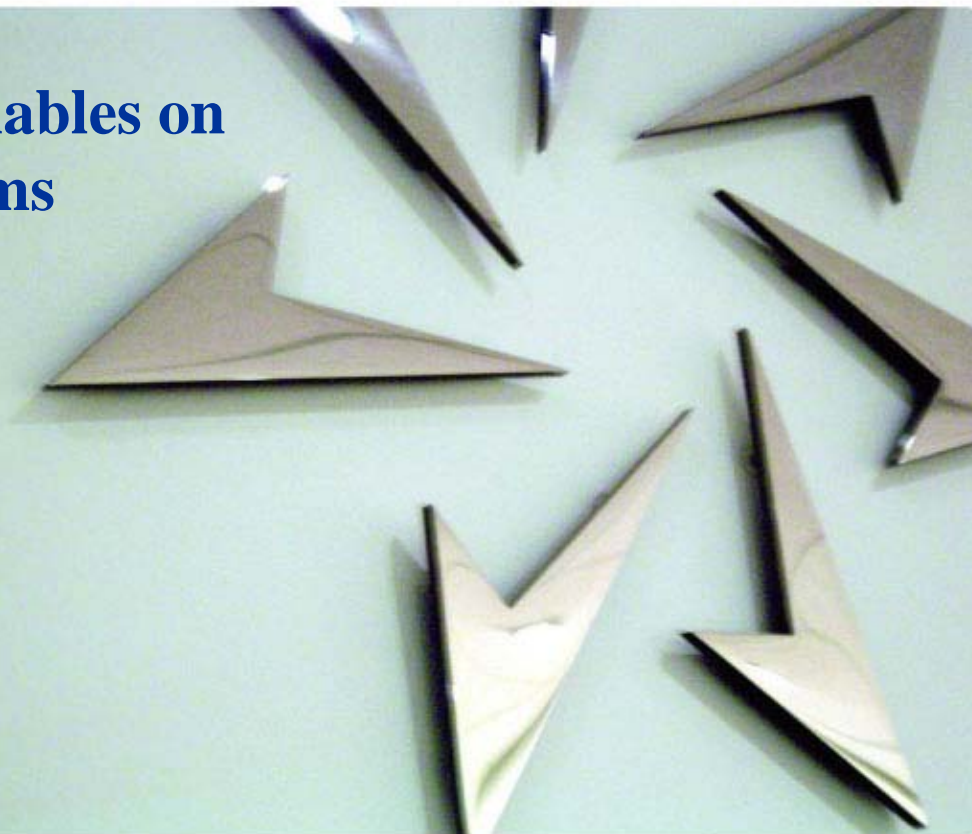


The Effect of Economic Variables on Securities Class Action Claims



Jennifer Kish, FCAS
CAS Annual Meeting, November 2009

D&O Securities Class Action Claim Study- New Source of Information

Changing Landscape for D&O Claims starting mid-year 2007

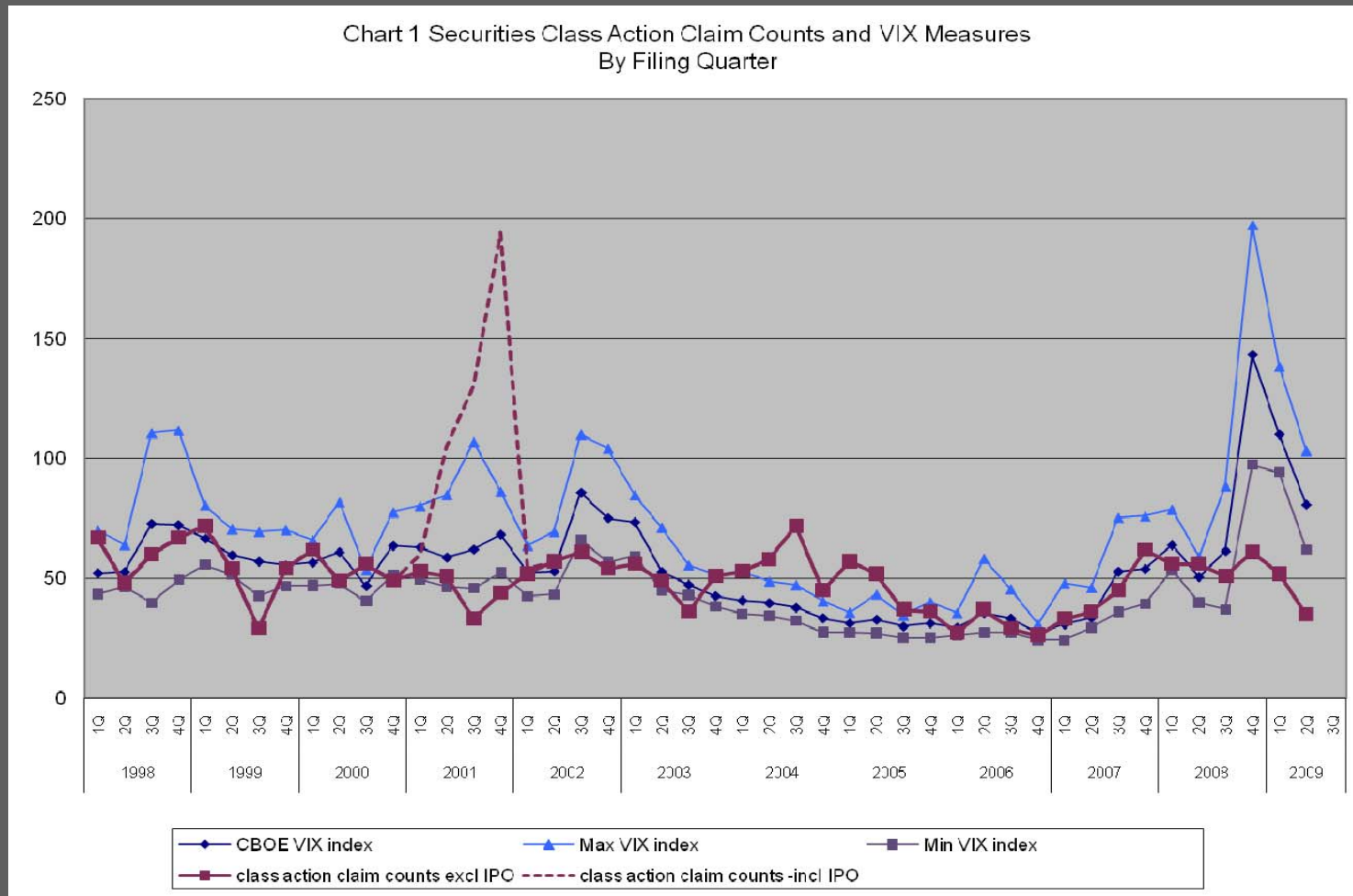
- S&P Stock Market Volatility Index (VIX) increasing dramatically (3X normal)
- Securities Class Action claim counts increasing
- Market capitalization losses for defendant firms increasing
- GDP growth slowing
- Recession

