



Are Value Premiums Driven by Behavioral Factors?

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Value Investing

- *Security Analysis* by Benjamin Graham and David Dodd in 1934
- Finding price-intrinsic value discrepancies in the market
- Various price-based ratios and future stock returns
 - ◇ Earnings-to-price ratio (Basu, 1977)
 - ◇ Dividend-to-price ratio (Litzenberger and Ramaswamy, 1979)
 - ◇ Sale-to-price ratio (Barbee, Mukherji, and Raines, 1996)
 - ◇ Other asset classes, as documented by Asness, Moskowitz, and Pedersen (2013)
 - ◇ Fama and French (1993, 2015, 2018)
 - ◇ Hou, Xue, and Zhang (2015)

Why Does It Work?

- A risk premium where investors are compensated for taking on systematic risk (Fama and French, 1993)
- Over/underreaction and temporary mispricing (Lakonishok, Schleifer, and Vishny, 1994; Daniel, Hirshleifer, and Subrahmanyam, 1997)
- Markets are inefficient (Basu, 1977; Rosenberg, Reid, and Landstein, 1985)

Important Contributions

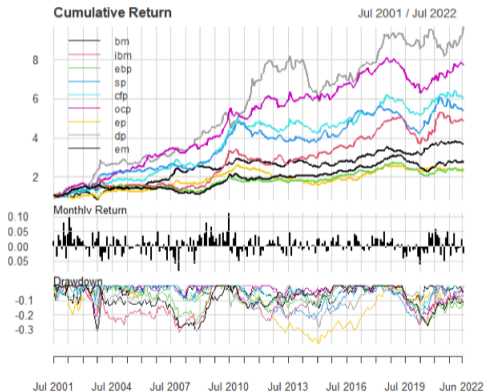
- ① Provide evidence on 9 alternative definitions of value premiums in Thailand
 - Fama-French six-factor model and the q-factor model do not fully price the 9 versions of the value premium
- ② Is value premium driven by behavioral factors?
 - Macro factors
 - Factor-mimicking portfolios

Table 1: Value Signal Descriptions

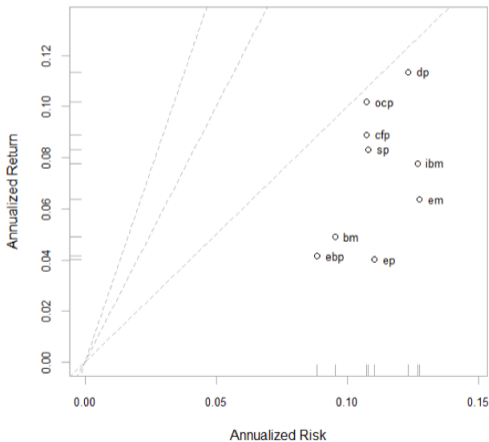
Variable	Related Literature
Book-to-Market Ratio (BM)	Graham and Dodd (1934) and Fama and French (1993)
Intangible Capital-Adjusted BM (iBM)	Peters and Taylor (2017)
Enterprise Book-to-Price (EBP)	Penman, Richardson, and Tuna (2007)
Sales-to-Price Ratio (SP)	Barbee, Mukherji, and Raines (1996)
Cash Flow-to-Price Ratio (CFP)	Lakonishok, Shleifer, and Vishny (1994)
Operating Cash Flow-to-Price (OCP)	Desai, Rajgopal, and Venkatachalam (2004)
Earnings-to-Price Ratio (EP)	Graham and Dodd (1934) and Basu (1977, 1983)
Dividend-to-Price Ratio (DP)	Graham and Dodd (1934) and Litzenberger and Ramaswamy (1979)
Enterprise Multiple (EM)	Loughran and Wellman (2011)

Performance

Value Factors Since 2001



Annualized Value Factors Risk-Return Trade-Off Since 2001



Risk Based Explanation

- Fama and French (2018) model
 - ◇ Market
 - ◇ SMB
 - ◇ HML
 - ◇ RMW
 - ◇ CMA
- Hou, Xue, and Zhang (2015) q-factor model
 - ◇ Market
 - ◇ ME
 - ◇ ROE
 - ◇ IA

