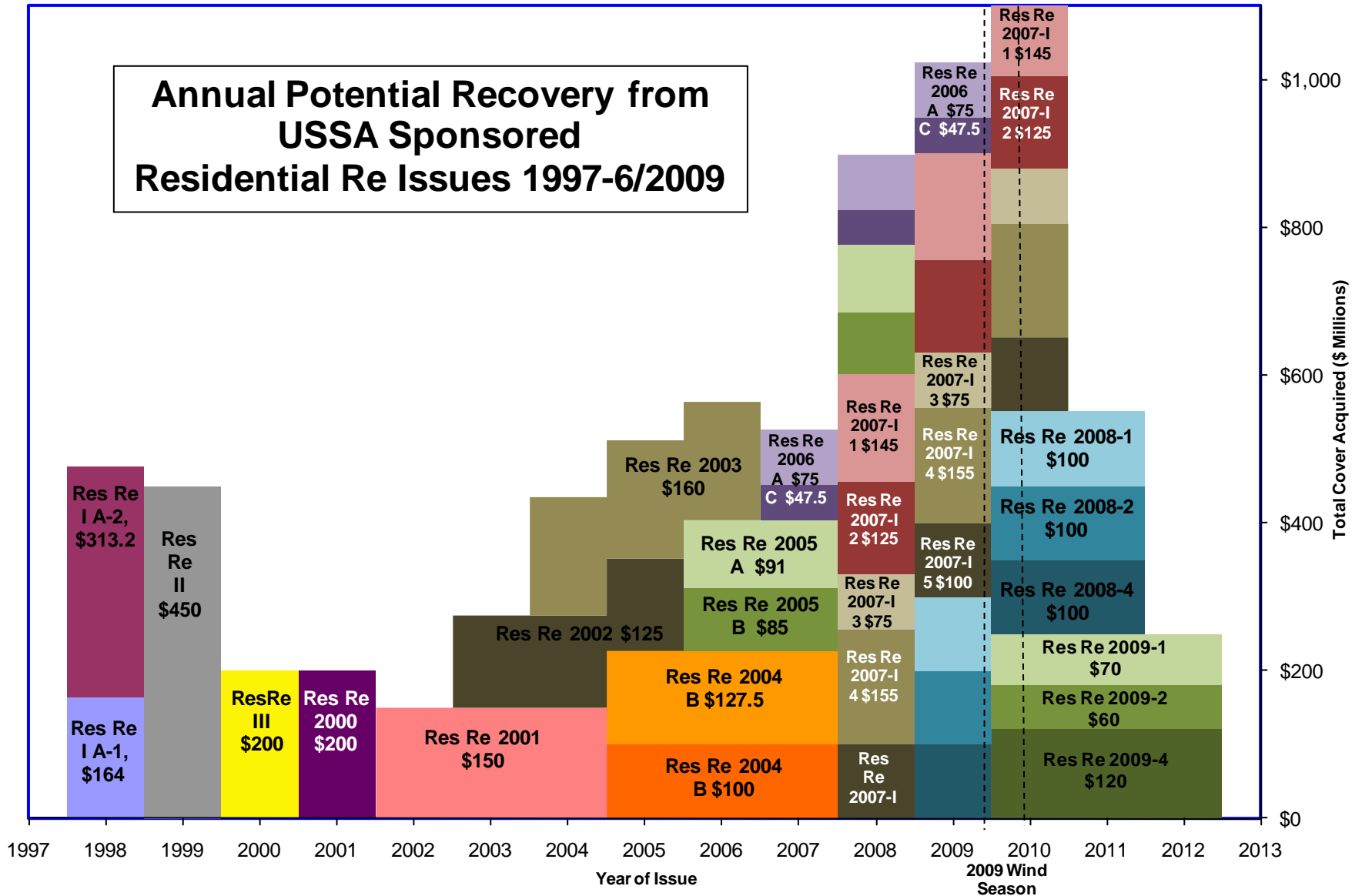
Residential Re Issues - 1997 to 2006

Issue	Amount (US \$Mil)	S&P Rating	Issue Date	Maturity	Spread Premium to LIBOR (bps)	Expected Loss (Annual)
Residential Re I Class A-1	163.8	AAAr	Jun-97	Jun-98	250	0.00%
Residential Re I Class A-2	313.2	BB	Jun-97	Jun-98	576	0.63%
Residential Re II	450.0		Jun-98	Jun-99	416	0.58%
Residential Re III	200.0	BB	Jun-99	Jun-00	366	0.44%
Residential Re 2000 Ltd.	200.0	BB+	May-00	Jun-01	410	0.54%
Residential Re 2001 Ltd.	150.0	BB+	May-01	Jun-04	499	0.68%
Residential Re 2002 Ltd.	125.0	BB+	May-02	Jun-05	490	0.67%
Residential Re 2003 Ltd.	160.0	BB+	May-03	Jun-06	495	0.48%
Residential Re 2004 A	127.5	BB	May-04	Jun-07	595	1.21%
Residential Re 2004 B	100.0	B	May-04	Jun-07	950	3.16%
Residential Re 2005 A	91.0	BB	May-05	Jun-08	545	1.43%
Residential Re 2005 B	85.0	B	May-05	Jun-08	845	3.41%
Residential Re 2006 A	47.5	B	Jun-06	Jun-09	1000	1.93%
Residential Re 2006 B	0.0	B				
Residential Re 2006 C	75.0	BB+	Jun-06	Jun-09	750	0.49%
Residential Re 2006 D	0.0	BB				

Residential Re 2007-I 1	Goldman Sachs BNP Paribas Lehman Bros.	145.0	BB
Residential Re 2007-I 2	Goldman Sachs BNP Paribas Lehman Bros.	125.0	B
Residential Re 2007-I 3	Goldman Sachs BNP Paribas Lehman Bros.	75.0	B
Residential Re 2007-I 4	Goldman Sachs BNP Paribas Lehman Bros.	155.0	BB+
Residential Re 2007-I 5	Goldman Sachs BNP Paribas Lehman Bros.	100.0	BB+
Residential Re 2008-1	Goldman Sachs Lehman Bros.	100.0	BB
Residential Re 2008-2	Goldman Sachs Lehman Bros.	100.0	B
Residential Re 2008-4	Goldman Sachs Lehman Bros.	100.0	BB+
Residential Re 2009-1	AON Benfield Securities BNP Paribas Goldman Sachs	70.0	BB-
Residential Re 2009-2	AON Benfield Securities BNP Paribas Goldman Sachs	60.0	B-
Residential Re 2009-4	AON Benfield Securities BNP Paribas	120.0	BB-

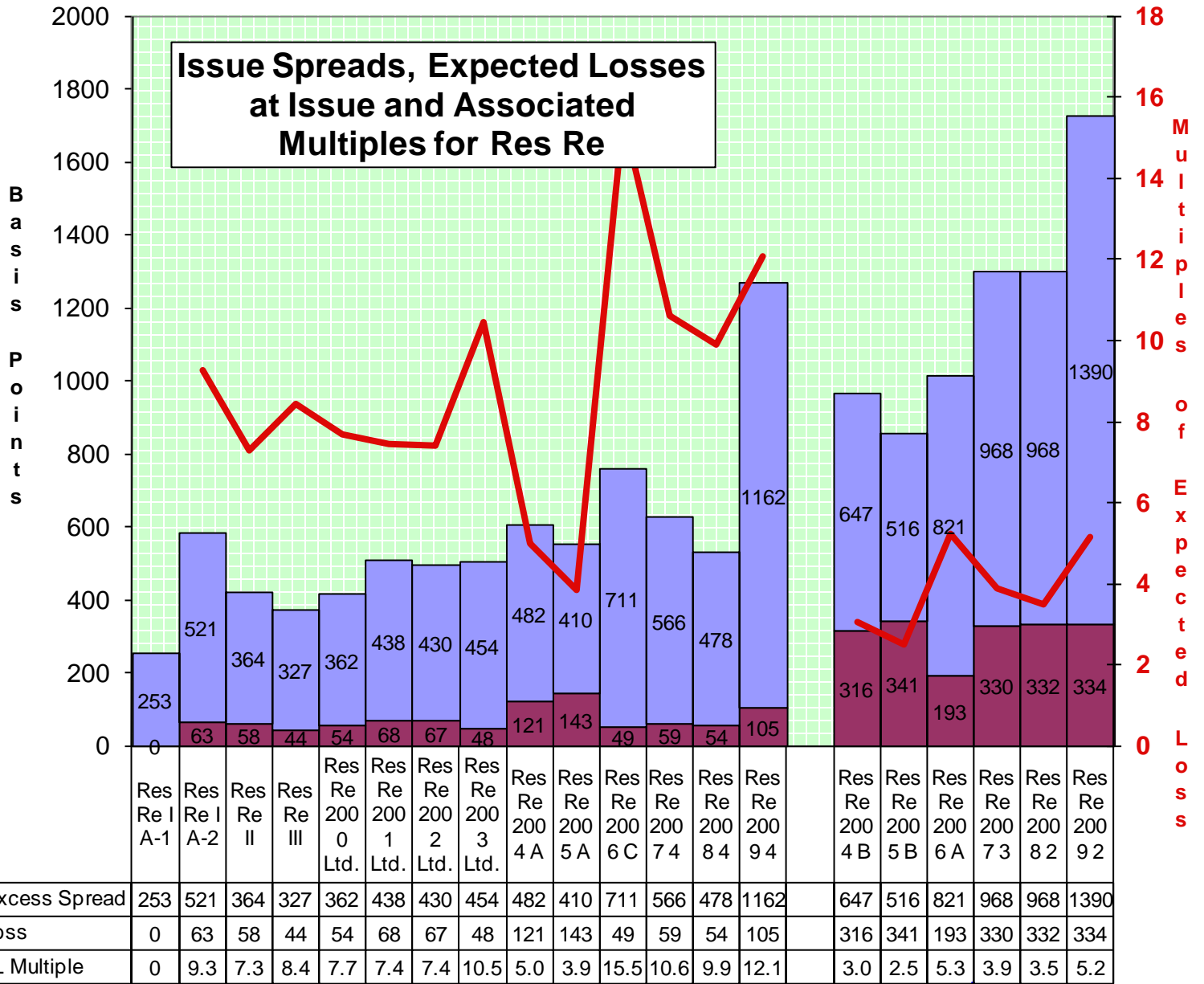
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Residential Re 2006 B	0.0	B				
Residential Re 2006 C	75.0	BB+	Jun-06	Jun-09	750	0.49%
Residential Re 2006 D	0.0	BB				

