SBIR Phase I Midterm Presentation

Information Market for Policy Analysis

19 April 2002

Overview

- Current DOD/Intel uses of Info. Mkts.
- Nature and Merit of an IMPA
- Non-Commercial Information Markets
- Qualities of an IMPA
- Net Exchange IMPA Design
- Phase I Activities to Date
- Phase I Test-of-Concept
- Progress towards a Phase II

Current Uses of Info. Mkts.

Futures Markets are Information Markets

- Aggregate Private Information from Disparate Parties
- Coalesce Information into Enhanced Predictions (Prices)
- Maintain Information Security while Improving Predictions

Current & Past Policy Analysis Uses

- Oil Futures (Mid-East concerns, non-OPEC mitigation)
- Precious Metals (late 1980s analysis of USSR condition)

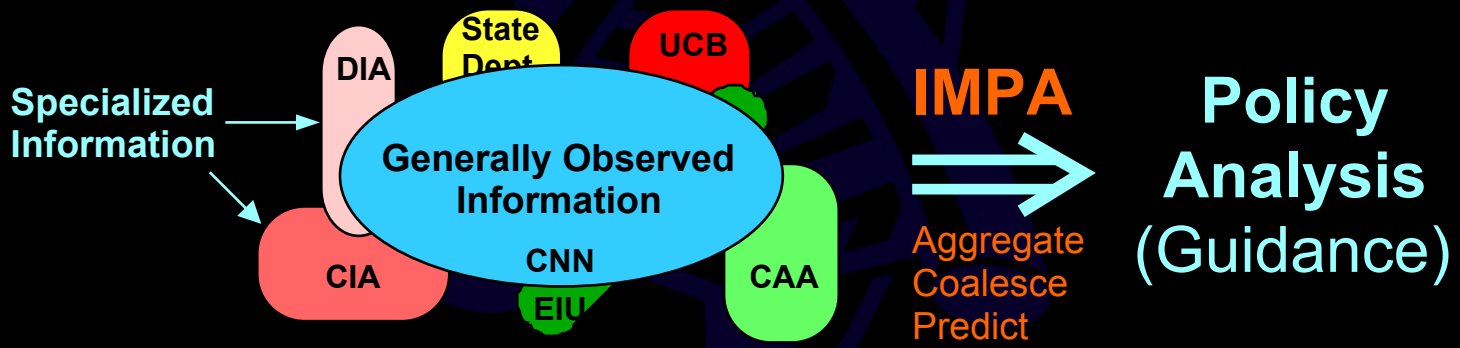
Consider the role played by Options: A payoff based on a contingency provides an incentive for those with information about the contingency to add that information to the market.

Nature and Merit of an IMPA

Interplay of basics, policies, and events

- Basics: Economy, Internal Cohesion, Interstate Rivalries
- Policies: Military Deployments, Trade Relations
- Events: Civil Unrest, State-to-State Conflict, Terrorism

Merit Claim: IMPA can amplify critical insight; improving event predictions.



Non-Commercial Info. Markets

Current Art in Non-Commercial Info. Markets

- Security sets that *span* an event (Bush, Gore, Nader, Other)
- Assign a value to each set; e.g., 2000 U.S. Pres. Set = $1.00
- Pre-Event, issue sets to a population and facilitate exchange
- Evolution of prices (all ≤ $1.00) track aggregate predictions

Summary of performance to date

- Election markets provide superior predictions to opinion polls
- Intra-firm decision support markets show promise
- Limitations: Fixed Horizon, Set Piece (e.g., no endogenous definition), Limited (if any) access to options.

Necessary Qualities in an IMPA

Advancing Horizon of well-defined securities

- Securities that *span* an ongoing policy environment
- Observable & Measurable: GDP, deployments, deaths

Ability to Handle Fundamental Ignorance

- Don't really know what specific future events to care about
- Interdependencies among Events: how so and which matter?

