CaR Modelling in OECD countries

Some observations on Trends and Developments

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Overview of Presentation

- Context

- Trends in the use of CaR modelling in OECD countries.

- How are CaR models used in practice.

- What can we learn from the use of CaR modelling in OECD countries.

- Concluding comments
Context

- The debt management object is (generically) stated as:
  - “the minimisation of long-term debt cost, taking account of risk”;

- Example, UK debt management objective:
  - “to minimise, over the long term, the costs of meeting the Government’s financing needs, taking into account risk,…….”
Context

- The government has a range of debt instruments:
  - Nominal bonds with a range of maturities;
  - Inflation-linked bonds;
  - Foreign currency bonds.

- These instruments have different cost-risk characteristics.
- The combination of instruments should be chosen that satisfies the Government’s cost-risk preference.
Context - illustration

Average interest rate, CaR and Maturity

- Low cost and high risk
- Acceptable risk (CaR)
- High cost and low risk

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Context

- Debt managers need to assess cost-risk characteristics/trade-off of instrument combinations.

- Build analytical tools to help do this.
Trends in the use of CaR Modelling

- The focus is on CaR models that are stochastic debt strategy simulation (SDSS) models:
  - Debt service costs/charges for different debt strategies are stochastically simulated over a given time-horizon;
  - The per-period debt cost distributions are analysed to assess the expected cost and risk characteristics or trade-off of the different debt strategies.
Trends in the use of CaR Modelling

Simulated debt service costs

Debt service cost

Periods

Risk
Trends in the use of CaR Modelling

- (1) More OECD members have developed or are developing CaR models as part of their debt management strategy framework.
  - Not always straightforward to detect because:
    - Not all debt managers’ models are made public.

- (2) New generation models are incorporating recent developments in the finance literature:
  - First-generation models are being improved;
  - Newcomers are taking advantage of advances in the literature.
Trends in the use of CaR Modelling

- (3) CaR models are mainly developed in-house;

- (4) CaR models take two broad forms:
  - Deterministic scenarios of primary budget position combined with stochastic simulation of interest rates;
  - Full stochastic environment that also includes a model of the economy.
Trends in the use of CaR Modelling

(5) Models primarily focused on interest rate risk:

- Measure interest rate risk in a variety of ways, but mainly use percentile measures of risk – e.g. absolute CaR, relative CaR, tail CaR, conditional CaR (see Bolder 2003).

- Present simulated risk profiles over a range of time horizons.
Trends in the use of CaR Modelling

The graph shows the probability distribution of debt servicing costs over different periods: 1yr, 2yr, 5yr, and 10yr. The x-axis represents debt servicing costs, ranging from 0% to 14%, while the y-axis represents probability. The graph indicates the mean, standard deviation, and 95% percentile for each period.
CaR models in practice

- CaR models are useful tools in the Debt managers’ risk management toolkit:
  - They help to complement qualitative judgements in formulating and explaining the debt strategy;
  - Support the choice of benchmarks used to manage the debt;
  - Support performance management/reporting.
CaR models in practice

Interests costs, DKK billion

- Absolute CaR
- Mean

- Duration 3.5 in 2006
- Duration 3 in 2006
- Duration 2.5 in 2006

United Kingdom Debt Management Office
Lessons from use of CaR models

- CaR models are not used as “black boxes” spitting out answers:
  - The results are largely a function of the assumptions made in the model.
  - Therefore assumptions ought to be realistic.
  - Since they help to complement qualitative judgements in formulating and explaining the debt strategy they are not substitutes for that judgement;
  - They help to make the difficult task of explaining debt strategies easier.
Lessons from use of CaR models

- CaR models should be robust, but not overly ambitious:
  - Should be fit for purpose and consistent with the environment in which the debt is to be managed; and
  - Should only contain as much complexity as is necessary to answer sensibly the questions being investigated.
Concluding comments

- More OECD countries are using/developing CaR models:
  - Useful tool in debt management strategy formulation;
  - Helps to complement sound judgement and qualitative arguments;
  - No “black-box” approach in its usage;
  - CaR Modelling is taking advantage of advances in finance literature;
  - Models are rigorous but remain tractable.