Annual Potential Recovery from USSA Sponsored Residential Re Issues 1997-6/2009



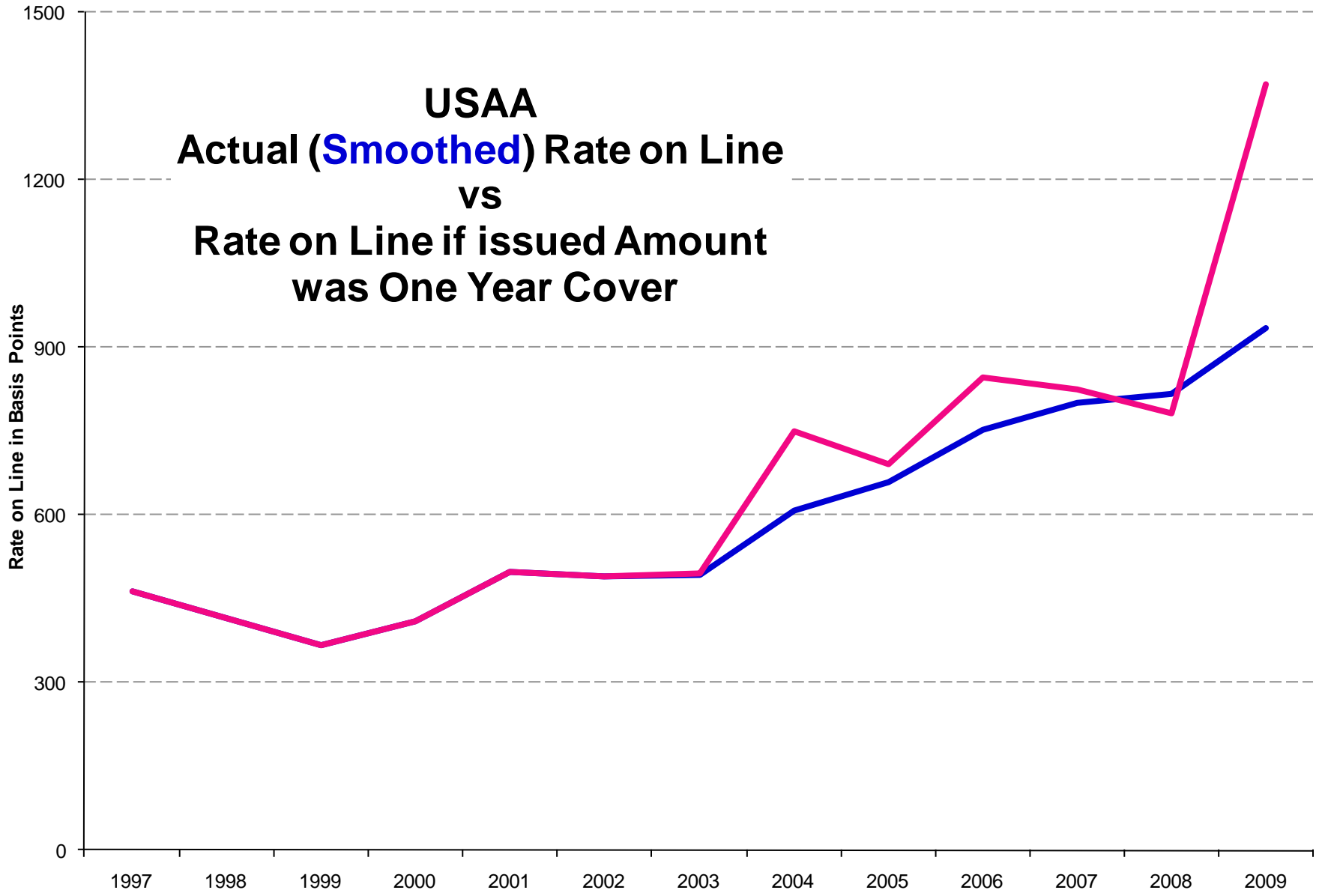
Issue Year	Capital Guaranty Cat 3 +21Gulf	Category 3 21 Gulf States	21 Gulf + Hawaii	3 year Term	US Wind + Quake	Multiple Tranches	Occurrence and Aggregate Offerings
1997	✓	✓					
1998-2001		✓		✓			
2002			✓	✓			
2003				✓	✓	✓	
2004-5				✓	✓	✓	
2006-7				✓	✓	✓✓	✓

Issue Spreads, Expected Losses at Issue and Associated Multiples for Res Re



Expected Excess Spread	253	521	364	327	362	438	430	454	482	410	711	566	478	1162		647	516	821	968	968	1390
Expected Loss	0	63	58	44	54	68	67	48	121	143	49	59	54	105		316	341	193	330	332	334
Premium/EL Multiple	0	9.3	7.3	8.4	7.7	7.4	7.4	10.5	5.0	3.9	15.5	10.6	9.9	12.1		3.0	2.5	5.3	3.9	3.5	5.2

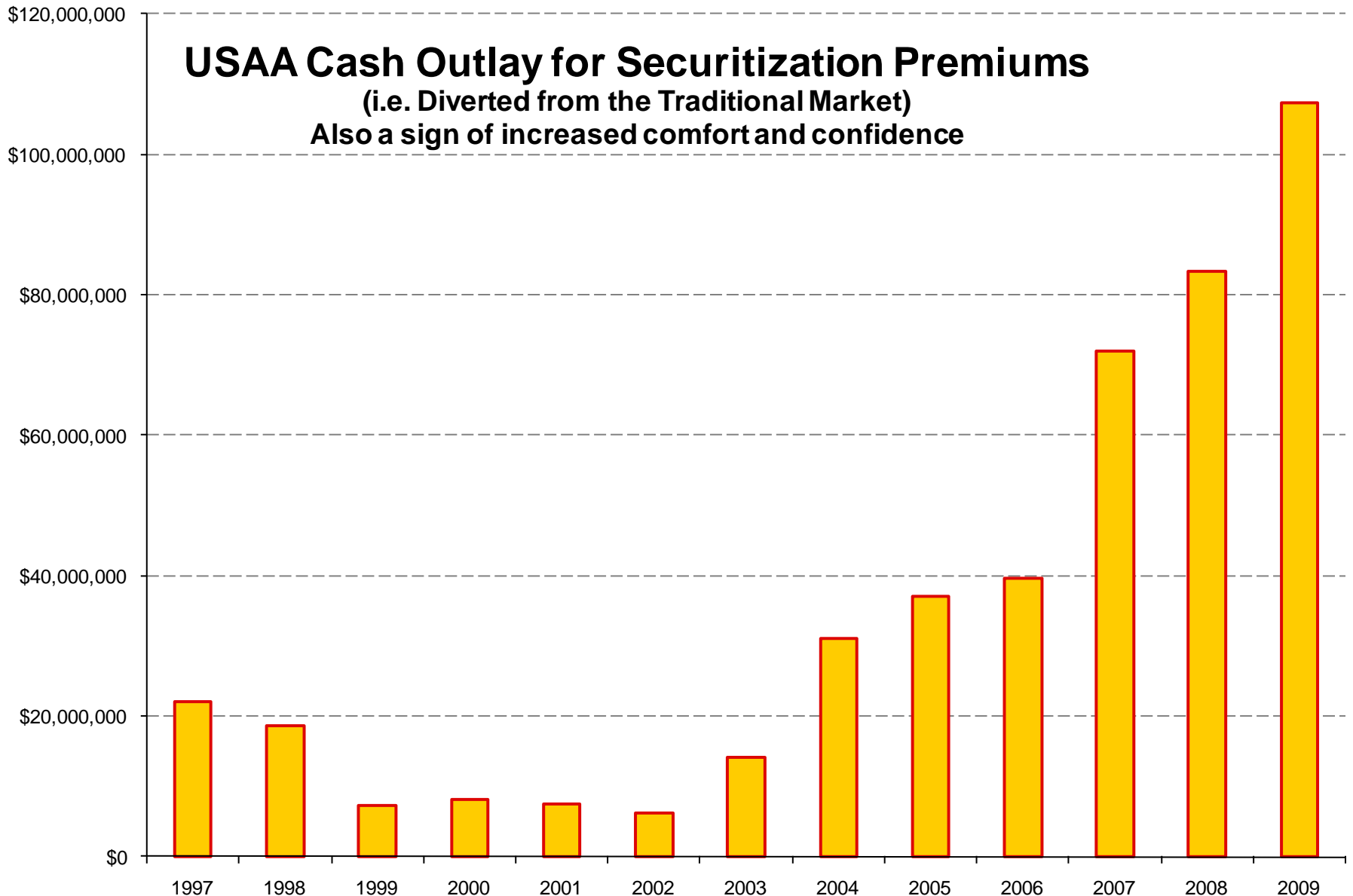
USAA
Actual (Smoothed) Rate on Line
VS
Rate on Line if issued Amount
was One Year Cover



