Noise Trading and Asset Pricing Factors

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Contribution

This paper is part of a new synthesis of ideas that can be summarized in the phrase "characteristics are covariances"

1960s CAPM - Covariance matters

1992 Fama and French - other factors matter...vague risk story

1997 Daniel and Titman, JF "Evidence on the Characteristics of Cross Sectional Variation in Stock Returns"

.... in the meantime we find hundreds of factors/characteristics....

2013 Lin, and Zhang JME "The Investment Manifesto"

2018 Kozak, Nagel, and Santosh JF "Interpreting factor models"

2019 Kelly, Pruitt, and Su JFE "Characteristics are covariances"

Contribution

- Start with the "factor zoo" - 70 anomalies/factors/characteristic sorted portfolios
- Ask if their risk and returns can be explained using a novel measure of "noise trader risk" constructed using mutual fund flows

Result: connects behavioral finance "investors make mistakes" with traditional finance "investors are compensated for bearing risk"

- De Long, Shleifer, Summers, and Waldman (1990,JPE) (DSSW) provide they key insight - noise traders can create their own risk

Summary - Mapped to DSSW

DSSW - "The representative noise trader young in period t misperceives the expected price of the risky asset by an independent and identically distributed normal random variable $\rho_t \sim \mathcal{N}(\rho^*, \sigma_\rho^2)$"

$$p_t = 1 + \frac{\mu(\rho_t - \rho^*)}{1+r} + \frac{\mu\rho^*}{r} - \frac{2\gamma\mu^2\sigma_\rho^2}{r(1+r)^2}$$

- as p_t approaches point mass at zero the price goes to fundamental value
- price changes due to variantion in noise traders misperception
- the third term is a price pressure effect from the average misperception (μ is the measure of noise traders)
- The final term - sophisticated investors demand compensation for price uncertainty from noise trader demand

Summary - Mapped to DSSW

Authors need to empirically connect noise trader risk to returns on characteristic sorted anomaly portfolios. To do this they need to do three things:

1. Create a measure of noise trader demand (FIT) at a factor level (FITOF) and validate it

$$FITOF_t^{\pi} = \sum_{j \in N_L^{\pi}} \mu_{j,t-1}^{\pi} FIT(j,t) - \sum_{j \in N_S^{\pi}} \mu_{j,t-1}^{\pi} FIT(j,t)$$

2. Calculate covariance matrix of flows to measure factor fragility

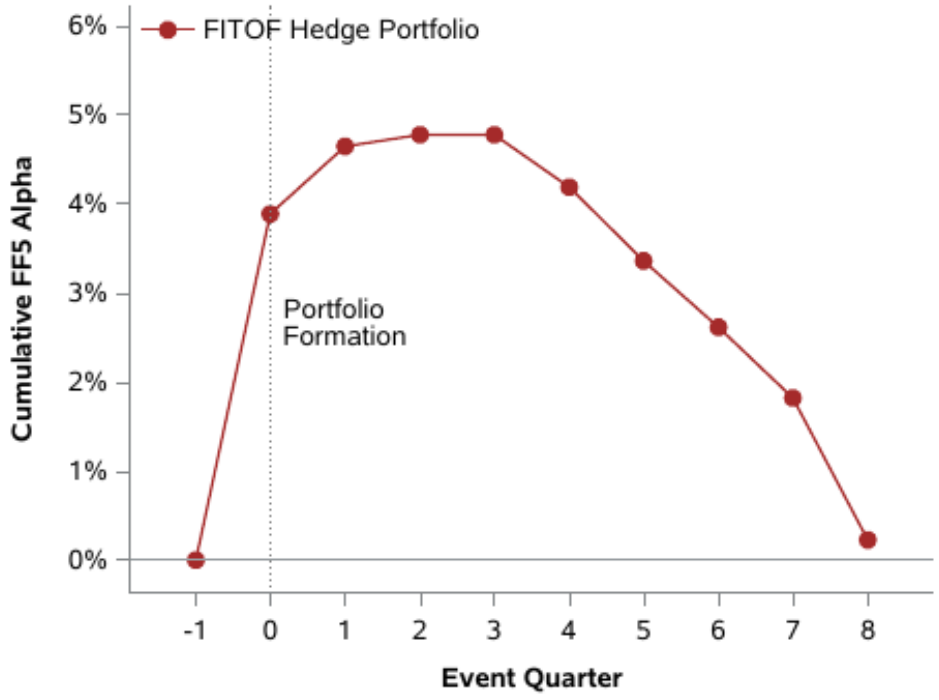
$$G_t^{\pi} = W_t^{\pi'} \mathbb{E}_t[\Omega_{t+1}] W_t^{\pi}$$

