Evaluating Benchmark Misfit Risk

Variations on a theme
For Asset Owners
PMAR 2023

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"Insights and Innovation"

Stephen Campisi, CFA

Originally presented as:

"Evaluating Benchmark Misfit Risk"
Journal of Performance Fall 2022

And

CFA Institute Enterprising Investor
https://blogs.cfainstitute.org/investor/**2022/12/19**/evaluating-benchmark-misfit-risk/

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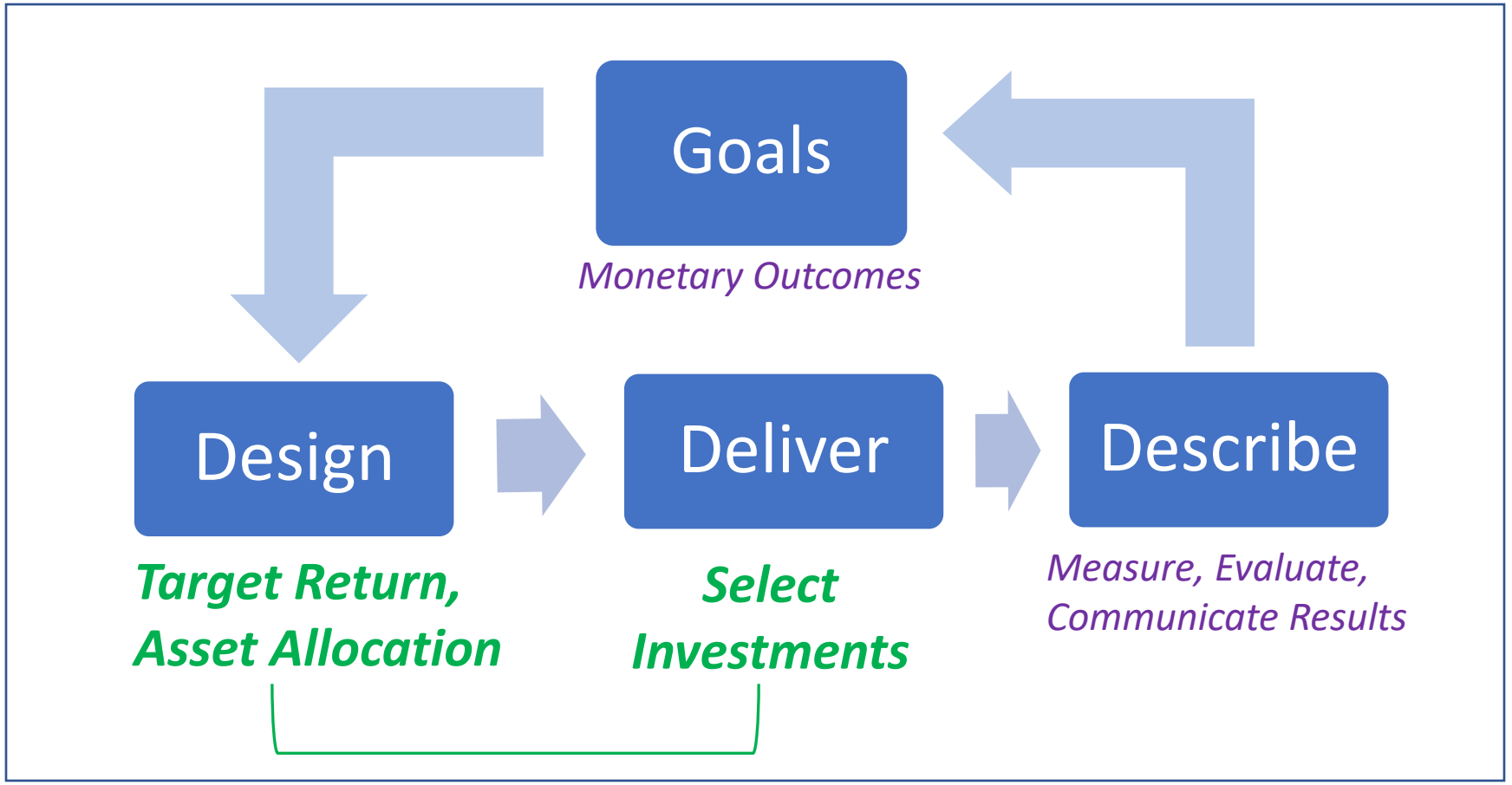
Overview of Investment Process



Today's Key Question

- Are my funds **delivering** or **undermining** my asset allocation?
- How **significant** is this effect?
- How can I **manage** this?

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Our First Assumption

Portfolio Return
- Benchmark Return

Excess Return
(Idiosyncratic)

Is that really true?

Hint:

It's not about "arithmetic vs geometric"

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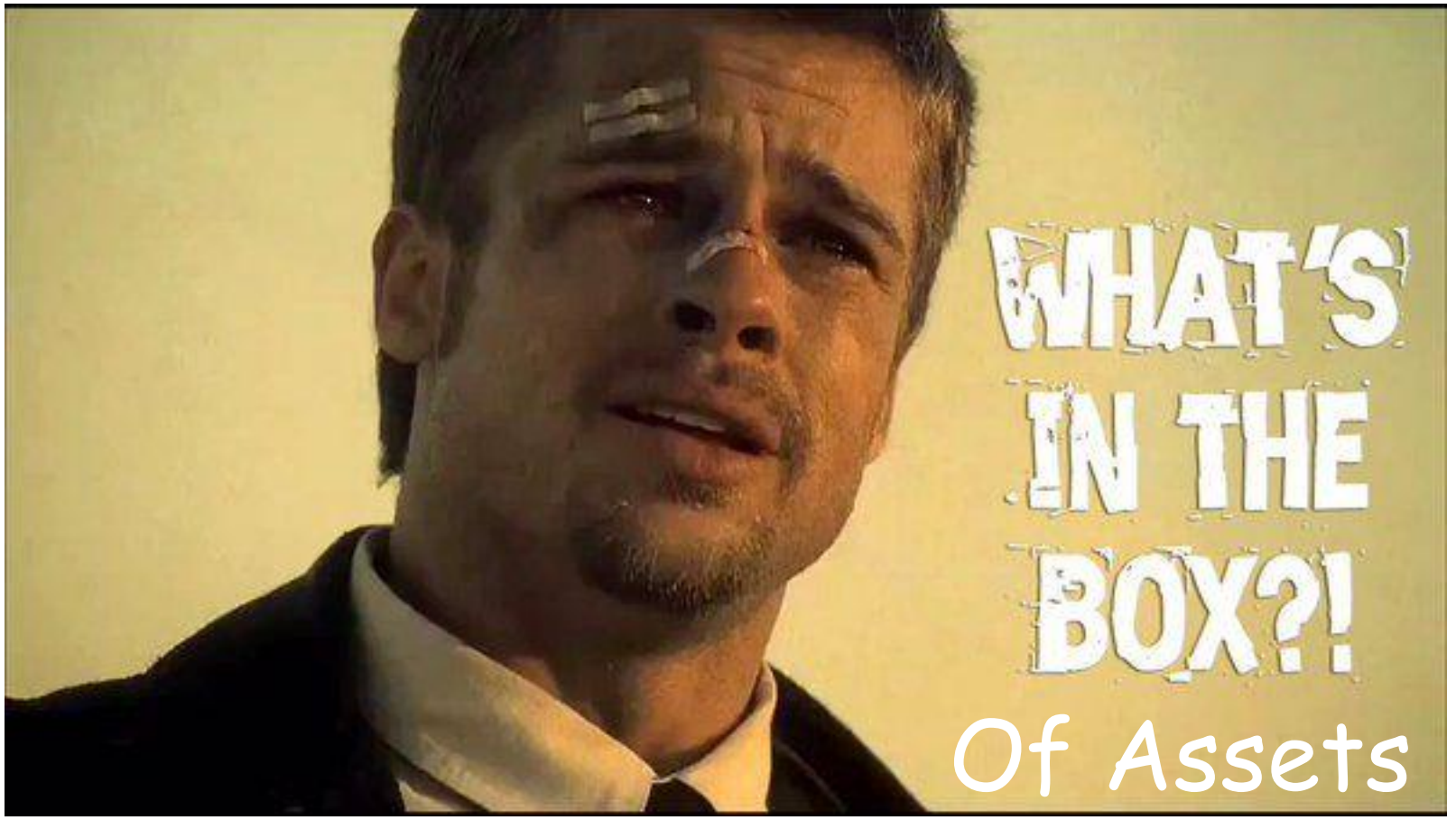

Is every fund 100% true to its name?

Hint: NO!

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Requirements for Idiosyncratic Excess Return

All sectors of benchmark must be represented

Strategic sector weightings must match benchmark

Tactical weightings must **net** to strategic weighting (same amount/time above vs below target)

Summary

Factor exposures must match benchmark

No out-of-benchmark holdings

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Large Cap US Equity Example

- Different long-term sector weights
- Does not hold every industry *(+125)*
- Buys mid cap and small cap
- Buys foreign securities
- Deviates from style mandate
- Often holds cash

Increasing Dislocation Problems

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What Does All This Mean?

Your portfolio is structurally different than its benchmark!

*(You have **BMS: Benchmark Mismatch Syndrome**)*

- Portfolio and its Benchmark have different:
  - *Strategic market allocation*
  - *Return and Risk profile*
- Portfolio has a "**strategic allocation**" return

How do we identify this?

