




CAS Seminar on Reinsurance Impact of Trend and Inflation on Re(Insurance)

A diagram featuring three interlocking gears of different sizes. The gears are rendered in a metallic, textured style. Three curved arrows, one orange, one green, and one red, point in a clockwise direction around the gears. The text 'DATA', 'ANALYTICS', and 'DECISION SUPPORT' is arranged in a circular path around the gears, with each word positioned near a corresponding arrow.

DATA • ANALYTICS •
DECISION SUPPORT

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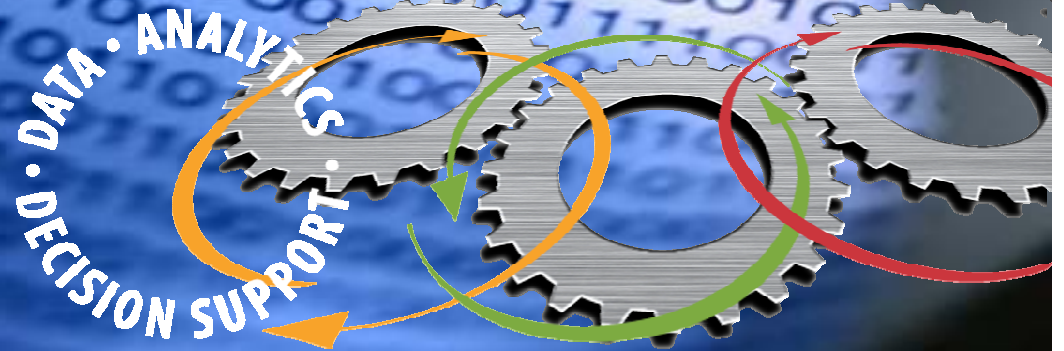
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Trend Sources and Techniques

- **Data for Trend Analysis**
- **Data available for Reinsurance/Excess Pricing**
- **Issues in Selecting Trends**
- **General Liability Manufacturers & Contractors example**
- **Commercial Property Basic Group I (Fire) example**
-  **EPL, Crime Frequency**



Trend Data



ISO Industry Data

- **Data available for claim severity, claim frequency and exposure trend analysis**
- **Detailed transaction reporting of premium and losses**
 - individual policy information
 - individual occurrence/claimant information
- **More flexibility in compiling data for analysis**
- **Enhanced quality and accuracy**



U. S. Economic Data

- **Historical data sources**
 - Federal Reserve
 - U.S. Bureau of Labor Statistics
 - Bureau of Economic Analysis
- **Forecasted information**
 - IHS Global Insight *
 - ISO models

* Neither IHS Global Insight nor any of its third party licensors make any warranties, expressed or implied, as to the results obtained using their data and forecasts.



Alternative Trend Forecasts for Severity

- **Inflation Adjusted Trend Procedure**
 - Calculate inflation index (or *severity deflator*) by weighting economic price indices
 - Compute real severities by dividing historical nominal severities by inflation index
 - Price inflation = trend in the (forecasted) severity deflators
 - Social inflation = exponential fit of historical real severities
 - changes in claim settlement, laws, court practices



Alternative Trend Forecasts for Severity

- **Inflation Adjusted Trend Procedure**
 - trend in real severities (social inflation) is constant
 - trend in severity deflators (price inflation) varies depending on trending period
- **Forecasted Nominal (or total) severity**
= forecasted real severity x forecasted severity deflators



General Liability Severity

- **Bodily Injury Severity Deflators**
 - Medicare – weighted price index of CPIs for hospital, physician services and medical commodities
 - Legal – price index for personal legal services
- **Property Damage Severity Deflators**
 - PCWC – personal consumption price index
 - Legal



Commercial Auto Severity

- **Bodily Injury Severity Deflators**
 - Medicare – weighted price index of CPIs for hospital, physician services and medical commodities
 - Wage – employment cost index for private industry workers
- **Property Damage Severity Deflators**
 - CPI for Motor Vehicle Body Work



General Liability Exposure

- **Contractors Payroll**
 - hourly earnings for construction workers
 - wages for private industry workers
- **Manufacturers Sales**
 - consumption of durables & nondurables
 - consumption of food services
 - net exports of merchandise
 - private domestic investment
- **OL&T Sales**
 - retail sales including food services



