
Predictive Modeling Solutions for Small Business Insurance

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Presentation Outline

- Current BOP Market Dynamics
 - Rating Plan Enhancements
 - Underwriting Scorecards
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Current BOP Market Dynamics



Current BOP Market

- Soft, Softer, Softest
 - Impact of Agency & MGA Captives
 - By-Peril Rating
 - Enhanced Territory Definitions
 - Expanded Eligibility
 - Detailed Class Factors
 - Expanded Amount of Insurance
 - **U/W Scorecards** vs. Schedule Rating
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BOP Predictive Modeling – Here to Stay

- Five Leading BOP Insurers Using Predictive Modeling 2000-2006:
 - Beat Industry Loss Ratio by 3.5 – 6.6 Points
 - Outperformed Industry 5 of 7 years, Up to 15 Points
 - All Grew Faster Than Industry
 - One Group by 5% per year!
 - Superior Growth ***and*** Operating Results
 - Sustained Competitive Advantage
 - Cream Skimming, Adverse Selection
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Rating Plan Enhancements



Class Refinement

Eligible Occupancies	Classification Factors			
The following are the eligible classes of business. No other types of business may be insured under this program. See also the Ineligibility List in the main section of this manual.	Building Lessors	Building Occupants	Business Personal Property	Class Code
Air Conditioning Equipment Dealers	1.314	1.150	0.806	00072
Alterations – Clothing	1.278	1.333	1.512	71961
Animal Cemetery	NA	0.526	0.619	00056
Animal Cemetery – Lessors Risk	0.604	NA	0.619	00056
Animal Hospital	NA	0.526	0.619	00057

Refined AOI Curves

Personal Property Limit (000's)	Limit Of Insurance Relativity		
	Group A	Group B	Group C
<\$50	1.678	1.142	1.330
50	1.678	1.142	1.330
75	1.525	1.115	1.223
100	1.347	1.080	1.153
125	1.224	1.053	1.101

New Rating Factors

<i>Age of Building Credit Factors:</i>		
Age	Original Construction	Significantly Renovated
0 -- 5	0.900	0.900
6 -- 10	0.950	0.950
11 -- 15	0.975	0.975

<i>Franchise Factor:</i>	Property	Liability
	0.950	0.975

<i>Mall Credit</i>	Property	Liability
	0.975	0.950

Multi-Policy Discounts

CATEGORIES

DISCOUNT applied to the Businessowners Policy

Commercial Automobile Policies	7%
Commercial Automobile Policies (excluding Garage Liability and Dealers Blanket).	
Commercial Umbrella Policies	4%
Commercial, Econ-O-Pak and Habitational Umbrella policies.	

Life, Health or Annuity Policies 2%

- The following policies written on an owner, partner or corporate officer of the business:
 - Life policy (nongroup) with a face amount of \$100,000 or more or Simplified Issue Life policy with a face value of \$50,000 or more; or
 - Annuity policy with a combined cash value exceeding \$10,000 or more, or
 - Disability Income policy with a monthly benefit of \$1,000 or more; or
 - Long Term Care Policy.

Industry Specific Rating Factors

- a. **Number of Units Factor.** Based upon the number of residential units at the premises, multiply the applicable rates for *General Liability* for that premises by:

Units	Factor
1 - 10	1.000
11 - 20	0.987
21 - 30	0.968
31 - 50	0.940
51 - 75	0.910
Over 75	0.885

