ERP5 (modified)
Simple yet remarkable portfolio select technique

STRATEGY

ERP5 (modified). The Value strategies adopted for this study are **(i)** ERP5, a 4-factor (i.e. **E**arnings Yield, **R**OIC, **P**/B ratio, **5**-year average ROIC) based Value investment strategy developed by Philip Vanstraceele and Luc Allaeys, and this is enhanced by incorporating **(ii)** the price momentum factor as advocated by Philip Vanstraceele and Tim Du Toit in their research paper, "Quantitative Value Investing in Europe: What works for achieving Alpha". This hybrid value strategy is called ERP5 (modified). It is notable that this strategy only uses historical accounting data and no forecasts.

OBJECTIVE

The objective of this study is to gauge whether the ERP5 (modified), using 4 historical accounting ratios plus a price momentum factor, on various Holding Period strategy will work on the Malaysian equities.

STUDY PARAMETERS

FBM KLCI constituents... This study is limited to the 30 largest companies listed on the Bursa Malaysia, i.e. the FBM KLCI Index components. The test period spans from January 2010 to August 2017.

...which were duly scored... To get the ERP5 (modified) score, all companies were scored on each of the five factors (i.e. Earnings Yield, ROIC, P/B ratio, 5-year average ROIC, and Price Momentum). These score were then added together to give the ERP5 (modified) score of the company. Companies with the lowest sum of factors score are the most attractive investment ideas.

...and divided into 5 portfolios... The stocks selected from the universe of 30 stocks were then divided into five equal groups (quintiles) based on sum of factors scoring. The best 20% of companies (i.e. 6 stocks) with lowest sum of factors score were put in the first quintile (Q1), the next in the second 20%, and so on, with the 20 % of companies with the highest sum of factors score in the fifth quintile (Q5).

...on equal-weighted basis... In addition, the portfolios were all constructed on an equal-weighted basis.

...were tested on multiple price momentum... The stock price momentum used for the testing was 2-, 3-, 6- and 12-month momentum. This was to gauge if these different time frame price momentum gave better returns in the Malaysian context.

...and holding periods. Furthermore, 2-, 3-, 6- & 12-month holding periods were used. All the back test portfolios were tested based from beginning of the year.

FINDINGS

It works... The study found that Malaysian equities also exhibit similar characteristics as mentioned in the result of studies conducted in other markets.

...thus confirms the predictive power of historical accounting ratios... It confirms the study by Lev and Thiagarajan (1993) which examined the predictive power of fundamental financial ratios used, as the results are overwhelming with the test shows superior excess returns over the FBM KLCI Index.

...and reaffirms Graham's portfolio focus. More importantly, the results in this study provide an affirmative answer to the question on whether a portfolio (e.g. of 6 stocks) based on a few simple criteria (e.g. ERP5-modified), focusing on the results of the group instead of individual stocks, as advocated by Benjamin Graham, could outperform the broader market (e.g. FBM KLCI Index).

Tables of numerical results. Please refer to OVERALL FINDINGS on pages 11-22.

Conclusions. Please refer to CONCLUSIONS on page 23.

RECOMMENDATIONS

Recommended portfolio of stocks based on ERP5 (modified)

Stock Name	Current Price 3-Oct (RM)	MIDFR Target Price (RM)	Exp. Price Return (%)	Dividend Yield (%)	Exp. Total Return (%)	MIDFR Recommendation
Tenaga Nasional	14.30	16.80	17.48	3.99	21.47	BUY
Petronas Chemicals	7.29	8.18	12.21	2.74	14.95	BUY
Malayan Banking	9.56	10.30	7.74	5.75	13.49	BUY
Astro Malaysia	2.80	3.64	30.00	4.64	34.64	BUY
Public Bank	20.60	23.30	13.11	2.91	16.02	BUY
British American Tobacco	42.94	48.60	13.18	5.50	18.68	NEUTRAL

Source: MIDFR, Bloomberg

Based on our latest ERP5 (modified) screenings as at end-September 2017, the equal-weighted portfolio of 6 stocks listed in table above is likely to outperform the broader FBM KLCI Index in some or all of the upcoming 2-, 3-, 6- & 12-month holding periods. It is also noteworthy that 5 out of the 6 stocks recommended by ERP5 (modified) are in agreement with MIDFR forecast-based fundamental research.

Macro Strategy	:	Stock Selection using Quantitative Selection Strategy
Strategy Types	:	Value & Momentum Play Investing - (Benjamin Gram's Net Current Asset Value, Joseph Piotroski's F-Score, Joel Greenblatt's MF Rank, and MFIE Capital's ERP5 Score)
This Strategy	:	ERP5 (modified) Score
Strategy Concept	:	**Value investing is one of the best known stock-picking methods**. In the 1930s, Benjamin Graham and David Dodd, finance professors at Columbia University, laid out what many consider to be the framework for value investing. The concept is actually very simple: **find companies trading below their inherent worth**.

The value investor looks for stocks with strong fundamentals – by way of earnings, dividends, book value, cash flow, etc. – that are selling at a bargain price, given their quality. The **value investor seeks companies that seem to be incorrectly valued (mispriced) by the market** and therefore have the potential to increase in share price when the market corrects its error in valuation. This report examines which **financial ratios** have the highest probability of consistently outperforming the market by adopting one of the many value investing strategies available called ERP5 (modified). Considerable research has documented the **use of individual ratios** or **combinations to create portfolios that outperform the market**.

For example, one factor that received a lot of attention in the past is the **Price-to-Book Value** investment strategy. Studies by Lakonishok, Shleifer and Vishny (1994), and Fama and French (1992) have demonstrated that buying a portfolio of low price-to-book value companies results in market outperformance. Other authors focused on different measures. Joel Greenblatt focused on **Earnings Yield & Return On Invested Capital (called Magic Formula)**, and found that scoring US companies based on these measures and investing in them on an equal-weighted and on a consistent basis in the top companies filtered resulted in an outperformance of 23% compared with the benchmark.

In his book, 'The Big Secret for the Small Investor', Joel Greenblatt wrote that the **best performing stock mutual fund of the last decade earned more than 18% annually**. This is impressive since the market, as measured by the S&P 500, was actually down close to 1% per year between 2000 and 2009. **Yet the average investor, in the same fund, managed to lose 11% per year over those 10 years.** How is that possible? The **problem is our emotions and they influence our investments returns**. After every period in which the fund did poorly, investors ran for the exits, and after every period in which the fund did well, investors piled in. Thus, the **average investor managed to lose money in the best performing fund by buying and selling the fund at just the wrong times**.

Emotions are simply a wrong guide to base investment decisions on. Our emotions and behaviour are under the continuous influences of the media, and of course of other people**. Where money is concerned, emotions regularly overcome rationality**. This can is seen in the market as stocks go up and down for no reason other than fear, greed, hope or despair of investors.

In order to **avoid emotions influencing investment decisions**, **invest using a strict standardized process; a proven system which removes emotions from the decision making process**. Think of this system as the process or procedure that a doctor needs to follow when performing an operation. It does not guarantee success, but the **procedure has proven its reliability over time** and has a **high probability of success**.

The **need to focus on the investment process with the highest probability of success, rather than the outcome, is critical when investing**. This is because investment outcomes

are probability based, and even if they have a high probability of success there is still a chance that they will be negative. However, **if only invest using a system with a high probability of market beating returns over the long term do you have a high probability of being a successful investor**.

This is exactly what this report would like to do. With so many quant strategies out there, this report suggests one of the quant strategies available based on **Value** and some **Momentum** called **ERP5 (modified)**. The evidence suggests that a value and momentum investing system, which combines both value and momentum into a single portfolio, may **prevent a value-only investor or a momentum-only investor from suffering through extended, long-term stretches of poor performance**. Of course, not all pains can be erased, and investors must always be aware that they should expect to endure sustained stretches of volatility and relative underperformance, even with a globally diversified value and momentum equity portfolio.

This study only uses **historical accounting data** and **no forecasts**. The reason being is that there is **ample evidence that forecasts, on average, cannot be relied on**. For example, in his excellent book, '**The New Contrarian Investment Strategy**', David Dreman mentioned a study that used a sample of 67,375 analysts' quarterly estimates for companies listed on US stock exchanges. The **study found** that the **average analysts' error was 40%,** and that the **estimates were misleading two-third of the time!**

Factors used were based on historical accounting/financial data to gauge how effective each factor is in generating market outperformance. It should be noted that a **less important but not insignificant factor is that historical accounting data is also cheaper**.

This **ERP5** is a **4-factor based Value investment strategy** developed by two friends, Philip Vanstraceele and Luc Allaeys, who devised it as a strategy to outperform the **Magic Formula** as described in the book by **Joel Greenblatt** called **"The Little Book that Beats the Market"**. Greenblatt Magic Formula was tested in the US and Eurozone Stock market and it was concluded that the strategy is able to generate higher returns than the market on average. Thus, the duo devised a way of combining a few great ideas into one method. They combined Greenblatt's **Earning Yield & Return on Invested Capital** with another 2 factors, **Price-to-Book Value** (one of most important indicators for Value Investing based on studies by Rosenberg, Reid, and Lanstein 1984; Fama and French 1992; Lakonishok, Shleifer, and Vishny 1994) and the **5-year trailing Return on Invested Capital**. The two extra factors were added by Vanstraceele and Allaeys as a strategy that aims **to pick high quality companies at bargain prices**. Thus, the strategy finds undervalued/mispriced companies based on the following **four accounting ratios**:

- **E**arnings Yield

- **R**eturn on invested capital (ROIC)

- **P**rice to Book, and

- **5**-year average ROIC

Hence, the strategy is named ERP5, based on the initials of the 4 factors. The duo found that the ERP5 value strategy also worked on the Finnish market they tested. In a later study, to improve the returns further, it was suggested in another paper by Philip Vanstraceele and Tim Du Toit called "Quantitative Value Investing in Europe: What works for achieving Alpha", a **fifth factor (Price Momentum)** was added.

