MBA Student Investment Management Fund

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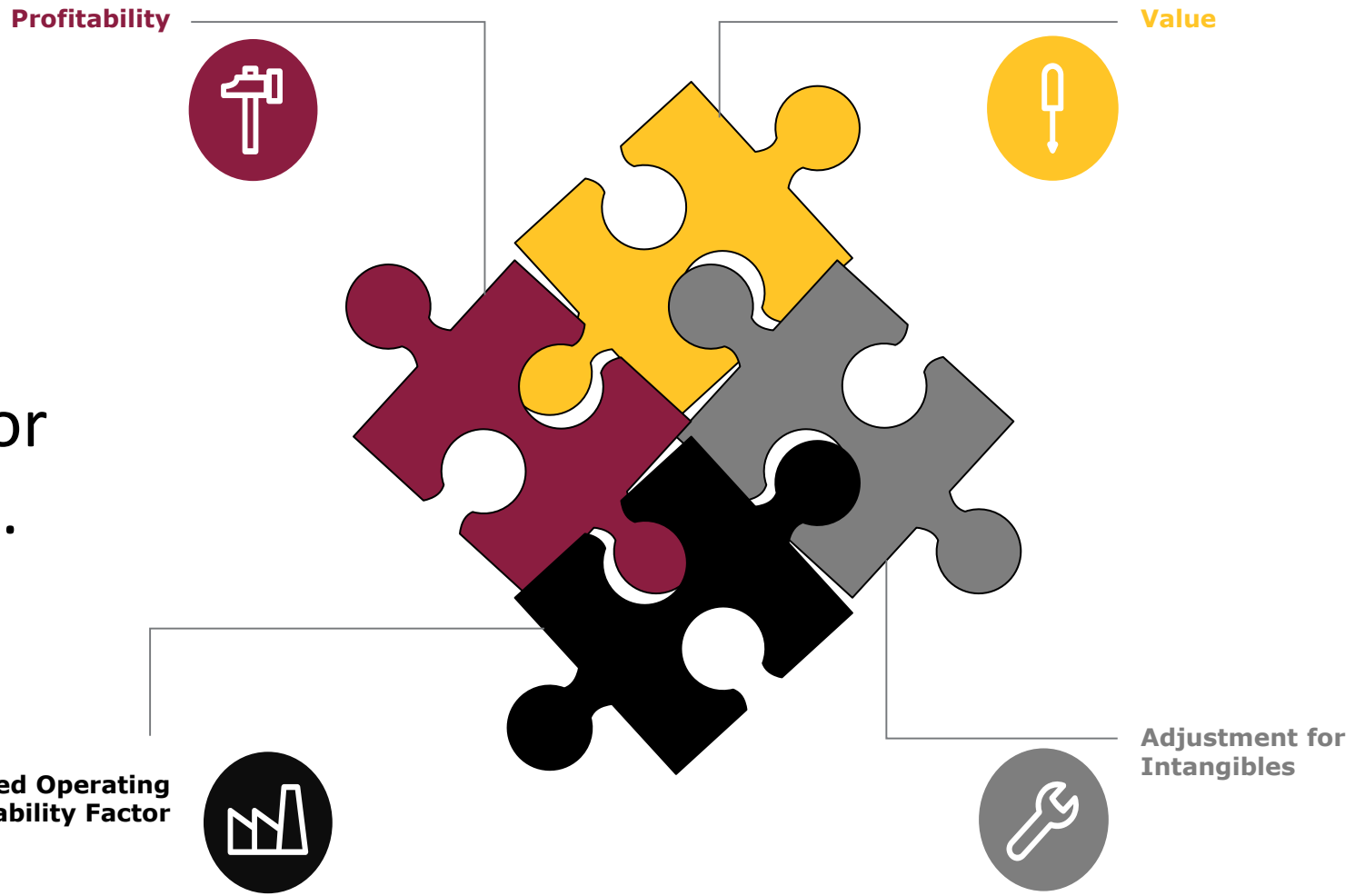
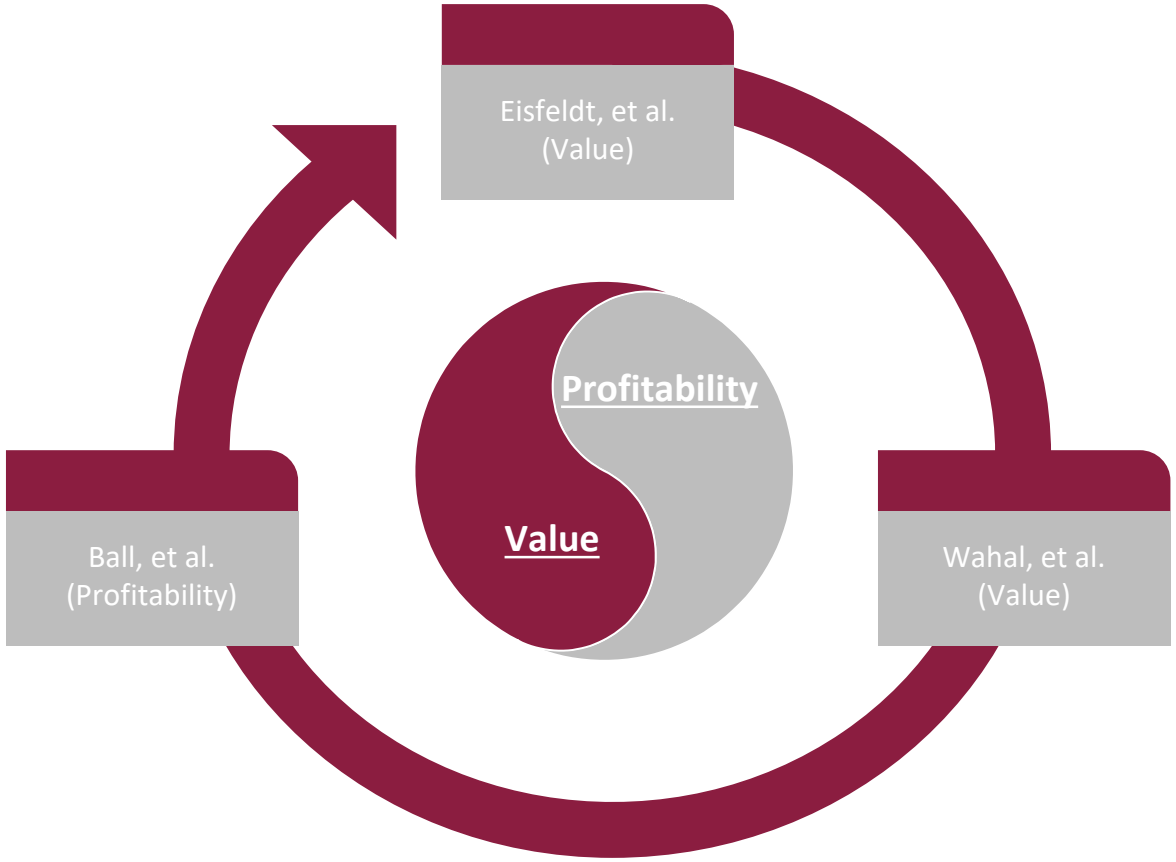
Investment Thesis

