

Undergraduate Student Investment Management Fund

Semi-Annual Presentation

Team A | December 2019

Team Introduction

**Fund
Manager**



***John
Michael
Hayes***

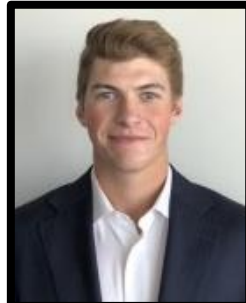
**Fund
Analyst**



***Patrick
Keller***



***Gabrielle
DeGravina***



***Logan
Robertson***



***Joseph
Briones***



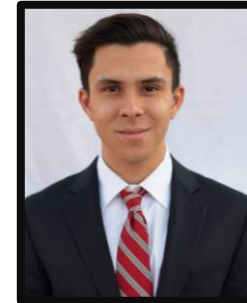
***Avinaash
Koganti***



***Eri
Koroli***



***Jacob
Robinson***



***Luismario
Higuera***

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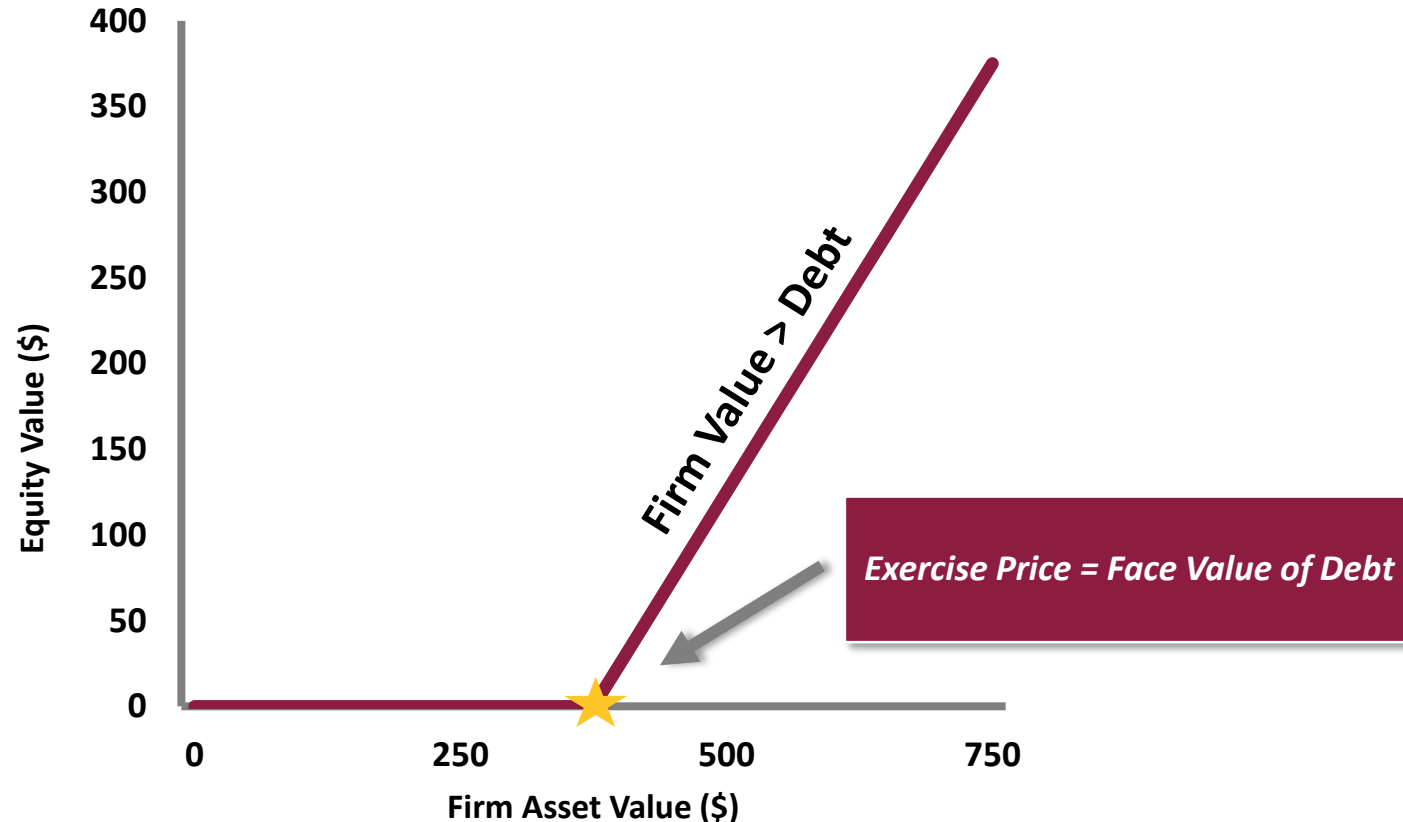
I. Investment Thesis

II. Strategy Implementation

Investment Thesis

Graphical Representation of Equity as a Call Option

Equity of a firm with debt in its capital structure is analogous to a call option on the written assets of a firm.



Black, Fischer, and Myron Scholes, 1973, "The Pricing of Options and Corporate Liabilities", *Journal of Political Economy* 81, 637–654. & Merton, Robert C., 1974, "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates", *Journal of Finance* 29, 449–470.

Call Option Replicated

A call option can be rewritten using a portfolio of stocks (assets), put options on the underlying stocks (assets), and risk-free bonds to provide an identical payoff.

	$S_T < x$	$S_T > x$
Call Option	0	$S_T - x$
Stock (Assets)	S_T	S_T
Put Option	$x - S_T$	0
Risk Free Borrowing	-x	-x
	<hr/>	<hr/>
	0	$S_T - x$
	<hr/>	<hr/>

$$\textit{Equity} = \textit{Assets} + \textit{Put Option} - \textit{Safe Debt}$$

Investment Thesis

Eisdorfer, Goyal, and Zhdanov hypothesize that if investors do not value the default option, misvaluation can occur.

	<u>High Default Option</u>	<u>Low Default Option</u>
Traditional Valuation (e.g. DCF)	Misvalued	Appropriate Valuation
Valuation with Default Option	Appropriate Valuation	Appropriate Valuation

Eisdorfer, Goyal, and Alexei Zhdanov, 2019, "Equity Misvaluation and Default Options", *The Journal of Finance* 74, 845–898.

Valuation of Equity in the Model

There are two components to valuing equity within the model, 1) value to the equity holders (if they were to operate into perpetuity), 2) value of default option.

$$\text{Value of Equity} = \text{Value to Equity Holders} + \text{Value of Default Option}$$

Eisdorfer, Goyal, and Alexei Zhdanov, 2019, "Equity Misvaluation and Default Options", *The Journal of Finance* 74, 845–898.

Value of Default Option

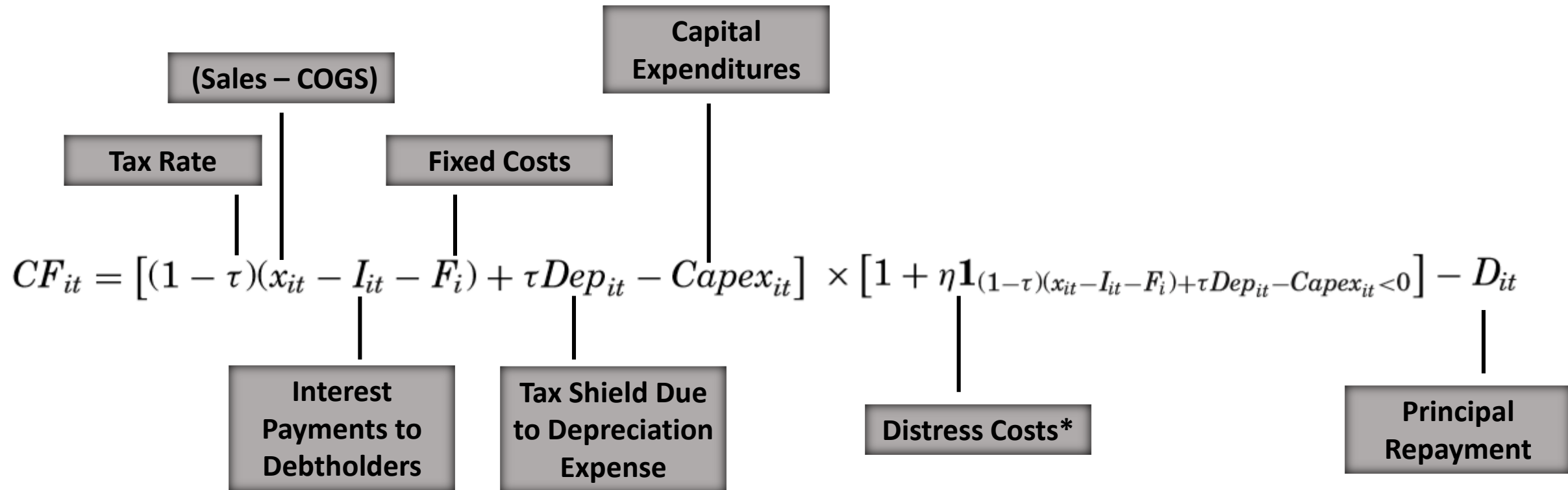
The default option can be deconstructed into two parts: 1) discounting the cash flows of a firm until an optimal stopping time, 2) discounting the cash flows of a firm into perpetuity.

