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Idiosyncratic Risks in Different Regimes and The Cross-section of Expected Stock Returns

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Objective: Grounded in a behavior finance argument, we reexamine the relation between idiosyncratic risks and the cross-section of expected stock returns by taking regime shifts into consideration.

Introduction

Idiosyncratic risk: (similar to unsystematic risk)
Risk that affects a very small number of assets, and can be almost eliminated with diversification.

Cross section: (in statistics and econometrics) A type of one-dimensional data set.

Motivation

According to the fundamental theory of investment, idiosyncratic risks can be eliminated through diversification and hence should not be priced. However, a significant positive relation between idiosyncratic risk and stock return is observed in numerous literatures.

We propose that investors change their preference of diversification under different market condition and thus the relation between idiosyncratic risk and stock return could vary correspondingly.

Methodology

Bai-Perron Regime Break Test is used to test the number of regimes breaks and the respective dates of break. (a least squared error estimation)

$$\text{Index return} - \text{Risk free return} = \beta_k * \text{Observed market volatility}$$

β_k is the estimated coefficient for regime k

Generalized Autoregressive Conditional Heteroskedasticity (GARCH) is then used to estimate the idiosyncratic risks. (a dynamical time series model)

$$R_{it} = \theta_0 + \sum \theta_i FF_{it} + \varepsilon_{it}; \quad \varepsilon_{it} \sim N(0, \sigma_{it}^2); \quad \sigma_{it}^2 = \alpha_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^p \beta_j \sigma_{t-j}^2$$

Fama and MacBeth Regression is used to test the relation between idiosyncratic risk and cross-section of expected stock returns.

$$R_{it} = \gamma_{0t} + \sum_{k=1}^K \gamma_{kt} X_{kit} + \varepsilon_{it}; \quad \hat{\gamma}_k = \frac{1}{T} \sum_{t=1}^T \hat{\gamma}_{kt}; \quad \text{Var}(\hat{\gamma}_k) = \frac{\sum_{t=1}^T (\hat{\gamma}_{kt} - \hat{\gamma}_k)^2}{T(T-1)}$$

Data (CRSP, Compustat)

Monthly data is used of stocks traded in the NYSE, Amex or Nasdaq during July 1963 to December 2011

Major result & Conclusion

We find that regimes do influence the estimation of idiosyncratic risk. By breaking down the regimes, the relations between idiosyncratic risk and stock return vary via regimes; and in some regimes, the relation is insignificant, which is consistent to the fundamental theory of investment. Meanwhile, it is also observed that investors don't rationally diversify the risks under certain market conditions.

Regime	Time	Parameter for IVOL	t test	p-value
1	1963-1982	0.1397	0.51899	0.60426
2	1983-1992	0.03512	1.50758	0.13431
3	1993-2000	0.10277	5.00099	<0.0001
4	2000-2003	0.0442	0.63399	0.53089
5	2003-2007	0.07188	2.49374	0.01574
6	2007-2009	0.02189	0.52778	0.60489
7	2009-2011	0.09887	2.51113	0.01711