Chapter 84
Examining the Impact of the U.S. IT Stock Market on Other IT Stock Markets

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Abstract Because of its very important role in modern production and management, information technology (IT) has become a major driver of economic growth and has speeded up the integration of the global economy since the 1990s. Due to the prominent position of the IT industry in the U.S., the U.S. IT stock market is believed to have driven up IT stock markets in other countries. In this paper, we adopt a multivariate GARCH model of Baba et al. (Unpublished manuscript, Department of Economics, University of California, San Diego, 1990) to investigate the linkages between the IT stock and several non-U.S. IT markets; namely, Japan, France, Canada, Finland, Sweden, and Hong Kong. Our findings reveal that, generally, the U.S. IT market contributes strong volatility to non-U.S. IT markets rather than having a mean spillover effect, implying that the U.S. IT market plays a dominant role in the volatility of world IT markets. In addition, our analysis of the dynamic path of correlation coefficients implies that during the formation, spread, and collapse of the IT bubble, the relationships between the U.S. and non-U.S. IT markets are strong but the relationships weaken after the IT bubble bursts.

Keywords Information technology • IT bubble • Stock market • Integration • Volatility • Spillover effect • Multivariate GARCH (MGARCH) • Conditional correlation

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84.1 Introduction

The rapid growth and diffusion of information technology (IT) have had a great impact on modern production and management. IT became a major driver of economic growth throughout the 1990s, and, thus, IT markets have attracted great attention from investors and policy makers. For example, Oliner and Sichel (2000) found that developments in computer hardware, software, and network infrastructure accounted for about two-thirds of the acceleration in labor productivity for the non-farm business sector in the U.S. between the first and second halves of the 1990s. Gains in the new technology fueled the fastest-growing companies in history through the second half of the 1990s. Writing at the peak of the IT boom, Gordon (2000) stated that the true enthusiasts treat the New Economy as a fundamental industrial revolution as great or greater in importance than the concurrence of inventions, particularly in electricity and the internal combustion engine, which transformed the world at the turn of the last century. However, Gordon (2000) pointed out that the miracle of U.S. economic performance that occurred on the back of the growth in the IT sector in the second half of the 1990s began to unravel when the NASDAQ fell by half between March and December 2000. In 2000 and 2001, it was reported that 784 IT companies went out of business, and in those 2 years, 143,440 workers in the IT industry in the U.S. lost their jobs (Maich 2003). The profits of Yahoo, a company whose primary source of revenues is online advertising, collapsed from earnings of nearly U.S. $300 million in 2000 to almost nothing in 2001. Yahoo's stock price slumped from a high of about U.S. $240 in early 2000 to U.S. $17 on March 9, 2001, the first anniversary of the 5,000-level peak of the NASDAQ. Over the same period, IT stocks in countries other than the U.S. also collapsed, focusing attention on the fact that the collapse in IT stocks was a global phenomenon.

With the progress of global economic integration, researchers have examined the linkages among major national stock markets. Important studies include Jeon and von Furstenberg (1990), Hamao et al. (1990), Campbell and Hamao (1992), Longin and Solnik (1995), Hamori and Imamura (2000), Masih and Masih (2001), and Edwards

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