   $\mathbb{E}_t[\Omega_{t+1}]$ is the conditional variance- covariance matrix of mutual fund flows in quarter t + 1 and $W_t^{\pi} = w_{1,t}^{\pi}, ...w_{K,t}^{\pi}$ is the vector of mutual fund weights in factor π
   a fragile factor has many funds with correlated flows invested in the factor

3. Show that it predicts factor covariance and returns

Comment # 1: Are flows uninformed or misinformed?

$$FITOF_t^{\pi} = \sum_{j \in N_L^{\pi}} \mu_{j,t-1}^{\pi} FIT(j,t) - \sum_{j \in N_S^{\pi}} \mu_{j,t-1}^{\pi} FIT(j,t)$$



Comment # 1: Are flows uninformed or misinformed?

Going from $D \rightarrow B$ the story changes from $\rho^* \approx 0$ traders to $\rho^* > 0$ Baker type sentiment traders

Portfolio	Qtr 0	Qtr 1-4	Qtr 5-8	Qtr 9-12
Panel B: Monthly CAPM Alpha				
Low	−0.10	0.55***	0.63***	0.42***
	(−0.70)	(4.12)	(4.87)	(4.79)
Mid	0.35***	0.34***	0.35***	0.35***
	(6.65)	(6.49)	(6.30)	(5.71)
High	0.85***	0.23***	0.13**	0.33***
	(8.53)		(2.00)	(3.73)
H−L	0.95***	−0.32*	−0.50***	0.08
	(4.51)	(−1.90)	(−3.04)	(0.66)
Panel D: Monthly FF5 Alpha				
Low	−0.42***	0.20***	0.36***	0.23***
	(−4.43)	(2.83)	(3.38)	(2.68)
Mid	0.18***	0.18***	0.18***	0.18***
	(3.16)	(4.18)	(4.35)	(3.42)
High	0.82***	0.19***	0.03	0.12*
	(6.55)		(0.51)	(1.75)
H−L	1.25***	−0.01	−0.33**	−0.12
	(5.93)	(−0.05)	(−2.25)	(−0.89)

Comment # 1: Are flows uninformed or misinformed?

Panel C: Monthly FFC4 Alpha				
Low	−0.19*	0.36***	0.39***	0.26***
	(−1.72)	(4.98)	(4.13)	(2.85)
Mid	0.21***	0.21***	0.22***	0.22***
	(4.54)	(5.30)	(5.07)	(4.78)
High	0.65***	0.10	0.05	0.18***
	(5.66)	(1.57)	(0.87)	(3.26)
H−L	0.84***	−0.26**	−0.33**	−0.08
	(3.99)	(−2.40)	(−2.48)	(−0.65)

Panel D: Monthly FF5 Alpha				
Low	−0.42***	0.20***	0.36***	0.23***
	(−4.43)	(2.83)	(3.38)	(2.68)
Mid	0.18***	0.18***	0.18***	0.18***
	(3.16)	(4.18)	(4.35)	(3.42)
High	0.82***	0.19***	0.03	0.12*
	(6.55)	(2.59)	(0.51)	(1.75)
H−L	1.25***	−0.01	−0.33**	−0.12
	(5.93)	(−0.05)	(−2.25)	(−0.89)

Going from $C \rightarrow D$ we drop Momentum and add the Investment (CMA) and profitability (RMW) factors suggesting the year one reversal is absorbed by these factors...

Comment # 1: Are flows uninformed or misinformed?