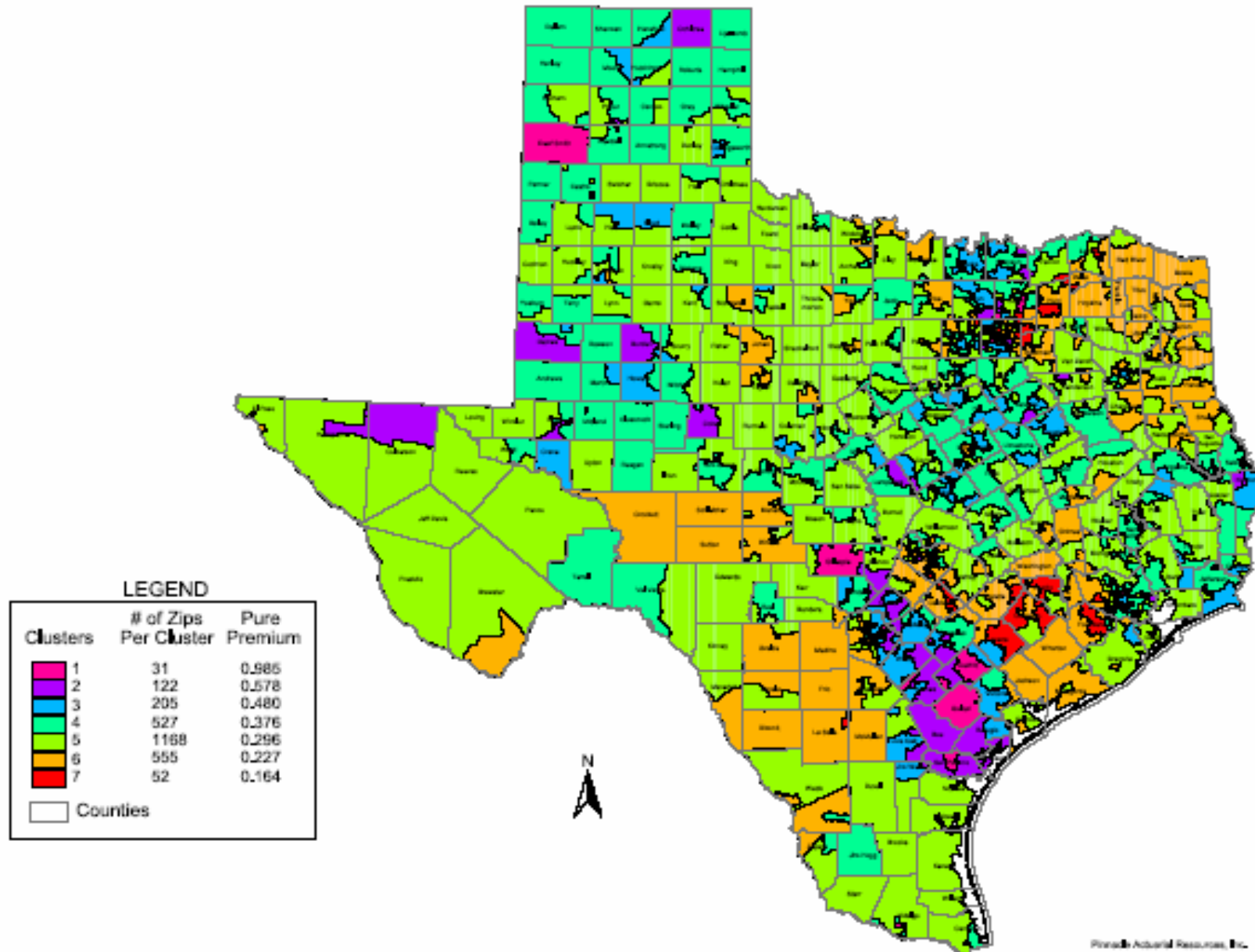
- b. **Number of Stories Factor.** Based upon the number of stories of the building, multiply the applicable rates for *General Liability* for that premises by:

