Resurrecting the Value Factor from its Redundancy

Manuel Ammann[1] Tobias Hemauer[1] Simon Straumann[2]
[1]University of St.Gallen
[2]WHU - Otto Beisheim School of Management

Abstract

- The value factor has **no incremental pricing power** in the Fama-French five-factor model. Its pricing power is primarily **subsumed by the investment factor**.
- We show that the relationship between the two factors arises because their sorting variables are driven by **cash flow and discount rate shocks**.
- **Only discount rate shock-driven stocks contain pricing information**. They generate value and investment premia more than 50% higher than the usual premia.
- Value and investment factors constructed using only discount rate shock-driven stocks **cannot subsume each other** and **improve the five-factor model's pricing power**.
- **Multifactor models should include a value factor** constructed from stocks for which book-to-market is a good expected return indicator.

Motivation

- Value factor is a **well-established risk factor** (Fama and French, 1993, 1996, 2015)
  - Main source of the Fama-French three-factor model's pricing power.
  - Fama and French (2015) provide a **theoretical motivation** for the value factor.
- Recently published papers put relevance of value factor in the presence of the investment factor into question:
  - Fama and French (2015): **value factor is redundant** in the five-factor model ($\alpha \approx 0$); its pricing power is primarily subsumed by the investment factor ($\rho \approx 0.7$).
  - Hou, Xue, and Zhang (2015): simple economic model that can motivate the profitability and investment factors, but **not the value factor**.
- Goal: Resolving the recent controversy about the value factor.
  - Why are the value and investment factors so closely related?
  - **Does a value factor capture pricing information beyond an investment factor?**

Theoretical Framework

- Thesis: book-to-market and investment driven by **cash flow and discount rate shocks**.
  - Investors value firms based on the **dividend discount model**.
  - Firm managers determine investments based on the **NPV rule**.
- **Negative cash flow shock**: Expected dividends and cash flows from projects decrease.

$$M_0 = \sum_{t=1}^{\infty} \frac{E_0(D_t)}{(1+r)^t} \qquad I_0 \leq \sum_{t=1}^{T} \frac{E_0(CF_t)}{(1+r)^t}$$

$$M_0 \downarrow \Rightarrow \frac{B_0}{M_0} \uparrow \qquad I_0 \downarrow$$

- **Positive discount rate shock**: expected dividends and cash flows from projects discounted at higher rate.

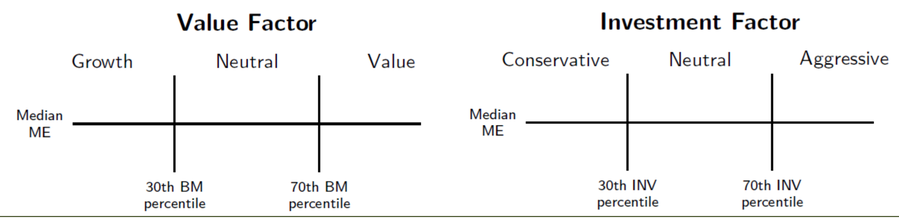
$$M_0 = \sum_{t=1}^{\infty} \frac{E_0(D_t)}{(1+r)^t} \qquad I_0 \leq \sum_{t=1}^{T} \frac{E_0(CF_t)}{(1+r)^t}$$

$$M_0 \downarrow \Rightarrow \frac{B_0}{M_0} \uparrow \qquad I_0 \downarrow$$

- Prediction: **Only stocks whose book-to-market and investment is driven by discount rate shocks should contain the factors' pricing information.**

Data

- Sample period: July 1963 - December 2019
- All common US stocks traded on NYSE, AMEX, and NASDAQ.
- Construction of value (HML) and investment (CMA) factor portfolios following Fama and French (2015):



Methodology

- **Market equity- vs. book equity-driven**: Decomposition of change in book-to-market:

$$log(BM_{i,t}/BM_{i,t-1}) = log(BE_{i,t}/BE_{i,t-1}) + (-log(ME_{i,t}/ME_{i,t-1}))$$

- **Cash flow shock proxy**: Profitability shocks following Hou and van Dijk (2019):

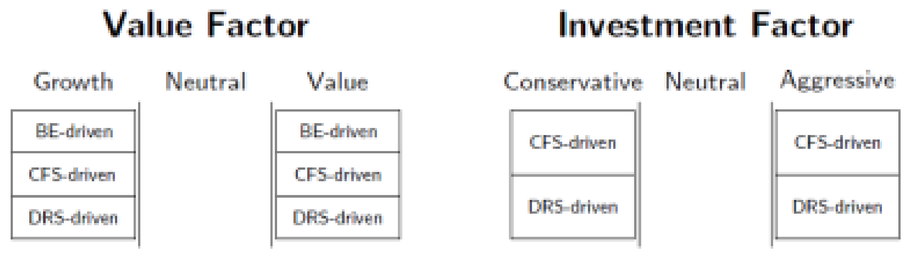
$$PS_{i,t} = \frac{E_{i,t}}{A_{i,t-1}} - E_{t-1}\left(\frac{E_{i,t}}{A_{i,t-1}}\right)$$