Behavioral Explanation

Table 2: Behavioral Variables

Variable	Representation	Related Literature
Volatility Index (VIX)	Investor sentiment	Delong et al. (1990), Shleifer and Vishny (1997), Baker and Wurgler (2007)
Google Search Value Index (GSVI)	Optimism/Pessimism	Griffith, Najand, and Shen (2020), Pan (2020), Pornpikul and Nettayanun (2021)
Trading Volume (TVOL)	Sentiment	Baker and Wurgler (2007)
Operating Accruals (OA)	Overconfidence	Sloan (1996)
Net Operating Assets (NOA)	Over-optimism	Hirshleifer et al. (2004)
Return on Assets (ROA)	Underreaction	Wang and Yu (2013)
Asset Growth (AG)	Overreaction to past growth	Cooper, Gulen, and Schill (2008)
Momentum (R11-1)	Mispricing	Jegadeesh and Titman (1993)

Data

- Refinitiv Datastream to retrieve prices, returns and financial statements
- All stocks that listed in Thailand, active and inactive
- SET + MAI
- July 2001 - July 2022
- Follow Fama and French (2018) and Hou et al. (2015) for factor construction
- Value portfolios are double-sorted 2×3 , value-weighted portfolios based on size and value dimension
- Behavioral factors are mean adjusted

Factor Contribution

$$v_t = \alpha + \sum_k \beta_k f_{k,t} + \beta_b b_t + \epsilon_t$$

v_t : The time series of a value factor

$f_{k,t}$: The times series of factor from an asset pricing model

b_t : The time series of a behavioral factor

Behavioral Factors Explaining Value?: Incremental $Adj - R^2$ for **FF6**

	iBM	DP	EP	CFP	EM	SP	OCP	EBP
Baseline	66.30%	8.28%	50.50%	31.70%	47.40%	18.80%	35.90%	74.20%
VIX	1.00%	-4.82%	1.20%	1.40%	-3.10%	0.10%	3.40%	2.10%
FEAR en	0.20%	4.42%	-7.60%	0.60%	-21.60%	5.60%	-3.50%	6.60%
FEAR th	0.60%	4.42%	-6.90%	-2.90%	-22.80%	6.20%	-2.80%	6.50%
TVOL	0.10%	6.52%	1.50%	6.50%	4.10%	0.70%	5.90%	0.00%
OA	-0.10%	-0.25%	0.80%	1.00%	4.60%	0.70%	11.80%	-0.10%
NOA	0.00%	0.48%	1.10%	2.50%	0.00%	-0.10%	3.30%	0.10%
ROA	-0.10%	-0.15%	7.20%	9.50%	6.50%	-0.20%	-0.20%	-0.10%

Behavioral Factors Explaining Value?: Incremental $Adj - R^2$ for **q4**

	BM	IBM	DP	EP	CFP	EM	SP	OCP	EBP
Baseline	19.40%	13.50%	5.81%	22.30%	8.78%	24.20%	6.59%	19.00%	6.57%
VIX	-3.90%	-2.60%	-1.88%	-5.20%	-1.44%	-5.70%	-0.36%	3.90%	0.27%
FEAR en	0.60%	1.60%	5.49%	-13.29%	-0.95%	-12.00%	6.31%	-0.40%	10.63%
FEAR th	-0.30%	0.50%	5.49%	-14.15%	-7.48%	-14.68%	6.61%	-0.60%	8.73%
TVOL	0.00%	0.70%	6.29%	1.20%	4.52%	5.40%	0.01%	6.40%	0.68%
OA	-0.30%	-0.30%	-0.19%	0.60%	1.22%	5.70%	0.75%	13.20%	-0.38%
NOA	1.40%	0.40%	1.02%	0.90%	2.82%	0.20%	0.62%	4.90%	3.11%
ROA	1.50%	0.90%	2.56%	9.80%	8.62%	9.80%	1.14%	0.60%	1.06%
AG	-0.30%	-0.30%	4.79%	3.30%	0.72%	0.80%	-0.17%	1.70%	0.04%
R1-11	-0.20%	0.00%	-0.30%	0.30%	2.22%	4.40%	0.58%	2.30%	-0.36%

Behavioral Factors Explaining Value?: α 's for FF6

	iBM	DP	EP	CFP	EM	SP	OCP	EBP
Baseline	0.002*	0.007***	0.005***	0.005***	0.005***	0.002	0.005***	0.001
VIX	0.002	0.007**	0.004***	0.004**	0.004**	0.002	0.004**	0
FEAR en	0.002	0.008***	0.003*	0.004**	0.004*	0.002	0.005***	0
FEAR th	0.002	0.008***	0.003*	0.004**	0.003*	0.002	0.005***	0
TVOL	0.003*	0.006**	0.004***	0.004***	0.005**	0.002	0.004***	0.001
OA	0.002*	0.007**	0.005***	0.004**	0.004*	0.002	0.003**	0.001
NOA	0.002*	0.007***	0.005***	0.005***	0.005***	0.002	0.005***	0.001
ROA	0.003*	0.007***	0.003**	0.003**	0.004*	0.003	0.005***	0.001