Thus, incorporating the fifth factor, the study strategy is deemed ERP5 (modified). The Stocks are then scored based on these 5 factors. **To get the ERP5 (modified) score, all companies in the universe are scored on each of the five factors.** These score are then added together to

4

give the ERP5 (modified) score of the company. **Companies with the lowest score are the most attractive** investment ideas.

Strategy Studies   :   Value investing have a long tradition in finance and can be traced back at least to **Graham and Dodd (1934),** when the two gentlemen laid the foundation of value investing by proposing that a disciplined investor can evaluate a rough value for a company from its financial statements, therefore, buying when the market inevitably undervalues some stocks at some point and earn a decent profit. However, soon after the efficient market hypothesis by Fama (1970) was published, **Graham (1976) stopped advocating** the use of **such techniques** in **selecting individual stocks** as the **costs of preparing fundamental analysis often exceed the benefits of earning a value premium.** In its place**, Graham SUGGESTED** that an investor should rather **FORM A DIVERSIFIED PORTFOLIO BASED ON A FEW SIMPLE CRITERIA FOCUSING ON THE RESULTS OF THE GROUP INSTEAD OF INDIVIDUAL STOCKS**.

This brings to the question that has puzzled researchers and investors ever since Fama (1970): **How efficient are the markets** and **if they are inefficient, how should one invest in order to take advantage of the value premium?** From previous research, it seems evident that the **value premium exists** (e.g. Abarbenell and Bushee, 1998 or Piotroski, 2000). Thus, this study is to test whether the value premium can be exploited using the approach suggested by Graham (1976) above: **WHETHER A DIVERSIFIED PORTFOLIO FORMED USING VALUE STRATEGIES BASED ON A FEW SIMPLE ACCOUNTING RATIOS CAN OUTPERFORM THE MARKET INDEX**.

It should be noted that the relationship between various ratios and future returns has been a subject of continuous research. Indeed, previous research on different ratios and accounting based investment strategies is ample. Research shows that in addition to being **useful in evaluating the past performance** of a company, **ratios can be useful in predicting future earnings and equity returns**. In a classic study, **Ou and Penman (1989)** found that ratios generated from accounting data were **useful in forecasting future earnings and stock returns**. Ou and Penman examined as much as 68 different accounting metrics and found that these variables could be reduced to a shorter list and **combined in a statistical model that was particularly useful for selecting investments.**

Lev and Thiagarajan (1993) examined the predictive power of fundamental financial ratios used by analysts to assess whether they are useful in security valuation. They **found that fundamental factors add about 70 percent to the explanatory power of earnings alone in predicting excess returns**. Abarbenell and Bushee (1998) devised an investment strategy using these variables and found that they can generate excess returns under this strategy.

In this ERP5 (modified) strategy context, the first ratio **Earnings Yield** has always raised researchers' interest as it is a reciprocal **Price-to-Earnings (P/E)** ratio. **Basu (1977)** studied the performance of stocks relative to their P/E ratios and found that when stocks are sorted based on the P/E ratio, **future returns are higher for low P/E stocks than predicted by the capital asset pricing model (CAPM)**, and interpreted it **as evidence of market inefficiency.**

Later, Basu (1983) studied the relationship between **high earnings yield** (low P/E ratio), firm size and future returns and showed that **companies with high earnings yield generate, on average, higher risk-adjusted returns than companies with low earnings yield even when firm size is controlled**. The usefulness of the other ratios are mentioned further down below.

Another important concept in the context of this report is the **trade-off between risk and return** which is a logical outcome of market efficiency. The risk-return trade-off suggests that since

price movements are unpredictable, an investor cannot consistently outperform the market when adjusted for risk, and consequently, in order to achieve higher returns, an investor must be willing to take more risk. The **return and risk** as **measured by Return to Volatility Ratio** and **Sharpe Ratio** in this report was very encouraging as **in all the test period the Value portfolios created gave better returns with less volatility compared to the FBM KLCI Index**.

In terms of investment **holding period**, earlier research shows that a holding period of less than 12 months may not be optimal as returns can be increased by extending the holding period. However, **12 months should be sufficient for the value premium to realize**. Leivo and Pätäri (2009) found that an investor employing value strategies can extend the holding period up to 5 years without a decrease in returns.

Bird and Whitaker (2003) examined different holding periods from one to 48 months and found that **portfolios were adding value for three years when the portfolios were formed based on four ratios (P/B, dividend yield, earnings yield and P/S, i.e. price-to-sales)**. Using P/E ratio as the scoring criteria, Rousseau and van Rensburg (2003) found that both returns and the reliability of the returns increased when holding period was extended beyond 12 months. They also noticed that the **portfolios should be formed based on 12-month old scorings rather than the most recent ones, implying it takes time from the value stocks to build price momentum.** The **modified ERP5 strategy of adding stock price momentum as a fifth factor** (as advocated by Philip Vanstraceele and Tim Du Toit in their research paper "Quantitative Value Investing in Europe: What works for achieving Alpha"), **use 1-year holding period and 6-month price momentum.**

However, the study here uses **SHORTER HOLDING PERIODS** and **DIFFERENT PRICE MOMENTUM** to gauge **if superior returns can be generated** to allow for Malaysian fund managers who wish to use this strategy for their various time-sensitive portfolio return mandates which necessitate holding periods of less than one year.

What will happen if everybody starts using this strategy? To quote from **"Quantitative Value Investing in Europe: What works for achieving Alpha"**, surely the strategy will stop working if everybody uses it as investors pile in and push up prices to where these companies would not be undervalued anymore. But as Joel Greenblatt in his book, 'The Little Book That Still Beats the Market' mentioned, **the reason everybody will not follow the strategy is because when it doesn't work sometimes in a certain year, emotions creep in**. This is evidenced in this study as it does not work in 2 out of the 7.7 years back tested. Therefore, as soon as it intermittently stops working, investors will abandon it like they abandoned the top performing investment fund mentioned above. Most likely at exactly the wrong time; just before the strategy would substantially starts outperforming the market once again. In one of the last years, or one of the other years that the strategy didn't outperform the market, it would most likely have been exactly the time when investors abandoned the strategy.

Having said the above, it is worth mentioning that do not for a minute think that it is easy to follow these strategies. If any fund manager is biased with emotion towards a stock or sector, and sees different companies that the ERP5 have selected, the fund manager may immediately start analysing them and might conclude that **there's no way I am investing in that industry or company at the current time.** On this score, a fund manager that follows this strategy must remember Graham (1976), the master of value investing, which advocates the **FORMING OF A DIVERSIFIED PORTFOLIO** BASED ON A FEW SIMPLE CRITERIA **FOCUSING ON THE RESULTS** OF **THE GROUP INSTEAD** OF **INDIVIDUAL STOCKS**.

Thus, a strategy must be followed to the letter if it is to work and not modified to emotions. That is also the reason why it is suggested that a fund manager depending on investment value need to invest in between of 20 - 30 companies. This means that even if some companies do not perform, the others will do extremely well and your overall performance will still be outstanding as per the value test portfolios results.

This Study Rationale	:	The objective of this study is to gauge whether a famous Value Strategy called ERP5 (modified), using simple accounting ratios plus a price momentum factor, on various Holding Period strategy will work on the Malaysian equities. This study is limited to the 30 largest companies listed on the Bursa Malaysia.

Fund managers who wish to adopt this rule should, firstly, **choose stocks that meet the liquidity criteria** out of the 900 plus stocks on the Bursa Malaysia. This is to ensure an expeditious portfolio rebalancing process. Furthermore, the fund managers may also **filter the listed stocks based on market capitalization** (small-, mid- and large-caps) while strictly observing the liquidity rule. This is done to avoid the bias of a bid-ask bounce which refers to the situation in which the spread between the buying bid and asking price is considerably wide.

The test period covered for Malaysian equities spans Jan 2010 to August 2017. Data for this study are sourced from Bloomberg. The following selection criteria are used in study:

1) The company's shares are traded on the Bursa for last 7.7 years;

2) The FBM KLCI Index components were used. However, number of stocks covered was 47 and not 30 as some stocks appears on different time frames due to being included in and excluded from the index pursuant to the June and December reviews each year by FTSE Russell, the index provider; and

3) The company reported fundamental data must be reported in every year (2010 – 2016) in Bloomberg.

The **original study** for Europe and USA advocated **1-year holding period** with **6-month price momentum**. However, it was suggested by Head of Research that the **1-year time frame may be too long for some Malaysian fund managers**, thus, this study uses **SHORTER HOLDING PERIODS** and **DIFFERENT PRICE MOMENTUM** to see if superior returns can be generated to allow for Malaysian fund managers who wish to use this strategy for their various time-sensitive portfolio return mandates which necessitate holding periods of less than one year.

