Financial Anomalies

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Preface

The article is desiged to study financial anomalies

1 Introduction

Fama and MacBeth (1973) show two-parameter regression model estimates average risk-return relationships based on efficient market porfolio (m), that is, the market prices fully reflect the available information. The asset are constructed based on Equation **??** for an asset (i) proposed by @Black (1972).

$$
\begin{aligned}
&x_{im} \equiv \frac{\text{total market value of all units of assets } i}{\text{total market value of all assets}} \\
&\text{where asset}(i)\text{in the portfolio}(m)
\end{aligned}
\tag{1.1}
$$

Excepted return of a security (i) is $E(\tilde{R_0})$, the expected return on a security that is riskless in the portfolio m, plus a risk premium that is β_i times the difference between expected return of the portfolio ($E(\tilde{R_m})$) and riskless portfolio ($E(\tilde{R_0})$). is calculated by Equation **??**, β_i is the risk of the asset i of the portfolio m, measured relative to $\sigma^2(\tilde{R_m})$

$$
\begin{aligned}
&E(\tilde{R_i}) = \left[E(\tilde{R_m}) - S_m \sum \tilde{R_m}\right] + S_m \sigma(\tilde{R_m}) \beta_i, \\
&\text{where,} \\
&\beta_i \equiv \frac{cov(\tilde{R_i}, \tilde{R_m})}{\sigma^2(\tilde{R_m})} = \frac{\sigma_{j=1}^{N} x_{jm} \sigma_{ij}}{\sigma^2(\tilde{R_m})} = \frac{cov(\tilde{R_i}, \tilde{R_m})/\sigma(\tilde{R_m})}{\sigma(\tilde{R_m})} \\
&S_m = \frac{E(\tilde{R_m}) - E(\tilde{R_0})}{\sigma(\tilde{R_m})}
\end{aligned}
$$

hence

$$
E(\tilde{R_i}) = E(\tilde{R_0}) + \left[E(\tilde{R_m}) - E(\tilde{R_0})\right] \beta_i \tag{1.2}
$$

For each period of t, the cross sectional regression is given by

$$
\begin{aligned}
&R_{pt} = \tilde{\gamma}_{0t} + \tilde{\gamma}_{1t} \tilde{\beta}_{p,t-1} + \tilde{\gamma}_{2t} \tilde{\beta}^2_{p,t-1} + \tilde{\gamma}_{3t} \bar{s}_{p,t-1} \tilde{\epsilon}_i + \tilde{\eta}_{pt}, \\
&p = 1, 2, ...t
\end{aligned}
\tag{1.3}
$$