USAA Cash Outlay for Securitization Premiums

(i.e. Diverted from the Traditional Market)

Also a sign of increased comfort and confidence



CASE STUDY II - MEXICO

- **Using the ILS Secondary Market to inform original issue pricing**

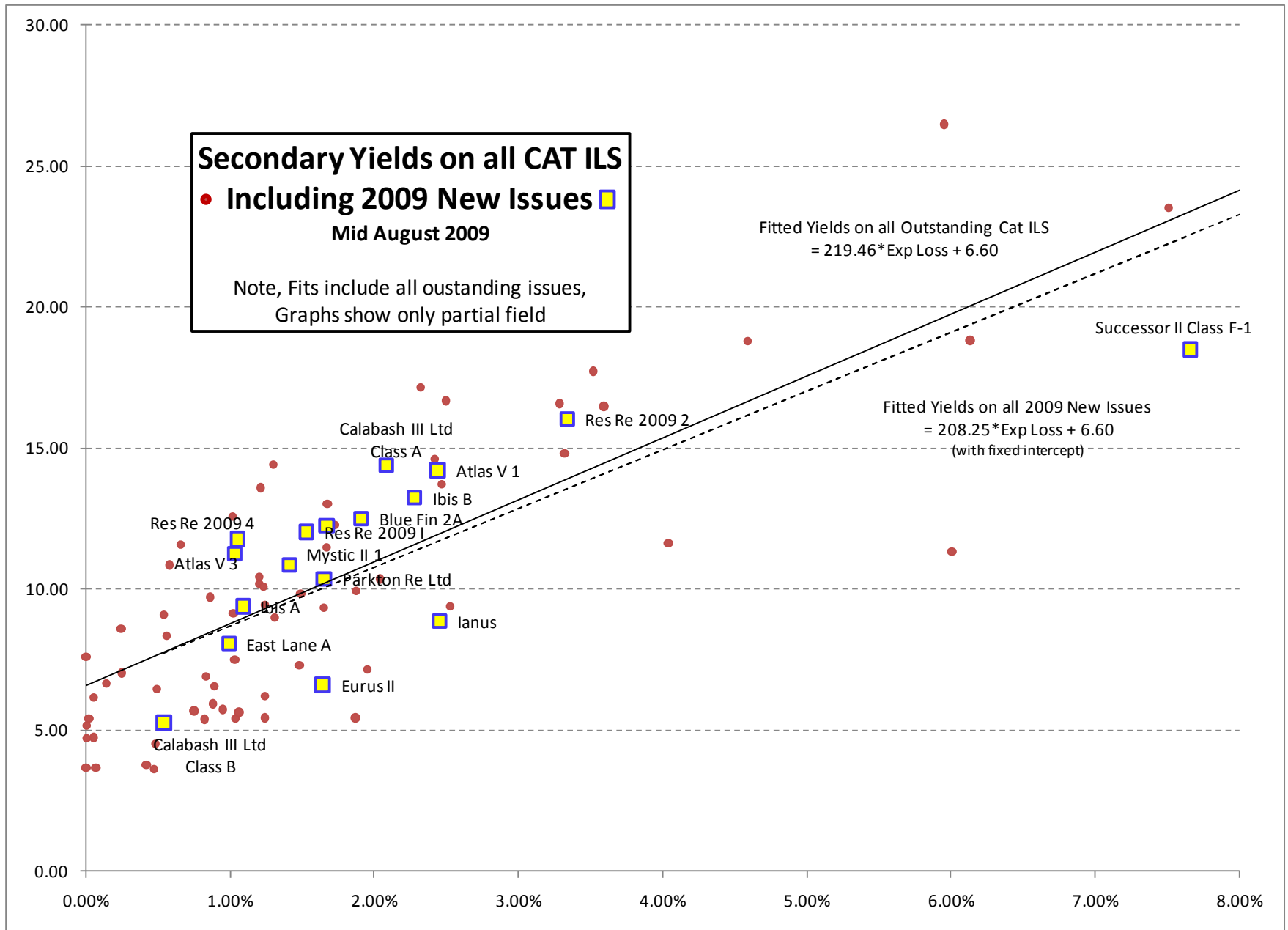
Multi-Cat Mexico September 2009

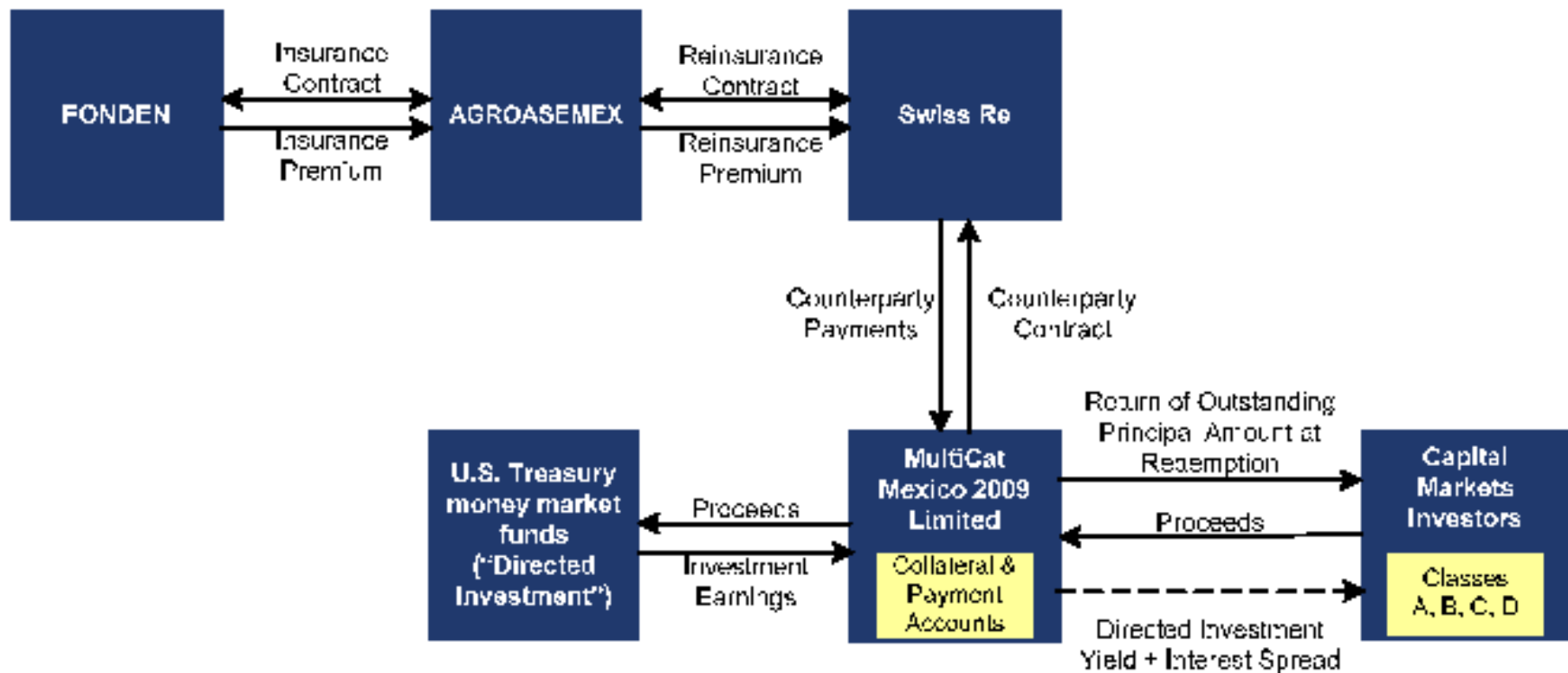
- **Second Issue by Sovereign**
- **3 year program**
- **Quake and Wind**
- **Parametric**
- **Multi-peril and Single peril structure**