So, for this study, **2-, 3-, 6- & 12-month holding periods** were used. All the back test portfolios were tested based from beginning of the year. The annual returns for back test portfolios were calculated as the 2-, 3-, 6- & 12-month holding periods. **Any dividend received during respective holding period is considered as an extra to the total returns**. This means each year, the return of the portfolio (dividends excluded) would be reinvested (equally weighted) in the strategy the following year.

Furthermore, instead of just 6-month momentum as in the original paper, the stock momentum used for the testing was **2-, 3-, 6- and 12-month momentum.** This was also to gauge if these different time frame price momentum gave better returns in the Malaysian context.

In addition, the portfolios were all constructed on an **equal-weighted basis.** Thus, this 3 aspects of Holding Period, Price Momentum and 7.7 years of back testing gave rise all together 128 back testing simulations.

Table 1 : 128 Back-Test scenarios based on Holding Period and Price momentum									
Holding Period	Price Momentum	2010	2011	2012	2013	2014	2015	2016	2017
2	2	1	2	3	4	5	6	7	8
2	3	9	10	11	12	13	14	15	16
2	6	17	18	19	20	21	22	23	24
2	12	25	26	27	28	29	30	31	32
3	2	33	34	35	36	37	38	39	40
3	3	41	42	43	44	45	46	47	48
3	6	49	50	51	52	53	54	55	56
3	12	57	58	59	60	61	62	63	64
6	2	65	66	67	68	69	70	71	72
6	3	73	74	75	76	77	78	79	80
6	6	81	82	83	84	85	86	87	88
6	12	89	90	91	92	93	94	95	96
12	2	97	98	99	100	101	102	103	104
12	3	105	106	107	108	109	110	111	112
12	6	113	114	115	116	117	118	119	120
12	12	121	122	123	124	125	126	127	128

In order to test the effectiveness of each strategy according to the factors tested, the stocks selected in the universe of 30 stocks were then divided into five equal groups (quintiles) based on sum of factors scoring. The best 20% of companies with lowest sum of factors score were put in the first quintile (Q1), the next in the second 20%, and so on, with the 20 % of companies with the highest sum of factors score in the fifth quintile (Q5).

A **good factor or strategy** is one where:

1. The **top quintile (Q1) outperforms the bottom quintile (Q5)** over the period back tested,

2. There must be a **linearity of returns** among the quintiles **(Q1 outperforms Q2 which outperforms Q3, and so on, up to Q5)** over the period tested, and

3. The strategy must also consistently outperform the market over time. We defined consistent outperformance when the **Q1 outperforms the market (FBM KLCI) portfolio 60% or more of the time.**

So, in summary, we are looking for factors that increase the probability of positive returns, beat the market. **Using 5 factors**, we tested the following:

1. **Valuation factors**

    a. **Earnings Yield (EY):** EBIT/Enterprise Value. This compares the earnings of a company against its theoretical purchase price (Market Capitalization + Debt). A company with a high EY can be purchased at a relatively low price compared to the earnings it generated during the last 12 months.

    b. **Price-to-Book (P/B) ratio**: The relationship between P/B ratio and **future returns** is one of the most researched topics. In their research, Stattman (1980) and Rosenberg et al. (1985) found that average returns on the US markets are positively correlated with low price-to-book (P/B) ratio. Likewise, Chao et al. (1991) examined and reported the same relationship to be strong in the Japanese markets. Capaul et al. (1993) extended the analysis to international markets and reported and found that companies with low P/B earned excess return in every market included in the study between the 1981-1992 periods. Another research shows that buying companies with a low P/B value generates superior returns (e.g. Rosenberg, Reid, and Lanstein 1984; Fama and French 1992; and Lakonishok, Shleifer, and Vishny 1994). Moreover, the **P/B value was a favorite tool of**

Benjamin Graham and other earlier value investors. In spite of some of its shortcomings, P/B is a strong factor in generating market outperformance.

2. **Fundamental factors**

   a. **Return on Invested Capital (ROIC)**: EBIT / (Net Working Capital + Net Fixed Assets). A company with a high ROIC demonstrates that it is lean, i.e. able to generate high earnings compared to the money invested. ROIC is used to assess a company's efficiency at allocating the capital under its control to profitable investments. The ratio gives a sense of how well a company is using its money to generate returns. It gives the clearest picture of exactly how efficiently a company is using its capital, and whether or not its competitive positioning allows it to generate solid returns from that capital. Improvements in ROIC are seen in companies able to achieve higher margins, stronger cash flow, and low cost of capital.

   b. **5-year ROIC**: Average ROIC during the last 5 years. Has the company demonstrated that it has been able to generate relatively high returns in a consistent manner in the past?

3. **Momentum factor** (Stock price Momentum). The 2-, 3-, 6- and 12-month were used. Momentum measures the rate of the rise or fall in stock prices. From the standpoint of trending, momentum is a very useful indicator of strength or weakness of the stock price. It should be noted that history has shown that momentum is far more useful during rising markets and capturing stock upwards rise.

The stocks in the universe have been compiled in a database diligently prior to screening. The stocks are **screened one day before purchase** and **sold at end of designated holding period.** All stocks purchased are **equal-weighted** as advocated by the studies mentioned above.

A study cited below compares the performance of equal-, value-, and price-weighted portfolios of stocks in the major U.S. equity indices over the last four decades. **The study found that the equal-weighted portfolio with monthly rebalancing outperforms the value- and price-weighted portfolios in terms of total mean return, four-factor alpha, Sharpe ratio, and certainty-equivalent return, even though the equal-weighted portfolio has greater portfolio risk.**

The total return of the equal-weighted portfolio exceeds that of the value- and price-weighted because the **equal-weighted portfolio has both a higher return for bearing systematic risk and a higher alpha measured using the four-factor model**. The nonparametric monotonicity relation test indicates that the differences in the total return of the equal-weighted portfolio and the value- and price-weighted portfolios is monotonically related to size, price, liquidity and idiosyncratic volatility. The higher systematic return of the equal-weighted portfolio arises from its higher exposure to the market, size, and value factors. **The higher alpha of the equal-weighted portfolio arises from the monthly rebalancing required to maintain equal weights, which is a contrarian strategy that exploits reversal and idiosyncratic volatility of the stock returns; thus, alpha depends only on the monthly rebalancing and not on the choice of initial weights.**

According to Greenblatt, market cap-weighted indexes suffer from a systematic flaw – they increase the amount owned of a particular company as that company's stock price increases, and vice versa. Thus, it results in systematically **invest too much in stocks when they are overpriced and too little in stocks when they are priced at bargain levels**. The equal weight index corrects this systematic flaw to a degree (the small correction is still worth 2.7 percent per year in additional performance).

Study:

1. **Why Does an Equal-Weighted Portfolio Outperform Value- and Price-Weighted Portfolios** - March 2012: Yuliya Plyakha - Goethe University Frankfurt, Raman Uppal - EDHEC Business School, Grigory Vilkov - Goethe University Frankfurt - EDHEC-Risk Institute.

   http://docs.edhec-risk.com/mrk/000000/Press/EDHEC_Working%20Paper_Equal Weighted_Portfolio.pdf

2. **Why Does an Equal-Weighted Portfolio Outperform Market Capitalization- and Price-Weighted Portfolios?** May 17, 2012 by Tobias Carlisle

   https://greenbackd.com/2012/05/17/why-does-an-equal-weighted-portfolio-outperform-market-capitalization-and-price-weighted-portfolios/

   The Return and Risk of the portfolios were also tested using Daily Return to Volatility Ratio and Sharpe Ratio. This is to examine whether the value strategies using ERP5 and Price Momentum include more risk than the general market Index, the volatilities of the quartile portfolios are compared to those of the benchmark index.

Findings Overview	:	The objective of ERP5 plus various Price Momentum and Holding Period strategy is to tests the **approach suggested by Graham (1976)** which recommended that an investor should rather **form a diversified portfolio** (based on a few **simple criteria** focusing on the **results of the group** instead of individual stocks) **to outperform** the benchmark index. The **Value strategy** adopted for this study was ERP5, a **4-factor based Value investment strategy** developed by two friends, Philip Vanstraceele and Luc Allaeys. This strategy is **enhanced by adopting the price momentum factor** as advocated by Philip Vanstraceele and Tim Du Toit in their research paper mentioned above, i.e. "Quantitative Value Investing in Europe: What works for achieving Alpha". **This hybrid value strategy is called ERP5 (modified).**
Portfolio Rebalanced	:	2-, 3-, 6-, and 12-Month Holding Period
Portfolio Price Momentum	:	2-, 3-, 6-, and 12-Month Momentum
Back Test Period	:	7.7 Years
Back-test Scenario	:	128 Simulations (based on all 3 combination mentioned above, i.e. Price Momentum, Holding Period and 7.7 Years)
		a) 112 Simulations (16 scenarios X 7 years) from 2010 to 2016, plus
		b) 16 Simulations (16 scenarios up to August 2017)
Results Tabled	:	Summary based on 7.7 Years data
Period Start	:	01-Jan-2010
Period End	:	31-August-2017
Index Observed	:	1 – FBM KLCI Index
Stocks Observed	:	47 – FBM KLCI Index Components
No. of observations	:	817,936
Ave. observation/stock	:	17,402

OVERALL FINDINGS : Malaysian stocks also exhibit similar characteristics as mentioned in the result of studies conducted in other markets. The results in this study provide an affirmative answer to the question on whether **a portfolio based on a few simple criteria focusing on the results of the group instead of individual stocks, as advocated by Graham, could outperform the broader market**. It also confirms the study by Lev and Thiagarajan (1993) which examined the predictive power of fundamental financial ratios used as the results are overwhelming as the test shows superior excess returns over the FBM KLCI Index for all strategies adopted. It is observed that from the tables below that:-

1. **All Quintiles – Summary of Portfolio Performance versus the FBM KLCI Index**

   From the table below it is observed that **All Quintiles (1 to 5)**, out of the 128 simulations, 119 or **92.97%** of the Value Portfolios **outperformed** the FBM KLCI Index.