Campisi, "Long-term Risk Adjusted Performance Attribution," JPM Fall 2002

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Bring in the "Multi-Variate Regression"

(It's your old friend… the "Style Analyzer")

1. Include the appropriate asset segments = **"Decisions"**
2. Set reasonable constraints (e.g. *no shorts or leverage*)
3. Use an optimizer to test various segment weightings

Goal:
Find set of average weightings that produces return stream most highly correlated to fund

These are "Effective Segment Weightings"

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Interpreting Optimizer Results

- Remember: these are ***"effective"*** weights
- This shows what the fund **"acts like"**
- This identifies the fund's exposure to **"factors"** that represent exposure to segments of the market
- This **"best-fitting benchmark"** creates the closest matching pattern of returns for the fund

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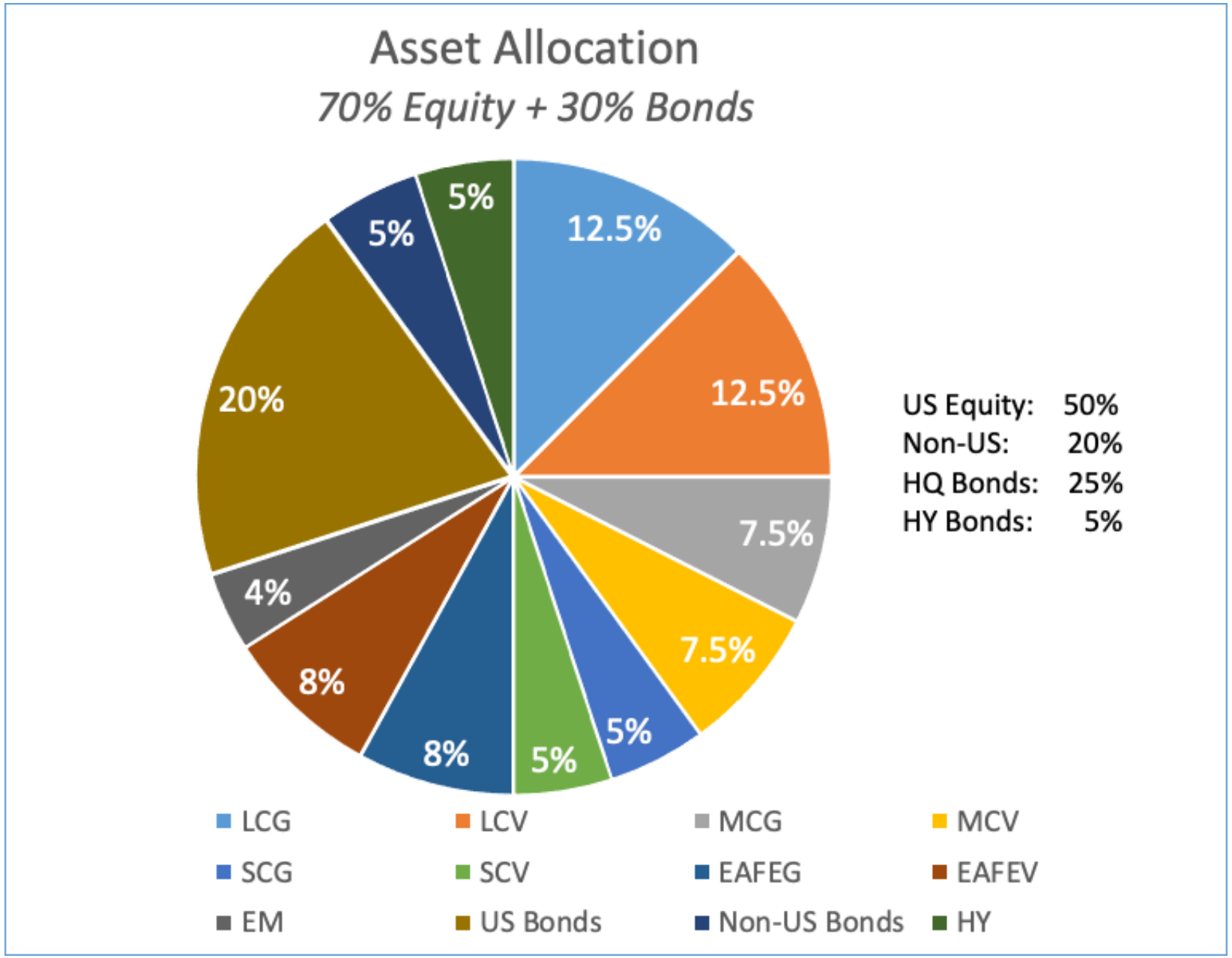

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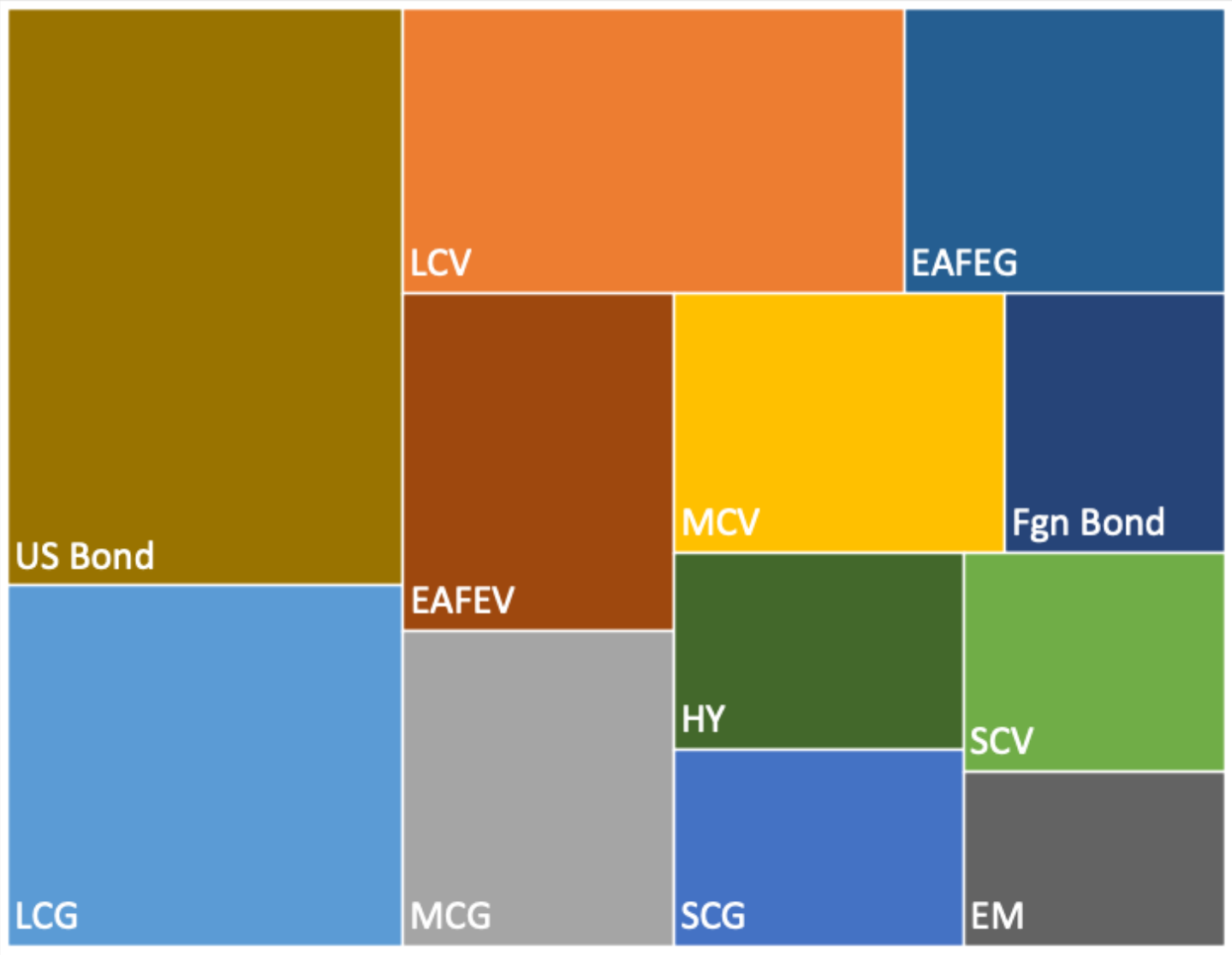
Target Asset Allocation