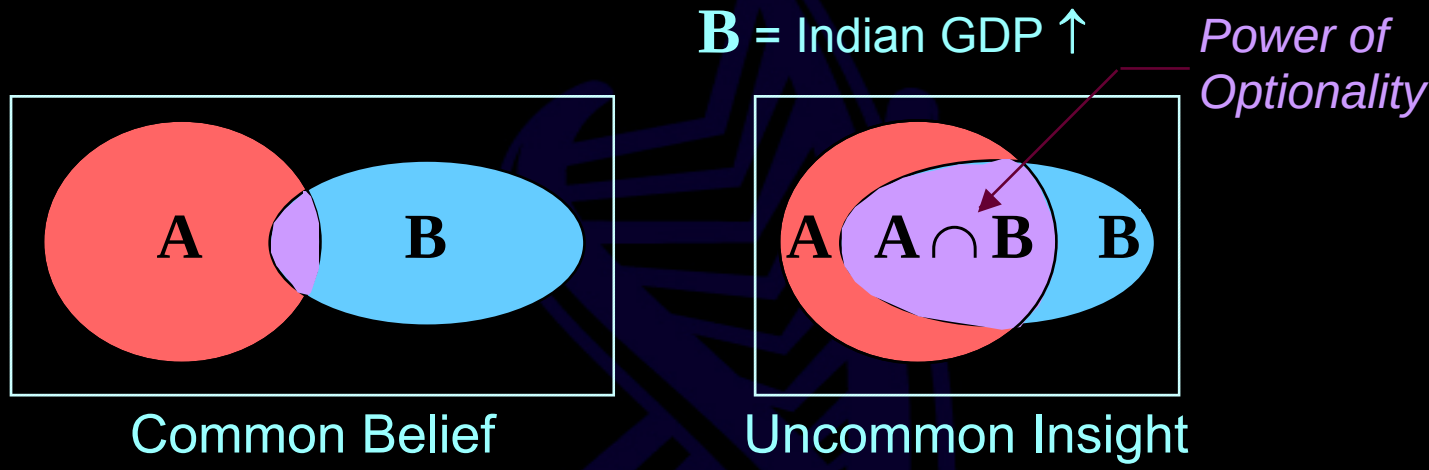
Broad Aggregation leading to Coalescence

Judge to assay security's *State* at maturity

Compliance: Legal and Policy

Net Exchange IMPA Design

Key to Coalescence -- Amplify Insight



Problem: Which, if any, A ϒ B is worthwhile

- Lead/Lag? Prior levels? Context w.r.t. others (e.g., C)?

Solution: Basis Securities + Endogenous Issuance of Intersections

Net Exchange IMPA Design

Basis Securities (Spanning the Event Space)

- What events will matter? Note: Event ≈ {Fundamentals}
- Provide Basis Securities spanning U.S. and foreign events
- Likely specific events gleaned from basis interplay revealed through the trading activity among information holders.
- Widely Observed: GDP, Civil Unrest, Deployment, Conflict

Probability of Iraqi-backed terror in U.S. in 2Q03 ≈ $\{DOW_{3Q04}, IRQcivil_{1Q04}, US/TR\$_{1Q04}\}$

A Basis Security is a time series of Triples

$$\text{Change in the Dollar Value of all flows from U.S. to Turkey} = \mathbf{\$US/TR} = \begin{cases} \$US/TR_t^{+} \text{ when increase from } t-1 \geq 5\% \\ \$US/TR_t^{=} \text{ when change from } t-1 \text{ within } 5\% \\ \$US/TR_t^{-} \text{ when decrease from } t-1 \geq 5\% \end{cases}$$