   Table 2: All Quintiles Value Portfolios vs FBM KLCI Index

			Portfolio Out- Performed Index out of 7 Yrs					
			2010 to 2016		Jan to June 2017		Total	
			No. Times	**% Of**	**No. Times**	**% Of**	**No. Times**	**% Of**
Portfolio Out-Performed Index			105	93.75%	14	87.50%	**119**	**92.97%**
Portfolio Under-Performed Index			7	6.25%	2	12.50%	**9**	**7.03%**
		Total	**112**	**100%**	**16**	**100%**	**128**	**100%**

   a) For the full year back tested for period **2010 to 2016,** the **All Quintiles** Value Portfolios **outperformed** the index in 105 simulations **(93.75%)** out of the 112 simulations of different holding periods with different price momentum for the periods back tested. Depending on the simulations, the outperformance was by a wide margin ranging from 18.41% to 4.77%.

   b) For **2017 up to August**, **Quintile 1** Value Portfolios **outperformed** the FBM KLCI Index in 14 simulations **(87.5 %)** out of 16 simulations of different holding periods with different price momentum for the periods back tested. Depending on the simulations, the outperformance was also by wide margins ranging from 14.15% to -6.48%.

   There were 4 periods that did not outperform in the year 2017:

   i. 2 months holding period with 6 months price momentum,
   ii. 3 months holding period with 2 months price momentum,
   iii. 3 months holding period with 3 months price momentum, and
   iv. 3 months holding period with 6 months price momentum.

2. **Quintile 1 – Summary of Portfolio Performance versus the FBM KLCI Index**

   The **Quintile 1** Value Portfolios selected using the ERP5 (modified) as suggested in this study **outperformed** the FBM KLCI Index in 261 **(74.15%)** periods out of 352 simulations of different holding periods with different price momentum for the periods back tested.

Table 3: Quintile 1 Value Portfolios vs FBM KLCI Index

| | | | Quintile 1 Out- performed other Quintiles in Period | | | | | |
| | | | 2010 to 2016 | | Jan to June 2017 | | Total | |
			No. Times	% Of	No. Times	% Of	No. Times	% Of
Quintile 1 Portfolio Out-Performed Other Quintiles			240	76.92%	21	52.50%	**261**	**74.15%**
Quintile 1 Portfolio Under-Performed Other Quintiles			72	23.08%	19	47.50%	**91**	**25.85%**
		Total	312	100%	40	100%	352	100%

a) For the period **2010 to 2016**, number of periods the **Quintile 1** Value Portfolios **outperformed** the FBMKLCI Index was 240 periods **(76.92%)** out of 312 simulations of different holding periods with different price momentum for the periods back tested.

b) For **2017 up to August,** number of periods the **Quintile 1** Value Portfolios **outperformed** the FBMKLCI Index was 21 **(52.5%)** out of 40 simulations of different holding periods with different price momentum for the periods back tested.

3. **Quintile 1 – Summary of Returns Performance versus the FBM KLCI Index**

Table 4:   Returns Period 2010 – 2016

	Jan 2010 to Dec 2016		
Returns	**Portfolio (6 Stocks) Total Return 7 Years**	**Index Total Return 7 Years**	**Portfolio Out-Perform Index**
Max	22.47%	4.06%	18.41%
Min	8.83%	4.06%	4.77%

a) From **2010 to 2016, Quintile 1** Value Portfolios returns **outperformed** the FBM KLCI Index for all **(100%)** the periods back tested. Depending on the simulations, the Quintile 1 Portfolios returns were superior ranging from 22.47% to 8.83%. This is high when compared to the FBM KLCI Index benchmark returns which registered only 4.06% for the same period. A hefty of at least 4.77% outperformance on the minimum.

Table 5:   Returns Period Jan – Aug 2017

	Jan to August 2017		
Returns	**Portfolio of 6 Stocks Total Return 6 Months**	**Index Average Return 6 months**	**Portfolio Out-Perform Index**
Max	22.16%	8.01%	14.15%
Min	1.53%	8.01%	(6.48%)

b) For **2017 up to August, Quintile 1** Value Portfolios returns also **outperformed** the FBM KLCI Index in 12 **(75%)** out of the 16 scenarios back tested. Depending on the simulations, the Quintile 1 Portfolios returns were superior most of the time averaging 11.85% (high at 22.16% and the lowest 1.53%). This is high when compared to the FBM KLCI Index benchmark returns which recorded only 8.01% for the same period.

4. **Quintile 1 – Value Returns versus the FBM KLCI for all the different periods**

The **detailed breakdown by 2-, 3-, 6- & 12-month holding periods** (each holding period 28 simulations = 4 scenarios x 7 years) are as follows:-

a) **2-month holding** and 2-, 3-, 6- & 12-month price momentum – **Returns of Quintile 1 value portfolios versus FBM KLCI Index**

Table 6: 2-Month Holding Period Returns Performance 2010 – 2016

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio (6 Stocks) Total Return 7 Years	Index Total Return 7 Years	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
1 - 8	2	2	7	100.00%	6	4	66.67%	14.91%	4.06%	10.85%
9 - 16	2	3	7	100.00%	6	4	66.67%	14.54%	4.06%	10.48%
17 - 24	2	6	7	100.00%	6	4	66.67%	11.66%	4.06%	7.60%
25 - 32	2	12	6	85.71%	6	4	66.67%	13.55%	4.06%	9.49%
		Max	7	100.00%	6	4	66.67%	14.91%	4.06%	10.85%
		Min	6	85.71%	6	4	66.67%	11.66%	4.06%	7.60%

Jan 2010 to Dec 2016

i. From the table above **(Jan 2010 to Dec 2016),** it is observed that for the **2-month holding period** irrespective of the momentum period used, the returns were above the 11% region which surpassed the FBM KLCI Index returns of 4.06% by a wide margin. The margin of 7.6% is almost twice the FBM KLCI Index performance at the minimum. In 3 scenarios out of 4, it outperformed 100% and 66.67% of the time in each scenario periods.

Table 7: 2-Month Holding Period Returns Performance Jan – Aug 2017

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio of 6 Stocks Total Return 6 Months	Index Average Return 6 months	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
1 - 8	2	2	1	100.00%	4	3	75.00%	12.10%	8.01%	4.09%
9 - 16	2	3	1	100.00%	4	2	50.00%	8.32%	8.01%	0.31%
17 - 24	2	6	0	0.00%	4	1	25.00%	6.02%	8.01%	(1.99%)
25 - 32	2	12	1	100.00%	4	2	50.00%	9.81%	8.01%	1.81%
		Max	1	100.00%	4	3	75.00%	12.10%	8.01%	4.09%
		Min	0	0.00%	4	1	25.00%	6.02%	8.01%	(1.99%)

Jan to August 2017

ii. From the table above **(Jan to Aug 2017),** it is observed that for the **2-month holding period** irrespective of the momentum period used, the returns were between 12.10% to 6.02% which surpassed the FBM KLCI Index returns on the high side and slightly underperformed the index on the low side. Moreover, 3 out of the 4 scenario recorded a 100% outperformance. Despite the short holding period, the frequency of outperformance in each scenario (50% and above) is encouraging.

b)   **3-month holding** and 2-, 3-, 6- & 12-month price momentum – **Returns of Quintile 1 value portfolios versus FBM KLCI Index**

Table 8:   3-Month Holding Period Returns Performance 2010 – 2016

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio (6 Stocks) Total Return 7 Years	Index Total Return 7 Years	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
33 - 40	3	2	4	57.14%	4	2	50.00%	8.83%	4.06%	4.77%
41 - 48	3	3	7	100.00%	4	4	100.00%	22.47%	4.06%	18.41%
49 - 56	3	6	7	100.00%	4	4	100.00%	21.43%	4.06%	17.37%
57 - 64	3	12	5	71.43%	4	3	75.00%	14.20%	4.06%	10.14%
		Max	7	100.00%	4	4	100.00%	22.47%	4.06%	18.41%
		Min	4	57.14%	4	2	50.00%	8.83%	4.06%	4.77%

(Header band: Jan 2010 to Dec 2016)

i.   From the table above **(Jan 2010 to Dec 2016),** it is observed that for the **3-month holding period** irrespective of the momentum period used, the returns at the minimum of 8.83% was twice of that of the FBM KLCI Index. Moreover, 3 out of 4 scenarios recorded above 10% returns, i.e. between 22.47% and 8.83% (see column 9). These returns also surpassed the FBM KLCI Index returns by a wide margin of 4.77% return at the minimum.