Number of Stories	Factor
1	0.850
2	0.950
3	1.000
4 or More	1.150

Condominium Factor

% Rented	Factor
0% - 49%	0.57
50% - 74%	0.79
75% & Over	1.00

Territory Clustering

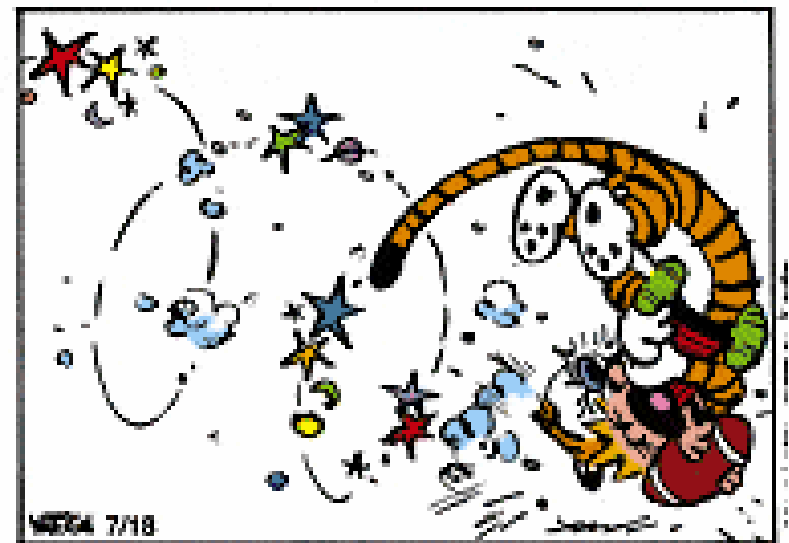


Underwriting Scorecards

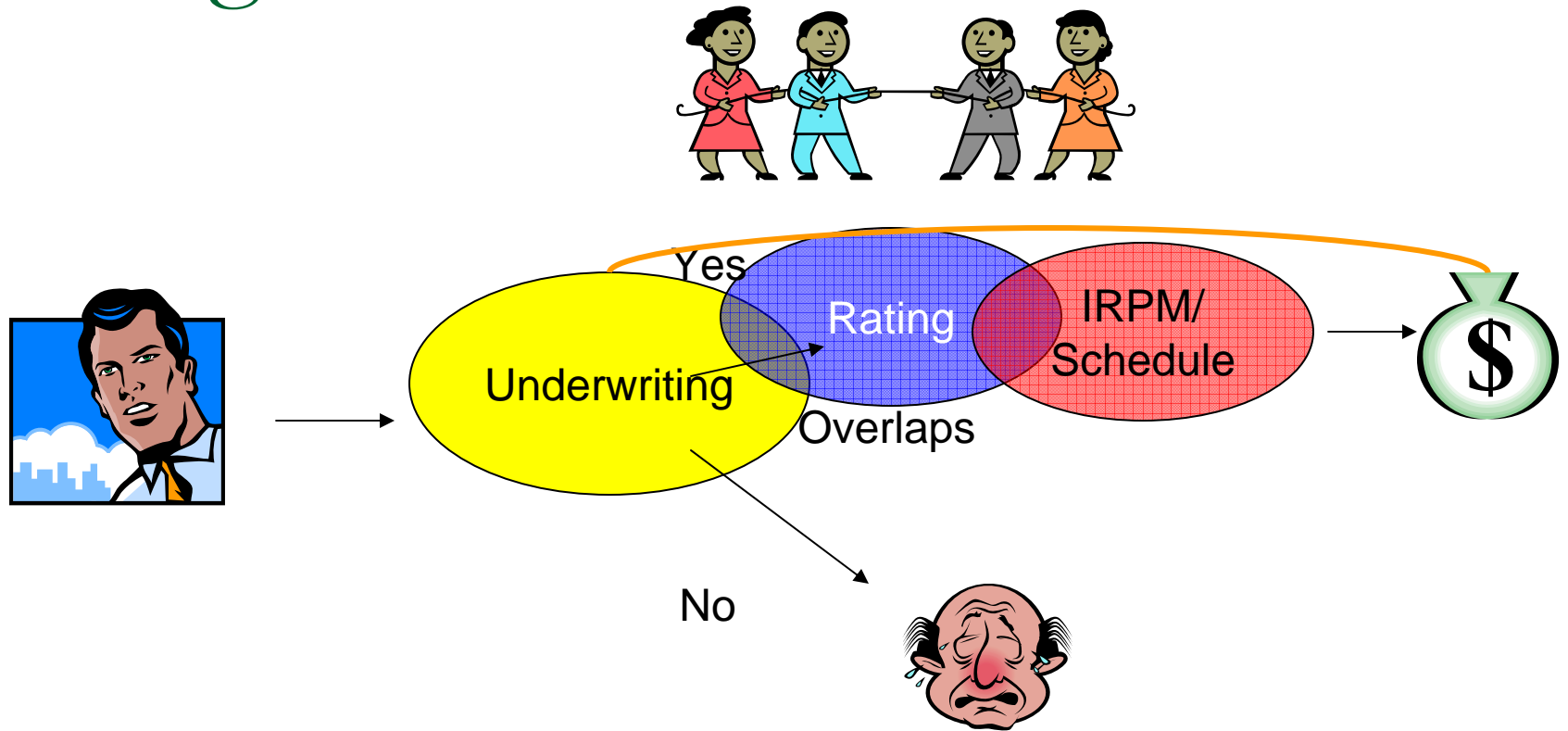


