

Investment Thesis and Implementation- Semi Annual Presentation



Prepared by the Undergraduate Student Investment
Management Fund - Team A

Under the designation of Dr. Wahal
Friday December 2nd, 2022



Team Introduction

Fund Manager



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Ethan Kibsey

Peter Andrews
Rajeev Vemuri
Ryan Davitt
Ryan Vanderway
Skene Black

Agenda

Investment Thesis

By Skene Black

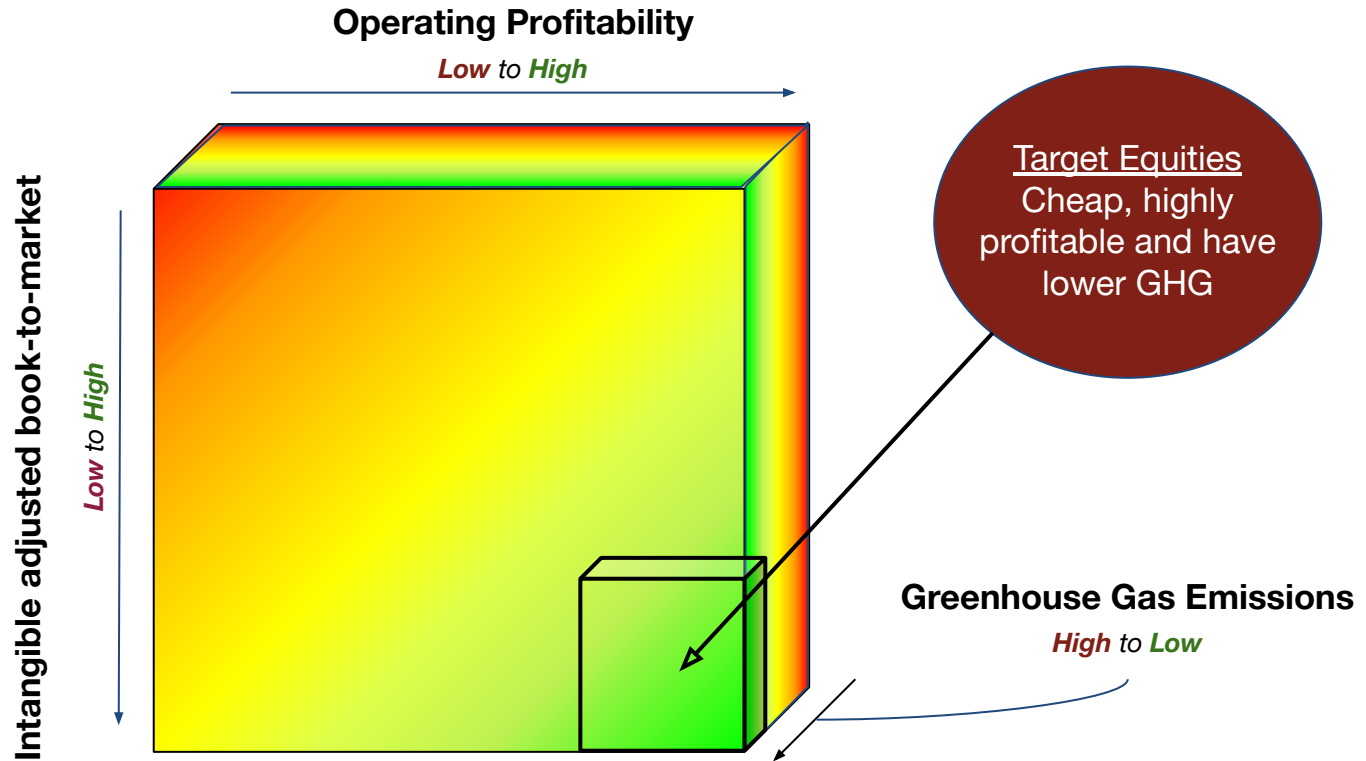
Strategy Implementation

By Peter Andrews

Investment Thesis



3 Main Components of our Investment Thesis





Intangible Value - Adjusted B/M

Equation 1: Initialization at T-1

$$INT_{i0} = SGA_{i1} / (g + \delta)$$



Equation 2: Depreciate Starting at T = 0

$$INT_{it} = (1 - \delta)INT_{it-1} + SGA_{it}$$

Equation 3: New Book to Equity_{INT}

$$B INT_{it} = B_{it} - GDWL_{it} + INT_{it}$$



HML and iHML factors

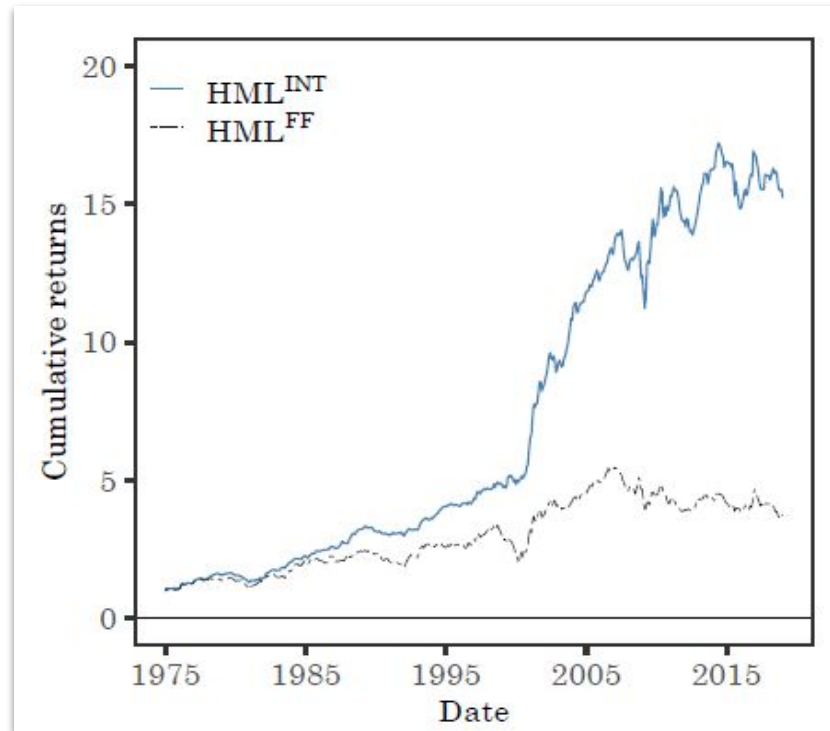
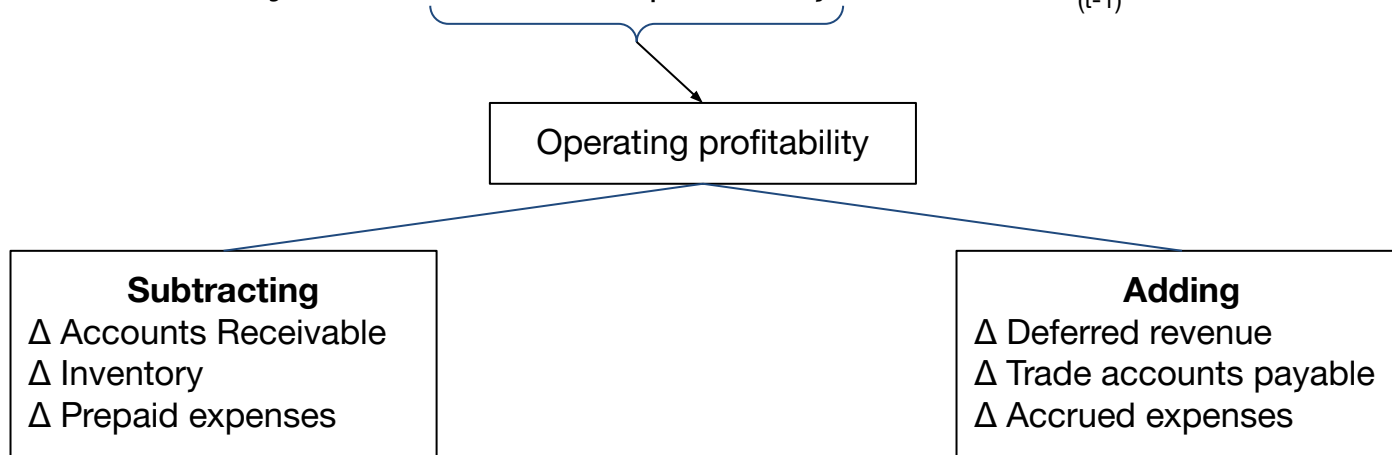


Figure 1: Accumulated returns for iHML and HML



Cash-based Operating Profitability

$$\text{Profitability Ratio} = \text{Cash-based profitability} \div \text{Total Assets}_{(t-1)}$$



Equation 4: Breakdown of the profitability ratio



Cash-based Operating Profitability

	CAPM_{OP}	FF3_{OP}	CAPM_{CBOP}	FF3_{CBOP}
Monthly Alpha	0.42	0.74	0.65	0.89
t-stat	2.81	5.98	4.74	8.48

Figure 2: Operating Profitability vs. Cash-Based Operating Profitability

- Accruals Anomaly