Net Exchange IMPA Design

Endogenous Issuance of Intersections

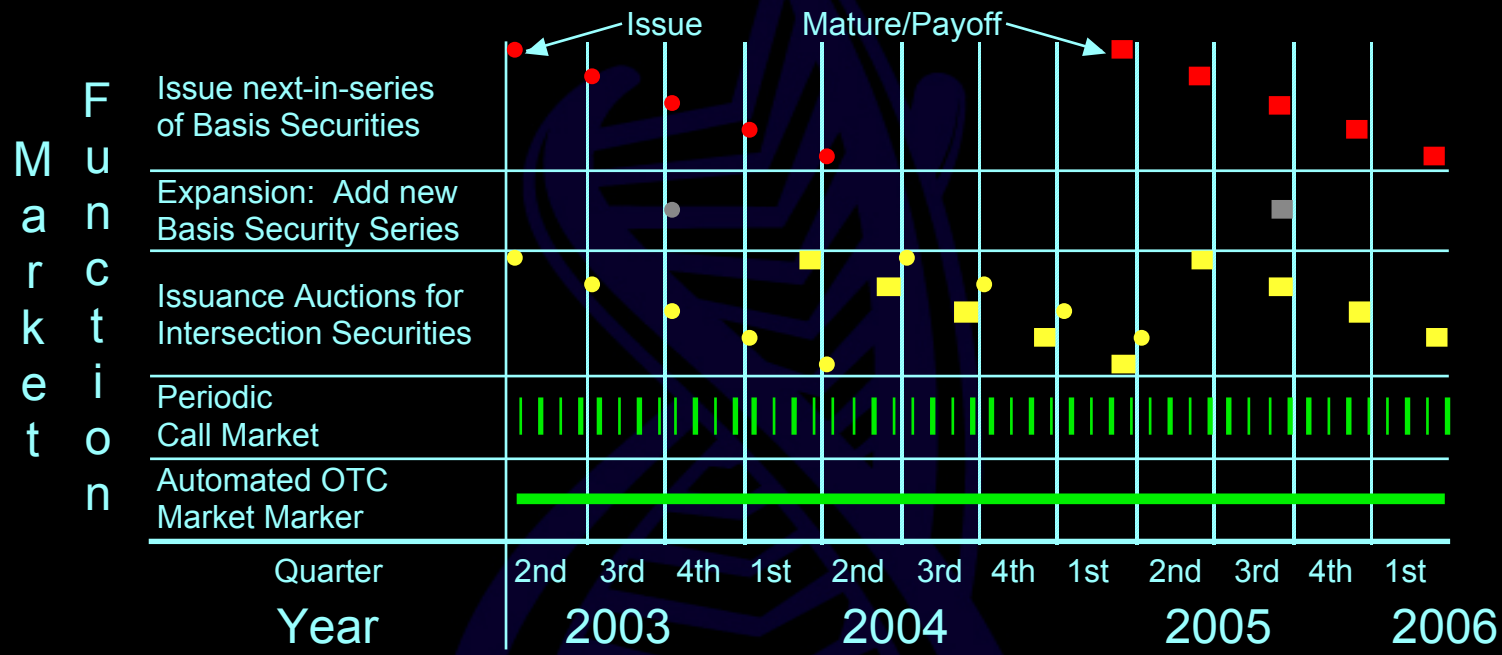
- Quarterly Auction: Traders nominate basis pairs for intersections and bid using scarce, perishable *script*.
- If $A_4 \curlyvee B_3$ is chosen, then all A_4^-, $A_4^=$, A_4^+, B_3^-, $B_3^=$, and B_3^+ are replaced by mixes of the nine intersection pairs.
- Overall, market value remains constant.

Valuable uses of Combinatorial Processes

- The basis securities in an issued intersection can still be traded using a package order.
- Unions can be traded w.r.t. issued intersections.
- Liquidity enhancement; e.g., swaps, XOR

Net Exchange IMPA Design

Market Processes, Operational Timeline



Each Invitee may buy $N worth of new basis securities per quarter at $1.00 per Triple.

Phase I Activities to Date

Investigation into basic questions

- Process Significance under Interdependence
- Relationship between underlying liquidity and mechanism
- Susceptibility to Manipulation
- Being undertaken by GMU & Caltech (Exp. Comp. 5/02)

Test-of-Concept Demonstration System

- Design finalized and under development
- Functional test planned for late May, Demo in June.

Preparations for Phase II (covered on final chart)

Phase I Test-of-Concept

Two-Nation Regional Model

- Sueland and Bobland
- Sues and Bobs have a long inter-history, not all of it good

Securities:

- Sueland: GDP, Civil Deaths, Mil. Deaths w.r.t. Bobland
- Bobland: GDP, Civil Deaths, Mil. Deaths w.r.t. Sueland
- U.S.: DOW, $US/SL, $US/BL, MilDepSL, MilDepBL

Market Functions: Next in Series, Periodic Call, Intersection Issuance

Phase I Test-of-Concept

Status of Development

- Existing combinatorial securities trading product is being modified for periodic call (DB work for intersections)
- New system for intersection issuance: design done, matching engine done, GUI underway, DB under design
- Designing information environment for eight participants

Demonstration Plan

- System components should be ready by 15 May
- Alpha-System should be assembled by 25 May
- First demonstration run completed at GMU by 7 June

Progress towards Phase II

Judge of Events (discussions advanced)

- Economist Intelligence Unit (assist in securities definition)
- Meeting with Managing Editor in London on May 7th

Commercial Partners (disc. just started)

- HP Labs: Info. Market Pioneer, IT System Architect
- IBM Watson Labs: IT System Architect, Comb. Auction.

Participant Populations (identified only)

- U.S. Government: Defense, Intel., State, Comm., Treas.
- Academia: Domestic (and Foreign)
- Press: Domestic (and Foreign)