Seminar on Reinsurance – May 18-2009

An Update to Stephen D'Arcy's –

"A Strategy for Property-Liability Insurers in Inflationary Times"

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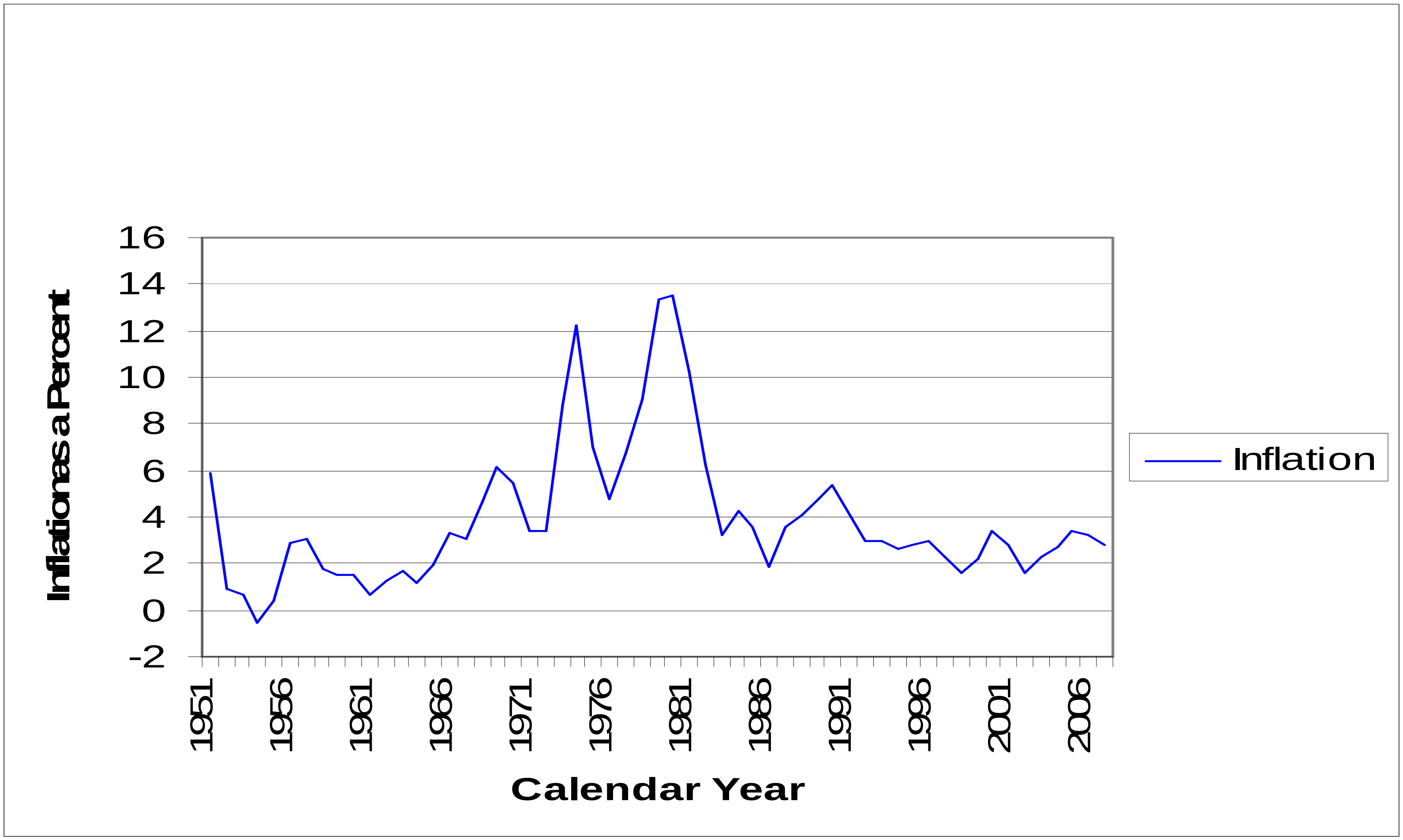
Disclaimer

The following is for information and discussion purposes only in connection with the Casualty Actuarial Society's Seminar on Reinsurance. Any views or opinions expressed are the speaker's and do not necessarily reflect any corporate position, opinion or endorsement of Partner Reinsurance Company of the US or it's affiliates.

Inflation and Insurance

- D'arcy' Paper → 1980
  - Is inflation good for (re)insurance companies?
  - How does it impact operations?
    - On the underwriting side? Specific lines?
    - On the asset side? Specific assets?
  - Is there a strategy to insulate and property-casualty insurance companies from inflation?