General Liability Frequency

- Forecasts: frequency ↑

with ↑ interest rates

and ↑ unemployment rates

- Use Unemployment rate & 5-year Treasury note interest rate



General Liability Frequency

- **High interest rates**
 - businesses have increased financial pressure
 - claimants under greater financial stress (higher debt service, lower asset values)
- **High unemployment**
 - poor business climate
 - claimants under greater financial stress
- **Potential for less investment & maintenance and production cutbacks**

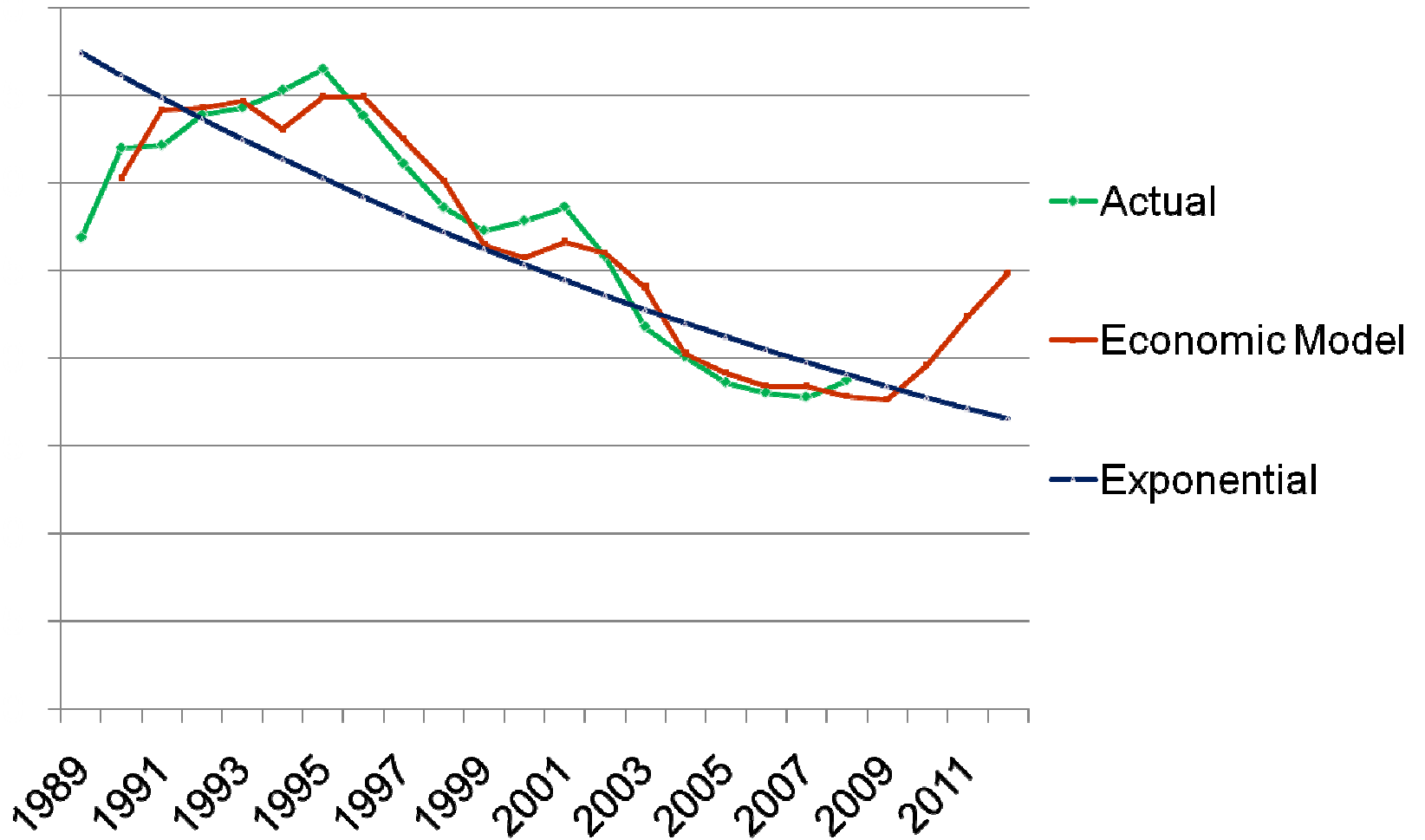


Other Economic Analyses

- **Commercial Auto Severity - PIP, Med Pay, Physical Damage**
- **Commercial Auto Frequency**
- **Personal Auto Severity & Frequency**
- **Homeowners Severity, Frequency, Exposure**



