Chapter IX

Volatility Spillover Structure of Stock and Foreign Exchange Market between Korea, Japan, and Hong Kong

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Abstract

Highly developed IT technology can be the source of volatility spillover between markets located in other countries. In this chapter, we investigate the interrelationship between stock returns in North East Asian countries and the effect of foreign exchange rate volatility on the interrelationship between stock returns. We bring out clear simultaneous interrelationship between stock return and foreign exchange volatility. Focusing on covariance of each asset returns, if we do not take foreign exchange rate volatility into account when we evaluate our international portfolio, the portfolio risk might be underevaluated. The analysis shows that foreign exchange market turbulence might be accompanied by increase in covariance between stock returns. Just after the Asian currency crisis, the relationship between stock returns and foreign exchange turbulence might have changed. For managing international portfolio risk, we should be aware of foreign exchange risk and structural change in covariance between stock returns.
Introduction

Information technology in financial industry has been developing at amazing speed. The information inflowed into a particular financial market can be transferred to other market within a minute or even a couple of second through many kinds of Internet tools. In this circumstance, volatility in any particular market can be transmitted to other markets, which is located even in other countries, caused by informational trade if traders act following efficient market hypothesis. This volatility transmission mechanism has been investigated in many articles. IT technology development has been accelerating this tendency in world financial market. The more IT technology develops, the closer the financial asset returns might co-move. Contagion in volatility co-movement during currency attack can be one of the important results arising from this mechanism.

In a globalized financial world, the importance of international capital flow has been stressed to afford the good opportunity to invest and finance. For investing and financing internationally, we have to be careful about the portfolio risk. Many methods to manage international portfolio risk are proposed from finance and economics field. To manage the portfolio risk in the first step, we should recognize the risk itself or the source of the risk. Cross-country stock return or those volatility covariances are one of the most important respects in international portfolio risk management in highly developed IT technology days from the reason just mentioned above. In this chapter, we try to explore the volatility structure between financial markets located in different countries and the effect of foreign exchange rate change on those structures. If the IT technology breeds information transfer between the markets, we might expect that there exist some kind of volatility relations.

Karolyi and Stulz (1996) emphasize the importance of stock return covariances between countries in some respects. As these covariances increase, internationally diversified portfolio risk increases. Financing cost for individual firms also rise through covariance increase. One of the important components, which may effect the international relationship between stock markets, is foreign exchange rate.

Some theoretical articles infer that the stability of foreign exchange rate may induce higher asset price variability with a given random shocks. This tendency can be called volatility transfer hypothesis. A lot empirical study is showing that the stability of foreign exchange rate contributes to ease volatility of asset prices. Fratianni and Hagen (1990), Artis and Taylor (1994) used EMS and related data to test this relationship. Multivariate GARCH with constant correlation is used in Longin and Solnik (1995) to investigate whether the correlation of international equity returns is constant. They suggest that the conditional covariance structure of international equity returns may change over time. And the correlation increases in periods in high volatility.

With the EMS experience, Bodart and Reding (1999) explores the relationship between exchange rate stability and international correlation of asset returns. They use bivariate GARCH model with constant conditional correlation and bring out that credible peg system can reduce bond market volatility, and an increase in exchange rate volatility is accompanied by a decline in international correlation between stock returns.
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