- High t-statistic and expected returns, meanwhile low standard deviation



GHG Emissions (subset of “E” in ESG)

**Why do
we care?**



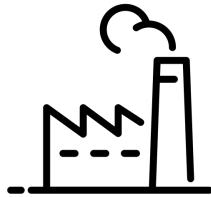
Net Zero Statement

“Consistent with these goals, the ASU Foundation commits to transition its investment portfolio to **at least Net Zero greenhouse gas emissions by 2035**”



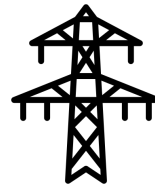
There are 3 main groups of GHG Emissions

GHG Emissions



Scope 1

Direct emissions from production



Scope 2

Indirect emissions from consumption of purchased electricity, heat, or steam



Scope 3

Indirect emissions from the production of purchased materials, product use, etc

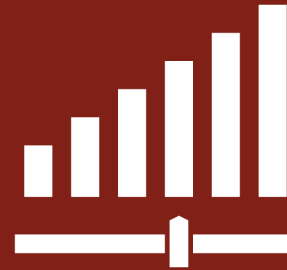


GHG Emissions - Measures

We will use **two metrics** to rank stocks in our portfolio



Absolute Emissions
(Scope 1 & 2):
Total Emissions Emitted by
a Company



Emissions Intensity
(Scope 1 & 2):
$$\frac{\text{Absolute Emissions}}{\text{Revenue}}$$

Strategy Implementation



Pre-Seeding Steps

Step 1



Develop Universe based on
ASU charter requirements
using EQS screener on
Bloomberg

Download data on Intangible
Assets, Cash-based Operating
Profitability, and ESG (GHG
Emissions) for Universe

Step 2



Step 3



Calculate values for each
component and rank on
percentiles scores

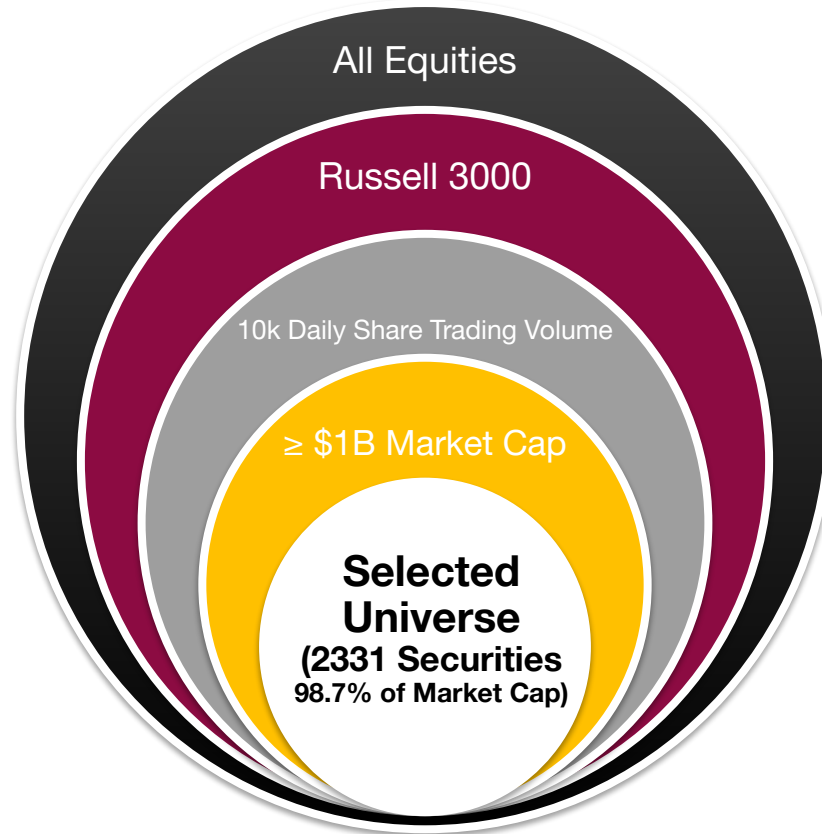
Determine **sector
allocation mechanism**
and **choose securities**