Investment Thesis

A marketwide approach combining value adjusted for intangibles and profitability.



Why Combine Value & Profitability?



1. Profitability addresses the value trap

1. Traditional value factor does not account for intangible assets

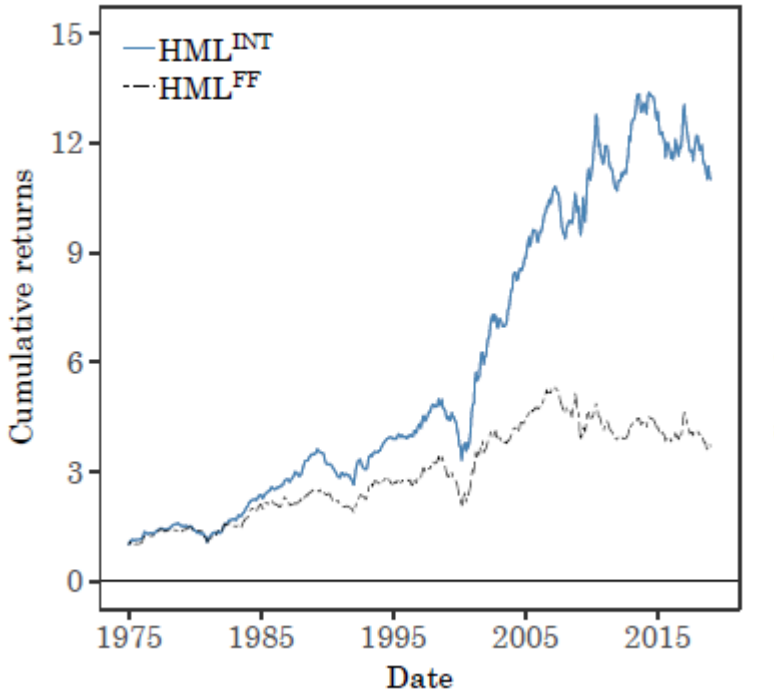
Value | Adjusting for Intangibles

According to Eisfeldt et al., "most intangible assets do not appear on corporate balance sheets, resulting in a **growing mis-measurement of book assets**."

