2007 ERM Symposium
Aon Re Insurance Risk Study

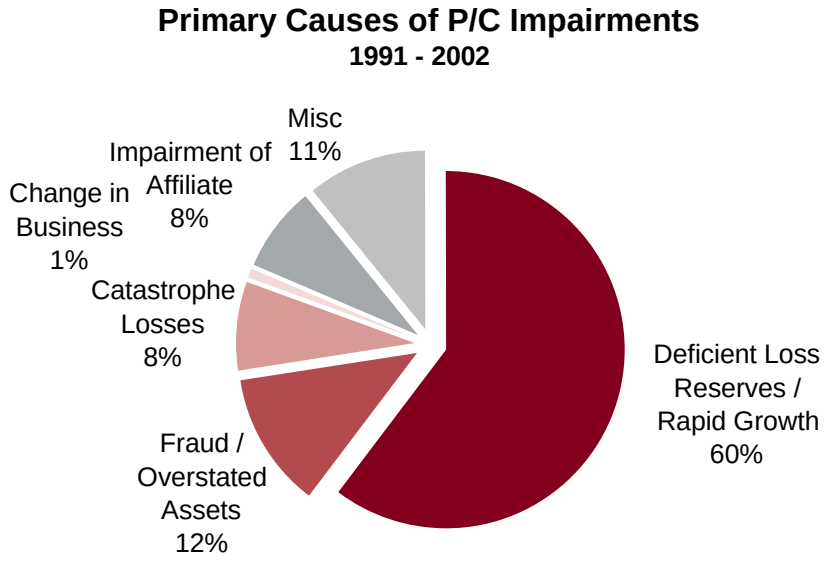
Aon Re Services

March 28, 2007

Proprietary & Confidential

A. M. Best Impairment Study

Cause (1969-2002)	Pct Total
Deficient Loss Reserves	37.2%
Rapid Growth	17.3%
Alleged Fraud	8.5%
Overstated Assets	7.8%
Significant Change	5.0%
Reinsurance Failure	3.7%
Catastrophe Losses	6.9%
Impairment of Affiliate	3.7%
Miscellaneous	9.8%



562 impairments* over 34 year period 1969-2002

Source: A. M. Best Impairment Study, 2004

* A. M. Best defines impairment as restrictive regulatory action

Garbage In, Garbage Out

"We rely heavily on [the company's] risk-management ability. You can't overemphasize how important that is. It's the underpinning to everything... It gives you a nice, warm, fuzzy feeling... Even though they're taking more risk, their market presence and risk-management skills allow them to get away with it... [They have] such extraordinary risk management capabilities that we look at them differently."

Aon Re Services - Insurance Risk Study

- Purpose: To provide robust estimates of loss ratio volatility that can be utilized to create realistic parameterization of insurance underwriting risk models.
  - Not only volatility estimates, but volatility estimates by volume
  - Also provides insight into the “shape” of the prospective loss ratio parameter uncertainty.

- Data Source: One Source Schedule P Part 1, Annual Statements 2001, 2002, 2003, 2004, 2005
- 1,875 P&C US insurance groups

