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"The Evidence of the Residual Momentum Strategy in the Thai Stock Market"

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The Evidence of the Residual Momentum in SET

- Research Objectives and Benefits for Thai Capital Market
- Executive Summary

The Evidence of the Residual Momentum in SET

Research Objectives and Benefits for Thai Capital Market

- The main objective of this study aims to examine the residual momentum strategy based on residual returns regressing against the Fama and French three-factor model in the Stock Exchange of Thailand (SET)
- The study results purpose to contribute to practical investment in the Thai stock market.
- The residual momentum strategy is assumed to improve the risk-adjusted profit with lower volatility and dominates the total return momentum in the Thai stock market.
- The implementation of the residual return momentum strategy is not hard to employ since information of each factors, which are market risk premium, size premium and value premium, is publicly available.
- The residual returns are prior obtained to form the momentum portfolios; thus, the residual strategy can be implemented in realistic.

The Evidence of the Residual Momentum in SET

Executive Summary

- Employing the residual momentum in the Stock Exchange of Thailand (SET) using data during January 2001 to December 2011 shows the improvement of the strategy in terms of reducing time-varying risk exposures of the momentum return.
- The results found that the residual momentum has higher raw return together with lower variability; as a result, has higher Sharpe ratio.
- The key prominence of the residual momentum is its better performance during economic crisis. The residual momentum portfolio do not face as much losses as the total return momentum portfolio when there is a market reversal after a severe recession because the residual momentum is considerably neutralized to the time-varying risk exposures.
- The study supports the hypothesis that the momentum is not risk factor. Its effect is caused by the behavior biases of investors. The Thai stock market is inefficient under the weak-form hypothesis.

The Evidence of the Residual Momentum in SET

Motivation

- Jegadeesh and Titman (1993) → Develop the momentum strategy, which buying past winner stocks and selling past loser stocks to generate abnormal profits.
- Fama and French (1996) → Use the Fama and French three-factor model to examine momentum effect which found that the short-run momentum strategy still generates positively excess profits.

The Evidence of the Residual Momentum in SET

Motivation

Grundy and Martin (2001)

- Investigate the risk and sources of the momentum returns.
- The total return momentum strategies of Jegadeesh and Titman (1993) are subjected to time-varying exposures to the Fama and French factors.

$$r_{i,t} = \alpha_i + \beta_i RMRF_t + s_i SMB_t + h_i HML_t + \varepsilon_{i,t}$$

	Formation Period	Momentum Portfolio	Net Factor loading	Holding Period	Momentum Profit
RMRF	+	Long high β Short low β	+	+	+
				-	-
SMB	+	Long small Short large	+	+	+
				-	-
HML	+	Long high BTM Short low BTM	+	+	+
				-	-

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The Evidence of the Residual Momentum in SET

Motivation

Blitz, Huij, et al. (2011)

- Zero-cost hedged portfolios based on residual returns, which are obtained *ex ante* to form the momentum portfolios.
- Residual return obtain by running the Fama and French regression in the estimation period using 36-month rolling windows approach.
- Can be implemented in realistic because the estimators are known at portfolios formation time.

The Evidence of the Residual Momentum in SET

Hypotheses

- Compare to the total return momentum

Residual Momentum	Explanation
• Decrease variability of profits • Higher long-run average Sharpe ratios • Better consistency performance over time	Using residual term which hedges against FF time-varying risk factors →Better predicts future returns →Do not depend on these factor returns
Smaller impact of transaction costs	Less weight in small cap stocks (already adjusted for size)
Reducing the January effect.	Less weight in small cap stocks (already adjusted for size)

The Evidence of the Residual Momentum in SET

Data

- The first 100 highest market cap stocks listed on the Stock Exchange of Thailand
- Extracted from the DATASTREAM database during the period of January 2001 to December 2011 (covering 132 months).
- Factor required :

  The total return index (*TRI*)