Step 4





Investment Universe





Here is the **process** for the **data** used to build the portfolio

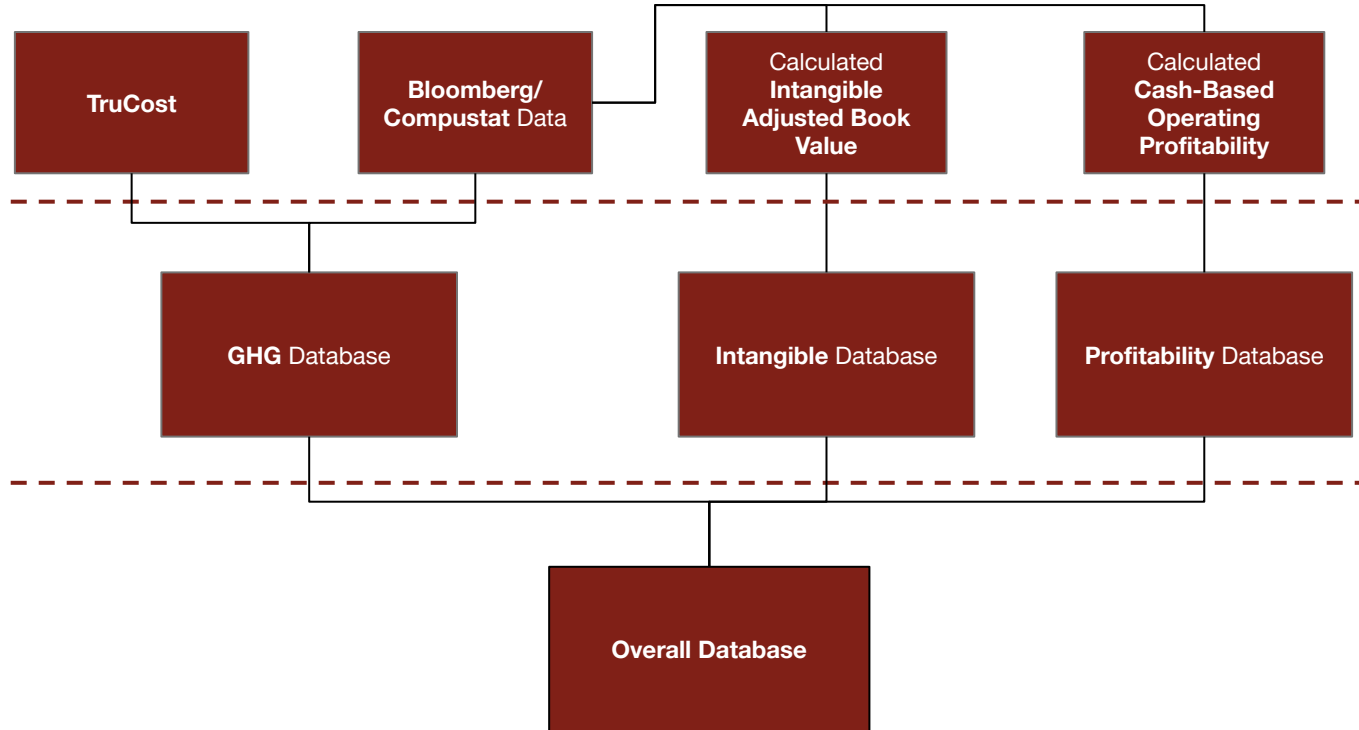
1. Obtain data & perform calculations



2. Intermediary merging



3. Final merging





Ranking Mechanism Example

Stock	Value Percentile (40%)	Profitability Percentile (40%)	GHG Intensity (15%)	Absolute GHG Emissions (5%)	Security Score (100%)
A	90%	90%	50%	50%	82%
B	80%	80%	100%	100%	84%
C	70%	70%	-	-	70%

*This ranking method was performed in *each individual Sector*



Ideal Sector Allocation Equation

$$\text{Sector Weight} = \frac{\text{Sector Score}}{\text{Sum of Sector Scores}}$$

Take the **top decile** of security scores in a sector and sum them up

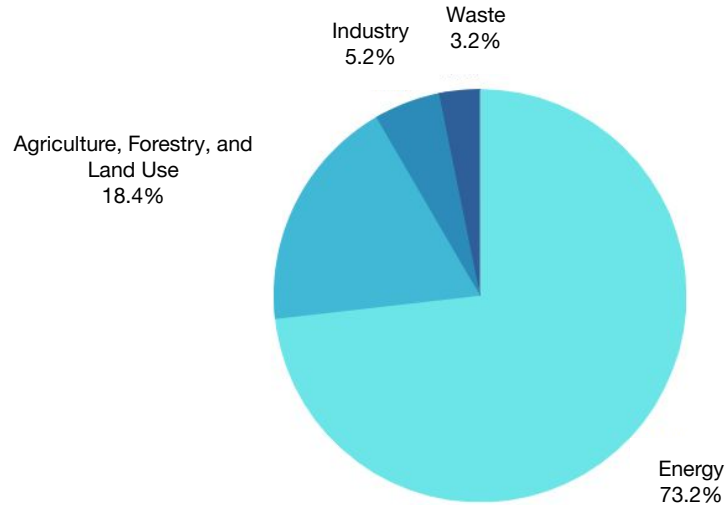
Take the sum of all sector scores

Equation 5: Breakdown of the sector weight

Sectors must stay in compliance to a **±7.5% requirement** (threshold of ±5.5%) compared to the Russell 3000 sector allocation.