Inflation Since 1951

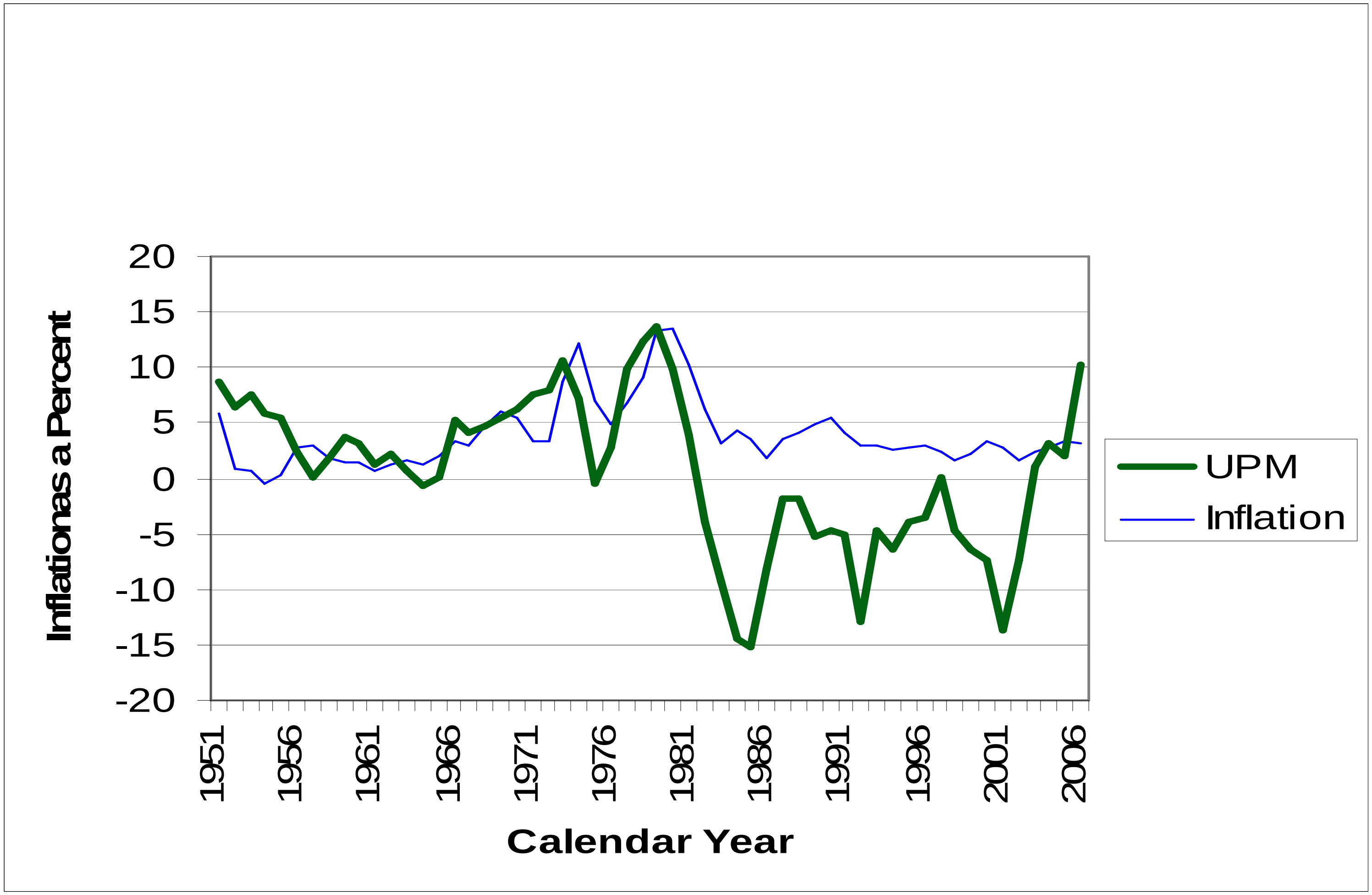


Data

- Best's Data for Insurance Returns
  - Calendar Year
    - Realize losses when they are reserved
    - Statutory Investment Income
- CPI
  - Proxy for insurer inflation

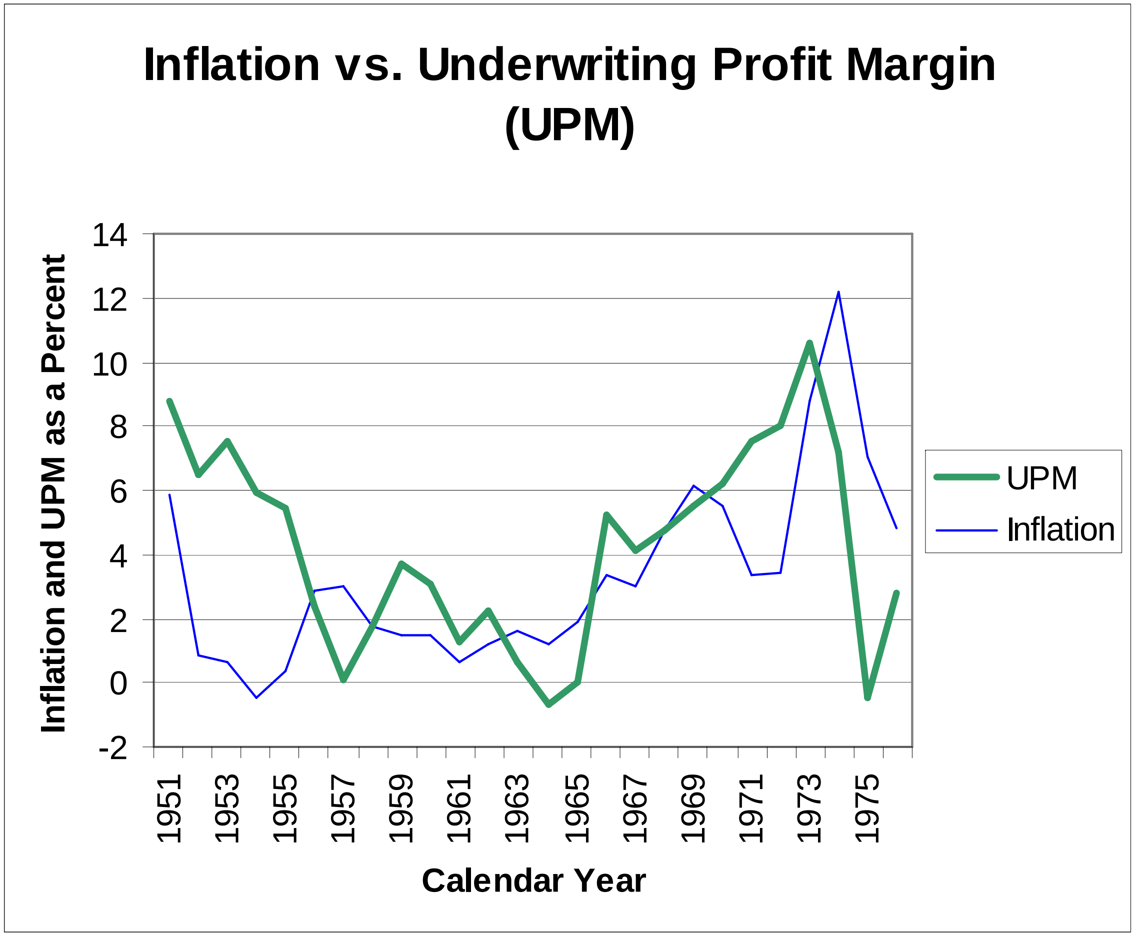
- **Underwriting Profit Margin = Combined Ratio After Dividends – 100%**