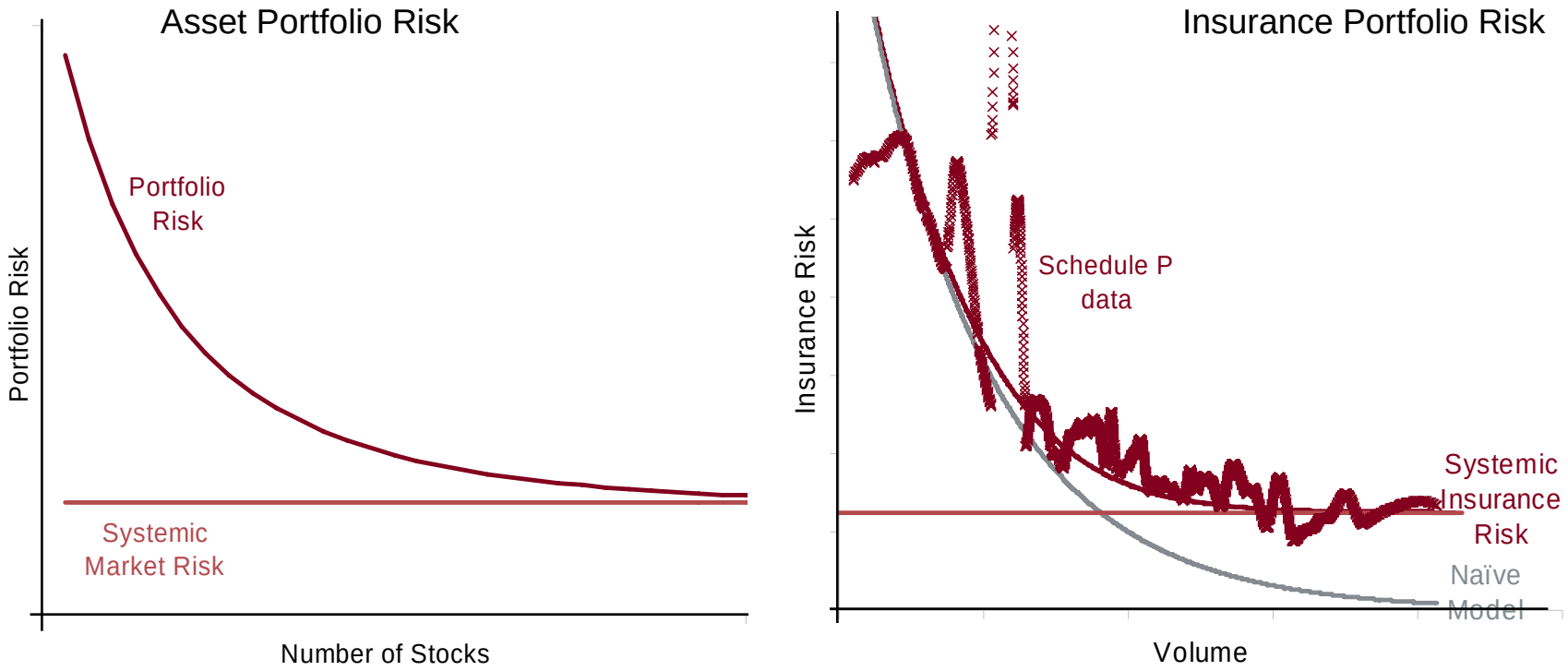
[1] A. M. Best Impairment Study, May 2004

Aon Re Insurance Risk Study

- ERM modeling: avoid “garbage in, garbage out”
  - Modeling assumptions must be realistic and fact-based
- Catastrophe exposure
  - Sophisticated models…focus of rating agency & management attention
  - Models calibrated using a handful of events
  - Only 7-8% of historical P/C insurer impairments attributable to cat[1]
- Non-catastrophe exposure
  - No analog of cat models…despite millions of credible data points!
  - 69% of historical P/C insurer impairments attributable to non-cat insurance risk[1]
  - Clear need for credible, data-driven estimate of insurance risk by line
  - Aggregation also requires risk correlation estimates

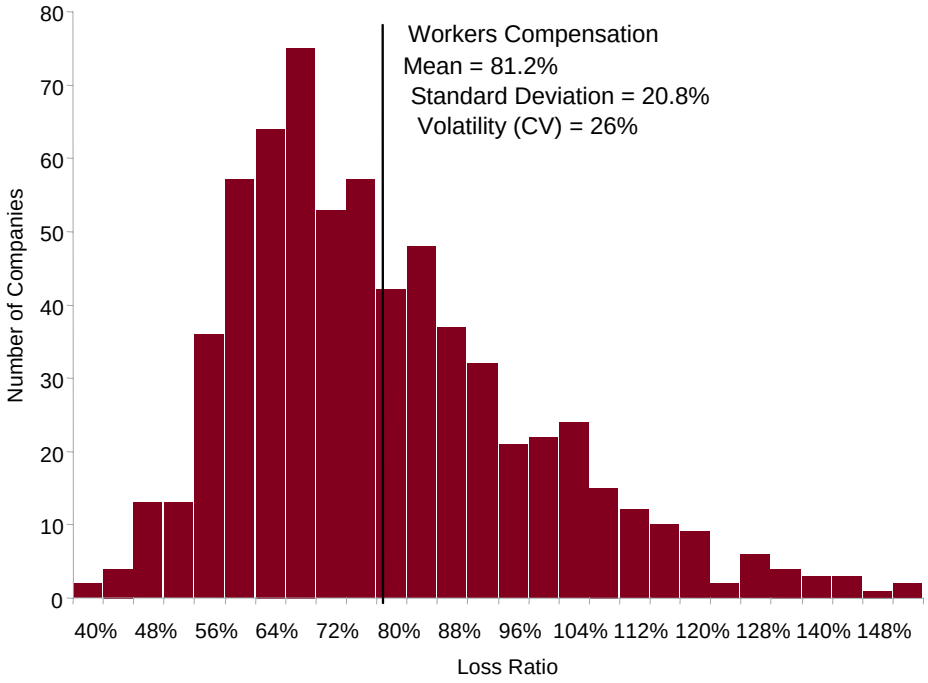
[1] A. M. Best Impairment Study, May 2004