How did these Changes Affect Current D&O Loss Estimates?

- Traditional Actuarial Methods (on-leveling of premiums and losses) does not perform well in this changing environment
- Class Action Claims study develops a different methodology - studies the relationship between class action claims and financial and economic variables. Uses the results to predict current securities class action market loss and loss ratio estimates.

Stock Market Volatility Index and Securities Class Action Claims

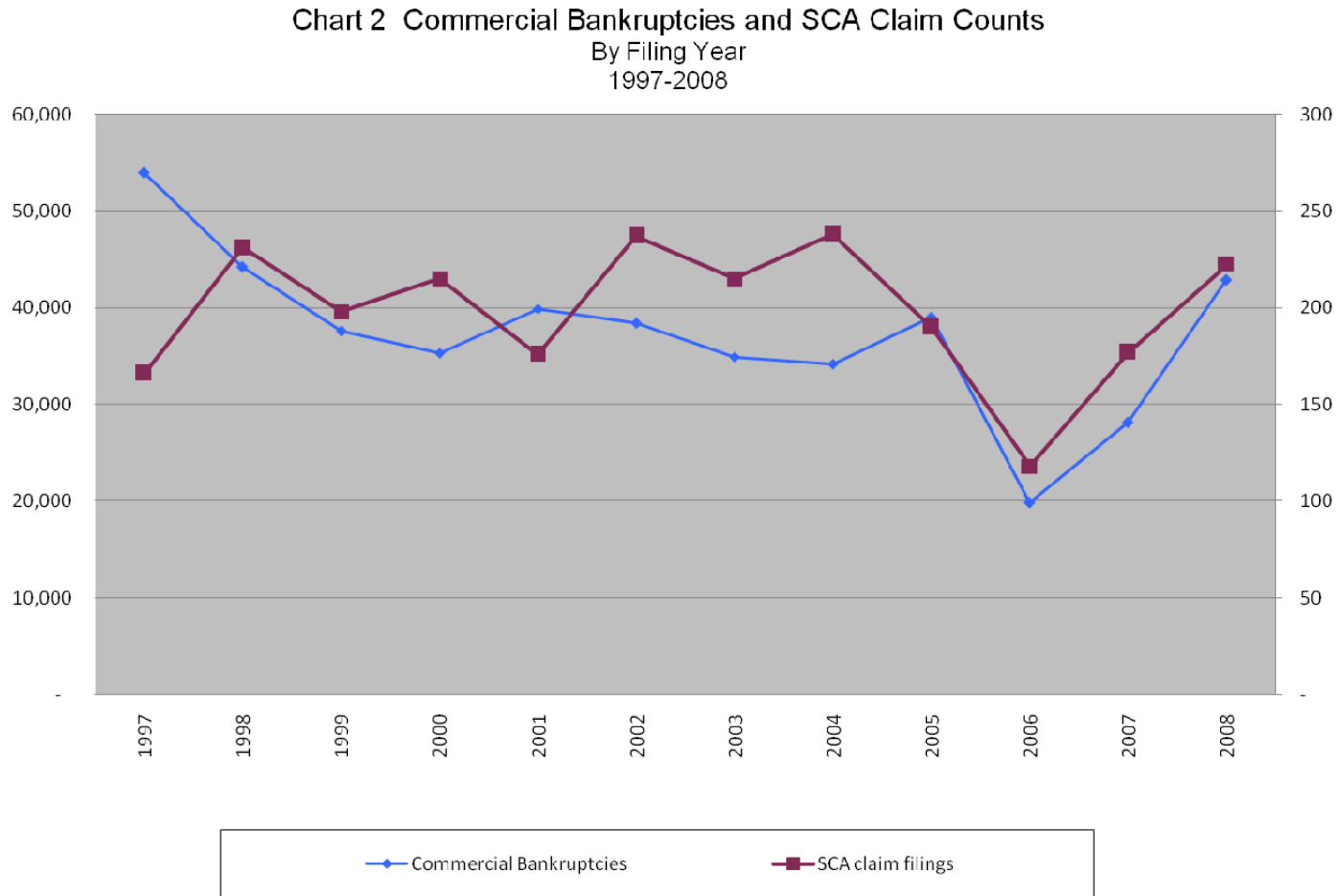
Does S&P 500 volatility have an impact on SCA claim frequency?



