

# Undergraduate Student Investment Management Fund

Fall 2016 Presentation

**Fund  
Managers**



Gregory Nowicki



Stephen McAleer

**Fund  
Analysts**



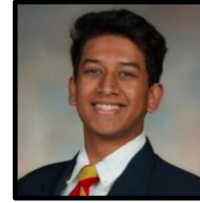
Charles Goode



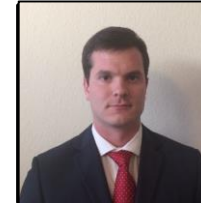
Gregory Goulder



Ryan Hebel



Sanketh Macha



Caleb Boehnlein



Michael Muscheid



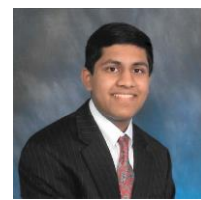
Alex Glenn



Hamza Amjad



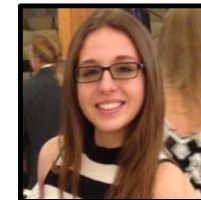
Ernest Dela Cruz



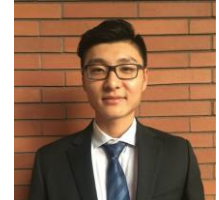
Daniel Martin



Madeline Osadjan

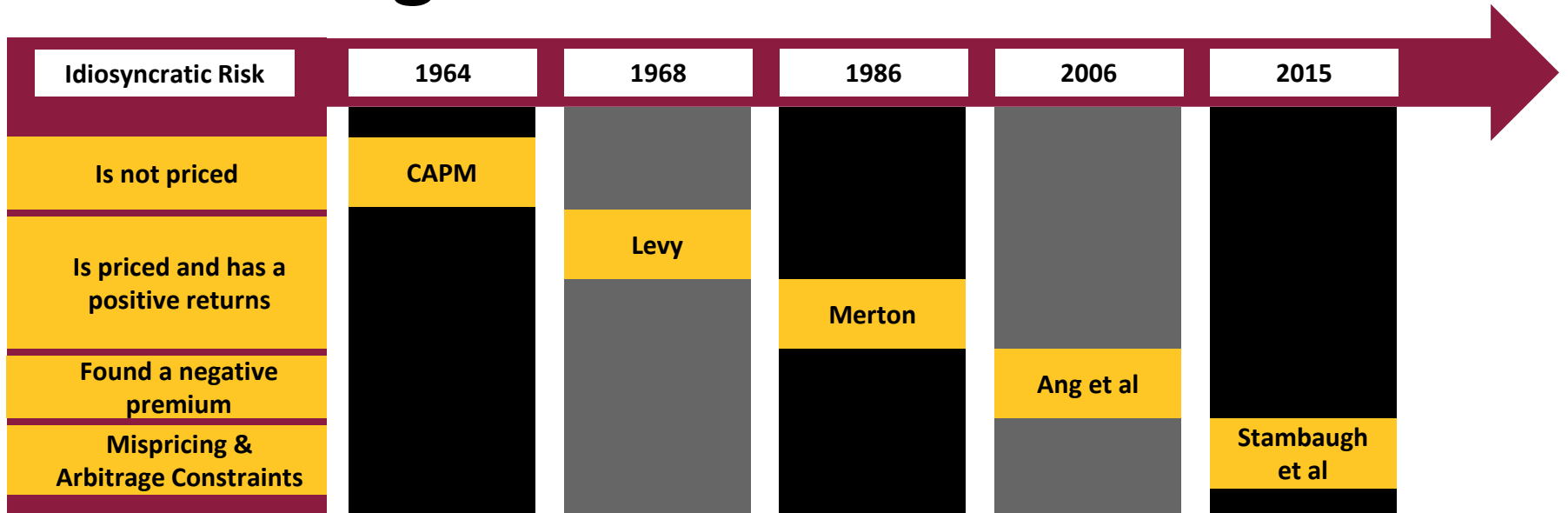


Paige Weisman



Junci Zhao

# IVOL Background



# Mispricing Anomalies

*Arbitrage Asymmetry and the Idiosyncratic Volatility Puzzle*  
Stambaugh, Yu, and Yuan (2015)