General Liability Frequency Example



External Data for Commercial Property

- **U.S. Economic Data**
 - Retail Sales
 - Manufacturers Sales Exposure
 - Producer Price Indices (PPI)
- **Xactware Commercial Index (XCI) for buildings**





Data for Reinsurance/Excess Trends

ANALYTICS
SUPPORT
DATA
DECISION

A diagram featuring three interlocking gears of different sizes, colored in shades of grey. Three curved arrows, one orange, one green, and one red, point in a clockwise direction around the gears. A circular text overlay is positioned to the left of the gears, containing the words 'ANALYTICS', 'SUPPORT', 'DATA', and 'DECISION' arranged in a circle.

Data Compilations

Standard Compilations

- **Size of Loss data for General Liability (“GL”) and Commercial Property (“CP”)**
- **Layer of Loss data for GL**
- **5-years historical primary experience by Class and State/Territory for GL & CP**

Custom Compilations

- **Size of Loss by Amount of Insurance for CP**
- **Layer of Loss by Policy Limit for GL**
- **Other possibilities for both lines**



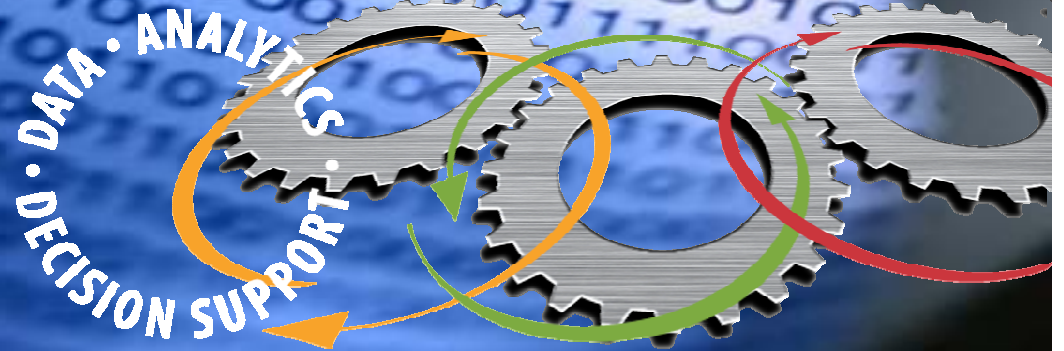
General Liability Increased Limit Analysis

- **Calculate Increased Limit Factors using mixed exponential curves fit to paid occurrence data by accident year & settlement date**
- **Analyze paid/settled data for many years by policy limit purchased**
- **Analyze basic limit and total limit paid and incurred accident year data**
- **Select long-term average unlimited severity trend for CSL**





Trend Issues



Trend Method

- **Fit data to exponential curves**
- **Calculate goodness of fit R^2**
- **Calculate fits for different number of years**



Trend Selection Issues

- **Stability**
- **Regulatory Support**
- **Compliance with Actuarial Standard of Practice #13 on Trending Procedures**
 - consider bias or distortions in data
 - consider economic or social influences either in data or in projection period





General Liability Trend

A diagram of three interlocking gears is located in the lower right quadrant. The gears are rendered in a metallic, textured style. Three curved arrows, colored orange, green, and red, point in a clockwise direction around the gears. The text 'ANALYTIC SUPPORT' is written in a white, sans-serif font, following the curve of the top gear. The text 'DECISION DATA' is written in a white, sans-serif font, following the curve of the bottom gear.

ANALYTIC SUPPORT
DECISION DATA

Manufacturers & Contractors Claim Severity and Frequency Trend

- **By coverage (bodily injury, property damage, pers & advertising injury)**
- **Internal ISO claim severity and claim frequency data**
 - **Basic limits** accident year loss data (unlimited ALAE)
 - losses/claims developed to ultimate
 - paid and incurred
 - indemnity, ALAE, indemnity + ALAE
 - 10, 8 and 6 year fits



Manufacturers & Contractors Exposure Trend

- **Use Economic Trend forecasts**
 - Contractors classes – use contractors payroll price index
 - Manufacturers classes – use manufacturers sales price index



Issues for Manufacturers & Contractors Trend Selections

- **Analyze severity fits excluding latest point(s) due to loss development**
- **Use paid severity to avoid bias in case reserve changes over time**
- **Incurred development more stable**
- **Analyze Indemnity vs. ALAE for any severity distortions**
- **Frequency selection also reflects any recent patterns and any external information**