•Data from CBOE and Cornerstone Research

Commercial Bankruptcies and Securities Class Action Claims

Do commercial bankruptcies have an impact on SCA claim frequency?

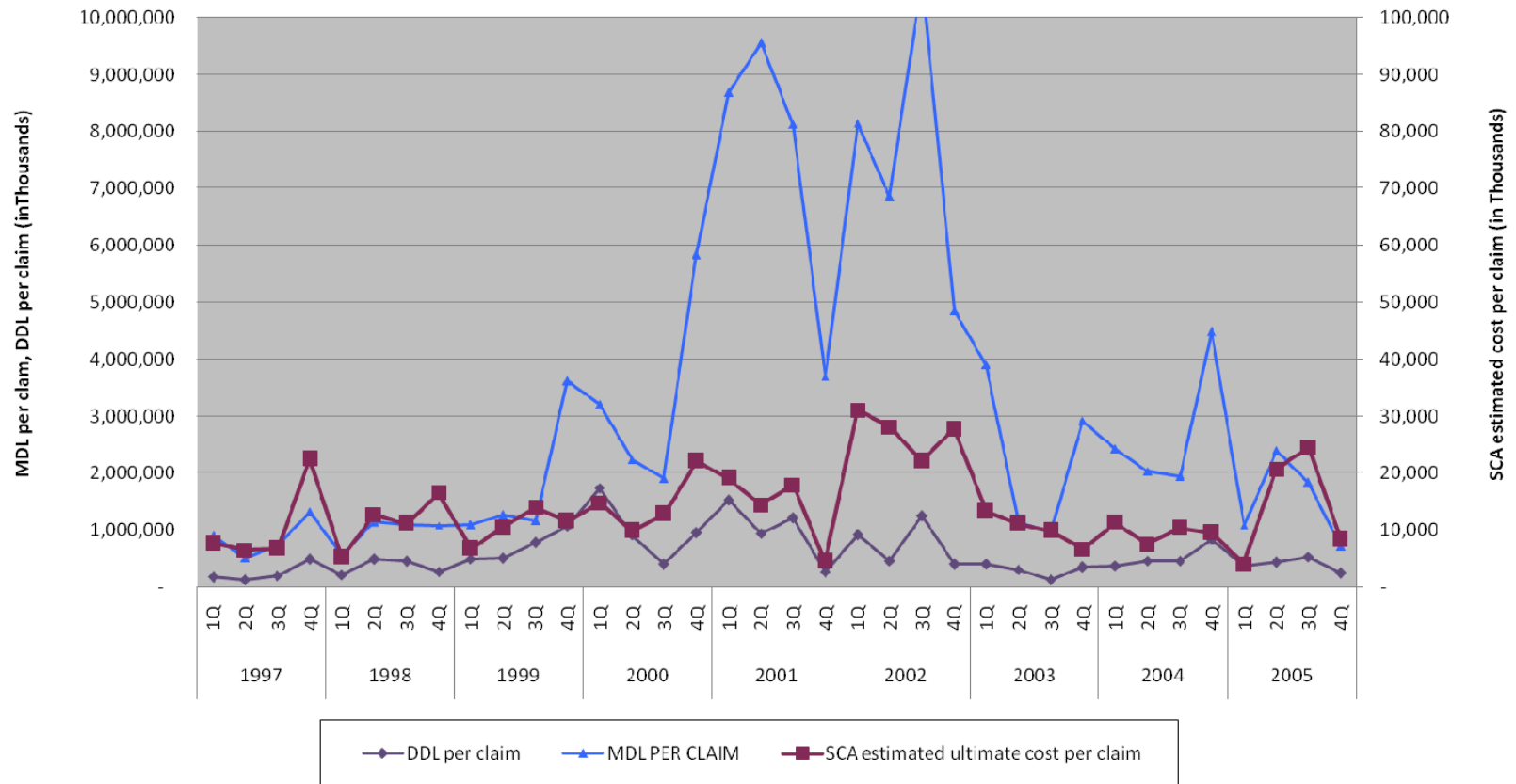


• Data from American Bankruptcy Institute and Cornerstone Research

Market Capitalization Loss Measures

Do MDL and DDL have an impact on SCA claim severity?

