Chapter 52
Computing Skills in Forecasting for Liquidity Risk Management in the Indian Banking Industry

Rituparna Das
National Law University, India

ABSTRACT
Liquidity Risk Management (LRM) in the banking industry happens at two levels: (1) the Central Bank (i.e., the regulator) and (2) the commercial banks. The term “liquidity” for the Central Bank means the monetary base consisting of the currency and the reserves in the banking system. These are the supply side of the interest rate market. The Central Bank being the only supplier of the same can target the interest rates by varying supply of monetary base and vice versa. There are several ways including auctioning and redeeming the government securities for squeezing and pumping liquidity into the system. However, before such recourse, the Central Bank needs an assessment of the liquidity requirement of the system and applies the forecasting techniques, which are mostly econometric by nature involving the time series data. This chapter explores this process.

1. INTRODUCTION
1.1 Concept of ‘Liquidity’ for a Bank
The term ‘liquidity’ is defined for a bank as “the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses” by the Basel Committee on Banking Supervision (2008). In the above definition, the term “without incurring unacceptable losses” tallies with the term “at a reasonable cost” in the definition of ‘liquidity’ provided by the Reserve Bank of India (2012). With the above ability a bank manages the mismatches in the volumes between the maturing liabilities and the maturing assets at the end of different common terms to maturity. If such mismatch affects the cash availability in a bank for the depositors at any point of time it would lead to bank-run. In this context Sethuraman (2008) distinguished between liquidity and solvency as follows. Solvency means a non-zero net worth. Even on the day of the bank-run it is possible for a bank to be highly solvent without having any cash or liquidity. In the day to day business of a bank, liquidity is an index of how fast it can convert the assets into
cash without any loss and/or how fast it can raise the wholesale funds from the unsecured interbank market without facing any hike in the payable interest for any reason unique to itself.

1.2 Concept of ‘Liquidity’ for the Central Bank

For the Central Bank, the term ‘liquidity’ is signified by Mitra and Abhilasha (2012) as “financial flows of various kinds, ranging from that originating from the Central Bank to the overall existent financing available in the banking system” or more simply by the term ‘macroeconomic liquidity’. Here ‘liquidity’ is described to be determined by the net change in the bank reserves through the interaction among the various autonomous factors that drive liquidity and its management by the RBI through the impacts of the RBI actions and the autonomous factors such as the government financial flows, the foreign capital flows and the demand for currency on the reserves of the banks with the RBI as a result of the central banking functions of the RBI in the Indian Rupee market as well as the foreign currency markets apart from its functions as the monetary authority of the country and the daily outstanding figure of liquidity adjustment facility though repo and reverse repo (LAF) is officially considered to be a measure of available funding in the system. The LAF is a process whereby the banks borrow from the RBI against the government security collateral, called ‘repo’ process. Thus the LAF, introduced in the middle of 2000, is a monetary policy tool as per quantity based monetary targeting described by the Reserve Bank of India (2003), in the hand of the RBI to pump liquidity into the system. The aforesaid monetary policy tools include the cash reserve ratio (CRR) and the open market operations (OMO). Higher the CRR, higher are the bank deposits with the RBI and vice versa. Liquidity in the system increases when OMO takes place in the form of the outright purchase of government securities and the repo operations, and vice versa when the OMO takes place in the form of the outright sale of the government securities and the reverse repo operations. With the ongoing LAF operations the RBI may ease the CRR for the banks.

2. BACKGROUND

Econometrics emerged as a distinct discipline in 1930s and gradually crossing the border of the social sciences entered the realm of computational finance and risk management in 1990s, where it churns laser generated data as also computer generated data apart from time series data like currency-exchange data. There are three broad categories of econometric analysis – (a) linear regression models, (b) time series models and (c) dynamic econometric methods. The time series models like the GARCH are widely used by the practitioners in the modeling of volatility. Practitioners also use analytical statistics, e.g. the probability distributions are used in computing the limits. In addition, a range of softwares based on Excel is used in constructing the yield curve.

Liquidity for a commercial bank means cash in hand, gold reserve, marketable securities and unencumbered government securities which are by large covered by the statutory liquidity ratio (SLR) requirement. In the forecasting of its liquidity requirement a bank needs computing skill in the case of the following components of the forecasting process: (i) forecasting the volumes of the liquid assets, the liquidity coverage ratio, the net stable funding ratio, the borrowing needs, the volumes of collateral, the premature deposit withdrawals, the variance analysis and (ii) the stress testing for the purpose of calculating the internal limits and developing a contingency funding plan. This is an exercise of analytical statistics involving fitting the field data with the appropriate probability distribution functions and then generating samples. These samples include the values of the variables during both the periods of stability and
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