GHG by Industry

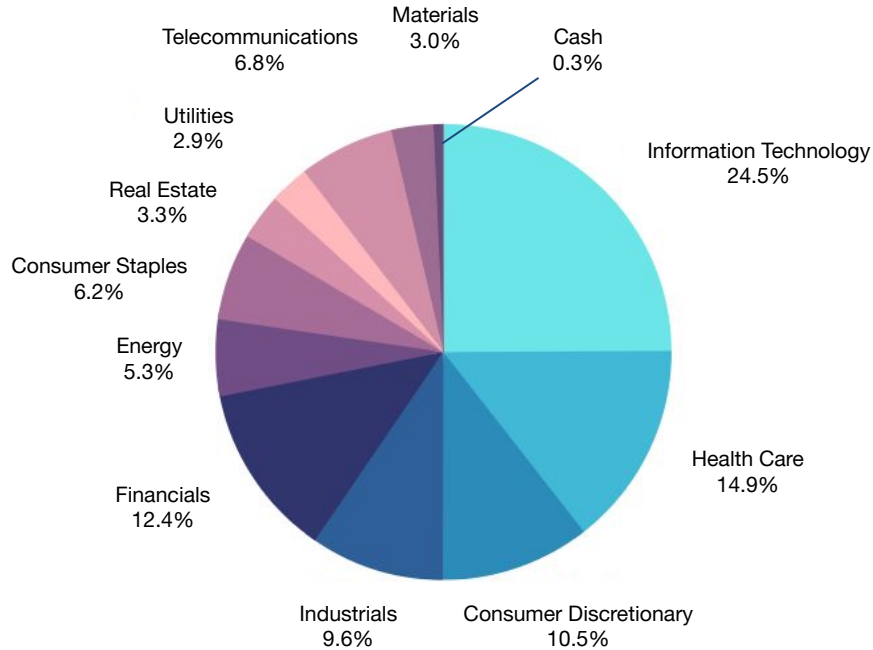


Sources of Greenhouse Gases in 2016

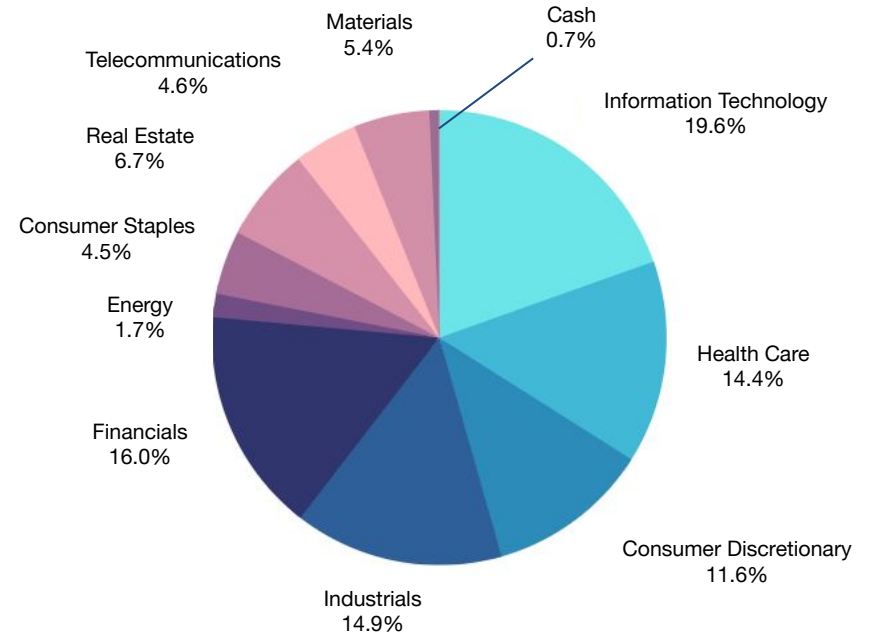
	Market Cap (\$ Tlns)	Russell 3000 Weights	Scope 1 & 2 (Gt CO ₂ emissions)
Oil and Gas	8.1	4.6%	3.1
Utilities	3.7	2.9%	5.2
Auto and Parts	3.4	2.1%	0.1
Mining and Metals	3.1	0.6%	2.7
Engines and Machinery	4.4	0.7%	0.1
Construction	2.3	1.2%	2.1
Chemicals	3.2	1.0%	1.0
Airlines	0.6	0.2%	0.5
Food Producers	2.4	0.9%	0.2
Forestry and Paper	0.5	0.2%	0.2



Index Compared to Portfolio



Russell 3000 (IWW)



Actual Allocation



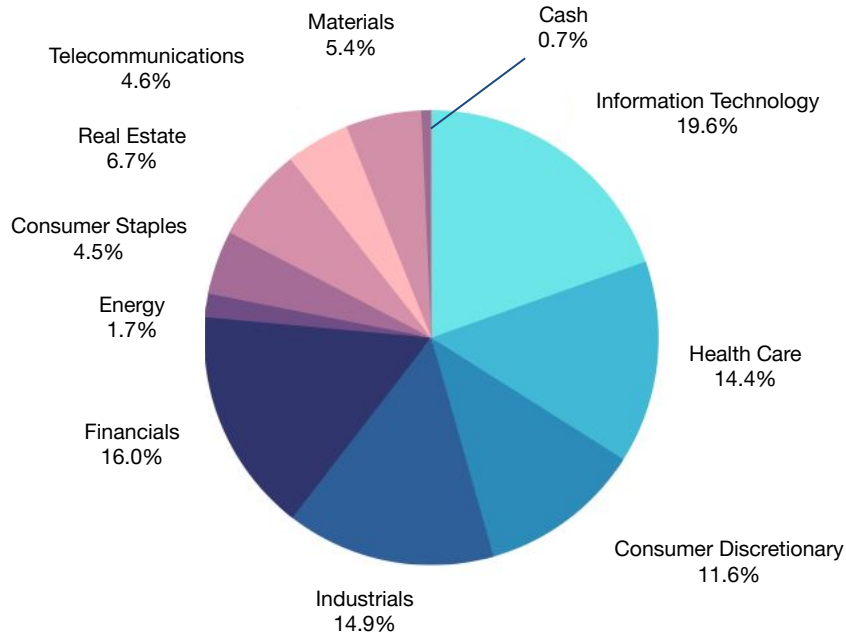
Summary Statistics

	int-Value (iB/M)	CBOP (CBOP/A)	Absolute (tCO₂e)	Intensity (tCO₂e/\$M)
Universe	0.591	0.009	1,197,528	187.106
Portfolio	1.471	0.058	299,681	82.123

