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Pacific-Basin stock markets and real activity

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Abstract

This paper investigates the relationship between the Pacific-Basin country stock returns and real economic activity. It also examines the importance of the Japanese and U.S. economies to the Pacific-Basin financial markets by investigating the effects of the former's industrial production growth rates on the latter's stock market movements. We find that the representative global instrumental variables can explain up to 18% of the monthly portfolio real return variability in the Pacific-Basin stock markets and 46% of the quarterly variability. Our evidence shows that U.S. industrial production growth rates tend to exhibit a stronger and more stable relationship with the Pacific-Basin real stock returns.

Key words: Asset pricing; Pacific-Basin stock markets; Real activity; Maximal R^2; MEP

JEL classification: G12; G15

1. Introduction

Over the past decade, the Pacific-Basin countries have been experiencing a rapidly growing importance in the global economy, resulting from their impressive economic growth and industrialization. While the world's industrialized nations grew at an annual rate of 3.1% in the 1980s, these Pacific-Basin countries such as Singapore, Japan, and Hong Kong grew more than twice as quickly as the world average. The economic dynamism suggests the

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likely emergence of an economic community in the Pacific-Basin region that parallels the European Economic Community.

The developments and changes toward a more cohesive and integrated region have attracted considerable research interests in the Pacific-Basin equity markets. Many studies, for example, have focused on: (1) the time series behavior of stock returns on the Pacific-Basin markets (Bailey et al., 1990), (2) the possible linkage of the Pacific-Basin stock returns via the lead-lag correlations among the stock returns or via the transmission of stock market volatility from one stock market to another (Ng et al., 1991), (3) the integration of the Pacific-Basin equity markets with the other national markets (Cho et al., 1986; Harvey, 1991; Campbell and Hamao, 1992), and (4) the diversification benefits to foreign investors for holding stocks that are traded on the Pacific-Basin stock markets (Bailey and Stulz, 1990). In contrast, there has been very little work investigating the relationships between the Pacific-Basin stock returns and macroeconomic variables, including measures of real activity.

In this paper we present an integrated approach to investigate the sources of total real stock return variation in the Pacific-Basin stock markets. Motivated by Fama (1990), we examine whether macroeconomic variables that proxy for time-varying expected returns, shocks to expected returns, and shocks to expected cash flows are the key elements that measure the total variation of the Pacific-Basin real stock market index returns. Fama argues that future production activity contains useful information pertaining to future cash flows; we therefore use future industrial production (IP) growth rates as proxies for shocks to expected cash flows. Using the post-1953 monthly and quarterly data, he finds that 43% of the annual real U.S. stock return variability are attributed to the variation of future U.S. IP growth rates and 30% to time-varying expected returns and shocks to expected returns. However, the combined explanatory power of these variables is about 59%.[1] Fama further shows that the shorter the holding period, the weaker the explanatory powers of these variables.

This study differs from Fama's (1990) in that we employ global information variables to explain real stock return variations in the Pacific-Basin region. Given the strong global economic linkages among these countries, it is of interest to investigate whether a common set of global economic variables has the ability to explain the variation of real returns in the Pacific-Basin stock markets. For this study, we use monthly and quarterly data on the national stock indexes of Australia, Hong Kong, Japan, and Singapore/Malaysia. We select macroeconomic variables that are representative of the

[1] Schwert (1990) extends the sample period from 1889 to 1988, and finds Fama (1990) results to be robust even with a much longer sample period.

existing empirical literature and are derived from both theoretical and empirical considerations.

Our analysis employs the Lo and MacKinlay (1992) procedure for the following reasons. First, the procedure allows us to determine the maximum explanatory power of a given set of determinants for portfolio returns, as measured by the R^2.[2] Second, it provides a systematic way to search for the best performance a financial valuation model can possibly achieve. Third, the method also allows us to assess the economic and statistical significance of the representative variables we use to explain the national stock returns.

