Integration between Regression Model and Fuzzy Logic Approach for Analyzing Various Electronic Commerce Effects on Economic Growth in Organizations

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ABSTRACT

Information technology (IT) has the potential to transform the means by which society learns and accesses information. Electronic commerce is a rapidly growing area enjoying considerable attention in conjunction with the emergence of the Information Superhighway or the building of the National Information Infrastructure (NII). Numerous firms are beginning to position themselves on this superhighway in terms of providing hardware, software, information content or services. Economic growth is a significant point for profit making organization, and many organizations need multi-aspect in-depth analysis for finding the effective criteria to grow economically. This paper introduces integration between regression methodology and the fuzzy logic approach to analyze the effects of e-commerce on economic growth in an organization. The numerical results in the Iranian economy reveal that the proposed methodology is efficient in terms of accuracy and policymaking.

Keywords: Business Implication, Electronic Commerce, Information Technology, National Information Infrastructure, Regression Models

INTRODUCTION

The world is in the midst of an all purpose technological revolution based on information technology (IT), defined here as computers, computer software, and telecommunications equipment. The macroeconomic benefits of the IT revolution are already apparent in some economies. Historical experience has shown that such revolutions have often been accompanied by financial booms and busts, and the IT revolution has been no exception. But, while
spending on IT goods is likely to remain weak in the immediate future, as past overinvestment unwinds, the longer-term benefits for the global economy are likely to continue, or even accelerate, in the years to come. While technological change is an ongoing process, there are periods during which technological progress is especially rapid, resulting in new products and falling prices of existing products that have widespread uses in the rest of the economy (Brynjolfsson & Kahin, 2000). Such periods are generally identified with all-purpose technological revolutions. The effects of such revolutions have generally occurred in three (often overlapping) main stages. First, technological change raises productivity growth in the innovating sector (Nordhaus & William, 2001); second, falling prices encourage capital deepening; and, finally, there can be significant reorganization of production around the capital goods that embody the new technology. IT has stimulated extraordinary investment in goods such as computer chips, semiconductors, and telecommunications equipments, resulting in significant capital deepening. This capital deepening has led, in some countries, to acceleration in overall productivity growth and may be encouraging changes in the organization of production, which could lead to further improvements in productivity growth (Lee et al., 2001).

The last decade has seen an explosion in the growth and the use of the Internet. New terms have appeared to more accurately distinguish the different types of business transactions that take place on the Internet (Litan et al., 2000). One of these new terms is “e-commerce” (EC). The EC can be defined as the exchange transactions which take place over the Internet primarily using digital technology. This encompasses all activities supporting market transactions including marketing, customers’ support, delivery and payment (Schniederjans et al., 2002). One important problem in EC marketing activities is the process of building and maintaining customer relationships through online activities to facilitate the exchange of ideas, products, and services that satisfy the goals of both parties (Kwan et al., 2005). Thus EC marketing teams devote most of their time to develop indicators to efficiently monitor their activities and adapt their business strategy dynamically. The specificity of e-marketing is related to the Internet and the WWW technologies. Indeed, faced with important amounts of information and a multitude of potential choices on the Web, indecisive Internet consumers tend to turn to the opinions and experiences of other customers to make their choices. A new type of websites has thus appeared to support this emerging sharing process. They propose to mediate, support, or automate the everyday process of sharing recommendations between cyber-consumers’ communities (McNee et al., 2003; Schafer et al., 2001).

Regression models are statistical models which describe the variation in one (or more) variable(s) when one or more other variable(s) vary. Inference based on such models is known as regression analysis. We use regression models for studying how changes in one or more variables will change the value of another variable. Generalizing slightly, we can talk about a variable ‘explaining’ some of the variation in another variable. Linear regression attempts to model the relationship between two variables by fitting a linear equation to observed data. One variable is considered to be an explanatory variable, and the other is considered to be a dependent variable. For example, a modeler might want to relate the weights of individuals to their heights using a linear regression model. Before attempting to fit a linear model to observed data, a modeler should first determine whether or not there is a relationship between the variables of interest. This does not necessarily imply that one variable causes the other (for example, higher SAT scores do not cause higher college grades), but that there is some significant association between the two variables. A scatterplot can be a helpful tool in determining the strength of the relationship between two variables. If there appears to be no association between the proposed explanatory and dependent variables (i.e., the scatterplot does not indicate any increasing or decreasing
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