Table 9:   3-Month Holding Period Returns Performance Jan – Aug 2017

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio of 6 Stocks Total Return 6 Months	Index Average Return 6 months	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
33 - 40	3	2	0	0.00%	3	1	33.33%	1.53%	8.01%	(6.48%)
41 - 48	3	3	1	100.00%	4	2	50.00%	6.64%	8.01%	(1.37%)
49 - 56	3	6	1	100.00%	3	1	33.33%	7.88%	8.01%	(0.13%)
57 - 64	3	12	1	100.00%	3	1	33.33%	9.61%	8.01%	1.61%
		Max	1	100.00%	4	2	50.00%	9.61%	8.01%	1.61%
		Min	0	0.00%	3	1	33.33%	1.53%	8.01%	(6.48%)

(Header band: Jan to August 2017)

ii.   From the table above **(Jan to Aug 2017),** it is observed that the **3-month holding period returns** were lower in 3 scenarios, confirming that longer periods (as advocated by the practitioners) are necessary for better returns as registered in earlier Table 8. However, except for the shortest term momentum, the returns in other 2 scenarios (3- and 6-month momentum) were only slightly lower than the index. In addition, the returns in this scenario were between 9.61% and 1.53. On the high side, it still managed to beat the index by a 1.61% margin.

c)   **6-month holding** and 2-, 3-, 6- & 12-months price momentum – **Returns of Quintile 1 value portfolios versus FBM KLCI Index**

Table 10:   6-Month Holding Period Returns Performance 2010 – 2016

Scenario 2010 to 2017	Holding Period	Momentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out-performed other Quintiles in Period			Portfolio (6 Stocks) Total Return 7 Years	Index Total Return 7 Years	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
65 - 72	6	2	7	100.00%	2	2	100.00%	15.88%	4.06%	11.82%
73 - 80	6	3	7	100.00%	2	1	50.00%	10.13%	4.06%	6.07%
81 - 88	6	6	7	100.00%	2	2	100.00%	13.19%	4.06%	9.13%
89 - 96	6	12	7	100.00%	2	2	100.00%	15.44%	4.06%	11.38%
		Max	7	100.00%	2	2	100.00%	15.88%	4.06%	11.82%
		Min	7	100.00%	2	1	50.00%	10.13%	4.06%	6.07%

i.   From the table above **(Jan 2010 to Dec 2016),** it is observed that for the **6-month holding period** irrespective of the momentum period used, the returns were better at double-digit (between 15.88% 10.13%) under all scenarios, far outpacing the index return of only 4.06%. These returns performance surpassed the FBM KLCI Index by a wide margin of 6.07% at the minimum.

Table 11:   6-Month Holding Period Returns Performance Jan – Aug 2017

Scenario 2010 to 2017	Holding Period	Momentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out-performed other Quintiles in Period			Portfolio of 6 Stocks Total Return 6 Months	Index Average Return 6 months	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
65 - 72	6	2	1	100.00%	2	2	100.00%	22.16%	8.01%	14.15%
73 - 80	6	3	1	100.00%	2	1	50.00%	12.80%	8.01%	4.79%
81 - 88	6	6	1	100.00%	2	2	100.00%	20.92%	8.01%	12.91%
89 - 96	6	12	1	100.00%	2	2	100.00%	22.16%	8.01%	14.15%
		Max	1	100.00%	2	2	100.00%	22.16%	8.01%	14.15%
		Min	1	100.00%	2	1	50.00%	12.80%	8.01%	4.79%

ii.   From the table above **(Jan to Aug 2017),** it is observed that returns for this **6-month holding period** was better than the 3-month holding period in Table 9 above whose returns were under 10%. This again emphasizes the practitioner's biasness towards longer-term holdings for better returns. For 3 out of the 4 scenarios, the returns were above 20%. The maximum is almost twice the minimum ranging between 22.16% and 12.80%. Even the minimum return of 12.8% is 1.5 times better than the FBM KLCI Index return.

d)   **12-month holding** and 2-, 3-, 6- & 12-month price momentum – **Returns of Quintile 1 value portfolios versus FBM KLCI Index**.

Table 12:   12-Month Holding Period Returns Performance 2010 – 2016

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio (6 Stocks) Total Return 7 Years	Index Total Return 7 Years	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
97 - 104	12	2	6	85.71%	1	0	0.00%	17.34%	4.06%	13.27%
105 - 112	12	3	7	100.00%	1	1	100.00%	19.99%	4.06%	15.93%
113 - 120	12	6	7	100.00%	1	1	100.00%	17.43%	4.06%	13.37%
121 - 128	12	12	7	100.00%	1	1	100.00%	20.09%	4.06%	16.03%
		Max	7	100.00%	1	1	100.00%	20.09%	4.06%	16.03%
		Min	6	85.71%	1	0	0.00%	17.34%	4.06%	13.27%

(Header note above table: Jan 2010 to Dec 2016)

i.   From the table above **(Jan 2010 to Dec 2016),** it is observed that for the **12-month holding period** irrespective of the momentum period used, the returns were above 15%. This is the **minimum optimal period advocated** by Joel Greenblatt, Philip Vanstraceele and Luc Allaeys in their books and research paper. Although there were deviations in returns depending on the momentum period used, even at the minimum registered return of 17.34%, it outperformed the index hands down by a wide margin of 13.27%.

Table 13:   12-Month Holding Period Returns Performance Jan – Aug 2017

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio of 6 Stocks Total Return 6 Months	Index Average Return 6 months	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
97 - 104	12	2	1	100.00%	1	0	0.00%	21.87%	8.01%	13.87%
105 - 112	12	3	1	100.00%	1	1	100.00%	12.36%	8.01%	4.35%
113 - 120	12	6	1	100.00%	1	1	100.00%	21.17%	8.01%	13.16%
121 - 128	12	12	1	100.00%	1	1	100.00%	21.87%	8.01%	13.87%
		Max	1	100.00%	1	1	100.00%	21.87%	8.01%	13.87%
		Min	1	100.00%	1	0	0.00%	12.36%	8.01%	4.35%

(Header note above table: Jan to August 2017)

ii. From the table above, it is observed that even for a relatively short **Jan to Aug 2017** period using the **12-month holding period,** the returns were also very impressive returning above 20% for 3 of the 4 scenarios. The returns ranged between 21.87% and 12.36% compared to the index return of 8.01%. The outperformance margin at the minimum return of 12.36% was 4.35%, or approximately 1.5 times FBM KLCI Index return.

5.   **Quintile 1 – Summary RISK & Returns Performance versus the FBM KLCI Index**

Returns and the risk using the various simulations are as follows:-

Table 14: Risk Returns Measured Period 2010 – 2016

Risk & Return	Jan 2010 to Dec 2016					
	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than Index	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
Max	8.10	3.05	Yes	6.59	0.05	Yes
Min	1.03	0.47	Yes	0.75	0.01	Yes

a) From **2010 to 2016**, **Quintile 1 Value Portfolios RISKS** taken to get the above good returns were **low compare to the FBM KLCI Index Risks which were giving much lower returns**. The above table is a summary for all 112 simulations for the full year Jan 2010 to Dec 2016 backtest period. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:

i. **Return to Volatility Ratio** of Quintile 1 Portfolio registered between **8.10** to **1.03** compare to the benchmark which registered a lower value between **3.05** and **0.47**. On both Maximum and Minimum counts the Quintile 1 value portfolios did better than the index.

ii. **Sharpe Ratio of Quintile 1 Portfolio showed a similar out performance trend of less risk given the higher and better returns registering between 6.59 and 0.75 in the Min and Max category compared to the Benchmark Sharpe Ratio which was a meager figure of 0.05 and 0.01 after risk free rate was imputed.**

Table 15: Risk Returns Measured Period Jan – Aug 2017

Risk & Return	Jan to August 2017					
	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than Index	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
Max	1.42	1.16	Yes	0.90	0.00	Yes
Min	0.14	1.05	No	(0.92)	(1.16)	Yes

b) From the table above, for the shorter period Jan to August 2017, **Quintile 1 Value Portfolios RISKS** were also lower given the better returns compared to the FBMKLCI Index benchmark. The above table is a summary for all 16 simulations for the three quarter year Jan to August 2017 backtest period. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:-

i. **Return to Volatility Ratio** registered between **1.42** to **0.14 on the Max and Min calculations** compared to the benchmark which registered a lower value on Max at 1.16 and 1.05 at Min. As per literature a longer period of investment holding is advocated, thus, on the Minimum value, the Benchmark (1.05) outperformed the Quintile Portfolio (0.14).

ii. **Sharpe Ratio** of the Quintile 1 portfolio however **showed a better performance trend of less risk given the higher and better returns** registering between **0.90 and -0.92** on the Min and Max **compared to the Benchmarked** which register lower figures of **0.00** and **-1.16** after risk free rate was imputed.

c) The **Risk Return** detailed breakdown by 2, 3, 6 & 12 holding periods are detailed below. Each table is for each holding period back tested is a summary for all 28 simulations (4 scenarios x 7 years). The details are as follows:-

i. **2-month holding** and 2, 3, 6 & 12 Months price momentum – **RISKS Return of Quintile 1 value portfolios versus FBM KLCI Index**.