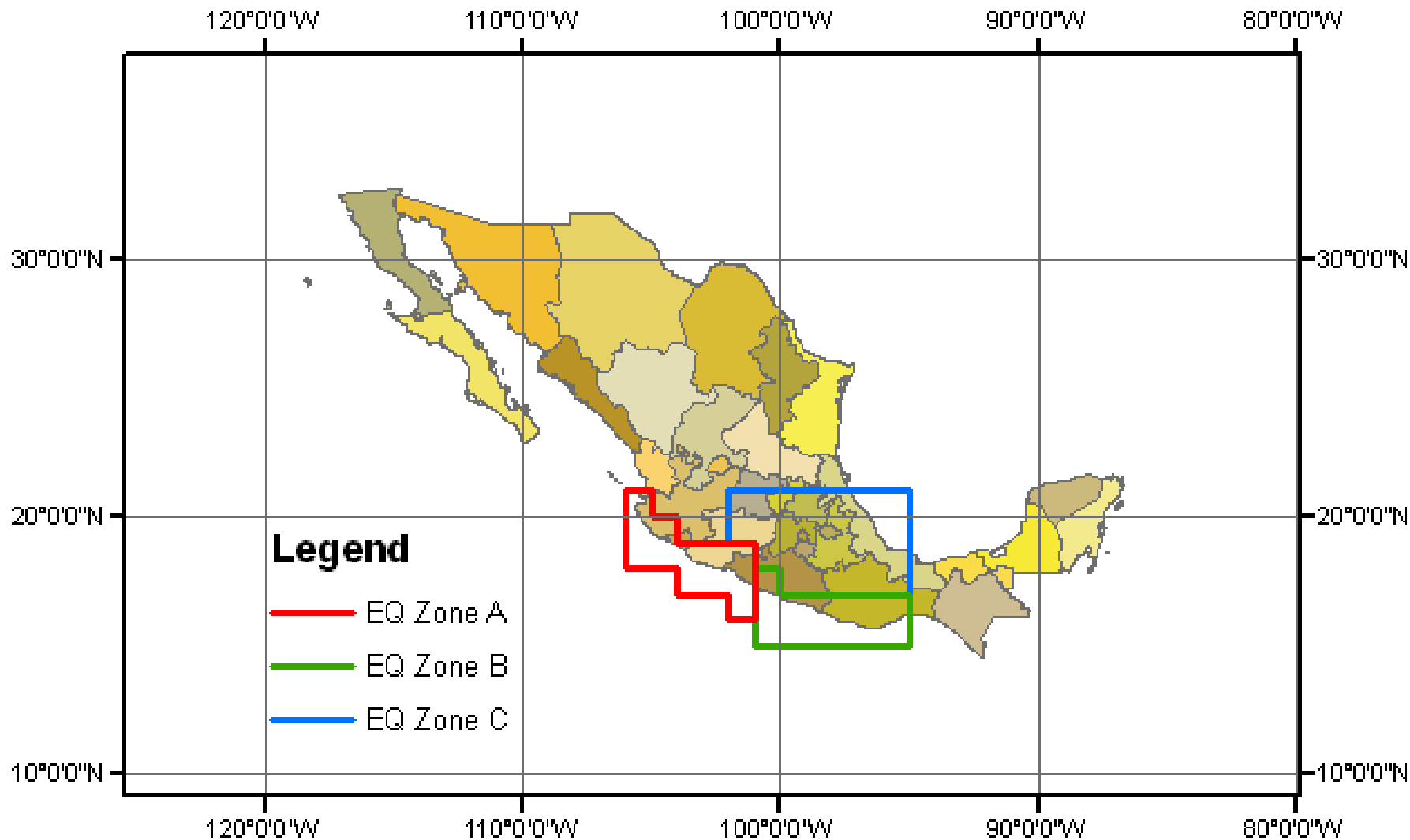
Secondary Market

- After issuance ILS may trade over the counter, at whatever prices the market determines
- Thus a deal issued at $L + 10\%$ (i.e. $L + 1000$) may fall in price, or equivalently rise in yield.
- Par becomes 98 and the secondary yield becomes $L + 12\%$ a hardening market
- Such prices can be plotted against expected loss to show current risk return trade-offs

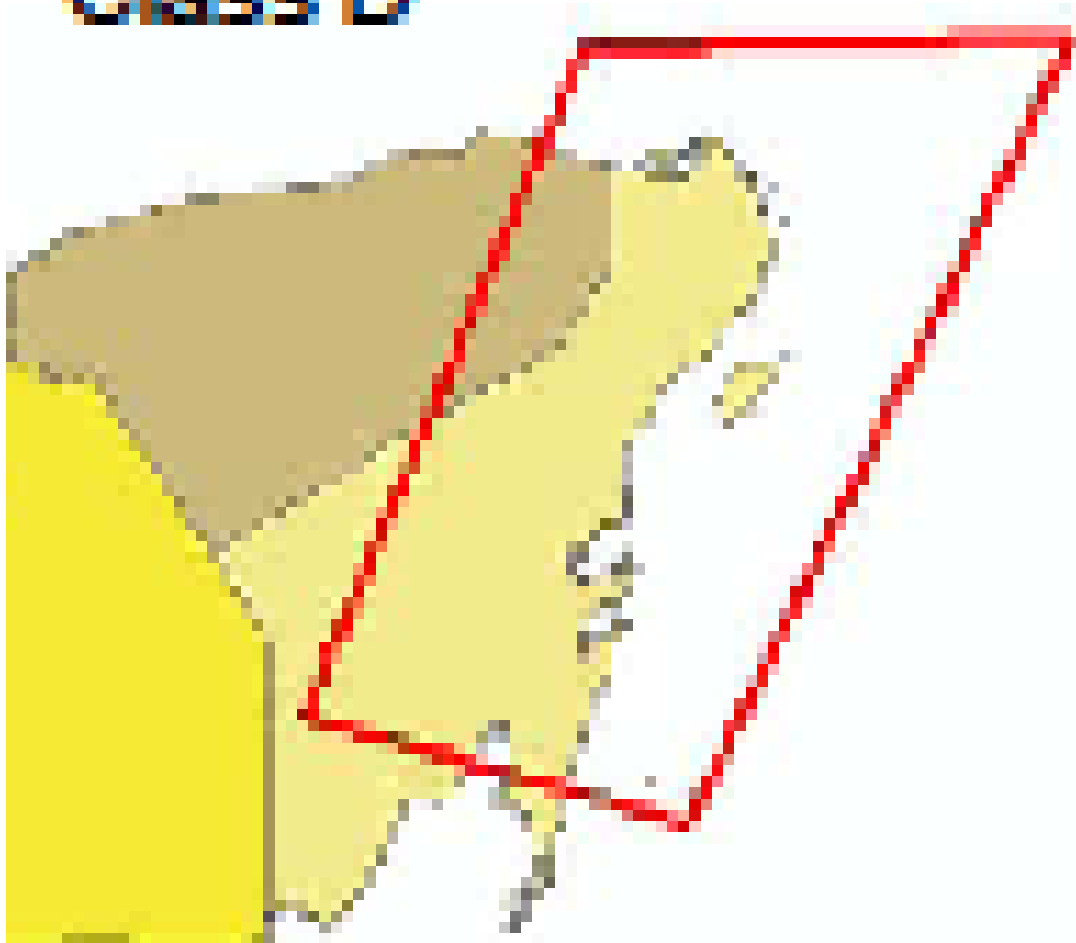
Figure 4







Class D



Terms	Class A	Class B	Class C	Class D
Notional:	[\$100] million	[\$50] million	[\$50] million	[\$50] million
Peril:	Earthquake	Pacific Hurricane	Pacific Hurricane	Atlantic Hurricane
Risk Period:	3 years	3 years	3 years	3 years
Trigger Type:	Parametric	Parametric	Parametric	Parametric
Principal Reduction Mechanism:	Binary	Binary	Binary	Binary
AIR Modeled Annualized Expected Loss:	4.65%	3.94%	4.00%	2.36%
Preliminary Rating (S&P):	[B]	[B]	[B]	[BB-]
Pricing	TMM + []	10.25 %	TMM + []	TMM + []

11.50 %

Prices vs. Expected Loss for various Peril/Zone Categories of Tranche

Secondary Prices - all outstanding - Mid August 2009

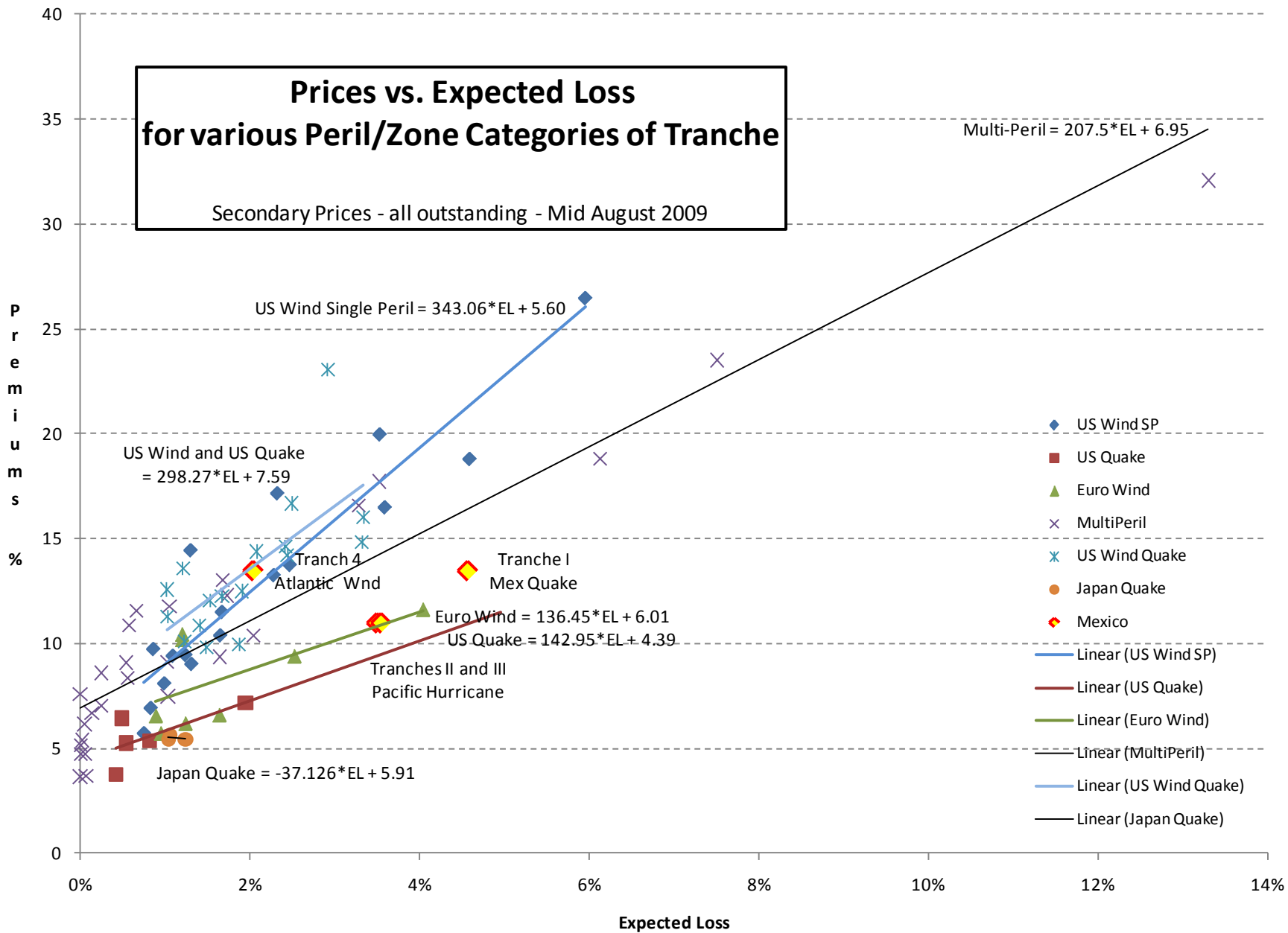
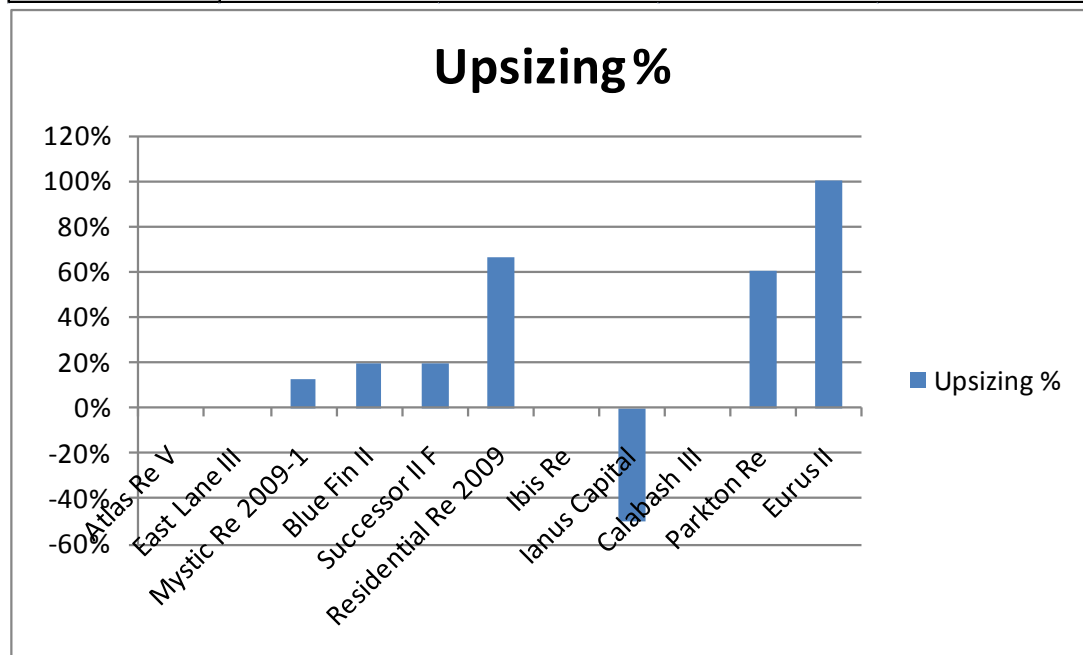