Manufacturers & Contractors Example

\$100k/\$200k Bodily Injury Paid Severity

	Indemnity + ALAE Fits	Indemnity + ALAE R ²	ALAE Fits	ALAE R ²
6 year	10%	.85	15%	.80
8 year	7%	.95	10%	.85
10 year	6%	.90	8%	.80
9 year (ex latest)	7.5%	.95	9.5%	.88

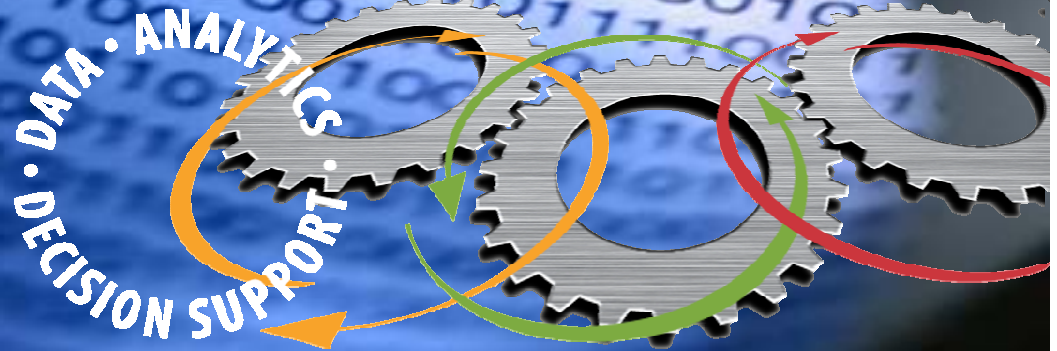
Last year's selection = 6.5%

This year's selection = **7.0%**





Commercial Property Trend



Basic Group I (Fire) Claim Severity and Claim Frequency Trend

- **By coverage (buildings, contents, time element)**
- **Fit internal ISO claim severity and claim frequency data**
 - losses/claims developed to ultimate
 - total vs. normal accident year losses
 - 10, 7 and 5 year fits
 - by deductible & “blended” weighted avg. of all deductible data



Basic Group I (Fire) Claim Severity

- **Fit 12 points of External data**
 - XCI for buildings
 - PPI for contents
 - Manufacturing sales & Retail sales for time element
- **Determine Current Cost Factor & Loss Projection Factor using External data**



Basic Group I (Fire) Loss Trend

- **Select Severity Loss Trend Adjustment (LTA) to complement external economic indices**
- **Select Frequency LTA based on internal data**
- **Apply severity trend to individual occurrence**
 - first add \$ded back to loss amount
 - apply severity trend
 - subtract \$ded



Basic Group I (Fire) Exposure Trend

- **By coverage (buildings, contents, time element) using internal ISO data**
- **Determined from actual changes in amounts of insurance from one year to the next**
- **Based on a sample of renewal policies, matched on premium record ID, insurer, state, territory, construction, coverage, protection, occupancy class and rating ID**



Issues for Commercial Property

- **Deductible distribution changes over time = rely on “blended average” of all deductibles**
- **Distortions due to large losses = rely more on normal losses**
- **Bias in distribution of losses by cause in different years- analyze fire, VMM, theft, water claims each year**



Commercial Property Example

Basic Group I Building Internal Severity

	\$500 Ded.		\$1000 Ded.		\$2500 Ded.		Blended Ded.	
	Normal	Total	Normal	Total	Normal	Total	Normal	Total
10 Yr. Fits	3%	4.5%	4%	4.5%	6%	5.5%	4.2%	5%
R ²	.85	.80	.90	.88	.80	.78	.90	.85