Optimal
Stopping Time

$$\text{Default option} = \sup_{T_{xd(t)}} \mathbf{E}_{x_0}^Q \underbrace{\int_0^{T_{xd(t)}} e^{-rt} CF_{it} dt}_{\text{Equity}} - \mathbf{E}_{x_0}^Q \underbrace{\int_0^{\infty} e^{-rt} CF_{it} dt}_{\text{Assets - Safe Debt}} \geq 0$$

Eisdorfer, Goyal, and Alexei Zhdanov, 2019, "Equity Misvaluation and Default Options", *The Journal of Finance* 74, 845–898.

Value of Default Option Continued



Eisdorfer, Goyal, and Alexei Zhdanov, 2019, "Equity Misvaluation and Default Options", *The Journal of Finance* 74, 845–898.

*Incurred when a firm incurs negative cash flows.

Comparing Model Value to Market Value

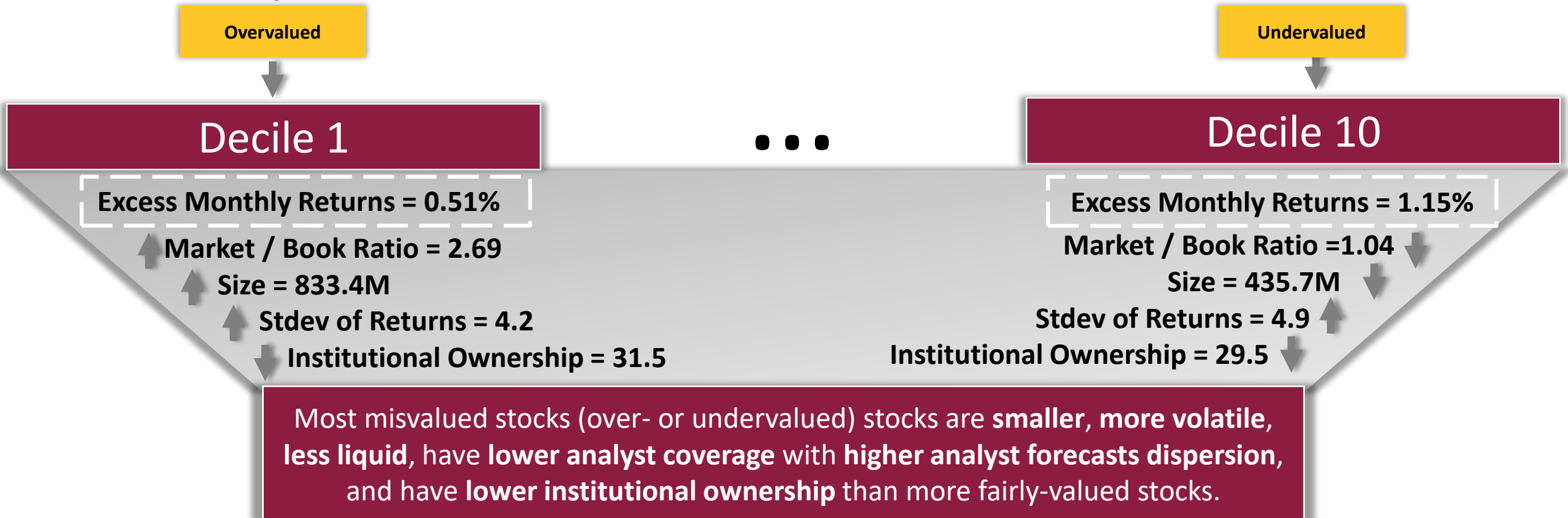
Stocks are sorted into deciles according to the ratio of the equity value implied by the valuation model to the actual equity value.

$$\begin{array}{l} \text{Equity Market Value} \\ \text{Current Market Value} \end{array} \frac{4 \text{ B}}{3.5 \text{ B}} = 1.14 \rightarrow \textit{Undervalued}$$

$$\begin{array}{l} \text{Equity Market Value} \\ \text{Current Market Value} \end{array} \frac{3.5 \text{ B}}{4 \text{ B}} = .88 \rightarrow \textit{Overvalued}$$

Misvaluation in Returns

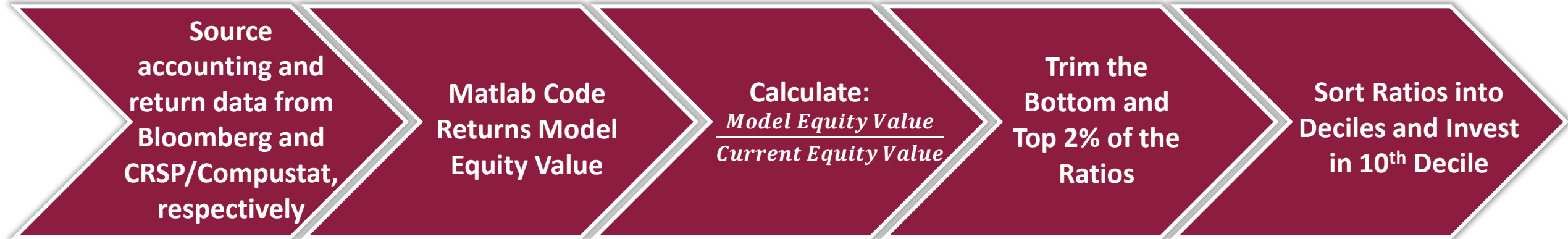
The model indicates that the misvaluation picked up by our model is related to the default option.



Eisdorfer, Goyal, and Alexei Zhdanov, 2019, "Equity Misvaluation and Default Options", *The Journal of Finance* 74, 845–898.