Underwriting Profit Margin Since 1951



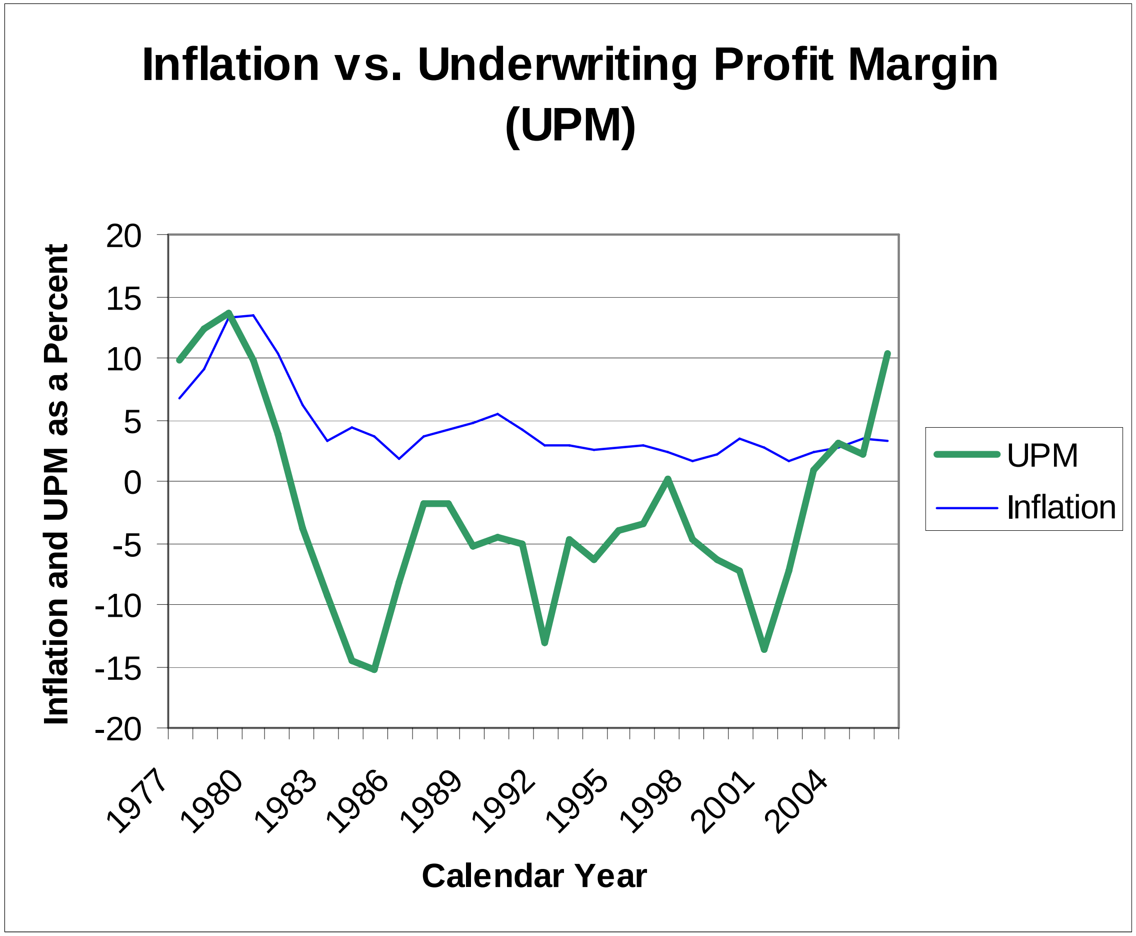
Calendar Years 1951-1976

UPM = -0.617*Inflation + 2.955 R^2 = 27.7%



Calendar Years 1977-2006

UPM = 0.593*Inflation - 9.586 R^2 = 8.7%



Is There Any Possible Explanation for the Lack of a Meaningful Fit?

- Inflation has been a narrow band over the subsequent 30 years
  - CPI Range 1.6% → 5.4%

- Underwriting Cycle is the key driver behind changes in Profit Margins
  - Prevailing wisdom – f (Excess Capital)

Autoregressive Model

- Model Built to Capture the Impact of the Underwriting Cycle Along with Inflation

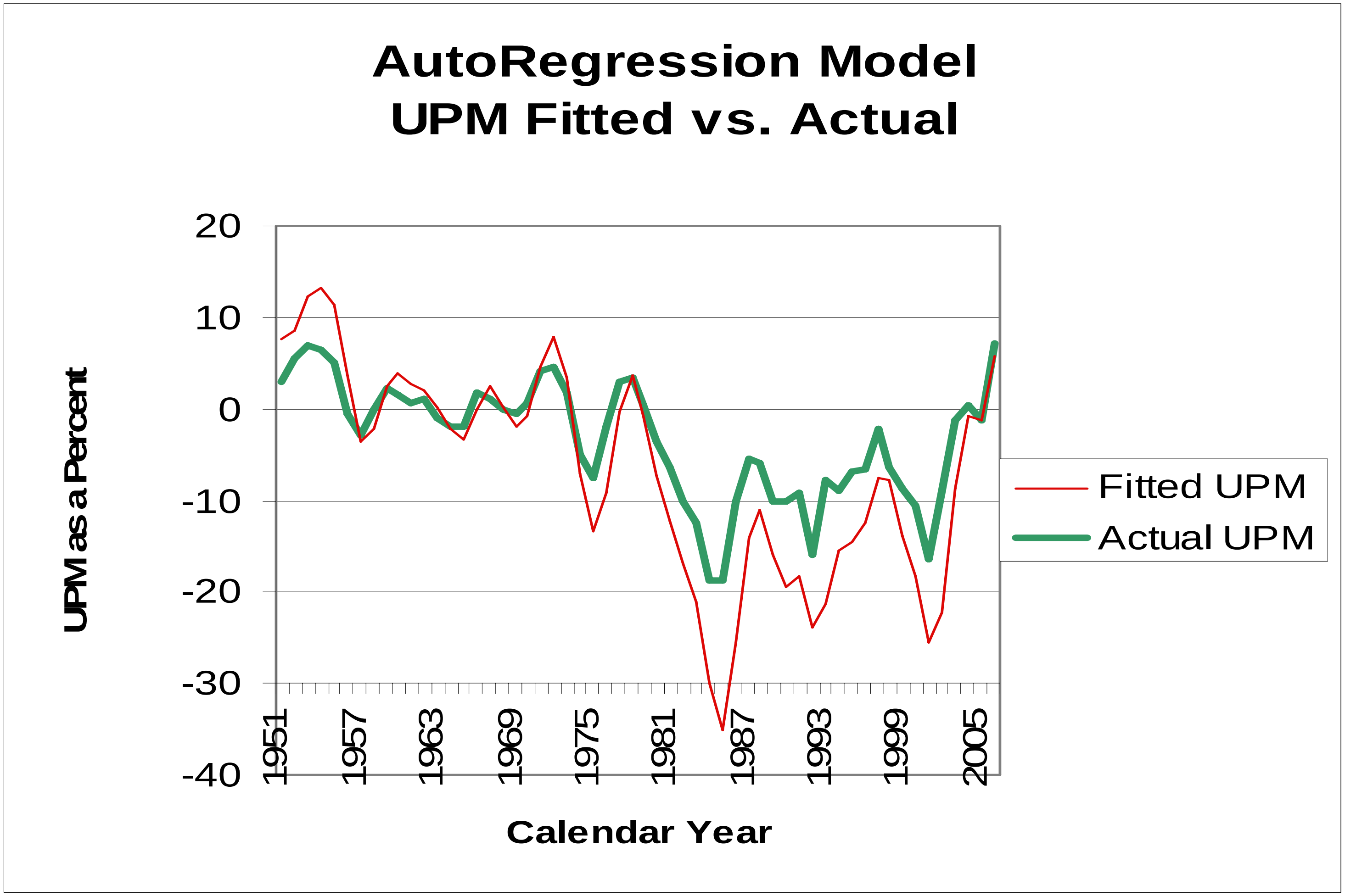
$UPM_{(t)} = a*UPM_{(t-1)} + b*Inflation_{(t)} + c$

