Risk management and debt

Q 8-01. What is the nature of risk?

Risk[1] is the state of being subject to an outcome that is governed by a random process and, hence, cannot be known with certainty in advance or a state in which outcomes are beyond the control of the manager.

An early approach to risk was developed Frank Knight[2] who made a distinction between uncertainty and risk. In his definition, "risk" refers to exposure to an event that has some chance of occurrence, causing a gain or a loss, and the chance of that event can be measured reasonably accurately. "Uncertainty," in contrast, is the term used for an occurrence that can result in unusual gain or loss, but whose probability of occurrence cannot be measured reliably. Although the distinction is still frequently used, its reliance on the ability to measure the probability of events is a significant impediment to employing it in practice.

Q 8-01.01. What are the sources of risk?

The random events whose impacts constitute risk in state fiscal management may arise from global or local causes. The global causes arise from changes in the macro economy or from changing expectations of future events in the financial markets. An example of the former is the lowering of tax collections by the state because of a dip in the business cycle. The lower tax collections make financing outstanding debt a greater strain on the government's resources. An example of the latter might be an inversion of the yield curve as the market reassesses near-term risk with consequent challenges for the state to rollover its maturing short-term debt. Local causes of uncertainty may include operational design weaknesses that allow malfeasance or carelessness to burden the state with uneconomic debt loads or badly designed debt instruments.

Q 8-01.02. What are the categories of risk?

The principal risks facing debt portfolio managers are country risk, market risk,

[1] The term "risk" will be used in several senses in this chapter. Among these are a state of being in which outcomes are subject to factors that cannot be known with certainty in advance, the mathematical measure of loss that is likely to result from such a state, and the prospect that an operation will miscarry or an agent will not perform as intended. It should be clear from the context which meaning is under discussion. The same word will be used in all three senses to avoid the cumbersome introduction of a special vocabulary to describe each sense.

[2] Frank Knight, *Risk, Uncertainty and Profit*, 1921 republished in Midway Reprint, Chicago: The University of Chicago Press, 1985.

and operational risk.

Country risk arises from macroeconomic and systemic disturbances and events. These represent changes in the external environment that can affect the success of the portfolio. Unexpectedly high or volatile inflation or the deterioration in a country's sovereign debt rating will affect the debt markets in ways that can be costly for states.

Market risk comprises those uncertainties that are generated by changes in market expectations and the effect those changes have on supply and demand in all relevant markets. Changes in the shape, location, or slope of the yield curve for sovereign debt are examples of market effects that can alter financing costs.

Operational risk often arises from a weak organizational structure. Operational risk can be addressed through organizational restructuring to provide an appropriate separation of responsibilities and procedures for accurate and timely accounting.

Q 8-01.03. What are the elements of country risk?

Country risk includes those losses that may result from deterioration in financial, economic, or political conditions of the country or from damage to the country's reputation. These may include *systemic risks*, such as failure of the banking system and its impacts or a failure of the regulatory system and *reputational risks* that affect the credit standing of the sovereign. In an extreme credit event, a default, an issuer will find market access severely curtailed or quite expensive. Default may be the result of funding risk in which the state cannot raise the funds to meet current debt obligations to roll over maturing debt or to meet interest payments.

Q 8-01.04. What are the elements of market risk?

Market risk includes those losses that may result from pricing and expectations changes in the debt and currency markets. These changes will affect the shape and location of the yield curve – and the relative prices for debt instruments – and in the value of currencies against each other.

Q 8-01.05. What are the elements of operational risk?

Operational risk includes those losses that may result from poor organizational design or lack of adequate managerial control of processes and operations. Operational risk is not generally treated in portfolio theory; it is more properly the subject of audits and management reviews.

Q 8-01.06. Should sovereigns use the risk tools common in market practice?

There are many portfolio management tools available to manage risk in market practice. Most of these tools, however, were designed for buyers of debt to help construct a portfolio that complements their cash flow needs and risk appetites. The portfolio holder is assumed to reshape the portfolio as needed to address changing conditions.

With few exceptions, however, sovereign borrowers cannot reform their portfolios with such a free hand. Unless a monopsonistic buyer dominates the local sovereign debt market, the state's portfolio of debt outstanding is far larger than the portfolio of any lender. This allows buyers to choose subsets of the outstanding debt, but restricts the state to offering a covering set of all individual portfolios if it is to sell the debt at the lowest overall cost. The state has less freedom to maneuver than the smaller lenders.

Q 8-01.07. Can duration be used to manage a portfolio?

Bondholders can choose portfolio duration as a decision variable. The debt issuer may have a preferred duration if the debt is tied to an asset-liability framework. Absent an asset-liability need, duration may still provide guidance for debt issuers.

If the state cannot make good use of standard financial risk measures and tools for its own benefit, they may be more useful for understanding the debt buyers and their preferences. Individual holdings will be selected to achieve target duration for the investor's portfolio. Different investors will have different attitudes towards risk or time preferences that will lead them to build portfolios of different duration. The debt issuer can offer a suite of securities whose duration overall does not resemble the value for any of the individual portfolios constructed from the suite.

Q 8-01.08. Can average maturity be used to manage a portfolio?

Average maturity is frequently used as a measure of riskiness in the portfolio. States with short average maturities are held to be more risky in their portfolio management. The implicit assumption is that longer maturities stretch out the length of time required to rollover the portfolio. This reduces the likelihood of disproportionate debt loads coming to market in such a short time that not all the debt can be absorbed at a reasonable price if at all. The portfolio is also protected from short-term spikes in interest rates that might appear at the same time as a major refunding of the portfolio.

Average maturity by itself, that is, without reference to the underlying portfolio, is an inadequate measure of risk because it can be easily manipulated. Averages only tell part of the story. A portfolio composed of one unit of 100-year debt and ten

units of 1-month debt, 91% of the portfolio, will still have an average maturity of nine years. This portfolio sounds much safer in terms of rollover risk than it really is.

Q 8-01.09. What other probabilistic tools are used in market practice?

Cost at Risk[3] (CAR) or similar probabilistic schemes are used to justify a benchmark composition of debt in terms of balances between long-term and short-term debt, domestic and foreign debt, and fixed rate and indexed debt to minimize expected costs.

Q 8-01.10. What are the challenges in public risk management matter?

The risks in public debt management are complex. They are likely to focus on a goal with a hierarchy of constraints that may not always seem consistent. For example, a risk structure for a sovereign might be as follows. First, minimize the risk of a funding shortfall and borrow the required volume of funds. Second, minimize, the impacts of volatility in debt service requirements for funds borrowed. This will require attention to liquidity risk, market interest rate risk, currency risk, counterparty and other business partner risks. Third, set the schedule of borrowing to limit rollover risk. Fourth, borrow funds at the lowest feasible cost. Satisfying all these constraints requires a cautious and well-planned program.

[3] Cost at risk is closely related to the popular market concept of value at risk. It was developed for state issuers to manage refunding risks and interest rate costs.