Financial  
Distress

O-Score  
Probability

Composite  
Equity Issues

Net Operating  
Assets

Return on  
Assets

Investment-to-  
Assets

Profitability

Accruals

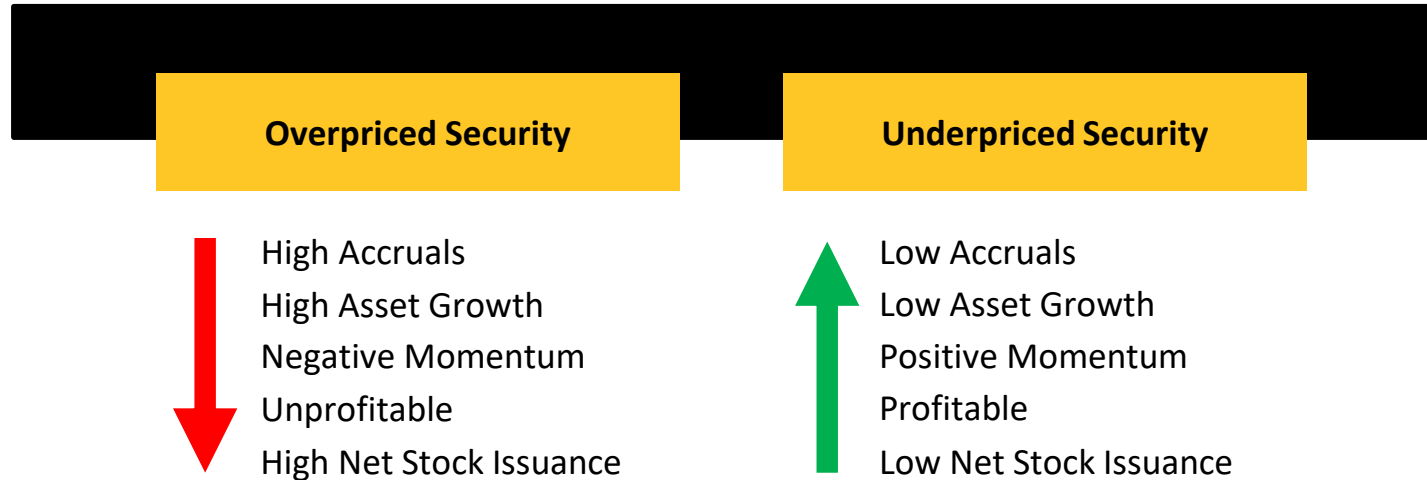
Net Stock  
Issues

Momentum

Asset Growth

# Mispricing

*Arbitrage Asymmetry and the Idiosyncratic Volatility Puzzle*  
Stambaugh, Yu, and Yuan (2015)



# Arbitrage Constraints

- Securities with higher IVOL have higher constraints to arbitrage
- Mispricing not completely eliminated by arbitrage

Margin Calls Closing  
Short Positions

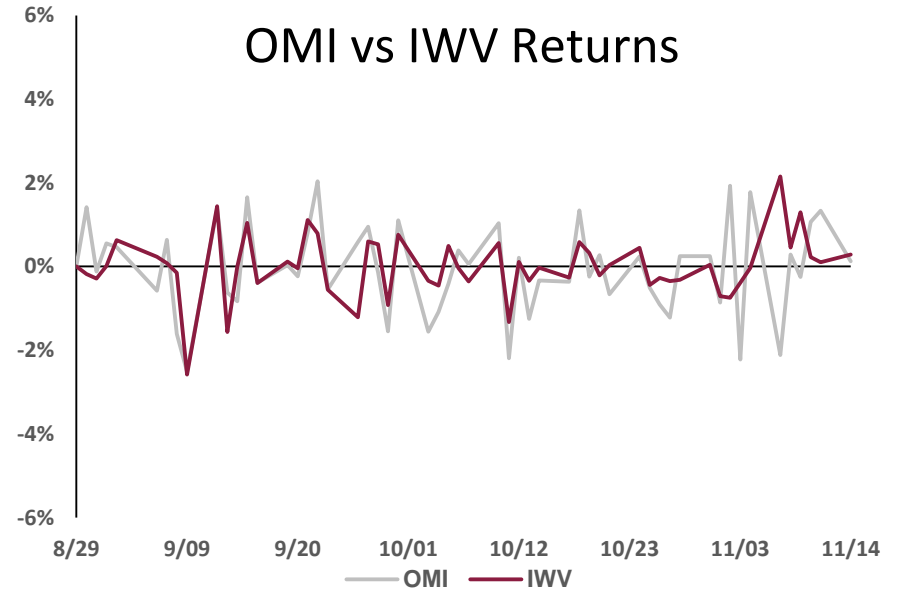
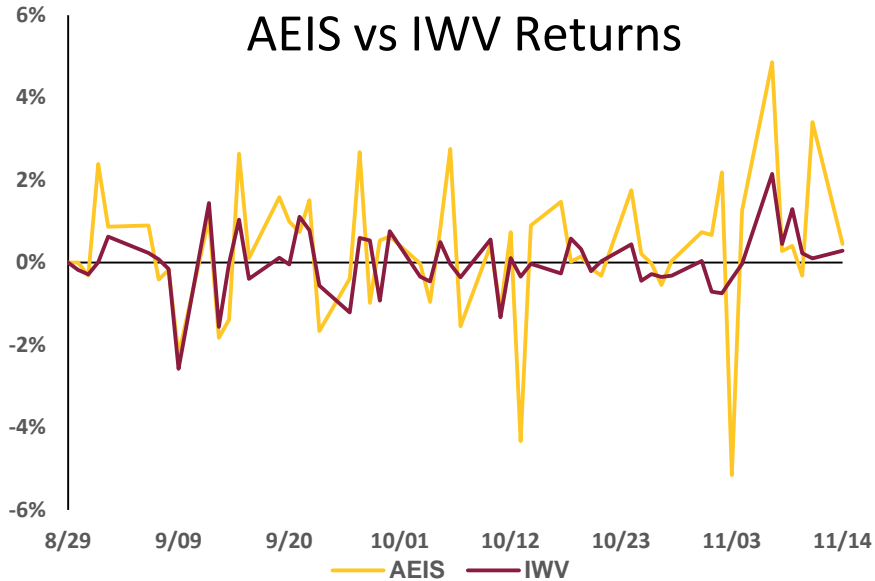