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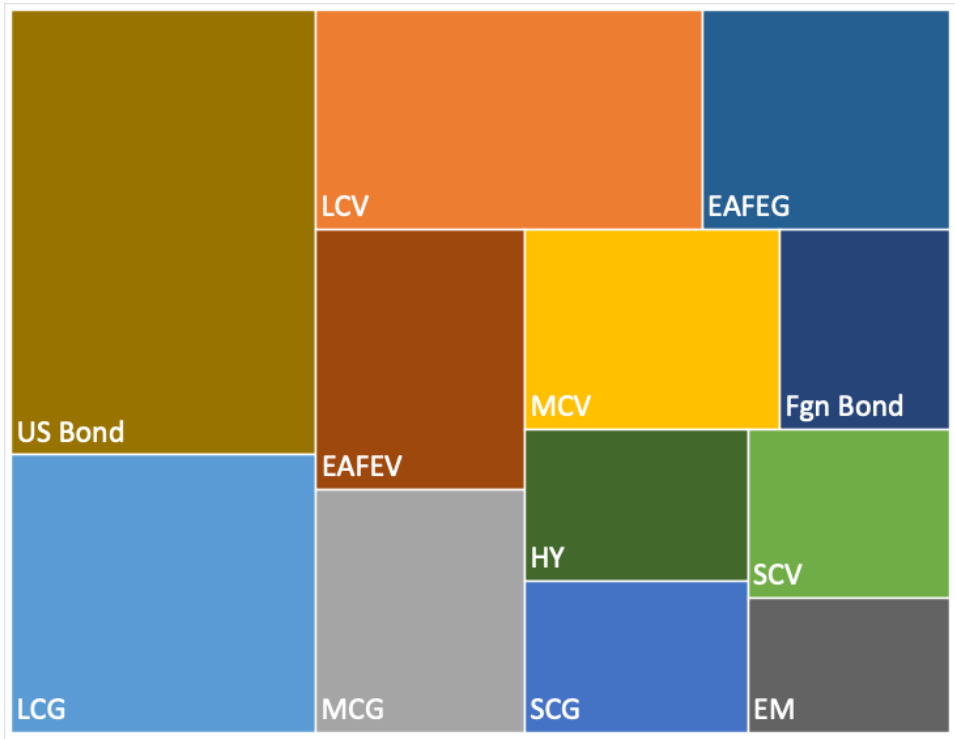
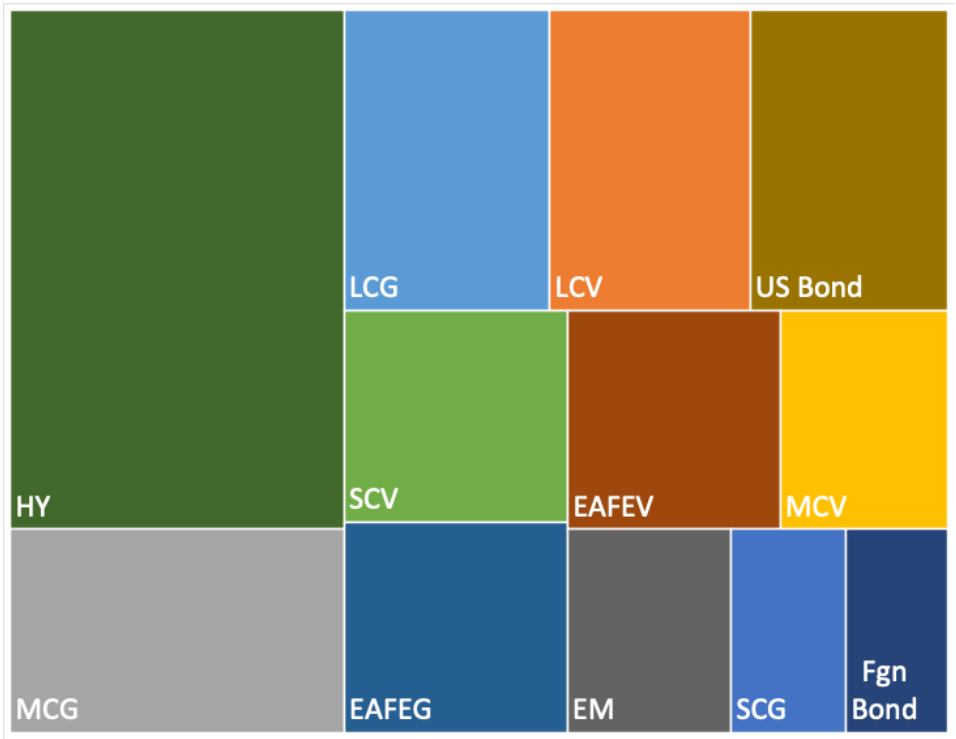
Target Asset Allocation



How the Portfolio Looks

Effective Asset Allocation



How the Portfolio Behaves

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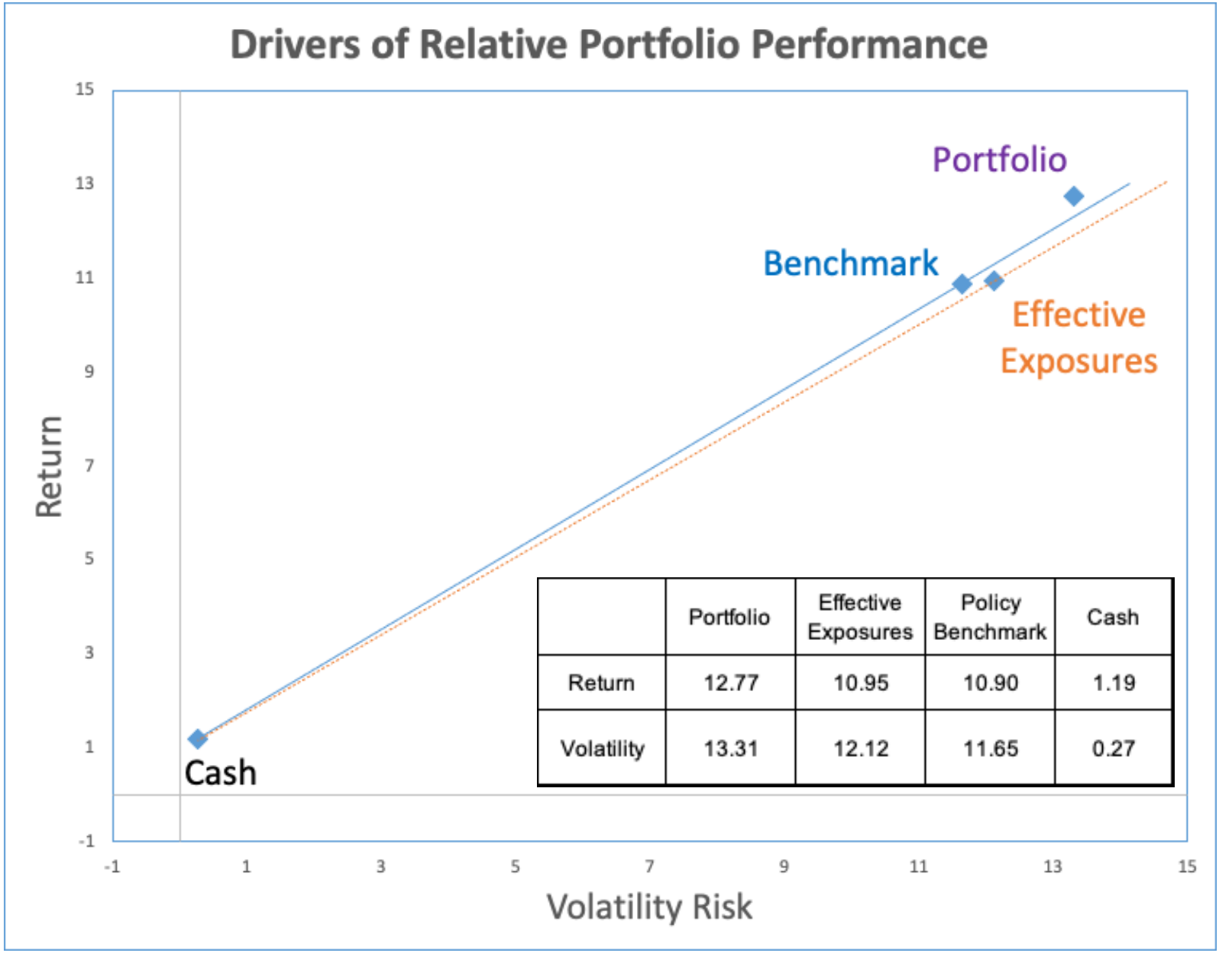

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True View of Active Fund Risk:

Strategic Misfit + Selection

	A Portfolio	B Effective Exposures	C Policy Benchmark	Cash
Return	12.77	10.95	10.90	1.19
Volatility	13.31	12.12	11.65	0.27

Fund Managers Decisions

- ***Misfit Return = B - C***
  (Effective Exposure Return minus Benchmark Return)
- ***True Selection Return = A – B***
  (Portfolio Return minus Effective Exposure Return)

Portfolio Manager Decision

We could add a tactical allocation effect.

(Measured relative to effective exposures.)