Table 1

Issue (listed in issue date order)	Proposed Issue Amount (\$000)	Actual Issue Amount (\$000)	Over (+) or Under (-) Subscribed (\$000)	Peril
Atlas Re V	200,000	200,000	0	US Wind, US EQ
East Lane III	150,000	150,000	0	US Wind
Mystic Re 2009-1	200,000	225,000	+25,000	US Wind, US EQ
Blue Fin II	150,000	180,000	+30,000	US Wind, US EQ
Successor II F	50,000	60,000	+10,000	US Wind, CA EQ
Residential Re 2009	150,000	250,000	+100,000	US Wind, US EQ
Ibis Re	150,000	150,000	0	US Wind
Ianus Capital	EUR 100,000 (\$137,160)	EUR50,000 (\$68,580)	-EUR50,000 (-\$68,580)	Euro Wind, Turkish EQ
Calabash III	100,000	100,000	0	US Wind, US EQ
Parkton Re	125,000	200,000	+75,000	NC US Wind
Eurus II	EUR75,000 (\$106,703)	EUR150,000 (\$213,405)	+EUR75,000 (+ \$106,703)	Euro Wind
Total	\$1,519,000	\$1,797,000	\$278,123	



Terms	Class A	Class B	Class C	Class D
Notional:	[\$100] million	[\$50] million	[\$50] million	[\$50] million
Peril:	Earthquake	Pacific Hurricane	Pacific Hurricane	Atlantic Hurricane
Risk Period:	3 years	3 years	3 years	3 years
Trigger Type:	Parametric	Parametric	Parametric	Parametric
Principal Reduction Mechanism:	Binary	Binary	Binary	Binary
AIR Modeled Annualized Expected Loss:	4.65%	3.94%	4.00%	2.36%
Preliminary Rating (S&P):	[B]	[B]	[B]	[BB-]
Pricing	TMM + []	TMM + []	TMM + []	TMM + []