This mismeasurement of book equity can lead to a **misclassification of securities** within the traditional value portfolio.

Eisfeldt et al. accurately assessed value by adjusting firms' book values of equity for intangible assets.

HML^{INT} Outperformed HML^{FF} Historically



Value | Adjusting for Intangibles (SG&A)

Eisfeldt et al. conducted Fama French 3/5 factor regression analysis using different intangible adjusted value factors.

	Capitalize 100% of SG&A	Capitalize 100% of R&D and 30% of SG&A
Beta	0.37	0.36
t-statistic	2.74	2.88

Methodologies did **not** produce significantly different results.

Value | Application

Eisfeldt et al: Adjust book-to-market ratios by accounting for intangible assets

- Capitalize intangible expenses (e.g. SG&A) using the perpetual inventory method.

Formula for intangible adjustment:

$$Int_{it} = (1 - \delta)Int_{it-1} + \theta SG\&A_{it}$$

Formula inputs:

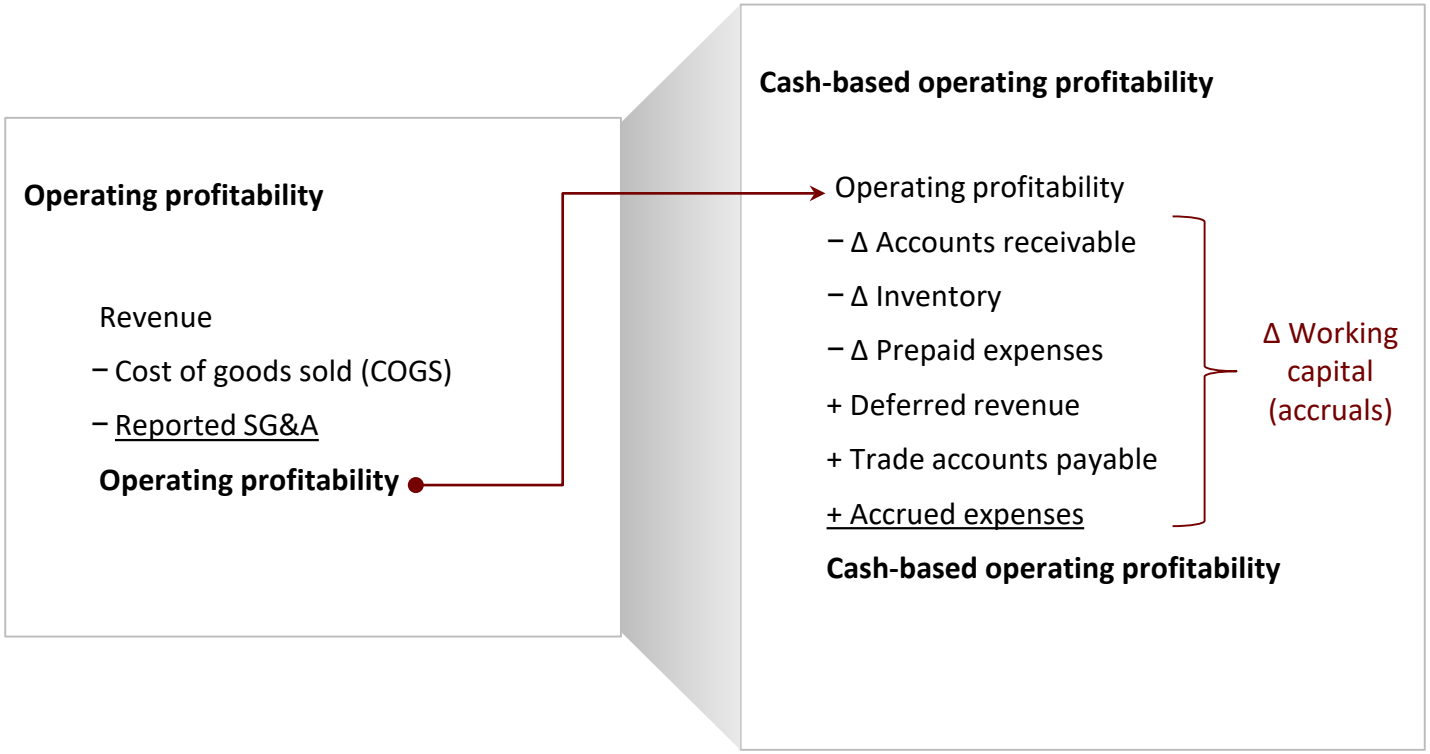
δ = 20%

θ = 100%

Demonstrated that an intangible adjusted value factor **significantly outperformed** the traditional value factor from 1975-2018.