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Complete Attribution of Total Return

Attribution of Total Return	Policy Benchmark	Effective Exposures Excess Return	Selection Excess Return
% Contribution to Portfolio Risk	86.7%	3.8%	9.5%
% Contribution to Portfolio Return	85.3%	0.8%	13.9%
Efficiency	-1.4%	-3.0%	4.4%

Campisi, "Portfolio Management via a Holistic and Efficiency-Driven Decision Process," JPM Spring 2019

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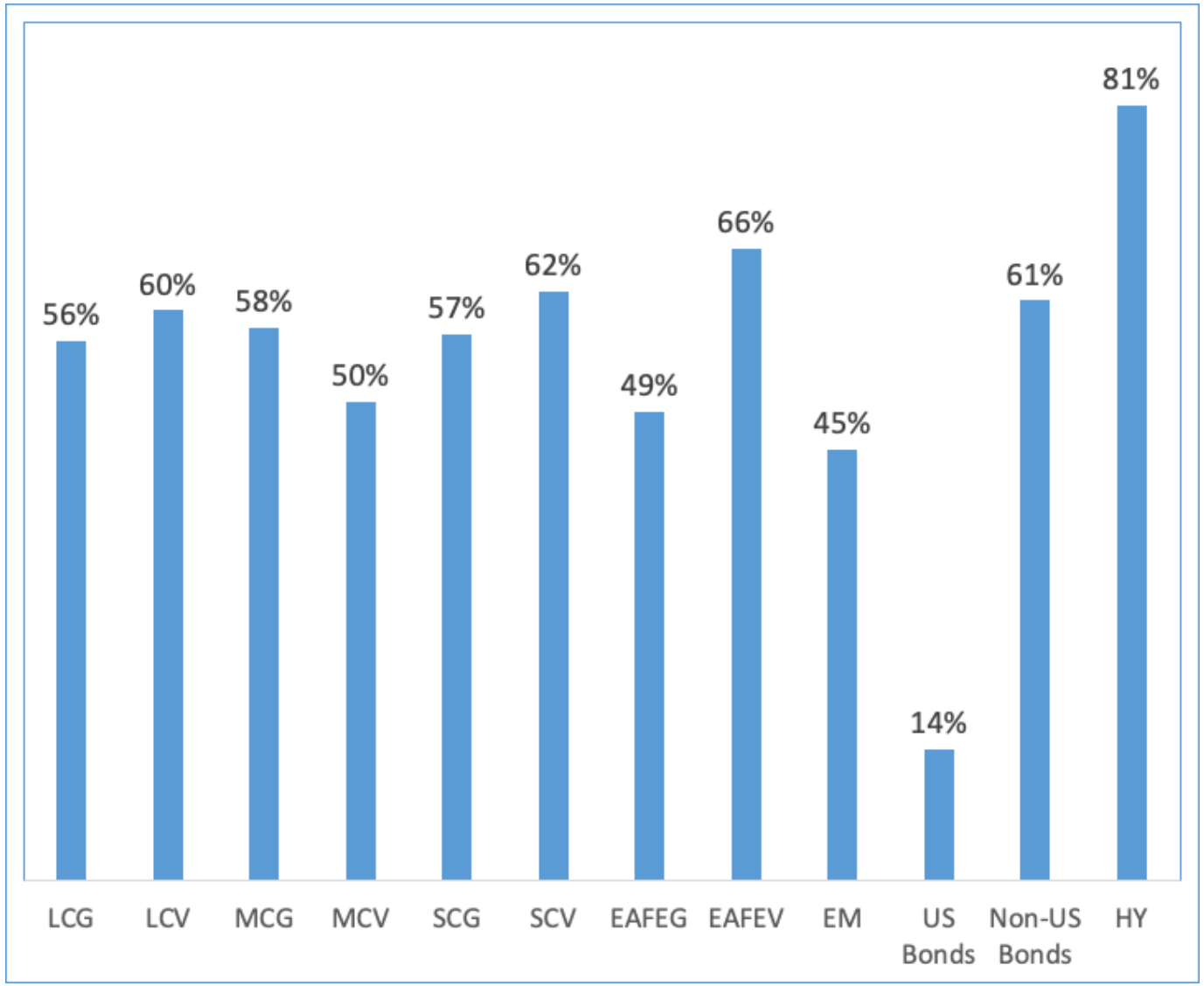
"What's in the Box?"

Effective Allocation to Stated Mandates



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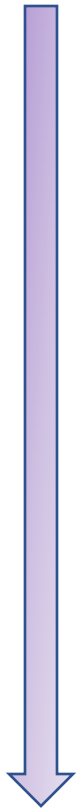
Effective Exposures – **Fund Focus**

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY
LCG	**56.5%**		25.4%				18.1%					
LCV	9.1%	**59.7%**	1.8%			20.6%		0.6%	8.2%			
MCG	5.0%		**57.8%**				8.4%			28.7%		
MCV		18.6%	0.5%	**50.1%**		4.9%				9.4%		16.5%
SCG	4.4%		33.9%		**57.2%**							4.5%
SCV				26.9%	4.5%	**61.7%**				6.9%		
EAFEG	3.1%		4.3%		1.2%		**49.1%**	17.2%	14.0%			11.1%
EAFEV			0.5%		1.4%	8.0%		**66.2%**	6.2%	12.9%		4.9%
EM	2.0%				4.0%		3.0%		**45.2%**	29.1%		16.7%
US Bonds						1.7%				**13.7%**		84.5%
Non-US Bonds								2.8%	9.2%	2.6%	**60.7%**	24.7%
HY			3.0%	6.3%						9.4%		**81.2%**

Effective Exposures – **Portfolio Focus**



Portfolio Weight

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY	Total
LCG	7.1%		3.2%				2.3%						12.5%
LCV	1.1%	7.5%	0.2%			2.6%		0.1%	1.0%				12.5%
MCG	0.4%		4.3%				0.6%			2.2%			7.5%
MCV		1.4%	0.0%	3.8%		0.4%				0.7%		1.2%	7.5%
SCG	0.2%		1.7%		2.9%							0.2%	5.0%
SCV				1.3%	0.2%	3.1%				0.3%			5.0%
EAFEG	0.2%		0.3%		0.1%		3.9%	1.4%	1.1%			0.9%	8.0%
EAFEV			0.0%		0.1%	0.6%		5.3%	0.5%	1.0%		0.4%	8.0%
EM	0.1%				0.2%		0.1%		1.8%	1.2%		0.7%	4.0%
US Bonds						0.3%				2.7%		16.9%	20.0%
Non-US Bonds								0.1%	0.5%	0.1%	3.0%	1.2%	5.0%
HY			0.2%	0.3%						0.5%		4.1%	5.0%
Total	9.1%	8.9%	10.0%	5.4%	3.5%	7.0%	6.9%	6.9%	4.9%	8.7%	3.0%	25.6%	100%
Active Weight	-3.4%	-3.6%	2.5%	-2.1%	-1.5%	2.0%	-1.1%	-1.1%	0.9%	-11.3%	-2.0%	20.6%	

Campisi, "Balanced Portfolio Attribution" JPM Spring 2009

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Muralidhar, "Decision Based Attribution" JPM Spring 2016

Meet the Funds

Total Return Metrics

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bond	Fgn Bond	HY
Return	22.21	11.34	23.22	10.56	20.35	10.24	11.89	7.08	16.55	6.30	6.65	8.63
Volatility	15.67	18.53	17.75	17.99	21.01	20.14	15.67	24.45	18.87	4.56	9.51	8.14

- Average Fund Return = 12.46 *(vs 12.77 portfolio return)*
- Average Fund Volatility = 14.77 *(vs 13.31 portfolio volatility)*

This illustrates "Double-Barreled Diversification"

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Meet the Funds

Individual Active Return Metrics

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bond	Fgn Bond	HY
Return	22.21	11.34	23.22	10.56	20.35	10.24	11.89	7.08	16.55	6.30	6.65	8.63
Volatility	15.67	18.53	17.75	17.99	21.01	20.14	15.67	24.45	18.87	4.56	9.51	8.14
Excess Return	0.51	1.58	4.56	0.82	3.99	0.58	1.39	2.88	3.74	1.87	1.75	0.78
Tracking Error	5.49	5.03	5.61	3.04	5.98	3.98	4.77	8.41	5.50	4.91	5.51	2.46
Information Ratio	*0.09*	*0.31*	*0.81*	*0.27*	*0.67*	*0.15*	*0.29*	*0.34*	*0.68*	*0.38*	*0.32*	*0.32*

- Average Tracking Error = 5.12 *(vs 2.42)*
- Average Information Ratio = 0.36 *(vs 0.77)*

Even Greater Active Diversification Within "Team of Funds"

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Complete Active Attribution

Fund View of Return and Risk

Fund Analysis	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bond	Fgn Bond	HY
Contribution to Portfolio Excess Return	0.05	0.24	0.31	0.05	0.18	0.01	0.12	0.31	0.14	0.35	0.09	0.03
Contribution to Portfolio Tracking Error	0.22	0.40	0.04	0.02	0.03	-0.05	0.25	0.52	0.10	0.73	0.18	-0.03

Campisi, "Fund Evaluation From a Portfolio Perspective," JPM Spring 2022

*This explains **187** bps of excess return and **242** bps of tracking error*

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Calculating Contribution to (Active) Risk

Markowitz in a Nutshell

	Fund Analysis	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY
	Contribution to Portfolio Excess Return	0.04	0.18	0.22	0.04	0.13	0.01	0.11	0.28	0.13	0.32	0.08	0.03
	Contribution to Portfolio Tracking Error	0.22	0.40	0.04	0.02	0.03	-0.05	0.25	0.52	0.10	0.73	0.18	-0.03
X	Weight	12.5%	12.5%	7.5%	7.5%	5%	5%	8%	8%	4%	20%	5%	5%
Sigma	Tracking Error	5.49	5.03	5.61	3.04	5.98	3.98	4.77	8.41	5.50	4.91	5.51	2.46
Rho	Correlation of Fund Alpha to Portfolio Excess Return	0.32	0.64	0.11	0.07	0.08	-0.25	0.66	0.77	0.47	0.75	0.67	-0.24

Refresher

- *"X-Sigma-Rho" is easily derived from covariance matrix*
- *This provides contribution to portfolio tracking error*