This Years' Profits = f [Last Years' Profits]

- Model Misses inflection points
  - When the market hardens the changes have been dramatic

Calendar Years 1951-2006

UPM(t) = 0.84UPM(t-1)- 0.364*Inflation(t) +0.911 R^2 = 70%



Autoregression Model Fit

$$UPM_{(t)} = 0.84UPM_{(t-1)} - 0.364*Inflation_{(t)} + 0.911$$

t =11.130 t = -2.285

- R^2 = 70%
- Inflation coefficient negative and significant
- Inflation is likely a second order variable in terms of its impact on the UPM

Questions Answered

- Is inflation good for (re)insurance companies?
  - Inflation Bad
- How does it impact underwriting operations?
  - Negative Correlation Implies that Higher Inflation Reduces Underwriting Profit Margins
- Why?
  - Rates become inadequate
    - Slow to recognize inflation
    - Regulation

Specific Lines - Discussion

- Personal Auto - Largest Line
  - Data Driven
  - Less Regulated than in the Past
  - Moderate Impact

- Property - Homeowners
  - Inflation-Guard
  - Moderate Impact

Specific Lines - Discussion

- Workers Compensation
  - No Limits!
  - New Procedures/Medications
  - Caps on Wage Replacement
  - State Regulation
  - High Impact

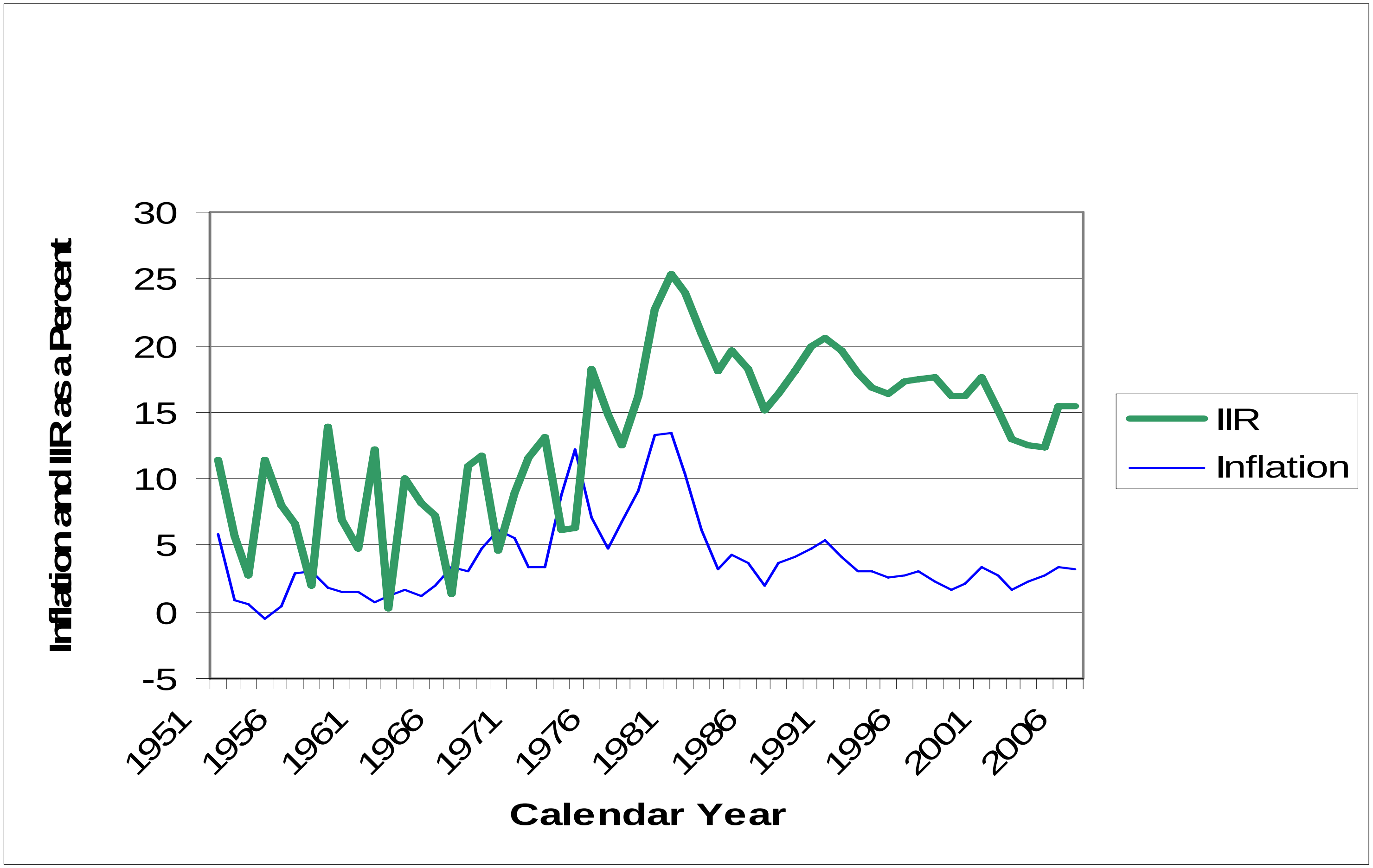
Specific Lines - Discussion

- Casualty (GL, Umbrella, Professional)
  - High Reserve-Risk With Reliance on BF Method
  - Less Impact on High Severity Lines (D&O)
  - Moderate to High Impact Overall

