Chapter 9

A MULTIOBJECTIVE METHODOLOGY FOR BANK ASSET LIABILITY MANAGEMENT

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Abstract

The uncertainty that prevails in the financial and investment environment has prompted banks to seek out greater efficiency in the management of their assets and liabilities. Today’s asset management decisions create tomorrow’s problems as well as opportunities. This need has led banks to determine their optimal balance among profitability, risk, liquidity and other uncertainties. The optimal balance between these factors cannot be found without considering important interactions that exist between the structure of a bank’s liabilities and capital and the composition of its assets. In managing its assets and liabilities, a bank should face several conflicting goals, such as the maximization of returns, the minimization of risk, the maintenance of a desirable level of liquidity and solvency, the expansion of deposits and loans. The present paper describes a linear goal programming model for asset liability management and apply it to data from a commercial bank of Greece. Taking into account all the above we include the essential institutional, legal, financial, structural and bank-related policy constraints as proposed from the bank’s board.

1. Introduction

In asset/liability management (ALM) the exposure to various risks is minimized by holding the appropriate combination of assets and liabilities in order to meet the firm’s objectives (Zopounidis, C., 1998). More precisely, allocating assets lies at the heart of a strategic risk management system. In addition, liability streams and their uncertainty, institutional constraints and policies, taxes, transaction costs and the like are important features in real financial planning. Application areas include pension plans, insurance companies, banks, university

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endowments and other leveraged institutions, wealthy and ordinary individuals (Ziemba, W.T., Mulvey, J.M., 1998). These investors possess future liabilities and goals. They must make investment decisions while considering the use of their funds, that is, investing for a purpose. Risks must be measured in the context of the entire organization's or individual's financial situation. Asset investment decisions are combined with liability choices in order to maximize the investor's wealth over time. The growing internationalization, the globalization of financial markets and the introduction of complex products have increased volatility and risks. The development of information technology has led to such an increasing public awareness that the bank’s performance, its politics and its management are closely monitored by the press and the bank’s competitors, shareholders and customers and thereby highly affect the bank’s public standing. The increasing competition in the national and international banking markets, the changeover towards the monetary union and the new technological innovations herald major changes in the banking environment and challenge all banks to make timely preparations in order to enter into the new competitive monetary and financial environment. All the above drove banks to seek out greater efficiency in the management of their assets and liabilities. Thus, the central problem of ALM revolves around the bank’s balance sheet and the main question that arises is: What should be the composition of a bank’s assets and liabilities on average given the corresponding returns and costs, in order to achieve certain goals, such as maximization of the bank’s gross revenues? It is well known that finding an appropriate balance between profitability, risk and liquidity considerations is one of the main problems in ALM. The optimal balance between these factors cannot be found without considering important interactions that exist between the structure of a bank’s liabilities and capital and the composition of its assets. Bank asset/liability management is defined as the simultaneous planning of all asset and liability positions on the bank’s balance sheet under consideration of the different banking and bank management objectives and legal, managerial and market constraints. Banks are looking to maximize profit and minimize risk. The present paper describes a linear goal programming model for asset liability management and apply it to data from a commercial bank of Greece. The objectives used are based on liquidity, solvency and average yield of assets and liabilities. Moreover, a sensitivity analysis on priority structure is performed to obtain all possible solutions in a decision-making environment. The rest of the paper is organized as follows. Section 2 presents a brief overview of bank asset liability techniques than have been used till today. Section 3 describes the methodology and the data used in this paper. Section 4 outlines the results obtained and finally the conclusions of the paper as well as future research perspectives are discussed in section 5.