

Volatility and Cyclicity of the Marine Insurance Market

Justin Gardner – Gen Re



What I hope to avoid...





Cycles - Anecdotal Evidence

“Insurance is a lousy business...and a very challenging business to invest in. It is a notoriously cyclical industry which regularly behaves poorly.”

**VJ Dowling
IBNR Weekly
Summer 2003**





Cycles - Anecdotal Evidence

“They say it’s only in the rinse cycle that you find out how dirty the laundry really was.

Now we are in the rinse cycle”.

Warren E. Buffet

March 2002





Cycles - Anecdotal Evidence

“Insurance Companies always pledge to be “disciplined” underwriters just as investors always say they won’t overpay for stocks and bonds. But good times are intoxicating. Several Years of a hard market have the same effect on insurance company CEO’s as several margaritas have on teenage boys: they start acting silly.”

David Schiff

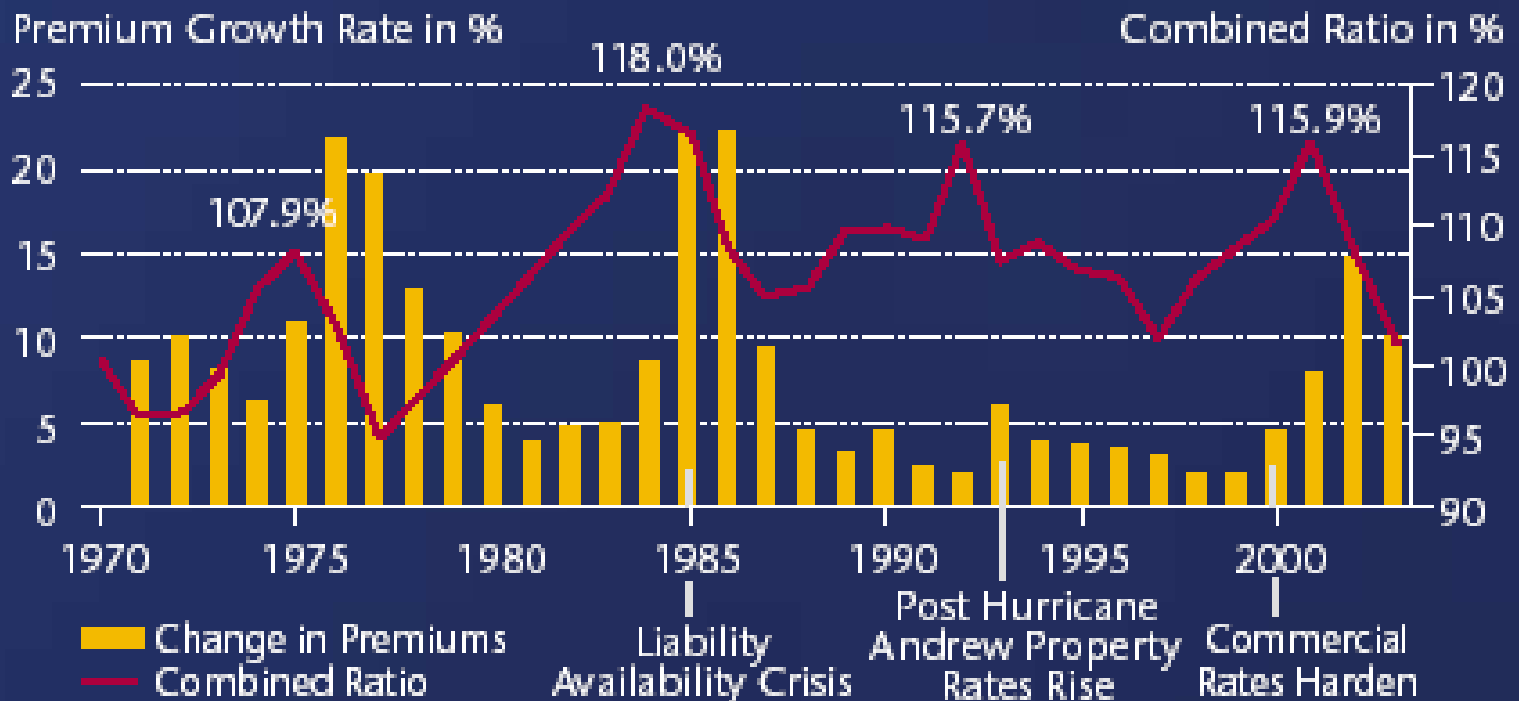
Schiffs Insurance Observer

Vol. 16, #11 Sept 10,2004



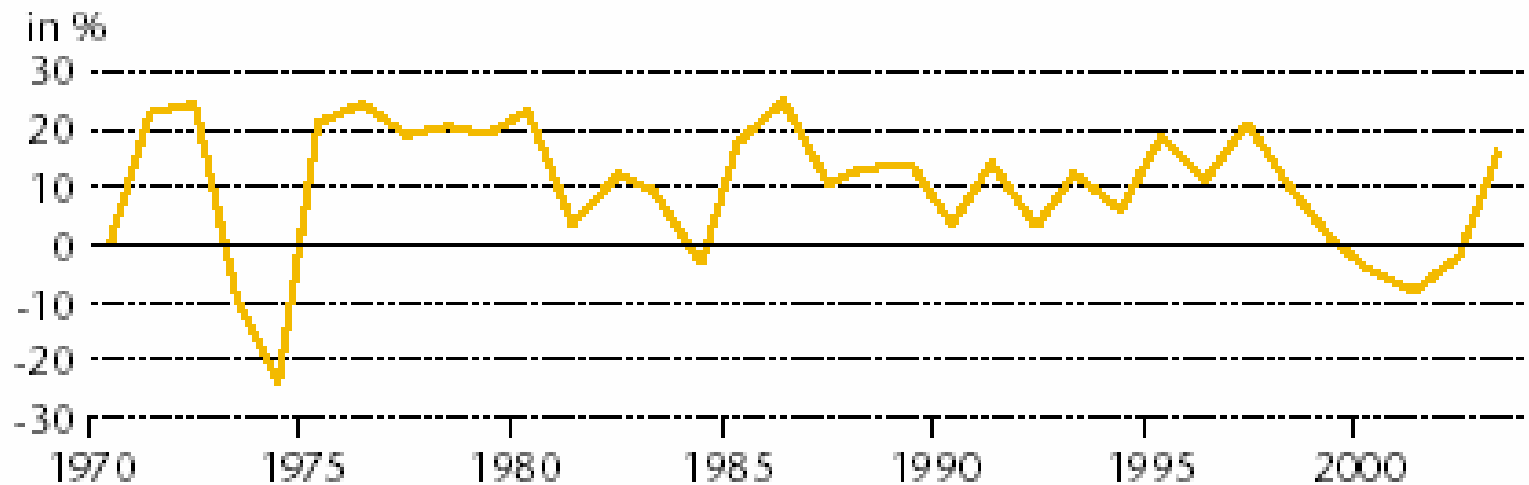
Cycles – Empirical Evidence in Results

U.S. Property/Casualty Industry Premium Growth and Underwriting Result: 1970–2003



Cycles – Empirical Evidence in Capital Levels

U.S. Property/Casualty Industry
Surplus Growth Rates: 1970–2003





International Insurance Cycles: Rational Expectations/Institutional Intervention

