

# Decoding the Nifty 50

## A Carhart Four-Factor Analysis

Decomposing the drivers of risk and return in the Indian Equity Market (2007–2025).

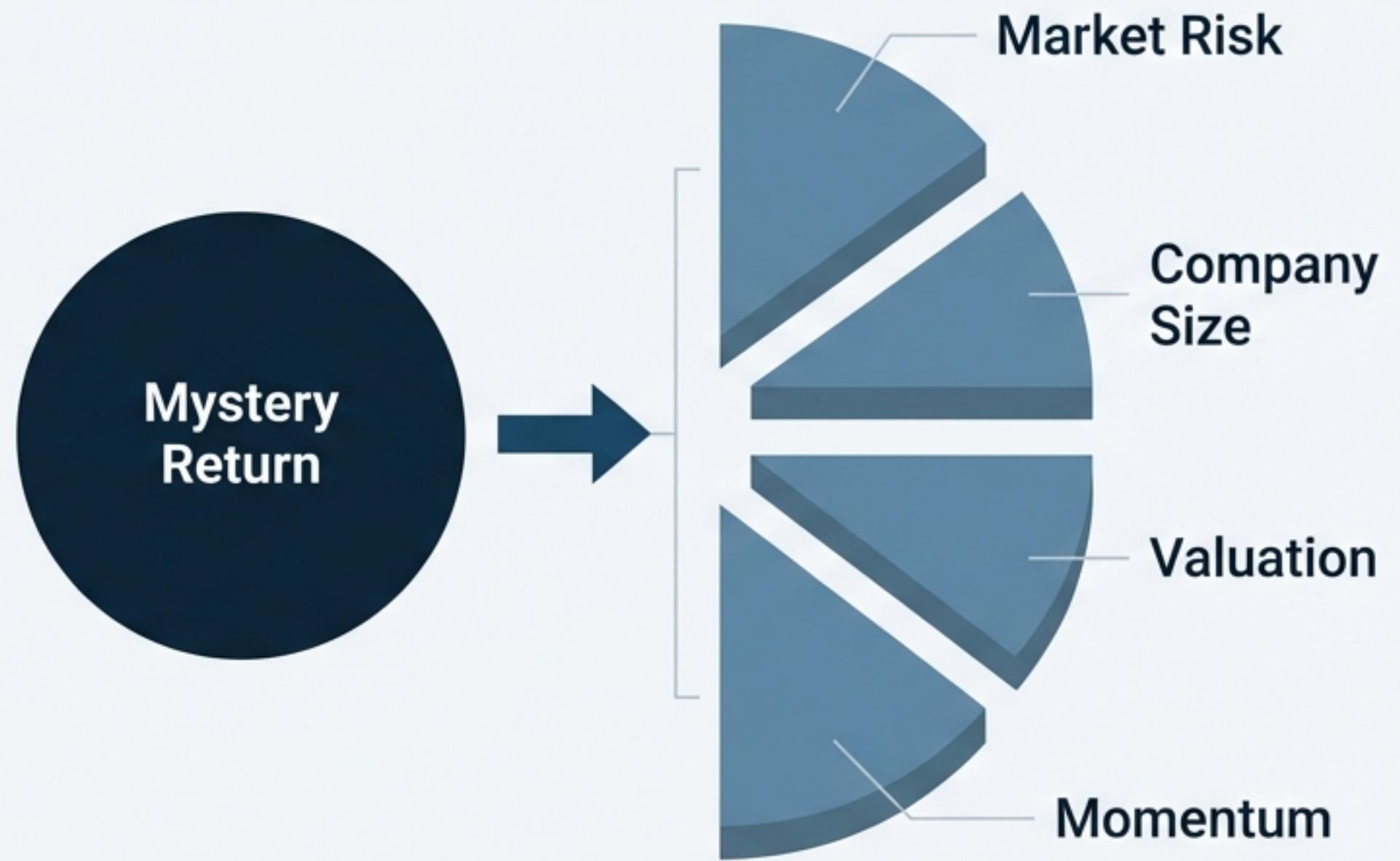
An analysis of Market, Size, Value, and Momentum factors.