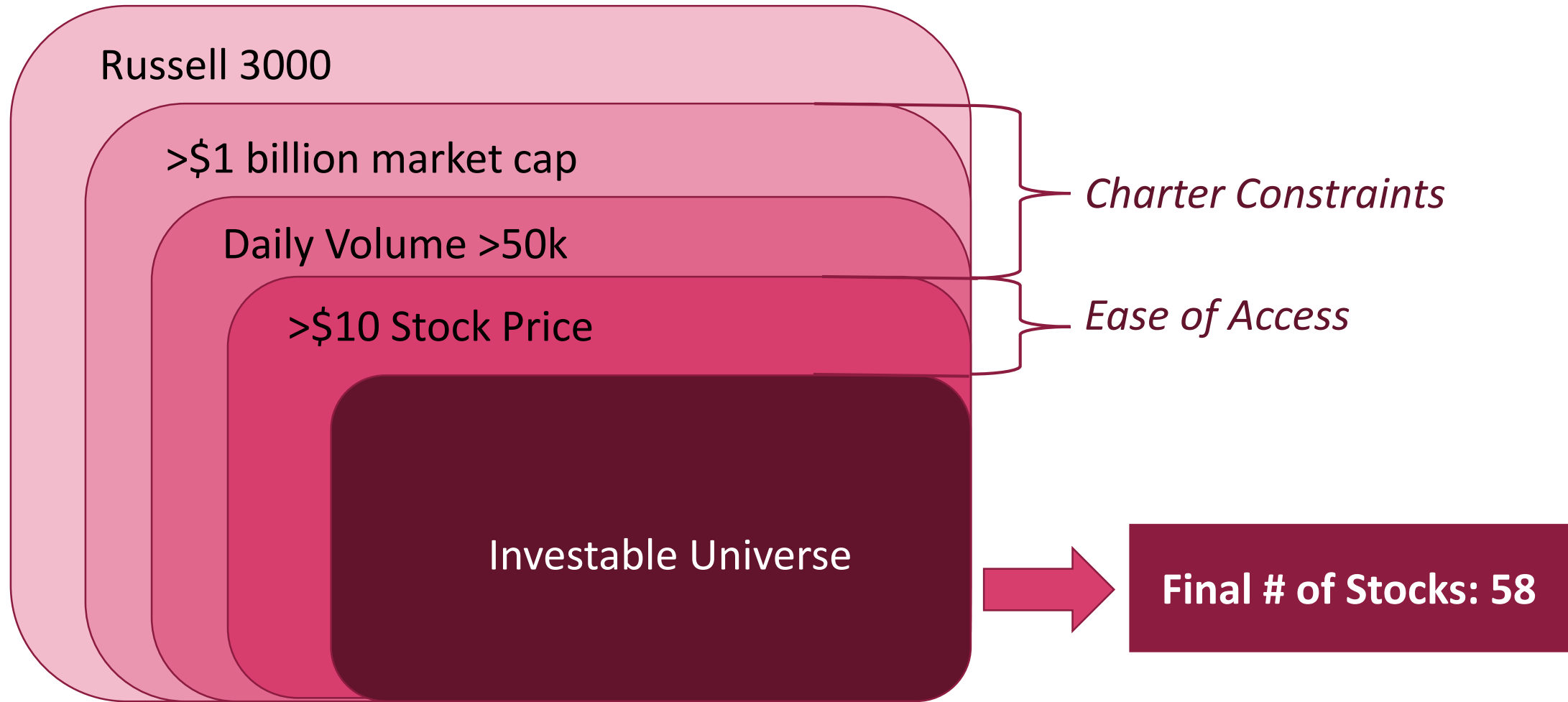
Implementation

Portfolio Construction Process Overview



**CRSP/Compustat till 2018, supplemented with Bloomberg for current info*

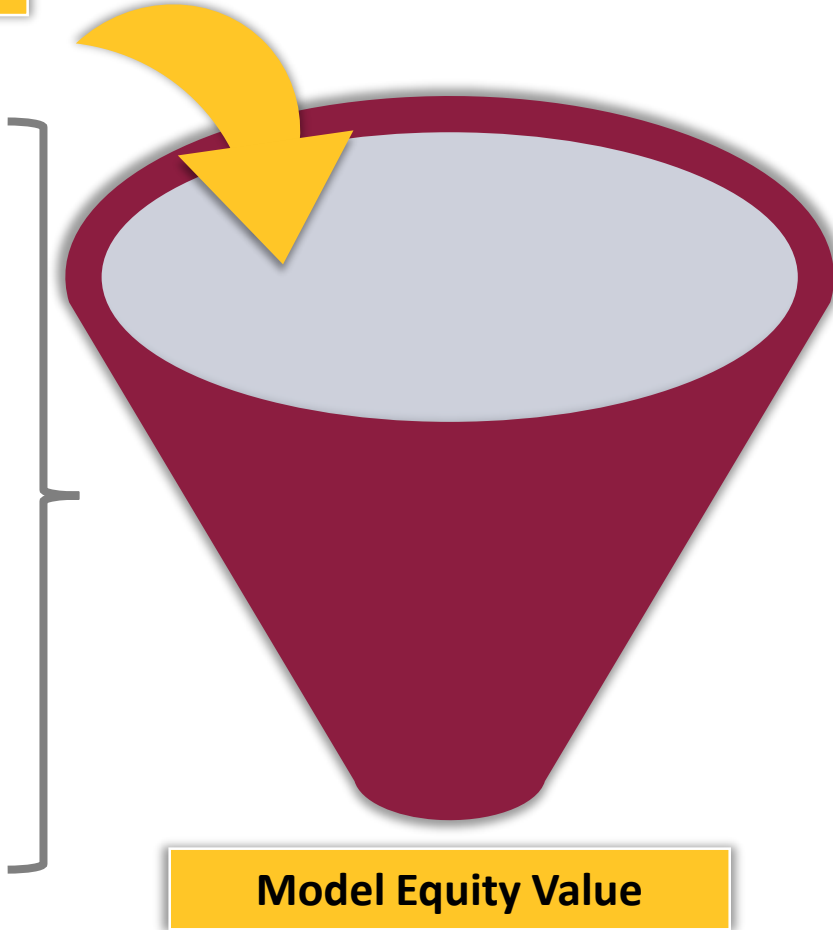
Filtering for Investible Universe



Portfolio Construction: Inputs & Assumptions

Model Inputs

- Current liabilities
- Long-term liabilities
- Revenue
- Fixed Costs
- Volatility
- Risk-free rate
- COGS
- WAAC
- CAPEX
- Depreciation
- Leverage
- SIC Code





SG&A → Proxy for fixed costs

SIC Codes → Used to calculate industry averages for Depreciation & CAPEX

Return on Assets → Equals WACC

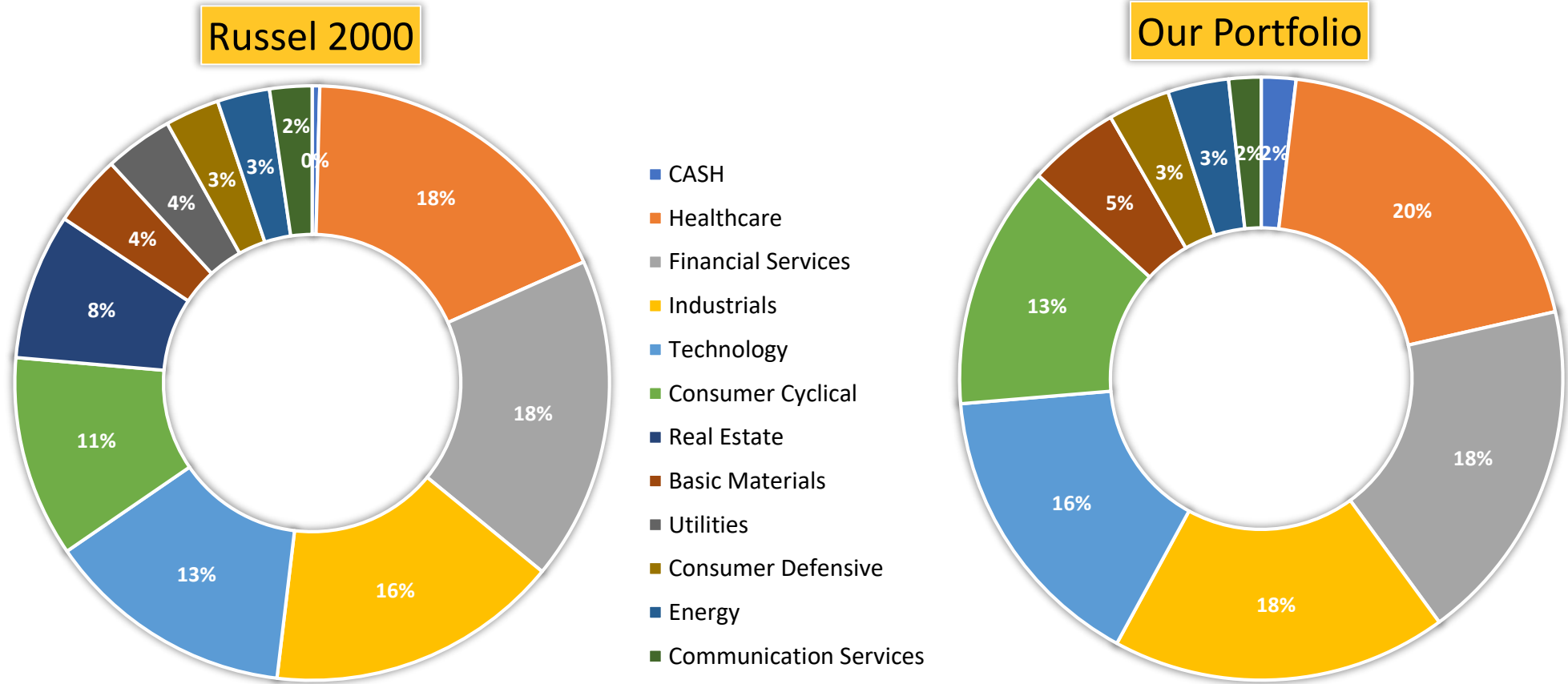
Decile Details and Construction

 Our data
 Paper's data

	Decile 1		...	Decile 5		...	Decile 10	
Size	21,419	833		9,828	2,034		5,768	436
Market-to-Book	12.50	2.69		3.85	1.96		5.51	1.4
Stdev of Returns	2.3	4.2		2.1	2.9		2.2	4.9

Paper data an average of 1983 – 2012, our data a snapshot of October 2019

Sector Weighting Comparison



Rebalancing

Pull Latest Data

We will pull the most updated data on Bloomberg as companies' report financial information.

