The Effect of Economic Variables on Securities Class Action Claims

Jennifer Kish, FCAS
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D&O Securities Class Action Claims in a Changing Environment

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.

▸ · *D&O Class Action Claim Study*

Stock Market Volatility Index and Securities Class Action Claims
Does S&P 500 volatility have an impact on SCA claim frequency?

Chart 1 Securities Class Action Claim Counts and VIX Measures
By Filing Quarter

▸ · *D&O Class Action Claim Study*
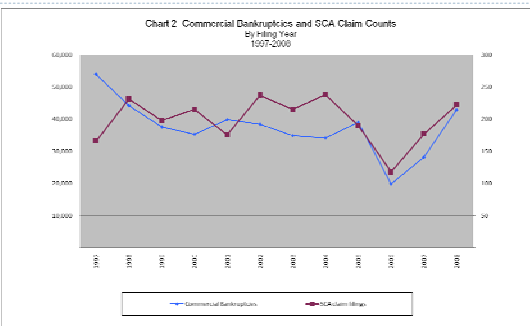
Commercial Bankruptcies and Securities Class Action Claims
Do commercial bankruptcies have an impact on SCA claim frequency?

Chart 2: Commercial Bankruptcies and SCA Claim Counts
By Filing Year
1997-2008

bar

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
1997-2006
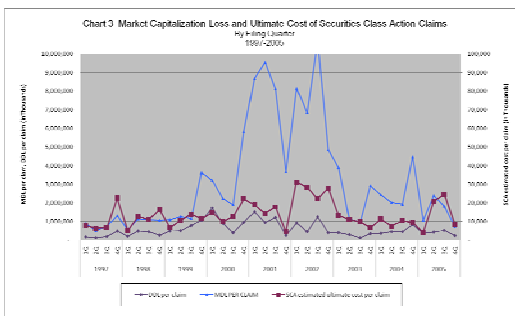
MDL and DDL-What are they?

▸ Basically 2 different measures of investors' market losses

▸ MDL – Maximum Dollar Disclosure Loss
  ▸ "Dollar value change in the market capitalization of the defendant firm from the trading day during the class period when its market capitalization was the highest to the trading day immediately following the end of the class period. We use the term "maximum dollar loss" as shorthand for this number". (*Cornerstone Research*)

▸ DDL- Dollar Disclosure Loss
  ▸ "Dollar value change in the market capitalization of the defendant firm between the trading day immediately preceding the end of the class period and the trading day immediately following the end of the class period. We use the term "disclosure dollar loss" as shorthand for this number". (*Cornerstone Research*)

Securities Class Action Database-Publically Available!

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: INTERESTING 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 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

Paid LDF Comparison

- Arch Re Default Payout Pattern
- Schedule P Other Liability CM Payout Pattern
- SCA Database Payout Pattern
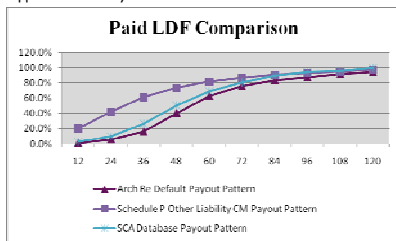
Database Results- Dismissal Rates

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

**Dismissal Rates
1997-2006**
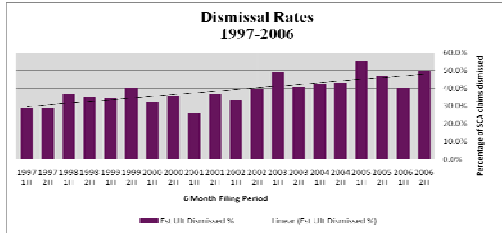
Database Results- Estimated Average Severity by Filing Year

- 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**
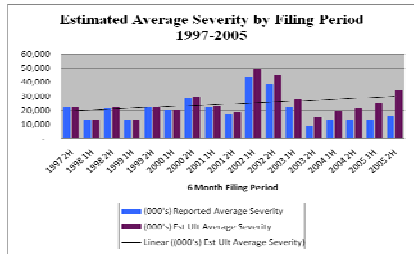
PART 2 : PREDICTIVE MODELS Regression Analysis