Chart 3 Market Capitalization Loss and Ultimate Cost of Securities Class Action Claims
By Filing Quarter
1997-2005



•Data from Stanford SCA Clearinghouse and Cornerstone Research

Securities Class Action Database

Study used publicly available data from Stanford Securities Class Action Database and Cornerstone Research

- Used information on claims filed from 1997 through 2009
- Converted loss information to a filing year basis using Stanford database through 6/30/2009

Importance of Database

- Previously only had loss information by settlement year
- Capped individual losses at 300M to approximate insured loss

Securities Class Action Database

PART 1: RESEARCH STATISTICS

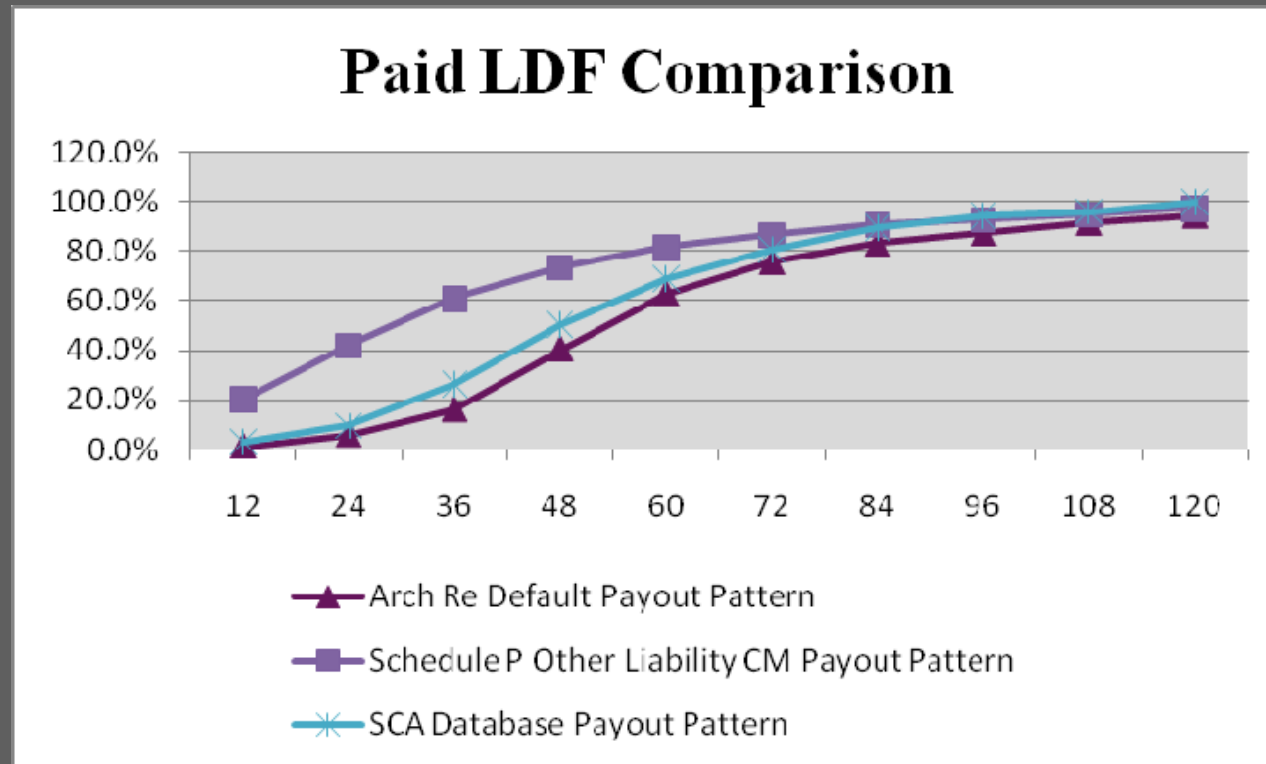
- Claim Settlement Paid Loss Development
- Dismissal Rate Trends
- Average Severity Trends

PART 2: PREDICTIVE MODELS

- Aggregate Securities Class Action Losses
- Number of Claims Filed
- Aggregate Disclosure Dollar Loss

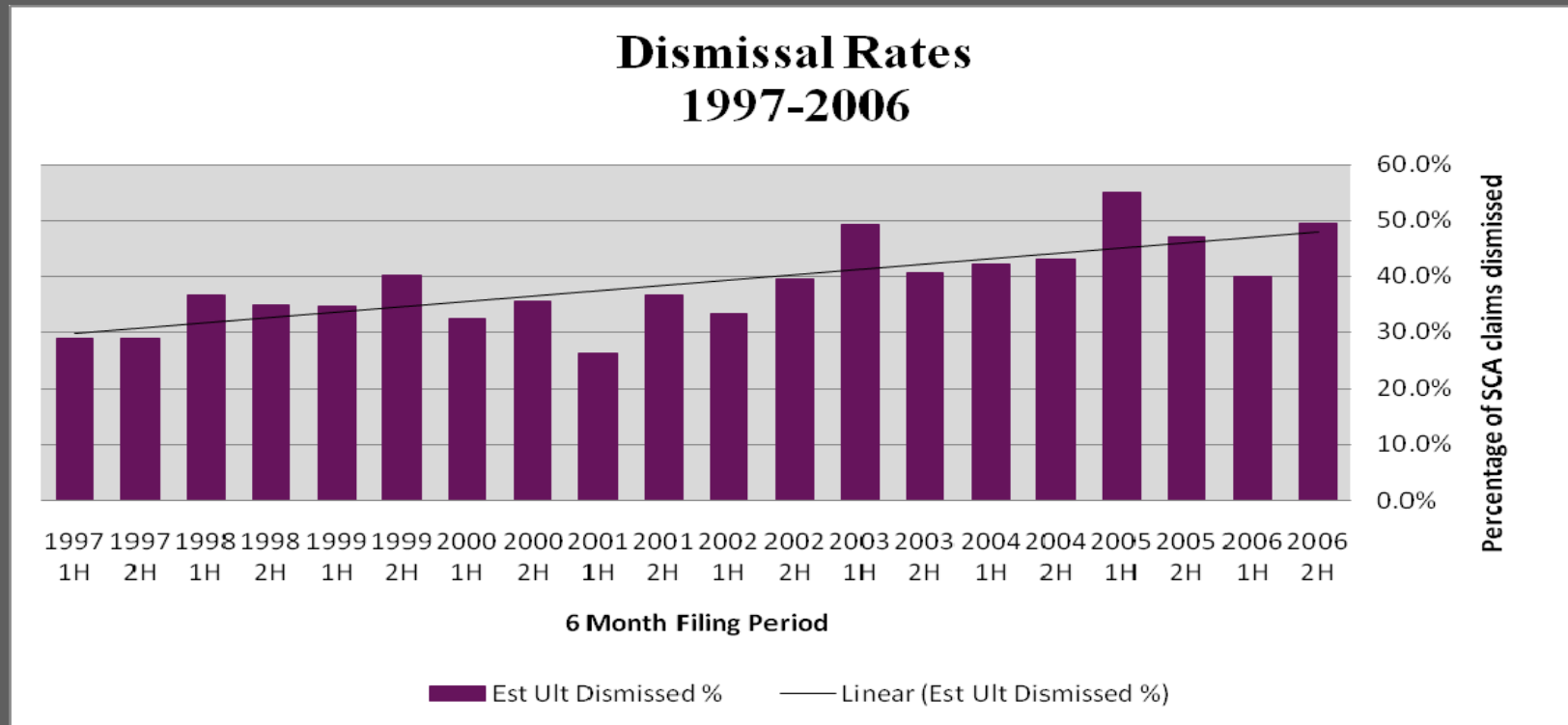
Database Results- Paid Loss Development Patterns