Traditional Underwriting vs. Rating

- Historically Distinct (*and often conflicting*)
 - Underwriting Determined Eligibility
 - Rating Determined Manual Premium
 - Underwriting then Applied IRPM/Schedule Rating



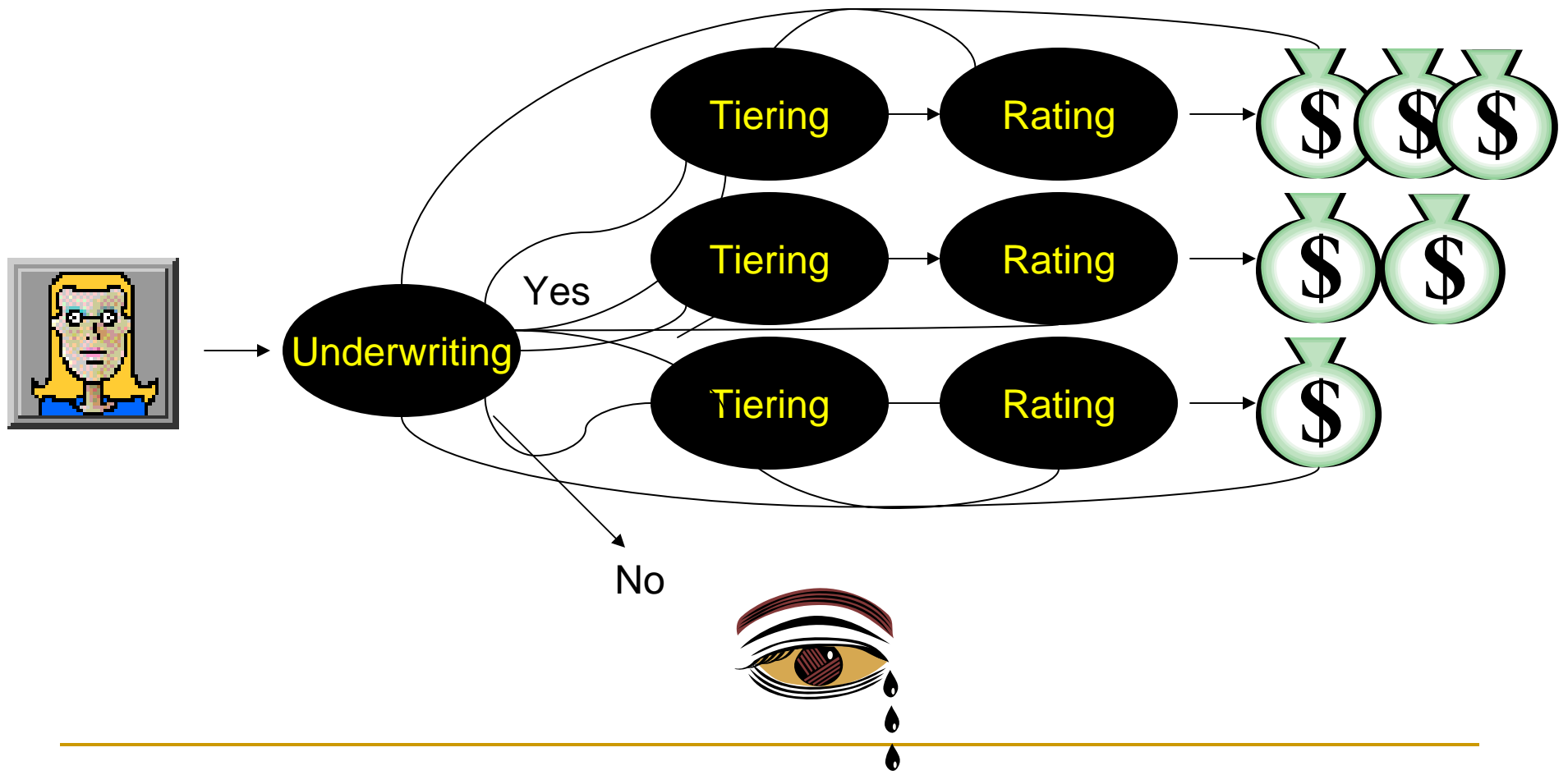
Historical Risk Selection & Pricing Flow