  The market capitalization

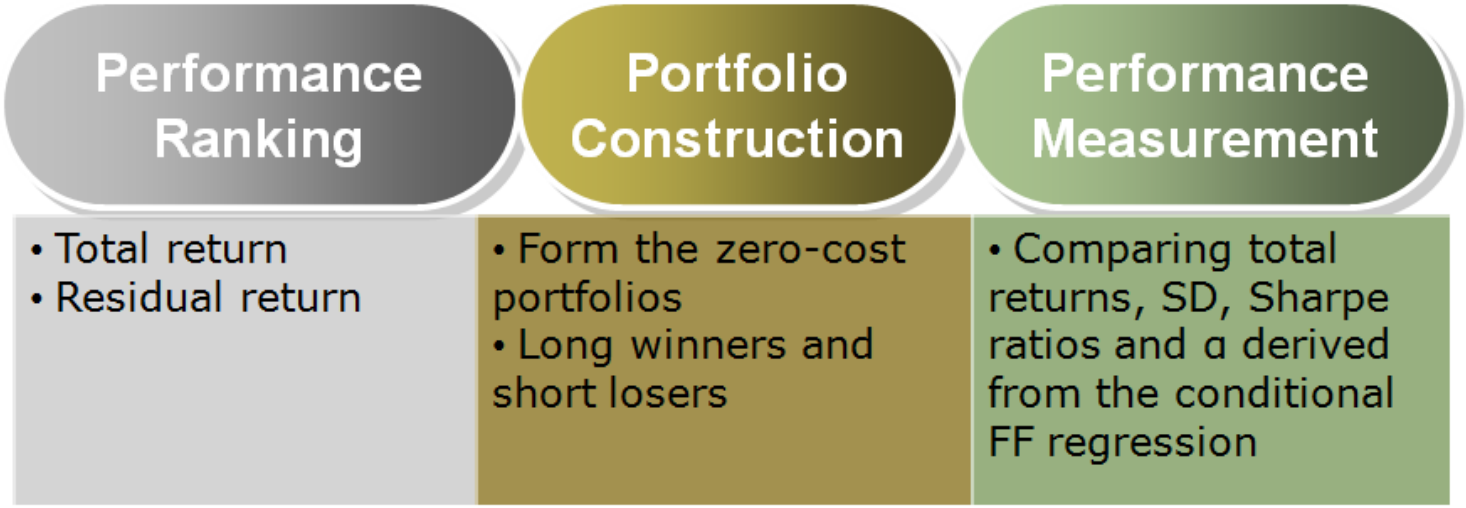
  The market-to-book value of common stocks

  The return of SET index

  The risk free rate : The 1-month T-Bills

The Evidence of the Residual Momentum in SET

Methodology



- Rank each return based on past 12 months.
- The residual returns are estimated using the 36-month rolling windows approach.
- The conditional Fama and French regression:

$$r_{i,t} = \alpha_i + \beta_{1,i} RMRF_t + \beta_{2,i} SMB_t + \beta_{3,i} HML_t + \beta_{4,i} RMRF\_UP_t + \beta_{5,i} SMB\_UP_t + \beta_{6,i} HML\_UP_t + \varepsilon_{i,t}$$

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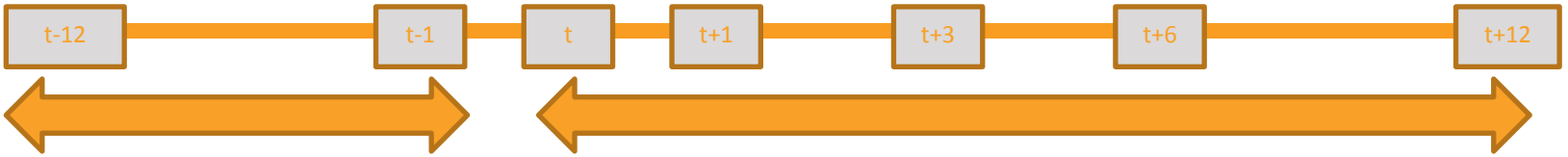
The Evidence of the Residual Momentum in SET