Size correlated with  
IVOL



Redemption Risk

# Arbitrage Constraints



# Arbitrage Constraints

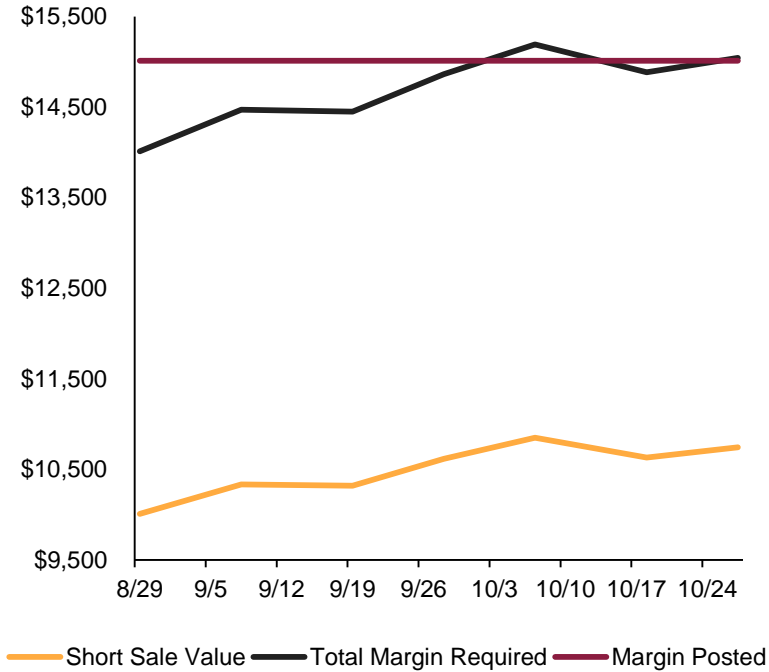
	Price	Shares	Short Sale Value	Initial Margin Requirement (50%)	Total Margin Posted
AEIS	\$44.09	227	\$10,008	\$5,004	\$15,012
OMI	\$33.93	295	\$10,009	\$5,004	\$15,014



