

Risk Models for Sovereign Debt Management

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Australia

Market Risk

- The risk that debt service costs increase directly or the opportunity to reduce debt service costs is forgone as a result of movements in financial market prices
 - A risk intrinsic to all debt and derivatives portfolios

Australia

- There are a number of market risk factors of relevance to the management of the Australian government's debt portfolio:
 - domestic and foreign interest rate risks
 - exchange rate risk

Australia

- The need to define, measure and model market risk factors arises at three levels:
 - determining longer-term strategic debt management policy
 - evaluating the risk associated with tactical departures from this strategic policy
 - correctly pricing debt and derivatives transactions

Australia

- The nature of the treatment of market risk depends substantially upon the particular goals and modus operandi of the sovereign

Longer-Term Strategic Debt Management

- Australia adopts an explicit market risk management approach that evaluates cost and risk of alternative long term debt management strategies
 - Examines consequences of long term market risk positions
 - Based on the trade-off between cost and risk, identifies a long term benchmark policy with explicit market risk characteristics

Longer-Term Strategic Debt Management

- Long term benchmark based on:
 - analysis of the cost/risk of a wide range of potential strategies
 - monte carlo simulation of market risk factors
 - structural assumptions regarding risk premia and market volatility
 - particular emphasis on robustness in selecting benchmark

Longer-Term Strategic Debt Management

- Definitions adopted for cost and risk have a significant influence on the recommended long-term strategy arising from this analysis

Longer-Term Strategic Debt Management

- A risk measure based upon volatility in the:
 - market or economic cost of debt usually results in a minimum risk portfolio that has short duration
 - volatility of NPV of debt dominate analysis
 - cash or accounting cost of debt usually results in a minimum risk portfolio that has long duration
 - volatility of debt cash flows dominate analysis

Longer-Term Strategic Debt Management

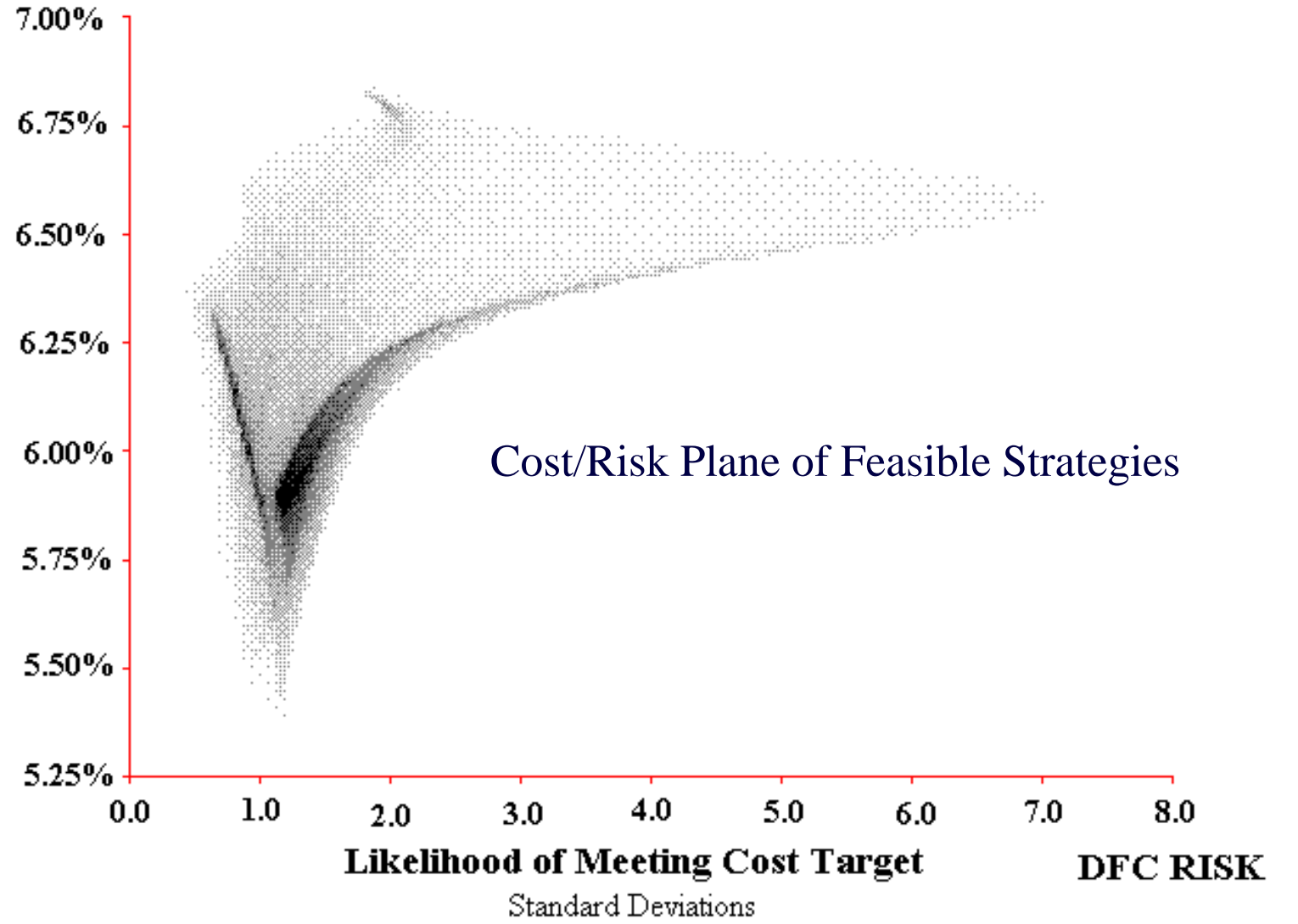
- This requires a decision as to what definition of market risk is relevant for a sovereign
 - Cash flow or debt NPV volatility?
- In Australia's case a balance has been struck
 - Cost: long-term market cost of debt
 - Risk: volatility of budgetary debt cost