Methodology

The total returns momentum strategy



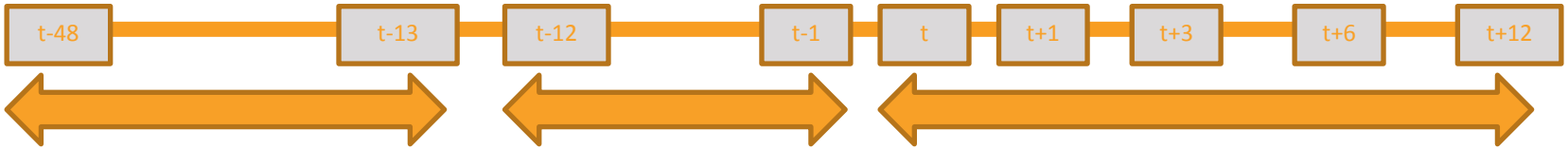
- Follows the Jegadeesh and Titman (1993)
- Ranks stocks from the highest returns to lowest returns based on their average monthly return over past 12 months, and then hold them for 1, 3, 6 and 12 months.
- These ranked stocks are sorted into equally-weighted quintile portfolios.
- The zero-cost portfolios are formed by buying the top 20% and selling the bottom 20% at the closing price of month t.
- At the end of each holding period, the zero-cost portfolios are closed their positions by selling the winners and buying the losers at the closing price.

$$R_{i,t} = \ln\left(\frac{TRI_{i,t}}{TRI_{i,t-1}}\right)$$

The Evidence of the Residual Momentum in SET

Methodology

The residual return momentum strategy



- Follows the Blitz, Huij et al. (2011)
- The past 36-month rolling window approach → used to estimate residual returns
- The raw return observed over month t-48 to month t-13 is used to run regression against the Fama and French factors to get the residual returns on month t-12.
- The estimation window is then rolled to be the regression of month t-47 to t-12 to get the residuals returns on month t-11. The estimation windows are rolled over by one month to get the residual returns until those of month t-1.
- The residual momentum portfolios are formed at month t using the residual returns over the period of month t-12 to t-1, and then are held for a specified holding period, which is 1, 3, 6 or 12 months.

The Evidence of the Residual Momentum in SET

Methodology

The performance measurement

- Comparing total returns, SD, Sharpe ratios and alphas that derived from the conditional Fama and French factors regression

$$r_{i,t} = \alpha_i + \beta_{1,i} RMRF_t + \beta_{2,i} SMB_t + \beta_{3,i} HML_t + \beta_{4,i} RMRF\_UP_t + \beta_{5,i} SMB\_UP_t + \beta_{6,i} HML\_UP_t + \varepsilon_{i,t}$$

Why use the conditional Fama and French factors regression?

- Grundy and Martin (2001): The condition Fama and French model is used to account for the dynamic factor exposures of momentum strategies.
- The conditional regression allows betas to change through time. These betas represent risk exposure.
- Using only the UP dummy and do not include the DOWN dummy because there is a perfect multi-collinearity between UP factor and DOWN factor.

The Evidence of the Residual Momentum in SET

Empirical Results

The main result of the strategy

	Return	Volatility	Sharpe	P(return>0)(%)	Alpha	RMRF	SMB	HML	RMRF_UP	SMB_UP	HML_UP	RSQ
Panel A. Total return momentum												
1M	10.55%	24.15%	0.4368	59.30%	1.16%	-0.4694	0.0089	-0.0178	0.0000	0.0000	0.0000	0.2321
					(1.6971)	(-4.6704)	(0.0473)	(-0.1134)	(0.0000)	(0.0000)	(0.0000)	
3M	4.71%	13.76%	-0.0328	60.47%	0.90%	-0.5681	-0.0476	-0.1469	1.0020	0.0000	3.5491	0.1582
					(1.1824)	(-3.4032)	(-0.1168)	(-0.5778)	(1.8215)	(0.0000)	(1.1920)	
6M	-0.35%	3.06%	-0.5828	55.81%	1.45%	-0.6569	-0.0851	-0.7012	0.7225	8.1678	0.0000	0.0967
					(1.6356)	(-2.6939)	(-0.1532)	(-1.7159)	(1.1121)	(0.5021)	(0.0000)	
12M	-3.52%	6.04%	-0.5828	48.84%	0.22%	0.4800	-0.6434	2.1130	0.3007	-5.5375	-3.4496	0.1585
					(0.1780)	(0.9914)	(-0.7387)	(2.1516)	(0.3592)	(-0.1712)	(-3.4380)	
Panel B. Residual return momentum												
1M	20.35%	12.82%	1.5870	63.95%	1.58%	-0.0337	-0.0345	-0.0115	0.0000	0.0000	0.0000	0.0070
	(1.1152)	(0.2773)			(3.8521)	(-0.5544)	(-0.3036)	(-0.1211)	(0.0000)	(0.0000)	(0.0000)	
3M	15.66%	8.61%	1.7468	74.42%	1.50%	0.0926	0.0543	-0.0140	0.0408	0.0000	2.9149	0.0500
	(1.9262)	(0.3843)			(3.5118)	(0.9826)	(0.2359)	(-0.0975)	(0.1313)	(0.0000)	(1.7350)	
6M	11.32%	1.87%	1.3022	73.26%	1.30%	0.2642	0.2456	0.0774	-0.0069	-9.7940	0.0000	0.0818
	(3.0365)	(0.3703)			(2.7453)	(2.0232)	(0.8253)	(0.3536)	(-0.0198)	(-1.1243)	(0.0000)	
12M	5.15%	3.95%	1.3022	69.77%	1.35%	0.6043	0.0239	-0.0644	-0.6114	-3.1423	0.3288	0.1209
	(4.4698)	(0.4233)			(2.0190)	(2.2989)	(0.0504)	(-0.1207)	(-1.3454)	(-0.1789)	(0.6036)	

