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Theory and Methodology

Strategic financial management in a multinational financial conglomerate: A multiple goal stochastic programming approach [☆]

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Abstract

The paper discusses a multi-stage stochastic programming approach to the strategic financial management of a multi-company financial conglomerate. The planning system creates a comprehensive strategy which simultaneously covers a number of future scenarios within a multi-period planning horizon. Multiple conflicting goals may be specified for the group level, company level or individual business area level, and the decision maker's preferences are allowed to change over time to reflect changing operating conditions and trade-off relationships between the goals. Special features include, among other things, full market valuation throughout the model, integrated treatment of different types of risks, explicit modelling of various types of intra-group transactions and relationships, extensive structures to deal with distressed assets and the covering of losses within the group, as well as consideration of potential portfolio effects of a diversified group structure on the cost of funding. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

Recent years have witnessed a trend towards financial services conglomerates consisting of de-

posit-taking institutions, finance companies, other credit institutions, investment companies, securities firms, real estate firms as well as life insurance and property-liability insurance companies. The group may also include industrial and commercial firms, frequently organized under a holding company.

The management of this type of a conglomerate is a difficult task under the present day conditions in which future operating environments can not be forecasted with any degree of accuracy. From a strategic planning point of view the difference between a 'conglomerate' and a single financial institution is, on the other hand, in many cases smaller

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than what one might initially think. The ‘conglomerate’ may consist of, say, two domestic subsidiaries and one foreign subsidiary. As the decision about the number of individual firms in the group is often arbitrary you might equally well think of a single company. It is obvious that if the management board of the company does not take a stand on the composition of the firm’s business portfolios and the risks related to these portfolios, it may ruin the company. Unfortunately this has also been the case in numerous real-world situations as the banking crises and failed institutions and groups of institutions have demonstrated in a number of countries. Furthermore, the crises in the financial services industry appear to continue and the process of covering losses within the group, for instance, has therefore become an important management issue. The diversification effects on the funding side, in particular, also justify a group perspective. There has, however been a lack of appropriate tools for dealing with the complex issues involved.

The paper therefore discusses a dynamic multi-stage stochastic programming approach to the strategic financial management of a multi-company group. The system is used to create a comprehensive strategy which simultaneously covers a number of potential future scenarios within a multi-period planning horizon.

The general area of strategic asset and liability management or strategic financial risk management has received increased attention in financial institutions during the last few years. For extensive reviews of stochastic models, scenario generation procedures, recent advances in solution algorithms as well as practical applications in this area see Mulvey et al. (1997), Mulvey and Ziemba (1995), Carino et al. (1994), Bunn and Salo (1993), and Langen (1989). For a discussion of earlier applications see, for instance, Kusy and Ziemba (1986) and Korhonen (1984, 1987). Previous studies typically deal with strategic asset and liability allocation decisions at the level of individual institutions such as banks, insurance companies and pension funds. The present model extends the analysis to the management of a multi-company group with a multitude of intra-group relationships.

2. Outline of general features

The application described in this paper is a multi-stage stochastic linear program designed to deal with the strategic asset and liability management problem of a multi-company group consisting of predominantly financial institutions. Asset and liability management means by definition that assets, liabilities, capital and off-balance sheet items are being managed simultaneously.

The group structure and the number of firms in the group are generally quite free. Multinational and multi-level groups are allowed (Fig. 1), and the full model structure and the full set of variables are available for holding companies, subsidiaries and operative associated companies within the group. A reduced model structure is applied in the case of other group-related companies such as industrial and commercial firms. Intra-group funding, holdings and asset transactions are also explicitly modelled. The intra-group funding alternatives, in particular, include a wide range of different options as far as the instruments and type of funding are concerned.

The model allows a flexible choice of goals, risk measures and types of activities to be included in the analysis. Goals may be specified for the group level, company level or individual business area level, and they deal with both financial and non-financial aspects of the operations. The risk measures consider the effects of covariability or correlation, and they thus allow an integrated treatment of different types of risk. Furthermore, they permit a joint treatment of risks arising from both price changes and volume changes. The decision maker’s preferences are allowed to change over time to reflect changing operating conditions and trade-off relationships in the case of conflict-

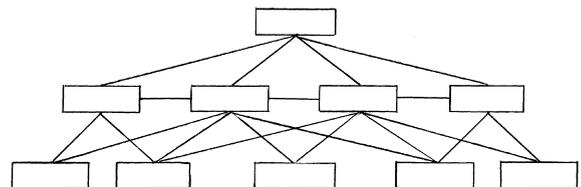


Fig. 1. Multinational and multi-level groups with varying structures and intra-group relationships.

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