# Returns are not magic. They are ingredients.

When a portfolio outperforms the market, is it skill or just exposure to specific risks?

Financial models allow us to ‘un-bake’ the cake us to ‘un-bake’ the cake to find the source of the flavor.

**What ingredients make up the Nifty 50?**



# The Evolution of the Decoder Ring



## 1960s: CAPM

1 Factor: The Market  
(The Tide).



## 1990s: Fama-French

3 Factors: Adds Size  
& Value  
(Company Style).



## 1997: Carhart

4 Factors: Adds  
Momentum (The  
Trend).

We move beyond simple market exposure to analyze style and behavior. The Carhart model adds 'Winners Minus Losers' (WML) to capture the momentum anomaly.

# The Four Forces Driving Returns



## Market (MF)

The Tide

How much does the asset move with the overall market?



## Size (SMB)

David vs. Goliath

Small-cap vs. Large-cap. (Positive = Small Cap tilt).



## Value (HML)

Bargain Hunting

Value stocks vs. Growth stocks.  
(Positive = Value tilt).



## Momentum (WML)

Riding the Wave

Recent winners vs. Recent losers.  
(Positive = Trend following).

# The Mathematical Framework & Data

$$R_i - R_f = \alpha_i + \beta_1(R_m - R_f) + \beta_2SMB + \beta_3HML + \beta_4WML + \varepsilon_i$$