Table 16: 2-Month Holding Period Risk Returns Measured 2010 – 2016

Jan 2010 to Dec 2016								
Scenario - 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
1 - 8	2	2	1.03	3.05	No	0.75	0.05	Yes
9 - 16	2	3	7.48	3.05	Yes	5.43	0.05	Yes
17 - 24	2	6	6.68	3.05	Yes	4.39	0.05	Yes
25 - 32	2	12	7.33	3.05	Yes	5.17	0.05	Yes
		Max	7.48	3.05		5.43	0.05	
		Min	1.03	3.05		0.75	0.05	

a) From **2010 to 2016**, **Quintile 1 Value Portfolios RISKS** observed in table above registered lower Risk given the higher returns **compared to the FBM KLCI Index Risks which were giving much lower returns**. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:-

1. **Return to Volatility Ratio** of Quintile 1 Value portfolio registered **above 6** in **three scenarios** compared to the **benchmark risk return of 3.05**. Only in one instance was the Quintile 1 Risk higher (1.03) than the benchmark (3.05). This was in the 1st row Shorter Holding Period and momentum (2 months holding period, 2 months momentum).

2. **Sharpe Ratio** of **Quintile 1 Value portfolio** showed clear out performance trend on all scenarios of **less risk given the higher and better returns** registering between **5.43 and 0.75** compare to the **FBM KLCI Index benchmark** which was a meager 0.05 after risk free rate was imputed.

Table 17: 2-Month Holding Period Risk Returns Measured Jan – Aug 2017

Jan to August 2017								
Scenario - 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
1 - 8	2	2	1.02	1.05	No	(0.37)	(1.16)	Yes
9 - 16	2	3	0.83	1.05	No	(0.79)	(1.16)	Yes
17 - 24	2	6	0.56	1.05	No	(0.92)	(1.16)	Yes
25 - 32	2	12	1.25	1.05	Yes	(0.84)	(1.16)	Yes
		Max	1.25	1.05		(0.37)	(1.16)	
		Min	0.56	1.05		(0.92)	(1.16)	

b) From the table above, for the period Jan to August 2017, **Quintile 1 Value Portfolios RISKS** were only slightly higher compared to the benchmark. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:-

1. **Return to Volatility Ratio** for 3 scenarios were lower than that of the benchmark registering **between 0.56 and 1.02** compared to the **benchmark higher value of 1.05**. However, the 4th scenario (1.25) of longer term momentum was better than the index value of 1.05 emphasizing the avocation of longer term holdings is essential for better performance as advocated by the practitioners.

2. **Sharpe Ratio** however showed that the Quintile 1 portfolios showed **out performance in all scenarios of less risk given the higher and better returns** registering between **-0.37 and -0.92** compare to the **Benchmark** which was showing **higher risk of -1.16** value after risk free rate was imputed.

ii. **3-month holding** and 2, 3, 6 & 12 Months price momentum – **RISKS Return of Quintile 1 value portfolios versus FBM KLCI Index**.

Table 18:   3-Month Holding Period Risk Returns Measured 2010 – 2016

Jan 2010 to Dec 2016								
Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
33 - 40	3	2	4.10	1.95	Yes	2.25	0.03	Yes
41 - 48	3	3	6.58	1.95	Yes	5.41	0.03	Yes
49 - 56	3	6	8.10	1.95	Yes	6.59	0.03	Yes
57 - 64	3	12	3.07	1.95	Yes	2.21	0.03	Yes
		Max	8.10	1.95		6.59	0.03	
		Min	3.07	1.95		2.21	0.03	

a) For the period **2010 to 2016**, **Quintile 1 Value Portfolios RISKS** observed in table above were **overwhelmingly lower compared to the FBM KLCI Index Risks.** The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:

1. **Return to Volatility Ratio** of Quintile 1 Value portfolio registered a hefty variance registering between **8.10** to **3.07** compare to the **benchmark** which registered a much **lower value of 1.95**. Quintile 1 Value portfolio at the **minimum had a value of 3.07 which was 1.5 times** the benchmark value of 1.95.

2. **Sharpe Ratio** of **Quintile 1 Value portfolio** showed a similar out performance trend of **less risk given the higher and better returns** registering between **6.59 and 2.21** compare to the **FBM KLCI Index benchmark** which was a meager 0.03 after risk free rate was imputed.

Table 19: 3-Month Holding Period Risk Returns Measured Jan – Aug 2017

Scenario - 2010 to 2017	Holding Period	Momentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
			Jan to August 2017					
33 - 40	3	2	0.03	1.09	No	(1.04)	(0.57)	No
41 - 48	3	3	0.24	1.09	No	(0.64)	(0.57)	No
49 - 56	3	6	0.42	1.09	No	(0.21)	(0.57)	Yes
57 - 64	3	12	0.60	1.09	No	(0.32)	(0.57)	Yes
		Max	0.60	1.09		(0.21)	(0.57)	
		Min	0.03	1.09		(1.04)	(0.57)	

b) For the period Jan to August 2017, **Quintile 1 Value Portfolios RISKS** were all lower albeit the better returns compare to the FBMKLCI Index benchmark. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:-

1. **Return to Volatility Ratio** for the 4 scenarios ranged **0.60** to **0.03** compared to the benchmark which registered a better value of **1.09**.

2. **Sharpe Ratio** showed however showed better performance in 2 of the 4 scenarios. The longer momentum of 6 and 12 months momentum as expected registered better performance than the benchmark as observed in above table.

iii. **6-month holding** and 2, 3, 6 & 12 Months price momentum – **RISKS Return of Quintile 1 value portfolios versus FBM KLCI Index**.

Table 20: 6-Month Holding Period Risk Returns Measured 2010 – 2016

Scenario - 2010 to 2017	Holding Period	Momentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
			Jan 2010 to Dec 2016					
65 - 72	6	2	3.55	0.93	Yes	2.66	0.02	Yes
73 - 80	6	3	2.21	0.93	Yes	1.34	0.02	Yes
81 - 88	6	6	2.64	0.93	Yes	1.84	0.02	Yes
89 - 96	6	12	3.66	0.93	Yes	2.72	0.02	Yes
		Max	3.66	0.93		2.72	0.02	
		Min	2.21	0.93		1.34	0.02	

a) For the period **2010 to 2016**, **Quintile 1 Value Portfolios RISKS** taken were **lower compared to the FBM KLCI Index Risks which were giving much lower returns**. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:

1. **Return to Volatility Ratio** of Quintile 1 Value portfolio registered between **3.36** to **2.21** compare to the benchmark which registered a lower value between **0.93**.

2. **Sharpe Ratio** of **Quintile 1 Value portfolio** showed a similar out performance trend of **less risk given the better returns** registering between **2.72 and 1.34** compare to the **FBM KLCI Index benchmark** which was meagre 0.02 after risk free rate was imputed.

Table 21: 6-Month Holding Period Risk Returns Measured Jan – Aug 2017

Scenario - 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
Jan to August 2017								
65 - 72	6	2	1.30	1.16	Yes	0.47	(0.00)	Yes
73 - 80	6	3	1.21	1.16	Yes	0.45	(0.00)	Yes
81 - 88	6	6	1.39	1.16	Yes	0.85	(0.00)	Yes
89 - 96	6	12	1.42	1.16	Yes	0.90	(0.00)	Yes
		Max	1.42	1.16		0.90	(0.00)	
		Min	1.21	1.16		0.45	(0.00)	

b) For the short period Jan to August 2017, **Quintile 1 Value Portfolios RISKS** were also lower and with better returns compared to the FBMKLCI Index benchmark. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:-

1. **Return to Volatility Ratio** registered between **1.42** to **1.21** compare to the benchmark which registered a lower value of **1.16**.

2. **Sharpe Ratio** showed a similar out performance trend of less risk given the higher and better returns registering between **0.90 and 0.45** compared to the Benchmark which was **negative 0.005** after risk free rate was imputed.

iv. **12-month holding** and 2, 3, 6 & 12 Months price momentum – **RISKS Return of Quintile 1 value portfolios versus FBM KLCI Index**.

Table 22: 12-Month Holding Period Risk Returns Measured 2010 – 2016

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
Jan 2010 to Dec 2016								
97 - 104	12	2	1.54	0.47	Yes	1.19	0.01	Yes
105 - 112	12	3	2.15	0.47	Yes	1.72	0.01	Yes
113 - 120	12	6	1.67	0.47	Yes	1.29	0.01	Yes
121 - 128	12	12	1.53	0.47	Yes	1.22	0.01	Yes
		Max	2.15	0.47		1.72	0.01	
		Min	1.53	0.47		1.19	0.01	

c) For the period **2010 to 2016**, **Quintile 1 Value Portfolios RISKS** taken were **lower compared to the FBM KLCI Index Risks which were giving much lower returns**. The **Quintile 1 ERP5 Value Portfolios risk return** as measured by the:

1. **Return to Volatility Ratio** of Quintile 1 Value portfolio registered between **2.15** to **1.53** compare to the benchmark which registered a lower value of **0.47**.

