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Financial crises, the decoupling–recoupling hypothesis, and the risk premium on the Greek stock index futures market

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ABSTRACT

Our results shed light on the contribution of local and regional factors to the risk premium on the Greek stock index futures market. Building upon the stochastic discount factor model, we estimate a multivariate exponential GARCH-in-mean model to uncover the risk premium on the FTSE/ASE-20 stock index futures traded in the ADEX, Greece. We provide evidence that the risk premium was mainly driven by its regional (European) component before the recent financial crisis. We also report that the local (Greek) component has become more important for the risk premium on the Greek stock index futures market after the recent debt crisis in Greece. Importantly, our results suggest that the decoupling–recoupling hypothesis, according to which the recent financial crisis has strengthened international financial links, does not apply to the risk premium on the stock index futures market. Rather, we report evidence consistent with a recoupling–decoupling hypothesis.

1. Introduction

Financial crises like the global market jitters of 2008 and the market turmoil caused by the recent European and Greek sovereign debt crises often have significant disruptive effects on the international linkages of financial markets. As far as the financial crisis of 2008 is concerned, Dooley and Hutchison (2009) find that the international linkages of financial markets of several emerging market economies with the U.S. markets have strengthened substantially relative to the period before the financial crisis. Dooley and Hutchison (2009) summarize their empirical findings by formulating a decoupling–recoupling hypothesis according to which the financial crisis (that is, the disruptions in the U.S. subprime mortgage market and the ensuing banking crisis) has led to closer international linkages of financial markets. This hypothesis has spawned much recent research. Researchers have reported both empirical (Levy-Yeyati & Williams, 2012) and theoretical results (Korinek, Roitman, & Végh, 2010) that support the decoupling–recoupling hypothesis.

We reexamine the decoupling–recoupling hypothesis in the context of the recent European and Greek sovereign debt crisis. Since Greece joined the EMU in 2001 and until the first downgrade of the Greek sovereign bonds in early 2009, the Greek economy experienced growing, unsustainable fiscal and external imbalances, deteriorating the country's competitiveness and resulting in weak economic fundamentals (Arghyrou & Tsoukalas, 2011; Gibson, Hall, & Tavlas, 2012). Further, in the aftermath of the U.S. subprime mortgage crisis, the interest-rate spread between 10-year Greek and German government bonds increased significantly (Gibson et al., 2012). We ask whether stock market investors price in these macroeconomic and financial-market developments in the Euro Area and, in particular, in Greece. Our research, thus, contributes to the large and significant literature on integration and segmentation of financial markets. A novel feature of our research is that we study the dynamics and the components of the risk premium on investment in the Greek FTSE/ASE-20 stock index futures market. To this end, we model the risk premium by developing a stochastic discount factor (SDF) model that features a regional (EMU) and local (Greek) component of the risk premium. The risk premium can fluctuate over time, where we use a multivariate exponential GARCH-in-mean (MEGARCH-M) model to capture

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the dynamics of the risk premium.[1] Our empirical model renders it possible to trace out the impact of the U.S. subprime mortgage crisis, the Euro crisis, and the Greek sovereign debt crisis on the risk premium in the Greek stock index futures market. Importantly, we show how our model can be used to extend the decoupling–recoupling hypothesis into two variants: an absolute and a relative decoupling–recoupling hypothesis.

Our empirical results show that the risk premium was mainly driven by the EMU component before the Greek sovereign debt crisis gathered steam, and that the Greek component significantly gained in importance thereafter. It thus follows that the Greek stock market has become more segmented from the EMU component during the recent sovereign debt crisis. In other words, our results demonstrate that the decoupling–recoupling hypothesis is not applicable to the Greek stock index futures market. Instead, we observe, in terms of the components driving the dynamics of the risk premium, a recoupling–decoupling of the Greek stock index futures market.

Our study is the first to provide a detailed analysis of the impact of the current financial crises on the risk premium of the Greek stock-index futures market. By studying the risk premium on investments in the Greek FTSE/ASE-20 stock index futures market, we contribute to the ongoing debate on the potential effects of the sovereign debt crisis on the economy and financial markets in Greece. The Greek financial market experienced periods of low and high volatility during the last decade. In particular, our data cover the period 2004–2011 and, thus, render it possible to study the risk premium before and after the global financial crisis and the Greek sovereign debt crisis, when (1) the Greek economy was in an expansion stage of the economic cycle (Greece organized the Athens Olympic Games in 2004 and experienced a high growth period), and (2) tensions in the Greek market increased after the collapse of Lehman Brothers in September 2008. We also report evidence of in-sample predictability of excess returns in the FTSE/ASE-20 futures market.[2]

We deem our estimation results interesting because they shed light on the variation over time in the risk premium on investing in the Greek stock index futures, and on the potential determinants of the risk premium. Our empirical results shed light on the absolute and the relative decoupling–recoupling hypotheses, and they add an additional piece of evidence to the literature on integration and segmentation of financial markets (Bekaert & Harvey, 1995; Hau, 2011, among others). Moreover, the Greek case provides a natural laboratory for research that evaluates the risk premium on stock market investments in countries that face a severe sovereign debt crisis and experience steeply rising government bond spreads and declining stock prices. By studying the links between the Greek sovereign debt crisis and the regional and local sources of the risk premium, our study also illustrates how the importance of regional and local economic state variables for the pricing of stock index futures changes across "normal" periods and periods of financial turmoil and market jitters.

