

Evidence-Based Analysis of Financial Data

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Problem



Detect and interpret interesting financial activity using non-traditional measures.

- **Traditional financial metrics do not provide sufficient visibility into matters of interest to our sponsors.**
- **Fact-based analyses of financial data may provide useful insights to traditional accounting analyses of financial data.**

Background



Traditional financial metrics do not provide sufficient visibility into matters of interest to our sponsors:

- **Detecting corporate fraud**
- **Detecting money laundering**
- **Detecting illicit trade**
- **Interdicting terrorist finances**
- **Detecting tax fraud**
- **Detecting insurance fraud.**

Objective



Identify telltale data in known past cases of interest by performing time series analysis of selected cases and drawing supportable conclusions from the indicators.

The analysis will look at corporate filings, public statements, and press coverage from 24 months prior to the transaction and 36 months after. Indicators will be sought that correlate to offenses using data visualization tools and other techniques.

Activities

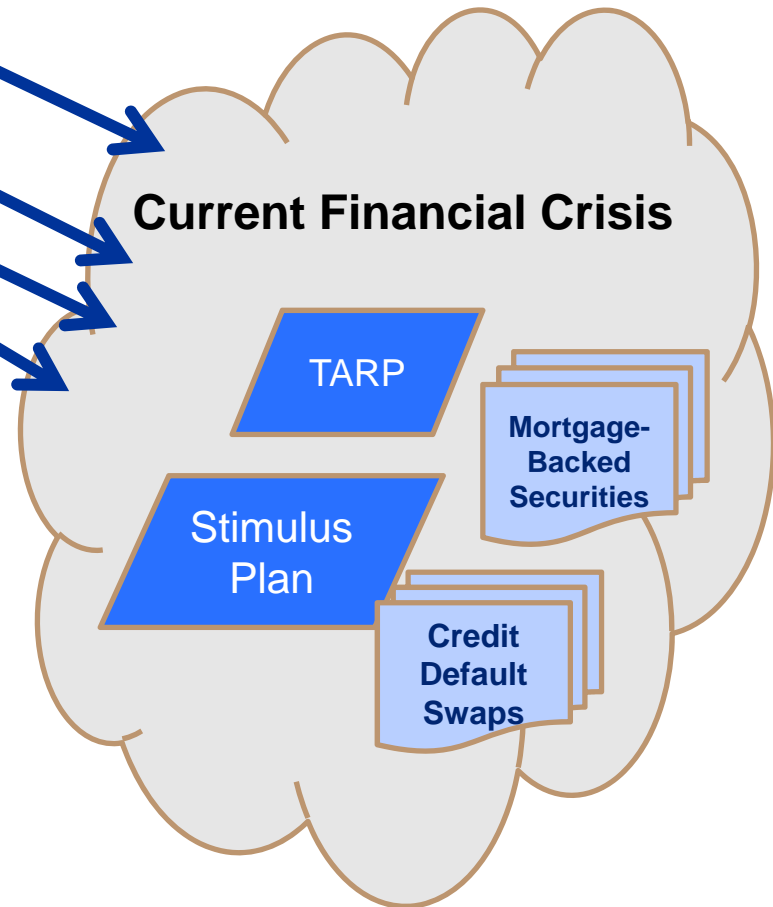


- **Select test cases**
- **Select evidence to apply**
- **Collect items of evidence**
- **Grade the evidence**
- **Develop preliminary arguments that connect evidence to hypotheses**
- **Draw preliminary conclusions based on the evidence**
- **Evaluate performance of the approach**
- **Inject findings into the regulatory process.**

Highlight

- **Potential applications**

- **Asset Valuation**
- **Credit Rating**
- **Investor Deception**
- **Accounting Fraud**
- **Money Laundering**
- **Tax Fraud**
- **Insurance Fraud.**



Demonstration

- **Probabilistic techniques employed:**
 - **Strength of evidence- Bayes Rule**
 - **Non-additive beliefs on evidential support- Glenn Schafer**
 - **Evidential completeness- Baconian Probability**
 - **Eliminative and variative testing- L. J. Cohen.**



Impacts



- **Draw conclusions based on evidence**
 - Bayesian techniques
 - Data mining techniques
 - Graphical techniques.

- **Inject findings into regulatory process.**

Future Plans



- Detailed test of argument development approach
- Additional industries
- Additional tactics
- Test combinations of predictive and explanatory techniques
- Apply data mining tools in the process
- Apply visualization tools in the process
- Integrate additional sources of data (Moody's, Bloomberg)
- Determine if results can be generalized beyond test cases
- Develop measures of performance
- Test approach in additional domains beyond corporate fraud (AML, Tax fraud, insurance fraud, etc.)
- Automated solutions for selected work steps.