- Raw returns, volatilities and percentage obtaining positive returns of the residual momentum are better than the total return momentum.
- The R-squared value of the residual momentum are lower which indicates that ranking stocks by their residual return is an effective approach to reduce the dynamic exposures of the total return momentum.

The Evidence of the Residual Momentum in SET

Empirical Results

The main result of the strategy

	Return	Volatility	Sharpe	P(return>0)(%)	Alpha	RMRF	SMB	HML	RMRF_UP	SMB_UP	HML_UP	RSQ
Panel A. Total return momentum												
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					(0.1780)	(0.9914)	(-0.7387)	(2.1516)	(0.3592)	(-0.1712)	(-3.4380)	
Panel B. Residual return momentum												
1M	20.35%	12.82%	1.5870	63.95%	1.58%	-0.0337	-0.0345	-0.0115	0.0000	0.0000	0.0000	0.0070
	(1.1152)	(0.2773)			(3.8521)	(-0.5544)	(-0.3036)	(-0.1211)	(0.0000)	(0.0000)	(0.0000)	
3M	15.66%	8.61%	1.7468	74.42%	1.50%	0.0926	0.0543	-0.0140	0.0408	0.0000	2.9149	0.0500
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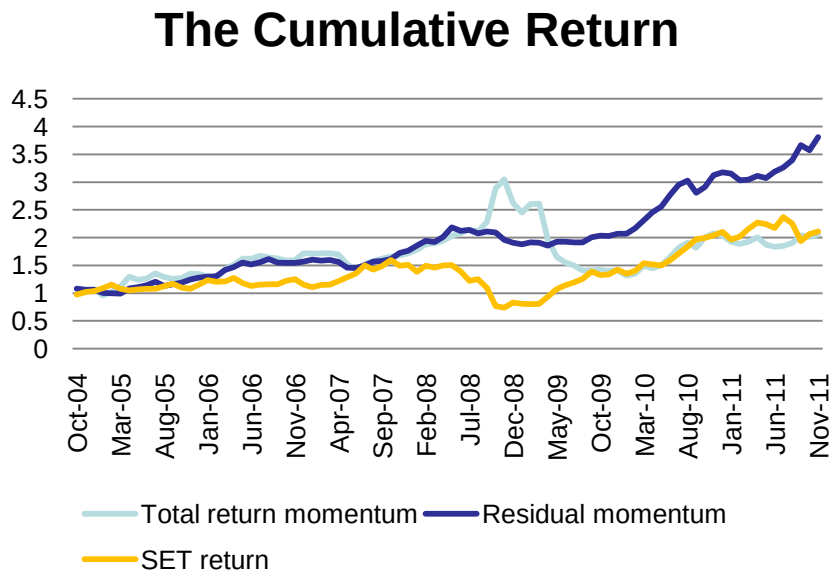
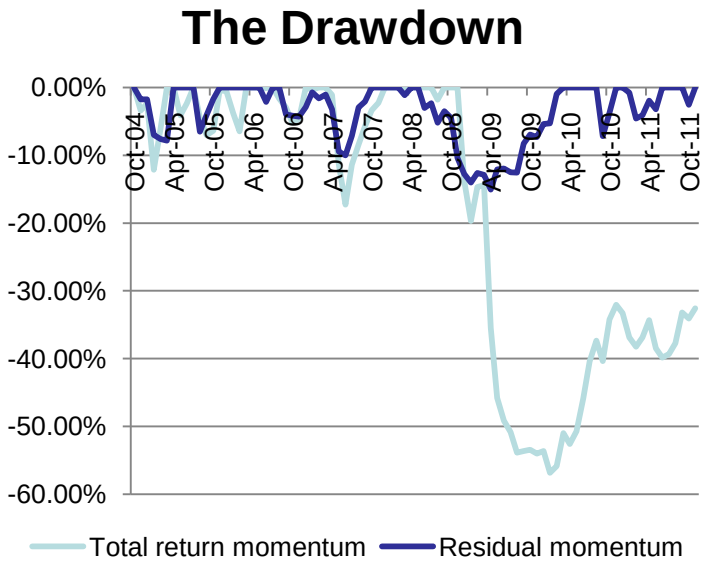
- The Sharpe ratio of the residual momentum are higher than that of the total return momentum which further support the notion of lower exposures on the time-varying risk factors of the residual momentum.
- The results support the gradual-formation-diffusion hypothesis, that firm-specific information diffuses slowly across the market.

