



Webinar

# Developing an Improved Investment Style Analysis Algorithm & My Journey to the FDP Designation

Welcome

We will begin promptly at 11 AM ET.

If you are unable to hear the speakers, please let us know in the chat box. You may enter your questions in the Q&A, we will address them at the end of the presentation. You can find a copy of the slide deck and recording of this webinar:

[www.fdpinstitute.org/webinars](http://www.fdpinstitute.org/webinars)



# Financial Data Professional Institute

FDP Institute provides world class training and education to financial professionals to meet the accelerating needs of digital transformation in the industry.



# Introductions



Claude Perron  
Founder, FIAM  
Emeritus Chairman,  
Crystalline Management



Cordell Tanny, CFA, FRM, FDP  
Portfolio Management &  
Construction Expert



Hossein Kazemi, Ph.D., CFA  
Senior Advisor,  
CAIA Association &  
FDP Institute

Today's Topic:  
**Developing an Improved Investment Style  
Analysis Algorithm**

# Association Partnership

FIAM<sub>TL</sub>

Forum d'investissement  
alternatif de Montréal  
Montreal Alternative  
Investment Forum

- **Why is FIAM an event partner in this Webinar**
- **FIAM's mission and the focus of its activities**
- **FIAM's key pillar / priority:**
  - Contribute to the development of a community of talent to lead the digital transformation of the financial industry.
- **FIAM's principal mean: The promotion of the FDP designation/credential in Quebec/Canada.**
  - A curriculum aimed at bridging the world of finance, data science, machine learning and artificial intelligence.
- **FIAM and Cordell Tanny – a timely synergetic encounter**

A complex network diagram with various sized nodes (black, blue, grey) and connecting lines, set against a light grey background with faint circular patterns.

# STYLE AND FACTOR ANALYSIS USING LASSO REGRESSION

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Cordell L. Tanny, CFA, FRM, FDP  
March 9, 2023

# OBJECTIVE

Demonstrate, with code, an idea I came up with while studying for the FDP designation.

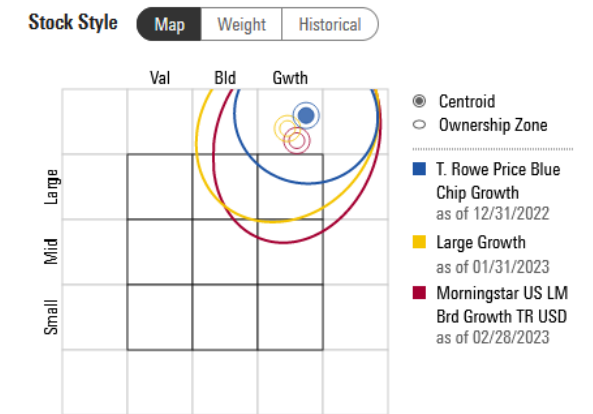
# AGENDA

- What are style analysis and factor models?
- Limitations of standard regression models.
- What is LASSO?
- Demonstration of how LASSO improves results.

# STYLE ANALYSIS AND FACTOR MODELS

- Style analysis attempts to explain an investment's behaviour as described by capitalization and styles (value, core, growth; large, mid, small).
- Usually done by one of the following methods, both with pros and cons:
  - Returns based.
  - Holdings based.
- Factor models attempt to break down an investment's exposures to various factors.