Cash-Based Operating Profitability

Ball et al. suggests that cash-based operating profitability is a **better predictor of future profitability** than operating profitability.



Implementation

Data Sources

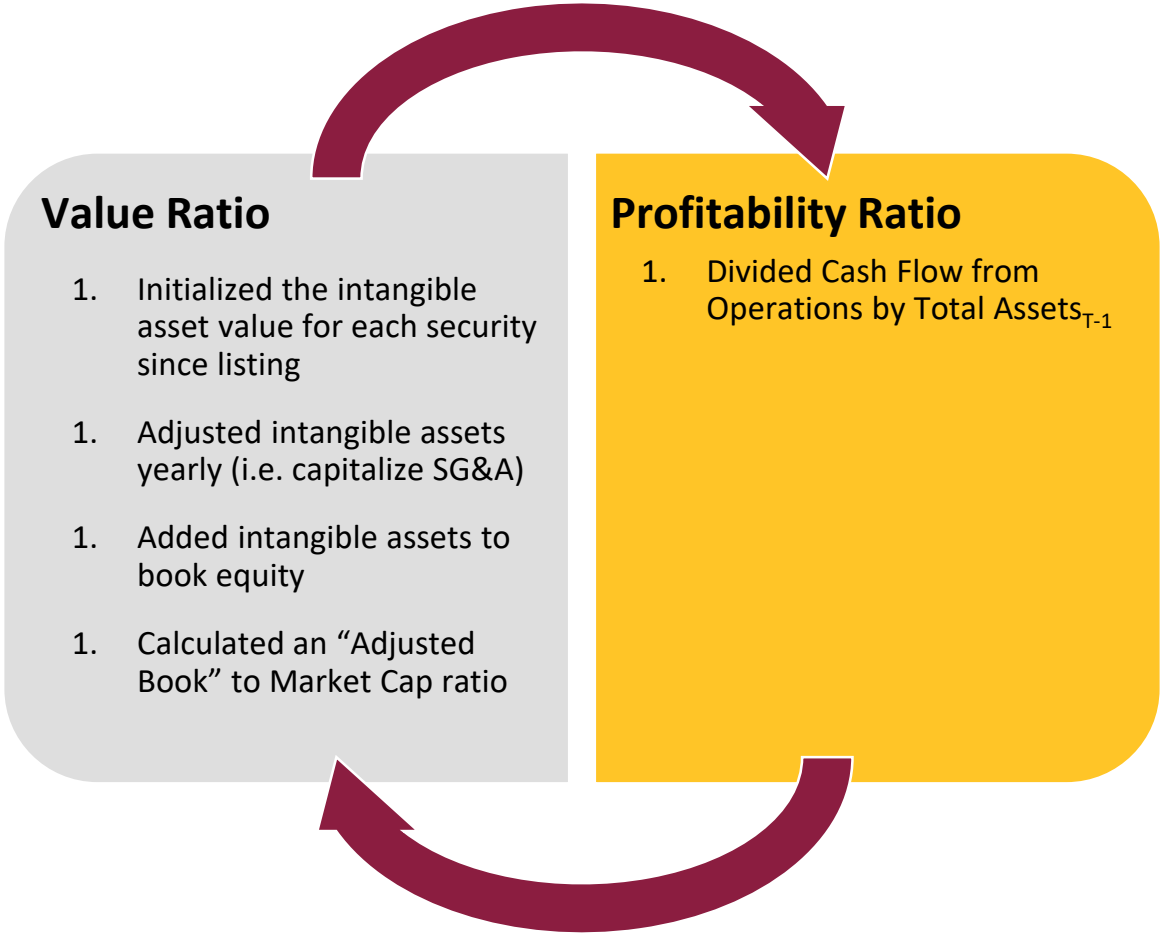
Compustat

- Used to calculate value metric
- Yearly historical accounting data for Russell 3000 securities from 1975
- Key Data points: Book Equity, SG&A