Longer-Term Strategic Debt Management

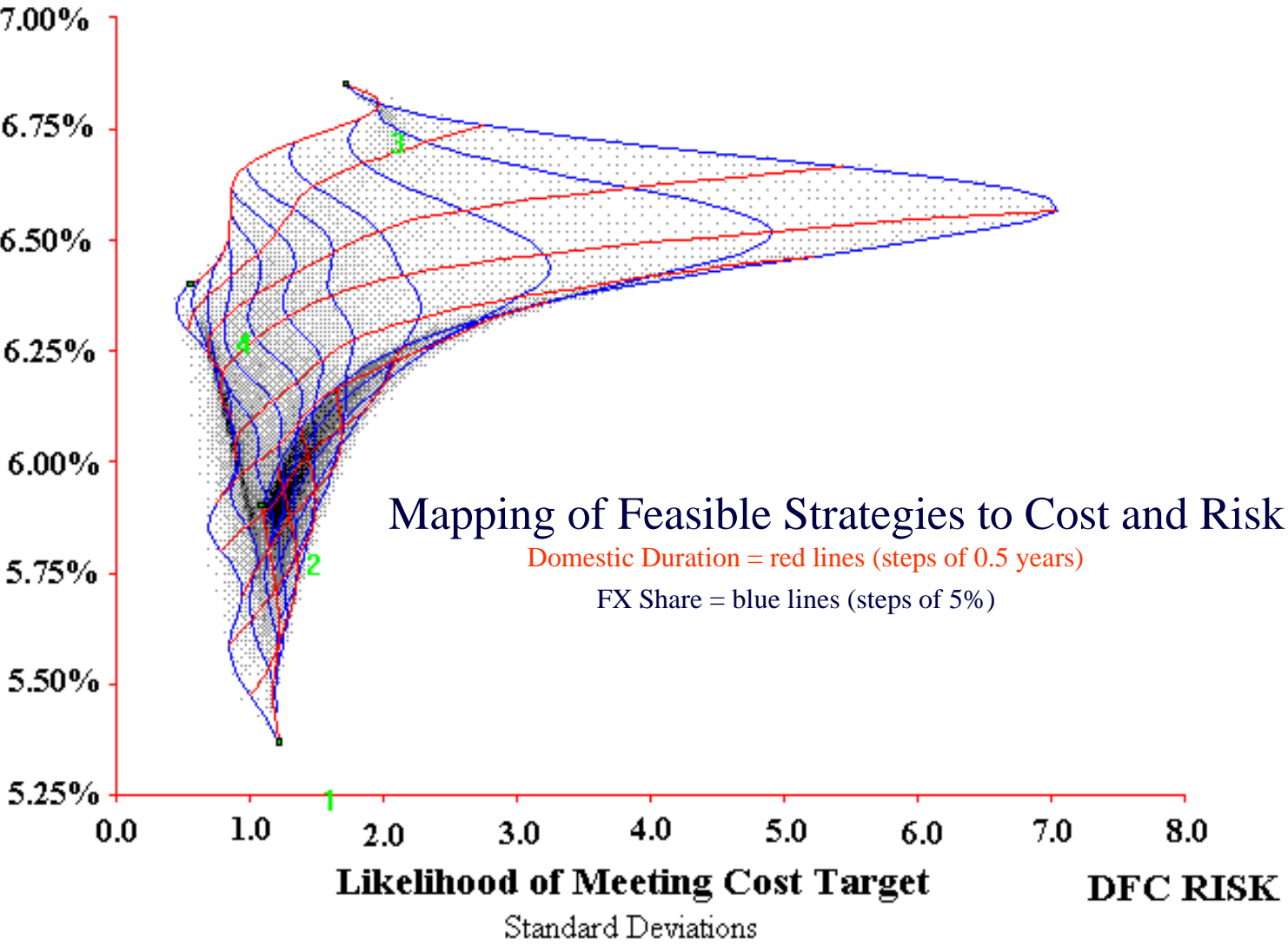
- Australian analysis uses a budgetary cash debt cost concept modified to include amortized FX gains and losses on principal
 - “Debt Financing Cost” - DFC
- Volatility is expressed by a Sharpe likelihood ratio of:

$$\frac{(\text{Expected DFC} - \text{Threshold DFC})}{\text{Standard Deviation of DFC}}$$