Source: Morningstar.com



Stock Style **Map** Weight Historical

	Value	Blend	Growth
Large	3	16	76
Medium	0	1	4
Small	0	0	0

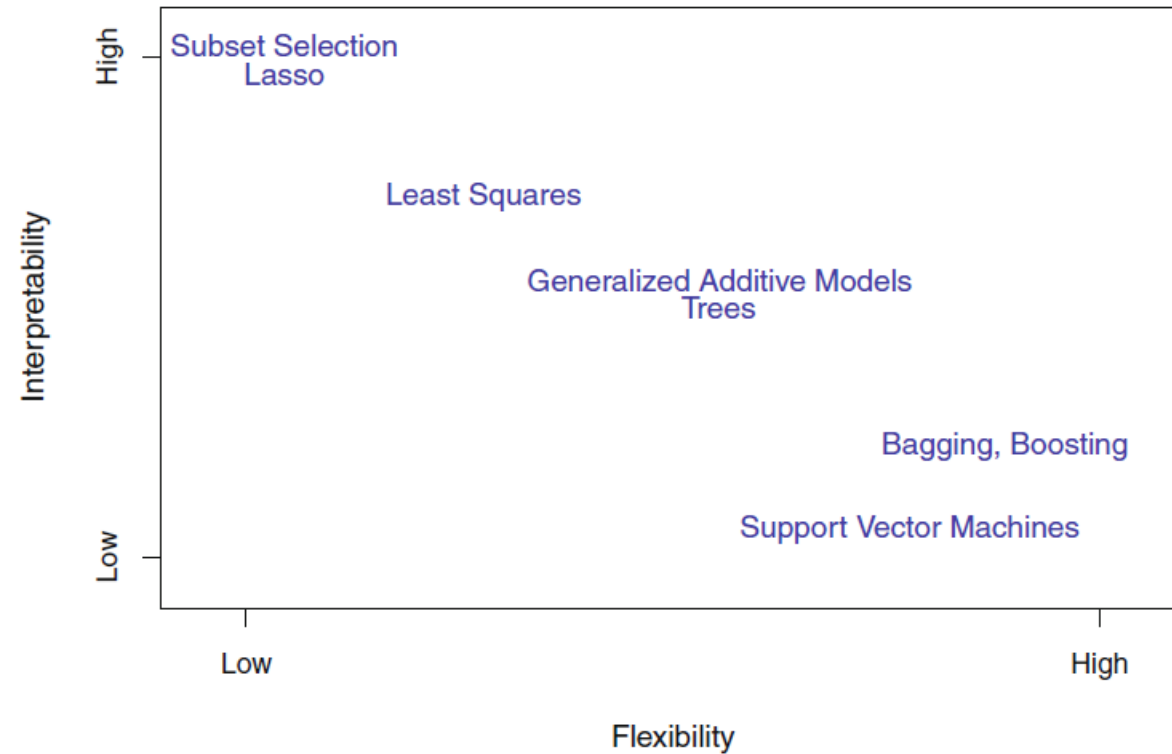
Weight %  
■ 50+  
■ 25-49  
■ 10-24  
■ 0-9



# RETURNS-BASED MODELS

- Typically employ linear regression models to map selected feature returns to the investment's returns.
- However, regression models come with a host of assumptions that are frequently (always) violated.
  - Multicollinearity is a very big problem.
  - Only captures linear relationships. But aren't most relationships between traditional asset classes linear?
- So how can we improve upon our plain-vanilla regression model?
  - Stepwise regression.
  - Regularized regression.

# MODEL SELECTION: INTERPRETABILITY VS. FLEXIBILITY



Source: James, G., D. Witten, T. Hastie and R. Tibshirani. (2013). An Introduction to Statistical Learning: with applications in R. New York, NY: Springer.

# WHAT IS LASSO REGRESSION

- LASSO is a regularized regression technique: It adds a penalty term to the regression equation.
- The penalty shrinks many non-informative variable coefficients to zero.

$$\sum_{i=1}^M (y_i - \hat{y}_i)^2 = \sum_{i=1}^M \left( y_i - \sum_{j=0}^p w_j \times x_{ij} \right)^2 + \lambda \sum_{j=0}^p |w_j|$$

Cost function for Lasso regression

Source:

<https://towardsdatascience.com/ridge-and-lasso-regression-a-complete-guide-with-python-scikit-learn-e20e34bcbf0b>

- Creates a sparse matrix: Focuses only on those variables that are significant in explaining the target's behaviour.
- Essentially, this is a feature selection technique.

# PROPOSED FACTOR MODEL

Investments	Factors	
Federated Hermes MDT All Cap Core Fund (QIACX)	US Growth	Intl Growth
Vanguard Total Stock Market Index Fund Admiral Shares (VTSAX)	US Value	Intl Value
Fidelity Contrafund® (FCNTX)	US Dividend	Intl Momentum
T. Rowe Price Blue Chip Growth Fund (TRBCX)	US Quality	Intl Dividend
	US Defensive	Intl Quality
	US Small-Cap	Intl Small-Cap
	US Mid-Cap	
	US Large-Cap	

# Q & A

Please join us for our upcoming webinar:

**How Should Long-Term Investors Form Portfolios?**

March 28, 2023 | 11 AM ET

**REGISTER NOW**

**Russ Goyenko**  
Associate Professor of Finance, McGill University

**Dr. Hossein Kazemi, CFA**  
Senior Advisor, CAIA Association & FDP Institute

**Claude Perron**  
Founder, FIAM, Emeritus Chairman, Crystalline Management

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