

BE AN ACTUARY.

ACTUARIES DAY-TO-DAY



Danny Linton,
Select Actuarial
Services

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CASE SPRING MEETING - MARCH 25, 2014

AUTO PRICING 101

BACKGROUND:

- ABC Insurance Company insures 1,000 eighteen year old drivers.
- Assume 300 of the 1,000 have accidents within a year.
- Assume the average repair cost for each accident is \$500.

QUESTION: WHAT IS THE MINIMUM PREMIUM THAT ABC SHOULD CHARGE AN 18-YEAR OLD FOR A 1-YEAR CAR INSURANCE POLICY?

AUTO PRICING 101

SOLUTION:

- At a minimum, the total premiums collected must equal the total cost of the accidents.
- Estimated cost of the accidents:
 $300 \times \$500 = \$150,000$
- Minimum premium for each driver:
 $\$150,000 \div 1,000 = \150

CHALLENGE: SHOULD ABC CHARGE MORE THAN THIS PREMIUM? IF SO, WHY?

AUTO PRICING 101

BACKGROUND:

- Assume 400 of the drivers are males and 600 are females.
- Assume 200 out of 300 of accidents will involve males, and the remaining 100 accidents will involve females.

QUESTION: WHAT PREMIUM SHOULD BE CHARGED FOR THE MALES AND THE FEMALES? SHOULD IT BE THE SAME?

AUTO PRICING 101

SOLUTION:

- Total males' premium:
 $200 \text{ accidents} \times \500
per accident = \$100,000
- Each male's premium:
 $\$100,000 \div 400 \text{ males}$
= \$250
- Total females' premium:
 $100 \text{ accidents} \times \500
per accident = \$50,000
- Each female's premium:
 $\$50,000 \div 600 \text{ females}$
= \$83.33

THE MALE'S PREMIUM
SHOULD BE THREE
TIMES THE FEMALE'S
PREMIUMS!

WHY BE AN ACTUARY?

- High earnings potential
- Graduate school not required – no loans to repay
- Advance by examinations – no “glass ceiling”
- Advancement opportunities expand throughout career
- Professional interactions – “Front Office” role
- Variety of avenues to choose
- Newsworthy projects
- High demand – less sensitive to economic cycles
- Job security
- Overall, a highly ranked profession

CareerCast.com: Actuary is the 2013 #1 job in US

BE AN ACTUARY.

NOT JUST INSURANCE.

Although insurance companies can't function without actuaries, that's **not the only place you'll find us.**

- Consulting 
- The Government
- Private corporations
- Colleges and universities
- Banks and investment firms
- Public accounting firms
- Labor unions
- Rating bureaus 
- Fraternal organizations
- Energy/Utilities
- Transportation

BE AN ACTUARY.



Being an NCCI Actuary

Vicky Mayen, FCAS, ASA, MAAA

Workers' Compensation (WC) Insurance

- Compensates employees for losses from work-related injuries
- No-fault system with benefits and coverage mandated by law
- Compulsory for most businesses

Indemnity	Medical
<ul style="list-style-type: none">• Wage replacement• Survivor benefits• Subject to min and max	<ul style="list-style-type: none">• Unlimited, first dollar coverage for all necessary treatments

National Council on Compensation Insurance

Operating since 1922 and with a not-for-profit philosophy, NCCI is nationally recognized as an expert in four major areas:

- Analyzing workers compensation trends
- Preparing insurance rate recommendations
- Assisting in legislative changes
- Providing specialized data products

Headquartered in Boca Raton FL, where most of the 900 employees work



Actuarial and Economic Services

Department within NCCI providing the following services:

- Ratemaking
 - Aggregate
 - Class
- Reserving
- Legislative Analysis
- Economic and Actuarial Research

Currently have about 80 actuaries/actuarial students/actuarial analysts, most working in Boca Raton

Professional Services Model – have allocations to more than one area

Vicky: Reserving and Legislative Analysis

What do NCCI Actuaries Do?

Ratemaking

- NCCI annually calculates workers compensation rates (or loss costs) for 38 states
- Insurance rates need to be adequate
- Aggregate and Class ratemaking

What do NCCI Actuaries Do?

