E-Commerce Growth and the Changing Structure of the Retail Sales Industry

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ABSTRACT

Recent studies of the growth in e-commerce retail sales examine mainly supply side factors, such as the application of information technology, low transaction costs etc. The author uses an empirical model that provides evidence of significant demand side factors which also help explain structural changes in the industry. Based on quarterly data from 1999 Q4 to 2010 Q3, the econometric results indicate an e-commerce sales elasticity of 9.36 and a non-e-commerce sales elasticity of 2.63, indicating a more dynamic and competitive internet market. Evidence of more demand stability for e-commerce sales is also provided. The policy implications for growing e-commerce sales necessitate strategic policies for planned expenditures on R&D and investments in information technology as well as the efficient use of store space by traditional retailers. The use of income elasticity differential for analyzing competition between these two sectors provides an alternative method to price differential used in previous studies.

Keywords: Competition, E-Commerce Sales, Non E-Commerce Sales, Real Income, Retail Sales Industry

INTRODUCTION

Several studies (Urbaczewski et al., 2002; Ngai & Wat, 2002; Kauffman & Walden, 2001; Zwass, 2003) have addressed the future research agenda related to the recent growth in electronic business. Litan and Rivlin (2001) articulate the impact of the Internet on the entire economy and Kauffman and Walden (2001) emphasize the importance of the application of economic analysis and statistical techniques. Bakos (2001), Heil and Prieger (2009), and Willis (2004) identify several factors contributing to the growth of electronic business, these include: (i) the growing use of information and communication technology (ICT) which positively impact productivity and economic growth through lower search and transaction costs and the efficient use of resources, (ii) the increasing productivity of firms, the enhancement of market and competition, and increasing consumer welfare, and (iii) the advantages over conventional ways of selling, such as low transaction cost, more efficient distribution and greater market access. These are mainly supply side factors, an examination of demand side

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factors will provide a deeper understanding of the dynamics of the market and adds to the existing research literature.

An important economic change resulting from the growth of e-commerce is the growing competition between traditional (conventional) retail sales and e-commerce (internet) sales (Borenstein & Saloner, 2001). This is evident in the findings of Brynjolfsson and Smith (2000) who compare pricing behavior at 41 internet and conventional retail outlets and find that prices on the internet are 9-16% lower than prices in conventional outlets. Kim et al. (2010) also find relatively lower search cost and price competition for on-line demand for durable goods. Goolsbee (2001b) contends that although price dispersion exists between online and retail stores price competition may not be particularly intense because of brand name and other factors. Balasubramanian (1998) emphasizes the growing need for modeling competition between retail and internet sales, as well as competition within a multiple channel environment.

This research empirically examines competition between e-commerce retail sales (internet) and non e-commerce sales (from traditional outlets) from a demand side perspective by estimating and comparing the sales (income) elasticity differential in these two sectors. We postulate that the sector with the higher income elasticity and more trend stability has a competitive advantage. The use of the variation in the income elasticity of demand as a measure/indicator of competitive effect has been used in recent studies, including Basker (2008), McCarty (1996), and Epple and Romano (1998). The theoretical significance is discussed in another section (Methodology) of the paper. The rationale for applying the demand side methodology (with emphasis on the income elasticity) is supported by recent findings on the significance of income on e-commerce sales. Jopson (2011) identifies four buying styles (tech-savvy multi-channel shopper; discerning online shopper; loyalist multi-channel shopper; and bricks-and-mortar shopper); each style is determined by the level of income (see Appendix A for a description). Lieber and Syverson (2011), based on the 2005 Forrest Research Technographics Survey, contend that internet users are mainly from the middle and upper income classes. Income elasticity also explains the long run variation in e-commerce sales better than price differential because a large portion of retail sales are durable goods whose demand is pro-cyclical and subjected to inter-temporal substitution. Earlier studies of the demand for retail sales, for example, Hymans et al. (1970) and Liu (1970) find real income to be the dominant independent variable. An advantage of the methodology is the offering of a better understanding of the demand side factor that explains e-commerce growth since previous studies (Bakos, 2001; Heil & Prieger, 2009; Willis, 2004) analyze supply side factors.

We use the latest quarterly data from 1999 Q4 to 2010 Q3 published by the US Census Bureau, (U.S. Department of Commerce) to empirically estimate the impact of real disposable income on: (i) total retail sales, (ii) non-e-commerce retail sales, i.e. sales from traditional/conventional retail outlets, and (iii) e-commerce (internet) retail sales. In addition to estimating the sales/expenditure elasticity using regression analysis, we perform several diagnostic tests to ensure the validity of the model and thus the reliability of the results. These tests are the following: (i) test of unit root for the stationarity of data, (ii) test of cointegration for the long run stable relationship between the variables, this is a prerequisite for a valid forecasting model, and (iii) Granger-causality test for the unidirectional causality from the independent to the dependent variable.

The results of this study have several important economic implications: (i) sales elasticity serves as reliable indicator of potential demand changes in the industry since B2C retail sales impact final (aggregate) consumption expenditures; this could also impact the effectiveness of macro-stabilization policies aimed at stimulating consumer spending which constitutes about 66% of GDP, (ii) sales elasticity as an indicator of demand is useful as an input by management for decision making on
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