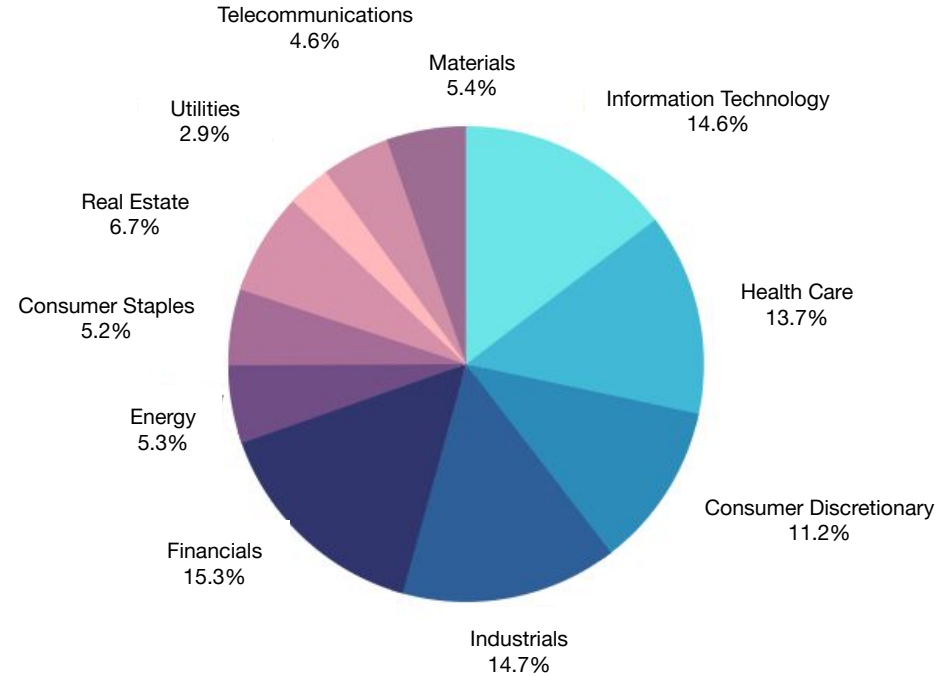
Universe vs Portfolio for the components



Actual Allocation vs. Shadow Portfolio



Actual Allocation



Shadow Allocation



Post-seeding Steps

Recalculate & Rebalance
Monthly

Compare returns to
benchmark (Russell
3000, Shadow Portfolio)
and **conduct attribution**
analysis

Step 5

Step 6

Step 7

Step 8

Step 9

Monitor seeded portfolio

Calculate returns by
sector and back-test
with different weights

Present results at the
next SIM Fund
presentation April 28th,
2023

Questions?

December 2, 2022

Fall 2022 Undergraduate SIM Fund Presentation

Team Introduction

Fund Manager



Jacob Nance

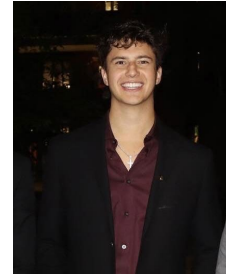
Analysts



Ian Cashen



Samantha Ferraro



Cal Frank



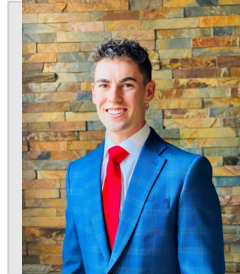
Will Harmon



Connor O'Loughlin



Paul Schmelzeis



Hunter Shulman



Connor Voightmann

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Strategy Overview

Downside Risk

Investors are *loss averse*.

Stocks that tend to decrease more during declining markets than they increase during rising markets are said to have high **downside risk** and are unattractive to investors.

Typical risk measurements based on volatility fail to capture this asymmetry.

Calculation of Downside Beta

r_i = security excess returns

r_m = market excess returns

μ_m = average market excess return



$$\beta^- = \frac{\text{COV}(r_i, r_m | r_m < \mu_m)}{\text{var}(r_m | r_m < \mu_m)}$$

Investment Thesis

Because they are loss averse, investors demand additional compensation for holding stocks with high downside risk.

Ang, Chen, and Xing show that if the most volatile stocks are excluded, stocks with high downside risk earn higher average returns than those with low downside risk, measured by β^- .

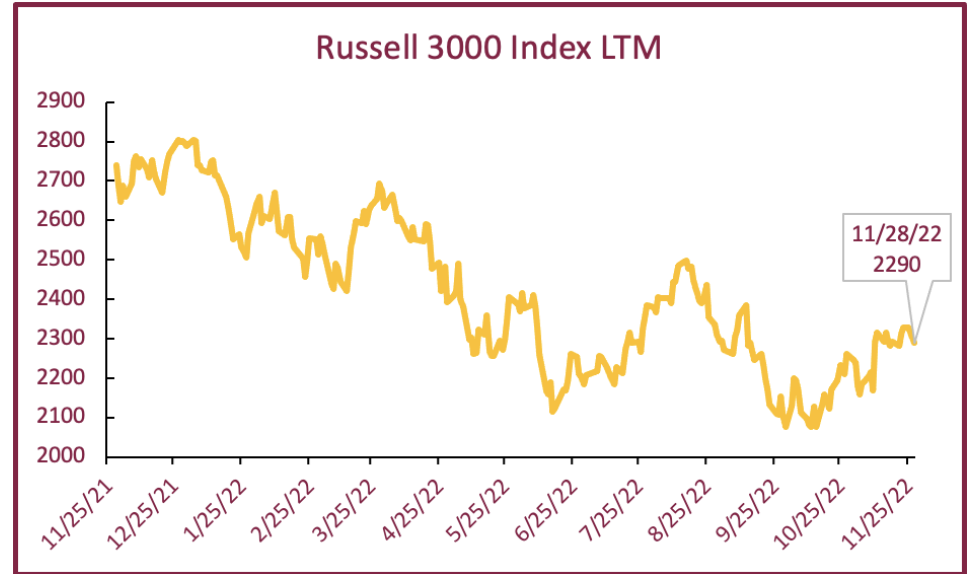
Panel B: Average excess returns
 β^- Quintiles excluding most volatile stocks

1 Low	2	3	4	5 High	High-low	Q4-low
0.58%	0.69%	0.82%	0.82%	0.92%	0.34% [2.31]	0.25% [2.28]

Today's Market Conditions

We believe that investors are especially sensitive to losses in the current market.