- **Discount rate shock proxy**: Residual return from regression of firms' contemporaneous (demeaned) returns on (demeaned) profitability shocks:

$$\overline{R}_{i,t} = c_{1,t}\overline{PS}_{i,t} + RR_{i,t}$$

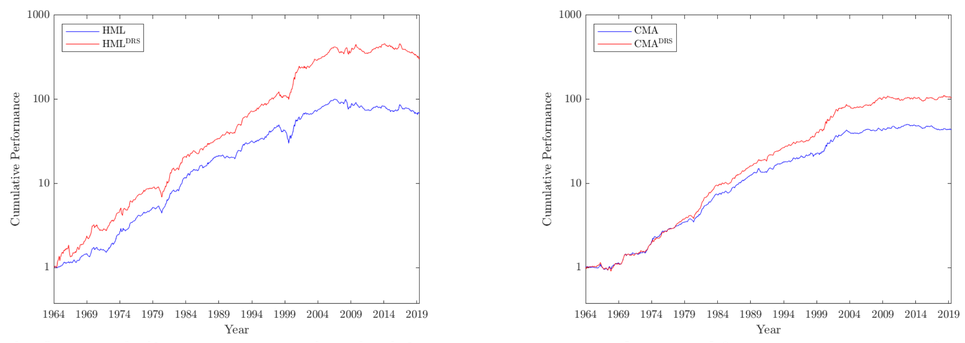
Decomposition of Factor Portfolios

- Splitting factor portfolios into book equity-driven, cash flow shock-driven, and discount rate shock-driven parts:



Discount Rate Shock-Driven Factors

	HML	HML^{CFS}	HML^{DRS}	CMA	CMA^{CFS}	CMA^{DRS}
Mean	0.30***	0.17	0.54***	0.21***	0.07	0.34***
	(2.79)	(1.45)	(4.14)	(2.93)	(0.90)	(4.28)



- Only factors' discount rate shock-driven parts **earn value and investment premia**.
- Discount rate shock-driven value and investment factors **outperform standard factors**.

Spanning Regressions

Dependent Factor: Investment

	INV	VAL	μ	σ	α	β^{MP}	β^{SMB}	β^{RMW}	β^{VAL}	R^2
(1)	standard	standard	0.21***	1.82	0.20***	−0.11***	−0.03*	−0.18***	0.41***	0.525
			(2.93)		(3.92)	(−9.11)	(−1.79)	(−7.76)	(22.25)	
(2)	standard	DRS	0.21***	1.82	0.16***	−0.12***	−0.05***	−0.14***	0.29***	0.442
			(2.93)		(2.90)	(−9.05)	(−2.60)	(−5.39)	(17.93)	
(3)	DRS	DRS	0.34***	2.07	0.20***	−0.09***	0.05***	−0.01	0.33***	0.368
			(4.28)		(3.01)	(−5.50)	(2.07)	(−0.46)	(17.17)	

Dependent Factor: Value

	INV	VAL	μ	σ	α	β^{MP}	β^{SMB}	β^{RMW}	β^{INV}	R^2
(1)	standard	standard	0.30***	2.75	0.00	0.03	0.04	0.24***	1.05***	0.465
			(2.79)		(−0.04)	(1.32)	(1.34)	(6.22)	(22.25)	
(2)	standard	DRS	0.54***	3.38	0.25**	0.01	0.11***	0.13**	1.14***	0.360
			(4.14)		(2.24)	(0.27)	(2.81)	(2.49)	(17.93)	
(3)	DRS	DRS	0.54***	3.38	0.25**	−0.05*	0.01	−0.02	0.93***	0.342
			(4.14)		(2.28)	(−1.87)	(0.19)	(−0.30)	(17.17)	

- A value factor that uses only stocks for which book-to-market is a good indicator of expected returns is **no longer redundant**.

Pricing Information

Panel A: Fama-French (2015) Five-Factor Model

	α	β^{MP}	β^{SMB}	β^{RMW}	β^{CMA}	β^{HML}	R^2
HML^{DRS}	0.25***	−0.01	0.05*	−0.05	0.31***	0.78***	0.589
	(2.83)	(−0.61)	(1.77)	(−1.19)	(4.65)	(19.21)	
CMA^{DRS}	0.10*	0.01	0.10***	0.12***	0.95***	−0.03	0.622
	(1.93)	(0.66)	(5.61)	(4.66)	(24.22)	(−1.39)	

Panel B: Adjusted Five-Factor Model

	α	β^{MP}	β^{SMB}	β^{RMW}	$\beta^{CMA^{DRS}}$	$\beta^{HML^{DRS}}$	R^2
HML	−0.04	−0.03*	−0.04	0.11***	0.10**	0.56***	0.575
	(−0.56)	(−1.88)	(−1.61)	(3.21)	(2.35)	(22.07)	
CMA	0.05	−0.07***	−0.08***	−0.13***	0.54***	0.11***	0.681
	(1.22)	(−7.05)	(−5.22)	(−6.73)	(22.32)	(7.34)	

- DRS-driven value and investment factors can **price Fama-French value and investment factors**, but not vice versa.
- DRS-driven value and investment factors capture **more pricing information**.

Conclusion

- Value and investment premia can be enhanced by using only stocks whose **book-to-market and investment are predictably good indicators of expected returns**.
- A value factor that uses only stocks that reflect pricing information captures **incremental pricing information** and is **no longer redundant**.
- **Multifactor models should include a value factor** that captures pricing information more accurately.
- Value and investment factors built from stocks for which book-to-market and investment are good indicators of expected returns **improve pricing performance**.

Contact

Tobias Hemauer
University of St.Gallen
tobias.hemauer@unisg.ch

References

- Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, Journal of Financial Economics 33, 3–56.
- Fama, Eugene F., and Kenneth R. French, 1996, Multifactor explanations of asset pricing anomalies, Journal of Finance 51, 55–84.
- Fama, Eugene F., and Kenneth R. French, 2015, A five-factor asset pricing model, Journal of Financial Economics 116, 1–22.
- Hou, Kewei, and Mathijs A. van Dijk, 2019, Resurrecting the size effect: Firm size, profitability shocks, and expected stock returns, Review of Financial Studies 32, 2850–2889.
- Hou, Kewei, Chen Xue, and Lu Zhang, 2015, Digesting anomalies: An investment approach, Review of Financial Studies 28, 650–705.