Market Risk

Size Premium

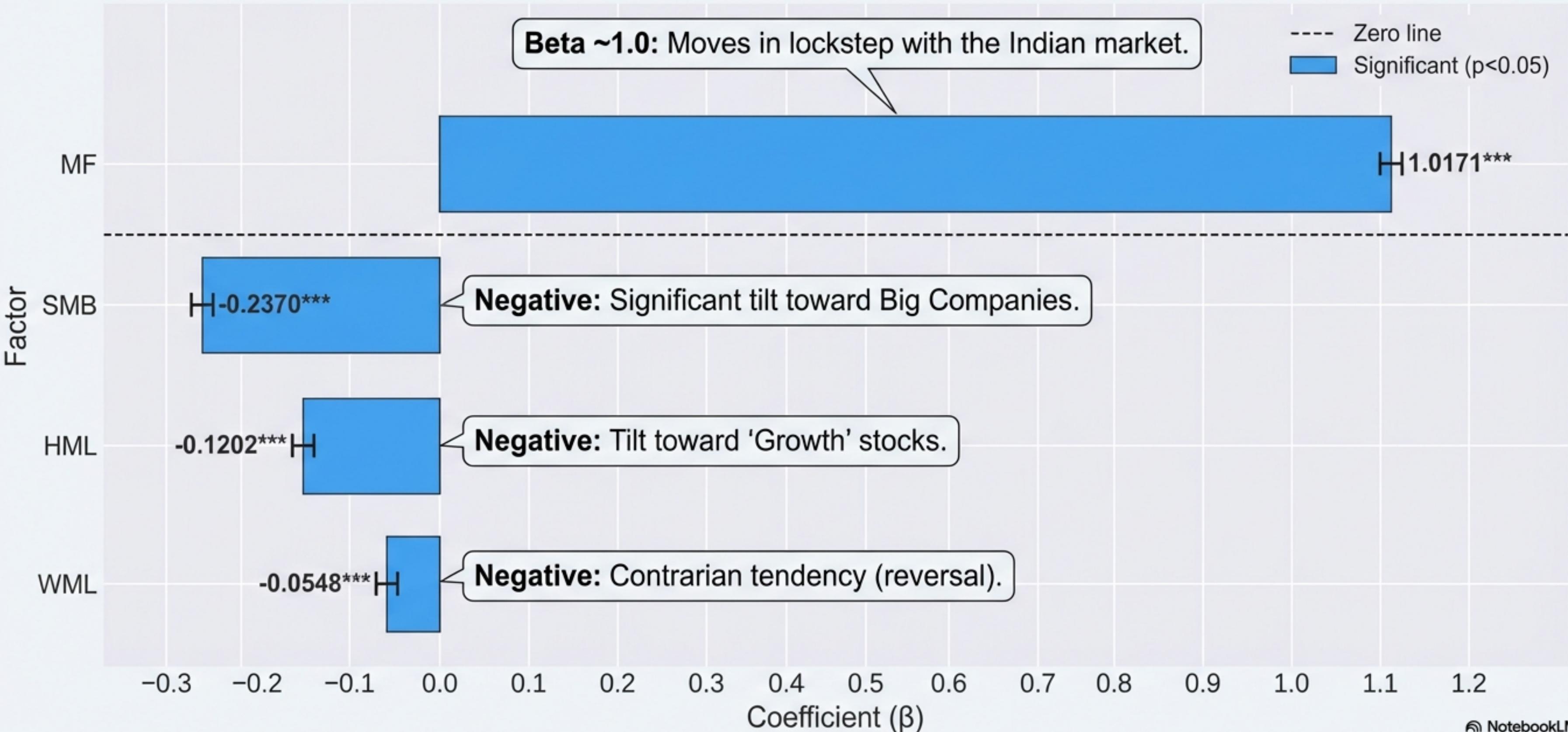
Momentum

Value Premium

## Data Context

- Subject: Nifty 50 Index (Daily Returns)
- Timeline: September 2007 – December 2025
- Observations: 4,486 Trading Days
- Source: Nifty 50 Prices vs. India-Specific 4-Factor Data.

# Nifty 50's 'Average' Personality Profile



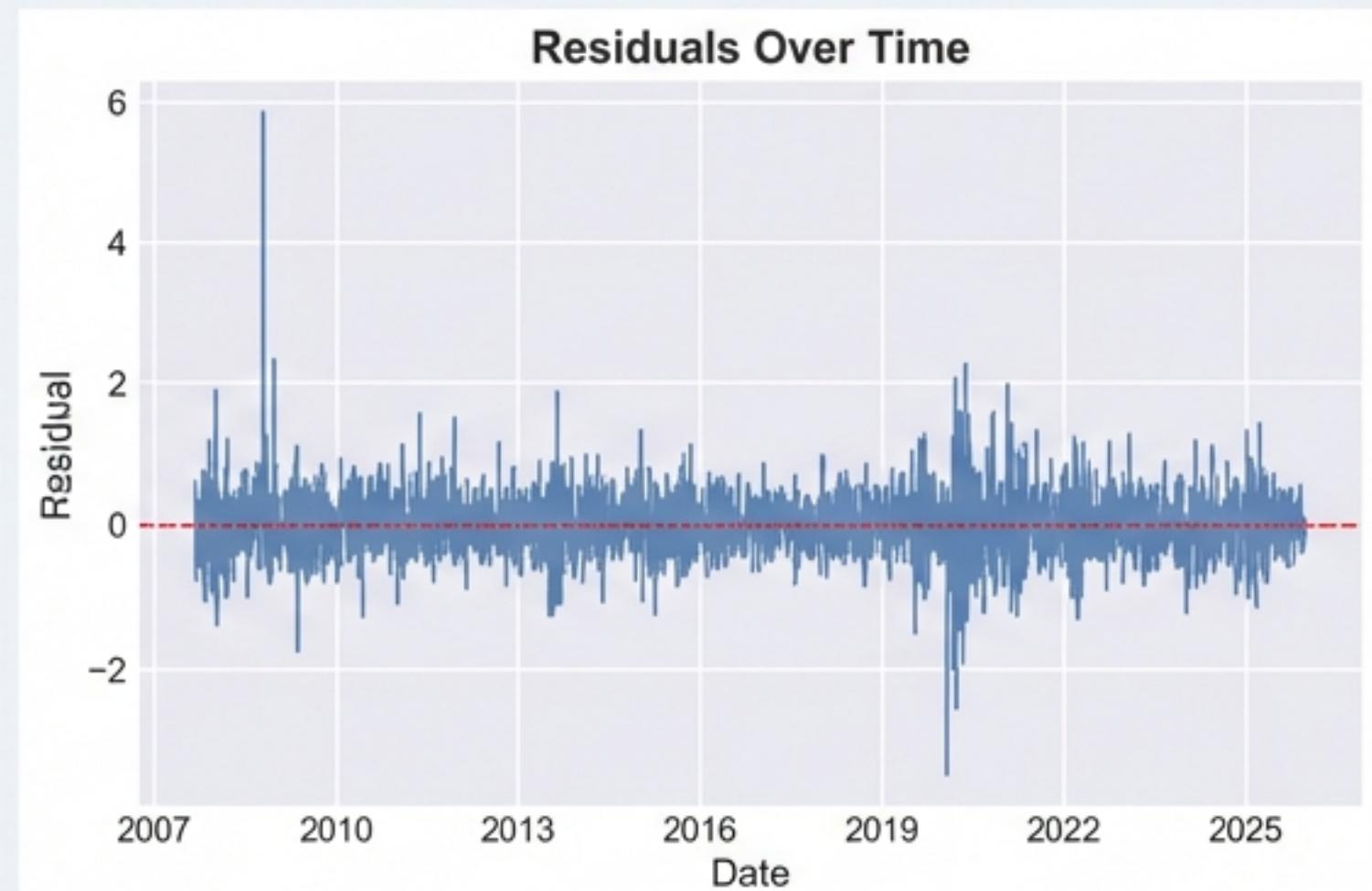
# How well does the decoder work?