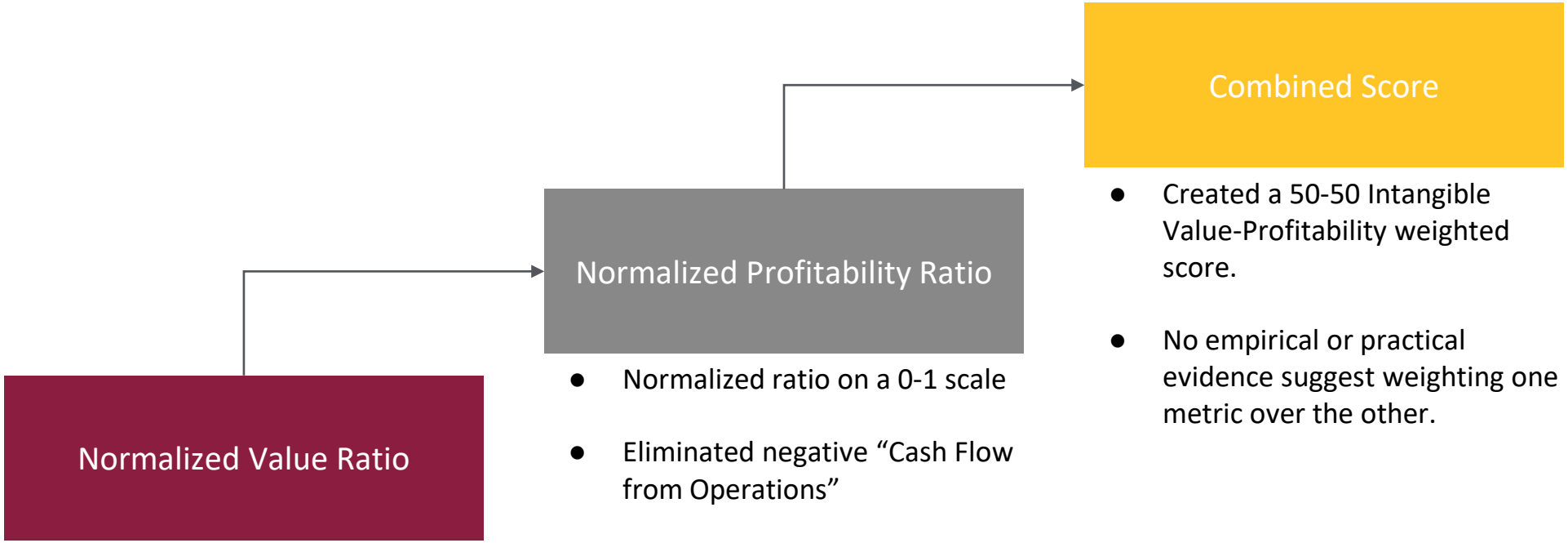
Bloomberg Terminal

- Used to calculate profitability metric
- Stock Universe - Russell 3000 (ex-utilities)
- Key Data Points: Market Capitalization, Cash Flows from Operations, Total $Assets_{T-1}$, Sector

Ratios | Value & Profitability



Selection Process



- Normalized ratio on a 0-1 scale

- Normalized ratio on a 0-1 scale
- Eliminated negative “Cash Flow from Operations”

- Created a 50-50 Intangible Value-Profitability weighted score.
- No empirical or practical evidence suggest weighting one metric over the other.

Selection Process

Sorted Russell 3000	Filtering	Initial Selection	News Check	Final Selection
Sorted by descending score of our weighted ratio	Excluded “red flag” securities via manual & automated checks	Applied investment policy regulations Applied portfolio weighting Proposed top 5-10 for each GICS sector	Manual investigation of news (e.g. announced delisting, merger)	Selected the top securities consistent with each sector, resulting in 62