Specific Lines - Discussion

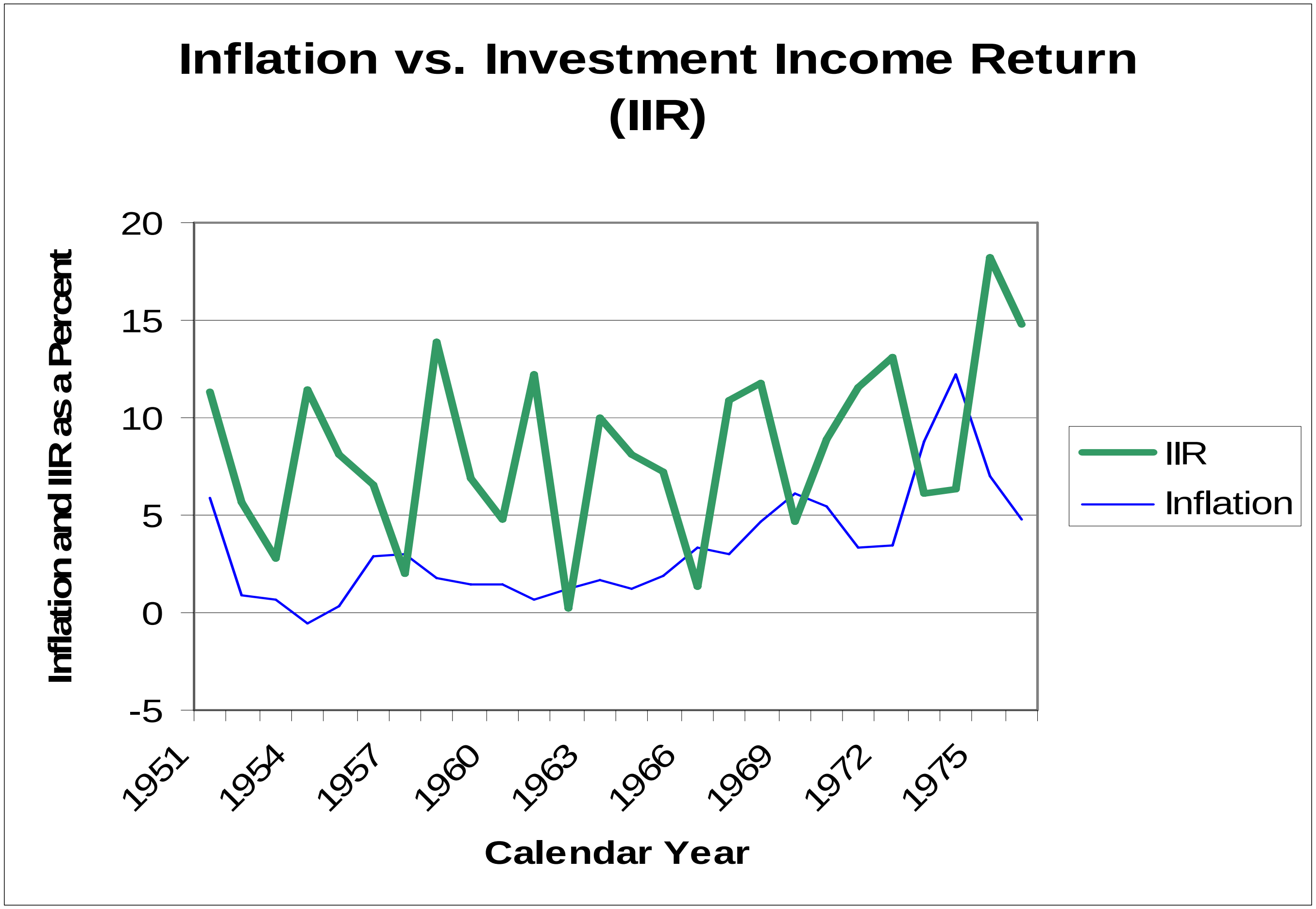
- Reinsurance
  - Trend-Leveraging
  - Birds-Eye View
    - Primary Rate Changes
    - Loss Trends
    - Coverage Expansion
  - Treaty Features can limit inflation exposure
  - High Impact

