NUS INVESTMENT SOCIETY

ACADEMIC RESEARCH REVIEW

The Value and Momentum Factor Model

INTRODUCTION

Value and momentum are two of the most important concepts in Fundamental Analysis and Technical Analysis respectively. They are constantly used by investors to make investment decisions. The aim of this research review is to find out whether value and momentum strategies work in isolation and what risks these strategies are exposed to by looking at the returns of these strategies across various markets and asset classes.

MODEL AND DATA FORMULATION

The following asset classes/markets are used in this study:
- Individual stocks in USA, UK, Europe and Japan
- Country equity index futures
- Government bonds
- Currencies
- Commodity futures

6 portfolios for each asset classes/market (High/Mid/Low Momentum & High/Mid/Low Value) are constructed. In total we have 48 portfolios across the asset classes/markets.

Metrics used to estimate value:
- **Stocks**: Equity Book-to-market value
- **Country indices**: Equity Book-to-market value of MSCI index of the country
- **Commodities**: Negative of spot return over last 5 years
- **Currencies**: 5 year change in PPP
- **Bonds**: 5 year change in 10 year yields

Metrics used to estimate momentum:
- Past 12-month cumulative raw returns

Securities within each asset class are ranked using the above conditions and equally split into 3 equally sized groups to form the high, mid & low portfolios. For stocks, the weightage of each individual stock is its market capitalization at the start of the month and for non-stock asset classes, the securities are equally weighed.

In addition, for each asset class, a zero-cost long-short factor portfolio is formed using the entire cross-section of securities within the asset class. The securities are weighted in proportion to their cross-sectional rank, with high value/momentum securities being longed and low value/momentum securities being shorted for a portfolio of zero-cost.

The returns of each portfolio are shown in Table 1.

		Value					Momentum					Combination		Correlation (Val,Mom)	
		P1	P2	P3	P3–P1	Factor	P1	P2	P3	P3–P1	Factor	P3–P1	Factor		
U.S. stocks	Mean	9.5%	10.6%	13.2%	3.7%	3.9%	8.8%	9.7%	14.2%	5.4%	7.7%	4.6%	5.8%	-0.53	-0.65
U.K. stocks	Mean	10.8%	12.5%	15.3%	4.5%	5.5%	9.2%	13.8%	15.2%	6.0%	7.2%	6.3%	7.2%	-0.43	-0.62
Europe stocks	Mean	11.8%	14.6%	16.7%	4.8%	5.2%	9.2%	13.3%	17.3%	8.1%	9.8%	5.9%	6.9%	-0.52	-0.55
Japan stocks	Mean	2.6%	8.2%	14.7%	12.0%	10.2%	8.4%	9.9%	10.1%	1.7%	2.2%	6.4%	5.9%	-0.6	-0.64
Global stocks	Mean	8.1%	11.0%	14.6%	6.2%	5.8%	8.5%	11.1%	14.1%	5.6%	7.1%	6.3%	6.8%	-0.52	-0.6
Country indices	Mean	3.1%	6.6%	9.1%	6.0%	5.7%	2.3%	5.8%	11.0%	8.7%	7.4%	7.3%	10.6%	-0.34	-0.37
Currencies	Mean	−0.5%	0.3%	2.8%	3.3%	3.9%	−0.7%	0.3%	2.8%	3.5%	3.0%	3.4%	5.6%	-0.42	-0.43
Fixed income	Mean	3.0%	4.0%	4.2%	1.1%	0.5%	3.8%	3.8%	4.2%	0.4%	1.0%	0.8%	0.7%	-0.17	-0.35
Commodities	Mean	4.2%	4.1%	10.5%	6.3%	7.3%	0.7%	5.8%	13.1%	12.4%	11.5%	9.4%	17.1%	-0.39	-0.46

Table 1

*P1 – Low Value/Momentum   P2 – Mid Value/Momentum   P3 – High Value/Momentum

These results show that both value and momentum strategies are significant, creating return premiums on the better portfolios. i.e. High Value/Momentum outperforms Mid Value/Momentum and Mid Value/Momentum outperforms Low Value/Momentum.