Joan Lamm-Tenant; Mary A. Weiss

Journal of Risk and Insurance Vol. 64,
No. 3 (Sep., 1997), 415-439

in which I found.....



Formulas!

$$\begin{aligned} \text{Log}[P_i / (1-P_i)] = & \alpha_0 + \beta_1 \text{Dis}_{ij} + \beta_2 \text{Reg}_{ij} + \beta_3 \text{Cat}_{ij} \\ & + \beta_4 \text{Per}_{ij} + \beta_5 \text{Res}_{ij} + \sum_{k=1}^K \beta_k D_{ijk} + \varepsilon_{ij}, \end{aligned}$$

$$\Pi_t = a_0 + a_1 \Pi_{t-1} + a_2 \Pi_{t-2} + \varpi_t,$$

where Π_t = the underwriting profit in period t, and
 ϖ_t = a random error term.

$$\begin{aligned} \text{CycPer}_{ij} = & \alpha_0 + \beta_1 \text{Dis}_{ij} + \beta_2 \text{Per}_{ij} + \beta_3 \text{Cat}_{ij} + \beta_4 \text{Reg}_{ij} \\ & + \beta_5 \text{Res}_{ij} + \beta_6 \text{CVLoss}_{ij} + \sum_{k=1}^K \beta_k D_{ijk} + \varepsilon_{ij}, \end{aligned}$$

$$\text{Period (P)} = 2\pi / \cos^{-1} (a_1 / 2\sqrt{-a_2}).$$

$$\Delta P_{it} = \alpha + \sum_{j=1}^J \beta_j \Delta x_{jt} + \sum_{i=1}^{n-1} c_i D_i + \varepsilon_{it},$$

where ΔP_{it} = the change in aggregate premiums for country i and time period t,

$$\varepsilon_{it} = \rho \varepsilon_{i, t-1} + \mu_{it},$$

$$\mu_{it} \sim N(0, \sigma_{iu}^2),$$

n = the number of countries, and

D_i = a dummy variable equal to one for country i and zero otherwise.