Investment Income Return Since 1951



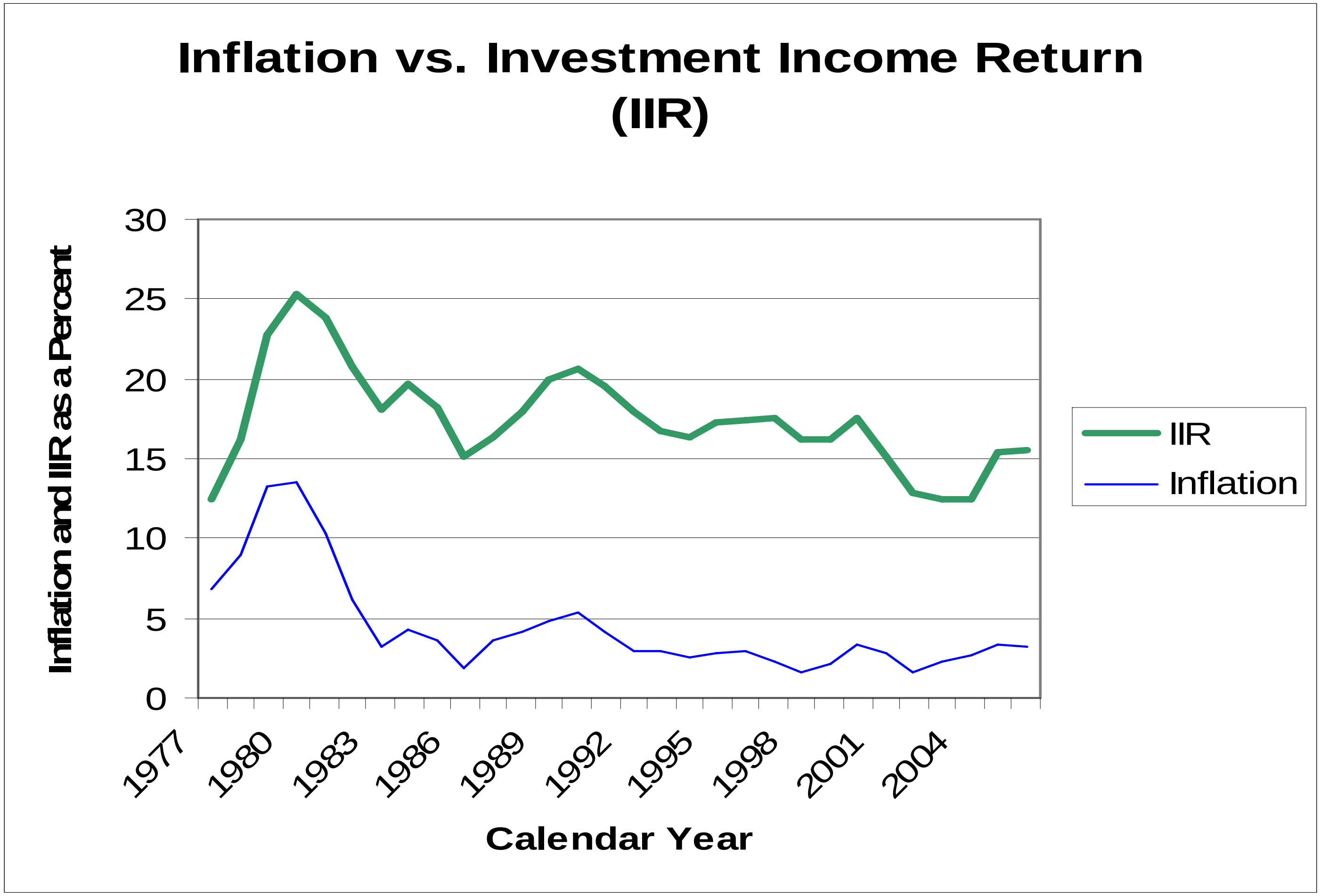
Calendar Years 1951-1976

UPM = -0.818*Inflation + 7.815 R^2 = 22.6%



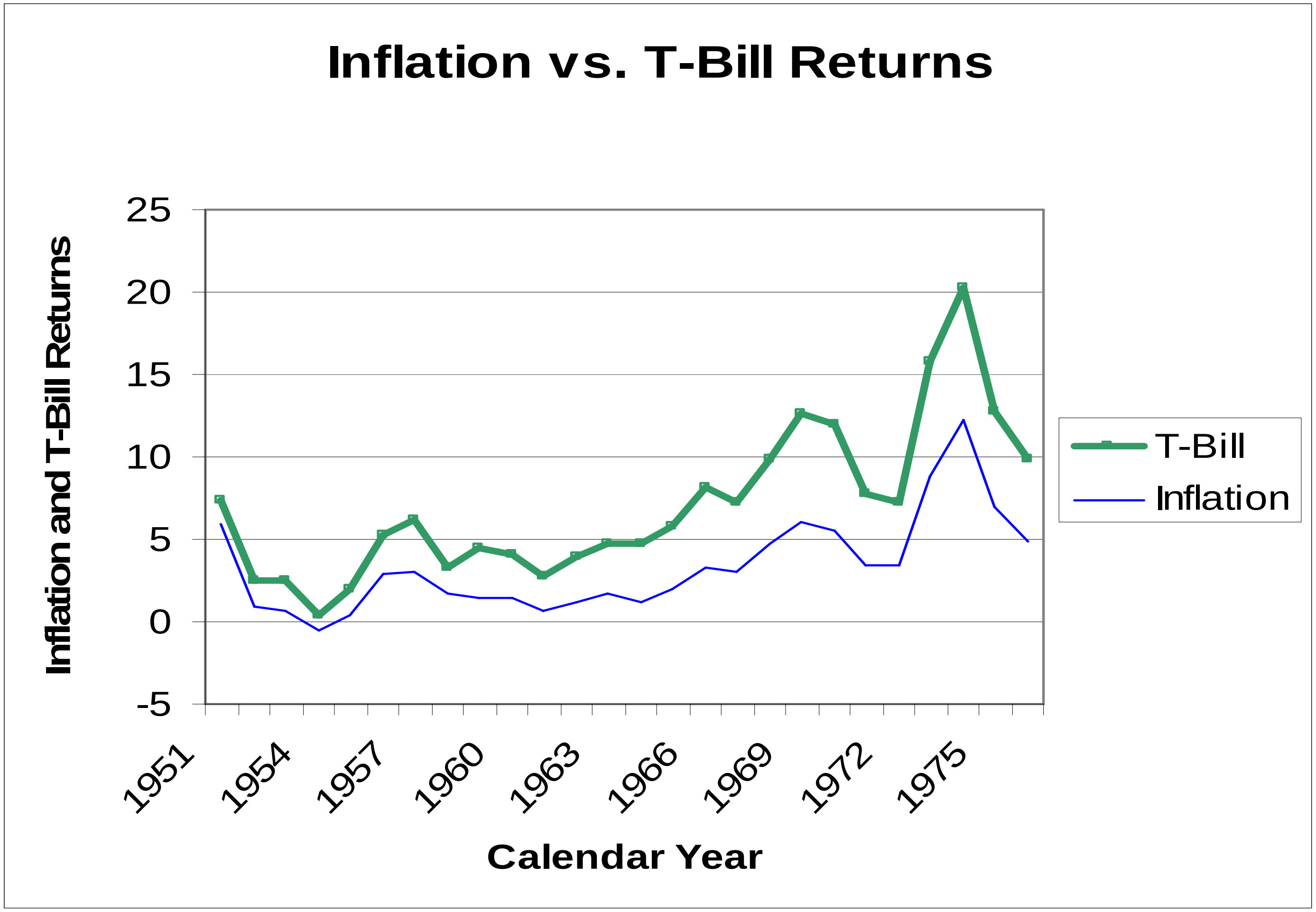
Calendar Years 1977-2006

UPM = -0.297*Inflation + 14.333 R^2 = 14.5%



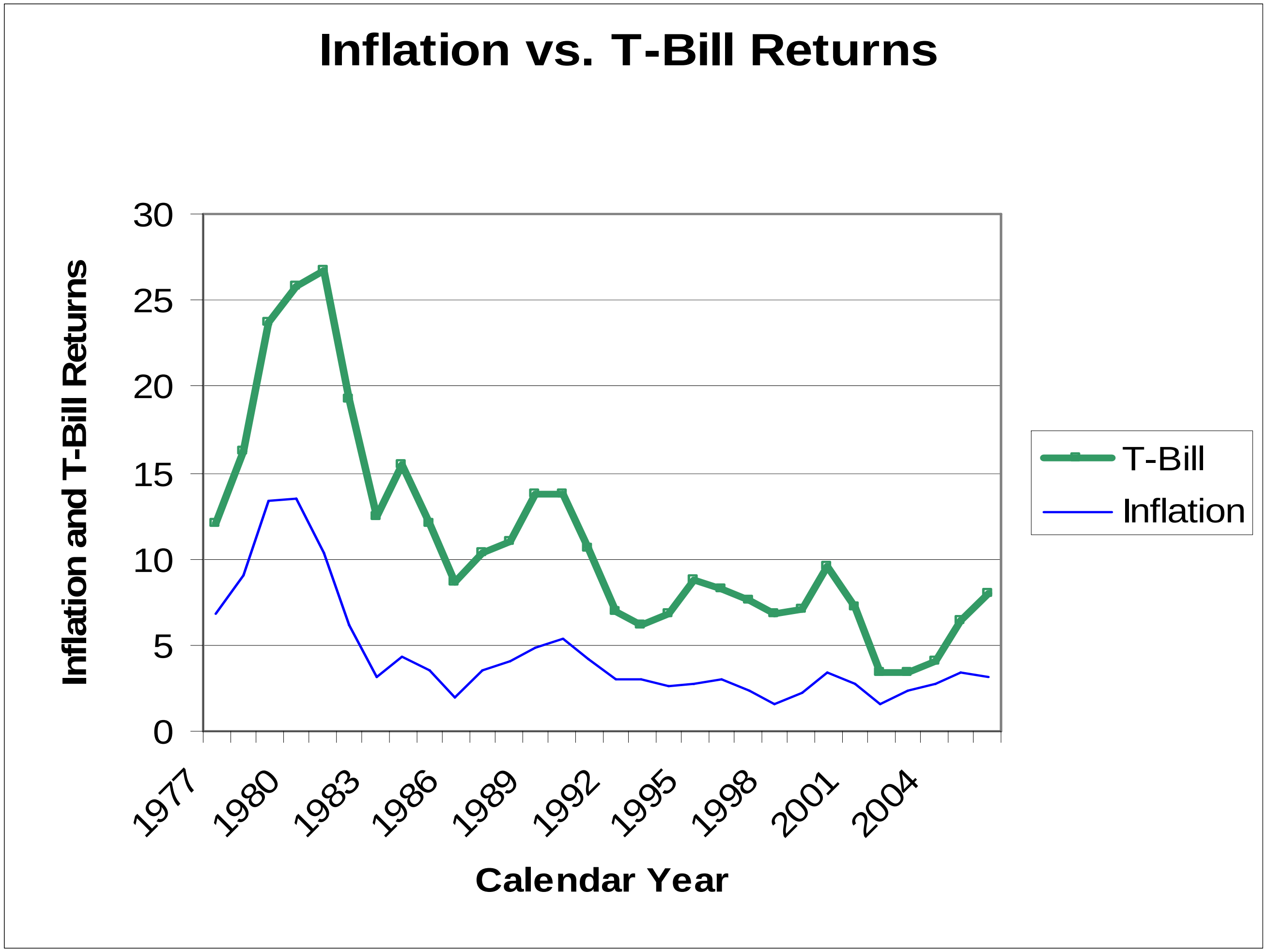
Calendar Years 1951-1976

T-Bill = 0.556*Inflation + 1.873 R^2 = 70.6%



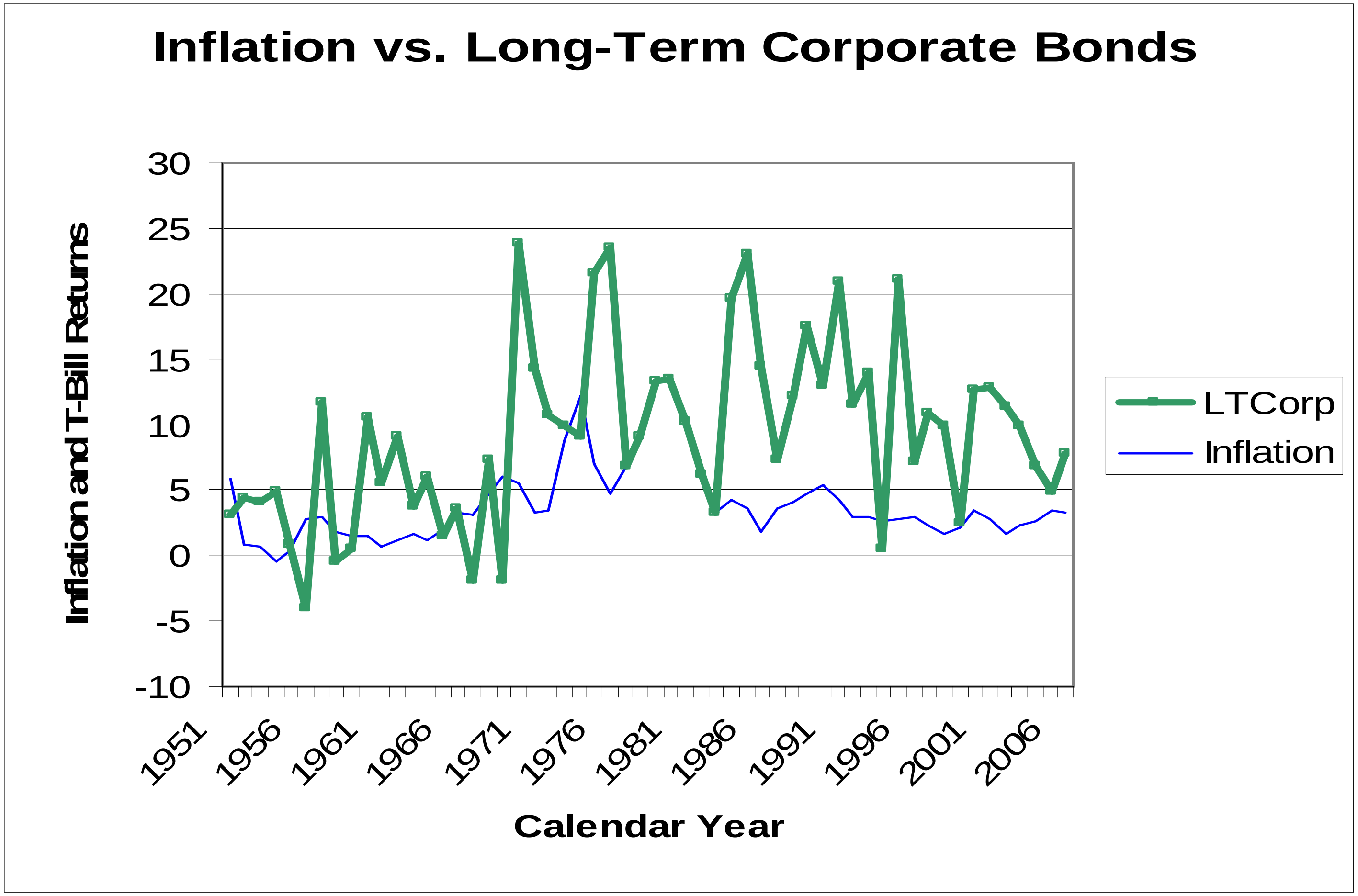
Calendar Years 1977-2006

T-Bill = 0.770*Inflation + 3.177 R^2 = 47.0%