Furthermore, because the correlation between the returns for the value and momentum portfolios are negative, using the formula show below for the standard deviation of a portfolio of 2 assets, combining the value and momentum portfolios together into a new portfolio can help to diversify some risk away, leading to a higher Sharpe Ratio.
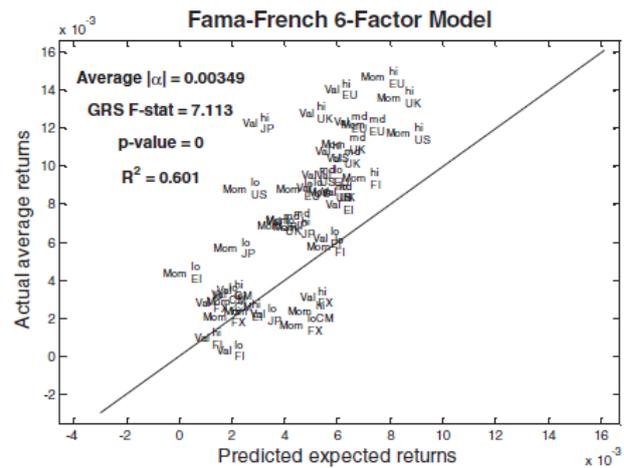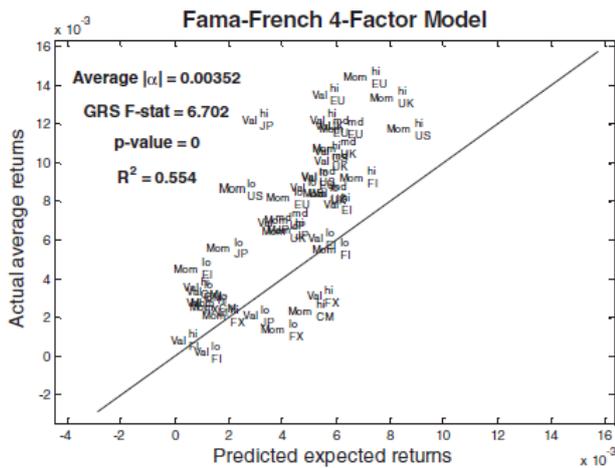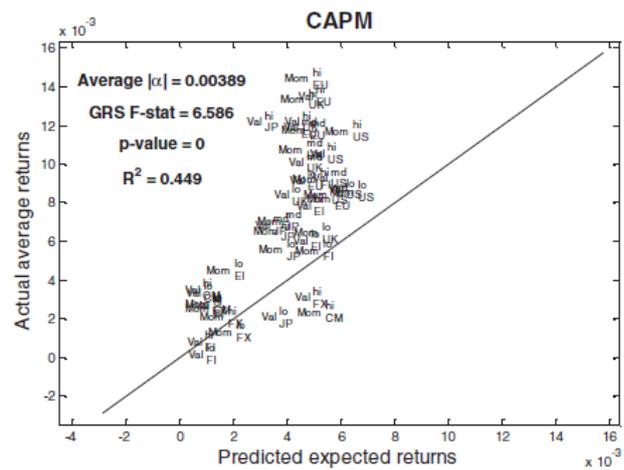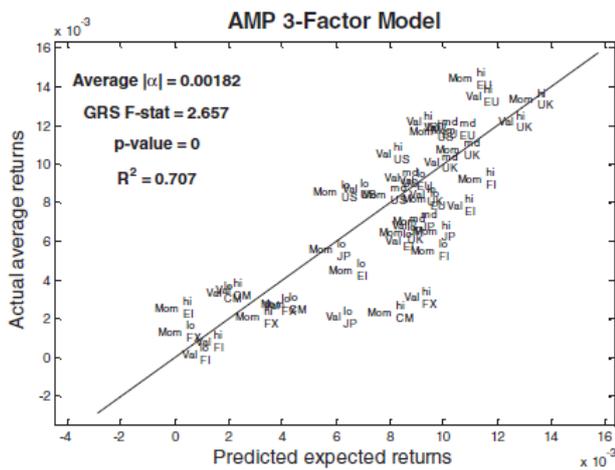
$$\sigma_{COMB}^2 = w_{Value}^2 \sigma_{Value}^2 + w_{Mom}^2 \sigma_{Mom}^2 + 2w_{Value} w_{Mom} Corr(Val, Mom) \sigma_{Value} \sigma_{Mom}$$

THE GLOBAL THREE-FACTOR MODEL

$$R_{i,t}^p - r_{f,t} = \alpha_i^p + \beta_i^p MKT_p + v_i^p VAL_t^{everywhere} + m_i^p MOM_t^{everywhere} + \varepsilon_{i,t}^p \, [1]$$

Applying time-series regression using the above model with the 48 portfolios gives a R^2 value of 0.707, which is a much better fit, compared to other common asset pricing models such as CAPM and the Fama-French models.

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[1] $VAL_t^{everywhere}$ & $MOM_t^{everywhere}$ are the equal-volatility-weighted value and momentum factors across the asset class

AMP 3-Factor Model
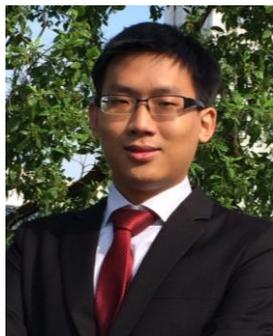
Average |α| = 0.00182

GRS F-stat = 2.657

p-value = 0

R^2 = 0.707

CAPM

Average |α| = 0.00389

GRS F-stat = 6.586

p-value = 0

R^2 = 0.449

Fama-French 4-Factor Model

Average |α| = 0.00352

GRS F-stat = 6.702

p-value = 0

R^2 = 0.554

Fama-French 6-Factor Model

Average |α| = 0.00349

GRS F-stat = 7.113

p-value = 0

R^2 = 0.601

CONCLUSION/EXTENSIONS

This study shows that both value and momentum strategies are very relevant in the market, generating return premiums in their respective portfolios. Furthermore, the negative correlation shows that a combined approach to portfolio construction has its merits, leading to a larger Sharpe Ratio. This negative correlation could mean that value and momentum are inversely related to some risk factors such as liquidity risk which could warrant additional study.

One should note that some simplifications have been made in this study, like zero cost for short selling and equally weighted securities in portfolio besides stocks. Hence further research need to be done to help investors make more informed decisions.