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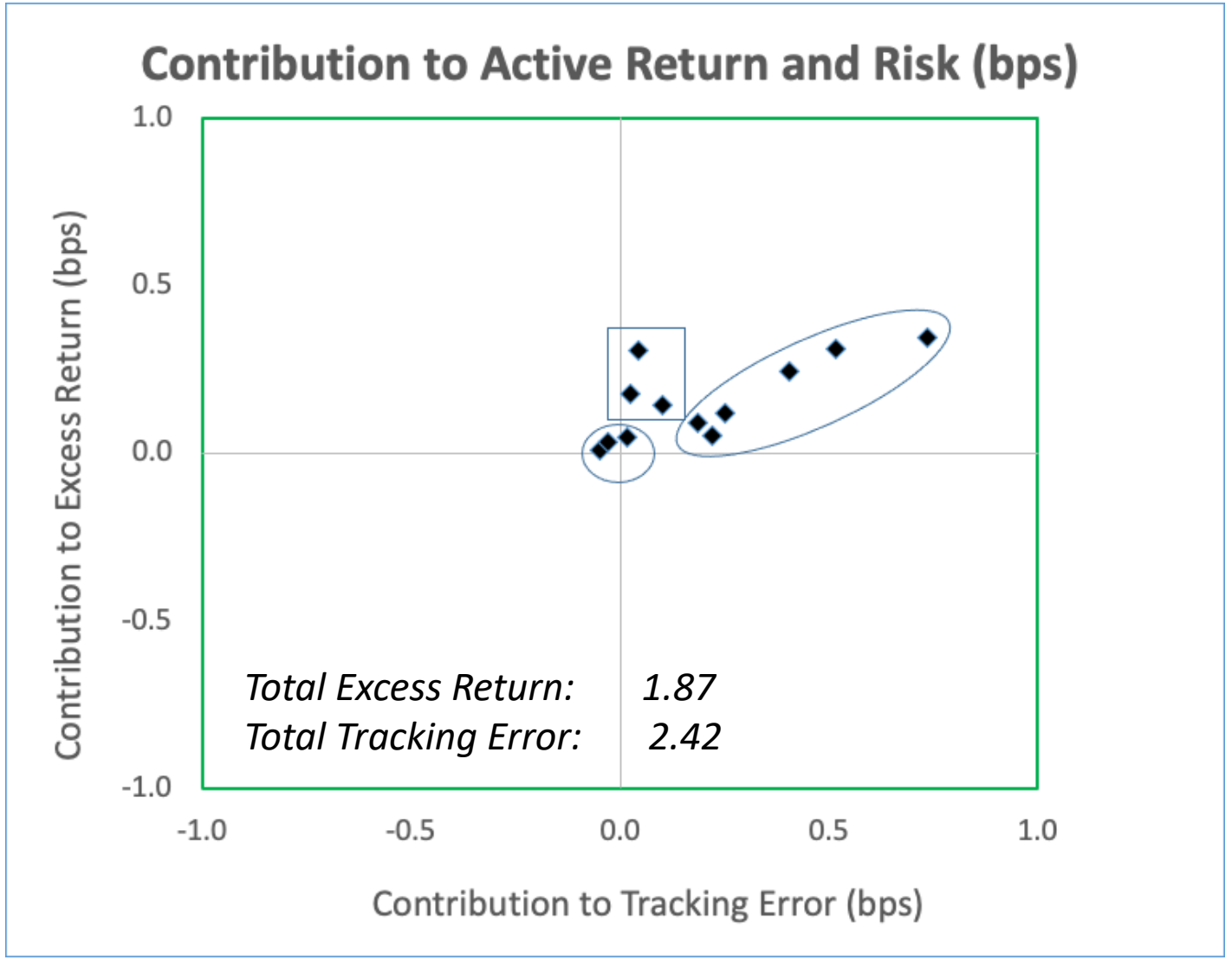
A Basis Points View can be Misleading



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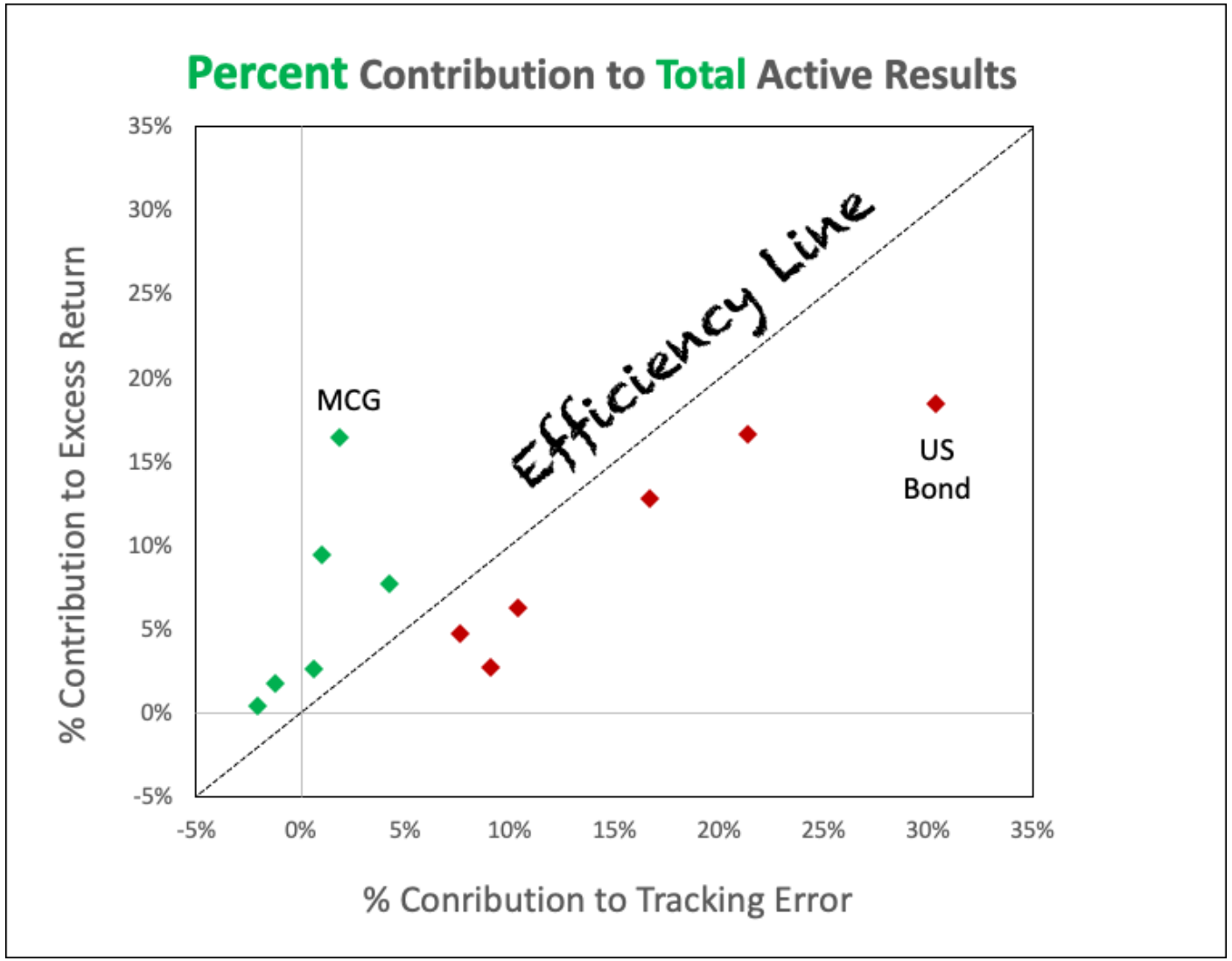
Visualizing Active Fund Efficiency



