Systems Research Institute, Polish Academy of Sciences

Preprints

TRANSITION TO ADVANCED MARKET ECONOMIES

Abstracts

of papers prepared for the IFORS Specialized Conference

June 22-25, 1992, Warsaw, Poland

Edited by

Jan W. Owsinski
Jacek Stefanski
Andrzej Straszak

SESSION 6

COMPANY LEVEL ISSUES AND MICROECONOMIC MODELLING

Part 6A

TRANSITION TOWARDS MARKET ECONOMY: COMPANY STRATEGIES DEVELOPMENT.

Ilya Guevsky, Ivan Popchev, Bonka Hinkova

Institute for Information
Bulgarian Academy of Sciences
Sofia, Bulgaria

The paper describes an interactive computer model to analyze the past performance and to help forecasting the future development of companies which have to re-design their strategies in order to meet the challenges of market economy.

The model consists of six basic blocks, each of them describing a specific feature of both the company's past behaviour and future performance (product mix, expenses and investment, income statement, balance sheet, free cash flow, forecast assumptions and key value drivers). In the process of strategy development, the model serves as a computer based environment to evaluate the strategies' impact on the company overall performance.

The model has been applied to analyse the past (1984-1991) and future (up to year 2000 peformance of CHIMCO company, the major urea-based fertilizer company in Bulgaria. Three scenarios for the future behavior of the company have been developed and thoroughly examined. Each scenario is a picture of the company under a unified set of assumptions for their future behavior. The results obtained can serve as a basis to design company investment, financial and production policies. The methodology applied in the paper may also serve as a tool to value the company's equity in case of acquisition, merger or privatization.

COMPARATIVE STATICS FOR PROFIT-MAXIMIZING AND LABOR-MANAGED COURNOT OLIGOPOLIES

Koji Okuguchi

Tokyo Metropolitan University
Tokyo, Japan

In capitalist economies profit-maximizing firms are predominant, while in socialist economies, especially in Yugoslavia and Poland, there are many firms which are labor-managed. In this paper comparative statics results are derived for two types of oligopoly, i.e. profit-maximizing and labor-managed Cournot oligopolies. After establishing a general principle for comparative statics for oligopoly, we will examine how a shift in the demand function, technical change, a change in the wage rate and that in fixed cost affect the Cournot equilibrium industry and firms' outputs. Our analysis is accomplished based on a relationship between an individual firm's and industry outputs. An iterative scheme is presented for computing the equilibrium industry output and a sufficient condition for the convergence is derived.

THE USE OF MANAGEMENT SCIENCE TECHNIQUES IN EUROPE

Mik Wisniewski

*University of Stirling,
Stirling, U.K.*

The major contributions that can be made to business efficiency and improved management decision-making through the application of management science (MS) techniques are widely accepted and relatively well researched. However, there has been little comparative research to determine the extent and nature of use of such techniques by European business organisations. What research has taken place has tended to focus upon the use of such techniques by business in a single country. Given the general movement towards economic integration in the European Community - and the potential for wider European integration given recent political and economic changes in eastern Europe - there is a clear need to establish what similarities and differences there are in the use of such techniques in different parts of Europe and the impact such techniques have on the organisation.

This paper discusses the need for such research and reports on the progress and findings to date of a European research project established in August 1989 to investigate the use of MS techniques by European business. The project involves a coordinated and collaborative survey in each participating country (to date involving UK, Denmark, Greece, Switzerland, Portugal, Spain, Eire, Belgium and Finland). The project aims to examine the use of such techniques by business throughout Europe and to identify cross-country similarities and differences. One of the aims of the project, inter alia, is to identify the need for the provision of management training and to investigate the perceptions of the MS specialist and senior management regarding the importance of MS to the business organisation.

MARKET-ORIENTED TRANSFORMATION. ECONOMIC ADJUSTMENT AT INDUSTRIAL AND CORPORATE LEVELS

W.J. Otta

Akademia Ekonomiczna
Poznań, Poland

Transformation policy carried out by Polish government has neglected adaptation capabilities of firms and industries. A higly demanding and hostile economic environment has been created for previously directed and protected firms and sectors. In consequence in many cases transformation turned out to be a destruction process. What is needed is a deliberate market-oriented adjustment in forms and industries. The government should create an economic environment supporting such processes. Main lines of adjustment policy at macro, mezzo and micro levels will be presented in the paper. Macro-adjustments should concentrate on basic systemic changes, reconstruction of market institutions, market infrastructure development and creating of supportive social and political climate. Mezzo-adjustments should take into account different situations in industries and regions. Micro-adjustment can take the form of a preplanned process or stimulate search and self-adjustment at operating levels.

SUPPLY RESPONSE IN AN OLIGOPOLY

Milan Horniaček

Faculty of Social Sciences, Charles University
Praha, Czechoslovakia

The paper develops and analyzes a theoretic model of changes of firms' supply in an oligopolistic industry, based on a system of difference equations, and uses it for theoretical analysis of supply response to price liberalization. The analysis pays attention to entry and exit.