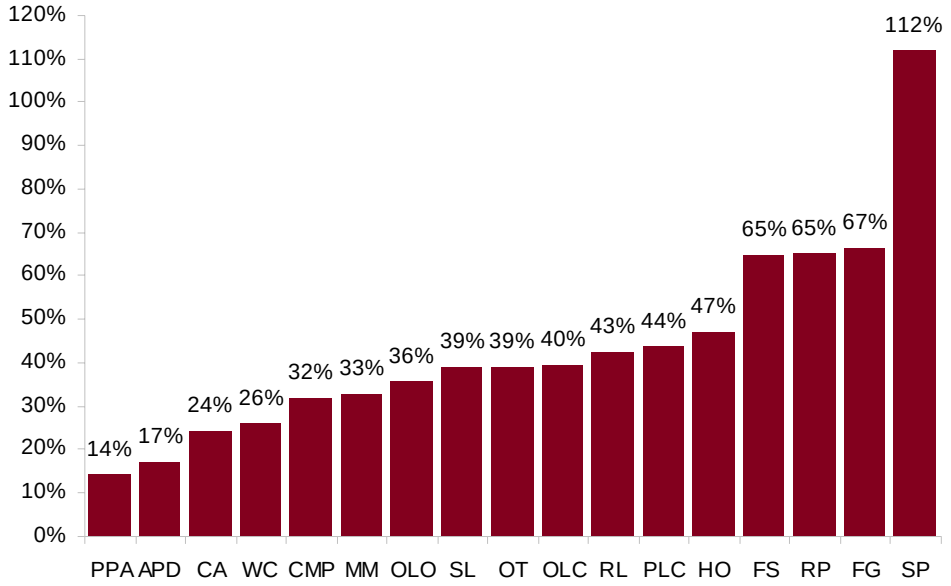
Systemic Insurance Risk



- Asset portfolio theory: risk does not diversify beyond systemic market risk
- Insurance risk by line shows same behavior
  - Risk does not completely diversify with increasing volume
    - Naïve insurance risk model assumes diversification benefit continues indefinitely
  - Level of systemic insurance risk varies by line
  - Aon Re study measures level of systemic insurance risk by line