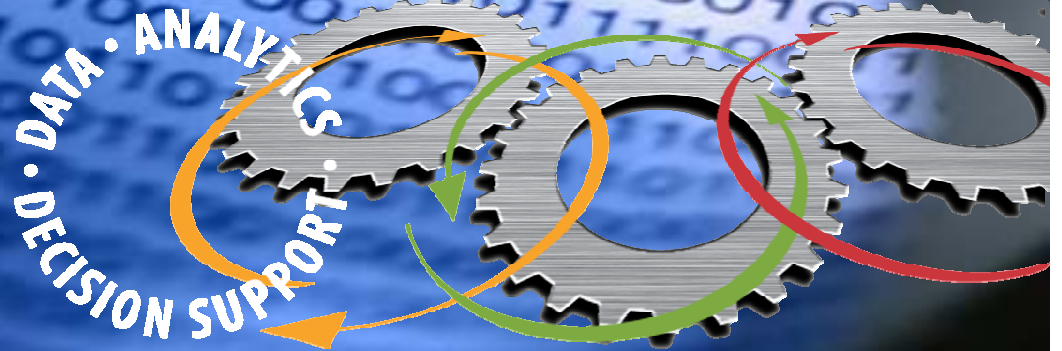
Last year's selection = 4.0%

This year's selection = 4.0%



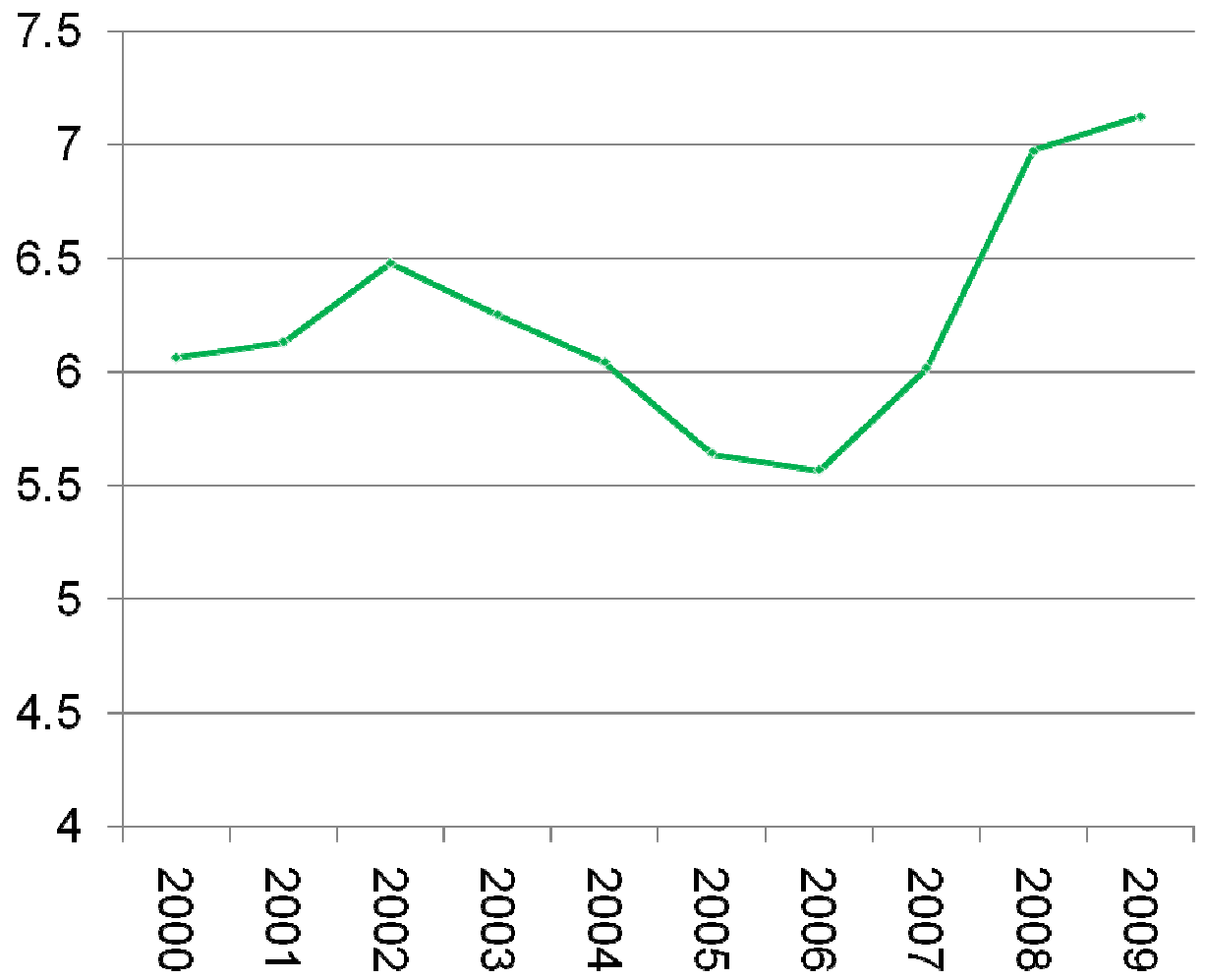


EPL Frequency Trend



Employment Practices Liability Frequency

Frequency of EEOC Charges Filed per Employee *