We organize the remainder of this paper as follows. In Section 2, we lay out the SDF model and the MEGARCH-M model. In Section 3, we describe our data and report the estimation results. In Section 4, we offer some concluding remarks.

2. The model

The SDF model is a vehicle for pricing assets in arbitrage-free markets. It implies that the price of a stock index futures at the beginning of period t, F_t, is given by its expected discounted payoff at the beginning of period $t+1$, F_{t+1}[3]:

$$F_t = E_t(M_{t+1}F_{t+1}), \tag{1}$$

where E_t is the conditional-expectations operator, and M_{t+1} is the SDF. Assume that the futures price in the current period is lower than implied by the non-arbitrage equilibrium in Eq. (1) (future expected price stochastically discounted to the present). In this situation, an investor believes that the futures price will go up. Then, it is optimal for an investor to take a long speculative position in futures contracts on the stock market index. An increased demand for futures contracts raises the futures price in the current period until the futures market clears and the non-arbitrage equilibrium is restored. An important feature of the SDF is that M_{t+1} is the same for all assets. Dividing Eq. (1) by F_t yields

$$1 = E_t(M_{t+1}R_{t+1}), \tag{2}$$

where $R_{t+1} = 1 + r_{t+1} = F_{t+1}/F_t$ denotes gross returns on the futures, F_t, and r_{t+1} denotes net returns between periods t and $t+1$. The SDF model, as described in Eqs. (1) and (2), can be thought of as an application of the Arrow-Debreu model of general equilibrium to financial markets (Campbell, 2000). The SDF model also encompasses various micro-founded asset pricing models with optimizing agents (for a survey, see Smith & Wickens, 2002), and more flexible models based on a multifactor approach to asset pricing (for a survey, see Connor & Korajczyk, 1995). For example, the SDF can be used to generalize the Consumption-CAPM under the assumption that arbitrage-free financial markets allow optimally smoothing consumption over time.

A common assumption is that the SDF and returns are conditionally jointly log-normally distributed (Hansen & Singleton, 1983; Smith & Wickens, 2002). The assumption of log-normality implies that the SDF model can be conveniently written as

$$E_t(m_{t+1}) + E_t(r_{t+1}) + 1/2Var_t(m_{t+1}) + 1/2Var_t(r_{t+1}) + Cov_t(m_{t+1}, r_{t+1}) = 0, \tag{3}$$

where $m_{t+1} = \ln M_{t+1}$, and Var_t and Cov_t denote the conditional variance and covariance operators. A risk-free asset that yields a rate of return of $r_{f,t+1}$ must satisfy the equation $E_t(m_{t+1}) + r_{f,t+1} + 1/2Var_t(m_{t+1}) = 0$, implying that a risky asset must satisfy the equation

$$E_t\left(r_{t+1} - r_{f,t+1}\right) + 1/2Var_t(r_{t+1}) = -Cov_t(m_{t+1}, r_{t+1}). \tag{4}$$

The right-hand side represents the risk premium. The term $1/2Var_t(r_{t+1})$ represents a time-varying term that arises because of Jensen's Inequality.

Building on a multifactor approach to asset pricing, we define the log of the inverse of the SDF as a linear function of N variables that determine the stance of the business cycle, s_{t+1}. We assume $-m_{t+1} = \beta' s_{t+1}$, where β denotes a vector of parameters. This yields

$$E_t\left(r_{t+1} - r_{f,t+1}\right) = 1/2Var_t(r_{t+1}) + \sum_{i=1}^{N} \beta_i Cov_t\left(s_{i,t+1}, r_{t+1}\right). \tag{5}$$

Upon introducing another parameter, β_0, we derive an unrestricted version of the SDF model:

$$E_t\left(r_{t+1} - r_{f,t+1}\right) = \beta_0 Var_t(r_{t+1}) + \sum_{i=1}^{N} \beta_i Cov_t\left(s_{i,t+1}, r_{t+1}\right). \tag{6}$$

[1] Recent applications of the SDF model to the study of the link between stock-market developments and business-cycle conditions can be found in Kizys and Pierdzioch (2010a,b).

[2] Gospodinov and Jamali (2011) provide a detailed analysis of the risk premiums in BAX (the Canadian Bankers' Acceptances) futures and report a significant element of out-of-sample predictability of returns. They show that excess returns on BAX contracts exhibit some predictability especially at longer horizons.

[3] See, for example, McCurdy and Morgan (1992), Sections 1.1 and 1.2.