The Evidence of the Residual Momentum in SET

Empirical Results

Performance Differences over Time





- The drawdown is used to compare the volatilities of the returns.

$$\text{The drawdown} = \frac{\text{The cumulative return of the strategy at time t}}{\text{The all-time high cumulative return of the strategy up to time t}} - 1$$

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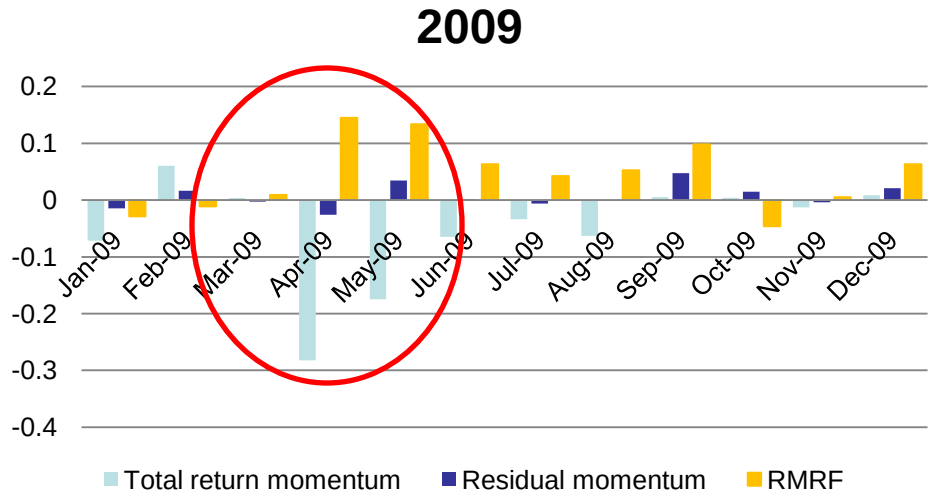
The Evidence of the Residual Momentum in SET

Empirical Results

Performance Differences over Time



- After the market reversal in April 2009, the total return momentum generates larger magnitude of negative returns than the residual momentum in April, May and June 2009.
- This result supports the hypothesis that the outperformance of the residual momentum is prominent when there is the strong market reversal after a severe economic crisis.

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The Evidence of the Residual Momentum in SET

Conclusion

- The residual momentum has higher raw return, lower variability, higher Sharpe ratio.
- The key prominence of the residual momentum is its better performance during economic crisis.
- When there is a market reversal after a severe recession, the residual momentum portfolio has lower loss than the total return momentum portfolio because the residual momentum is considerably neutralized in the time-varying risk exposures.
- The total return momentum tends to invest in high exposure stocks, the residual momentum tends to put less weight in high exposure stocks, which result in lower sensitivity and volatility in the residual momentum returns.

The Evidence of the Residual Momentum in SET

Conclusion

- The study supports the hypothesis that the momentum is not one of the price risk factors.
- The Thai stock market is inefficient under the weak-form hypothesis.
- The study supports the gradual-formation-diffusion hypothesis that the market underreacts to the firm-specific events more than to common events
- To employ the strategy in practice need to consider the transaction costs in such the way that the obtaining return may significantly decrease when taking the transaction costs into account.
- Following the residual momentum strategy in the Thai stock market considerably consumes less risk and earns higher reward-to-risk ratios.


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