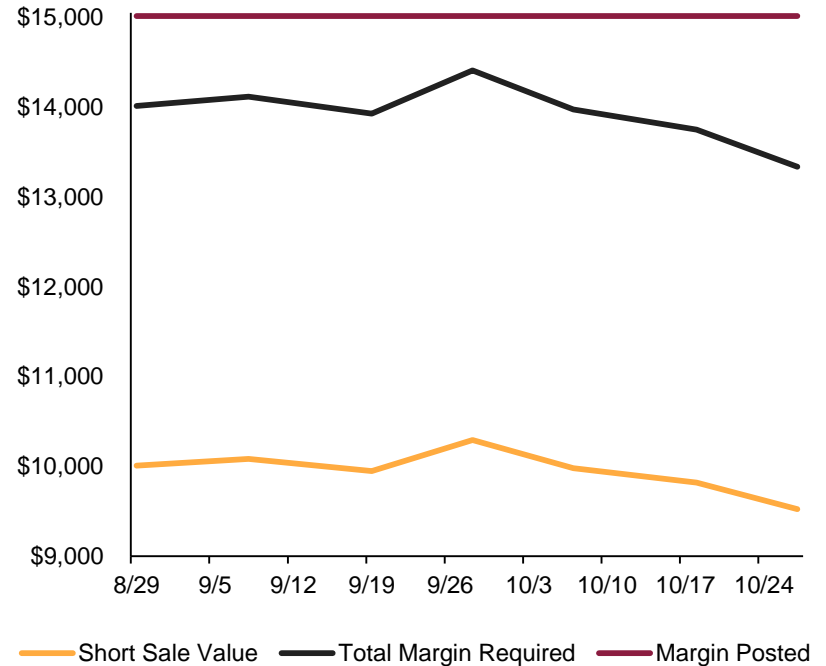
# Arbitrage Constraints

		Price	Short Sale Value	Maintenance Margin (40%)	Total Margin Required	Margin Posted	Margin to Spare
<b>AEIS</b>	<b>8/29</b>	\$44.09	\$10,008.43	\$4,003.37	\$14,011.80	\$15,012.65	\$1,000.84
	<b>9/8</b>	\$45.53	\$10,335.31	\$4,134.12	\$14,469.43	\$15,012.65	\$543.21
	<b>9/19</b>	\$45.47	\$10,321.69	\$4,128.68	\$14,450.37	\$15,012.65	\$562.28
	<b>9/28</b>	\$46.77	\$10,616.79	\$4,246.72	\$14,863.51	\$15,012.65	\$149.14
	<b>10/7</b>	\$47.80	\$10,850.60	\$4,340.24	\$15,190.84	\$15,012.65	<b>(\$178.19)</b>
<b>OMI</b>	<b>8/29</b>	\$33.93	\$10,009.35	\$4,003.74	\$14,013.09	\$15,014.03	\$1,000.94
	<b>9/8</b>	\$34.18	\$10,083.10	\$4,033.24	\$14,116.34	\$15,014.03	\$897.69
	<b>9/19</b>	\$33.72	\$9,947.40	\$3,978.96	\$13,926.36	\$15,014.03	\$1,087.67
	<b>9/28</b>	\$34.89	\$10,292.55	\$4,117.02	\$14,409.57	\$15,014.03	\$604.46
	<b>10/7</b>	\$33.83	\$9,979.85	\$3,991.94	\$13,971.79	\$15,014.03	\$1,042.24

### AEIS Margin Requirements



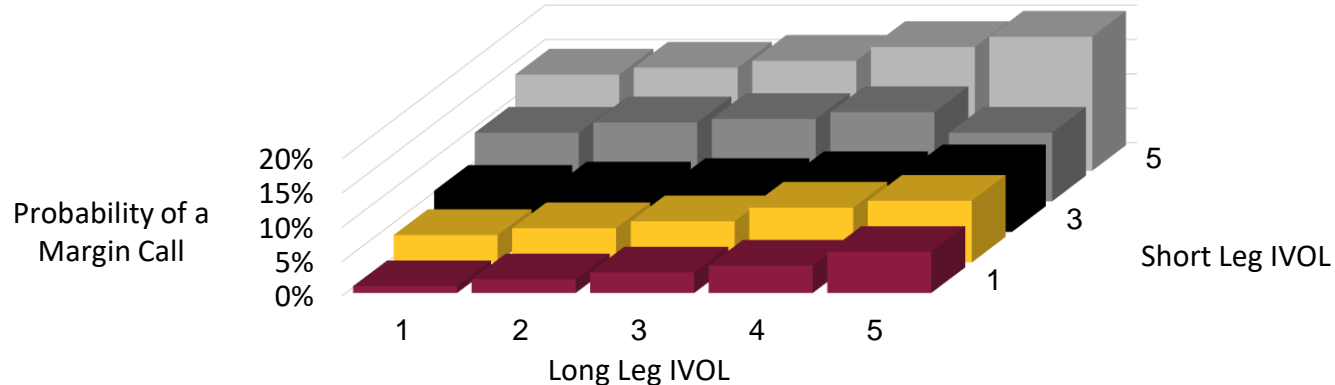
### OMI Margin Requirements



# Arbitrage Risk

- Limits of arbitrage restrict ability of investors to enter and/or hold profitable short position
- Higher IVOL suggests difficulty in maintaining short position