Reserving

- Insurance companies need to balance premium and expenses and losses they expect to pay
- Actuaries calculate how much money insurance companies need to set aside to pay the ultimate cost of individual claims and all claims
- NCCI sets reserves for WC residual market pools in 37 states on an aggregate basis (by state and by policy year), not by individual claim

What do NCCI Actuaries Do?

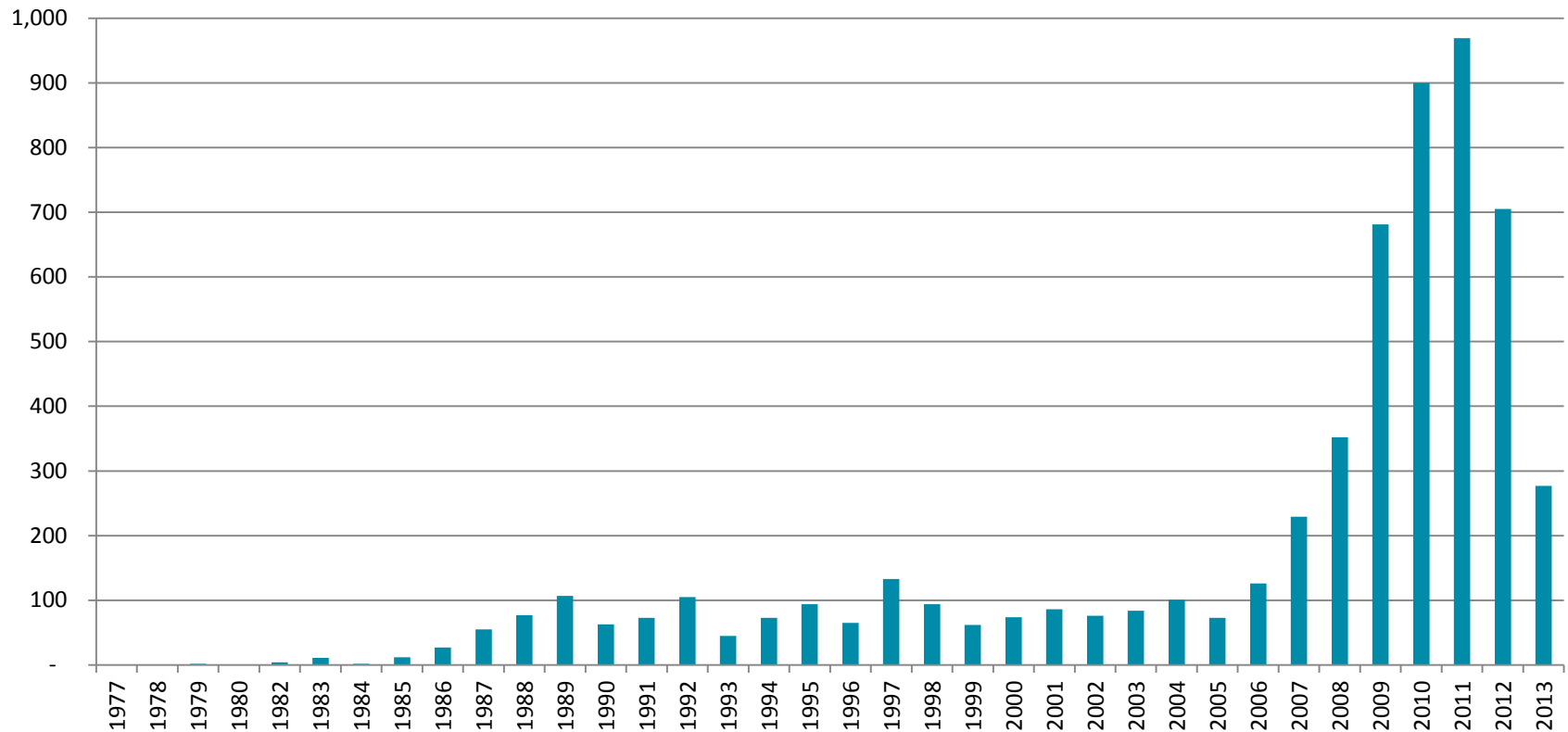
Reserving Example - Basketball

- Your favorite basketball team scores 100 points per game on average
- On average they score half of the points in each half of the game
- At tonight's game, they have scored 55 points at half-time
- How many points do you expect them to score by the end of the game?