* Frequency per 10,000 employees

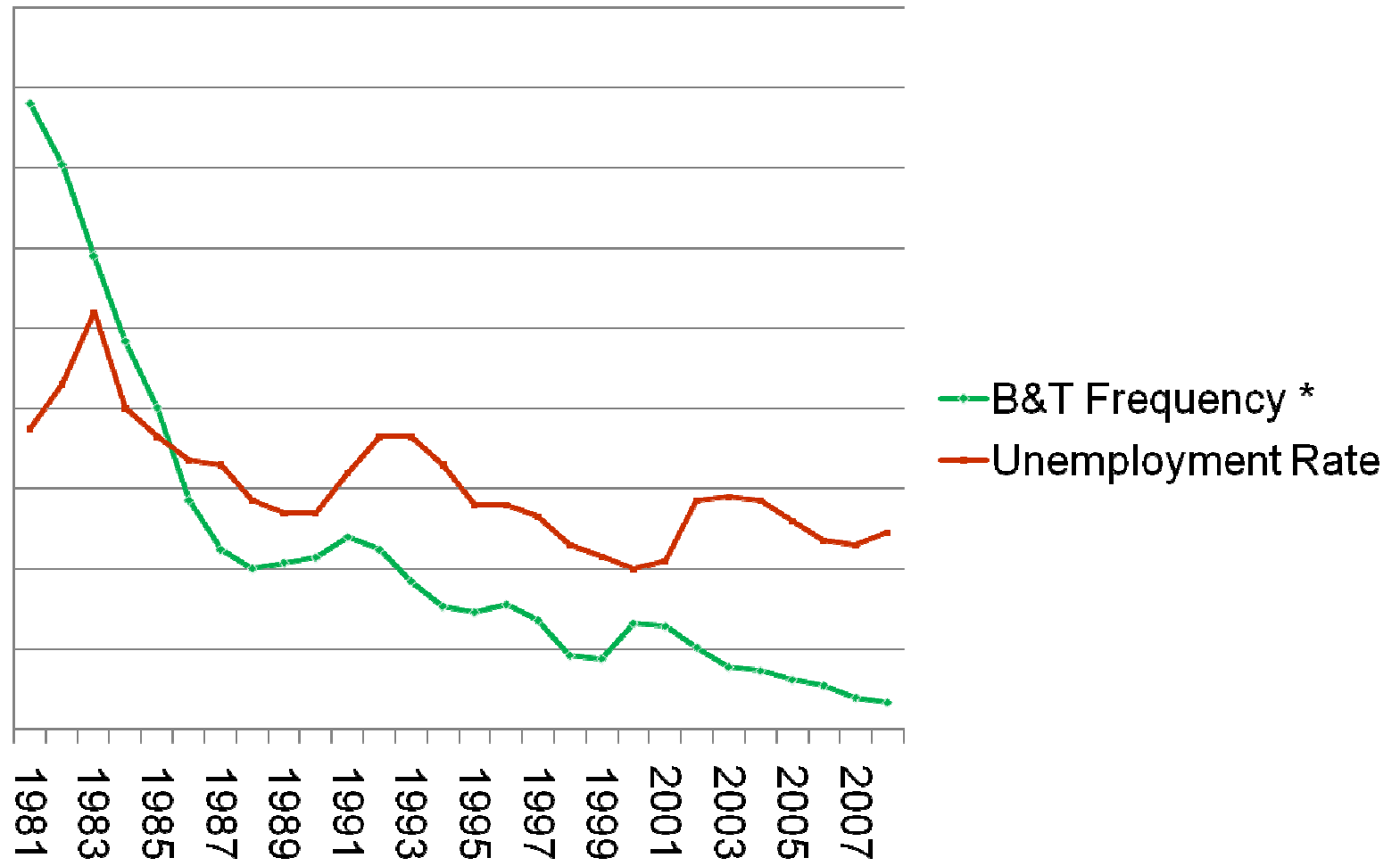


Crime Frequency Trend

ANALYTICAL
SUPPORT
DECISION DATA

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Burglary & Theft Frequency



* Frequency per \$1000 of ALCCL