Decomposing Fund Activeness

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Motivation

- To outperform their benchmarks, mutual funds actively deviate from them

- Several measures to quantify **level** of activeness
  - Active Share (Cremers-Petajisto, 2009), $1 - R^2$ (Amihud-Goyenko, 2013), Industry Concentration (Kacperczyk-Sialm-Zheng, 2008)

- Established results: higher fund activeness $\Rightarrow$ higher performance

- However, funds adopt different strategies to be active
  - stock-picking, market-timing
  - factor rotation, smart beta
  - concentration, diversification
  - $\Rightarrow$ **Asset Pricing View**: exposure to idiosyncratic and systematic shocks

- **This paper**: focus on **source** of activeness
  - what type of risk do mutual funds take when deviating from their benchmarks?

What We Do

Develop novel measure which we call **"Idiosyncratic Activeness"** (*IDA*)

- **decompose** fund activeness into idiosyncratic and systematic components

- *IDA* = relative contribution of idiosyncratic shocks in explaining variation in <u>active</u> returns
    - $\Rightarrow$ *IDA* $\in [0, 1]$
    - $\Rightarrow$ $1 - IDA \equiv$ systematic activeness (*SA*)

- *IDA* is 60% on average, is persistent, and exhibits substantial within- and between-fund variation

What We Find

- Result 1: High-*IDA* funds outperform Low-*IDA* funds
  - contemporaneously as well as in future
  - Q10-Q1 of *IDA*: 2% of active returns and \$4.04Mn of value added (annually)
  - robust to any level of activeness, in fact spread rises with activeness

- Result 2: Level of activeness predicts outperformance only if *IDA* is high
  - when source of activeness is mostly systematic, being active does not lead to outperformance (in fact, the opposite)
  - **source of activeness is key for understanding fund performance**

- Result 3: Identify various smart-beta strategies by decomposing fund's systematic activeness (*SA*)
  - fund's active factor exposure is concentrated (largest factor share $\approx 65\%$)
  - active exposure to Market ↓ (close to 10%) and SMB ↑ (to 40%) since 2000's

- Result 4: Underperformance of smart-beta strategies based on:
  - multi-factor exposure
  - factor-rotation

Measuring Source of Activeness

IDA Measure

IDA $\Rightarrow$ contribution of idiosyncratic shocks to variation in active returns

- Use daily fund return data to estimate *IDA* for each quarter

- **Stage 1:** Obtain funds' active returns

$$R_{i\tau}^A = R_{i\tau} - R_{i\tau}^B, \quad \text{for} \quad \tau \in t+1$$

- **Stage 2:** Decompose variation in active returns

$$R_{i\tau}^A = \alpha_{it+1}^A + \beta_{it+1}^{A'} F_\tau + \epsilon_{i\tau}^A, \quad \text{for} \quad \tau \in t+1$$

$\Rightarrow$ $\beta_{it+1}^{A'}$ captures **active exposure** to systematic factors

$$IDA_{it} = \frac{\mathbb{V}\mathrm{ar}_t(\hat{\epsilon}_{i\tau}^A)}{\mathbb{V}\mathrm{ar}_t(R_{i\tau}^A)}, \quad \text{for} \quad \tau \in t+1$$

- Key aspects: choice of benchmark (Stage 1), choice of factor model (Stage 2)

Investable Benchmarks

Three essential and sensible criteria to identify investabile benchmarks:

- **Investability 1:** Benchmark must be made up of easily tradable assets
  $\Rightarrow$ we use Vanguard Index Funds (as in Berk-van Binsbergen, 2015)

- **Investability 2:** Benchmark must be known ex-ante
  $\Rightarrow$ we use historical exposures of fund returns to Vanguard Indexes

- **Investability 3:** Benchmark must reflect most common investors' constraints
  $\Rightarrow$ we constrain historical exposures to be positive and to sum to less than 1

Classical factor models $\Rightarrow$ ex-post (non-invetsable) benchmark
$\Rightarrow$ any factor exposure (both active and passive) is considered passive