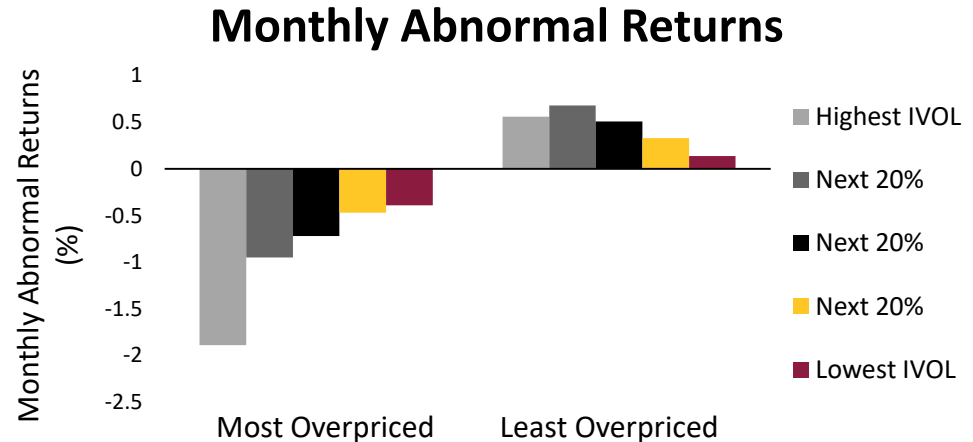
**Arbitrage Asymmetry and the Idiosyncratic Volatility Puzzle**



# Arbitrage Asymmetry

*Arbitrage Asymmetry and the Idiosyncratic Volatility Puzzle*  
 Stambaugh, Yu, and Yuan (2015)

- Arbitrage eliminates more underpricing than overpricing
- Greater amount of arbitrage capital in long positions versus short positions
- The negative IVOL effect among overpriced stocks is greater than the positive IVOL effect among underpriced stocks



# Strategy Implementation

# Charter Constraints



# Accruals

*Do Stock Prices Fully Reflect Information in Accruals  
and Cash Flows about Future Earnings?*  
Sloan (1996)

- Companies with low accruals have a higher expected future return
- Invest in companies with the lowest accrual portion of earnings
- Number of securities: 1,714

$$\text{Accruals} = \frac{(\Delta\text{CA} - \Delta\text{Cash}) - (\Delta\text{CL} - \Delta\text{STD} - \Delta\text{TP}) - \Delta\text{Dep}}{\text{Average Total Assets}}$$

# Asset Growth

*Asset Growth and the Cross-Section of Stock Returns*  
Cooper, Gulen, and Schill (2008)

- Firms that have high asset growth are less likely to perform well in future
- Invest in firms with low asset growth
- Number of securities: 2,212

$$\text{Asset Growth} = \frac{(\text{Total Assets}_t - \text{Total Assets}_{t-1})}{\text{Total Assets}_{t-1}}$$



# Momentum

*Returns to Buying Winners and Selling Losers:  
Implications for Stock Market Efficiency*  
Jegadeesh and Titman (1993)

- “Winners continue to win and losers continue to lose.”
- Ranked on compounded monthly returns during September 2015 to September 2016
- Number of securities: 2,757

$$\text{Momentum} = (R_{t-1})(R_{t-2})\dots(R_{t-13}) - 1$$

# Gross Profitability

*The Other Side of Value: The Gross Profitability Premium*  
Novy-Marx (2013)

- Firms with high gross profit are expected to generate abnormally high future returns
- Invest in companies with high profitability
- Number of securities: 1,642

$$\text{Gross Profitability} = \frac{(\text{Revenue} - \text{Cost of Goods Sold})}{\text{Total Assets}}$$

# Net Issuance

*Share Issuance and Cross-Sectional Returns*  
Pontiff and Woodgate (2008)

- Management tends to repurchase shares when stock is undervalued
- Invest in companies with lower net issuance
- Number of securities: 2,592

$$\text{Net Issuance} = \ln(\text{Adj. Shares Outstanding})_t - \ln(\text{Adj. Shares Outstanding})_{t-1}$$

# Aggregate Ranking Construction

- Found the individual percentile ranking of each anomaly for every security
- Took the average of percentiles to find the total average mispricing percentile for every security
- Sorted securities based on the average percentile ranking
- Selected the top decile of securities based on mispricing anomaly ranking