Avoid Bankrupt Companies

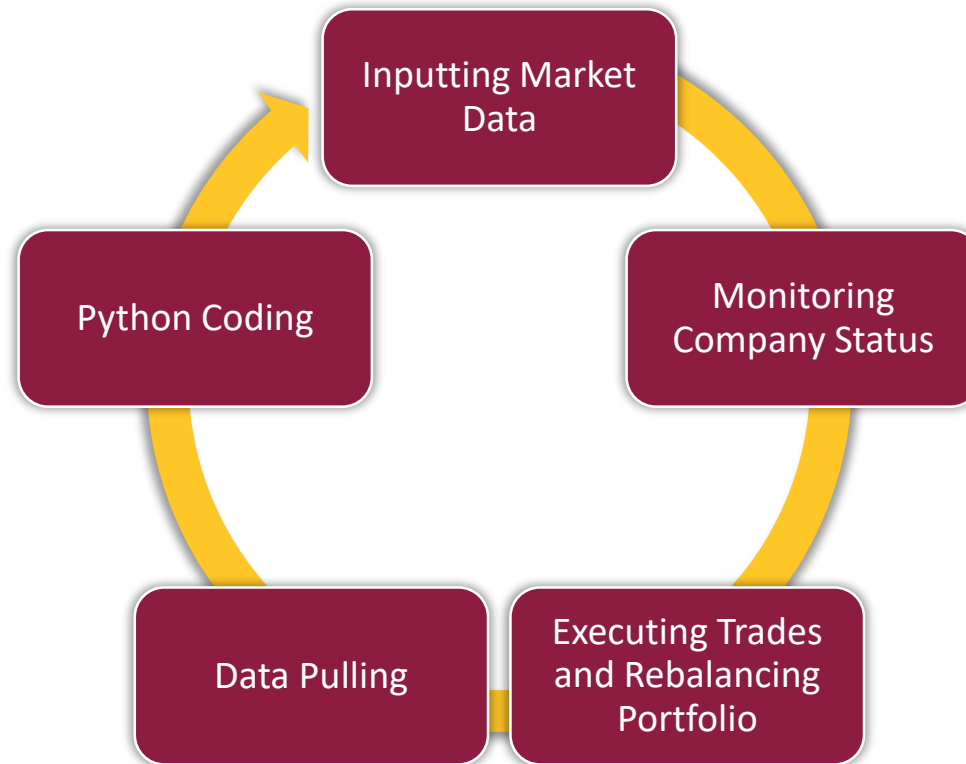
We will have a dedicated team to monitor that the securities are not under bankruptcy.

Rebalance Accordingly

We shall rebalance our portfolio monthly using equal weights.

Task Allocation Process

Each team member will rotate positions throughout the semester. This will ensure all team members are exposed to every aspect of the investment process.



Semi-Annual Presentation

Friday, December 6th, 2019

Team B - Undergraduate Student Investment Management Fund



Fund Analysts

Fund Manager



John Michael
Hayes



Nicholas
Ackerley



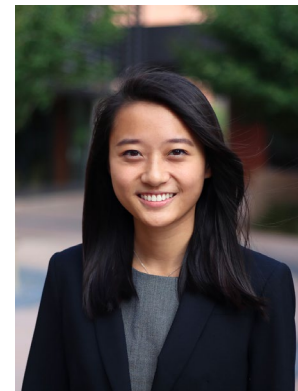
Elbridge
Barnard



Vivian Chen



Mauricio
Corona



Amy Lin



Jonathan
Miranda



Bailey Roos



David Stahle

Investment Thesis



An event-based portfolio capturing abnormal returns around dividend distribution

Predictable Corporate Distributions & Stock Returns
by Bessembinder & Zhang (BZ)

Dividend Month Premium
by Solomon & Hartzmark (SH)

Forecasting
Corporate Distribution
Announcement Date

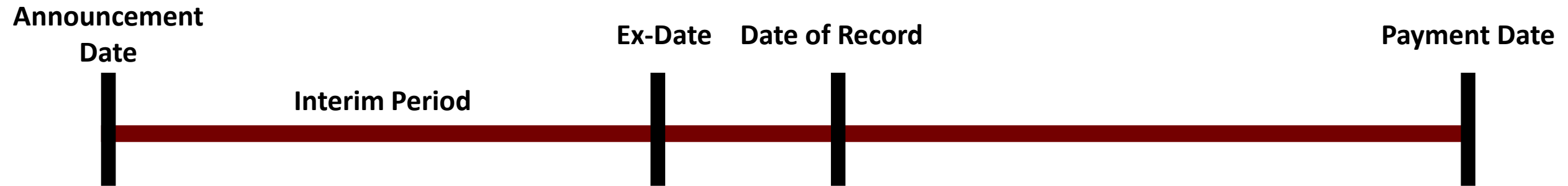
Abnormal Returns on
Announcement Day

Focuses on
Interim Period

Abnormal Returns on
Ex-Day



Dividend Distribution Timeline



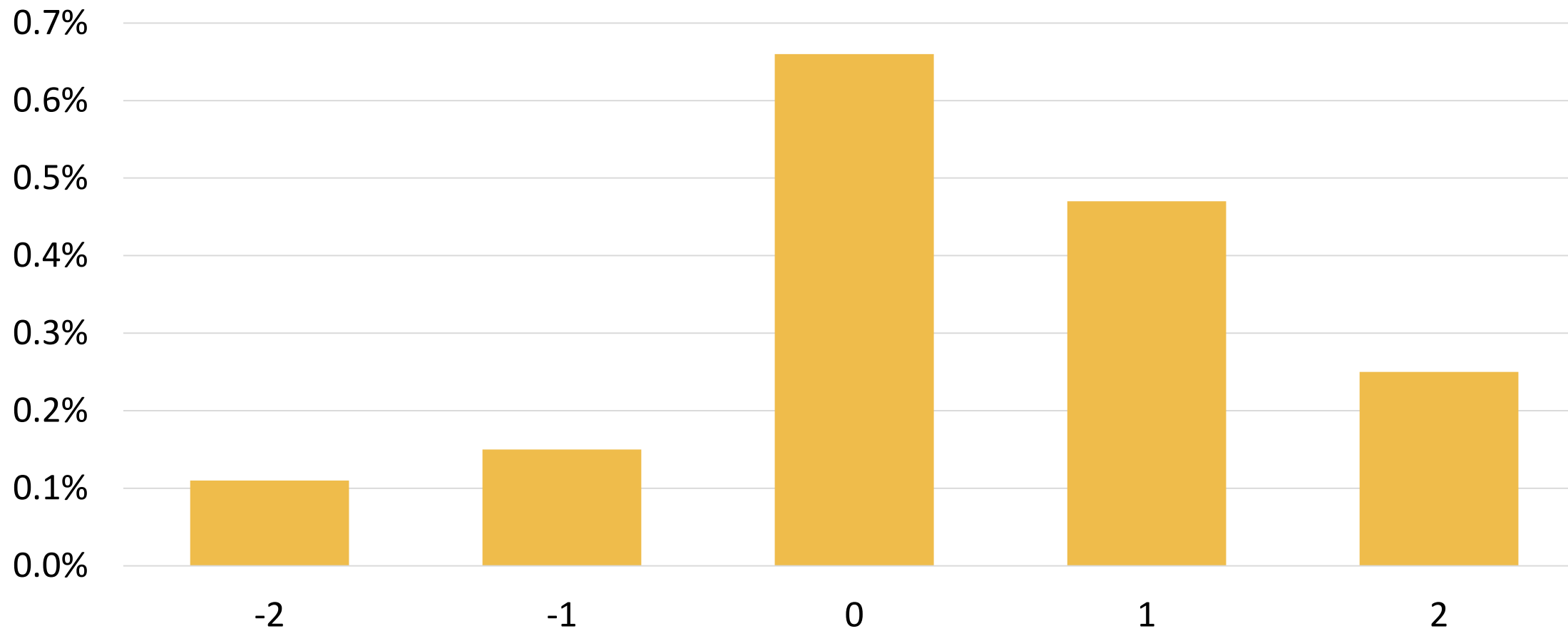
Purchasing stocks with high estimated probabilities of distribution events generates significant abnormal returns

Predicting distribution events

	P(t)		P(t t-12)
Dividend Increases	1.2%	x28	32.9%
Special Dividends	0.24%	x136	32.6%
Stock Dividends	0.37%	x79	29.2%
Stock Splits	0.45%	x10	4.5%