## Regression Statistics

Regression Statistics	
R-Squared	<b>0.91</b>
Alpha (Daily)	~0%
Observations	4,486

The model explains 91% of the daily movement. No statistically significant 'magic' (Alpha) exists.

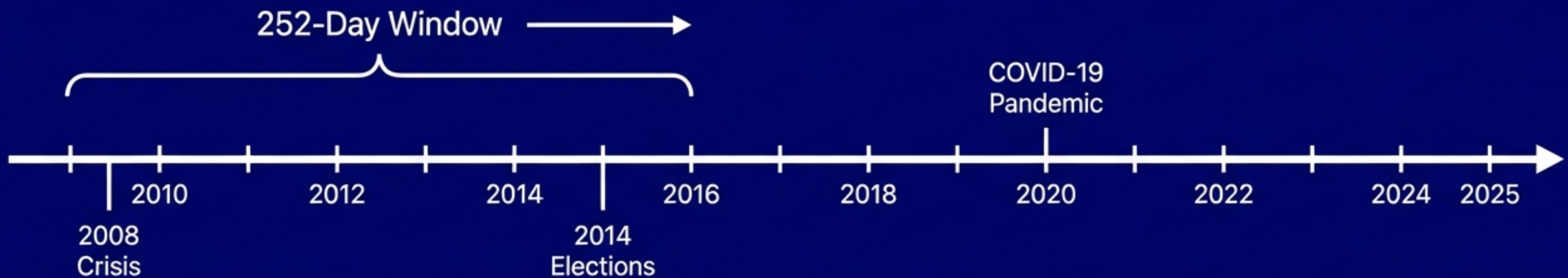
## Residuals Over Time (Visual Proof)



The noise (residuals) is random, confirming a strong model fit.

# The Problem: Markets Aren't Statues

An average over 15 years hides the truth. The economy shifted through the 2008 Crisis, the 2014 Elections, and the COVID-19 Pandemic. A static photo cannot capture a movie.



