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Co-movements of sector index returns in the world's major stock markets in bull and bear markets: Portfolio diversification implications

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Abstract

In this paper, principal components analysis and Granger causality tests are used to study the portfolio diversification implications of the co-movements of sector indexes in the US, UK, German, French, and Japanese stock markets in bull and bear markets. We find that, in a bull market, investors can obtain more benefit with global diversification than with domestic diversification even if they invest in the same sector in different countries as opposed to investing in different sectors within the same country. In a bear market, the sectors of different countries tend to be more closely correlated and country diversification opportunities are limited.
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1. Introduction

The co-movements of the world's national equity market indexes have long been a popular research topic in the finance literature (see, e.g., Hilliard, 1979; Joy, Panton, Reilly, & Martin, 1976; Makridakis & Wheelwright, 1974; Maldonado & Saunders, 1981; Philippatos, Christofi, &

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Christofi, 1983). Low correlation between national stock markets is often presented as evidence in support of the benefit of global portfolio diversification (see, e.g., Lessard, 1976; Levy & Sarnat, 1970; Meric & Meric, 1989; Solnik, 1974; Watson, 1978). However, recent studies indicate that correlation between national stock markets has been increasing and the benefit of global portfolio diversification has been decreasing (e.g., Aggarwal & Leal, 1997; Erb, Harvey, & Viskanta, 1995; Goetzmann, Li, & Rouwenhourst, 2001; Longin & Solnik, 1995; Meric & Meric, 1998).

Although the co-movements of the world's national equity market indexes have received considerable attention, the portfolio diversification implications of the co-movements of the world's industry and sector indexes have not been studied sufficiently. Lessard (1974) and Meric and Meric (1989) find that there is closer correlation between different industry indexes within the same country than between same industry indexes in different countries. Therefore, they conclude that investors can obtain better portfolio diversification by investing globally even if they invest in the same industry in different countries compared with investing in different industries in the same country.

Ratner, Meric and Meric (2006) provide evidence that demonstrate that sector dispersion can be used to predict stock market returns. Roll (1992) finds that industry concentration is a significant factor affecting global equity market correlation and diversification benefits. In two recent studies, Meric, Ratner and Meric (2005) and Ratner and Leal (in press) determine that, although the benefit of global diversification with national equity indexes has been decreasing because of increased correlation between countries, there are still substantial global diversification opportunities with sector investments.

The objective of this paper is to study the portfolio diversification implications of the co-movements of sector equity index returns in the US, the UK, Germany, France, and Japan during the September 15, 1997–October 9, 2002 period. Our study differs from previous studies in two respects:

(1) Although the principal components analysis (PCA) and Granger causality statistical techniques have been used extensively to study the co-movements of national benchmark stock market indexes (see, e.g., Makridakis & Wheelwright, 1974; Meric, Coopersmith, Wise, & Meric, 2002; Meric & Meric, 1989; Philippatos et al., 1983; Ratner & Leal, 1996), these techniques have not been used to study the co-movements of national sector equity indexes. In this study, the PCA and Granger causality techniques are used to study the co-movements of ten sector equity indexes in the world's five largest stock markets.

(2) Recent studies indicate that the co-movements of national stock market indexes change significantly in bull and bear markets (see, e.g., Meric et al., 2002; Solnik, Boucrelle, & Le Fur, 1996). However, the effects of bull and bear-market conditions on the co-movements of national sector equity indexes have not been studied. In this paper, the co-movements of ten national sector equity indexes are studied and compared during bull and bear markets.

The paper is organized as follows. The next section explains the data and methodology of the paper. In Section 3, the PCA methodology is used to study the portfolio diversification implications of the co-movements of ten sector equity indexes and the national benchmark stock market index in each country during bull and bear markets. In Section 4, the PCA methodology is used to study the portfolio diversification implications of the global co-movements of the sector equity indexes and the national benchmark stock market indexes under bull and bear-market conditions. In Section 5, the Granger causality technique is employed to study the portfolio diversification implications of the linkages between the US, UK, German, French, and Japanese