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**Our benchmark estimation:** denoting returns of Vanguard Index Funds by R^I,

$$R^B_{i\tau} = \hat{b}'_{it} R^I_{\tau}, \quad \text{for} \quad \tau \in t+1$$

where portfolio weights $\hat{b}'_{it}$ are estimated using historical data only up to t:

$$R_{i\tau} = b'_{it} R^I_{\tau} + e_{i\tau}, \quad \text{subject to} \quad \left\{ \begin{array}{l} b_{it} \geqslant 0 \\ 1' b_{it} \leqslant 1 \end{array} \right. , \quad \text{for} \quad \tau \in (t-4, t]$$

Risk Factor Model

- We choose leading risk-factors to decompose variance of active returns
  - **<u>Baseline</u>:** Fama-French Three Factors + Carhart's Momentum

- Robust to
  - Fama-French five factors + Momentum
  - Ferson-Schadt conditioning variables
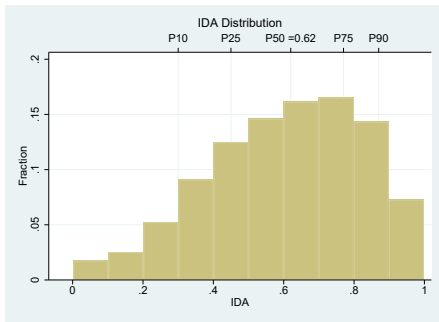
- **Median** *IDA* **= 0.62**, with meaningful variation across funds (0.13) and within fund over time (0.18)

- *IDA* is **highly persistent:** top 20% funds remain 1σ above bottom 20% funds even 8 quarters out

- *IDA* is highest within **Mid-Cap** funds and lowest within **Small-Cap** funds

- High-*IDA* funds are **smaller**, **trade less**, hold **concentrated positions**, and belong to **smaller families**

IDA and Fund Performance

Outperformance of High-*IDA* Funds

Panel A: Univariate Sort on *IDA* and Performance

	Raw Return (1)	Active Ret (AR) (2)	Log Value-Added (3)	Four-Factor Alpha (4)	Idiosyncratic AR (5)	Systematic AR (6)	Picking (7)	Timing (8)
Bottom 10% *IDA* (D1)	5.501*** (0.331)	-1.647*** (0.122)	-0.115*** (0.007)	-2.540*** (0.129)	-3.594*** (0.116)	1.650*** (0.040)	2.494*** (0.131)	6.429*** (0.363)
Top 10% *IDA* (D10)	6.715*** (0.332)	0.026 (0.123)	0.006 (0.007)	0.685*** (0.129)	-0.055 (0.116)	0.157*** (0.040)	3.329*** (0.136)	6.598*** (0.376)
D10-D1	1.214*** (0.468)	1.674*** (0.173)	0.121*** (0.009)	3.224*** (0.183)	3.538*** (0.164)	-1.493*** (0.057)	0.836*** (0.189)	0.169 (0.523)

Panel B: Robust to Panel Estimation With Controls and Fixed Effects

	Active Ret (AR)	Net AR	Log Value-Added	Four-Factor α	Idiosyncratic AR	Systematic AR	Picking	Timing
IDA	3.131*** (0.289)	3.136*** (0.289)	0.178*** (0.017)	4.576*** (0.311)	4.837*** (0.296)	-1.191*** (0.109)	1.681*** (0.269)	0.945*** (0.269)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Style*Time FE	Y	Y	Y	Y	Y	Y	Y	Y
Fund Cluster	Y	Y	Y	Y	Y	Y	Y	Y

- High-Low *IDA*: active return spread of 3.13%
- High-Low *IDA*: additional value-added of $7.77M
- Funds exposed to idiosyncratic shocks generate more Picking Value

Outperformance of High-*IDA* Funds

- Outperformance of High-*IDA* Funds is **not** due to:
    - family size
    - stock concentration
    - turnover
    - fund size
    - investment style
- *IDA* generates larger outperformance for **Small-cap** and **Growth**