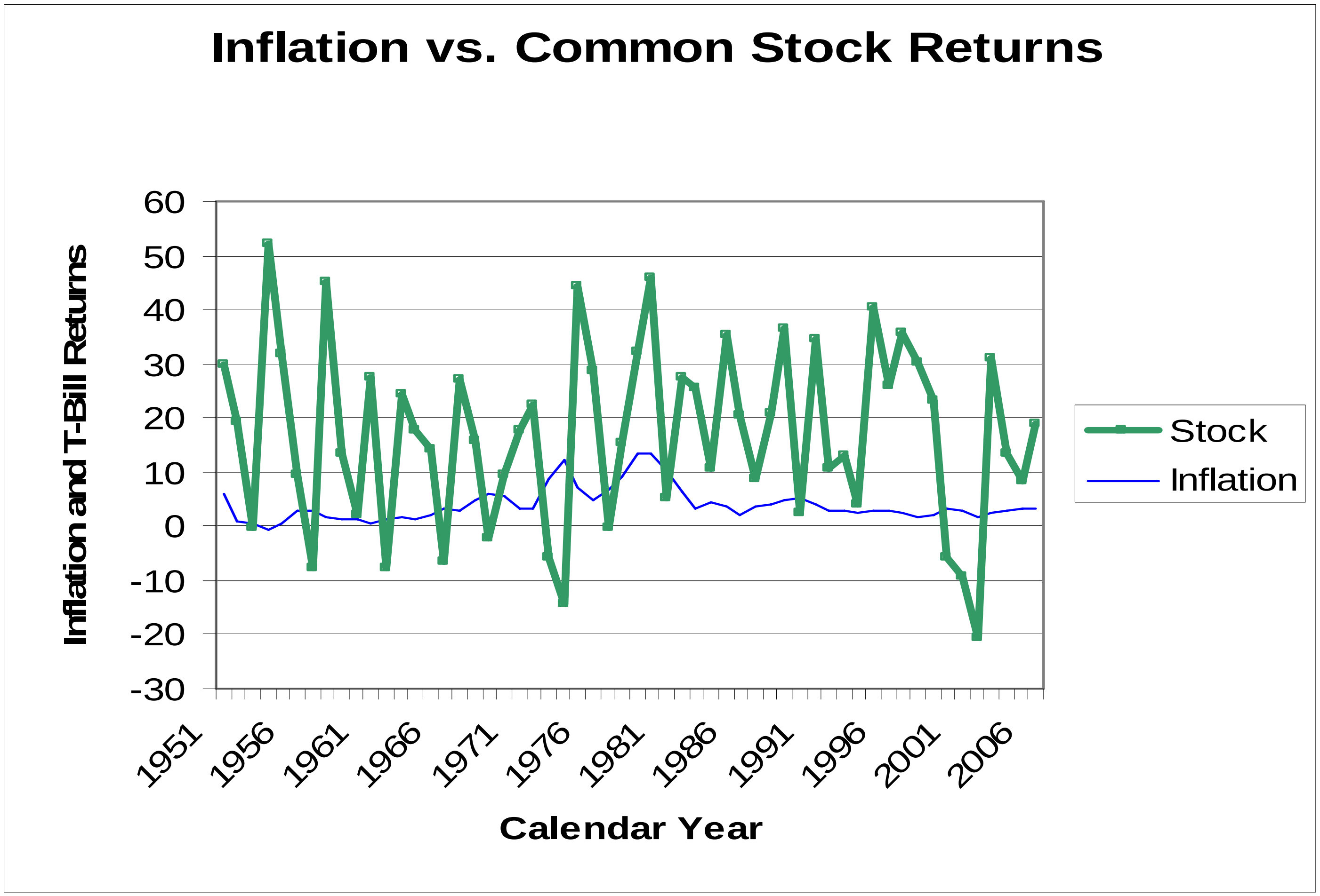
Calendar Years 1951-2006

LT Corp = -0.014*Inflation + 6.067 R^2 = 0.0%



Calendar Years 1951-2006

Stock = -1.192*Inflation + 17.701 R^2 =4.6%



More Questions Answered

- How does inflation impact investment returns?
  - T_Bills
    - Positively Correlated
  - Stock Returns / Long Term Corporate Bonds
    - No Observable Correlation

- Is there a strategy to insulate property-casualty insurance companies from inflation?
  - Yes!

The Strategy

- Hedge your underwriting portfolio with assets that are positively correlated with inflation
  - T-Bills / Commodities / Stock Sectors / TIPS
- Insurance Companies need to be proactive
  - Select appropriate trends
  - Keep loss costs adequate

Additional Research

- Put Together Correlations to Properly Hedge Insurers' Risk Portfolios
  – Specific Lines (Schedule P)
  – Stock Market Segments
    - Defensive Stocks (Utilities / Health Care)
    - ETFs
    - Commodities
  – Fixed Income Segments
- Depression/Recession Scenarios