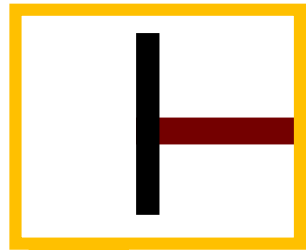


Daily Stock Returns around Dividend Increase Announcement





Announcement
Date



Interim Period

Ex-Date

Date of Record

Payment Date

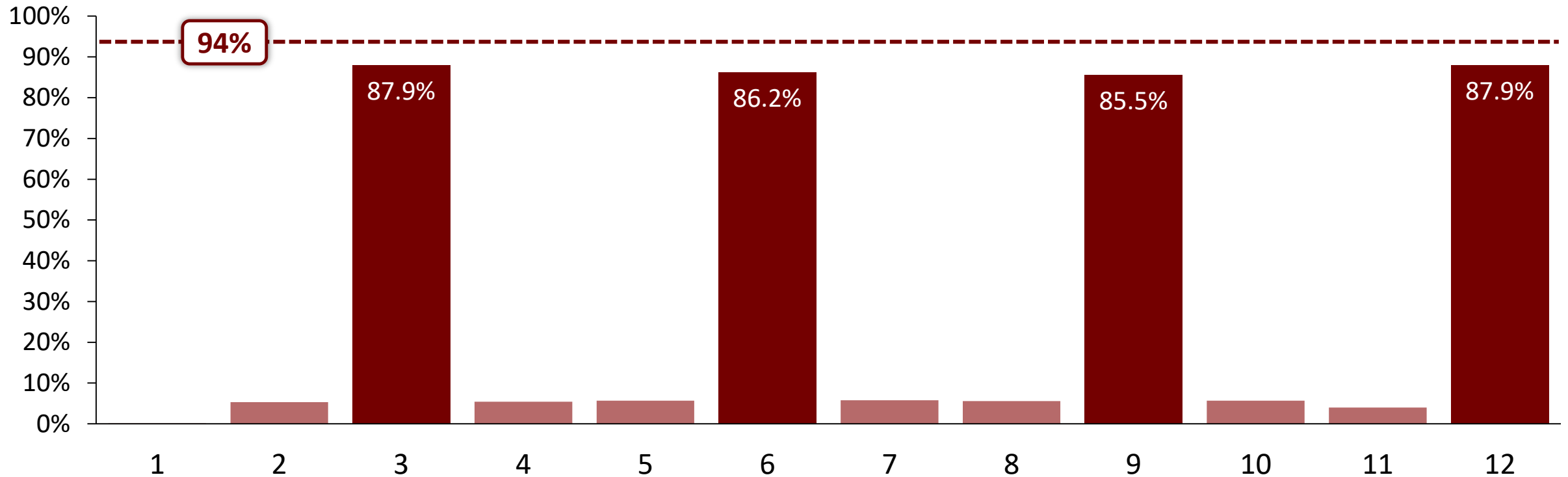


Key Takeaways:

- Increased predictability using conditional probability to select securities
- Abnormal returns around announcement date

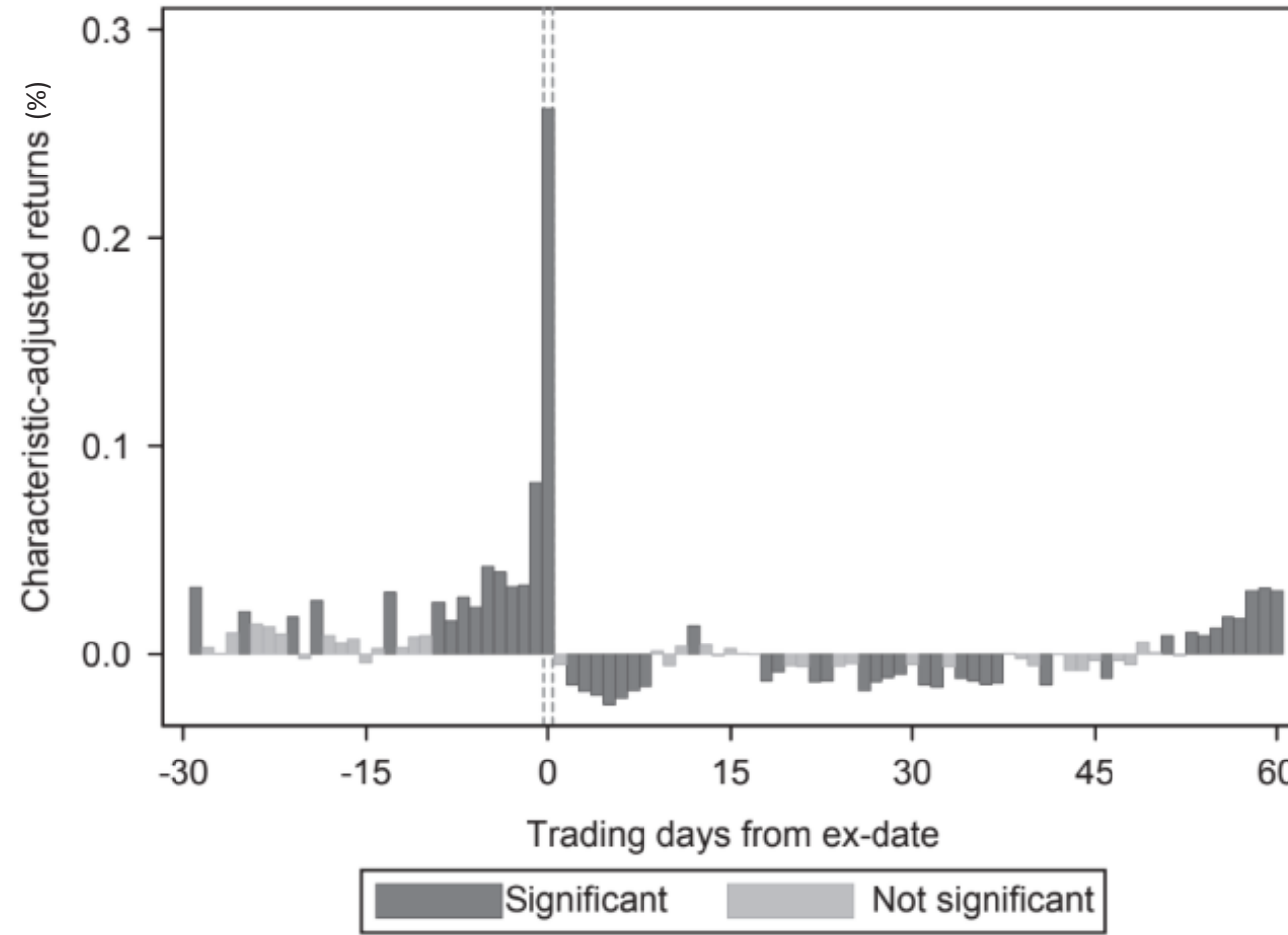


Purchasing stocks in months with high estimated probabilities of dividend distribution generates significant abnormal returns



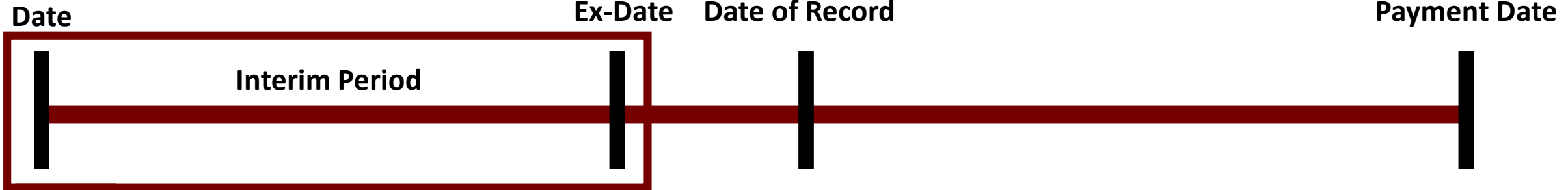


Daily characteristic-adjusted returns around ex-dividend date



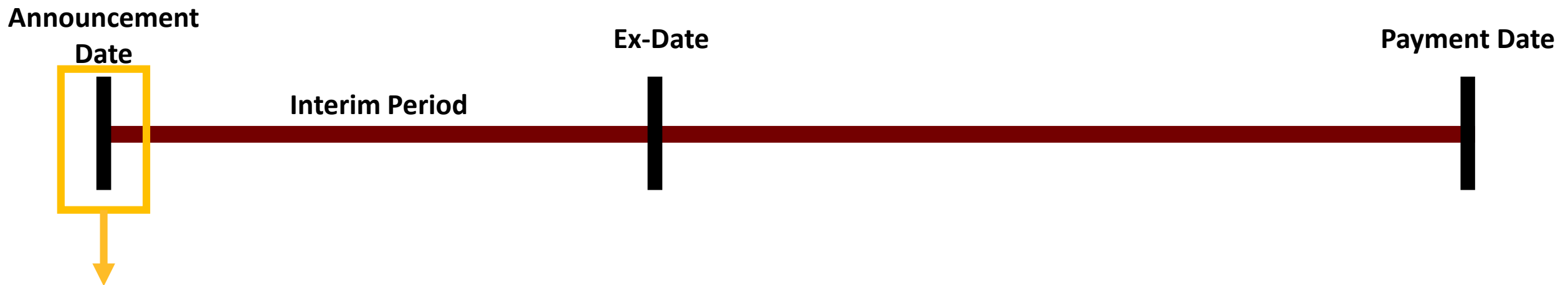


Announcement



Key Takeaways:

- Increased predictability using conditional probability to select securities
- Abnormal returns at announcement date, during interim period, and on ex-date