Portfolio Weighting

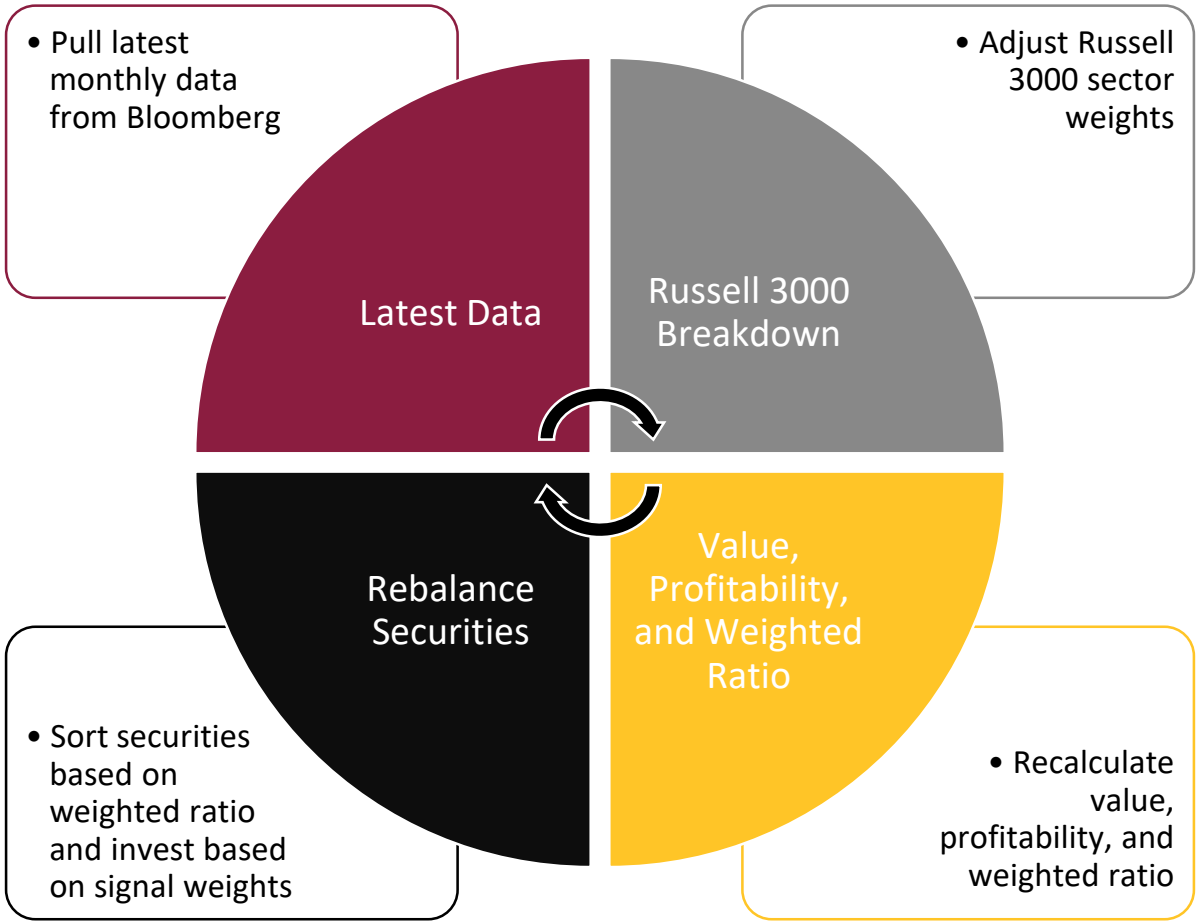
1) Calculate portfolio sector weights to mirror Russell 3000 to achieve market-wide diversification
   - IPS limit on Sector Allocation affects Information Technology

1) Signal weighted the securities within each sector
   - Gives us each securities individual portfolio weight

Sector	Russell 3000	Portfolio	Delta
Communication Services	13.64%	13.88%	0.24%
Consumer Discretionary	13.23%	13.48%	0.24%
Consumer Staples	5.47%	5.71%	0.24%
Energy	2.48%	2.72%	0.24%
Financials	11.48%	11.72%	0.24%
Health Care	12.31%	12.55%	0.24%
Industrials	8.66%	8.91%	0.24%
Information Technology	27.15%	24.00%	-3.15%
Materials	2.36%	2.60%	0.24%
Real Estate	3.19%	3.43%	0.24%
Utilities	0.03%	0.00%	-0.03%
Cash	0.00%	1.00%	1.00%
Total	100.00%	100.00%	0.00%

Rebalancing

We plan to rebalance on a **monthly** basis.



Discussion

Thesis | Implementation | Discussion

Thank You!

Appendix

- Intangible Adjustment
- Cash Flow from Operations
- Statistical Analysis
- Detailed Selection Breakdown

Intangible Adjustment

Eisfeldt et al. justification for capitalizing 100% of SG&A:

> "...we show in the Online Appendix that our main results are unchanged if we follow the alternative convention of separately setting = 0.3 for SG&A minus R&D expenditures and = 1 for R&D expenditures."

In reference to their 2013 paper:

> "firms with higher stocks of intangible assets outperform firms with lower intangibles, and provides additional evidence supporting the use of the selling and general administrative expense as a measure of intangible investment."

Intangible Adjustment

Eisfeldt et al. Fama French 3/5 factor regression analysis using different intangible adjusted value factors.

