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TIME-SERIES RELATION AMONG FUTURE RETURNS, RISK AND COMPANY CHARACTERISTICS

The recent research by Fama and French (2015), Novy-Marx (2013) and Aharoni, Grundy and Zeng (2013) among others shows a significant relationship between size, book-to-market, profitability and investment factors on the one hand and average stock returns on the other hand. Fama and French (2015) used dividend discount model to explain why these factors are related to average stock returns.

The evidence of cross-sectional relation between average stock returns and a firm's book equity to market equity was detected a while ago (Stattman 1980, Rosenberg,1985). Fama and French (1992) showed that even controlling for size, book-to-market ratio and other firm characteristics, the book-to-market ratio (BM) remains statistically significant in explaining average stock returns. Moreover, explanatory power of BM was detected in stock markets outside of the US (Chan et al., 1991,Haugen and Baker, 1996).

Novy-Marx (2013) proved that profitability, measured as the ratio of a firm's gross profits to assets, has the same explanatory power in the cross section of average stock returns as BM. His findings come into contradiction with those of Fama and French (2008) that profitability sorts produce the weakest average hedge portfolio returns among the strategies they evaluate. Novy-Marx (2013) claims in favor of explanatory power of profitability factor for the average portfolio returns, as firms with high profitability generate significantly higher returns than unprofitable firms.

Aharoni, Grundy and Zeng (2013) revised relation between investment and average stock returns and found that statistically significant negative relation exists between an investment proxy and average returns. The logic of this relationship comes fromFama and French (2008) valuation approach of Modigliani-Miller formula which sets a basic relationship between four variables: future stock returns, current BM, firm-level expected profitability, and firm-level expected investment.

The logic is next: the company market value is a discounted value of income after the taxes and interest plus the change in the book value of the company. Dividing by the current book value, it follows that future stock returns should be positively correlated with the current BM ratio and expected profitability relative to the current book value, and negatively with the expected future growth in the book equity relative to the current one. The investment element comes exactly in the ratio of the expected future growth in the book equity relative to the current, as the growth in equity is investment itself.

In contrast to Fama and French (2015), Novy-Marx (2013) and Aharoni, Grundy and Zeng (2013) I focus on the time-series relations among expected returns, risk, and BM, profitability and investments ratios. First of all, it is important to state what risk is. As Fama and French (2015) show that five factors capture priced risk in the economy, I assume that five factors, namely market, SMB, HML, RMW and CMA(to be presented further) are the risk proxies. However, there is an ongoing debate that Fama and French factors are not adequate proxies for the unknown risks. But in this paper, I do not concentrate on the risk definition, but on predictive power of characteristic-based variables.

To be more precise, I ask whether portfolios' BM, profitability and investment ratios predict time-variation in their expected returns, and test whether changes in expected returns can be explained by changes in risk. Previously the research about BM predictability of stock returns was carried out by Lewellen (1999). He found that BM predicts economically and statistically significant time-variation in expected stock returns. But my research is different from Lewellen's, as I extend time sample and evaluate if the results are valid for longer time period. Also, I analyze not only the predictive power of the book-to-market ratio, but also of profitability and investment ratios. As I use company-specific characteristics, I do not disregard the information that comes from them and that can be important to predict future returns, while in the five factors of Fama and French this information disappears. This is the key difference between BM, GP and INV factors of Fama and French and the characteristic ratios that I construct. The economic intuition behind it is that

characteristic-based ratios are calculated on the company level, while five factors of Fama and French are based on the aggregate level.

I find statistical evidence that within industry portfolios the companies' BM and INV ratios predict changes in expected returns. But the high volatility of monthly returns decreases the precision of estimates. To have better estimates for betas of BM and INV ratios, I use SUR regressions that help to decrease the estimation error of the estimates. Beta estimate on BM ratio is statistically significant for 1 industry portfolio from OLS regressions and for 5 industries from SUR regressions. The INV ratio does not have a strong predictive power when analysed by means of OLS regressions (significant for 1 industry portfolio). But from SUR regressions, INV ratio predicts future portfolios' returns for 3 industries. GP ratio does not have any predictive power for future industries' returns. These results suggest that BM and INV track economically large changes in expected returns. After controlling for changes in risk, BM and INV ratios still contain additional information about expected returns. Time-variation in the intercepts of the five-factor model measures the incremental explanatory power of BM and INV ratios.

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