Behavioral Factors Explaining Value?: α 's for q4

	BM	iBM	DP	EP	CFP	EM	SP	OCP	EBP
Baseline	0.006***	0.008***	0.007***	0.004**	0.007***	0.006***	0.005***	0.007***	0.005***
VIX	0.005***	0.007***	0.007***	0.004**	0.006***	0.005**	0.005**	0.006***	0.005**
FEAR en	0.006***	0.008***	0.007***	0.003	0.006***	0.004**	0.005**	0.005***	0.005***
FEAR th	0.006***	0.008***	0.007***	0.002	0.005***	0.003*	0.004**	0.005***	0.005**
TVOL	0.006***	0.008***	0.006**	0.004**	0.007***	0.006***	0.005***	0.007***	0.005***
OA	0.006***	0.008***	0.006**	0.005**	0.006***	0.004**	0.005**	0.005***	0.005***
NOA	0.006***	0.008***	0.007***	0.004**	0.007***	0.006***	0.005***	0.007***	0.005***
ROA	0.005***	0.008***	0.006***	0.004**	0.007***	0.006***	0.005***	0.007***	0.005***
AG	0.005***	0.008***	0.005**	0.005***	0.007***	0.007***	0.005***	0.006***	0.006***
R1-11	0.006***	0.008***	0.006**	0.003	0.005***	0.003	0.004**	0.005***	0.005***

Behavioral Factors Explaining Value?: β 's t-statistics for **FF6**

	iBM	DP	EP	CFP	EM	SP	OCP	EBP
VIX	-0.37	-1.56	-0.64	-0.27	0.68	0.09	-1.78	0.71
FEAR en	-0.86	-0.16	-0.93	-2.77	-2.41	-1.09	-0.71	-1.4
FEAR th	3.35	-0.47	-3.41	0.42	1.59	-2.23	2.51	0.85
TVOL	-1.14	3.55	2.94	4.63	4.38	1.8	3.84	-1.09
OA	0.5	0.59	-1.86	2.03	3.95	1.68	6.35	0.32
NOA	0.78	1.08	-1.94	-2.27	0.67	-0.55	3.09	-1.44
ROA	-0.22	-0.53	5.33	4.81	3.8	-0.52	-0.49	-0.48

Behavioral Factors Explaining Value?: β 's t-statistics for q4

	BM	iBM	DP	EP	CFP	EM	SP	OCP	EBP
VIX	-0.52	-0.72	-1.41	-1.02	-0.94	-0.22	-0.27	-1.69	-0.05
FEAR en	-2.07	-1.92	-0.52	-2.19	-3.62	-3.58	-1.76	-1.6	-2.14
FEAR th	-0.57	0.69	-0.75	-1.65	0.18	1.48	-2.36	1.34	-0.16
TVOL	-0.75	-1.49	3.18	1.6	3.33	3.56	1.06	3.19	-1.4
OA	-0.34	-0.13	0.61	-1.37	1.73	3.26	1.52	4.85	-0.03
NOA	-1.84	-1.22	1.21	-1.62	-2.07	0.96	-1.13	2.67	-2.62
ROA	-2.08	-1.71	-2.08	4.77	3.93	3.61	-1.11	-1.07	-1.66
AG	0.4	-0.2	2.48	-2.58	-1.12	-0.98	0.64	1.5	-1.01
R1-11	-0.57	-0.92	0.26	1.17	2.07	2.73	0.98	1.46	-0.23

Conclusions

- Statistical approach to value investing works
- A mystery to researchers around the world as to what forces are behind it
 - ◇ Market inefficiencies (e.g. Basu, 1977; Rosenberg, Reid, and Landstein, 1985; Lakonishok, Schleifer, and Vishny, 1994)
 - ◇ Risk that warrants higher returns expectations (e.g. Fama and French, 1993)

Conclusions

- “Price is what you pay, value is what you get” – Warren E. Buffett
- “Margin of safety” – *The Intelligent Investor*
- “...the 2013 Nobel Prize committee split the prize between the two camps [of rational, risk-based, efficient markets versus behavioral, irrational, and inefficient markets]” – Asness et al. (2015)
- Nine value premiums are significant and not explainable by fundamental factors in Thailand
- VIX and GSVI have limited roles in explaining value premiums
- Factor-mimicking portfolios capture several aspects of investor behavioral biases also cannot explain the value premiums



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Thank You!