

## BOOK REVIEW

Jerzy Witold Wiśniewski, *Microeconometrics in Business Management*, John Wiley & Sons, United Kingdom 2016: 216, ISBN: 978-1-119-09680-1

Mathematical tools – especially econometric models – play an important, but still underestimated role in business management. The process of decision-making in a company requires increasing access to data. To make a proper decision the data must be analyzed in order to find regularities in the functioning of the economic entity. These regularities constitute the basis for the construction of tools for making forecasts or simulations and then – decisions. It is econometrics which creates such tools. Generally two branches of econometrics can be distinguished: the theory of econometrics, which provides models and develops methods for their construction and applied econometrics, where theoretical models are used for specific applications in a given economy or enterprise.

Jerzy W. Wiśniewski has published over 100 scientific papers and books devoted to the application of mathematical methods in economics and management. He has extensive experience in business management and consultant activity. For over 25 years managing his own business helped him better understand the rules governing the economy and enabled him to combine his theoretical knowledge with practical experience. The main field of J. Wiśniewski's research is microeconometrics which is a part of applied econometrics. The main task of microeconometrics is to create and customize tools

dedicated to the support of the decision-making process in companies of all sizes.

The monograph is divided into two parts: theoretical (Chapters 1 and 2) and empirical (Chapters 3–6). Chapters 1 and 2 contain a systematic overview of the basic econometric modelling theory, whereas Chapters 3–6 are devoted to practical applications of econometric models in different areas of enterprise activity. The construction of the book enables the reader – even if he or she is not acquainted with econometrics and statistics – to understand these tools and apply them to decision-making. The reader can easily follow the theoretical considerations and learn how to use such models in business decision-making.

The first chapter contains the basic knowledge on single-equation econometric models. The author defines elements of the econometric model step by step and describes in detail the main stages of model construction. Special attention is given to the verification of the model quality. The last part of the chapter is devoted to econometric forecasting. The reader can learn not only how to make forecasts with the use of econometric models but also how to analyze the accuracy of such forecasts.

In order to take into account the interdependencies occurring between different variables which describe the functioning of an enterprise multiple-equation mod-

els must be applied. Such models are the subject of consideration in Chapter 2. The author presents a classification of multiple-equation models based on the mechanism of interrelations between interdependent variables, discusses the problem of model identification, explains how the parameters of a multiple-equation model are estimated and how the forecasts based on such models are constructed.

The efficiency of the use of econometric models in enterprises for decision-making purposes depends on a proper knowledge and good understanding of microeconomics and the enterprise theory on the part of the model constructor. In Chapters 3–6 the reader is made familiar with the functioning of different sized companies and learns how to describe the main areas of a company's activity with mathematical equations. The author considers two separate groups of enterprises: the first group covers large- and medium-sized companies, the second – small ones (unfortunately in the book there are no formal definitions of large, medium and small enterprises). The relationships between various economic processes and variables in a company are presented in Figure 3.1 (for large- and medium-sized company) and in Figure 4.1 (for a small company). The systems presented in these figures play the key role in understanding the way of model construction and especially of defining the model equations.

Chapter 3 is devoted to the application of an econometric recursive multi-equation model to large- and medium-sized enterprises. Based on Figure 3.1 J. Wiśniewski explains the main governing the functioning of such enterprises and presents a general structural form of the model which describes them. The parameters of the model were estimated with the use of the EViews 4 package based on real quarterly data collected by the au-

thor during his business activity. The estimation results are presented in the form of computer-outputs and charts. The last ones show the actual values of each interdependent variable, its theoretical values resulting from the empirical model and the residuals of the model. For a reader who is not familiar with econometrics it can be difficult to follow the estimation results as there are no model equations quoted. There is also no explanation as to what kind of information results from some of the statistics given in the computer outputs (log likelihood, Akaike information criterion, F-statistic). In the final part of Chapter 3 the author shows how to apply the constructed model to make forecasts of the endogenous variables describing the enterprise and how to decide on the basis of absolute and relative errors whether the obtained forecasts are acceptable or not.

Chapter 4 presents an empirical multiple-equation model of a small-sized enterprise. The system of interdependencies shown in Figure 4.1 constitutes the basis for defining the variables appearing in the model. The way of presentation of the estimation results is different from that in Chapter 3. There are no computer outputs and no information concerning the program which was used for the estimation of the model's parameters. Instead of this for each interdependent variable there are two model equations given: one equation based on monthly data and one based on quarterly data. In case of four variables – although without any comments – the empirical distribution of the residuals is also presented. In this chapter the author pays more attention to the interpretation of the parameters' signs and values. He also interprets the value of Durbin-Watson statistic.

The last two chapters are devoted to the modeling of two special areas in management of a small company: financial li-

quidity (Chapter 5) and labour resources (Labour 6). Financial liquidity plays a fundamental role in the viability and development of any enterprise. Having the cash necessary for timely payments of liabilities is one of the most significant problems of a small-sized company as financing business activity in such a company is usually done using its own funds. In Chapter 5 J. Wiśniewski defines three measures of a small-sized company's financial liquidity and then uses them in the empirical analysis based on monthly and quarterly data. He constructs a model describing the interdependencies between the financial liquidity and the debt recovery efficacy in an enterprise.

Chapter 6 presents different approaches to the econometric modeling of labour resources in small-sized enterprises. Econometric models are shown which can be used in a company in the selection of an efficient worker and for an efficient white-collar employee. According to the author familiarity with the mechanism of the demand for labour in an enterprise enables recognition of employment stimulators and its inhibitors.

In my opinion the book will be interesting not only for students and researchers in economics and management, but above all for practitioners who are faced with the decision-making process in a company. Entrepreneurs and managers do not have to be constructors of the analytical and decision-making tools. However they should be aware of their

existence, availability and possibilities of implementation. In J. Wiśniewski's book the reader will find a good theoretical background necessary for the proper construction of empirical models which can be used in enterprises for making forecasts or simulations of economic variables. Such forecasts and simulations are more and more often used in the decision-making process.

Practitioners who would like to make use of the models presented in the monograph must be aware of the fact that these models describe only the functioning of certain companies and should not be implemented to make decisions in others. The mechanism of interdependencies between economic variables may differ in detail from enterprise to enterprise depending on its size as well as on the sector and country in which it carries out its activities. Therefore the models presented in the book may simply serve as examples of mathematical tools supporting managerial decisions and can help each company to construct its "own" models. The parameters of such individual models should be estimated with the use of statistical data collected in the company. An important function of this book is to make decision-makers aware of the need for the collection of statistical data with reference to the activity of the company.

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