Regression Analysis – MODEL 1 Aggregate Loss Model

Aggregate SCA Loss as Response Variable
aggregated in 3 month filing period intervals (38 obs)

BEST MODEL: Used Number of Claims Filed in period and Disclosure Dollar Loss (DDL) in addition to economic variables as predictor variables. (unfortunately considered proprietary)

<u>However, can show other models that were considered:</u>
1a: DDL and VIX as predictor variables
1b: Claims Filed, Claims Settled, S&P 500 P/E ratio as predictor variables
1c: Uses only economic variables as predictor variables, no information on claims filed, DDL etc

‣ Most $ variables in natural log form, constant 2004 $ level
‣ <u>VIX definition</u>: The *Volatility Index (VIX)* is a contrarian sentiment indicator that helps to determine when there is too much optimism or fear in the market. When sentiment reaches one extreme or the other, the market typically reverses course.
<u>How it Works:</u> The VIX is based on data collected by the CBOE, or Chicago Board Options Exchange. Each day the CBOE calculates a figure for a "synthetic option" based on prices paid for puts and calls.

▸ *D&O Class Action Claim Study*

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				
PREDICTOR VARIABLE	**COEFFICIENT**	**T**	**P**		**VIF**
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				

▸ *D&O Class Action Claim Study*

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			
PREDICTOR VARIABLE		**T**	**P**	**VIF**
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			

▸ *D&O Class Action Claim Study*

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	COEFF	T	P	VIF
PREDICTOR VARIABLE					
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			

D&O Class Action Claim Study

Multivariate Regression Analysis - Model 2: Claims Filed in QTR

- 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:

Response Variable	Some Possible Predictor Variables
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 (SEC law firm indictments)

D&O Class Action Claim Study

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	COEF	T	P	VIF
PREDICTOR VARIABLE					
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=52					
ADJUSTED R-SQUARED		42.6%			
F		20.27			
P		0.0000			

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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				
PREDICTOR VARIABLE		COEF	T	P	VIF
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:

Response Variable	Predictor Variables
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				
PREDICTOR VARIABLE		COEF	T	P	VIF
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=48					
ADJUSTED R-SQUARED		61.4%			
F		20.08			
P		0.0000			

Multivariate Regression Analysis Results- FINAL AGGREGATE LOSS MODEL- (similar to 1A,1B,1C)

- Model aggregate SCA losses per quarter using: number of claims filed, DDL per claim as well as additional economic variables. *(unfortunately considered Proprietary)*
- 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
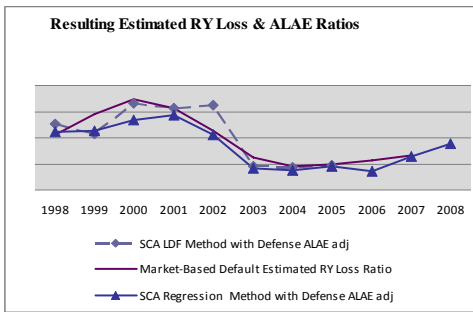 - Compared to current estimates of D&O market premiums from reinsurance brokers

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Ultimate D&O Loss Ratio Comparison

Resulting Estimated RY Loss & ALAE Ratios

1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

- SCA LDF Method with Defense ALAE adj
- Market-Based Default Estimated RY Loss Ratio
- SCA Regression Method with Defense ALAE adj

• D&O Class Action Claim Study

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.

Average Securities Class Action Settlement Values
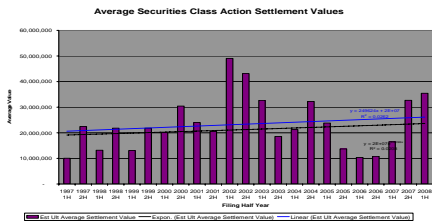
• D&O Class Action Claim Study

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

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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