Underwriting vs. Rating Today

- Lines are blurred...
 - Underwriting determines eligibility, often using modeled actuarial data
 - Underwriting determines rating tier, often with actuarially determined tiers
 - Actuarial determines tier relativities and rates
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Current Risk Selection and Pricing Flow



Underwriting Score

- Definition – A scaling of multiple predictive model factors into a single metric resulting in a single premium modification and/or an eligibility threshold.
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Underwriting Scorecard – Scaling

Credit Score				
Credit Score	Exposure	Indicated Relativity	On Balance Indicated	Score Points
A	359,376	1.000	0.988	32
M	153,873	1.081	1.068	9
NS	90,760	1.045	1.032	19
S	106,681	0.902	0.891	62
U	26,131	1.114	1.101	0

Lots of Small Factors

Criteria and Point Allocation

For ALL Natures of Business, the following apply:

- Percent Building Occupied
95-100% = 4 pts; 90-65% = 2 pts; all else = 0 pts.
- Years in Business
Over 10 = 16 pts; 5 to 10 = 8 pts; all else = 0 pts.
- Age of Building
Less than 10 = 16 pts; 10 to 25 = 10 pts; 26-50 = 2 pts; over 50 = 0 pts.
- Alarms
Local = 4 pts; Central Station (U.L. Appd) = 16 pts;
Central Station (Other) = 8 pts; None = 0 pts.
- Building Appraisal Received - owner occ. only
Yes = 4 pts; No = 0 pts.
- EDP: Off-Site Backup
Yes = 2 pts; No = 0 pts.
- Building Height (# stories) - owner occ. only
Less than 3 = 8 pts; 3 to 6 = 4 pts; all else = 0 pts.
- Parking Lot or Garage at premises - owner occ. only
Yes = 0 pts; No = 4 pts.



Class-Specific Scoring

In addition to the above, the following objective criteria are used, depending on the nature of business of the occupancy.