11.50 %

10.25 %

10.25 %

10.25 %

END

mlane@lanefinancialllc.com

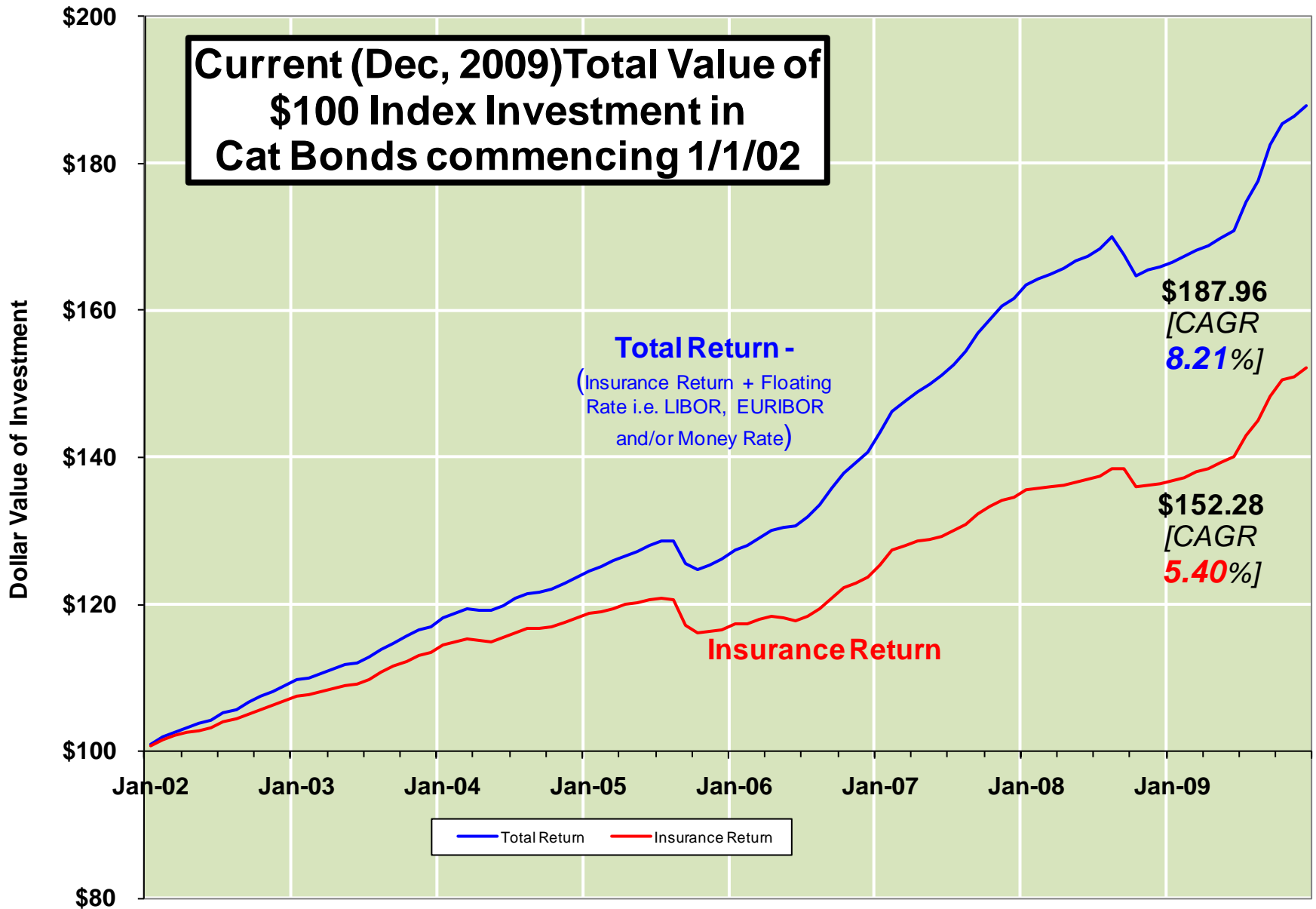
mnlane@illinois.edu

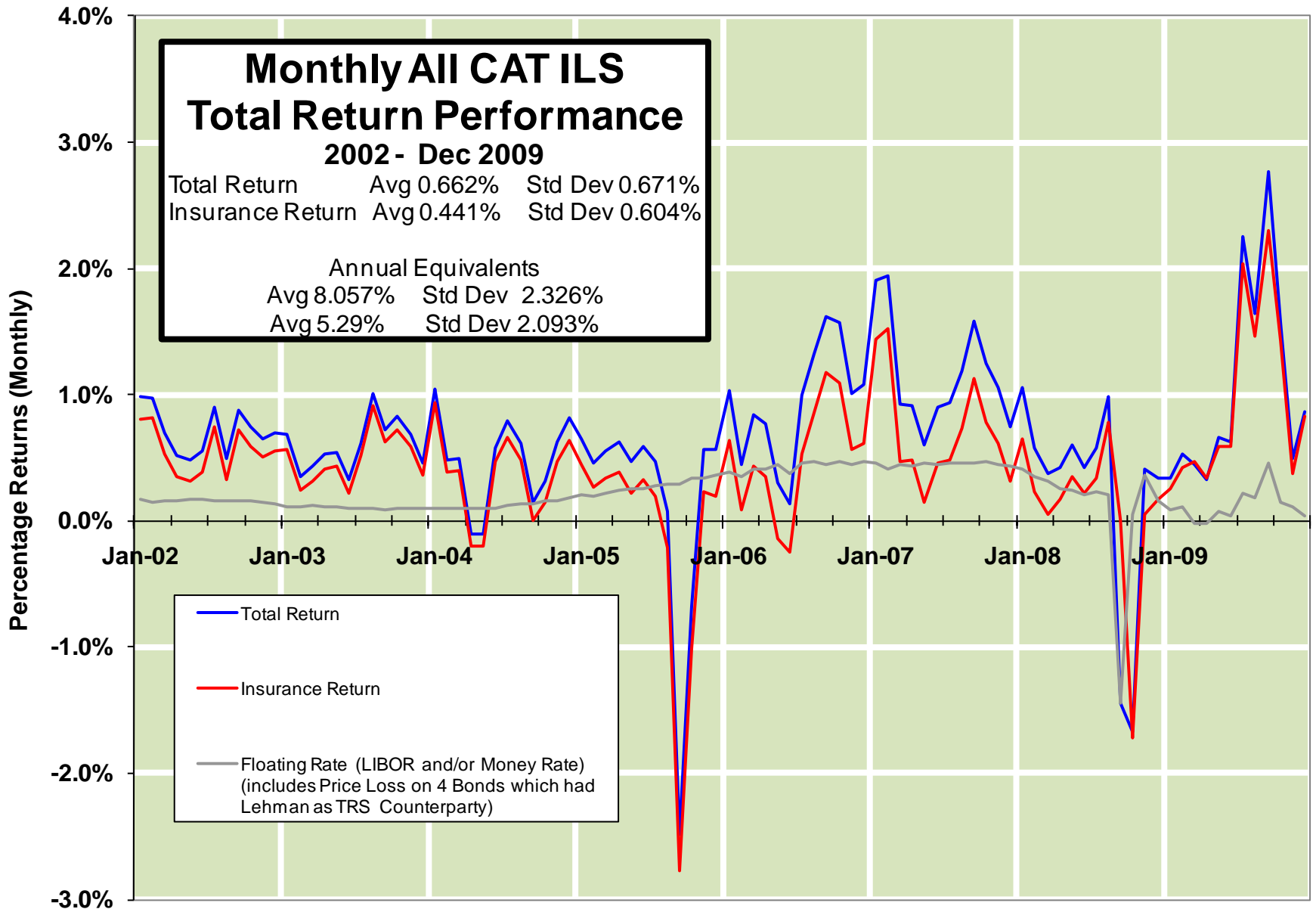
Additional Material

ILS Return Performance Benchmarking

And

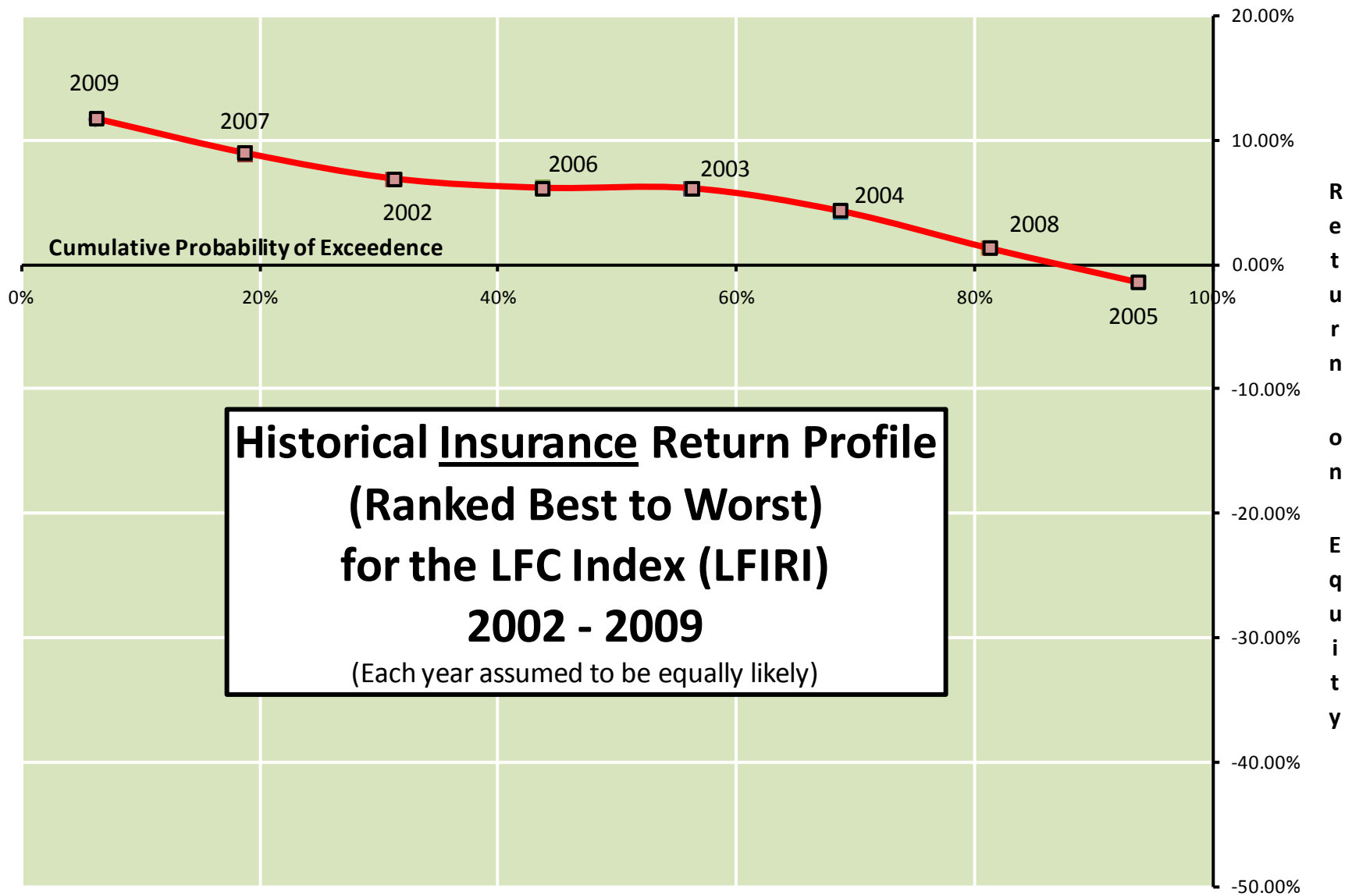
Price Indices





Calendar Annual Returns, ALL Cat

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<i>Annual Average</i>	8.30%	5.47%	2.69%	-0.74%
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Historical Insurance Return Profile
(Ranked Best to Worst)
for the LFC Index (LFIRI)
2002 - 2009
 (Each year assumed to be equally likely)

Lane Financial Insurance Return Index (LFIRI) - Historical

All Cat ILS

Total Returns

Rolling Returns -		3 Months	6 Months	9 Months	12 Months	Index Level
						100
End Mar	2002	2.67%	NA	NA	NA	102.67
End Jun	2002	1.56%	4.27%	NA	NA	104.27
End Sep	2002	2.29%	3.89%	6.67%	NA	106.67
End Dec	2002	2.11%	4.45%	6.08%	8.91%	108.91
End Mar	2003	1.47%	3.61%	5.99%	7.65%	110.52
End Jun	2003	1.40%	2.89%	5.06%	7.47%	112.06
End Sep	2003	2.37%	3.80%	5.33%	7.55%	114.72
End Dec	2003	1.98%	4.39%	5.85%	7.41%	116.98
End Mar	2004	2.03%	4.04%	6.51%	7.99%	119.36
End Jun	2004	0.36%	2.40%	4.42%	6.90%	119.79
End Sep	2004	1.55%	1.92%	3.98%	6.04%	121.64
End Dec	2004	1.77%	3.34%	3.72%	5.82%	123.79
End Mar	2005	1.68%	3.47%	5.07%	5.46%	125.87
End Jun	2005	1.69%	3.40%	5.23%	6.85%	128.00
End Sep	2005	-1.94%	-0.28%	1.39%	3.18%	125.52
End Dec	2005	0.44%	-1.51%	0.16%	1.84%	126.07
End Mar	2006	2.33%	2.78%	0.79%	2.50%	129.01
End Jun	2006	1.20%	3.57%	4.02%	2.00%	130.57
End Sep	2006	3.99%	5.24%	7.70%	8.17%	135.77
End Dec	2006	3.70%	7.84%	9.14%	11.69%	140.80
End Mar	2007	4.84%	8.72%	13.06%	14.42%	147.62
End Jun	2007	2.43%	7.39%	11.37%	15.81%	151.21
End Sep	2007	3.76%	6.28%	11.43%	15.55%	156.89
End Dec	2007	3.08%	6.96%	9.56%	14.86%	161.73
End Mar	2008	2.02%	5.17%	9.12%	11.78%	165.00
End Jun	2008	1.46%	3.52%	6.71%	10.72%	167.42
End Sep	2008	0.11%	1.57%	3.63%	6.82%	167.59
End Dec	2008	-0.94%	-0.84%	0.61%	2.65%	166.01
End Mar	2009	1.32%	0.37%	0.47%	1.94%	168.21
End Jun	2009	1.62%	2.97%	2.00%	2.10%	170.94
End Sep	2009	6.80%	8.54%	9.98%	8.94%	182.57
End Dec	2009	2.95%	9.96%	11.74%	13.22%	187.96

Note: The difference between Total Return and the Insurance Return is the Floating Return. Calculated monthly these two components are additive, however when monthly returns are compounded over several months, component numbers must be similarly compounded. Because of differential compounding, addition of the components may diverge over time from compounded total returns.