- Very similar to Arch Re current default D&O payout pattern
- Almost all class action settlements closed by 9 years after filing year
- Pattern appears to be fairly stable over time



Database Results- Dismissal Rates

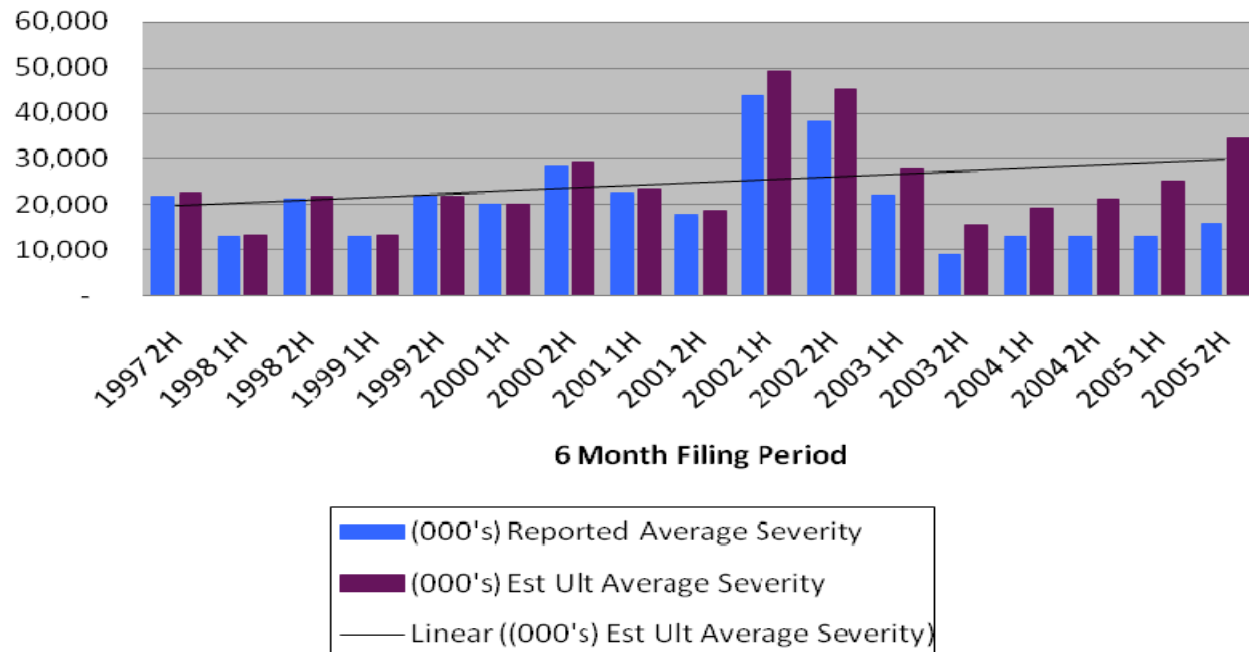
- Dismissal Rates increasing between 1997 and 2006
- By the end of 2006 approximately 50% of filed claims are dismissed



Database Results- Estimated Average Severity by Filing Year

- 1997-2005 Fitted Annual Trend of 5.4%
 - 1997-2002 Fitted Annual Trend of 19.3%
- Losses capped at 300M, excludes IPO and laddering claims

**Estimated Average Severity by Filing Period
1997-2005**



PART 2 : PREDICTIVE MODELS Regression Analysis

- Relationship is expressed in the form of an equation connecting a response variable and 1 or more predictor variables.
- Allows estimate of the marginal impact of changing one predictor variable while holding constant other influential factors.
- Analytic technique that examines interrelationships among a given set of variables.