We also investigate the relative importance of the Japanese and U.S. economies to the Pacific-Basin equity markets. Notwithstanding the fact that the Japanese and U.S. stock markets are the two largest in the world in terms of the market value of equity, the motivation for our investigation is primarily derived from the evolving U.S. and Japanese economic and financial roles in the world economy. To compare their influences on the Pacific-Basin equity markets, we use future Japanese and U.S. IP growth rates as two different proxies for expected cash flow shocks in this region. We also explore whether the trade patterns between the Pacific-Basin countries and the U.S. can provide an insight concerning the observed correlation patterns between real stock returns and the two IP growth rates.

The remainder of this paper is organized as follows. Section 2 describes the data and their sample statistics. The models and methodology are discussed in Section 3. Section 4 contains analyses of both the individual country stock index returns and portfolio returns. Section 5 summarizes the paper.

2. Data

The data on the national stock equity indexes of Australia, Hong Kong, Japan, and Singapore/Malaysia are provided by Morgan Stanley Capital International (MSCI).[3] These indexes are: (1) value-weighted, (2) calculated with dividend reinvestment, and (3) in U.S. dollar-denominated currency. In constructing these indexes, MSCI excludes the market value of investment companies and of foreign domiciled companies to avoid double-counting. These stock returns are then converted to real returns using inflation rates computed from the U.S. consumer price index. The sample period is from January 1970 to December 1991.

Global information variables that proxy for time-varying expected returns, global shocks to expected returns, and global shocks to expected cash flows

[2] Roll (1988), for example, has suggested using the coefficient of determination R^2 to measure the explanatory power and performance of a financial valuation model.

[3] Morgan Stanley Capital International also provides data on New Zealand. However, this data series starts from 1977 and is therefore excluded from this study.

are drawn from both theoretical and empirical considerations. These variables are representative of those used in the existing studies on international capital markets (e.g. Harvey, 1991; Solnik, 1991; Bekaert and Hodrick, 1992; Campbell and Hamao, 1992; Ferson and Harvey, 1992; Cheung et al., 1993; Cheung and Ng, 1994). The proxies for time-varying expected returns are: (1) the dividend yield on the MSCI Pacific index (*PDY*), (2) the Eurodollar-Treasury yield spread (*TED*), which is the difference between the three-month Eurodollar rate and the 90-day yield on the U.S. Treasury Bill, and (3) the term spread (*TERM*), which is given by the difference between the CRSP long-term government bond return and the short-term 30-day U.S. Treasury Bill rate.

As in Fama (1990), the residuals from first-order autoregressions fitted to *TED* and *TERM* are interpreted as proxies for shocks to expected returns and are labeled *SHD* and *SHM*, respectively, and the quarterly future IP growth rates are used to measure shocks to expected cash flows. Data on the interest rates and IP indexes are obtained from the CRSP bond files and CITIBASE, respectively. In this study, we consider the Japanese and U.S. IP indexes as proxies because of their dominant positions in the Pacific-Basin region and in the world economy.

Table 1 presents summary statistics of national real stock returns and the proxy variables. Notice that for both monthly and quarterly data, the rate of returns on the Hong Kong stock market is the most volatile among these markets. The autocorrelations of *TERM*, *SHD*, *SHM*, and stock returns are small. The means and standard deviations of the U.S. and Japanese IP growth rates are very similar. However, the U.S. IP data are less persistent than those of the Japanese because the former has smaller estimated autocorrelations.

3. Models and methodology

As in Fama (1990) and Schwert (1990), the following three regression models that describe the relation between real stock returns and variables proxying for time-varying expected returns, global shocks to expected returns, and global shocks to expected cash flows are considered:

$$r_t=\alpha+\alpha_1 P_t+\alpha_2 P_{t+3}+\alpha P_{t+6}+\alpha_4 P_{t+9}+v_t, \tag{M1}$$

$$r_t=\alpha+\alpha_5 PDY_{t-1}+\alpha_6 TED_{t-1}+\alpha_7 TERM_{t-1}+\alpha_8 SHD_t+\alpha_9 SHM_t+v_t, \tag{M2}$$

and

$$r_t=\alpha+\alpha_1 P_t+\alpha_2 P_{t+3}+\alpha_3 P_{t+6}+\alpha_4 P_{t+9}+\alpha_5 PDY_{t-1}+\alpha_6 TED_{t-1}+\alpha_7 TERM_{t-1}+\alpha_8 SHD_t+\alpha_9 SHM_t+v_t. \tag{M3}$$