We also use the model to examine consequences of breaking up of horizontally integrated firms forchanges in output after price liberalization. This enables us to appraise argument of opponents of price liberalization that it should have been preceded by "demonopolization".

FUZZY LOGIC IN DECISION MAKING DURING SIMULATION OF ENTERPRISES ACTIVITIES UNDER CIRCUMSTANCES OF TENDERS

Tadeusz Witkowski

Warsaw, Poland

The simulation process of production-financial activities of an enterprise receiving orders under circumstances of the competition tenders in form of business game is observed. The main stages of simulation are: choice of order structure and determination of the enterprise productive capacity; selection of proposals on the lowest prices and their distribution among the enterprises gained in the tenders; determination of real costs of order realization by separate enterprises; bookkeeping of new orders, received as results of tenders, in registers of separate enterprises; order generation and their structure determination (cost and time of realization) for separate orders for each enterprise; financial conditions of enterprise for the i-th game period.

During the game its participants make decisions once a quarter over the period of five conventional years.

In the process of decision making with respect to choice of order structure, as well as, enterprise productive capacity change, methods of fuzzy dynamic programming are used. And the change of productive structure is determined with due account of minimum time of an order execution delay.

First of all, for the increase of prices of all types of orders the characteristic function "increase of price value" is constructed. Then, by means of indirect method thecharacteristic functions of appropriate fuzzy sets are constructed and maximum errors of expert responses are determined. Using the rules, the expert systems included, the characteristic function, describing linguistic variable value "gain probability in the competition tender is constructed in the form of graphs.

The results of analysis of simulation were obtained accounting fordifferent behaviour strategies of the game participants with the use of Wald, Hurwitz, Lapace and Savage criteria and their varieties as well as other optimization criteria. The software has been designed for carrying out the game in dialogue mode as well as for decision making with IBM 370/148 and IBM PC/AT.

MARKETING OF GOODS: STATISTICS OF FEEDBACK

I.V. Semeniak, B.S. Elkin

Charkow, Russia

A model of computerized marketing system is suggested, comprising the subsystems: (a) statistics of field studies; (b) statistics of the service; (c) statistics of reclamations; (d) statistics of advertising.

Subsystem (a) includes motivation analysis. For pattern recognition features are differentiated by a multi-dimensional analysis. Aggregation of features and formation of types is done using the main components of a matrix of feature combinations. Measures for liquidation of causes of reclamation are analyzed by using several statistic criteria (Ansari-Bradley, Wilkinson, Moses-Shorak).

The application of the system permits to reduce productive losses, to improve quality control, to segment customers on a regional market, to influence the demand and to provide the producer with updated information on the state of sales.

The system was tested in Kharkov for the study of producers, suppliers and buyers of TV sets.

FORECASTING IN THE LOCAL ECONOMY.
AN OR APPROACH FOR BUSINESSES AND PLANNERS.

Roger Bailey and Brian Lehaney

*Faculty of Business, Luton College of Higher Education
Luton, U.K.*

Managers and owners of businesses can usually find a ready supply of economic forecasts to assist in their planning. Usually, however this relates to aggregate activity in the economy as a whole and many businesses do not buy and sell in national markets. Their markets often correspond geographically with local areas whose economies may reflect national economic trends to an uncertain degree.
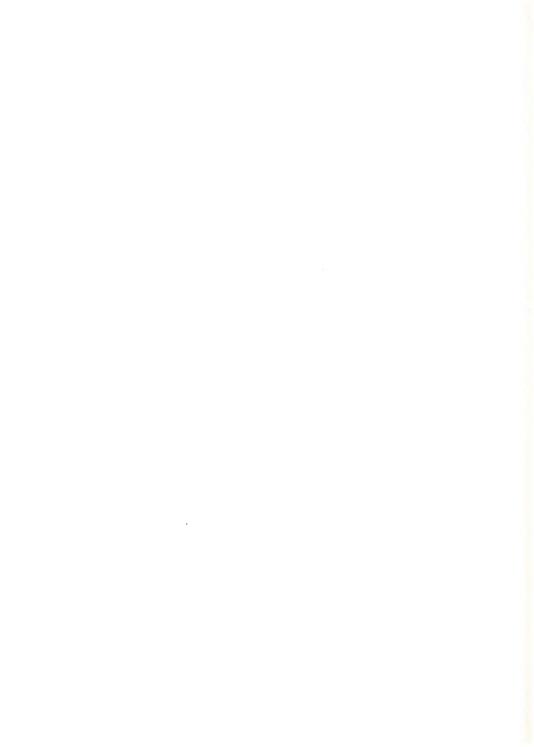
This paper adopts an OR approach to the problems of businesses and planners who need to make predictions about levels of economic activity in their local area. The practical application of forecasting techniques is reported on. Theoretical problems are addressed.

We must ask in economic terms: "what kind of a place is this and what useful comparisons can we make with our region and with other local areas?

A key question is: are there readily available techniques which will perform better in forecasting than intuitive guesses or simple extrapolation from business records?

A particular issue that is addressed is the problem of capturing data on the local economy that will give sufficient coverage and a suitable quality to provide a basis for forecasting.

Computing requirements are addressed and techniques involved are based on industry standard software.