Similar Models Investigated in 2008 and again in 2009

- 2008 Used loss data from 1998 – 2004, in 6 month filing periods (14 obs)
- 2008 Used claim filing and economic data from 1998 – mid year 2008 (21 obs)
- 2009 Used loss data from 1996 2H – 2005, in 3 month filing periods (38 obs)
- 2009 Used claim filing and economic data from 1997 mid year 2009 (52 obs)

Regression Analysis – MODEL 1

Model Number 1: Aggregate SCA Loss as Response Variable

2008: aggregated in 6 month filing period intervals (only 14 obs)

2009: aggregated in 3 month filing period intervals (38 obs)

- Used Period from 1996 to 2005 to reduce impact of loss development.
- Used Number of Claims Filed in period and Disclosure Dollar Loss (DDL) in addition to economic variables as predictor variables.

* Most \$ variables in natural log form, constant 2004 \$ level.

Multivariate Regression Analysis Results- Model 1A

- Disclosure Dollar Loss (DDL) and S&P 500 Volatility Index have statistically significant impact on aggregate settlement dollars
- For every 10% increase in DDL, settlement losses increase by 3%.
- If S&P 500 Volatility Index increases by 10%, settlement losses will increase by 11%. This variable is significantly correlated with claim filing activity.
- Model explains 45% of the variation in class action settlement dollars between 1996 2H and 2005.

MODEL 1A		LN ULTIMATE CLAIM COST			
<u>PREDICTOR VARIABLE</u>	<u>COEFFICIENT</u>	<u>I</u>	<u>P</u>	<u>VIF</u>	
LN DDL	0.3162	2.93	0.0061	1.4	
LN VIX	1.1174	2.81	0.0082	2.5	
TREND		2.58	0.0144	2	
CONSTANT					
N=38					
ADJUSTED R-SQUARED	45.0%				
F	11.08				
P	0.0000				

Multivariate Regression Analysis Results- Model 1B

- The number of claims filed and the percentage that are settled also have a statistically significant impact on aggregate settlement dollars.
- For every 10% increase in the number of claims filed, aggregate settlement losses increase by 12%.
- Model explains 56% of the variation in class action settlement dollars between 1996 2H and 2005.

MODEL 1B		LN ULTIMATE CLAIM COST		
<u>PREDICTOR VARIABLE</u>		<u>T</u>	<u>P</u>	<u>VIF</u>
LN NUMBER OF CLAIMS FILED		4.40	0.0001	1.0
PERCENTAGE OF CLAIMS SETTLED		2.07	0.0465	1.9
S&P 500 PRICE/EARNINGS RATIO - LAG 6 QTRS		3.58	0.0011	1.1
TREND		2.95	0.0057	1.8
CONSTANT				
N=38				
ADJUSTED R-SQUARED	56.3%			
F	13.25			
P	0.0000			

Multivariate Regression Analysis Results- Model 1C

- Estimate SCA Losses Using only Economic Variables
- LAWYER dummy variable represents period during indictment of Weiss/Milberg/Lerach
- Model explains 52% of the variation in class action settlement dollars between 1996 2H and 2006.

MODEL 1C		LN ULTIMATE CLAIM COST			
<u>PREDICTOR VARIABLE</u>		<u>COEFF</u>	<u>T</u>	<u>P</u>	<u>VIF</u>
LN VIX		1.1477	3.18	0.0036	2.4
LN NUMBER OF COMMERCIAL BANKRUPTCY FILINGS-LAG 2 QTRS		2.7420	3.44	0.0018	3.6
LN LEVEL OF S&P 500-LAG 2 QTRS		1.7625	3.1	0.0043	1.9
PERCENTAGE CHANGE IN GDP (ANNUALIZED)		-6.5744	-1.89	0.0698	1.2
LAWYER		-1.2424	-3.28	0.0028	2.4
TREND					
CONSTANT					
N=38					
ADJUSTED R-SQUARED		52.3%			
F		7.26			
P		0.0001			

Multivariate Regression Analysis - Model 2: Claims Filed

- Number of claims filed is important predictor of ultimate settlement costs.
- Use additional model to look at variables affecting claim filings.
- Advantage: Can use longer period to fit model (1997 to 2009) since no development in number of claims filed during the filing period.

Model Number 2:

<u>Response Variable</u>	<u>Predictor Variables</u>
• Aggregate Number of SCA Claims Filed Each QTR	• S&P 500 Volatility Index (VIX)
•	• Return on S&P 500
•	• Level of S&P 500
•	• GDP Growth Rate
•	• Claims filed in Prior Period
•	• Bankruptcy Filings
•	• Value of Leading Indicators
•	• Law Firm Indicator

Multivariate Regression Analysis Results- Model 2a

- Claims filed model primarily AR1.
- S&P 500 Volatility Index (VIX) predictor variable also significant.
- Model strongly significant and explains 43% of the variation in class action claims between 1996 and 2009.

MODEL 2A	LN CLAIMS FILED				
<u>PREDICTOR VARIABLE</u>		<u>COEF</u>	<u>T</u>	<u>P</u>	<u>VIF</u>
LN CLAIMS FILED - LAG 1 QTR		0.5025	4.83	0.0000	1.2
LN VIX		0.1880	2.00	0.0505	1.2
CONSTANT					
N=53					
ADJUSTED R-SQUARED		42.6%			
F		20.27			
P		0.0000			

Multivariate Regression Analysis Results- Model 2b

- “Lawyer” predictor variable also significant.
 - » Refers to hypothesis that indictment of Milberg and Lerach had an impact on claim filings
- Model strongly significant and explains 52% of the variation in class action claims between 1996 and 2009.

