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The relationship between stock returns and volatility in international stock markets

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Abstract

This study examines the relationship between expected stock returns and volatility in the 12 largest international stock markets during January 1980 to December 2001. Consistent with most previous studies, we find a positive but insignificant relationship during the sample period for the majority of the markets based on parametric EGARCH-M models. However, using a flexible semiparametric specification of conditional variance, we find evidence of a significant negative relationship between expected returns and volatility in 6 out of the 12 markets. The results lend some support to the recent claim [Bekaert, G., Wu, G., 2000. Asymmetric volatility and risk in equity markets. *Review of Financial Studies* 13, 1–42; Whitelaw, R., 2000. Stock market risk and return: an empirical equilibrium approach. *Review of Financial Studies* 13, 521–547] that stock market returns are negatively correlated with stock market volatility.

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1. Introduction

The relationship between the return on an asset and its variance (or volatility) as a proxy for risk has been an important topic in financial research. The theoretical asset-pricing models (e.g., Sharpe, 1964; Linter, 1965; Mossin, 1966; Merton, 1973, 1980) typically link the return (or the price change) of an asset to its own return variance, or to the covariance between its return and the return on the market portfolio. However, whether such a relationship is positive or negative has been controversial. As summarized in Baillie and DeGennaro (1990), most asset-pricing models (e.g., Sharpe, 1964; Linter, 1965; Mossin, 1966; Merton, 1973) postulate a positive relationship between a stock portfolio's expected returns and volatility. On the other hand, there is also a long tradition in finance that models stock return volatility as negatively correlated with stock returns (Black, 1976; Cox and Ross, 1976; Bekaert and Wu, 2000; Whitelaw, 2000). For example, Bekaert and Wu (2000, p. 1) recently claim that "it appears that volatility in equity markets is asymmetric: returns and conditional volatility are negatively correlated." Although their paper is critically motivated by such a claim, the empirical evidence for such a negative relationship between expected returns and volatility is mixed in the US stock markets and has not yet been reported in international stock markets other than the US. In this context, our study substantially complements Bekaert and Wu (2000). Furthermore, Glosten et al. (1993) and Nelson (1991) argue that across time there is no theoretical agreement about the relationship between returns and volatility within a given period of time and that either a positive or a negative relationship between current stock returns and current volatility is possible.

Numerous empirical studies have been conducted to investigate the relationship between stock market returns and volatility. The findings of early studies are mixed (e.g., Pindyck, 1984; Poterba and Summers, 1986). As pointed out by Bollerslev et al. (1992, pp. 17–18), inference from early studies may not be reliable because variance modeling in these studies does not make efficient use of the data. More recent studies have typically used (G)ARCH-in-Mean models (Engle et al., 1987) to allow for time-varying behavior of volatility. Surprisingly, most find an insignificant relationship between returns and conditional variance (as defined by the parametric GARCH process) in international stock markets. Although French et al. (1987) document a significant positive relationship between US stock market returns and the conditional variance of these returns, Baillie and DeGennaro (1990) report that such a positive relationship is weak and almost nonexistent in the US stock market. Similarly, Theodossiou and Lee (1995) and Lee et al. (2001) also find a positive but insignificant relationship between stock market returns and the conditional variance in many other international stock markets. In contrast, Nelson (1991) documents a negative but insignificant relationship between expected returns and the conditional variance of the US stock market. Glosten et al. (1993) show evidence that such a negative relationship is significant in the US market. Obviously, the empirical findings remain inconclusive.

The finding of an insignificant relationship appears puzzling. Though a significant impact of volatility on the stock prices can take place only if shocks to volatility persist over a long period of time (Poterba and Summers, 1986), it is well documented that stock market volatility is persistent. Hence, many of the previous studies, e.g., Baillie and DeGennaro (1990), Theodossiou and Lee (1995), and Choudhry (1996), challenge the appropriateness

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