What do NCCI Actuaries Do?

Reserving Example – NFL WC Claims

Number of WC Claims Filed in CA per year by former NFL players



Source: LA Times

What do NCCI Actuaries Do?

Legislative Analysis

- Actuaries review proposed legislation and estimate impact of this legislation on insurance rates
- Actuaries review judicial decisions and estimate the impact of these cases on insurance rates

What do NCCI Actuaries Do?

Legislative Analysis - Example

EXAM 5, SPRING 2010

23. (2.5 points)

Given the following workers compensation information:

- The compensation rate is 80% of the worker's pre-injury wage.
- The state average weekly wage (SAWW) is \$1,500.
- The minimum benefit is 48% of the SAWW.
- The maximum benefit is changing from 128% of the SAWW to 112% of the SAWW.
- The distribution of workers (and their wages) according to how their wages compare to the SAWW is as follows:

Ratio to Average Weekly Wage	Number of Workers	Total Weekly Wages
0 - 60%	64	\$37,550
60 - 120%	144	\$196,200
120 - 140%	33	\$64,350
140 - 160%	21	\$47,250
160 +	29	\$84,000

a. (2 points)

Calculate the direct effect of the change in maximum benefits on losses.

b. (0.5 point)

Explain a potential indirect effect of the change in maximum benefits on losses.

What do NCCI Actuaries Do?

Legislative Analysis - Solution

Part a.

ratio to avg weekly wage	80% of ratio to avg weekly wage	compensable weekly wages	
		pre-reform	post-reform
0-60%	0-48%	$64 * 1,500 * 48\% = 46,080$	same
60-120%	48-96%	$196,200 * 80\% = 156,960$	same
120-140%	96-112%	$64,350 * 80\% = 51,480$	same
140-160%	112-128%	$47,250 * 80\% = 37,800$	$21 * 1,500 * 112\% = 35,280$
160%+	128%	$29 * 1,500 * 128\% = 55,680$	$29 * 1,500 * 112\% = 48,720$
	Total	348,000	338,520
		% Change	-2.7%

Part b.

An indirect effect of lowering the max benefit would be a change in claimant behavior. Higher wage earnings may return to work faster as their benefits would not be as favorable as they had been prior. This might compound the decrease in total compensation.

What do NCCI Actuaries Do?

Economic and Actuarial Research

- Actuaries work with economists complete several research projects annually
- Recent studies:
 - The Impact of Physician Fee Schedules in WC
 - Claim Frequency Analysis
 - Bayesian Trend Selection
 - Narcotics in WC

NCCI Study Program

Exam	Study Hours per Sitting	First-time Sitting Pass Bonus	Pay Increase
1, 2, 3F	75/75/55	\$750	\$2,000/\$1,200
LC	35/35/25	\$250	\$450
ST	65/65/50	\$500	\$750
4	120/120/90	\$1,000	\$2,400
5, 6	120/120/90	\$1,500	\$2,400
7, 8, 9	120/120/90	\$1,500	\$2,800

- Try to benchmark to industry average

NCCI Careers

Full Time Positions

- Usually hire at entry-level
- Need at least Bachelors degree and 1 exam
- No set quota, as needed: avg 7 per year

Summer Internship (12 weeks)

- 4 positions, usually for rising seniors
- Can offer full-time positions

Select Actuarial Services

Actuarial Consulting

Danny Linton, FCAS, MAAA
March 25, 2014



Select Actuarial Services Overview

- **Experience**

- 80+ Years of Actuarial Experience
 - Five Partners
 - Fellows – Casualty Actuary Society
 - Past President American Academy of Actuaries (MAAA)
 - Past President of the Casualty Actuarial Society (CAS)
- **More than 125 Clients**
 - Over 200 actuarial studies completed every year

Who Uses Our Services?