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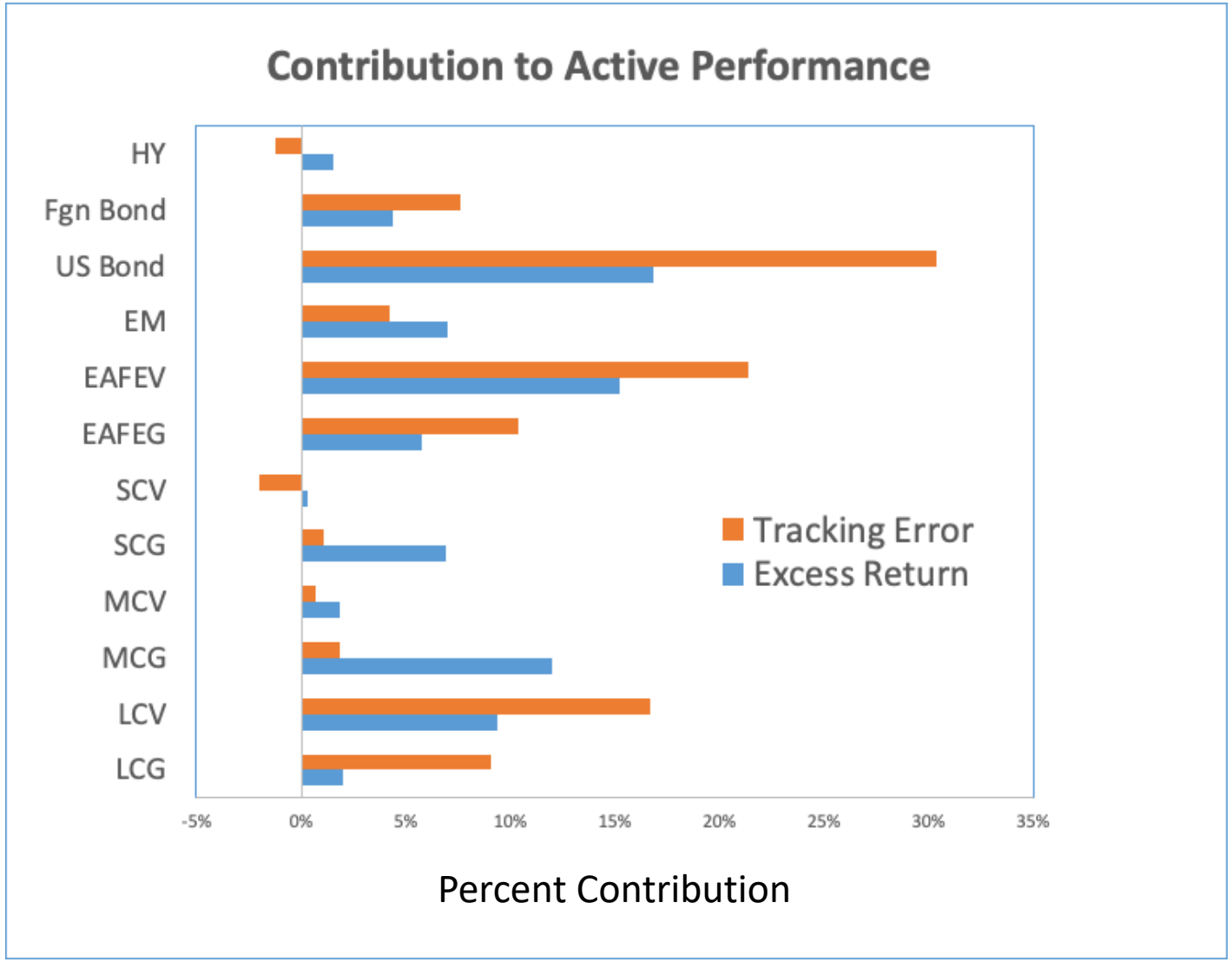
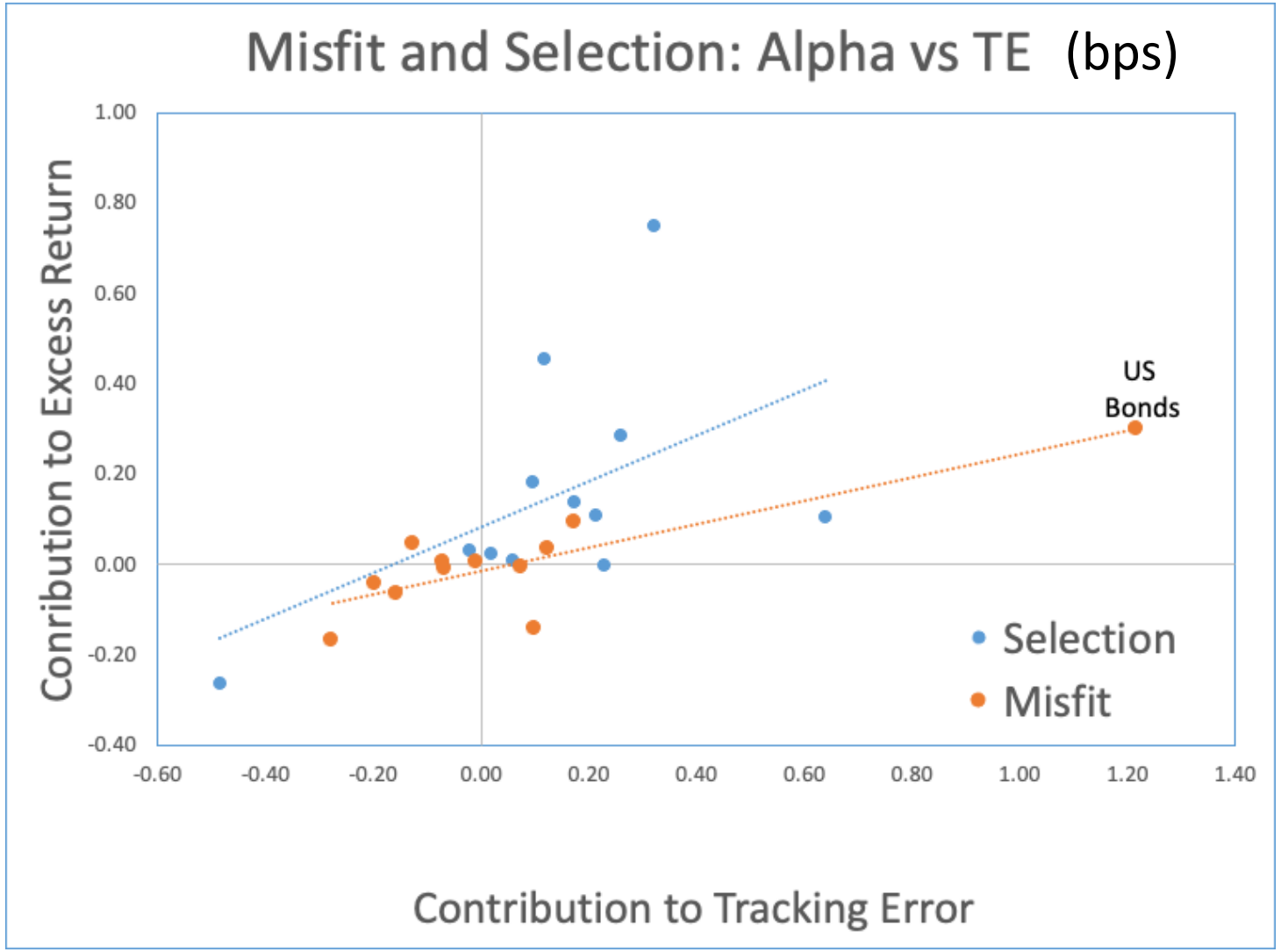
Proportionality is Key



We have to talk about… “The Elephant in the Room”



Active Process is more efficient than Misfit Risk

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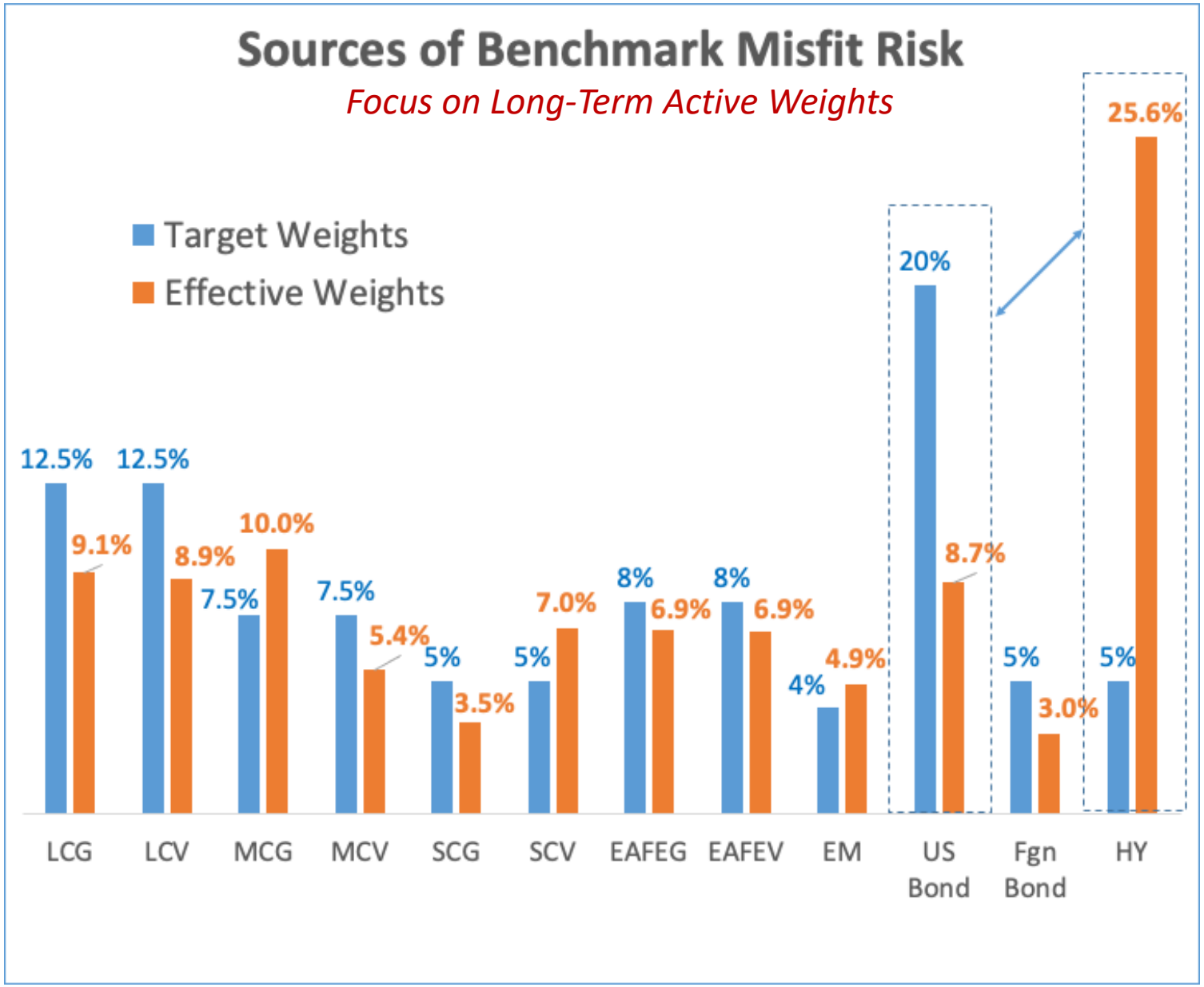

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Complete Active Attribution

(Portfolio Level)

Efficiency Analysis	Excess Return	Contribution to Tracking Error	*Info Ratio (in portfolio)*
Effective Exposures	0.05	0.79	*0.06*
Fund Selection	1.82	1.63	*1.12*
Total	**1.87**	**2.42**	

- Misfit contributes 1/3 of active risk
- Unintended consequence of fund selection
- Selection skill within funds is more efficient

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Active Efficiency
(Portfolio Level)

Efficiency Analysis	% Contribution to Active Return	% Contribution to Active Risk	Efficiency
Effective Exposures	2.7%	32.8%	-30.0%
Fund Selection	97.3%	67.2%	30.0%

Efficiency = Return Contribution minus Risk Contribution

Mismatch risk is surprisingly high!