Ticker	Accruals	Asset Growth	Momentum	Net Issuance	Profitability	Aggregate
Company A	10%	20%	30%	30%	10%	20%
Company B	20%	30%	20%	20%	30%	24%
Company C	30%	10%	10%	10%	20%	16%

# Idiosyncratic Volatility (IVOL)

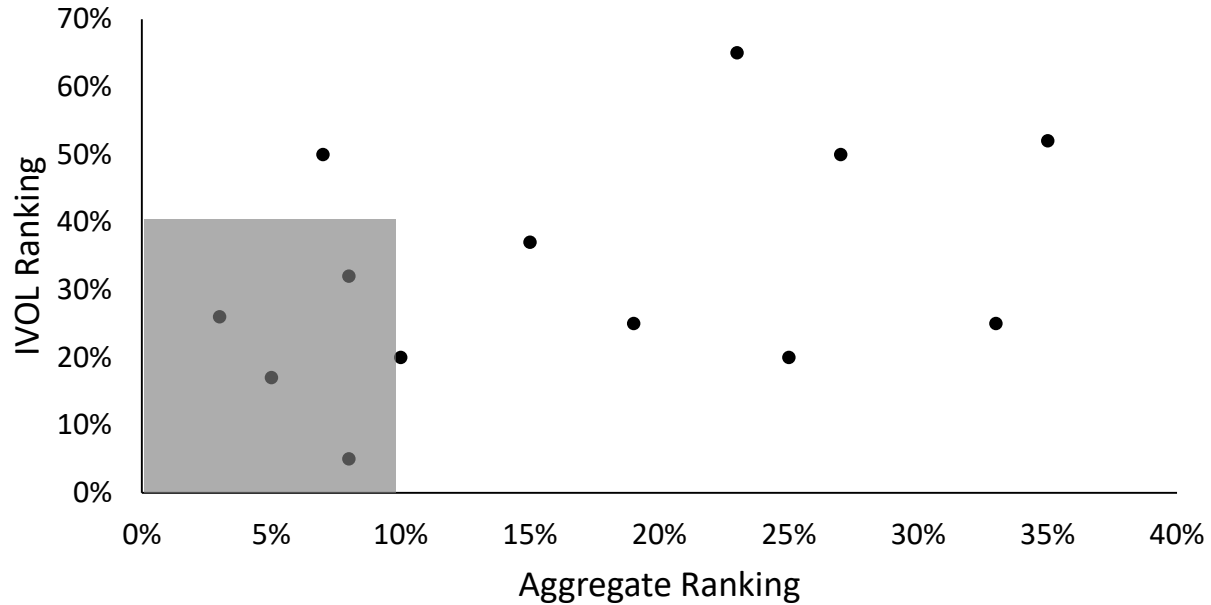
*Arbitrage Asymmetry and the  
Idiosyncratic Volatility Puzzle*  
Stambaugh, Yu, and Yuan (2015)

- High IVOL indicates high expected returns
- Calculated for 60 trading days from August 26, 2016 to November 17, 2016
- Number of securities: 2,843