- Public and Private Entities
- Must be large enough in order to make reasonable statistical predictions regarding loss experience
 - Resulting in a benefit to retaining risk
- Finance risk portfolio through various forms of “Alternative Risk Transfer”
 - Large Deductibles
 - Self Insurance
 - Captive Insurance Companies

Client Portfolio

- *Hospitals*
- *Healthcare Companies*
- *Communications Companies*
- *Cities*
- *Counties*
- *State Insurance Departments*
- *School Districts*
- *Airports*
- *Public Transportation Systems*
- *Utility Companies*
- *Manufacturers*
- *Retail Stores*
- *Restaurant Chains*
- *Hotels*
- *Delivery Service Companies*
- *Waste Management Companies*
- *Food Processing Companies*
- *Paper Manufacturers*
- *Cellular Telecommunications*
- *Captive Insurance Companies*
 - *Domestic and International*

Actuarial Services Offered

- **Lines of Coverage**
 - Workers Compensation
 - General Liability
 - Automobile Liability
 - Automobile Physical Damage
 - Hospital and Professional Liability
 - Executive Risk – Directors' & Officers
 - Public Officials Liability
 - Property Insurance

Actuarial Services Offered

- **Loss Forecast Studies**
 - Used for budgeting purposes
 - Forecasts about size and frequency of future losses
 - Study tailored to insurance program
 - Retentions
 - Limits
 - Aggregates

Actuarial Services Offered

- **Loss Reserve Analysis**
 - Helps set and achieve appropriate level of reserves
 - Large deductible, self-insured, other loss-sensitive plans
 - Examples
 - Outstanding self-insured loss and expense reserves
 - Analyses of collateral requirements
 - Insurance company reserve analyses and statutory opinions

Actuarial Services Offered

- **Captive Feasibility Studies**

- Viability of a company depends on the appropriate balance of:
 - Premium
 - Surplus
 - Exposure

- **Capital Adequacy Studies**

- Primarily used to answer three questions:
 - What is the minimum amount of surplus to maintain the company?
 - Is there extra surplus (free capital) to grow the business?
 - If so, what types of exposures should be introduced?

Why Retain Risk?

- Save on premiums
 - Don't need to give money away to insurers for risk that can be effectively managed
- The amount of risk retained varies
 - Risk appetite
 - Insurer approval
 - Regulatory approval

Why Retain Risk? (Example)

- Consider a large insured managing their auto liability program:

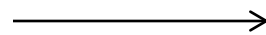
Automobile Liability Program	
Number of Autos	1,000
Number of Claims	300
Average Claim Severity	\$500

- What are the expected retained losses by introducing a \$250 deductible?

Why Retain Risk? (Example)

- Let's assume the annual number of claims is constant.
- Claim severity is distributed as follows:

Auto Liability Claim Severity	
25%	\$100
35%	\$150
35%	\$250
5%	\$6,700



$$E[X; \$250] = 25\% * \$100 + 35\% * \$150 + 35\% * \$250 + 5\% * \$250 = \$177.50$$

$$\text{Expected Retained Losses} = \$53,250$$

Complicating Factors

- Claim Frequency is not constant
- Severity distributions are not discrete and tend to vary by layer
- Litigation
- Aging Workforce
- Economic Environment

Closing Remarks

- Rewarding Career

- Gain experience with a wide variety of risks
 - Work doesn't get stale
 - Always something to learn

- Financially rewarding

- Casualty actuaries are compensated more on average than Life & Pension actuaries

- Consistently rated as one of the best jobs in America

WHAT IS WORKING AS AN ACTUARY REALLY LIKE?

Paul Cochran, Vice President, Actuarial Services, Old Republic General Services Inc., and Fellow of the Casualty Actuarial Society:

- On an analytical level, a typical day would consist of working on spreadsheets to complete a reserve analysis or pricing adequacy review. In a midsize company like mine, there is also opportunity to price a new product, which takes creativity, or respond to an insurance department inquiry, which requires communication skills and tact.
- On a management level, a typical day might consist of approving reserve or pricing reviews, conferring with data management over discrepancies, discussing product strategies with operating units, or meeting with senior management of the company to discuss quarterly results.

FIND OUT MORE

- www.beanactuary.org – career information for future actuaries
- www.casact.org – Casualty Actuarial Society
- www.CASstudentcentral.org – CAS Student Central
- www.soa.org – Society of Actuaries
- www.actuary.org – American Academy of Actuaries

- Actuary is #1 best job for 2013
 - www.careercast.com/jobs-rated/10-best-jobs-2013
- Salary Surveys
 - www.ezrapenland.com
 - www.dwsimpson.com

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Questions?