Underwriting Cycles Present in Different Countries

Length of Non-Life Underwriting Cycles by Country

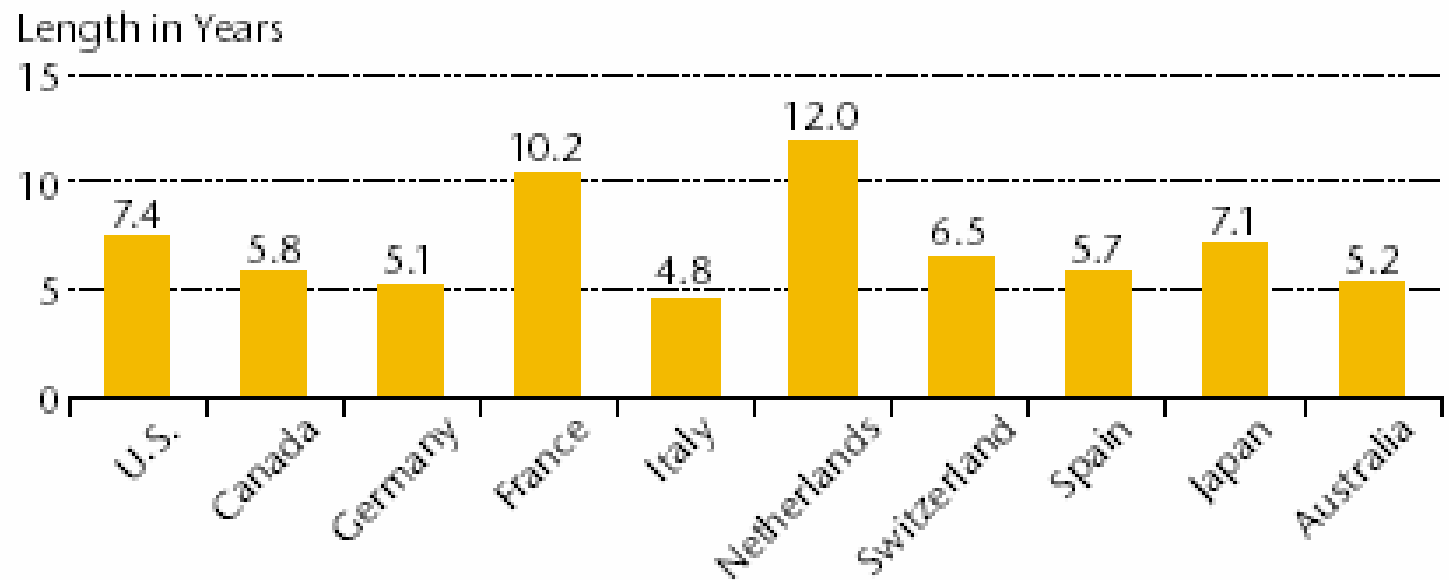


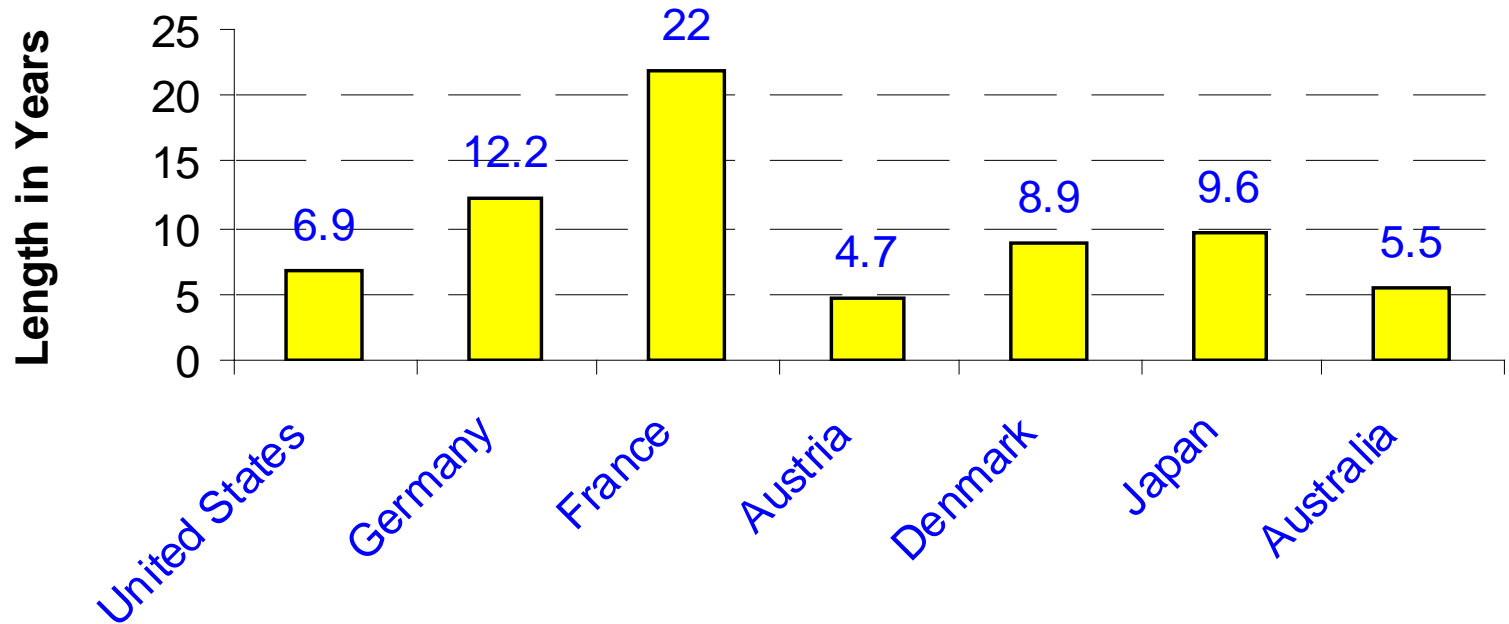
Chart 1

Source: Lamm-Tennant & Weiss, *International Insurance Cycles and Rational Expectations*



And Different Lines of Business (even Marine).

Length of Marine Underwriting Cycles by Country



Source: Almm-Tennant & Weiss, *International Insurance Cycles and Rational Expectations*



Why Do Cycles Exist?



Hypothesis #1 -Insurance Markets Operate Irrationally
and/or Exhibit Market Imperfections



CYCLES

NONE OF US IS AS DUMB AS ALL OF US.



Hypothesis #2 - Rational Expectations/Institutional Intervention (aka “When Bad Things Happen to Good Underwriters”)



- Institutional, regulatory, & accounting characteristics
- Unexpected shocks to surplus (Nat Cat, shifts in claims costs, or loss distributions)
- Interest rate and equity value changes



Factors Affecting Cycle Period Length (measured by change in premium volume)

- Growth in discount rate and stock market indexes (positive relationship)
 - Economic expansion of the late 80's through the 90's
 - Global equity returns of 2000-2002
- Catastrophe Losses (negative relationship)
 - Piper Alpha (1988)
 - Hurricanes “Andrew” (1992)
 - Northridge Earthquake (1994)
 - Hurricanes “Charley,” “Frances,” and “Ivan” ??
- Policy period length (positive relationship)
 - Long term Blue Water Hull policies of 96-03
- Volatility in underwriting result (positive relationship)
 - Blue Water Hull and Offshore Energy Markets