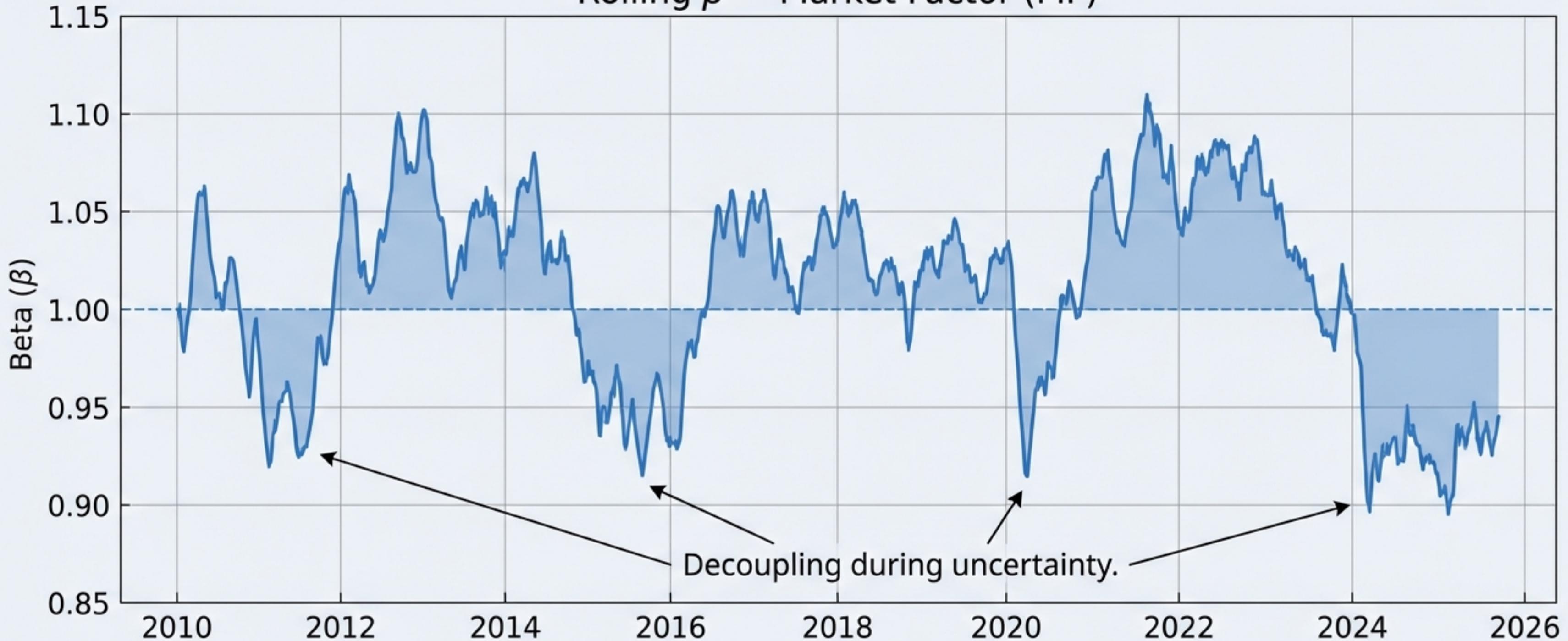
Rolling Regression: Calculating factors for every single day from 2010 to 2025.

Let's see the Nifty 50 in motion.

