Forecasting USPTO
Patent Application Filings

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Overview of the USPTO

- Fully-fee funded Government agency
- 6,939 Federal employees
- Total earned revenue - $1.1 Billion in FY 2002
- Two major business lines
  - Patents
    - 86% of total revenue
  - Trademarks
    - 14% of total revenue
- Patent filings is a major variable affecting revenue and other key forecasts and planning decisions (e.g., hiring)
Patent Filings Overview

- Annual Filings Growth Rates by Decade
  - No growth in the 1970s
  - About 4.1% annual growth in the 1980s
  - About 5.3% annual growth in the 1990s

- Key events affecting the patent filings trend
  - Fiscal Year 1983 fee increase
    - Filing fees increased by more than 100% and reduced fees offered for small entities (500 employees or less)
  - Fiscal Year 1995 patent term change
    - 20 year patent term replaced 17 year patent term
USPTO Patent Filings Since 1970

Utility, Plant and Reissue Patent Filings

Fiscal Years
Three Basic Approaches to Forecasting

1) Quantitative Modeling
2) Customer Survey
3) Expert Opinion - (Delphi Method)

- Because of the importance attached to filing rate forecast accuracy, the USPTO approaches this task using different forecasting methods.
- Each method has its strength and weakness.
- **Scenarios** are developed by combining these methods. The USPTO attempts to use all available information to balance the weakness of one methodology with the strength of another methodology.
1) Quantitative Modeling

- Two Modeling Approaches
- Modeling Historical Statistical Attributes
  - Trend
  - Growth rates
  - Breaks or Structural Changes
- Modeling Historical Relationships
  - Economic indicators
  - Other patenting factors (e.g., fees, institutions)
Modeling Historical Statistical Attributes

- Averages and Simple Trends
- Holts Exponential Smoothing
- Winters Exponential Smoothing
- Box-Jenkins (ARIMA and Intervention)
Modeling Relationships

- Econometric Modeling of Key Indicators
  - Combine Economic Theory and Time Series
  - Supply Side Determinants
    - R&D effort and expenditures
    - Stock of “Knowledge”
  - Demand Side Determinants
    - Real GDP
    - USPTO patent filing fees
  - Other Variables to be Explored
    - Standard and Poor’s 500 Index
    - Venture Capital Investment
Modeling Relationships (cont’d)

- Stable Long-run and Dynamic Relationships
  - Distributed Lags and Cointegration
  - Error Correction
- Growth in Patents depends on
  - R&D
  - GDP
  - Fees
  - Stock of Knowledge

\[
\Delta \text{Pats}_t = \beta_0 + \beta_1 \Delta \text{RD}_{t-1} + \beta_2 \Delta \text{GDP}_{t-1} + \beta_3 \Delta \text{Fee}_{t-1} \\
+ \beta_4 \text{KnowStock}_{t-1} + \alpha (\text{Pats}_{t-1} - \gamma \text{RD}_{t-1}) + u_t
\]
Patent Filings and R&D Expenditures
Model Results and Use

- The newest R&D model utilized since fiscal year 2000 includes the one-year lag of industry R&D investment and a one-year lag of USPTO filings.
- From fiscal year 2000 through 2002, the one-year ahead forecasts errors have been less than five percent.
- Models must be used in conjunction with other methodologies given limited factors.
- This year, it appears the model will be off by about 7.9 percent.
- Refine models over time with new factors and technology.
2) Survey

- Initiated in fiscal year 2001

- Goal
  - To develop workload forecasts with input from a sample of industry and the inventor community

- Sample U.S. customers only
Groups Sampled

- Domestic patent customer groups:
  - Large Entities
    - Largest 209 application generating entities
  - Small Entities
    - Randomly selected from a USPTO data base
  - Independent Inventors
    - Nationally representative sample of independent inventors maintained in-house by USPTO
  - Universities/Non-Profit
    - Largest 50 application-generating entities
Latest Survey Results

- Survey conducted between late October 2002 and January 2003

- 1,831 questionnaires distributed

- Response rates varied widely by group
  - Large corporations -- 41%
  - Small businesses -- 9%
  - Universities/Non-profits -- 31%
  - Independent inventors -- 14%
2003-2004 Activities -- Integrative Phase

● Objectives
  – Integrate lessons learned from past surveys
  – Coordinate more closely with EPO and JPO annual surveys
    ● Ensure that agreed-upon common queries are included
    ● Develop method of integrating results
  – Complete within 12 months
3) Expert Opinion

- The USPTO endeavors to gather pertinent information within the agency and bring it to bear in a disciplined manner.
- Changes in procedures and rules can, for example, increase or decrease the attractiveness of patent protection.
Expert Opinion Continued

- No one knows these changes better than the **USPTO lawyers** who analyze them, draft them, and interact with customers with regard to them.

- **USPTO technical directors** have an unparalleled view of the technology world in which they are expert.

- In many cases, these individuals can **spot future shifts in demand** that no econometric model or survey could ever hope to incorporate.
Constructing a Forecast
based on a Scenario

1) Assemble forecast-relevant information
2) In many instances the three methodologies’ forecasts are similar
3) However, the methodologies’ forecast diverged in FY 1995 and FY 2003
4) Integrate and Develop Scenarios
5) This is as much an art as a science.
6) Select a most likely Scenario.
Conclusion

- Forecasting USPTO patent filings is a major undertaking, considering that major cyclical turns, structural changes, and the accompanying uncertainty must be taken into account.

- The USPTO relies on different forecasting methodologies.

- The final forecast is obtained from combining formal models, the survey information, and the judgmental views of experts.

- Combining different methodologies improves the overall forecasting accuracy.

- Questions and Answers

- Thank you