WHY THE FAMA-FRENCH FACTORS WORK AND SERIAL CORRELATION TOO

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ABSTRACT

We show that the definition of return implicitly contains book to market and size from two time periods. Assuming the Fama and French (FF) factors mimic book to market and size, we show that previous return along with previous period values of HML and SMB should substitute for their current values. This substitution actually “drives out” current values of HML and SMB in regressions. This result could be due to previous return mimicking book to market and size better than the FF factors; or a missing variable such as dividend payout. Industry-specific information is ruled out as an explanation.

JEL codes: G12, G14

Keywords: Fama and French Factors, serial correlation, definition of return

INTRODUCTION

Firms with high book to market ratios tend to have higher stock returns (e.g. Fama and French, 1992) as do firms with smaller market capitalizations, or “size” (e.g. Banz, 1981). Fama and French (1993) augment the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) by adding two additional factors, HML and SMB, which mimic the effects of book to market and size, respectively. The Fama and French factors are extremely useful for modeling return, but the theoretical justification for including these additional variables in the model for returns has lagged behind the empirical justification that “they work”. Fama and French (1993, p.7) argue that “although size and book to market equity seem like ad hoc variables for explaining average stock returns, we have reason to expect that they proxy for common risk factors in returns”. Fama and French (1993) essentially argue that a firm’s size and book to market are proxies for the firm’s coefficients (loadings) on risk factors that are priced by the market and that the HML and SMB factors they create serve as proxies for these risk factors. Fama and French (1995) attempt unsuccessfully to explain the linkage of the mimicking factors to returns by searching for such common factors in earnings. Daniel and Titman (1997) find that firm specific measures of size and book to market ratio model returns better than the Fama and French factors.

Fama and French (2008b, p.2973) explain the motivation for using the book to market ratio as a proxy for a factor which affects expected returns by noting that the dividend per share is earnings per share less the change in book value per share. They point out that the dividend...
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We conclude from this that since both the book to market ratio and $HML_{t+1}$ are proportional to $\delta_t$, it follows that the book to market value ratio is also proportional to $HML_{t+1}$ so that the Fama and French (1993) $HML_{t+1}$ factor should be expected to be a mimicking factor of book to market. Using a very similar analysis, it can be shown that the Fama and French (1993) market value factor $SMB_{t+1}$ is proportional to the expected difference $\lambda_t$ between successively ranked sizes.

$$SMB_{t+1} = \frac{\lambda_t}{N/3} \left[ \sum_{k=\frac{2N}{3}+1}^{N} c_j k_t - \sum_{k=2}^{N} c_j k_t \right]$$  \hspace{1cm} (A9)$$

Also, similar to the $HML_{t+1}$ analysis, since both market value and $SMB_{t+1}$ are proportional to $\lambda_t$, it follows that size is also proportional to $SMB_{t+1}$ so that the Fama and French (1993) $SMB_{t+1}$ size factor is indeed a mimicking factor of previous period market size.

REFERENCES


