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Idiosyncratic risk matters! A regime switching approach

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Abstract

The evidence on the inter-temporal relation between idiosyncratic risk and future stock returns is conflicting and confusing. We shed new light on the issue using a more flexible econometric approach based on [Hamilton, J.D. 1989. A new approach to the economic analysis of nonstationary time series and the business cycle. Econometrica, 57, 357–384.] regime switching model that accommodates the parameter instability of the forecasting relation between returns and financial variables. We find strong evidence suggesting that idiosyncratic risk is related to future stock market returns only in the low variance regime.

JEL classifications: G10; G11; C13
Keywords: Idiosyncratic risk; Stock market volatility; Regime switching

1. Introduction

In a recent paper with the provocative title "Idiosyncratic risk matters!", Goyal and Santa-Clara (2003) show empirically that the average variance of US stocks returns is a significant predictor of the return of the value-weighted market portfolio. The predictive ability of the average variance remains intact after corrections for small sample bias and cannot be attributed to business cycle variables. This evidence is clearly at odds with asset pricing theories which predict that only systematic (market) risk should matter in equilibrium, as idiosyncratic risk can be eliminated through diversification.

A number of subsequent studies question the robustness of Goyal and Santa-Clara's (2003) findings. Bali, Cakici, Yan, and Zhang (2005) argue that the positive relation uncovered by Goyal and Santa-Clara (2003) disappears if the sample includes the more recent history of returns (from 2000 to 2001) and is partially driven by a liquidity premium. Wei and Zhang (2005) also show that the positive relation between market returns and lagged idiosyncratic volatility is sample specific. When the sample used by Goyal and Santa-Clara (2003) is extended by three years (2000, 2001 and 2002), the positive relation between return and idiosyncratic risk was not statistically significant. Finally, a major finding of Bali et al. (2005) and Wei and Zhang (2005) is that the Goyal and Santa-Clara (2003) results completely disappear when average idiosyncratic volatility is calculated using value rather than equal weights.

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The evidence on the inter-temporal relation between idiosyncratic risk and future stock returns is conflicting and confusing. The purpose of this paper is to investigate the issue, using a more flexible econometric method that allows the possibility that the relation between idiosyncratic risk and future market returns varies across state regimes. Most empirical studies use single state equations assuming that the relation between the variables of interest is linear and remains constant through time[1].

Our paper is similar in spirit to the work of Schaller and Van Norden (1997), Timmermann and Perez-Quiros (2000) and Gu (2005). Schaller and Van Norden (1997) examine whether the price/dividend ratio has marginal explanatory power for market returns after accounting for state dependent switching. They find that the coefficient of the lagged price/dividend ratio is four times larger in the high return-low variance regime than in the low return-high variance regime. Timmermann and Perez-Quiros (2000) conclude that the risk and return of small capitalisation firms' is more sensitive to interest rates, default premia and monetary conditions during recessions than across expansions. Gu (2005) develops a regime switching version of the CAPM and the Fama and French three factor model and finds that risk loadings are asymmetric across market states.

In this paper we examine the forecasting ability of idiosyncratic risk allowing for the possibility that the relation between asset specific risk and future US stock market returns is different across volatility states of the market. Consistent with previous research, we identify two regimes in US stock market returns[2]: a longer lasting state characterised by positive returns and low volatility; and, a state where the average return is close to zero and the volatility is high. The coefficient of idiosyncratic volatility is different across the two states. In the low variance regime there is a positive and statistically significant relation between idiosyncratic risk and future market returns, a finding that is robust to the weighting scheme used to calculate average idiosyncratic volatility. In the high variance regime we find a statistically insignificant relation between idiosyncratic risk and subsequent market returns.

The absence of a relationship between future returns and idiosyncratic volatility in the high variance regime is consistent with similar evidence reported by Mayfeld (2004) and Lundblad (2005) who studied the relation between market return and systematic (market) volatility. Lundblad (2005) shows, using Monte Carlo simulation, that even if the relation between risk and return is positive, it is not likely to be verified statistically when volatility is high and the sample size is small. Mayfeld (2004) discusses the possibility of the regime switching model confounding expected with realized returns in the less frequently observed high variance regime.

The structure of the paper is as follows. The second section describes the idiosyncratic risk measures; Section 3 presents preliminary evidence on the relation between returns and idiosyncratic volatility. In Sections 4 and 5 we present and discuss the results from the estimation of the regime switching model. In Section 6 we examine the economic performance of a market timing strategy based on the regime switching model while Section 7 concludes the paper.

2. Idiosyncratic risk measures and dataset

Idiosyncratic risk is measured using the methodology of Bali et al. (2005)[3] and the CRSP database covering the period August 1963 to December 2001. The idiosyncratic component of stock i (ε_i) is defined according to the following equation:

$$r_{i,t} - r_{f,t} = \beta_i\left(R_{m,t} - r_{f,t}\right) + \varepsilon_{i,t} \tag{1}$$

[1] Recent studies provide evidence against the hypothesis of stability in the relation between state variables and stock returns. Paye and Timmermann (2006) reject the hypothesis of constant regression coefficients between stock returns and several predictive variables (lagged dividend yield, short term interest rate, term spread and the default premium) for the majority of OECD countries examined. Lettau and Nieuwerburgh (2006) argue that shifts in the mean of financial ratios used as predictive variables, might be responsible for the instability of return forecasting regressions. Rapach and Wohar (2003) find extensive evidence of single and multiple breaks in the eight predictive regression models they tested for the US market. Stock and Watson (1996) provide evidence of structural breaks in many of the macroeconomic and financial variables used in financial research.

[2] The estimated parameters of the regime switching model are quite similar with those reported in Schaller and Van Norden (1997) and Guidolin and Timmermann (2003) for the US market. The average return (−.0.17%) during high volatility periods (Regime 2) is statistically insignificant, while the excess return during low volatility periods (Regime 1) is positive (0.94%) and statistically significant. The corresponding monthly standard deviation of the returns is equal to 3.16% (5.72%) in Regime 1 (2). Due to space limitations the detailed results are not reported, but are available upon request from the authors.

[3] Return and volatility data were kindly provided by T. Bali.