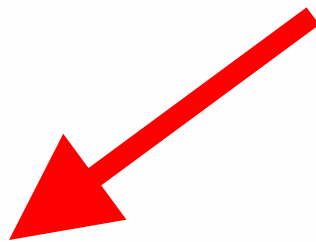
- **Habitational**
- Owner/Manager on Premises
- Athletic Courts
- Clubhouse
- Exercise Room
- Playground
- Pool with Diving Board
- Woodstove
- Fireplace
- Restaurant on Premises

- **Office-All Other, Office-Medical**
- Sole Occupancy
- Restaurant on Premises

- **Funeral Home**
- Sole Occupancy

- **Retail/Service/Wholesale**
- Sole Occupancy
- Closing Time Before 9pm
- Chain or Franchise
- Theft Monitoring Devices
- Restaurant on Premises
- Off-Premises Repair/Installation < 10%
- Delivery Operations
- Inventory Skidded

- **Restaurant**
- Sole Occupancy
- Closing Time Before 9pm
- Chain or Franchise
- Delivery Operations
- Inventory Skidded



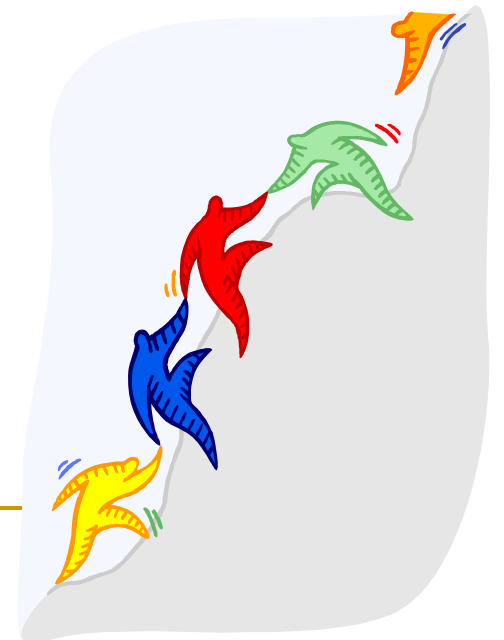
Additional Internal Information

- Percent Occupied
- Years in Business
- Age of Building
- Alarms
- Computer Back Ups
- Building Height
- Swimming Pools
- Safety Program
- Type of Entity (Individual, Partnership, Corporation, LLC)
- Location of Building (Mall, Strip Mall, Attached to Habitational, Stand Alone)
- Elevators
- Years of Same Mgt.
- Updated Systems
- Resp. for Parking Lot?
- Hours of Operation
- Deliveries?
- Franchisee?
- # of Employees/Leasing

Not to mention – Billing history, account experience

Additional External Information

- Credit Score
 - Commercial
 - Owner
- Lots of Operational Info
 - Niche Specific (CLUE of Habitational Tenants)
 - Adjacent Properties/Tenants
- Geographic Data
- Economic/Demographic Data
- Property Value Data
- Commercial CLUE



Potential ZIP Code Level Demographics

■ Data Available

- Population Density
- Traffic Density
- Population Growth
- Unemployment Rates
- Building Vacancy Rates
- Industry Mix
- Prosperity Indices