Lane Financial Insurance Return Index (LFIRI) - Historical

All Cat ILS

Insurance Return Component

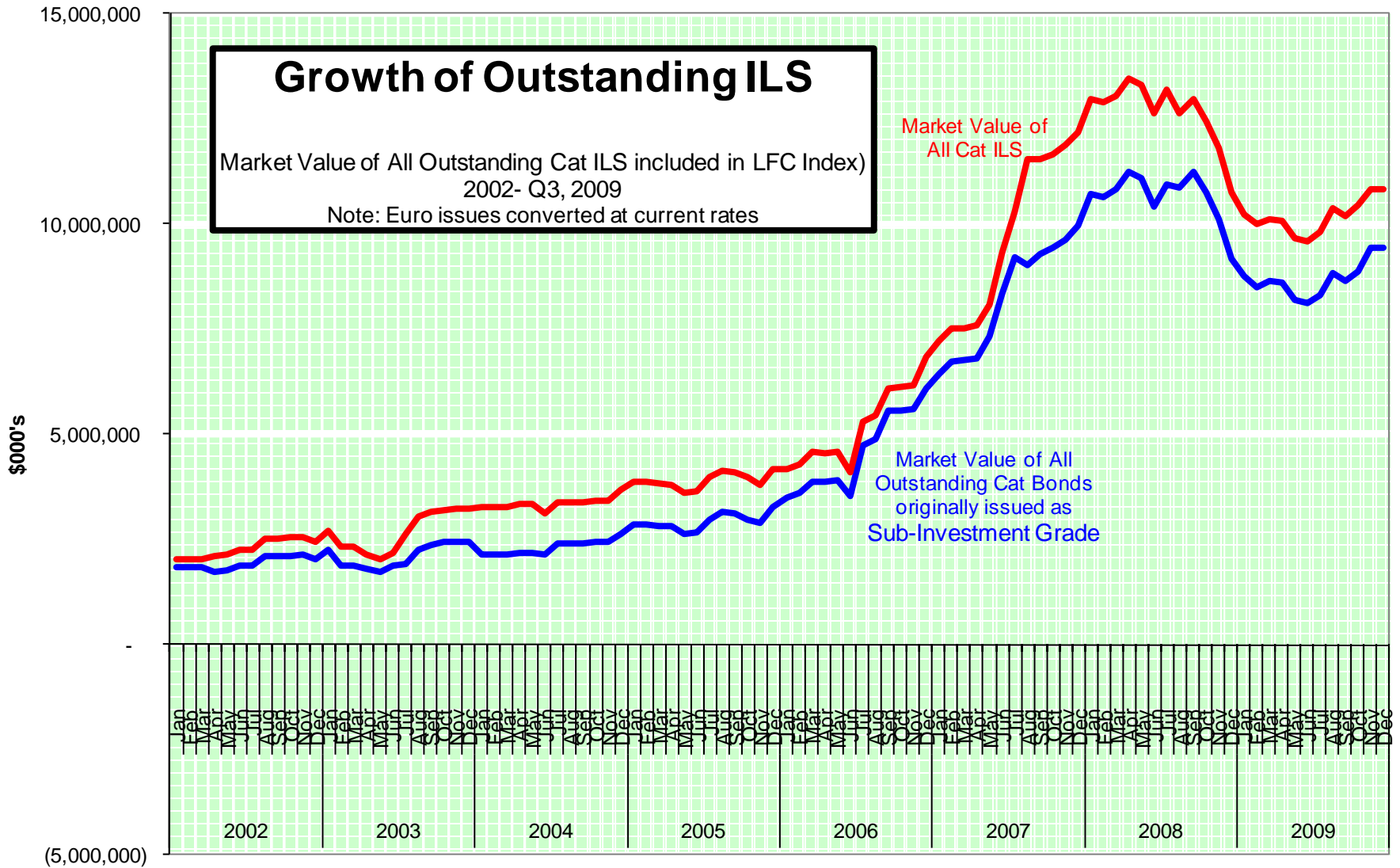
Rolling Returns -		3 Months	6 Months	9 Months	12 Months	
						100
End Mar	2002	2.17%	NA	NA	NA	102.17
End Jun	2002	1.06%	3.25%	NA	NA	103.25
End Sep	2002	1.81%	2.88%	5.11%	NA	105.11
End Dec	2002	1.66%	3.50%	4.59%	6.86%	106.86
End Mar	2003	1.13%	2.81%	4.67%	5.78%	108.07
End Jun	2003	1.07%	2.21%	3.91%	5.79%	109.23
End Sep	2003	2.08%	3.16%	4.33%	6.07%	111.49
End Dec	2003	1.68%	3.79%	4.90%	6.09%	113.37
End Mar	2004	1.72%	3.43%	5.58%	6.71%	115.32
End Jun	2004	0.07%	1.79%	3.50%	5.65%	115.40
End Sep	2004	1.15%	1.22%	2.96%	4.70%	116.73
End Dec	2004	1.26%	2.43%	2.50%	4.26%	118.20
End Mar	2005	1.05%	2.33%	3.50%	3.57%	119.45
End Jun	2005	0.94%	2.00%	3.29%	4.48%	120.57
End Sep	2005	-2.79%	-1.88%	-0.85%	0.41%	117.20
End Dec	2005	-0.59%	-3.37%	-2.46%	-1.44%	116.51
End Mar	2006	1.17%	0.57%	-2.24%	-1.32%	117.87
End Jun	2006	-0.03%	1.14%	0.54%	-2.27%	117.83
End Sep	2006	2.58%	2.55%	3.75%	3.13%	120.87
End Dec	2006	2.29%	4.93%	4.90%	6.13%	123.65
End Mar	2007	3.48%	5.85%	8.58%	8.55%	127.95
End Jun	2007	1.08%	4.60%	7.00%	9.76%	129.33
End Sep	2007	2.36%	3.47%	7.07%	9.53%	132.39
End Dec	2007	1.72%	4.12%	5.25%	8.91%	134.66
End Mar	2008	0.93%	2.67%	5.09%	6.23%	135.92
End Jun	2008	0.75%	1.69%	3.44%	5.88%	136.94
End Sep	2008	1.13%	1.88%	2.83%	4.60%	138.48
End Dec	2008	-1.51%	-0.40%	0.35%	1.28%	136.39
End Mar	2009	1.14%	-0.38%	0.74%	1.49%	137.95
End Jun	2009	1.53%	2.69%	1.14%	2.28%	140.06
End Sep	2009	5.92%	7.54%	8.77%	7.13%	148.35
End Dec	2009	2.65%	8.72%	10.39%	11.65%	152.28

Note: The difference between Total Return and the Insurance Return is the Floating Return.

Calculated monthly these two components are additive, however when monthly returns are compounded over several months, component numbers must be similarly compounded. Because of differential compounding, addition of the components may diverge over time from compounded total returns.

Growth of Outstanding ILS

Market Value of All Outstanding Cat ILS included in LFC Index)
 2002- Q3, 2009
 Note: Euro issues converted at current rates