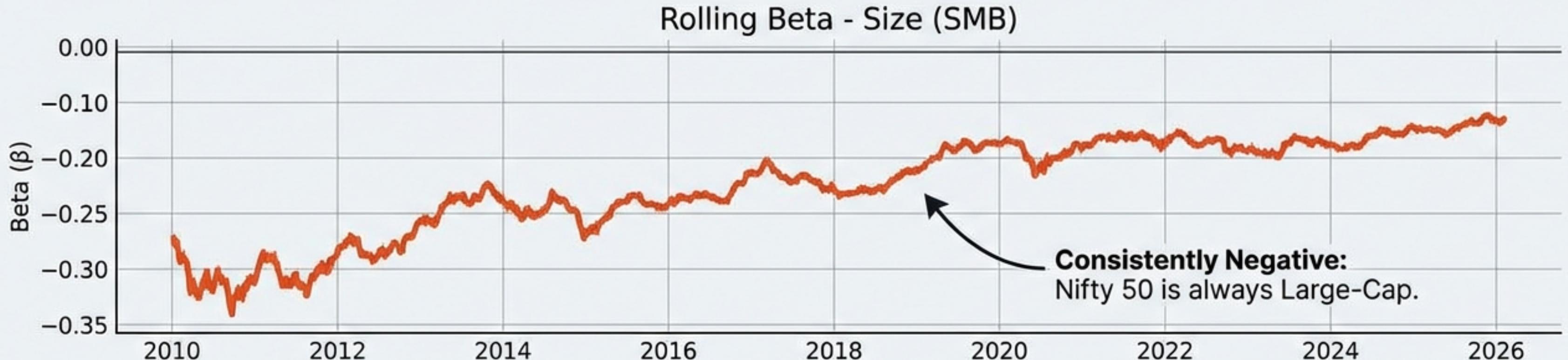
# Market Beta: The Pulse of Sensitivity

Translates to: How sensitive is Nifty to the broad market?

Rolling  $\beta$  – Market Factor (MF)