■ Sources

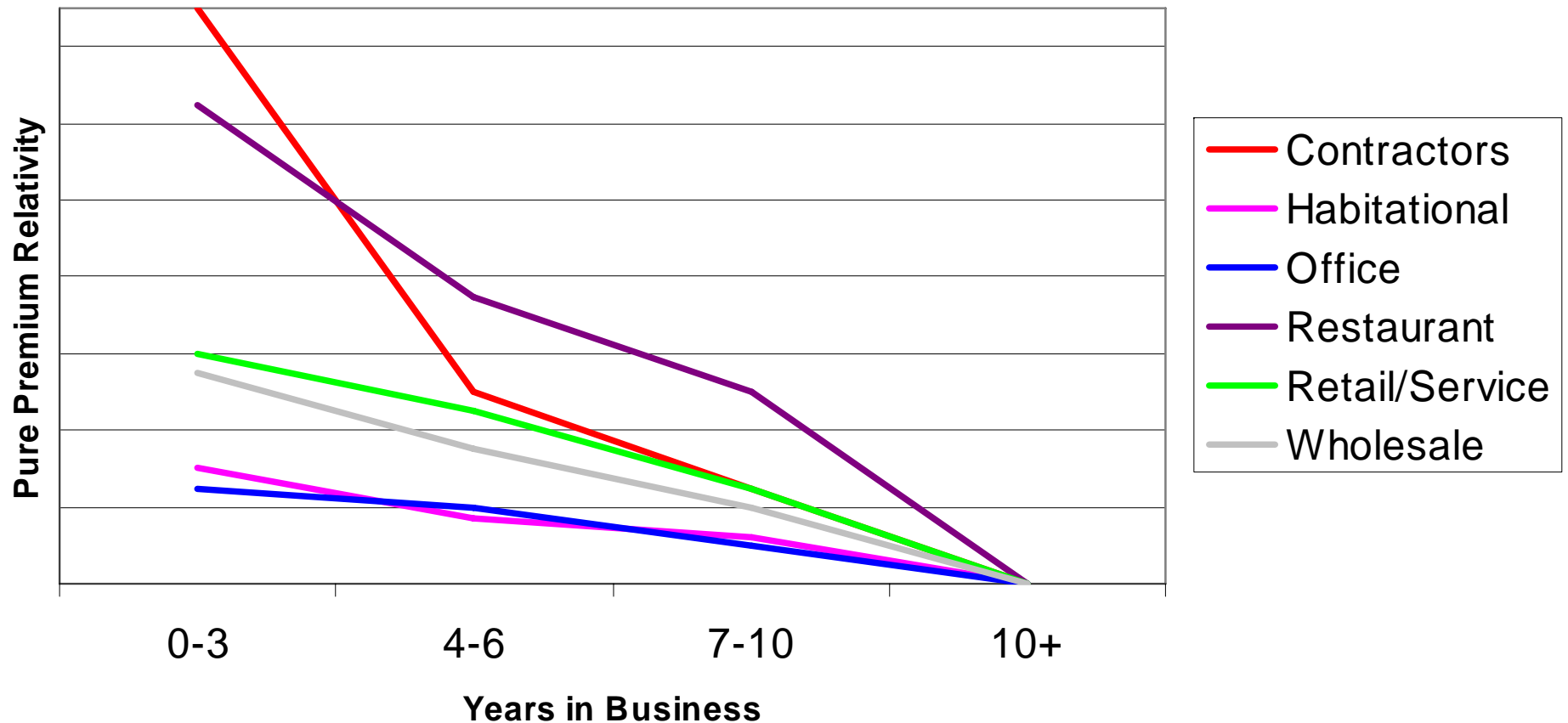
- Publicly available from census sources
 - Useful for addressing location specific issues
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Building of Underwriting Score

- Build predictive model with all rating variables and potential tiering variables (3 ways)
 - Complete
 - Tiering then rating
 - Rating then tiering
 - Develop selections for underwriting variables
 - Calculate underwriting score for each risk
 - Calculate final rating relativities
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Interactions Matter

Pure Premium Relativities by Program and Years in Business



Underwriting Scorecards with Interactions

Multivariate analysis allows the modeling of interactions and facilitates incorporation into scorecards

Years of Current Control	Score Points					
	Contr.	Habit.	Off.	Rest.	Ret./Serv.	Wholes.
0-3	60	115	120	70	95	100
4-6	100	130	125	85	100	110
7-10	120	135	135	100	120	125
10+	150	150	150	150	150	150

Underwriting Scorecard - Farmers

Risk Characteristic Pricing Element	Response	Point Value
Years in Business at this Location	New in Business	5
	Less than 1 Year	4
	1-2 Years	3
	2-3 Years	1
	3-4 Years	0
	4-5 Years	-1
	5-6 Years	-2
	6 Years or More	-3
Responsible for Parking Lot	Yes	2
	No	0
Wiring Year	25 Years or More	4
	20-24 Years	0
	11-19 Years	-2
	10 Years or Less	-4