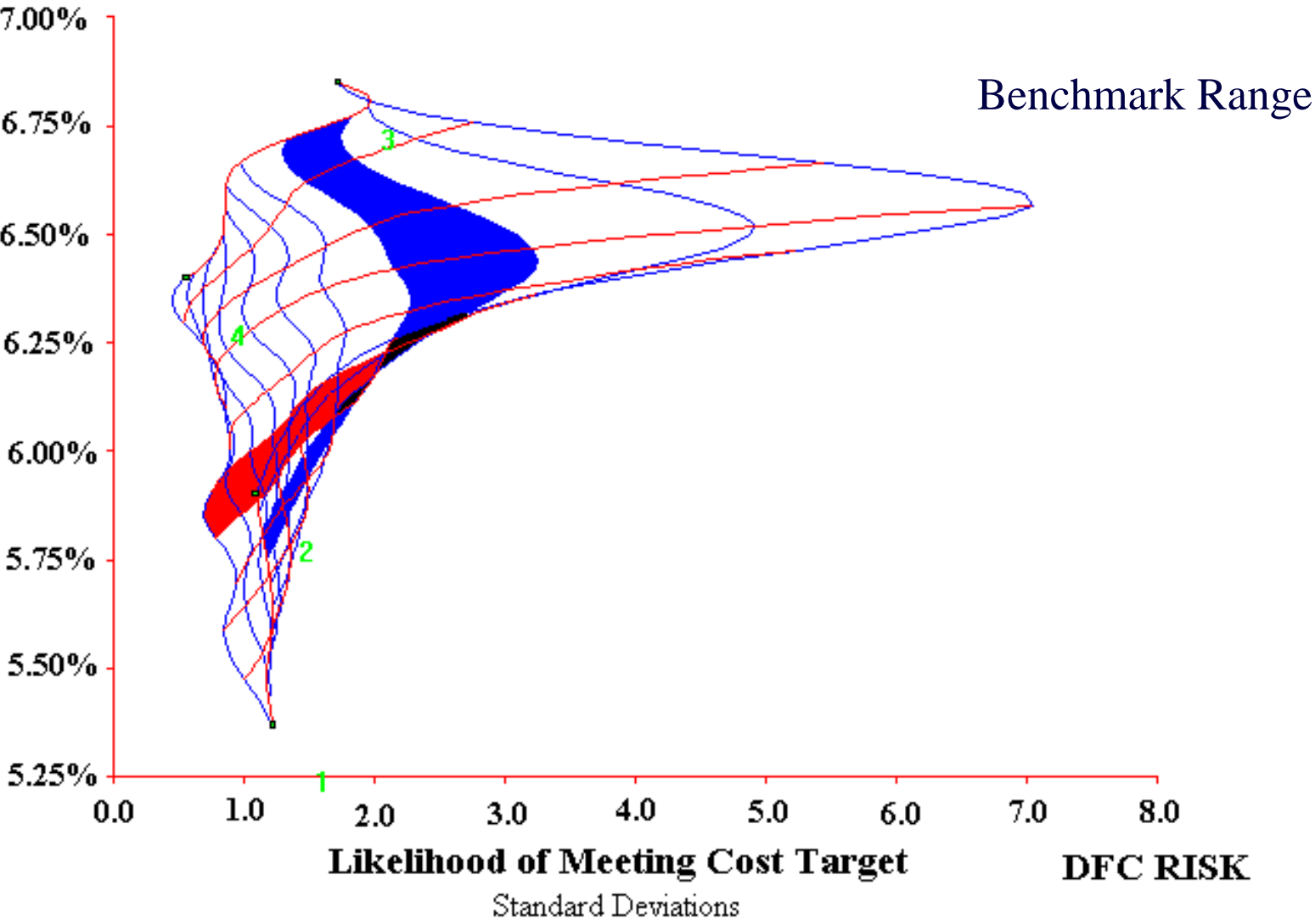
LONG TERM MARKET COST



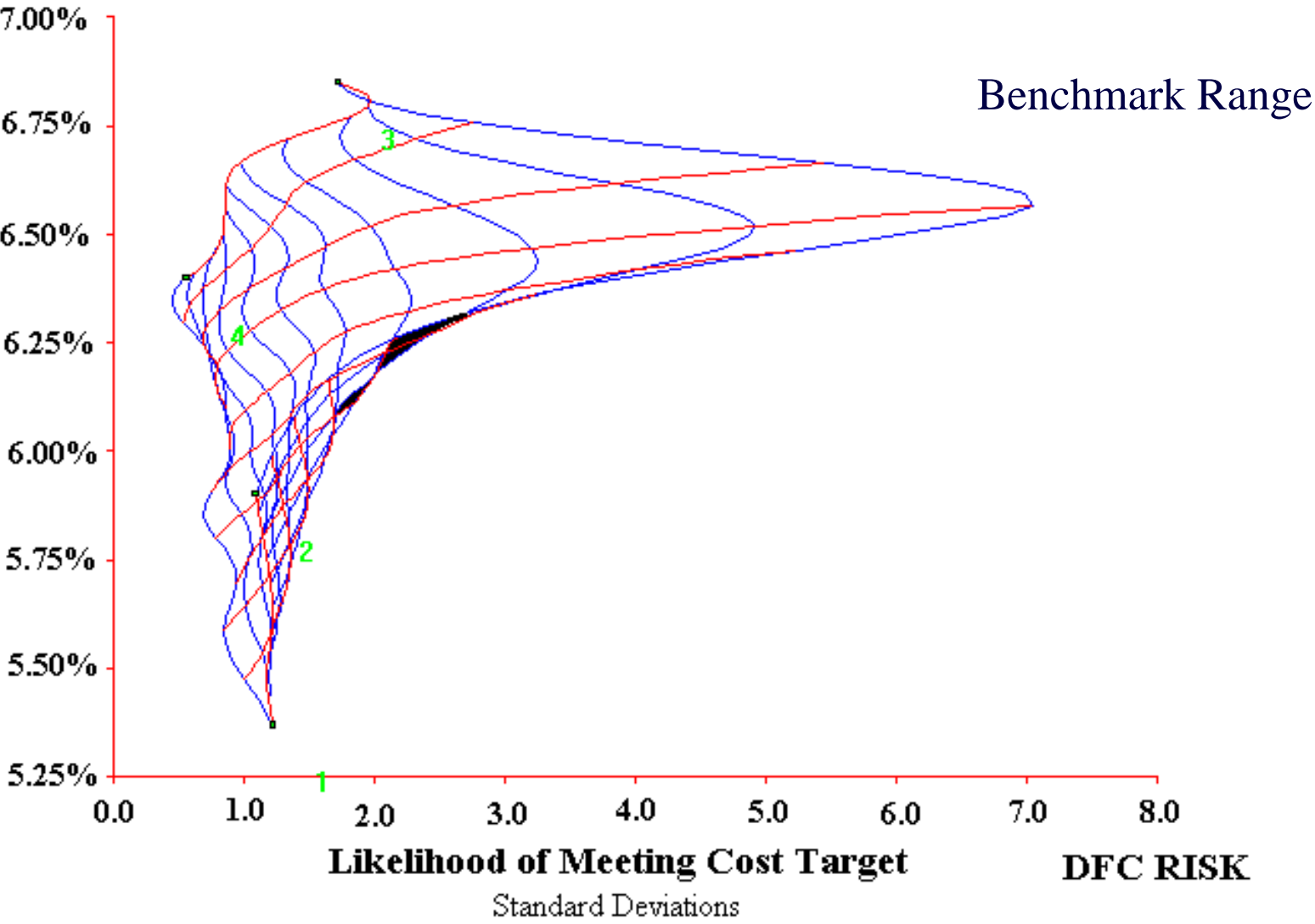
LONG TERM MARKET COST



LONG TERM MARKET COST



LONG TERM MARKET COST



Longer-Term Strategic Debt Management

- Merits
 - Balance between a financial management focus and traditional debt service costs
 - Tension between long-term market cost and risk based on short-term accounting cost volatility
 - Avoids horizon problem with market cost volatility measures
 - Methodology improvement over traditional mean-variance

Longer-Term Strategic Debt Management

- Challenges
 - Sharpe likelihood ratio formulation of risk not intuitive
 - Still need to define acceptable risk
 - Changes to budget debt cost measures with accrual accounting
 - A fiscal environment of surpluses
 - Debt repurchases

Conclusions

- Make explicit decisions about market risks
- Context of Australia's long term debt management strategy
- Balance long term cost cost savings against market risks
- Definition of risk appropriate to the fiscal environment

Short-Term Tactical Debt Management

- Currently, Australia does not take tactical views against its long-term benchmark
 - Important public policy constraints on a sovereign debt manager
 - Limits scope to take views on interest or exchange rates
 - Policy contagion and signaling
 - Dominance of sovereign in domestic markets

Short-Term Tactical Debt Management

- The appropriate risk methodology would probably be one that focussed on the risk associated with the volatility of the value added of tactical variations
 - Volatility in NPV of debt more appropriate
 - Relative to the “neutral” long-term debt management strategy

Short-Term Tactical Debt Management

- Desirable risk measures:
 - Value At Risk (monte carlo simulation)
 - Extensive stress testing

Pricing Debt and Derivatives

- Currently, not a major issue for Australia
 - Do not trade in our own debt or derivatives
 - Buying/selling with a profit motive
 - Utilise auction / tender style processes to issue debt and derivatives