	Terciles of				Styles			
	Family Size	Stocks	Turnover	Fund Size	Small Cap	Large Cap	Growth	Value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IDA	2.935***	3.518***	2.948***	2.337***	5.374***	1.579***	3.928***	1.687***
	(0.440)	(0.520)	(0.418)	(0.456)	(0.757)	(0.352)	(0.391)	(0.365)
Top Tercile × *IDA*	-0.144	-0.222	0.087	1.070**				
	(0.517)	(0.587)	(0.532)	(0.540)				
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Style × Time FE	Y	Y	Y	Y	Y	Y	Y	Y
Fund Clustering	Y	Y	Y	Y	Y	Y	Y	Y

- High-*IDA* also **predicts future outperformance** $\rightarrow$ even 8 quarters out

Level vs. Source of Activeness

Conditional Performance of Active Share

- Active Share predicts higher performance only for High-*IDA* funds
- *IDA* predicts higher performance for **any level of activeness**
- "High-High" vs. "Low-Low" portfolios generate a spread of 2.52%

	Active Return Spread: Double Sorted Portfolios on *IDA* and Active Share (*AS*)						
	IDA (*t*-4, *t*-1)						
AS (*t*-4, *t*-1)	All	Low	Q2	Q3	Q4	High	High-Low *IDA*
Low (Bottom 20%)	-0.486***	-1.715***	-0.439**	-0.312	-0.009	0.072	1.787***
	(0.096)	(0.254)	(0.210)	(0.200)	(0.198)	(0.203)	(0.207)
High (Top 20%)	0.333***	-2.126***	-0.783***	0.125	0.882***	0.819***	2.945***
	(0.097)	(0.257)	(0.212)	(0.202)	(0.200)	(0.205)	(0.409)
(a) High-Low Active Return (*t*)	0.819***	-0.411	-0.344	0.437	0.891***	0.748***	
	(0.136)	(0.361)	(0.299)	(0.284)	(0.281)	(0.289)	
(b) High-Low Active Return (*t*, *t*+3)	0.563***	-0.458**	-0.566***	-0.238	0.069	0.621***	
	(0.076)	(0.198)	(0.172)	(0.163)	(0.163)	(0.170)	
(c) High-Low Four-Factor $\alpha(t)$	1.179***	-0.181	0.062	1.189***	1.534***	1.278***	
	(0.148)	(0.353)	(0.324)	(0.318)	(0.320)	(0.329)	

Similar Results for Other Measures of Activeness

- Similar results for other measures of activeness
  - $1 - R^2$ of Amihud-Goyenko (2013)
  - Industry Concentration (IC) of Kacperczyk-Sialm-Zheng (2008)

- Robust to Panel estimation

- Robust to lags used to form portfolio

Active Return Spread (t): High-Low Activeness						
	IDA (t-4, t-1)					
	All	Low	Q2	Q3	Q4	High
High-Low $1 - R^2$ (t-4, t-1)	1.558***	-0.500	-0.380	0.445*	1.124***	1.015***
	(0.121)	(0.323)	(0.270)	(0.254)	(0.248)	(0.251)
High-Low *IC* (t-4, t-1)	0.584***	-0.530	0.381	1.205***	1.478***	1.274***
	(0.136)	(0.359)	(0.296)	(0.282)	(0.279)	(0.287)

Robustness

- Alternative Benchmarks (Stage 1)
  - Ex-ante benchmark using Fama-French-Carhart four/six factor models
  - Ex-ante benchmark using tradable version of Cremers et al. (2013)
  - Benchmarks without leverage and shorting constraints

- Alternative Factor Models for Decomposition of Activeness (Stage 2)
  - Three/Five Factor models of Fama-French + Momentum Factor
  - Ferson-Schadt conditioning variables
  - Peer-based benchmarks