Creating a portfolio based on downside risk may be able to capture the premium demanded by investors for holding especially unattractive stocks.



Low-Volatility Strategy

A low-volatility strategy targets stocks with the lowest volatility.

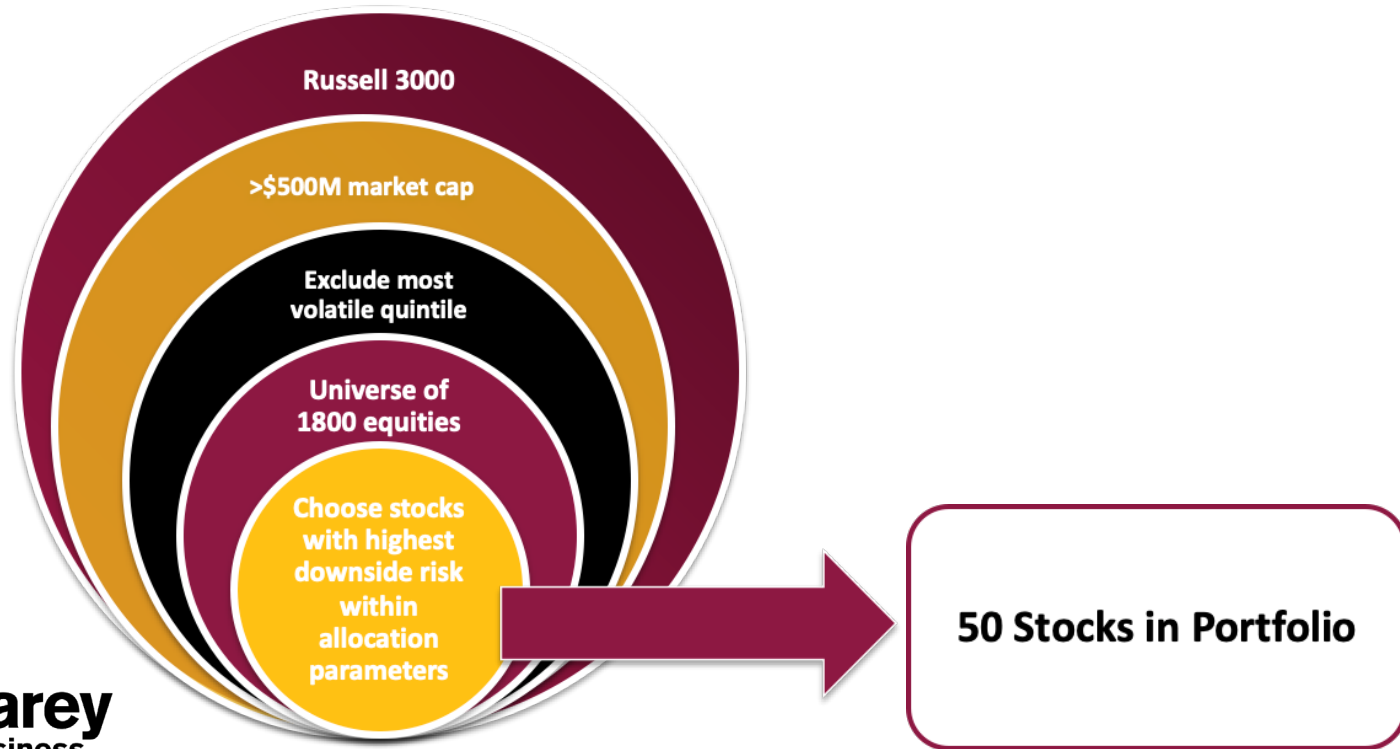
While our strategy **does avoid** the most volatile stocks, it **does not target** the least volatile stocks.

Investing in stocks with high downside risk is not the same as investing in stocks with low volatility because stocks with high downside risk tend to have higher volatility by nature.



Implementation

Equities Universe



Allocation & Market Weights

*Weights are based on the Russell 3000

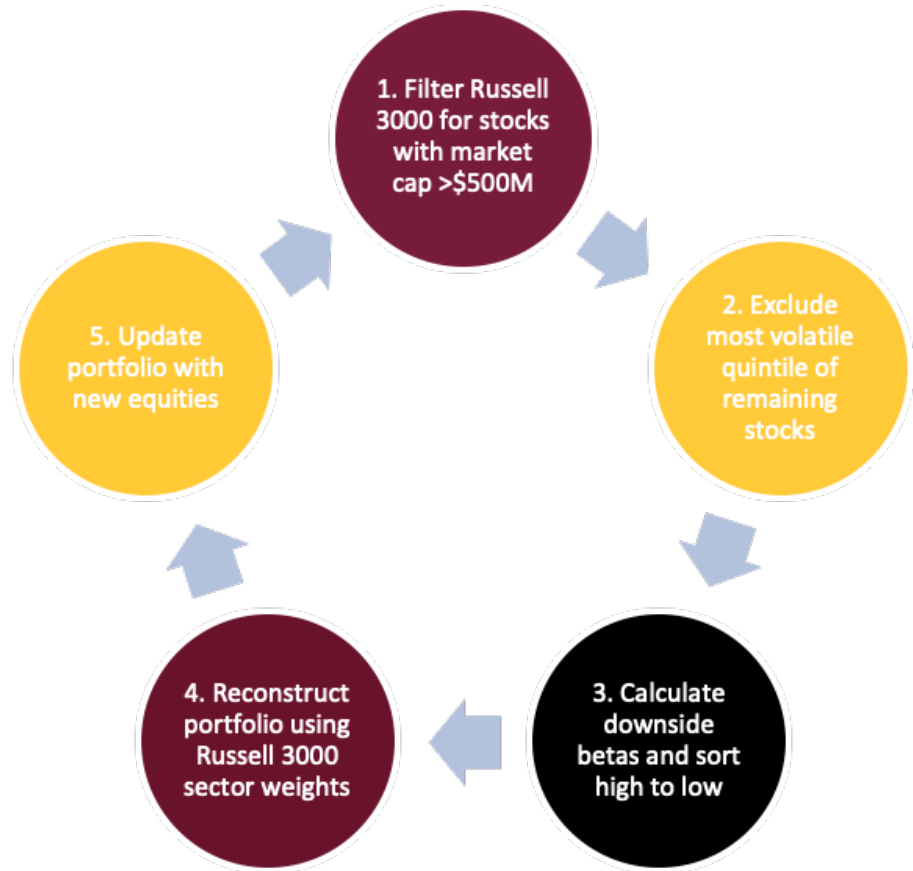
Sector	Weight	Portfolio Count
Information Tech.	24%	12
Health Care	16%	8
Consumer Discretionary	14%	7
Financials	12%	6
Industrials	10%	5
Energy	8%	4
Consumer Staples	6%	3
Communications	6%	3
Materials	4%	2

A blurred background image of a person walking on a path with trees and a yellow text box.