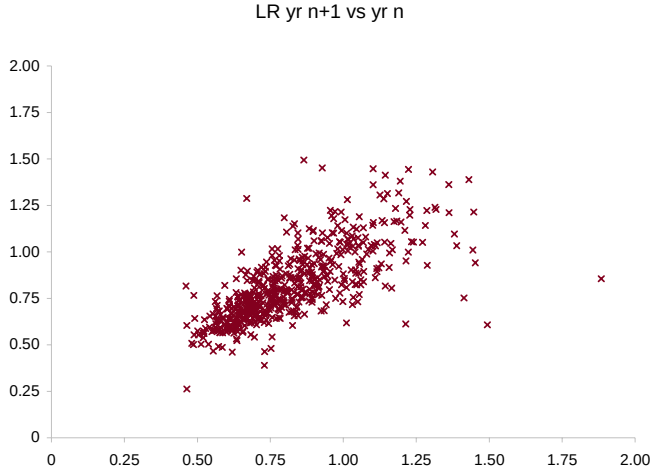
Systemic Insurance Risk by Line

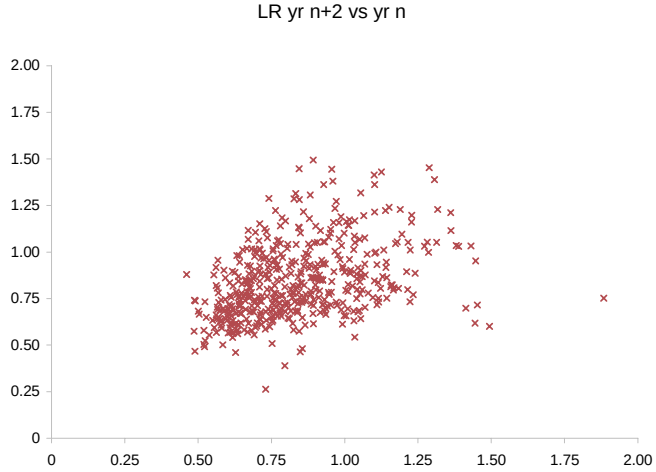


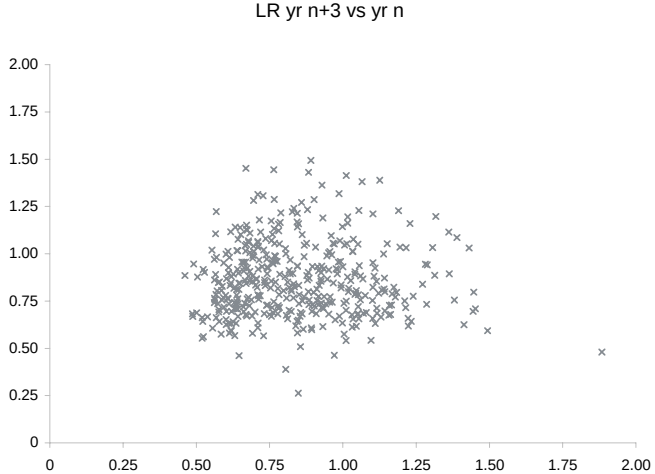


- Systemic risk quantified using study of Schedule P gross ultimate loss ratios
- Systemic insurance risk includes line of business uncertainty caused by
  - Pricing cycle
  - Frequency & severity trend
  - Economic activity
  - Loss reserve uncertainty
  - Legal & judicial changes
  - Weather

Workers Compensation, $100M Threshold







Correlation	Yr	Yr+1	Yr+2	Yr+3
Yr	1.000	0.723	0.350	-0.008
Yr+1	0.723	1.000	0.683	0.344
Yr+2	0.350	0.683	1.000	0.705
Yr+3	-0.008	0.344	0.705	1.000

Regression Statistics

	n	F	R^2	CV
1 Year	569	673.7529	0.5426	16.6%
2 Year	487	274.5507	0.5310	16.2%
3 Year	419	185.2114	0.5719	14.8%
2 Year Lagged	419	72.1597	0.2571	19.5%

Parameters	Const	YR1	YR2	YR3
1 Year	0.248	0.696		
Std. Error	0.023	0.027		
2 Year	0.318	-0.257	0.879	
Std. Error	0.027	0.041	0.044	
3 Year	0.396	-0.252	0.012	0.779
Std. Error	0.031	0.041	0.058	0.045
2 Year Lagged	0.661	-0.457	0.685	
Std. Error	0.036	0.052	0.057	

Correlation by Line

	All	HO	PP Auto Liab	CMP	Comm Auto Liab	WorkComp	Oth Liab Occ	Med Mal CM	Oth Liab CM	Prod Liab
All	**1.000**	0.400	0.494	0.717	0.635	0.716	0.675	0.533	0.553	0.364
Homeowners	0.400	**1.000**	0.106	0.210	-0.065	-0.156	-0.127	-0.016	0.065	-0.155
Personal Auto Liabilty	0.494	0.106	**1.000**	0.035	0.077	0.216	0.079	0.082	0.162	0.057
CMP	0.717	0.210	0.035	**1.000**	0.494	0.360	0.413	0.298	0.265	0.205
Commercial Auto Liability	0.635	-0.065	0.077	0.494	**1.000**	0.519	0.643	0.524	0.233	0.513
Workers Compensation	0.716	-0.156	0.216	0.360	0.519	**1.000**	0.524	0.551	0.348	0.308
Other Liability Occ	0.675	-0.127	0.079	0.413	0.643	0.524	**1.000**	0.466	0.254	0.352
Medical Malpractice CM	0.533	-0.016	0.082	0.298	0.524	0.551	0.466	**1.000**	0.475	0.575
Other Liability CM	0.553	0.065	0.162	0.265	0.233	0.348	0.254	0.475	**1.000**	0.087
Product Liability	0.364	-0.155	0.057	0.205	0.513	0.308	0.352	0.575	0.087	**1.000**

- Portfolio risk combines two effects:
  - By line insurance risk and
  - Correlation between lines
- Aon Re study quantifies correlation using Schedule P gross loss ratio data
  - 800,000 individual company loss ratio data points provides greater level of credibility to correlation estimates than possible from industry aggregate information or internal company data.
- Correlation factor assumptions need to be stress tested
  - Correlation is not constant over time
  - Correlation likely stronger in stressed scenarios (e.g LTCM experience)

ERM: Current State-of-the-Art

- Confusion about ERM objectives and end-goals
  - Common question: “What are our competitors doing?”
  - Integration of silo reporting common…without clear next steps
- Willingness exists to invest resources to get ERM right
  - Other than rating agency, value proposition of ERM often unclear
  - Big machine view of ERM can stall effort at start line
- Rating agency scrutiny major driver of company activity
  - A. M. Best asking more ERM-related questions
  - S&P proposing to accept capital guidance from internal models
- Implications
  - Must understand risks individually to assure premium adequacy
  - Must understand how risks aggregate
  - Complexity of task increases exponentially with size