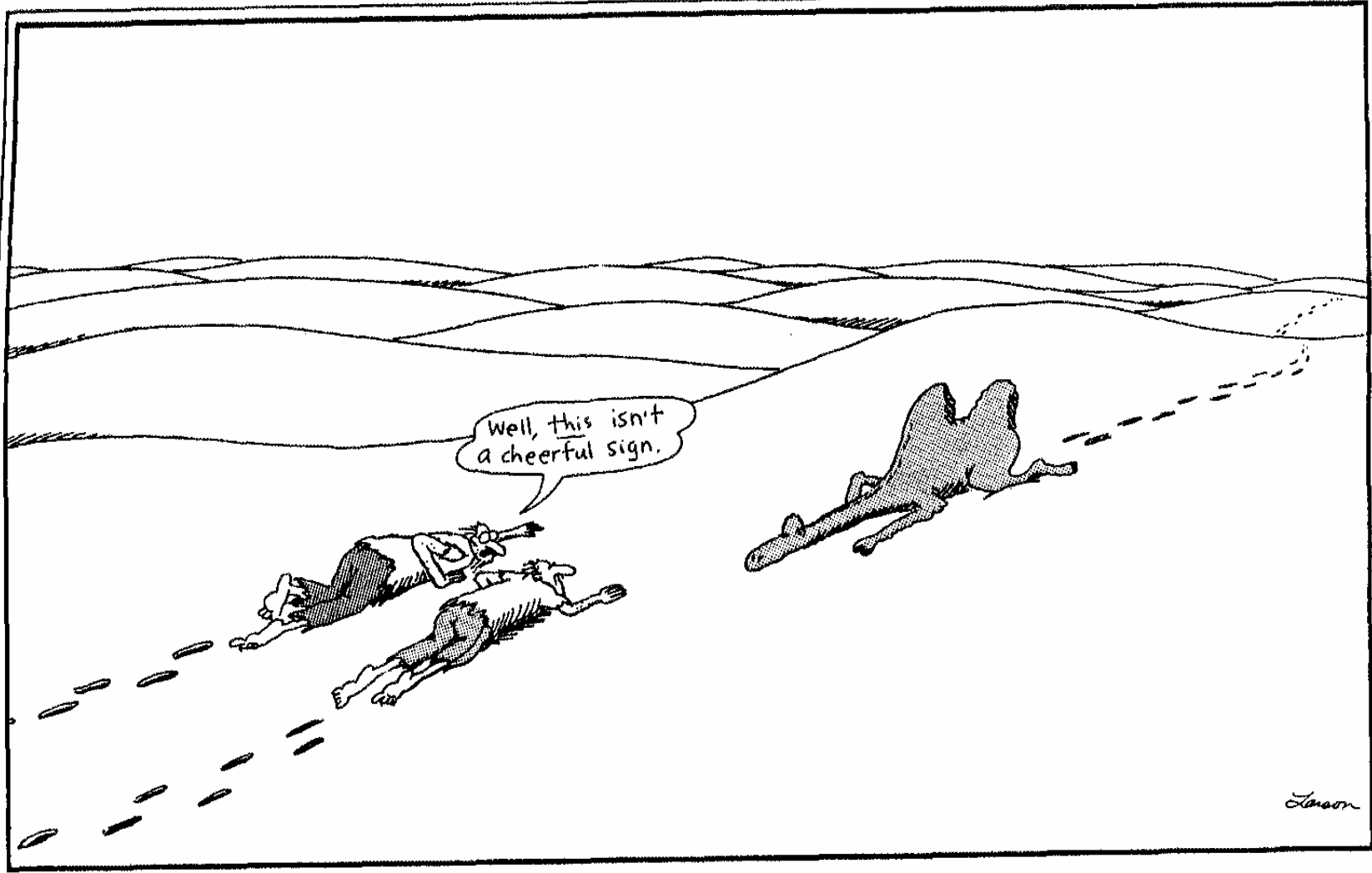
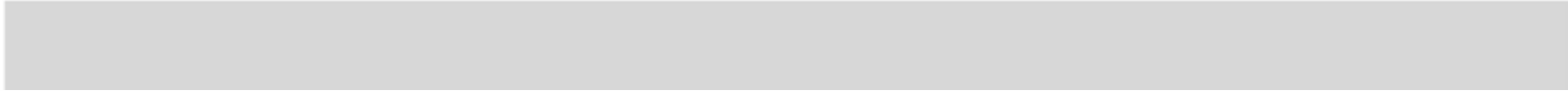




Some Conclusions on Cycles

- Cycles are universal and will have different lengths and severities.
- Evidence seems to indicate that irrational behavior is not the only driver. Can't eliminate cycles by alerting others to their bad behavior.
- Managers and Underwriters can only control their own actions and behaviors in the face of external factors.

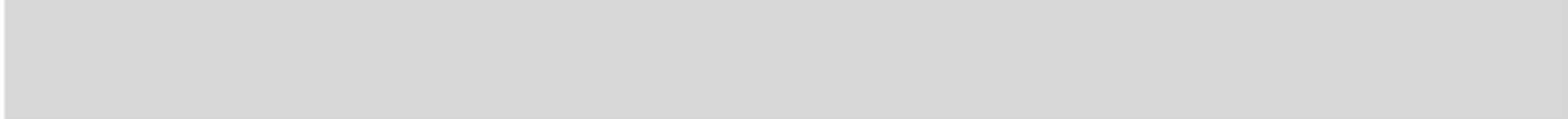




Well, this isn't a cheerful sign.