"Cost of doing business" for selection?

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True Sources of Active Return

(Fund View in bps)

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bond	Fgn Bonds	HY	Total
Weight	12.5%	12.5%	7.5%	7.5%	5%	5%	8%	8%	4%	20%	5%	5%	
Fund Return	22.21	11.34	23.22	10.56	20.35	10.24	11.89	7.08	16.55	6.30	6.65	8.63	12.77
Benchmark Return	21.70	9.76	18.66	9.73	16.36	9.65	10.50	4.20	12.81	4.44	4.89	7.84	10.90
Effective Weight Return	18.94	11.36	14.24	9.24	17.10	9.84	10.34	5.92	10.12	7.48	6.47	8.06	10.95
Misfit Excess	*-2.76*	*1.60*	*-4.42*	*-0.49*	*0.74*	*0.18*	*-0.16*	*1.71*	*-2.69*	*3.05*	*1.57*	*0.22*	***0.05***
Selection Return	*3.27*	*-0.02*	*8.98*	*1.32*	*3.25*	*0.40*	*1.55*	*1.17*	*6.43*	*-1.18*	*0.18*	*0.56*	***1.82***
Total Excess Return	*0.51*	*1.58*	*4.56*	*0.82*	*3.99*	*0.58*	*1.39*	*2.88*	*3.74*	*1.87*	*1.75*	*0.78*	***1.87***

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Attribution of Active **Risk**

(Portfolio View)

Tracking Error Attribution	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bond	Fgn Bond	HY	Total
Misfit	0.10	0.17	-0.28	-0.20	-0.07	-0.07	0.08	-0.12	-0.16	1.22	0.13	-0.01	0.79
Selection	0.12	0.23	0.32	0.21	0.10	0.02	0.17	0.64	0.26	-0.48	0.06	-0.02	1.63
Total	0.22	0.40	0.04	0.02	0.03	-0.05	0.25	0.52	0.10	0.73	0.18	-0.03	2.42

- Misfit and Selection risks offered diversification
  - *Offsetting risk in 8-out-of-12 segments*
- Half the tracking error comes from only 2 segments
- US Bond Fund employs overly-aggressive strategy
  - *Too much in out-of-index assets*
  - *Low quality relative to its benchmark*

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Long-Term Attribution At a Glance

	Excess Return	Tracking Error	*Misfit Risk*	*Active Risk*
LCG	0.05	0.22	*0.10*	*0.12*
LCV	0.24	0.40	*0.17*	*0.23*
MCG	0.31	0.04	*-0.28*	*0.32*
MCV	0.05	0.02	*-0.20*	*0.21*
SCG	0.18	0.03	*-0.07*	*0.10*
SCV	0.01	-0.05	*-0.07*	*0.02*
EAFEG	0.12	0.25	*0.08*	*0.17*
EAFEV	0.31	0.52	*-0.12*	*0.64*
EM	0.14	0.10	*-0.16*	*0.26*
US Bond	0.35	0.73	*1.22*	*-0.48*
Fgn Bond	0.09	0.18	*0.13*	*0.06*
HY	0.03	-0.03	*-0.01*	*-0.02*
Total	**1.87**	**2.42**	***0.79***	***1.63***

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How Could We Do Better?

(3 Approaches to Portfolio Construction)

Fill the Style Boxes

	Return	Risk	Excess Return	Tracking Error	Info Ratio	95% Confidence Alpha
Single Fund Constrained Portfolio	12.77	13.31	1.87	2.42	**0.77**	**-0.25**
Constrained Multi-Fund Portfolio	13.19	13.21	2.30	2.32	**0.99**	**0.26**
Unconstrained Multi-Fund Portfolio	13.18	11.83	2.29	0.87	**2.63**	**1.53**
Benchmark	**10.90**	**11.65**				

Alpha Diversification

Effective Weights

- **Diversify alpha** across funds **within** a mandate
- **Align market exposure across all funds:**
  - *Focus on exposures, not optics*
  - *Minimize Misfit Risk*

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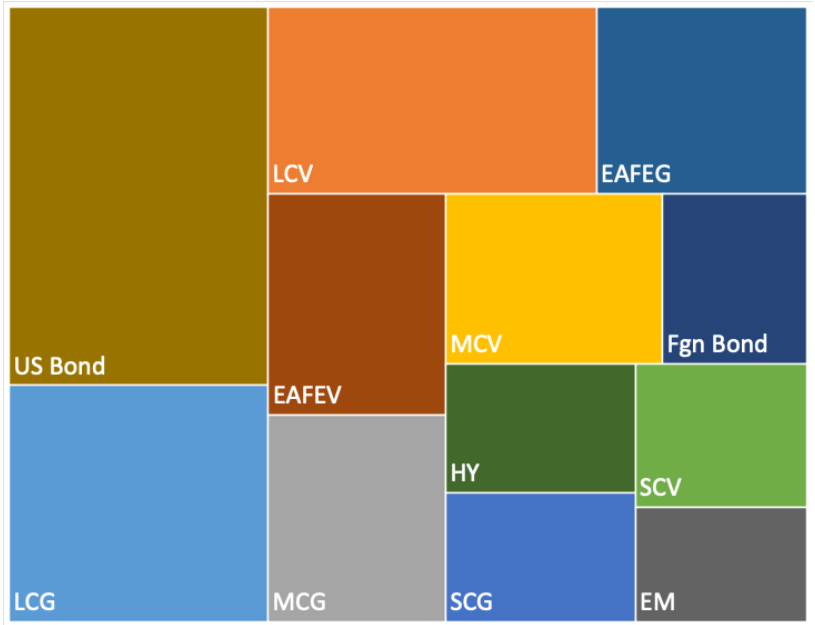
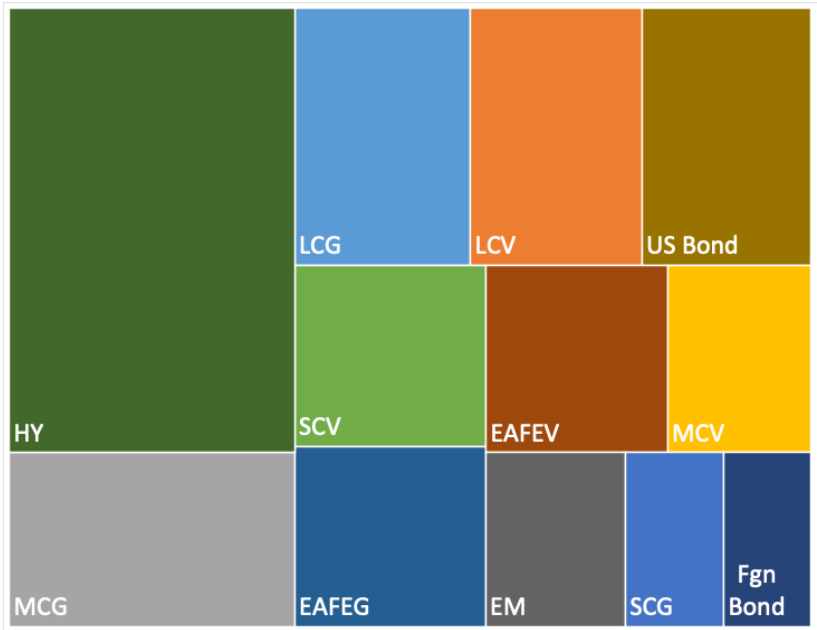
"Looks Like"
vs
"Acts Like"
Portfolios