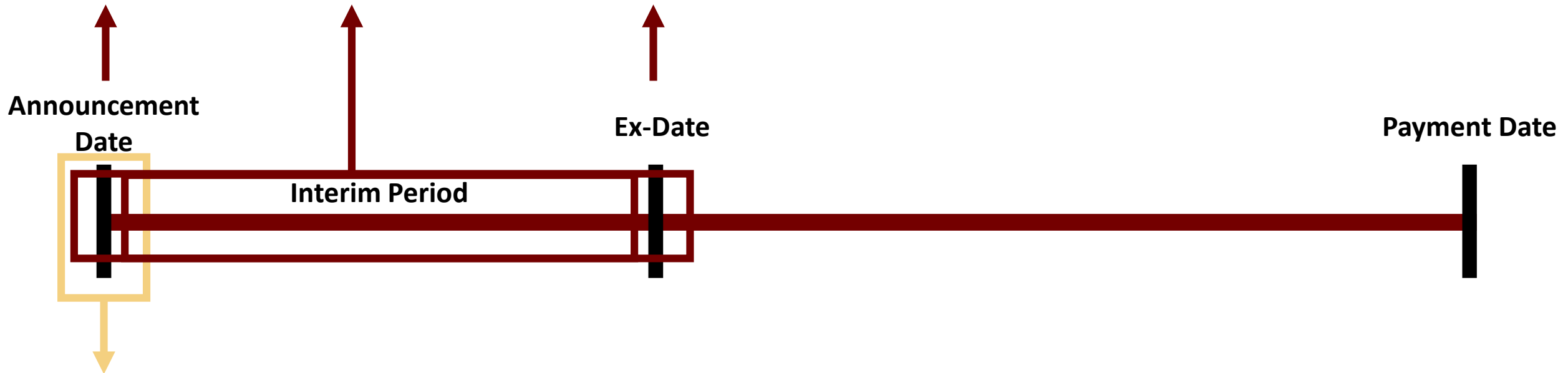
BZ:

- Predict announcement date
- Capture announcement date abnormal returns



SH:

- Predict dividend distribution
- Capture announcement date, interim period, and ex-date abnormal returns

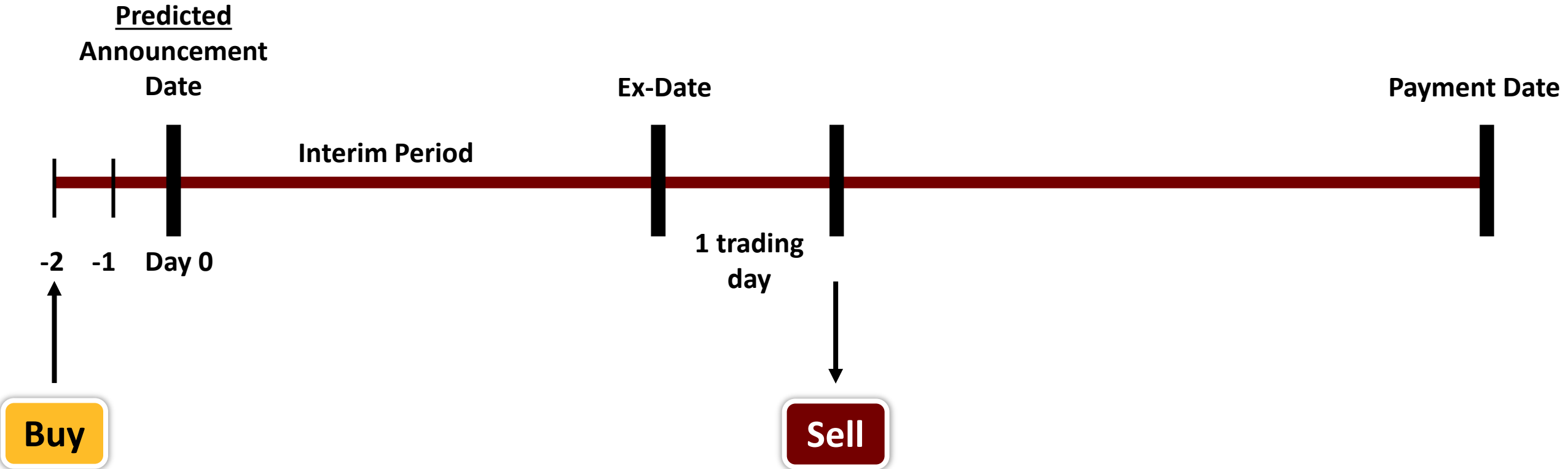


BZ:

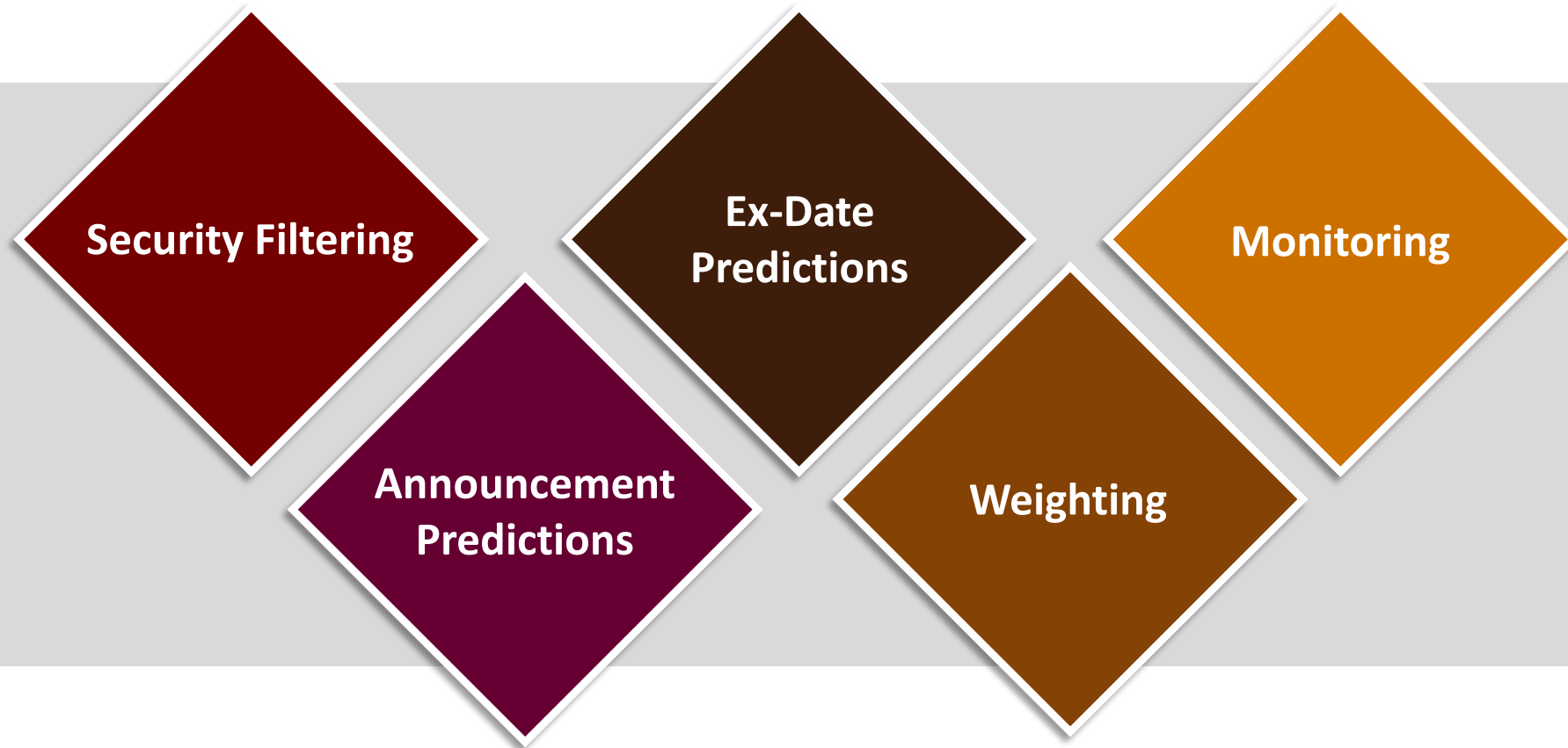
- Predict announcement date
- Capture announcement date abnormal returns



Strategy Timeline to Be Implemented



Strategy Implementation






Introduction

Process

Security Filtering - SH



Security ID	November				January				March			
	M-3	M-6	M-9	M-12	M-3	M-6	M-9	M-12	M-3	M-6	M-9	M-12
22103	1	1	1	1	0	0	0	0		0	0	0
10932	0	0	0	0	1	1	1	1		0	0	0
10252	0	0	0	0	0	0	0	0		1	1	1
90454	0	0	0	0	1	1	1	1		0	0	0
11884	1	1	0	0	0	0	0	0		0	0	1
89841	1	1	1	1	0	0	0	0		0	0	0
57809	1	1	1	0	0	0	0	0		0	0	0