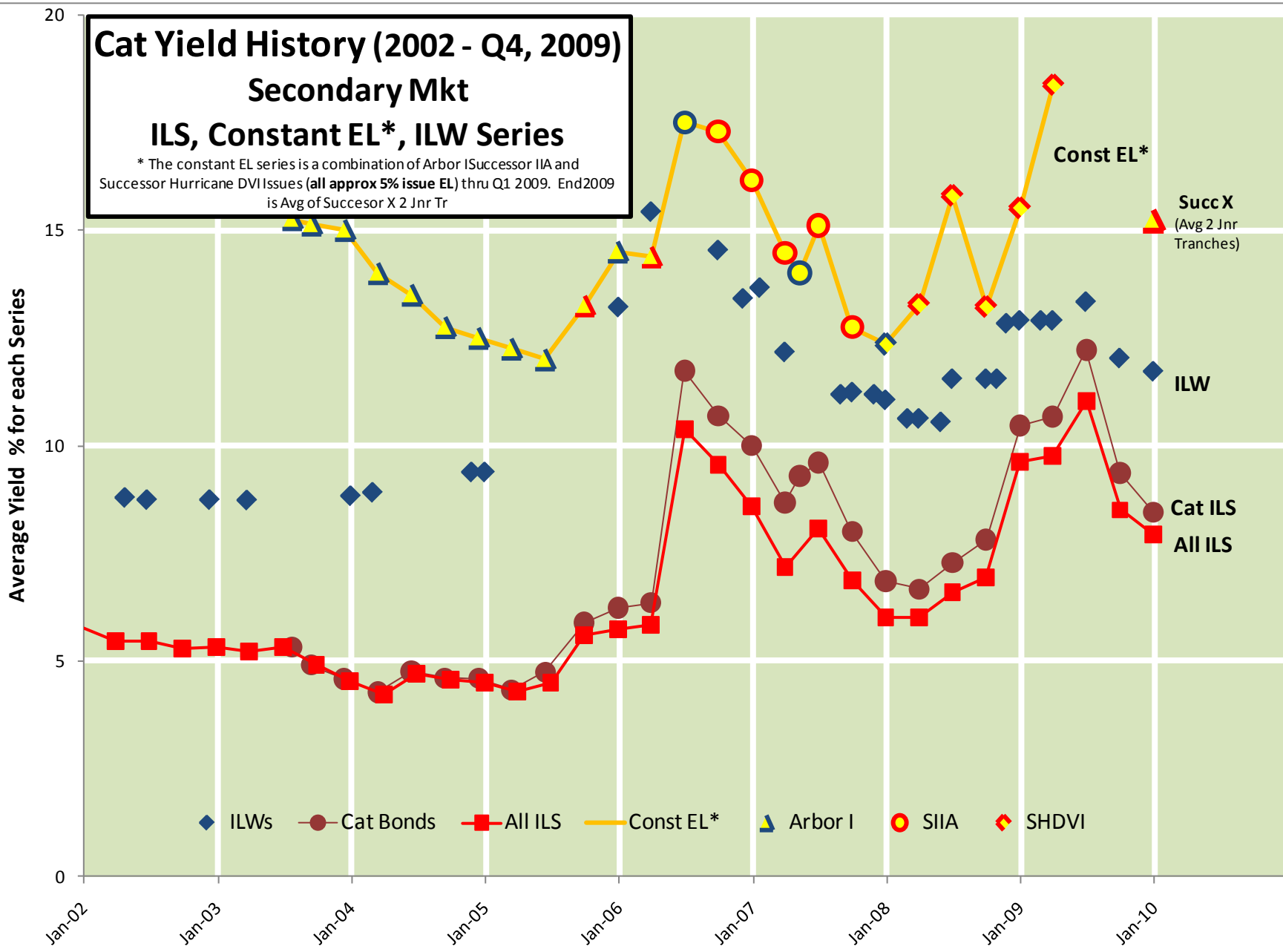
Price Indices

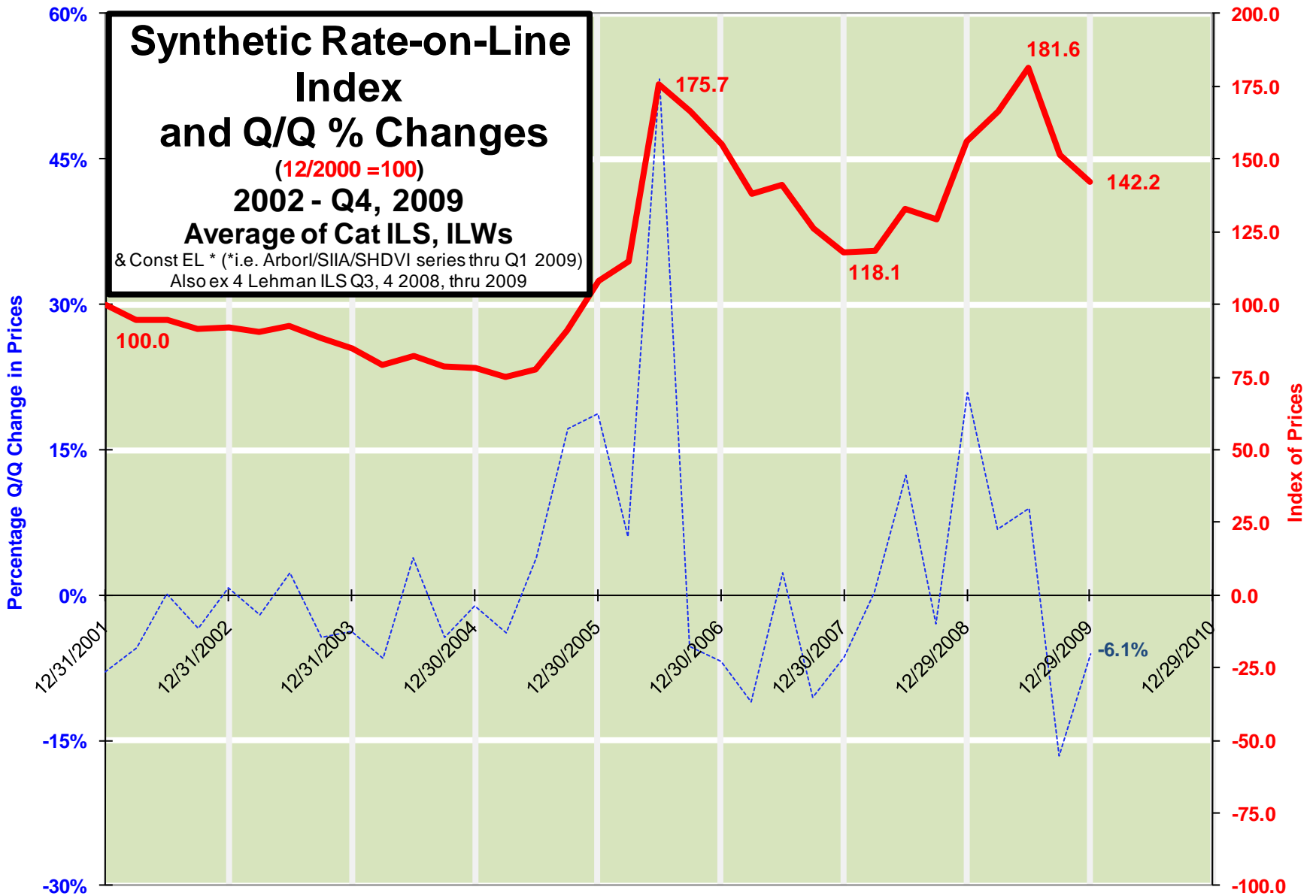
Cat Yield History (2002 - Q4, 2009)

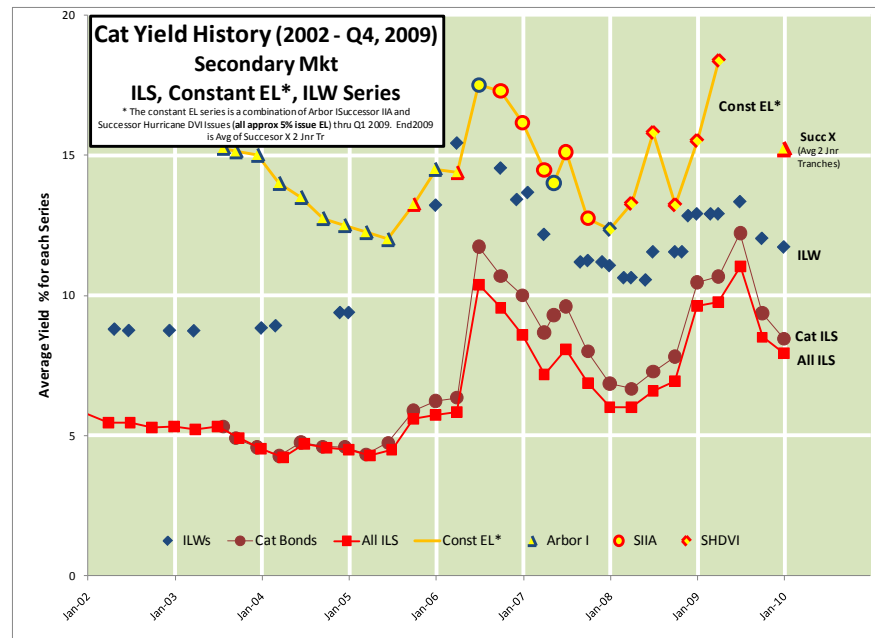
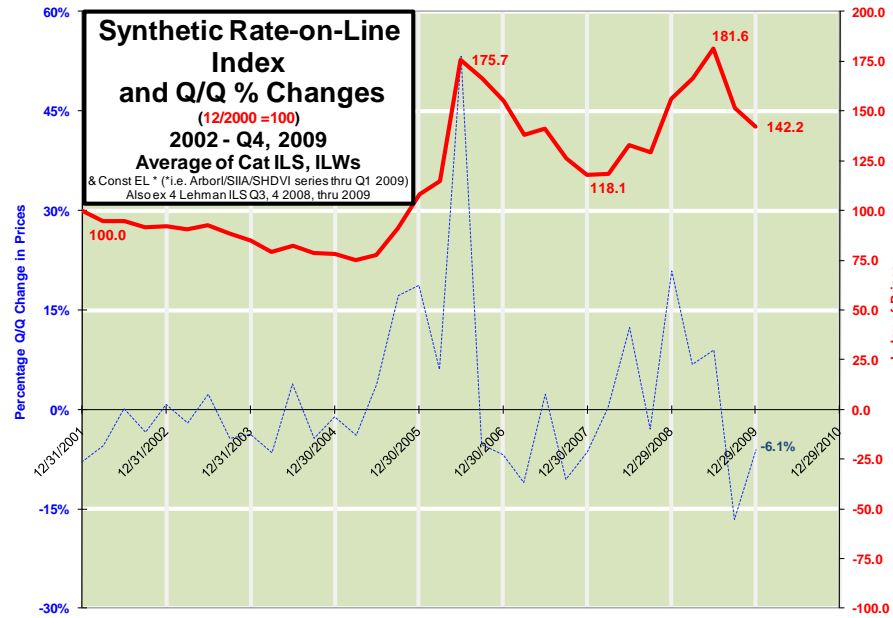
Secondary Mkt

ILS, Constant EL*, ILW Series

* The constant EL series is a combination of Arbor ISuccessor IIA and Successor Hurricane DVI Issues (all approx 5% issue EL) thru Q1 2009. End2009 is Avg of Successor X 2 Jnr Tr







Arithmetic Average Secondary Market Yield Spreads and Average Expected Losses (as Issued)

All Outstanding (ex-Lehman, ex-Impaired and ex-Maturing Issues)

Cat ILS 2001 - Q4/2009. Dec ELs and EERs shown.