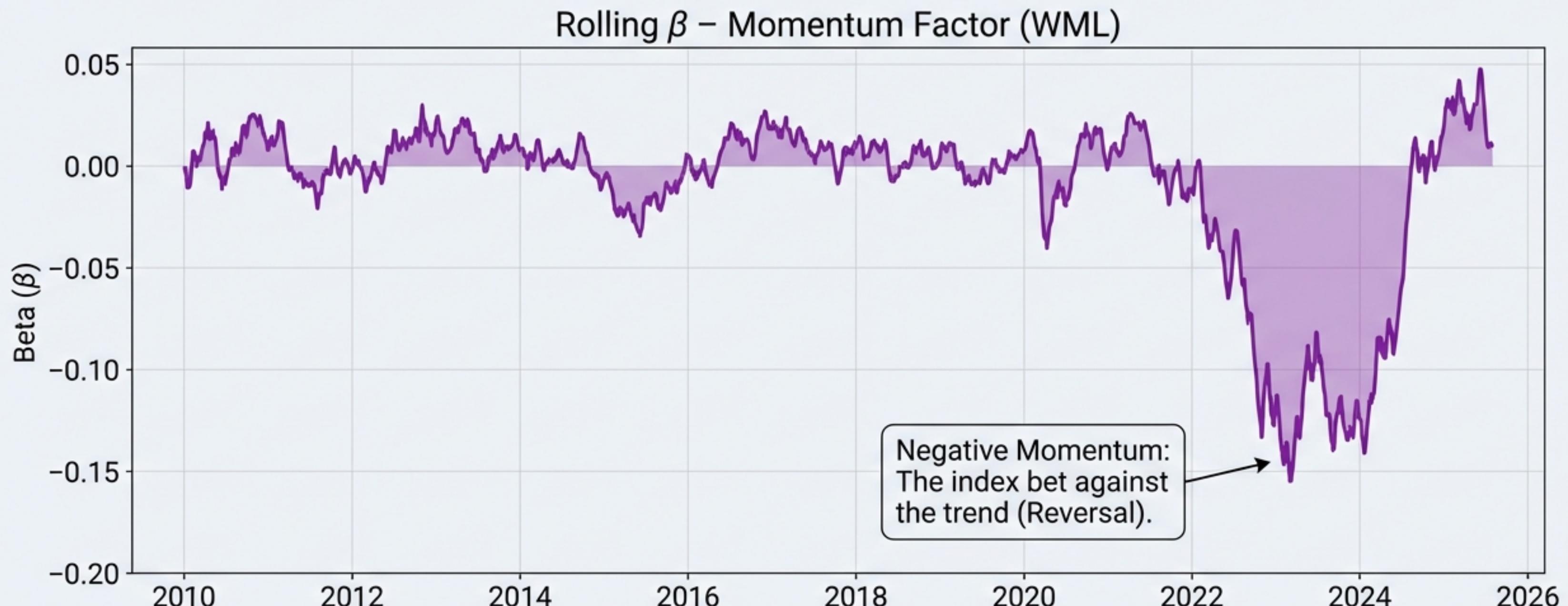


# Style Drift: Size and Value



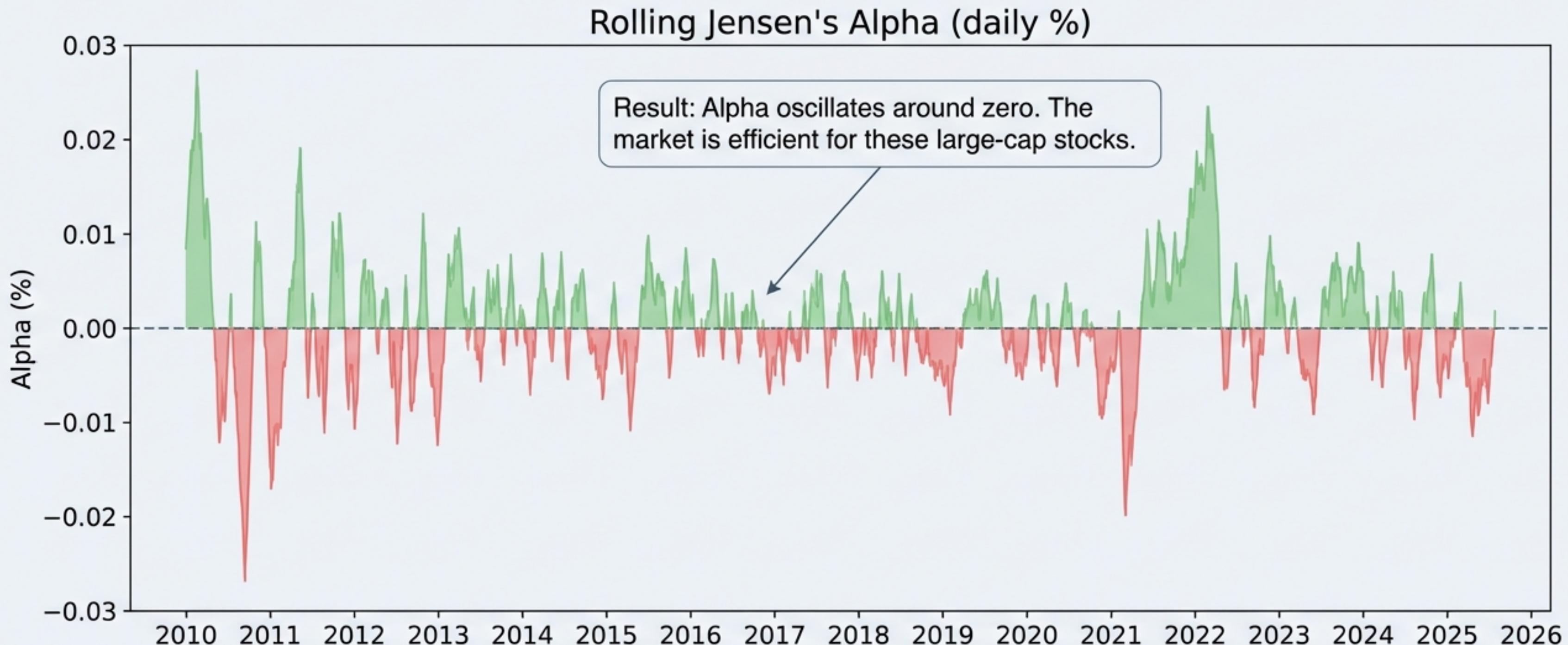
# The Momentum Crash (WML)

Translates to: Does the index follow trends?