 = Buy List

 = Watch List

Introduction

Process

Security Filtering - BZ

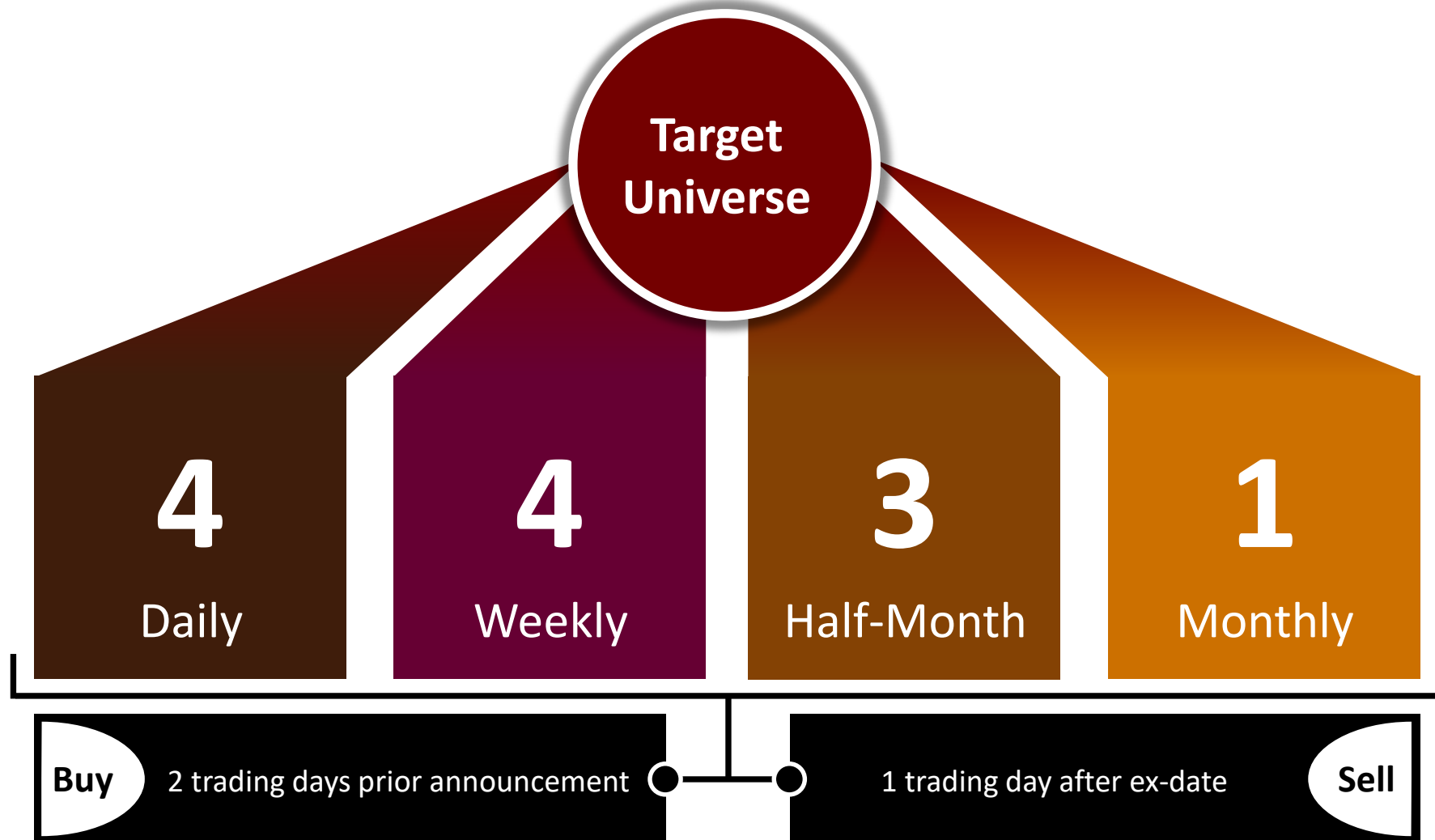


Security ID	November				January				March			
	M - 12	M - 24	M - 36	M - 48	M - 12	M - 24	M - 36	M - 48	M - 12	M - 24	M - 36	M - 48
22103	1	1	1	1								
10932					0	0	0	0				
10252									0	1	1	1
90454					0	1	1	1				
11884												
89841	0	1	0	0								
57809												

= BZ

Introduction

Process



Introduction

Process

Purpose

Announcement Predictions

Security ID	Daily					Weekly					Half-Month	
	M	T	W	Th	F	1	2	3	4	5	H1	H2
22103		1										
10932										1		
10252				3								
90454												1
11884												
89841												
57809												

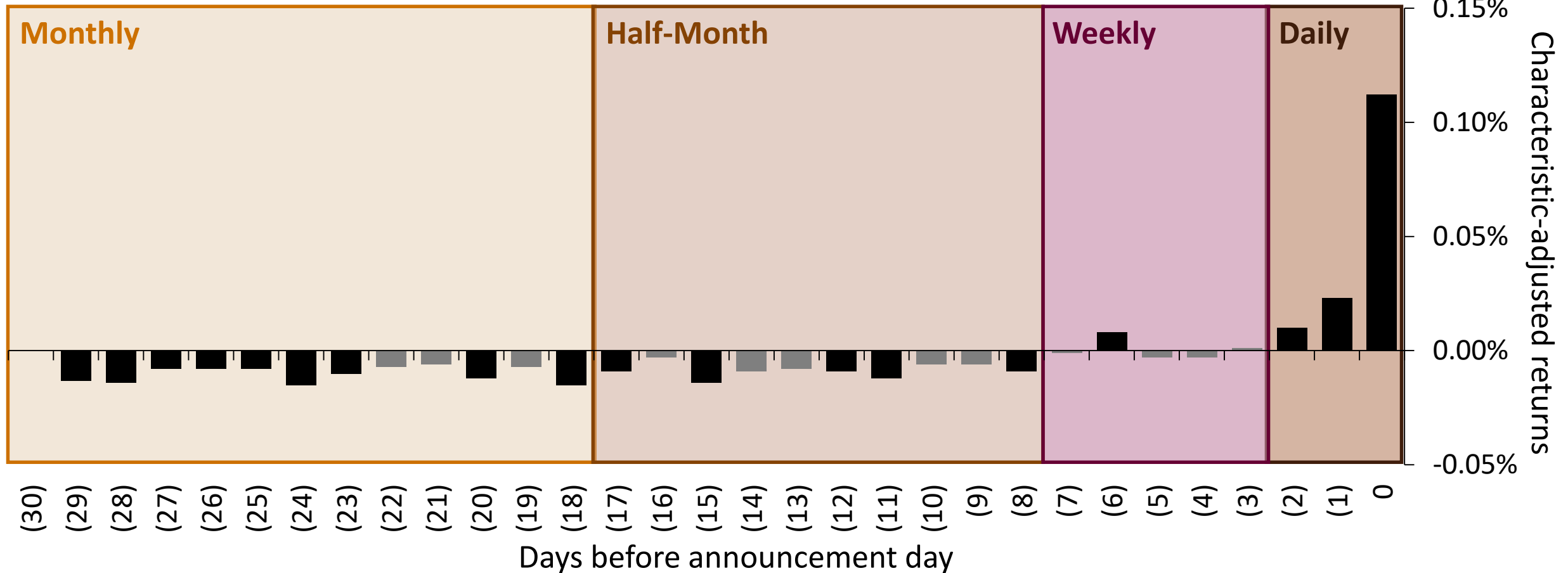
= Daily
 = Weekly
 = Half-Month
 = Monthly