- Other Robustness
  - Length of history used to compute historical factor exposure
  - Robust to frequency of estimation of *IDA* (e.g., annual)
  - Robust to using monthly return data instead of daily data
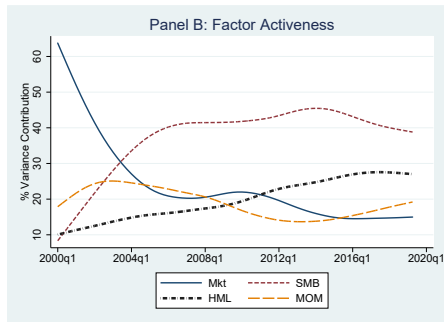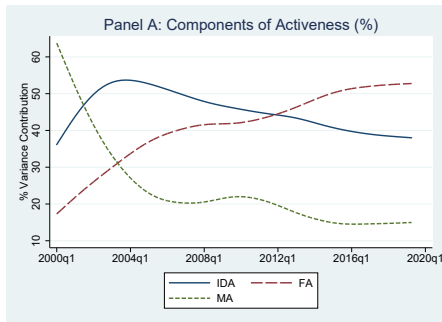
Factor-based/Smart-beta Strategies

- Median $IDA = 0.60 \Rightarrow$ meaningful systematic exposure for a typical fund

- Various strategies to take systematic exposure
  - Traditional market-timing
  - Smart-beta $\Rightarrow$ multi-factor exposures, factor rotation

- Advent of ETFs, Smart-beta funds $\Rightarrow$ importance of systematic strategies

- We further decompose systematic activeness (SA) to identify these strategies

Sources of Systematic Activeness

Model	VI+Four Factor	VI+Six-Factor	VI+Ferson-Schadt
Stage 1 (Benchmark)	Vanguard	Vanguard	Vanguard
Stage 2 (Decomposition)	Four-Factors	Six-Factors	Ferson-Schadt
	(1)	(2)	(3)
IDA	0.453	0.396	0.409
1-*IDA*	0.547	0.604	0.591
Sources of 1-IDA			
Market	0.246	0.096	-0.075
SMB	0.369	0.366	0.379
HML	0.194	0.170	0.198
Mom	0.190	0.160	0.222
Profitability		0.111	
Investment		0.097	
Dividend Yield$\times$ Market			0.070
Default Spread$\times$ Market			-0.009
Term Spread$\times$ Market			0.001
Interest Rate$\times$ Market			0.214

Sources of Systematic Activeness Over Time

- Average fund's active **Market** exposure ↓ drastically since 2000
- Factors gained importance, notably **SMB** and **HML**, in explaining funds' *SA*

Panel A: Components of Activeness (%)

Panel B: Factor Activeness

Performance of Smart-beta Strategies

Active Return (Sample: Average *IDA* < Median)			
Strategies →	Market vs. Factors	Smart Beta	
		Multi-Factors	Factor-Rotation
Market Activeness (MA)	-5.579*** (0.368)		
Factor Concentration (Within-Quarter)		1.158*** (0.383)	
Factor Concentration (Over-Time)			1.851*** (0.621)
High IDA	Base Group		
Low-IDA + Low-MA	-0.964*** (0.208)		
Low-IDA + High-MA	-1.914*** (0.206)		

- High-*IDA* funds outperform both Market-active and Factor-active funds

- Within Systematically Active funds (Market-active + Factor-active):
  - those with large market exposure underperform
  - those with stable factor exposures outperform

Concluding Remarks

- Develop new measure (*IDA*) to identify sources of fund activeness
  - decomposition of variance of <u>active</u> returns into idiosyncratic and systematic

- Document that funds mostly exposed to idiosyncratic shocks outperform
  - high *IDA* predicts both contemporaneous and future outperformnce

- Uncover that what predicts performance is *source* and not *level* of activeness
  - highly active funds with high active systematic exposure underperform
    ⇒ ivestors should care more about the way funds deviate from benchmarks than the extent of deviation

- Why High-*IDA* funds outperform Low-*IDA* funds?
  - Buffa-Javadekar (2020b): a theory of self-selection
    ⇒ good managers choose High-*IDA* strategies to generate more informative signals about their skill