REGULATIONS AND REBUILDING OF FINANCIAL MODELS; SFS^{HK} SUPPORT UTILITY

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ABSTRAKT

Text přináší rozbor a představení problematiky SFS^{HK} modelu (signum finanční stability Hálek-Králík). V současném pojetí je stať zaměřena na propojení dílčích okruhů, které se dotýkají finančního zdraví, účetnictví firmy a možných matematických a statistických metod finančního modelování.

ABSTRACT

The article deals with introduction of SFS^{HK} model named by Mr. Vitezslav Halek and Mr. Jiri Kralik as Sign of Financial Stability. The present content of this text is able to integrate financial and accounting field, with existing primary mathematical and statistical method leading to financial modelling.

Introduction

With the development of the Czech market, financial analysis will grow in importance. It is a handy instrument to gauge companies' financial standing in the past and present and to forecast their future course. It operates with many ratios based on data drawn from the company's annual report and statistics.

It can be applied by the companies themselves for planning purposes or to assess their client's exposure. Government supervisory agencies use it to monitor the market, and it is an essential part of the arsenal used by auditors, consultants and rating agencies.

The mathematics is not very complicated; nevertheless, the results may be revealing. Does the company have enough readily available resources to cover its liabilities? Does it generate enough profits from its assets? What is the quality of the company's investments?

These and other questions of similar nature may be answered on the basis of these fairly straightforward mathematical calculations. The difficulty lies in their interpretation which requires great skill.

Usually, two methods are used: time series and comparisons within a given sector of the economy. While enough has been written on financial analysis of industrial enterprises, the bibliography is scarce. The most common ratios used for any type of company fall into four groups: liquidity, leverage, activity and profitability ratios.

Proposed modifications are applied at the same time, so the output of data of financial modelling can show trustworthy and reliable picture of financial situation of subject that is analyzed.

1. Background of Dynamic Financial Analysis

Dynamic Financial Analysis (DFA) is a systematic approach based on large-scale computer simulations for the integrated financial modelling mainly used by non-

life insurance and reinsurance companies aimed at assessing the risks and the benefits associated with strategic decisions.

In the last few years, non-life insurance corporations in Europe, in the US and Canada have experienced, among other things, pricing cycles accompanied by volatile insurance profits and increasing catastrophe losses contrasted by well performing capital markets, which gave rise to higher realized capital gains.

These developments impacted shareholder value as well as the solvency position of many non-life companies. One of the key strategic objectives of a joint stock company is to satisfy its owners by increasing shareholder value over time.

In order to achieve this goal it is necessary to get an understanding of the economic factors driving shareholder value and the cost of capital. This does not only include identifying the factors but investigating their random nature and interrelations to be able to quantify earnings volatility.

Once this has been done various business strategies can be tested in respect of meeting company objectives. There are two primary techniques in use today to analyze financial effects of different entrepreneurial strategies for non-life insurance companies over a specific time horizon. The first one – scenario testing – projects business results under selected deterministic scenarios into the future. Results based on such a scenario are valid only for this specific scenario. Therefore, results obtained by scenario testing are useful only insofar as the scenario was correct.

Risks associated with a specific scenario can only roughly be quantified. A technique overcoming this flaw is stochastic simulation, which is known as DFA when applied to financial cash flow modelling of a (non-life) insurance company. Thousands of different scenarios are generated stochastically allowing for the full probability distribution of important output variables written premiums or loss ratios.

DFA has its roots in post World War II military strategizing or “scenario planning” work developed by the Rand Corporation. To date, one of the most prominent users of scenario planning has been Royal Dutch/Shell. Starting in the early 1970’s, Shell began experimenting with scenario planning to identify threats to “business as usual” in the oil industry and responses to those threats.

The application of DFA to the insurance industry began with the work of Finnish and British working groups on solvency. Their primary motivation was recognition of the inadequacy of accounting documents for solvency evaluations. These evaluations were viewed as too static, too retrospective to properly measure future solvency. The fundamental insights of the Finnish and British researchers redefined the assessment of solvency from a static accounting basis to a dynamic (going concern operation), cash flow focused approach [2, Blum, p. 14].