- Since the paper is about explaining factor returns - not showing a new factor - you don't need to focus on FF5 alphas, if we only had those 4 (non market) factors, and your story was 100% true, the FF5 alphas would always be zero
- The graph suggests a world where we have $\rho_t \sim \mathcal{N}(0, \sigma_\rho^2)$ Table A.2 suggests that high FITOF portfolios are overvalued, this is consistent with a world of $\rho^* > 0$ and allows you to connect FITOF to measures of investor misperception like earnings mistakes. This would be a convincing validation of your measure!

Comment # 2: Fragility and Volatility

Table 2 Fama MacBeth regresions of Fragility - covariance across mutual fund flows to factor - on factor return volatility

Panel B: Predicting factor return volatility				
DepVar: σ_{t+1}	(1)	(2)	(3)	(4)
	Full Sample		*Excluding Crisis Periods*	
$\sqrt{G_t}$	0.35^{***}	0.15^{***}	0.48^{***}	0.21^{***}
	(8.81)	(5.72)	(11.52)	(6.79)
σ_t		0.63^{***}		0.62^{***}
		(25.25)		(25.92)
No. Obs.	10,080	10,080	8,960	8,960
Adj. R^2	0.08	0.41	0.08	0.39

- this validates the relation between fragile flows and volatile returns

Comment # 2: Fragility and Volatility

Table 4 Predictive time-series regression of the equal-weighted average quarterly return of the 70 factors in quarter t + 1 on the fragility of the equal-weighted portfolio of the 70 factors in quarter t

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Avg Co-Fragility	0.54***				0.50***	0.40***	0.37***	0.38**
	(3.14)				(3.21)	(2.65)	(2.89)	(2.47)
Avg Covariance		0.32*			0.23			−0.07
		(1.83)			(1.60)			(−0.34)
BW Sentiment			0.70***			0.61***		0.27
			(3.60)			(2.95)		(0.88)
Avg Value Spread				0.74***			0.64***	0.42
				(3.02)			(2.82)	(1.02)
Avg Factor Ret								0.13
								(0.60)
No. Obs.	144	144	144	144	144	144	144	144
Adj. R^2	0.07	0.02	0.11	0.13	0.08	0.15	0.16	0.17

Comment # 2: Fragility and Volatility

- Table 2 shows fragility predicts variance of factor returns and that some of the factor fragility effect is coming from factor variance
- Table 4 shows that average fragility predicts average factor returns but does not directly control for factor variance (average covariance only contains off diagonal elements)
- It would be nice to understand more about the relationship between fragility and volatility...perhaps noise traders flows are particularly sensitive to uncertainty in some stocks

Comment # 3: How do investors anticipate these noise trader risk changes?

Table 8 suggests hedge funds care about fragility:

	(1)	(2)	(3)	(4)
	Low HF Trade		High HF Trade	
Aggregate Fragility	0.10	0.03	0.57***	0.43**
	(0.49)	(0.17)	(2.76)	(2.09)
Avg Covariance		0.06		0.15
		(0.47)		(0.39)
BW Sentiment		0.39**		0.12
		(2.23)		(0.40)
Avg Value Spread		0.30*		0.33
		(1.73)		(0.74)
Avg Factor Ret		0.03		0.22
		(0.19)		(1.03)
Mkt Volatility		−0.23		−0.44**
		(−1.46)		(−2.19)
No. Obs.	144	144	144	144
Adj. R^2	0.00	0.09	0.07	0.15

While Table 5 which shows it's hard to predict:

$$\mathbb{E}[\text{Aggregate Fragility}_{t+1}] = 0.46 + 0.03 \times \mathbb{E}[\text{Aggregate Fragility}_t]$$

Summary

- Key idea- fragility (and co-fragility) of noise-trader flows explains future factor returns - novel and well empirically supported.
- The ability to time factors is extremely impressive - Haddad, Kozak, and Santosh (RFS,2020) predict market neutral equity factors with their own BM ratio - this paper shows that we can use a non-price based measure to predict factor returns.
- Particularly relevant today - see BTC, GME, AMC - where many traders are certain that fundamental values are far below the market price, but unwilling to trade against it.
- Raises lots of interesting questions - what preference or information variables explain this noise trader demand? (common media consumption, biases..).