Capitalizing 100% of SG&A

	(1)	(2)	(3)	(4)
α (%)	12.97	11.19	8.73	9.85
	(4.04)	(3.47)	(2.92)	(3.30)
β_{MktRF}	-0.36	-0.23	-0.05	-0.14
	(-1.11)	(-0.70)	(-0.17)	(-0.46)
β_{SMB}	0.22	0.24	0.29	0.29
	(1.68)	(1.79)	(2.28)	(2.23)
$\beta_{HML^{FF}}$	0.30		0.25	
	(2.33)		(1.98)	
$\beta_{HML^{INT}}$		0.37		0.43
		(2.74)		(3.13)
β_{MOM}	0.54	0.55	0.53	0.54
	(2.78)	(2.81)	(2.74)	(2.78)
β_{RMW}			0.31	0.31
			(2.76)	(2.81)
β_{CMA}			0.16	0.11
			(1.75)	(1.20)
Adj. R^2	73.66	77.56	78.21	80.38
RMSE	0.43	0.39	0.34	0.33

Capitalizing 100% of R&D and 30% of SG&A

	(1)	(2)	(3)	(4)
α (%)	12.97	11.92	8.73	9.52
	(4.04)	(3.70)	(2.92)	(3.19)
β_{MktRF}	-0.36	-0.28	-0.05	-0.12
	(-1.11)	(-0.86)	(-0.17)	(-0.37)
β_{SMB}	0.22	0.23	0.29	0.29
	(1.68)	(1.71)	(2.28)	(2.23)
$\beta_{HML^{FF}}$	0.30		0.25	
	(2.33)		(1.98)	
$\beta_{HML^{INT}}$		0.36		0.37
		(2.88)		(2.87)
β_{MOM}	0.54	0.55	0.53	0.54
	(2.78)	(2.82)	(2.74)	(2.78)
β_{RMW}			0.31	0.31
			(2.76)	(2.77)
β_{CMA}			0.16	0.12
			(1.75)	(1.33)
Adj. R^2	73.66	77.97	78.21	79.59
RMSE	0.43	0.41	0.34	0.33

Intangible Adjustment

Formula for initializing a firm's intangible assets used by Eisfeldt, Kim, et. al.

$$\text{Int}_{it} = SG\&A_1/(g+\delta)$$

Formula for adjusting a firm's book equity

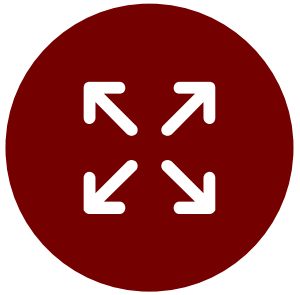
$$B_{it}^{\text{INT}} = B_{it} + \text{Int}_{it}$$

Leveraging Cash Flows from Operations

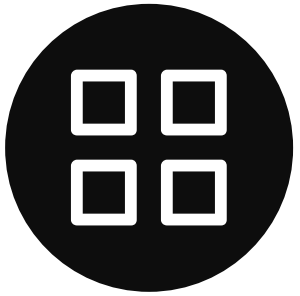
We leveraged **cash flows from operations (CFO)** from the Statement of Cash Flows because:

Adjusted for change in working capital

Cash-based line item (pulled from Statement of Cash Flows)



Limited missing data across Russell 3000 universe (Bloomberg)



Industry agnostic since required by GAAP regardless of industry

Statistical Analysis

Russell 3000 Value B/M against "Adjusted B/M" spread

Bit/M	
Mean	0.78
Standard Error	0.02
Median	0.59
Standard Deviation	0.91
Sample Variance	0.83
Kurtosis	41.21
Skewness	5.00
Range	13.88
Minimum	0.002
Maximum	13.88
Sum	1319.78
Count	1651

B/M	
Mean	0.51
Standard Error	0.01
Median	0.44
Standard Deviation	0.44
Sample Variance	0.20
Kurtosis	52.26
Skewness	3.57
Range	10.82
Minimum	-2.97
Maximum	7.85
Sum	837.07
Count	1651

Spread	
Mean	0.29
Standard Error	0.02
Median	0.06
Standard Deviation	0.83
Sample Variance	0.68
Kurtosis	56.31
Skewness	6.14
Range	12.79
Minimum	-0.80
Maximum	11.99
Sum	482.70
Count	1651

*** 80.85% overlap with Russell 3000 Value ***

GICS Sector	Average of B/M	Average of Bit/M	Average of Spread
Consumer Discretionary	0.42	1.33	0.92
Consumer Staples	0.38	1.20	0.82
Information Technology	0.34	0.69	0.35
Communication Services	0.50	0.82	0.32
Industrials	0.42	0.70	0.28
Health Care	0.38	0.62	0.24
Materials	0.47	0.67	0.20
Energy	0.76	0.82	0.06
Real Estate	0.55	0.56	0.01
Financials	0.78	0.75	(0.03)
Utilities	0.47	0.41	(0.06)
Grand Total	**0.51**	**0.90**	**0.29**