Having accepted the real perspective of the organization as an ongoing enterprise, the financial model implementing this perspective required assumptions about possible future operating conditions. In order to develop and sustain the type of model that the British and Finnish researchers envisioned, actuaries have begun reaching out to strategic planners, financial analysts and investment professionals. Experts from these areas have pooled their talents and developed sophisticated computer models that incorporate all major aspects of insurance operations (assets, liabilities, pricing, taxation) into a cohesive model to help insurance company executives better understand how their day-to-day decisions interact to affect overall returns, capital and the all-important bottom line.

2. Objectives of DFA and relation to SFS^{HK} model

DFA and SFS^{HK} goal is not to forecast the future. Rather, DFA's and SFS^{HK} goal is to give company managers insight into how they should manage their company's financial affairs. With DFA tools these managers can better position their companies to absorb the transfer of risk, to earn an appropriate return and to minimize the company's exposure to insolvency. DFA goal is to provide management with:

- solid information about the interaction of decisions from all areas of company operations,
- a quantitative look at the risk-and-return trade-offs inherent in emerging strategic opportunities, and
- a structured process for evaluating alternative operating plans,

So it can make more informed decisions. For a long time insurance business used to be a fairly quiet area, characterized by little strategic flexibility and innovation.

Regulations heavily constrained the insurers in the types of business they could assume, and also in the way they had to do the business. Relatively simple products were predominant, each one addressing a specific type of risk, and underwriting and investment were separated, within the (non-life) insurance companies themselves and also in the products they offered to their clients. In this rather static environment, there was no particular need for sophisticated analytics: actuarial analysis was carried out on the underwriting side – without linkage to the investment side of the company, which was analyzed separately [4, Kaufmann, p. 32]. Reinsurance as the only means of managing underwriting risks was acquired locally per line of business, whereas there were separate hedging activities for financial risks. Quantitative analysis amounted to modelling a group of isolated silos, without taking a holistic view.

Regulations were loosened and gave more strategic flexibility to the insurers, leading to new types of complicated products and to a fierce competition in the market.

The traditional separation between banking and insurance business became increasingly blurred, and many companies developed into integrated financial services providers through mergers and acquisitions.

The risk landscape was also changing because of demographic, social, and political changes, and because of new types of insured risks or changes in the characteristics of already insured risks. The boom in the financial markets in the late 1990s also affected the insurers. On the one hand, it opened up opportunities on the investment side [1, Bergbauer, p. 13].

On the other hand, insurers themselves faced shareholders who became more attentive and demanding. Achieving a sufficient return on the capital provided by the investors was suddenly of paramount importance in order to avoid a capital drain into more profitable market segments.

A detailed account on these developments, including case studies on some of their victims, can be found.

3. Rating agencies and analysing

A credit rating reflects a rating agency's opinion, as of a specific date, of the creditworthiness of a particular company, security, or obligation. For almost a century, credit rating agencies have been providing opinions on the creditworthiness of issuers of securities and their financial obligations. During this time the importance of these opinions to investors and other market participants, and the influence of these opinions on the securities markets have increased significantly.

This is due in part to the increase in the number of issuers and the advent of new and complex financial products, such as asset-backed securities and credit derivatives. The globalization of the financial markets also has served to expand the role of credit ratings to countries other than the United States, where the reliance on credit ratings largely was confined for the first half of the twentieth century. Today, credit ratings affect securities markets in many ways, including an issuer's access to capital, the structure of transactions, and the ability of fiduciaries and others to make particular investments.

Credit ratings carry considerable weight in financial markets. There are two basic reasons for this. First, although they are based on complex assessments they can be easily and instantly assimilated by investors regardless of their expertise and profile. Secondly, credit rating agencies enjoy a good reputation and are seen by market participants to be providing unbiased data analysis [4, Champsaur, p. 48].