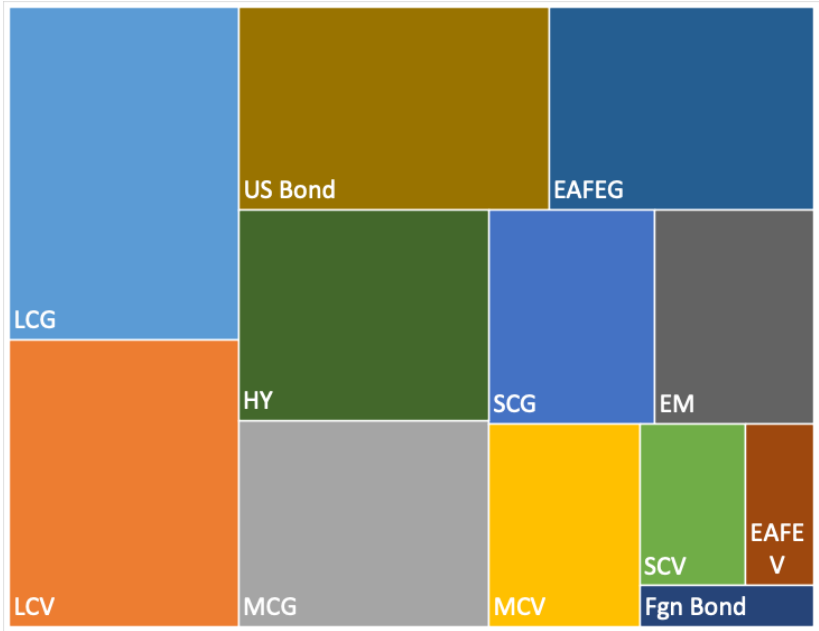


Benchmark

Effective Active Weights:
Min: -11.3
Max: +20.6

Effective Active Weights:
Min: -7.4
Max: +5.6





Fill Each Style Box with Single Fund

Unconstrained Multi-Fund Segments

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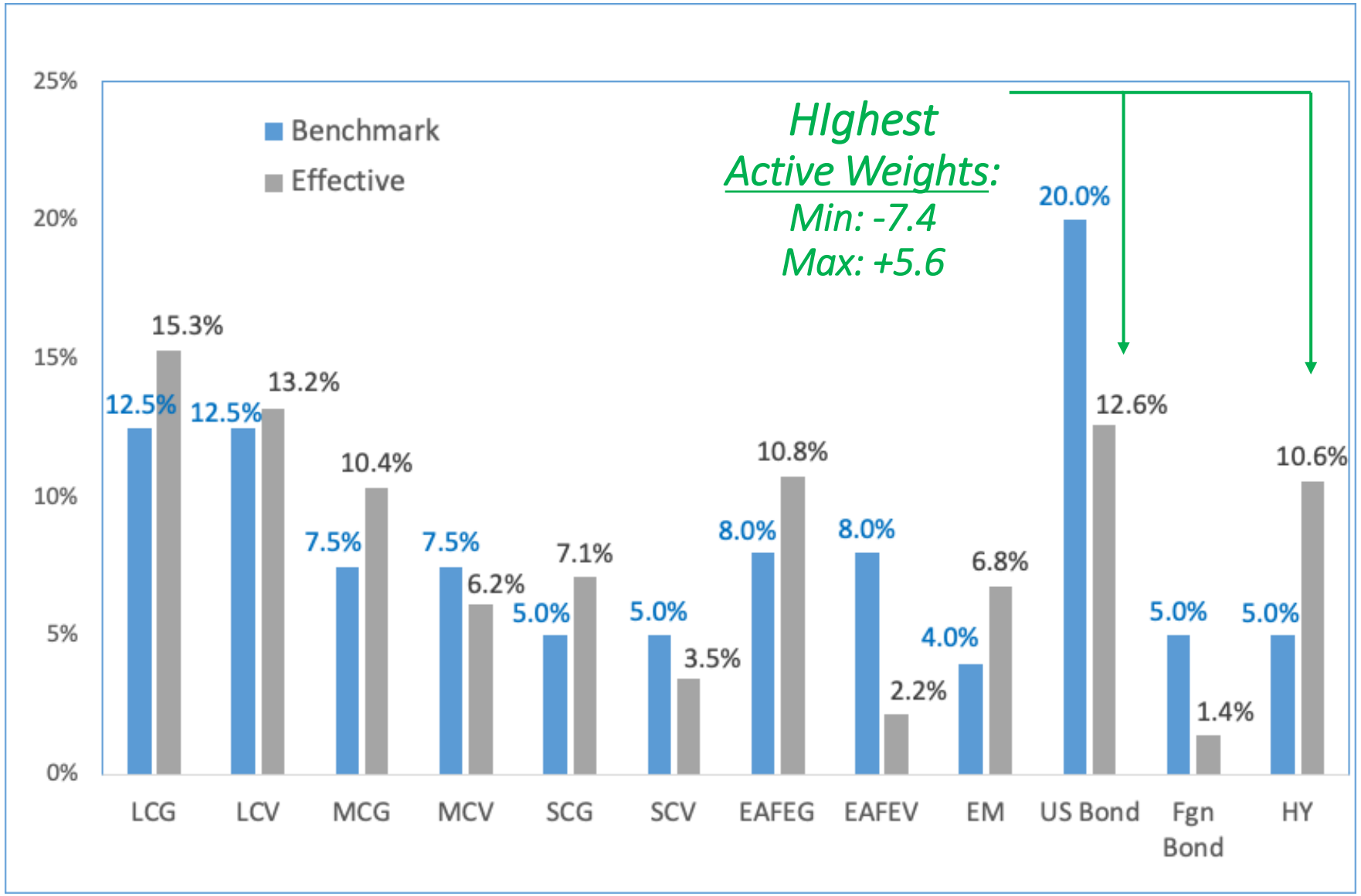
Effective Exposures of Unconstrained Portfolio



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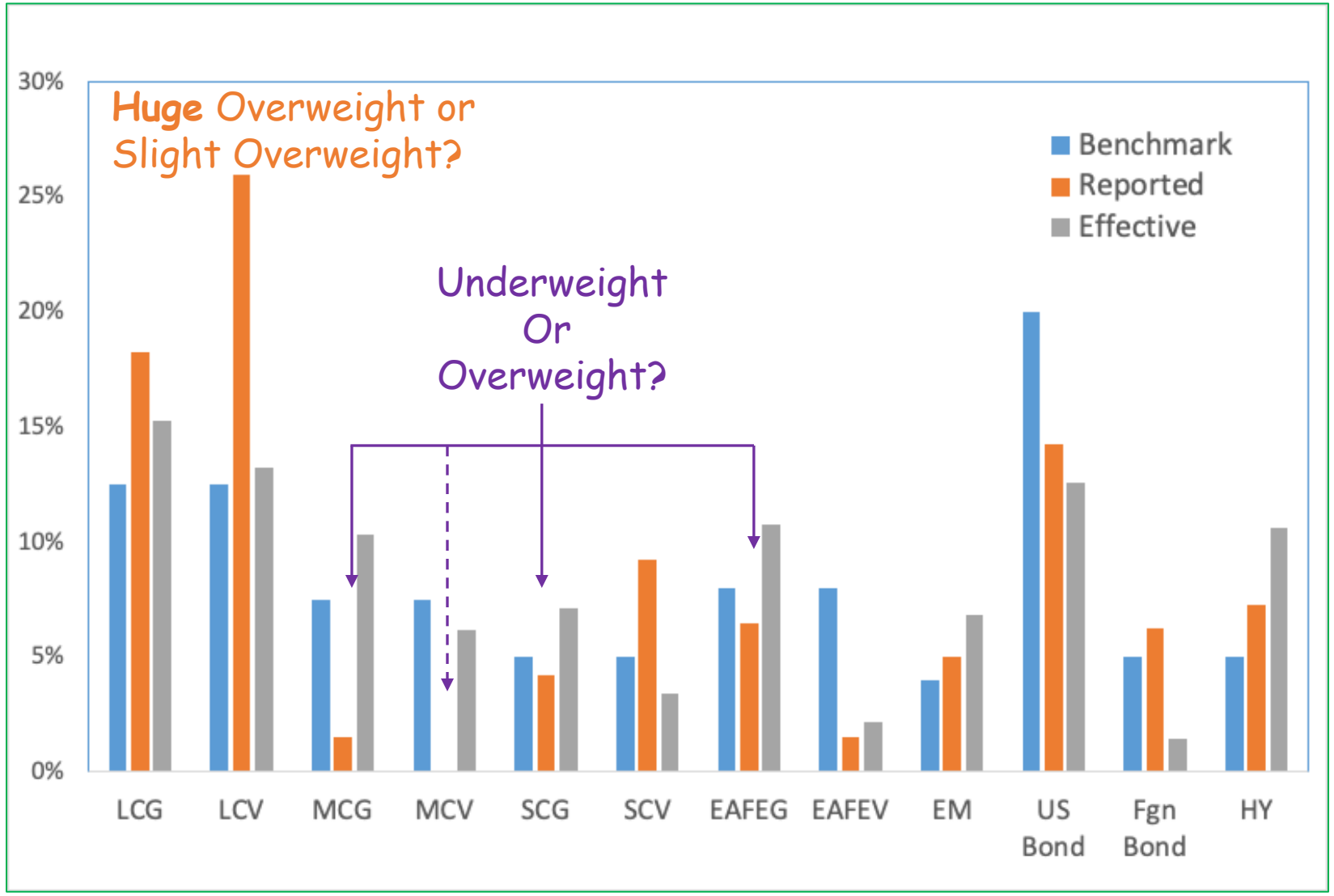
Appearances are Often Deceiving

(*Reported* vs *Effective* Exposures)



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Insights on Benchmark Misfit Risk

- Benchmark Misfit is an **Asset Allocation Mismatch**, but…
  *it is **NOT** the decision of the "**OCIO/Fund of Funds**" manager*

- Misfit comes from active effects within underlying funds

- **What should asset manager do regarding Benchmark Mismatch?**
  - ***Be aware** of it*
  - ***Incorporate it** when selecting fund **team***

This is the "next phase" of Portfolio Construction

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"What's in YOUR portfolio?"

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