$$R = \alpha_i + \beta_i (R_{mkt} - R_f) + \epsilon_i$$

$$IVOL = \sum (\epsilon_i)^2$$

# Portfolio Construction



# Portfolio Construction

Security Weighting: 50 bps  
floor / 5% ceiling

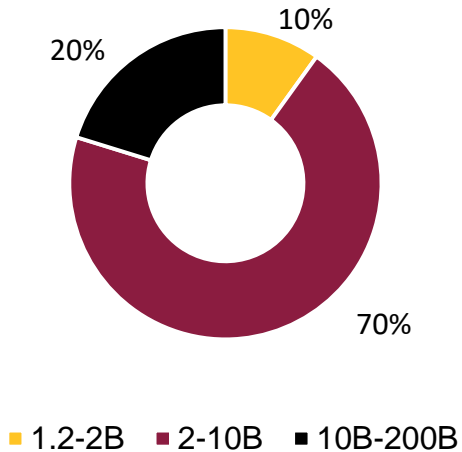
Market-cap weighted

Comprised of 44 securities

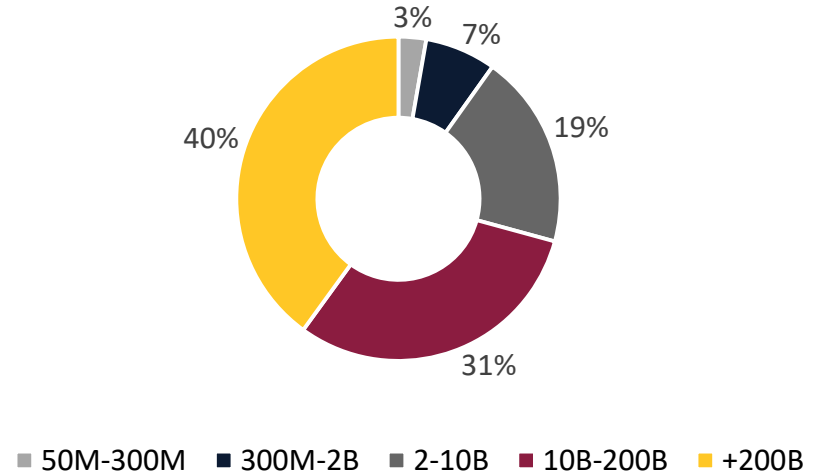
Excluded firms with pending  
M&A activity and performed  
news checks on each individual  
security