Statistical Analysis

Russell 3000 B/M against "Adjusted B/M" spread

Bit/M	
Mean	0.66
Standard Error	0.02
Median	0.45
Standard Deviation	0.83
Sample Variance	0.69
Kurtosis	45.00
Skewness	5.09
Range	13.87
Minimum	0
Maximum	13.87
Sum	1549.30
Count	2357

B/M	
Mean	0.40
Standard Error	0.01
Median	0.31
Standard Deviation	0.45
Sample Variance	0.20
Kurtosis	68.11
Skewness	4.53
Range	10.82
Minimum	-2.97
Maximum	7.85
Sum	941.50
Count	2357

Spread	
Mean	0.26
Standard Error	0.02
Median	0.06
Standard Deviation	0.76
Sample Variance	0.58
Kurtosis	62.59
Skewness	5.61
Range	19.29
Minimum	-7.30
Maximum	11.99
Sum	607.81
Count	2357

GICS Sector	Average of B/M	Average of Bit/M	Average of Spread
Consumer Staples	0.35	1.04	0.69
Consumer Discretionary	0.30	0.99	0.68
Information Technology	0.22	0.49	0.27
Industrials	0.36	0.63	0.27
Materials	0.44	0.65	0.21
Health Care	0.28	0.48	0.20
Communication Services	0.46	0.63	0.17
Energy	0.65	0.69	0.04
Real Estate	0.50	0.49	(0.01)
Financials	0.74	0.71	(0.03)
Utilities	0.47	0.41	(0.06)
Grand Total	**0.40**	**0.66**	**0.267**

Statistical Analysis

Russell 3000 CFO/Total Assets against EBIT/Total Assets spread

GICS Sector	Average of CFO/Total Assets Y-1	Average of EBIT / Total Assets Y-1	Average of Spread	Average of ABS
Consumer Discretionary	0.64	-4.58	-5.22	5.32
Health Care	-4.01	-7.25	-3.24	3.35
Information Technology	0.14	-0.12	-0.27	0.30
Financials	0.06	-0.06	-0.11	0.35
Communication Services	0.05	-0.01	-0.06	0.08
Real Estate	0.05	0.003	-0.05	0.06
Industrials	0.08	0.03	-0.04	0.09
Energy	0.06	0.03	-0.04	0.12
Utilities	-0.01	-0.03	-0.01	0.03
Consumer Staples	0.08	0.07	-0.01	0.06
Materials	0.07	0.08	0.01	0.07
Grand Total	**-0.81**	**-2.36**	**-1.55**	**1.62**

Statistical Analysis

Russell 3000 CFO/Total Assets against EBIT/Total Assets spread

CFO/Total Assets Y-1	
Mean	-0.81
Standard Error	0.60
Median	0.070
Mode	0.24
Standard Deviation	30.10
Sample Variance	905.68
Kurtosis	2,131.67
Skewness	-44.42
Range	1,674.05
Minimum	-1,453.50
Maximum	220.55
Sum	-2,076.37
Count	2,558

EBIT / Total Assets Y-1	
Mean	-2.36
Standard Error	1.08
Median	0.05
Mode	0.26
Standard Deviation	54.69
Sample Variance	2,991.47
Kurtosis	1,275.44
Skewness	-34.04
Range	2,258.46
Minimum	-2,250
Maximum	8.46
Sum	-6039.79
Count	2,558

Spread	
Mean	-1.55
Standard Error	0.72
Median	-0.03
Mode	0.03
Standard Deviation	36.64
Sample Variance	1,342.26
Kurtosis	1,484.86
Skewness	-36.63
Range	1,600.22
Minimum	-1593.34
Maximum	6.88
Sum	-3,963.41
Count	2,558

ABS	
Mean	1.62
Standard Error	0.72
Median	0.05
Mode	0.02
Standard Deviation	36.64
Sample Variance	1,342.02
Kurtosis	1,485.09
Skewness	36.63
Range	1,593.33
Minimum	-
Maximum	1,593.34
Sum	4,154.57
Count	2,558

Detailed Selection Breakdown

Breakdown of # of companies after automatic checks per sector prior to 1) Rank Ratio by Industry & 2) News Check (Investable Universe):

GICS Sector	Count of Ticker
Communication Services	59
Consumer Discretionary	191
Consumer Staples	82
Energy	50
Financials	283
Health Care	155
Industrials	267
Information Technology	204
Materials	93
Real Estate	122
Grand Total	**1,506**

Breakdown of # of companies selected per sector (Final Selection)

GICS Sector	Count of Ticker
Communication Services	5
Consumer Discretionary	6
Consumer Staples	5
Energy	5
Financials	10
Health Care	5
Industrials	6
Information Technology	10
Materials	5
Real Estate	5
Grand Total	**62**