Time-varying market, interest rate, and exchange rate risk premia in the US commercial bank stock returns

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Abstract

This paper examines the role of market, interest rate, and exchange rate risks in pricing a sample of the US Commercial Bank stocks by developing and estimating a multi-factor model under both unconditional and conditional frameworks. Three different econometric methodologies are used to conduct the estimations and testing. Estimations based on nonlinear seemingly unrelated regression (NLSUR) via GMM approach indicate that interest rate risk is the only priced factor in the unconditional three-factor model. However, based on 'pricing kernel' approach by Dumas and Solnik [(1995). J. Finance 50, 445–479], strong evidence of exchange rate risk is found in both large bank and regional bank stocks in the conditional three-factor model with time-varying risk prices. Finally, estimations based on the multivariate GARCH in mean (MGARCH-M) approach where both conditional first and second moments of bank portfolio returns and risk factors are estimated simultaneously show strong evidence of time-varying interest rate and exchange rate risk premia and weak evidence of time-varying world market risk premium for all three bank portfolios, namely those of Money Center bank, Large bank, and Regional bank. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

Merton (1973) argues that if market factor can not totally characterize the intertemporal changes in a risk-averse investor’s investment opportunity set, then he/she will demand a higher risk premium for exposure to extra-market factors which are correlated with the intertemporal changes in his/her investment opportunity set. Merton further argues that the level of market interest rates may provide a single instrumental variable representing the shifts in the investment opportunity set. This suggests that researchers might want to incorporate the interest rate risk as one possible extra-market factor when testing intertemporal capital asset pricing models (ICAPM). For example, employing different estimation methodologies, Sweeney and Wagra (1986), Choi et al. (1992), Turtle et al. (1994), Song (1994), and Elyasiani and Mansur (1998) all suggest that interest rate risk is one of the priced factors in the US stock market. However, Flannery et al. (1997) find that interest rate risk is priced for the overall US stock portfolios, but not for bank stock portfolios. This is particular puzzling given the fact that the returns and costs of financial institutions are directly affected by the movements of market interest rates. Thus, it is interesting to re-examine whether the interest rate risk is the potential determinant of bank stock returns.

The increasing volatility of exchange rates after the advent of the flexible exchange rate system in the 1970s and the increasing globalization of the economy, including the banking sector, have created an additional source of uncertainty and risk for firms operating in an international environment. Because fluctuations in exchange rates may result in translation gains or losses depending on banks’ net foreign positions, the exchange rate risk could be another potential determinant of bank stock returns. Empirical studies concerning the pricing of exchange rate risk are inconclusive. For example, in a domestic context, Jorion (1991) finds that exchange rate risk is not priced in the US stock market based on unconditional tests of multi-factor arbitrage pricing models. However, using same unconditional tests, Prasad and Rajan (1995) find that exchange rate risk is priced in the US, Japanese, and the UK stock markets. However, based on conditional tests, this inconclusive result seems to disappear. For example, both Choi et al. (1998) and Tai (2000) find that exchange rate risk is priced in the Japanese stock market when testing conditional multi-factor asset pricing models. In an international context, the evidence of exchange rate risk pricing is overwhelming. For instance, Ferson and Harvey (1993, 1994), Korajczyk and Viallet (1989, 1993), Dumas and Solnik (1995) and Tai (1999a,b) all find that foreign exchange risk is one of the priced factors in global stock markets. Moreover, Tai (1998, 1999c) concludes that foreign exchange risk is also priced in foreign exchange markets for both European and Asia-Pacific countries. Thus, in the domestic context, it is interesting to examine whether exchange rate risk is priced in the US bank stock returns.

Since most empirical studies concerning the pricing of bank stock returns mainly focus on the pricing of interest rate risk and very few published papers explicitly investigate the joint interaction of exchange rates and interest rates on bank stock pricing except for Choi et al. (1992) and Wetmore and Brick (1994, 1998), the
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