Introduction

Process

Purpose

Minimizing Exposure to Non-Event Days and Announcement Misses



S.M. Hartzmark, D.H. Solomon / Journal of Financial Economics 109 (2013) 640–660

Introduction

Process

Purpose

1

Eliminate exposure to
post ex-date losses

2

Maximize portfolio
exposure to strategy

3

Reduce probability buy
orders exceed cash

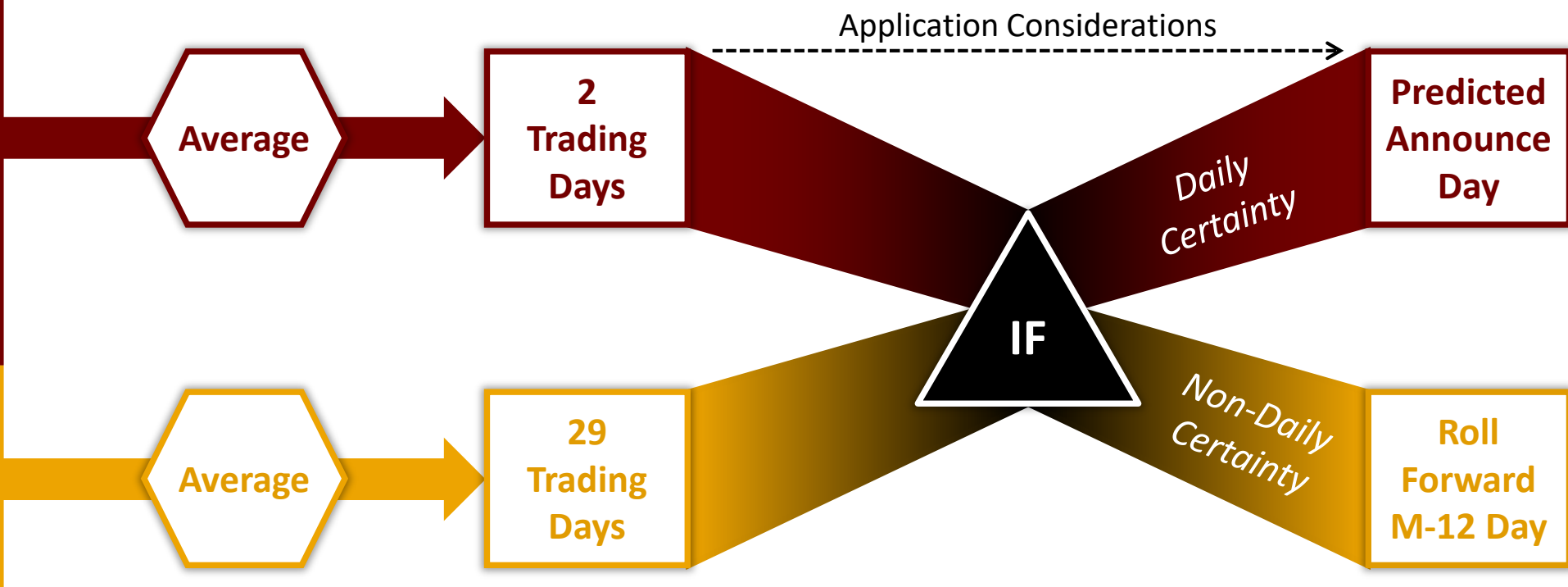
Purpose

Process

Ex-Date Predictions

Source Data	
Security ID	Trading Days to Ex-Date
10113	1
10113	2
10113	2
10113	2
10113	2
10113	2
10113	2
10113	2
10113	2
10113	2
10113	2
10113	2
10147	22
10147	28
10147	43
10147	9
10147	33
10147	34

The model runs off of a **Trading Day Matrix**, ensuring buy, sell, and predicted announcement dates occur on active trading days.



Purpose

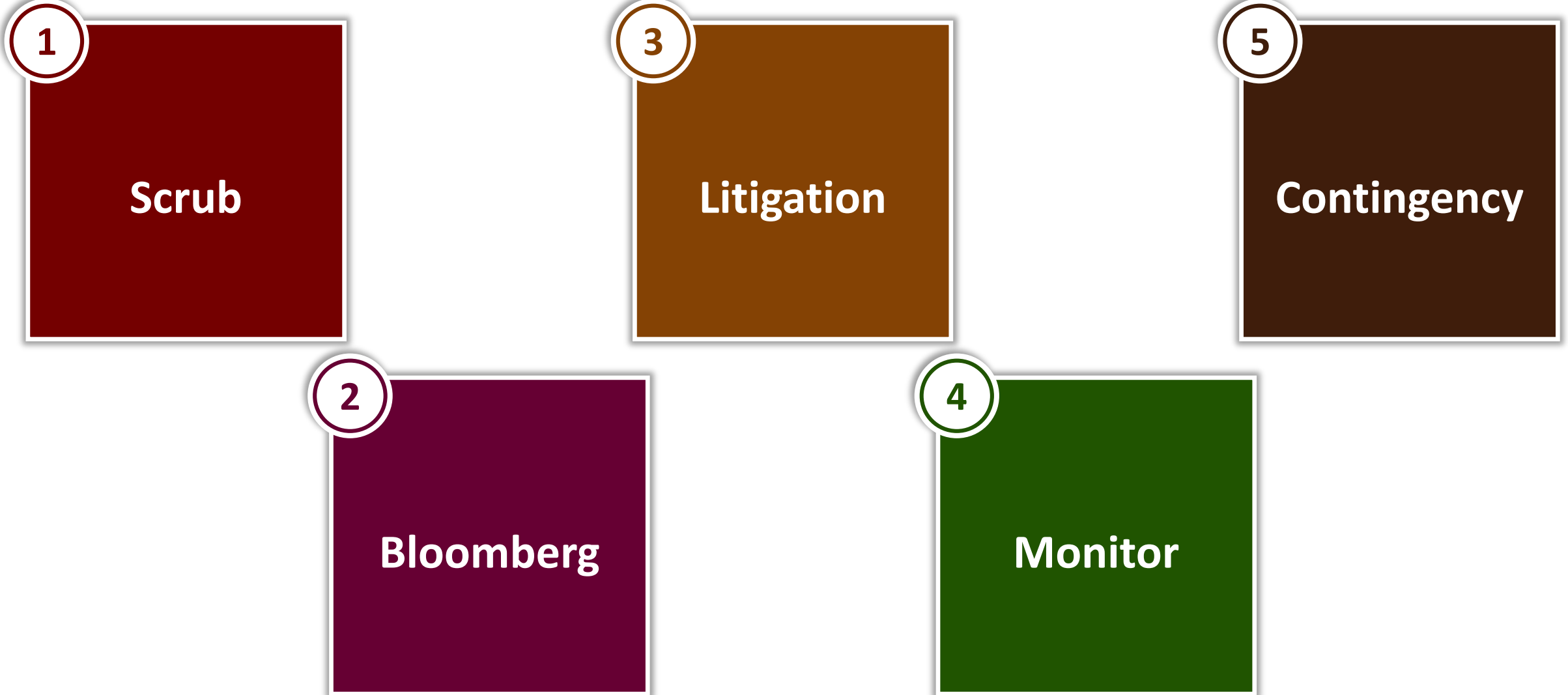
Process

Increase performance by maximizing portfolio exposure to abnormal returns surrounding dividend events

Certainty	Rank	Base Weight
Daily	1	3.5%
Weekly	2	2.5%
Half-Month	3	1.5%
Monthly	4	1.5%

Increase	Rank	Add-On
Dividend	1	0.5%
Increase		
No	2	0.0%
Increase		

Certainty	Increase	Weight
Daily	Yes	4.0%
Daily	No	3.5%
Weekly	Yes	3.0%
Weekly	No	2.5%
Half-Month	Yes	2.0%
Half-Month	No	1.5%
Monthly	Yes	2.0%
Monthly	No	1.5%



Appendix

Prediction Probability



probability of announcement in current month given announcements in the last 3, 6, 9 and 12 months



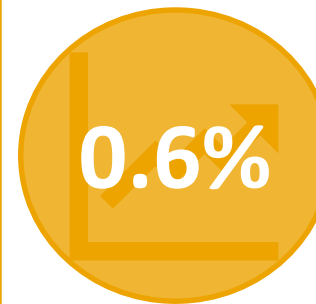
probability of dividend increase announcement in current month given announcements in the last 12, 24, and 36 months

Optimization

Expected Returns



characteristic-adjusted returns on announcement day



abnormal returns on increase announcement day

Bucket Breakdown by Month

Buy List

December		
Certainty	Increase	Count
Daily	Yes	1
Daily	No	2
Weekly	Yes	1
Weekly	No	9
Half-Month	Yes	2
Half-Month	No	9
Monthly	Yes	0
Monthly	No	4

January		
Certainty	Increase	Count
Daily	Yes	9
Daily	No	37
Weekly	Yes	4
Weekly	No	39
Half-Month	Yes	21
Half-Month	No	94
Monthly	Yes	1
Monthly	No	18

February		
Certainty	Increase	Count
Daily	Yes	1
Daily	No	30
Weekly	Yes	11
Weekly	No	39
Half-Month	Yes	9
Half-Month	No	49
Monthly	Yes	0
Monthly	No	36

Watch List

March		
Certainty	Increase	Count
Daily	Yes	1
Daily	No	6
Weekly	Yes	4
Weekly	No	18
Half-Month	Yes	0
Half-Month	No	15
Monthly	Yes	0
Monthly	No	8

April		
Certainty	Increase	Count
Daily	Yes	15
Daily	No	59
Weekly	Yes	7
Weekly	No	33
Half-Month	Yes	15
Half-Month	No	84
Monthly	Yes	1
Monthly	No	32

May		
Certainty	Increase	Count
Daily	Yes	5
Daily	No	48
Weekly	Yes	11
Weekly	No	53
Half-Month	Yes	11
Half-Month	No	100
Monthly	Yes	1
Monthly	No	54