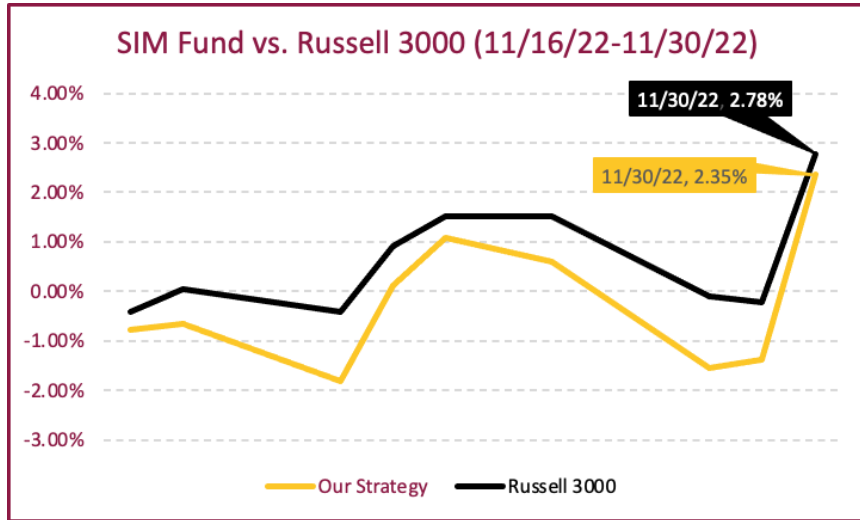
Next Steps

Rebalancing

To be congruent with Ang, Chen, and Xing and to minimize effects from turnover such as transaction costs, all equities in our portfolio are held for one month. Additionally, the portfolio is equally weighted.



2 Weeks of Returns



Date	SIM Daily Return	SIM Gain/Loss	Russell Daily Return	Russell Gain/Loss
11/17/22	-0.77%	-0.77%	-0.42%	-0.42%
11/18/22	0.11%	-0.66%	0.46%	0.04%
11/21/22	-1.15%	-1.81%	-0.44%	-0.41%
11/22/22	1.92%	0.11%	1.33%	0.92%
11/23/22	0.97%	1.08%	0.58%	1.50%
11/25/22	-0.48%	0.60%	0.02%	1.52%
11/28/22	-2.14%	-1.54%	-1.63%	-0.10%
11/29/22	0.16%	-1.38%	-0.11%	-0.21%
11/30/22	3.73%	2.35%	2.99%	2.78%

Questions & Comments

Thank you!

Appendix

Coskewness

Equally-weighted portfolios emphasize the differences between downside risk and coskewness.

Results of Fama-MacBeth (1973) regressions of 12-month excess returns on firm characteristics and realized-risk characteristics (Ang



Arizona State University

Table 2
Fama-MacBeth Regressions

Model	I	II	III	IV	V	VI	Mean (Std Dev)
Intercept	0.300 [9.35]	0.044 [3.39]	0.054 [1.66]	0.046 [1.42]	0.246 [7.62]	0.257 [7.79]	
β	0.177 [8.19]						0.828 (0.550)
β^-		0.069 [7.17]	0.064 [7.44]	0.028 [2.68]	0.062 [6.00]	0.056 [5.25]	0.882 (0.739)
β^+		-0.029 [4.85]	-0.025 [4.15]	0.003 [0.22]	0.020 [2.33]	0.017 [1.91]	0.722 (0.842)
Log-size	-0.039 [8.82]		-0.007 [1.47]	-0.013 [3.03]	-0.034 [7.77]	-0.034 [7.39]	5.614 (1.523)
Bk-Mkt	0.017 [3.87]		0.024 [5.17]	0.023 [5.03]	0.017 [3.67]	0.018 [3.76]	0.768 (0.700)
Past Ret	0.017 [1.91]		0.063 [6.32]	0.053 [5.40]	0.020 [2.12]	0.015 [1.50]	0.085 (0.370)
Std Dev	-8.433 [10.7]				-5.781 [6.41]	-6.459 [7.04]	0.355 (0.174)
Coskewness	-0.229 [10.7]			-0.181 [4.31]	-0.196 [5.07]	-0.188 [4.59]	-0.179 (0.188)
Cokurtosis	0.015 [1.57]				0.045 [4.40]	0.047 [4.52]	2.240 (1.353)
β_L						-0.008 [0.93]	-0.166 (0.456)

Appendix

Low Volatility vs. Downside Risk

- The Low Volatility isolates the lowest volatility stocks which carry low expected return. This is where downside risk differs. The goal of low vol is taking a defensive position against the volatility of stocks in down markets and accept the lower return; downside risk has the goal of attaining greater future gains while mitigating severe losses during down markets
- The strategies are similar in that they can be utilized in the same type of market environment
- Downside risk strategy allows investors to capitalize on the **greater expected future returns** that we identify
 - Strategy goes against the common financial behavior to avoid risk