MODEL 2B		LN CLAIMS FILED					
<u>PREDICTOR VARIABLE</u>				<u>COEF</u>	<u>T</u>	<u>P</u>	<u>VIF</u>
LN CLAIMS FILED - LAG 1 QTR				0.44373	4.55	0.0000	1.3
CHANGE IN S&P 500 INDEX				-0.6731	-1.7	0.0953	1.0
LAWYER				-0.27036	-2.89	0.0057	1.2
CONSTANT							
N=53							
ADJUSTED R-SQUARED				52.1%			
F				19.47			
P				0.0000			

Multivariate Regression Analysis - Model 3: DDL/claim filed

- Disclosure Dollar Loss is important predictor of ultimate settlement costs.
- Use additional model to look at variables affecting claim filings.
- Advantage: Can use longer period to fit model (1997 to 2009) since no development in dollar disclosure loss during the filing period.

Model Number 3:

<u>Response Variable</u>	<u>Predictor Variables</u>
• Dollar Disclosure Loss per Claim Filed Each QTR	• S&P 500 Volatility Index (VIX)
	• Return on S&P 500
	• Level of S&P 500
	• GDP Growth Rate
	• Claims filed in Prior Period
	• Bankruptcy Filings
	• Value of Leading Indicators
	• Law Firm Indicator

Multivariate Regression Analysis Results- Model 3: DDL/claim filed

- Change in S&P 500 has statistically significant impact on DDL.
- Lawyer predictor variable also significant.
- Model explains 61% of the variation in DDL per claim between 1997 and 2009.

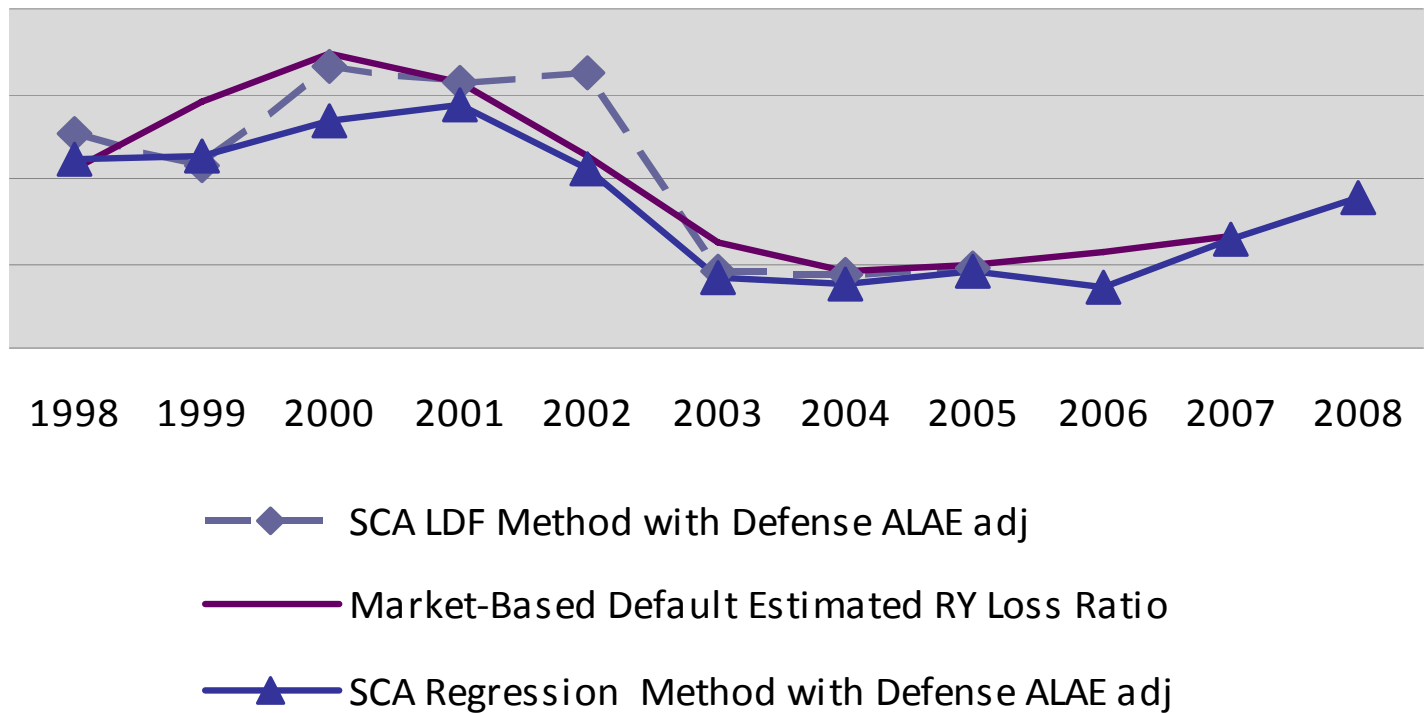
•MODEL 3A		•LN DISCLOSURE DOLLAR LOSS PER CLAIM FILED				
<u>•PREDICTOR VARIABLE</u>		<u>•COEF</u>	<u>•T</u>	<u>•P</u>	<u>•VIF</u>	
•CHANGE IN S&P 500 INDEX	•	•-4.8574	•-4.87	•0.0000	•1.3	
•CHANGE IN S&P 500 INDEX - LAG 1 QTR		•-2.06778	•-1.98	•0.0054	•1.4	
•LAWYER	• • •	•-0.8707	•5.64	•0.0000	•1.2	
•LEVEL OF S&P 500	• •	•0.00212	•-4.26	•0.0001	•1.0	
•CONSTANT	• • •		•	•	•	
•N=49	• • •		•	•	•	
•ADJUSTED R-SQUARED	•	•61.4%	•	•	•	
•F	• • •	•20.08	•	•	•	
•P	• • •	•0.0000	•	•	•	