2. **Sharpe Ratio** showed a similar out performance trend of **less risk given the higher and better returns** registering between **1.72 and 1.19** compared to

the **FBM KLCI Index benchmark** which was **0.01** after risk free rate was imputed.

Table 23:   12-Month Holding Period Risk Returns Measured Jan – Aug 2017

Jan to August 2017								
Scenario - 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
97 - 104	12	2	0.00	0.00	No	0.00	0.00	No
105 - 112	12	3	0.00	0.00	No	0.00	0.00	No
113 - 120	12	6	0.00	0.00	No	0.00	0.00	No
121 - 128	12	12	0.00	0.00	No	0.00	0.00	No
		Max	0.00	0.00		0.00	0.00	
		Min	0.00	0.00		0.00	0.00	

b)   For the period Jan to August 2017, **Quintile 1 Value Portfolios RISKS** were not able to be calculated due to one period only.

CONCLUSIONS

1. Detailed results shows that the **ERP5 (modified) strategy is able to steadily generate results exceeding the return of the FBM KLCI Index most of the time** in the periods tested. It is observed that for the period 2010 to 2016 tested and 8 months in 2017 tested, the ERP5 (modified) Quintile 1 portfolio strategy works as testified by the results above. We reckon it should work better if longer periods are used as advocated by the practitioners.

2. For the two main periods, the longer 2010 to 2016 (7 Years) period and the very much shorter period of 8 months in 2017, it appears that using **ERP5 (modified) to screen stocks can indeed not only result in higher returns but also lower volatility**. ERP5 (modified) **value strategy** can be used to **separate not only the winners but the losers as well**. The findings are in line with the results reported by Topias Kukkasniemi in his study and further supports Vanstraceele and Allaeys, Joesl Greenblatt and Philip Vanstraceele and Tim Du Toit conclusions that the **strategy can work using simple factors based company historical fundamental data and a second factor in the form of momentum to improve stock returns**.

3. This **implies that the ERP5 (modified) value strategy, indeed, possesses stock picking power that can be used to construct portfolios that generate excess returns in the long-term**. The results are similar to (i) those reported by Vanstraceele and Allaeys (2010a) who tested the ERP5 strategy in the **Danish market,** and (ii) paper by Philip Vanstraceele and Tim Du Toit called **"Quantitative Value Investing in Europe: What works for achieving Alpha"**.

4. To the **question whether the value strategies include more risk than the Index, the answer is no**, as from the tables related to risk and return it is **observed that the volatilities of the Value portfolios in the Quintile 1 are lower compared to those of the benchmark index** using measurement **Return to Volatility Ratio** and the **Sharpe Ratio** as advocated by the original study. Thus, the lower volatility of the ERP5 (modified) value portfolios is in line with the earlier research by Pätäri and Leivo, 2009 and others.

5. It is also **notable that the top quintile portfolios based on ERP5 have the lowest volatility** while the bottom quintile portfolios have the highest volatility. This **implies that all ERP5 strategies could be used to separate the most risky stocks from the stocks that have lower risk in terms of volatility**.

6. These results also answers in the Malaysian context the question "WHETHER A DIVERSIFIED PORTFOLIO FORMED USING **VALUE STRATEGIES BASED** ON A **FEW SIMPLE ACCOUNTING RATIOS CAN OUTPERFORM THE MARKET INDEX**. This iterates literature mentioned above that **ample research** shows **financial ratios** can be **useful in predicting future earnings and equity returns**. Thus, the results support the classic study of **Ou and Penman (1989)** who found that ratios generated from accounting data were **useful in forecasting future earnings and stock returns.** The results also support **Lev and Thiagarajan (1993)** study that **examined the predictive power of fundamental financial ratios** when they concluded that **fundamental factors add about 70 percent to the explanatory power of earnings alone in predicting excess returns**. Abarbenell and Bushee (1998) devised an investment strategy using these variables and found that they can generate excess returns under this strategy.

7. The results also proves that the strategy advocated by **Columbia University Professor Benjamin Graham** (known as **"the father of value investing"** and the **"Dean of Wall Street," Ben Graham (1894-1976)** that "investors should FORM A **DIVERSIFIED PORTFOLIO** BASED ON A FEW SIMPLE CRITERIA FOCUSING ON THE RESULTS OF THE **GROUP INSTEAD** OF **INDIVIDUAL STOCKS"** also **applicable in the Malaysian context**.

APPENDIX 1

Summary of 2010 to 2016 ERP5 Quintile Value Portfolios Returns Outperformance Vs FBM KLCI Index

Summary - ERP5 - Back Test Jan 2010 to June 2016

Different Price Momentum vs Same Holding Periods

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio (6 Stocks) Total Return 7 Years	Index Total Return 7 Years	Portfolio Out-Perform Index
			Jan 2010 to Dec 2016							
			No. Times	% Of	Total No. Periods	No. Times	% Of			
1 - 8	2	2	7	100.00%	42	28	66.67%	14.91%	4.06%	10.85%
9 - 16	2	3	7	100.00%	42	31	73.81%	14.54%	4.06%	10.48%
17 - 24	2	6	7	100.00%	42	28	66.67%	11.66%	4.06%	7.60%
25 - 32	2	12	6	85.71%	42	31	73.81%	13.55%	4.06%	9.49%
		Max	7	100.00%	42	31	73.81%	14.91%	4.06%	10.85%
		Min	6	85.71%	42	28	66.67%	11.66%	4.06%	7.60%
			Jan 2010 to Dec 2016							
33 - 40	3	2	4	57.14%	28	17	60.71%	8.83%	4.06%	4.77%
41 - 48	3	3	7	100.00%	28	26	92.86%	22.47%	4.06%	18.41%
49 - 56	3	6	7	100.00%	28	27	96.43%	21.43%	4.06%	17.37%
57 - 64	3	12	5	71.43%	28	18	64.29%	14.20%	4.06%	10.14%
		Max	7	100.00%	28	27	96.43%	22.47%	4.06%	18.41%
		Min	4	57.14%	28	17	60.71%	8.83%	4.06%	4.77%
			Jan 2010 to Dec 2016							
65 - 72	6	2	7	100.00%	14	14	100.00%	15.65%	4.06%	11.59%
73 - 80	6	3	7	100.00%	14	7	50.00%	10.13%	4.06%	6.07%
81 - 88	6	6	7	100.00%	14	14	100.00%	13.19%	4.06%	9.13%
89 - 96	6	12	7	100.00%	14	14	100.00%	15.44%	4.06%	11.38%
		Max	7	100.00%	14	14	100.00%	15.65%	4.06%	11.59%
		Min	7	100.00%	14	7	50.00%	10.13%	4.06%	6.07%
			Jan 2010 to Dec 2016							
97 - 104	12	2	6	85.71%	7	0	0.00%	17.45%	4.06%	13.39%
105 - 112	12	3	7	100.00%	7	7	100.00%	19.99%	4.06%	15.93%
113 - 120	12	6	7	100.00%	7	7	100.00%	17.43%	4.06%	13.37%
121 - 128	12	12	7	100.00%	7	7	100.00%	20.09%	4.06%	16.03%
		Max	7	100.00%	7	7	100.00%	20.09%	4.06%	16.03%
		Min	6	85.71%	7	0	0.00%	17.43%	4.06%	13.37%
		Max	7	100.00%	42	31	100%	22.47%	4.06%	18.41%
		Min	4	57.14%	7	7	50%	8.83%	4.06%	4.77%

APPENDIX 2

Summary of 2017 ERP5 Quintile Value Portfolios Returns Outperformance Vs FBM KLCI Index

Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Out-Performed Index out of 7 Yrs		Quintile 1 Out- performed other Quintiles in Period			Portfolio of 6 Stocks Total Return 6 Months	Index Average Return 6 months	Portfolio Out-Perform Index
			No. Times	**% Of**	**Total No. Periods**	**No. Times**	**% Of**			
1 - 8	2	2	1	100.00%	4	3	75.00%	12.10%	8.01%	4.09%
9 - 16	2	3	1	100.00%	4	2	50.00%	8.32%	8.01%	0.31%
17 - 24	2	6	0	0.00%	4	1	25.00%	6.02%	8.01%	(1.99%)
25 - 32	2	12	1	100.00%	4	2	50.00%	9.81%	8.01%	1.81%
		Max	1	100.00%	4	3	75.00%	12.10%	8.01%	4.09%
		Min	0	0.00%	4	1	25.00%	6.02%	8.01%	(1.99%)
33 - 40	3	2	0	0.00%	3	0	0.00%	0.17%	8.01%	(7.84%)
41 - 48	3	3	0	0.00%	3	1	33.33%	3.00%	8.01%	(5.01%)
49 - 56	3	6	1	100.00%	3	1	33.33%	7.60%	8.01%	(0.40%)
57 - 64	3	12	0	0.00%	3	1	33.33%	7.71%	8.01%	(0.29%)
		Max	1	100.00%	3	1	33.33%	7.71%	8.01%	(0.29%)
		Min	0	0.00%	3	0	0.00%	0.17%	8.01%	(7.84%)
65 - 72	6	2	1	100.00%	2	2	100.00%	12.73%	8.01%	4.72%
73 - 80	6	3	1	100.00%	2	1	50.00%	12.80%	8.01%	4.79%
81 - 88	6	6	1	100.00%	2	2	100.00%	20.92%	8.01%	12.91%
89 - 96	6	12	1	100.00%	2	2	100.00%	22.16%	8.01%	14.15%
		Max	1	100.00%	2	2	100.00%	22.16%	8.01%	14.15%
		Min	1	100.00%	2	1	50.00%	12.73%	8.01%	4.72%
97 - 104	12	2	1	100.00%	1	0	0.00%	10.27%	8.01%	2.27%
105 - 112	12	3	1	100.00%	1	1	100.00%	12.36%	8.01%	4.35%
113 - 120	12	6	1	100.00%	1	1	100.00%	21.17%	8.01%	13.16%
121 - 128	12	12	1	100.00%	1	1	100.00%	21.87%	8.01%	13.87%
		Max	1	100.00%	1	1	100.00%	21.87%	8.01%	13.87%
		Min	1	100.00%	1	0	0.00%	10.27%	8.01%	2.27%
		Max	1	100.00%	4	3	100%	22.16%	8.01%	14.15%
		Min	1	100.00%	1	1	25%	0.17%	8.01%	(7.84%)