Appendix

Asset Detail: First 25

Description	Super Category Cod	S
UNITED STS STL CORP NEW COM	5	E
GLOBALFOUNDRIES INC	5	E
B RILEY FINL INC COM	5	E
FORTINET INC COM	5	E
AMAZON COM INC COM	5	E
PENN ENTERTAINMENT INC	5	E
BRINKER INTL INC COM	5	E
DANA INC COM	5	E
NVIDIA CORP COM	5	E
XPO LOGISTICS INC COM	5	E
DEVON ENERGY CORP NEW COM	5	E
CARLYLE GROUP INC COM	5	E
JACKSON FINANCIAL INC CL A COM	5	E
OCCIDENTAL PETROLEUM CORP	5	E
E L F BEAUTY INC COM	5	E
APA CORP COM	5	E
UNIVERSAL DISPLAY CORP COM	5	E
CHINOOK THERAPEUTICS INC COM USD0.0001	5	E
AMERICAN AIRLINES INC COM USD1	5	E
LIBERTY ENERGY INC COM USD0.01 CL A	5	E
LATTICE SEMICONDUCTOR CORP COM	5	E
GOGO INC COM	5	E
ADVANCED MICRO DEVICES INC COM	5	E
SIGNATURE BK NY N Y COM	5	E

Name	\$ Allocation
UNITED STS STL CORP NEW COM	\$22,549.89
GLOBALFOUNDRIES INC	\$21,853.25
B RILEY FINL INC COM	\$21,644.47
FORTINET INC COM	\$22,442.44
AMAZON COM INC COM	\$22,594.81
PENN ENTERTAINMENT INC	\$22,734.80
BRINKER INTL INC COM	\$22,208.44
DANA INC COM	\$22,028.97
NVIDIA CORP COM	\$22,083.66
XPO LOGISTICS INC COM	\$21,890.04
DEVON ENERGY CORP NEW COM	\$22,043.75
CARLYLE GROUP INC COM	\$22,481.51
JACKSON FINANCIAL INC CL A COM	\$22,125.04
OCCIDENTAL PETROLEUM CORP	\$22,136.50
E L F BEAUTY INC COM	\$23,333.97
APA CORP COM	\$22,247.45
UNIVERSAL DISPLAY CORP COM	\$22,028.60
CHINOOK THERAPEUTICS INC COM USD0.0001	\$22,802.70
AMERICAN AIRLINES INC COM USD1	\$22,129.89
LIBERTY ENERGY INC COM USD0.01 CL A	\$22,060.41
LATTICE SEMICONDUCTOR CORP COM	\$21,792.22
GOGO INC COM	\$22,532.56
ADVANCED MICRO DEVICES INC COM	\$21,681.46
SIGNATURE BK NY N Y COM	\$21,350.32
WINGSTOP INC COM	\$22,483.97

et	As of Date - Accrued Market Va
	0.02100000
	0.01910000
	0.01920000
	0.01840000
	0.01890000
	0.01770000
	0.02010000
	0.01860000
	0.01890000
	0.01840000
	0.01800000
	0.01960000
	0.01960000
	0.01830000
	0.02130000
	0.01830000
	0.01890000
	0.01880000
	0.01890000
	0.01840000
	0.01930000
	0.01970000
	0.01910000
	0.01800000

Appendix

Asset Detail: Second 25

Description	Super Category Cod	Super Ca
WINGSTOP INC COM	5	Equities
COTY INC COM CL A COM CL A	5	Equities
ZIPRECRUITER INC CL A CL A	5	Equities
CYTEK BIOSCIENCES INC COM	5	Equities
AVID TECHNOLOGY INC COM	5	Equities
H & E EQUIP SVCS INC COM	5	Equities
INSPIRE MED SYS INC COM	5	Equities
BLUEPRINT MEDICINES CORP COM	5	Equities
MAXLINEAR INC COMMON STOCK	5	Equities
LIBERTY LATIN AMERICA LTD COM USD0.01 CLASS C	5	Equities
CLEVELAND CLIFFS USD0.125	5	Equities
BUILDERS FIRSTSOURCE INC COM STK	5	Equities
MONOLITHIC PWR SYS INC COM	5	Equities
ARES MANAGEMENT LP COM SHS REPSTG LTD PARTNER	5	Equities
SYNAPTICS INC COM	5	Equities
SAGE THERAPEUTICS INC COM	5	Equities
ALIGN TECHNOLOGY INC COM	5	Equities
ROCKET COS INC CL A CL A	5	Equities
INTUITIVE SURGICAL INC COM NEW STK	5	Equities
MARVELL TECHNOLOGY INC COM	5	Equities
SIX FLAGS ENTMT CORP NEW COM	5	Equities
AIRBNB INC CL A COM USD0.0001 CL A	5	Equities
DARLING INGREDIENTS INC COMSTK	5	Equities
ON SEMICONDUCTOR CORP COM	5	Equities
AXONICS INC COM	5	Equities
VERITIV CORP COM	5	Equities
MFC ISHARES TRUST RUSSELL 3000 ETF	5	Equities
United States dollar	90	Cash and

Name	\$ Allocation
COTY INC COM CL A COM CL A	\$22,647.96
ZIPRECRUITER INC CL A CL A	\$22,718.08
CYTEK BIOSCIENCES INC COM	\$22,582.73
AVID TECHNOLOGY INC COM	\$22,734.84
H & E EQUIP SVCS INC COM	\$22,664.32
INSPIRE MED SYS INC COM	\$22,820.40
BLUEPRINT MEDICINES CORP COM	\$22,342.93
MAXLINEAR INC COMMON STOCK	\$21,671.28
LIBERTY LATIN AMERICA LTD COM USD0.01 CLASS C	\$23,585.65
CLEVELAND CLIFFS USD0.125	\$22,486.39
BUILDERS FIRSTSOURCE INC COM STK	\$22,453.65
MONOLITHIC PWR SYS INC COM	\$21,236.87
ARES MANAGEMENT LP COM SHS REPSTG LTD PARTNER	\$22,387.64
SYNAPTICS INC COM	\$21,522.33
SAGE THERAPEUTICS INC COM	\$23,059.53
ALIGN TECHNOLOGY INC COM	\$21,833.93
ROCKET COS INC CL A CL A	\$21,144.73
INTUITIVE SURGICAL INC COM NEW STK	\$22,551.27
MARVELL TECHNOLOGY INC COM	\$21,496.50
SIX FLAGS ENTMT CORP NEW COM	\$22,102.20
AIRBNB INC CL A COM USD0.0001 CL A	\$22,372.82
DARLING INGREDIENTS INC COMSTK	\$22,034.66
ON SEMICONDUCTOR CORP COM	\$21,830.69
AXONICS INC COM	\$22,379.13
VERITIV CORP COM	\$22,810.09

Accrued Market Va