Underwriting Scorecard - Farmers

Location of Business	Attached to Habitational Structure	10
	Stand-alone Building	3
	Strip Shopping Center	0
	Enclosed Mall	-3
Hours of Operation Open to Public	21-24 Hours	10
	16-20 Hours	5
	12-15 Hours	0
	Less than 12 Hours	-5
Percentage of Sales from Catering Services	Over 10%	10
	1-10%	5
	None	0
Total Percent of Sales from Liquor Sales	More than 20%	5
	1-20%	2
	None	0
Drive Thru	Yes	0
	No	0
Credit Score	All Responses	0

Underwriting Scorecard - Farmers

Debit or Credit Factors

Point Values				Debit or Credit Factors
Over		70	points	1.15
66	to	70	points	1.14
61	to	65	points	1.13
56	to	60	points	1.12
51	to	55	points	1.11
46	to	50	points	1.10
41	to	45	points	1.09
36	to	40	points	1.08
31	to	35	points	1.07

Travelers BOP Scorecard

Master Pac Tier Rating Factors

Pricing Track	Pricing Factor	Pricing Track	Pricing Factor
1	.52	21	1.14
2	.55	22	1.16
3	.58	23	1.20
4	.61	24	1.25
5	.64	25	1.30
6	.67	26	1.35
7	.70	27	1.40
8	.73	28	1.45
9	.76	29	1.50
10	.79	30	1.60
11	.82	31	1.70
12	.85	32	1.80
13	.88	33	1.90
14	.91	34	2.00
15	.94	35	2.10
16	.97	36	2.25
17	1.00	37	2.40
18	1.03	38	2.55
19	1.06	39	2.70
20	1.10	40	2.85

**NOTICE
THE
LIFT!**

Scorecard Advantages

- Regulatory
 - Underwriting Guidelines
- Preserve Competitive Advantage
 - To File or Not to File?
- Small & Class Specific Factors
- Response to Counter-Intuitive Results
(e.g. ACV, named perils)
- Similarity to Credit Scoring (Intuitive)
- **Ability for Underwriter/Agent Feedback**

Intuitive Look & Feel

A Pricing Track Factor will then be assigned based on the total points as follows:

<u>Point Range</u>	<u>Pricing Track Factor</u>
0 - 99	1.00
100 - 199	.92
200 - 299	.84
300 - 399	.76
400 - 499	.68
500 - 599	.60
600 - 700	.52

Other intuitive scaling approaches are also quite common.

Benefits of Using GLM for BOP Scorecard

- Improves Predictive Accuracy of Net Pricing
 - Increases Underwriting Effectiveness
 - Increases Use of “Who” Characteristics
 - Creates Adverse Selection for Competitors
 - Reflects Interactions
 - Fast, Cost-Effective Tool for U/W Decisions
 - Demonstrated Success Personal and Commercial Lines
 - Expand Your Markets
 - Smarter Soft Market Reaction
 - Provides Feedback to Underwriter, Agent & Insured
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For More Information



About the Author



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Underwriting Power Tools for Small Business Insurance

By Robert J. Walling, III, FCAS, MAAA

Commercial lines insurers are moving faster than ever to develop sophisticated underwriting tools for their small business insurance programs.

One of the most popular innovations is an underwriting scorecard that quantifies the impact of a variety of factors into the rating process. By providing greater pricing accuracy, scorecards offer advantages including

tier almost five-and-a-half times the lowest tier, which was impossible before. This new approach also allows more accurate assessment of the loss potential of each risk.



- www.pinnacleactuaries.com/pages/publications/files/PinnacleMonograph-PowerTools.pdf

Closing Thoughts

It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.

- Sir Arthur Conan Doyle

You can use all the quantitative data you can get, but you still have to distrust it and use your own intelligence and judgment.

- Alvin Toffler