Lanson

• IUMI 20
SINGAPORE
• 12 - 15 Sept





Managers and Underwriters are Not Helpless

- Choices they make will either exacerbate the effects of the underwriting cycle or blunt them.





Management Behavior

The pain of underwriting cycles will be more severe when management teams:

- Undermine underwriting decisions
- Under invest in skills
- Underestimate parameter and model risk
- **Set strict premium volume goals or “budgets”**



Softening Market Strategy #1 – maintain rates, reducing premium volume and increasing expense ratio

20% Decrease in Premium

	<u>Period 1</u>	<u>20% Prem Reduction</u>
Earned premium	<u>\$5,000</u>	<u>\$4,000</u>
Loss and ALAE	65.0%	65.0%
Commissions	15.0%	15.0%
Overhead Expenses	<u>15.0%</u>	<u>18.8%</u>
Combined Ratio	<u>95.0%</u>	<u>98.8%</u>
Underwriting Gain / Loss	<u>\$ 250</u>	<u>\$ 50</u>

(amounts in millions)



Softening Market Strategy #2 – cut rates to preserve premium volume and control expenses

15% Rate Reduction

	<u>Period 1</u>	<u>15% Rate Reduction</u>
Earned premium	<u>\$5,000</u>	<u>\$5,000</u>
Loss and ALAE	65.0%	76.5%
Commissions	15.0%	15.0%
Overhead Expenses	<u>15.0%</u>	<u>13.5%</u>
Combined Ratio	<u>95.0%</u>	<u>105.0%</u>
Underwriting Gain / Loss	<u>\$ 250</u>	<u>\$ (249)</u>

(amounts in millions)



Softening Market Strategy #2 – cut rates to preserve premium volume and control expenses

15% Rate Reduction

	<u>Period 1</u>	+++++++15% Rate Reduction+++++++		
		<u>In-Force</u>	<u>New Business*</u>	<u>Total</u>
Earned premium	<u>\$5,000</u>	<u>\$4,250</u>	<u>\$750</u>	<u>\$5,000</u>
Loss and ALAE	65.0%	76.5%	86.7%	78.0%
Commissions	15.0%	15.0%	15.0%	15.0%
Overhead Expenses	<u>15.0%</u>	<u>13.5%</u>	<u>13.5%</u>	<u>13.5%</u>
Combined Ratio	<u>95.0%</u>	<u>105.0%</u>	<u>115.2%</u>	<u>106.5%</u>
Underwriting Gain / Loss	<u>\$ 250</u>	<u>\$ (211)</u>	<u>\$ (114)</u>	<u>\$ (325)</u>

* Assumes 25% rate reduction

(amounts in millions)





Conclusions

- Underwriting Profits and Combined Ratios Will Decline in a Softening Rate Environment
- Superior Strategy:

Maintain underwriting and pricing discipline to control loss ratio even though premium volume declines and the expense ratio increases.
- Inferior Strategy:

Cut rates to maintain premium volume and control expense ratio.



How Underwriters Can Blunt the Effects of Cycles



THE UNIVERSITY OF MICHIGAN LIBRARIES





Underwriter Behavior

The pain of underwriting cycles can be blunted if underwriters better understand:

- Circle of competence – appreciation of what we know and don't know
- Science to Art ratio (80/20 not 20/80)
- Inflection points and trend – Looking Forward as well as backward
- Problems applying law of large numbers to small samples. (experience vs. exposure underwriting)





Small Sample Experience Problems

Coin Flip Portfolios - (re)insuring against incidence of tails
(Flips performed by Colby Gardner, a very honest 6yr old)

	<u>Tails in Portfolio 1</u> <u>Loss Cost</u>		<u>Tails in Portfolio 2</u> <u>Loss Cost</u>	
Year 1 (5 flips)	2	2	4	4
Year 2 (5 flips)	3	3	1	1
Year 3 (5 flips)	3	3	5	5
3 Yr Total Loss Cost:		8		10
Avg Loss cost:		2.67		3.3
Error %		6.7%		33.3%





It is a difficult business but not a complicated one...

“Unlike the situation prevailing in many other industries – **neither size nor brand name determines** an insurer’s **profitability**. Indeed, many of the biggest and best-known companies regularly deliver mediocre results. **What counts** in this business **is underwriting discipline**”.

Warren E. Buffet
Berkshire Hathaway
2001 Letter to Shareholders