Multivariate Regression Analysis Results- Combined Model

- Model aggregate SCA losses per quarter using: number of claims filed, DDL per claim as well as additional economic variables.
- Used data from 1997 through 2005.
- Predicted aggregate losses for RY period from 2006 through 2009.
- Adjustments to aggregate losses
 - Added load for non-class action losses (fixed dollar amount trended forward)
 - Added load for defense ALAE (different fixed dollar amount for settled vs dismissed)
- Premium Estimate – matched to default historical loss ratio
 - Adjusted by rate changes going forward
 - Compared to current estimates of D&O market premiums from reinsurance brokers

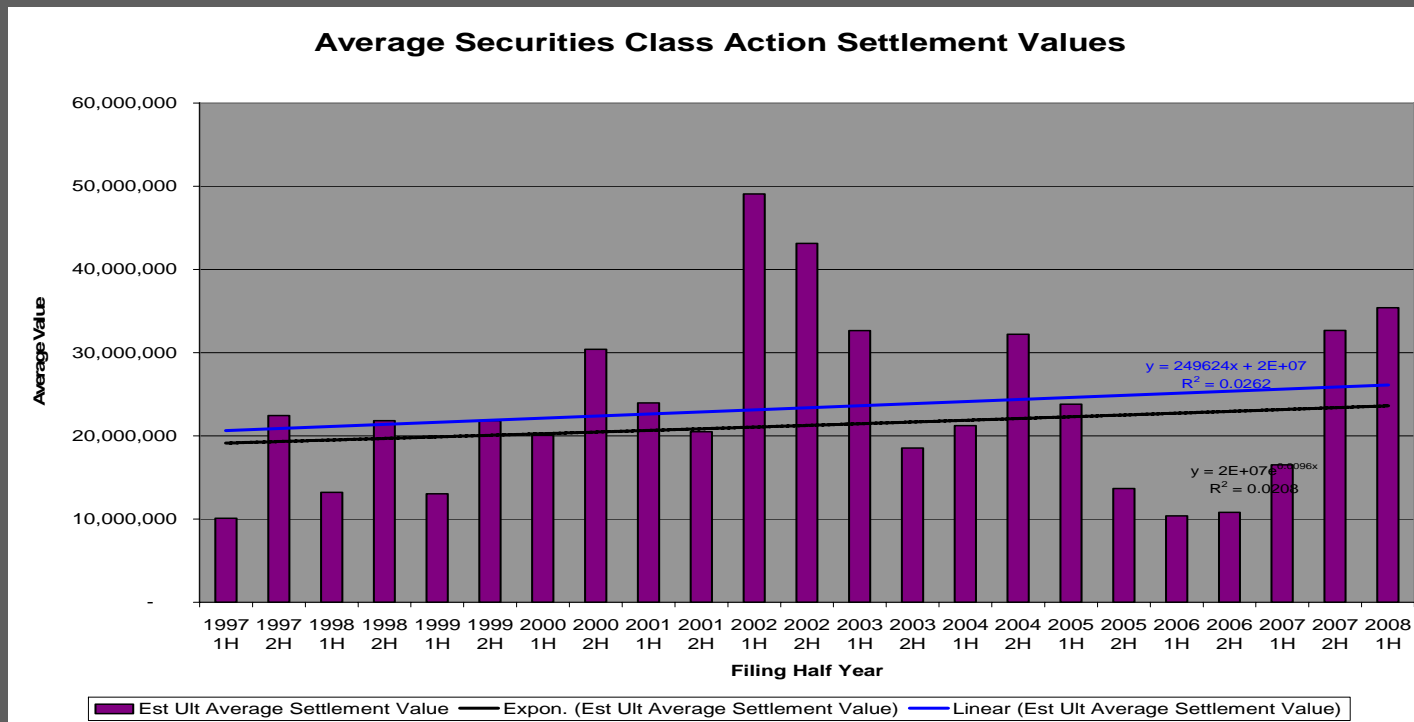
Ultimate D&O Loss Ratio Comparison

Resulting Estimated RY Loss & ALAE Ratios



Average SCA Settlement Values by Filing Year/Report Year

- Shows how traditional actuarial analysis methods will overestimate average severities in good years, underestimate in bad years.
- Multivariate analysis of environmental factors can provide valuable information to be used in projection of current loss ratios.



Future Loss Ratios Impacts

- SCA claim environment deteriorated significantly during 2007, 2008, 2009
- Environmental factors associated with increasing loss may show improvement in the next 6-12 months
- Rates currently flat to up slightly

Future Analysis

- **New data source available through Bloomberg may provide additional information**
- **Look at more precise ways to predict future losses:**
 - » Estimate future model parameters: DDL, VIX, claim counts, GDP growth
 - » Look for additional lagged variables to improve model
 - » Scenario testing of different sets of parameters
- **Use for other lines of business impacted by economic variables**
 - » Surety?

The End

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