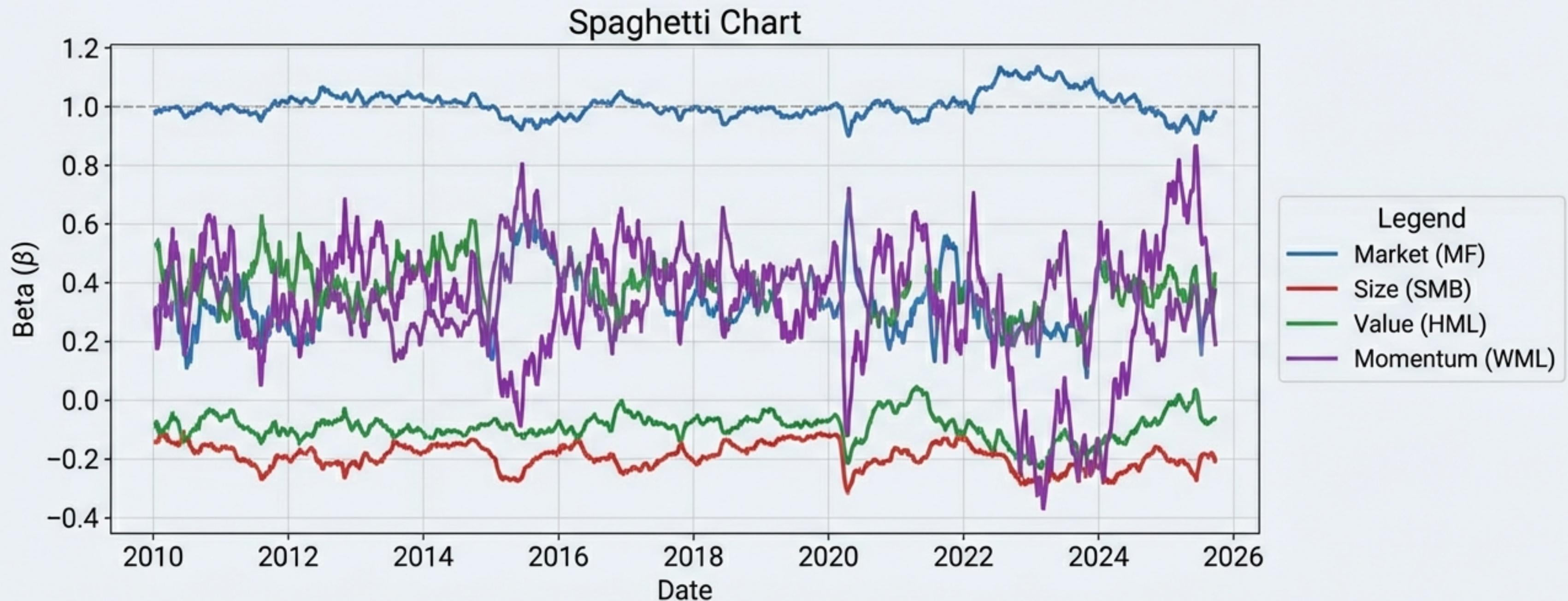
# The Search for Alpha (Skill vs. Risk)

Is there any return left unexplained?



# The DNA of the Market in Motion

Rolling Beta Regimes: Visualizing Indian Market Dynamics



# Executive Summary



**The Baseline:** Nifty 50 is a Large-Cap, Growth-tilted index that acts as a contrarian to momentum.



**The Fit:** The Carhart model explains 91% of the index's variance; “Alpha” is negligible.



**The Lesson:** Static models lie. The “average” beta masks significant volatility during crisis periods.

*“To understand the return, you must first decode the risk.”*