APPENDIX 3

Summary of 2010 to 2016 ERP5 Quintile Value Portfolios RISK measurement Outperformance Vs FBM KLCI Index

Jan 2010 to Dec 2016								
Scenario 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
1 - 8	2	2	1.03	3.05	No	0.75	0.05	Yes
9 - 16	2	3	7.48	3.05	Yes	5.43	0.05	Yes
17 - 24	2	6	6.68	3.05	Yes	4.39	0.05	Yes
25 - 32	2	12	7.33	3.05	Yes	5.17	0.05	Yes
		Max	7.48	3.05		5.43	0.05	
		Min	1.03	3.05		0.75	0.05	
33 - 40	3	2	4.10	1.95	Yes	2.25	0.03	Yes
41 - 48	3	3	6.58	1.95	Yes	5.41	0.03	Yes
49 - 56	3	6	8.10	1.95	Yes	6.59	0.03	Yes
57 - 64	3	12	3.07	1.95	Yes	2.21	0.03	Yes
		Max	8.10	1.95		6.59	0.03	
		Min	3.07	1.95		2.21	0.03	
65 - 72	6	2	2.59	0.93	Yes	1.93	0.02	Yes
73 - 80	6	3	2.21	0.93	Yes	1.34	0.02	Yes
81 - 88	6	6	2.64	0.93	Yes	1.84	0.02	Yes
89 - 96	6	12	3.66	0.93	Yes	2.72	0.02	Yes
		Max	3.66	0.93		2.72	0.02	
		Min	2.21	0.93		1.34	0.02	
97 - 104	12	2	2.26	0.47	Yes	1.75	0.01	Yes
105 - 112	12	3	2.15	0.47	Yes	1.72	0.01	Yes
113 - 120	12	6	1.67	0.47	Yes	1.29	0.01	Yes
121 - 128	12	12	1.53	0.47	Yes	1.22	0.01	Yes
		Max	2.26	0.47		1.75	0.01	
		Min	1.53	0.47		1.22	0.01	
		Max	8.10	3.05		6.59	0.05	Yes
		Min	1.03	0.47		0.75	0.01	Yes

Summary of 2017 ERP5 Modified Quintile Value Portfolios RISK measurement Outperformance Vs FBM KLCI Index

Scenario - 2010 to 2017	Holding Period	Mo-mentum Period	Portfolio Rtn. to Vol. Ratio	Index Rtn. to Vol. Ratio	Return to Volatility Ratio BETTER than	Portfolio Sharpe Ratio	Index Sharpe Ratio	Sharpe Ratio BETTER than Index
					Jan to August 2017			
1 - 8	2	2	1.02	1.05	No	(0.37)	(1.16)	Yes
9 - 16	2	3	0.83	1.05	No	(0.79)	(1.16)	Yes
17 - 24	2	6	0.56	1.05	No	(0.92)	(1.16)	Yes
25 - 32	2	12	1.25	1.05	Yes	(0.84)	(1.16)	Yes
		Max	1.25	1.05		(0.37)	(1.16)	
		Min	0.56	1.05		(0.92)	(1.16)	
33 - 40	3	2	0.03	1.09	No	(1.04)	(0.57)	No
41 - 48	3	3	0.24	1.09	No	(0.64)	(0.57)	No
49 - 56	3	6	0.42	1.09	No	(0.21)	(0.57)	Yes
57 - 64	3	12	0.60	1.09	No	(0.32)	(0.57)	Yes
		Max	0.60	1.09		(0.21)	(0.57)	
		Min	0.03	1.09		(1.04)	(0.57)	
65 - 72	6	2	1.30	1.16	Yes	0.47	(0.00)	Yes
73 - 80	6	3	1.21	1.16	Yes	0.45	(0.00)	Yes
81 - 88	6	6	1.39	1.16	Yes	0.85	(0.00)	Yes
89 - 96	6	12	1.42	1.16	Yes	0.90	(0.00)	Yes
		Max	1.42	1.16		0.90	(0.00)	
		Min	1.21	1.16		0.45	(0.00)	
97 - 104	12	2	0.00	0.00	0	0.00	0.00	0
105 - 112	12	3	0.00	0.00	0	0.00	0.00	0
113 - 120	12	6	0.00	0.00	0	0.00	0.00	0
121 - 128	12	12	0.00	0.00	0	0.00	0.00	0
		Max	0.00	0.00		0.00	0.00	
		Min	0.00	0.00		0.00	0.00	
		Max	1.42	1.16		0.90	0.00	Yes
		Min	0.03	1.05		(1.04)	(1.16)	Yes

APPENDIX 5

Extract from the paper by Philip Vanstraceele and Tim Du Toit called "Quantitative Value Investing in Europe: What works for achieving Alpha".

Note: **Last row ERP5** shows **a return of 600.9% using Quintile 1. However,** if ERP5 is combined with another factor the **6 Months Price Momentum, the results is phenomenal yielding 732.1% as** observed in the 3rd Last Row from bottom.

Abstract
Introduction
Methodology
Value Factors
Quality Factors
Momentum Factors
Composite Factors
Single Factors Summary
Combining Factors
  Earnings Yield
  Price-to-Book
  FCF
  Price-to-Sales
  Piotroski F-Score
  Price Index 12 Months
  Price Index 6 Months
  Magic Formula
  ERP5
  Summary
Conclusion
References
Copyright

ERP5

With this combination we combined the 20% of companies with the highest ERP5-rank with all the second factors we tested.

	TOTAL RETURN 13/06/1999–13/06/2011				
SECONDARY FACTOR	Q1	Q2	Q3	Q4	Q5
EARNINGS YIELD 12 MONTHS	590.3%	355.9%	248.9%	175.8%	120.6%
EARNINGS YIELD 5 YEARS	404.2%	408.4%	351.7%	216.2%	84.1%
PRICE TO BOOK	680.2%	456.8%	265.2%	200.3%	46.6%
FCF YIELD	555.6%	245.2%	204.0%	223.9%	177.0%
FCF YIELD 5 YEARS	336.4%	311.0%	285.8%	206.1%	179.6%
PRICE TO SALES	402.4%	272.7%	332.7%	220.5%	166.5%
F-SCORE	583.1%	332.5%	190.8%	336.8%	94.7%
NET DEBT ON MARKET VALUE	321.2%	291.7%	314.7%	238.2%	216.0%
ROIC	145.6%	178.8%	383.5%	296.8%	449.2%
ROIC 5 YEARS	114.4%	246.1%	362.7%	236.5%	481.2%
PRICE INDEX 12 MONTHS	696.5%	378.4%	300.8%	195.3%	41.4%
PRICE INDEX 6 MONTHS	732.1%	357.2%	268.2%	192.7%	51.8%
MF RANK	256.3%	319.5%	260.1%	247.8%	309.0%
ERP5	600.9%	249.2%	434.2%	151.1%	113.0%

Show/Hide details

Your average return of combining the ERP5 score with all the second factors would have been 458.5% (median was 479.9%) over 12 years. The average this was the fourth best two-factor strategies we tested.

Similar to what we found with the MF-rank, the best performing strategy was combining the ERP5 score with companies that had the highest 6-month price index. If you did this your returns would have been 732.1%.

The worst return was generated by combining the ERP5 score with companies that had the highest return on investment capital on average over the past five years. This would have only given you a return of 114.4%.

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MIDF AMANAH INVESTMENT BANK : GUIDE TO RECOMMENDATIONS

STOCK RECOMMENDATIONS

BUY	Total return is expected to be >15% over the next 12 months.
TRADING BUY	Stock price is expected to *rise* by >15% within 3-months after a Trading Buy rating has been assigned due to positive newsflow.
NEUTRAL	Total return is expected to be between -15% and +15% over the next 12 months.
SELL	Total return is expected to be <-15% over the next 12 months.
TRADING SELL	Stock price is expected to *fall* by >15% within 3-months after a Trading Sell rating has been assigned due to negative newsflow.

SECTOR RECOMMENDATIONS

POSITIVE	The sector is expected to outperform the overall market over the next 12 months.
NEUTRAL	The sector is to perform in line with the overall market over the next 12 months.
NEGATIVE	The sector is expected to underperform the overall market over the next 12 months.