The importance of credit rating agencies in recent years can be observed in both business practice and regulatory requirements. On the one hand, the commercial success of most debt instrument issues largely depends on the rating granted. A rating has become a pre-requisite for seeking external financing in the securities markets (especially when issuers do not have an established presence on the debt markets).The credit rating of an issuer determines the interest rates that they will have to offer in order to obtain external financing. Moreover, credit ratings are increasingly used in contractual provisions regarding the termination of credit availability, acceleration of debt repayment or modification of other crediting conditions. On the other hand, several jurisdictions now insist that certain types of investment products can only be sold if the issuer can demonstrate a certain grade of creditworthiness reflected in a rating issued by a recognized credit rating agency.

It is generally considered that credit ratings play an essential role in securities markets, insofar as they help reduce information asymmetries between investors and issuers. Credit ratings promote market efficiency – both informational efficiency and allocation efficiency – by allowing issuers to signal their credit worthiness to lenders, thus helping lenders allocate capital to creditworthy borrowers. Also, due to their synthetic, simplified character, credit ratings allow investors to easily compare entities belonging operating in different countries and economic sectors.

Credit rating agencies are also increasingly involved in the assessment of the risks associated with assets held by financial institutions which are subject to capital adequacy requirements. The role which credit rating agencies play in the markets is generally very positive for both investors and issuers.

They provide investors with information which helps them to assess the risks related to a security. And they help to lower the costs of raising capital for issuers. The Resolution of the European Parliament does not call into question the positive role that credit rating agencies can and generally do play. However, it identifies a

number of issues of concern which require serious attention in order to ensure that all credit rating agencies exercise their functions responsibly at all times.

4. Importace of Dynamic Financial Analysis for future

For classical life insurance contracts such a matching of financial risks could always be done by classical debt securities like AAA-rated bonds or government bonds. Things have become more complicated since life insurance contracts nowadays feature properties which were years ago only known from financial trading. Today, a life or pension insurance can be unit-linked. For instance, payoffs are not guaranteed amounts of currency units, but guaranteed numbers of shares from a certain financial funds or a market index – often equipped with a guaranty which ensures that a certain minimum amount is paid even when markets crash. Such insurance is rather a financial option with some mortality risk included, than a classical life insurance contract.

These differences to former insurance contracts must also emerge when it comes to the hedging of such contracts. Where formerly debt securities where enough to deal with, modern insurance mathematics has drawn the right conclusions from modern financial mathematics and the actuarial community is aware of the fact that option-like contracts must be hedged by financial options. Many scientific publications on that topic exist and it is very well known, how to hedge an insurance contract such that variances of contractual payments together with hedges become minimal, or such that the balance per insured individual gets close to zero.

In the future the focus will be on economic value creation rather than simply mimicking the cash flow structures of the company. Substantial fundamental research still needs to be done in this area. A crucial point will be to incorporate managerial flexibility into the models in order to make projections more realistic. Currently there is a wide gap between DFA-type models and dynamic programming models aimed at similar goals.

In future, a certain convergence of these two approaches can be expected. For DFA, this means that models will have to become much simple. In scenario generation, the proper modelling of dependencies and extreme values (individual as well as joint ones) will be an important issue.

In general, the DFA approach has the potential of becoming the state of the industry for risk management and strategic decision support, but it will only exhaust this potential if the shortcomings discussed here are overcome in the foreseeable future.

Building an insurer-specific DFA model which represents the real situation is by no means easy. It often involves model risk and parameter risk. The former refers to the risk of employing an incorrect model and the latter the risk of using inappropriate probability distributions and specifying the wrong values for the variables included in the model. If stochastic modelling is employed, then the model is additionally exposed to stochastic risk reflecting the stochastic element of the model.

If a DFA model were to be used in determining insurer solvency, regulators would need some means of ensuring that an insurer’s internal model, if there was no standard models, reflects accurately the level of the risks that may high the financial position of the insurer. Back-testing may provide a way of continually checking model performance.

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