# Portfolio By Market Cap

IVOL Portfolio



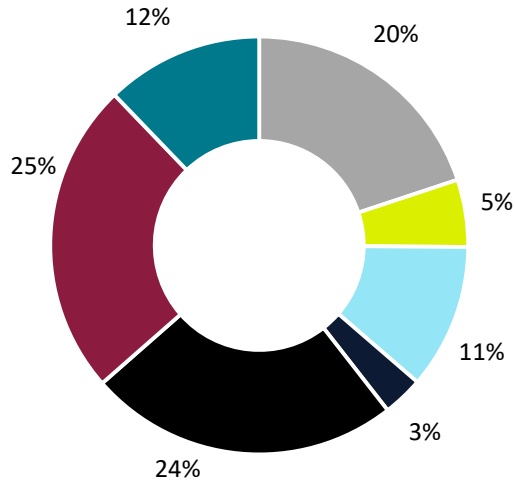
Russell 3000



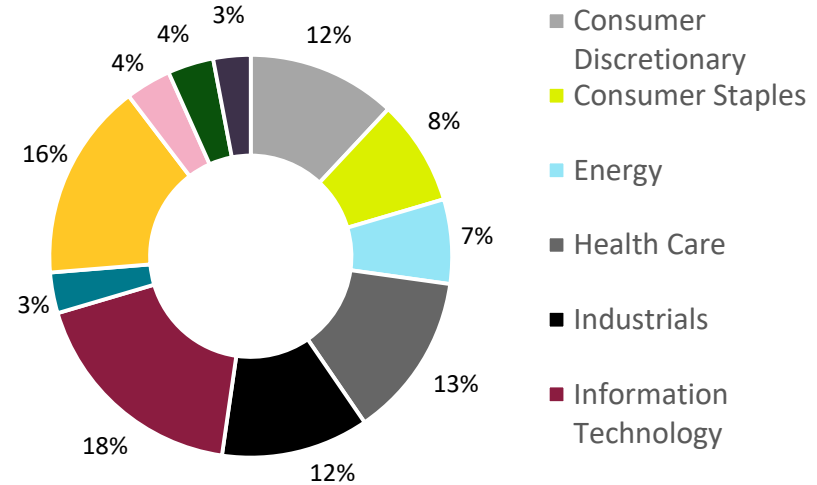


# Portfolio By Sector

IVOL Portfolio

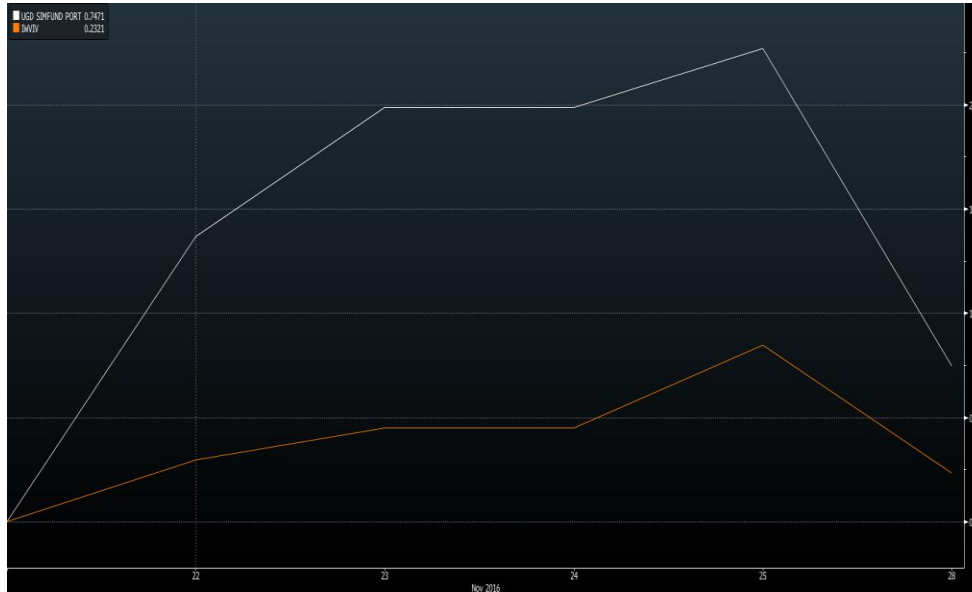


Russell 3000



- Consumer Discretionary
- Consumer Staples
- Energy
- Health Care
- Industrials
- Information Technology

# Returns



**Portfolio Return:** 0.75%

**IWM Return:** 0.23%

**Notable Securities:**

CLF Return: 19.92%

IGT Return: -10.04%

**Thank you. We will now welcome questions.**

# Anomaly Correlations

Anomaly	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Panel A. Correlations: long minus short</i>												
(1) Failure Probability	1.00											
(2) Oshlon's O (distress)	0.47	1.00										
(3) Net stock issues	0.27	0.20	1.00									
(4) Composite equity issues	0.20	0.11	0.43	1.00								
(5) Total accruals	0.15	0.08	0.15	0.11	1.00							
(6) Net operating assets	0.09	0.16	0.22	0.10	0.26	1.00						
(7) Momentum	0.62	0.18	0.22	0.25	0.15	0.14	1.00					
(8) Gross profitability	0.36	0.34	0.21	0.01	0.12	0.13	0.19	1.00				
(9) Asset growth	0.09	0.03	0.36	0.22	0.22	0.36	0.17	-0.01	1.00			
(10) Treturn on assets	0.58	0.41	0.16	0.01	0.03	0.02	0.31	0.38	-0.03	1.00		
(11) Investment-to-assets	-0.02	-0.01	0.19	0.12	0.34	0.32	0.08	-0.08	0.51	-0.08	1.00	
(12) Combination	0.77	0.52	0.52	0.39	0.42	0.42	0.68	0.43	0.44	0.56	0.35	1.00
<i>Panel B. Excess returns</i>												
Long leg (mean)	0.94	0.51	0.70	0.62	0.72	0.71	1.11	0.69	1.00	0.64	0.91	0.76
Short leg (mean)	-0.01	-0.19	0.07	0.20	0.13	0.06	-0.45	0.29	0.04	-0.34	0.15	-0.01
Long minus short (mean)	0.95	0.70	0.63	0.42	0.58	0.65	1.56	0.40	0.96	0.98	0.75	0.77
Long leg (t-statistic)	3.97	2.18	3.66	3.47	2.54	2.98	3.81	3.20	3.82	2.56	3.65	3.57
Short leg (t-statistic)	-0.01	-0.51	0.27	0.79	0.40	0.22	-1.23	1.33	0.14	-0.88	0.57	-0.05
Long minus short (t-statistic)	2.55	2.83	5.11	2.59	3.11	4.41	5.45	2.45	5.34	3.53	5.22	6.91
<i>Panel C. Benchmark-adjusted returns</i>												
Long leg (mean)	0.39	0.21	0.20	0.02	0.26	0.25	0.63	0.43	0.22	0.38	0.17	0.28
Short leg (mean)	-1.16	-0.93	-0.46	-0.41	-0.34	-0.51	-1.14	-0.23	-0.44	-0.90	-0.37	-0.60
Long minus short (mean)	1.55	0.13	0.66	0.43	0.61	0.76	1.77	0.66	0.66	1.28	0.54	0.87
Long leg (t-statistic)	3.39	3.37	3.87	0.29	1.85	2.27	4.95	4.42	1.76	4.40	1.59	7.66
Short leg (t-statistic)	-4.53	-6.17	-4.62	-3.85	-2.24	-4.75	-5.11	-2.19	-3.93	-4.29	-3.30	-7.07
Long minus short (t-statistic)	5.00	7.13	5.96	3.18	3.09	4.98	5.82	4.30	3.94	5.48	3.78	9.38