Evaluating Benchmark Misfit Risk

Redux and The Road Not Taken

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"Insights and Innovation"

Stephen Campisi, CFA

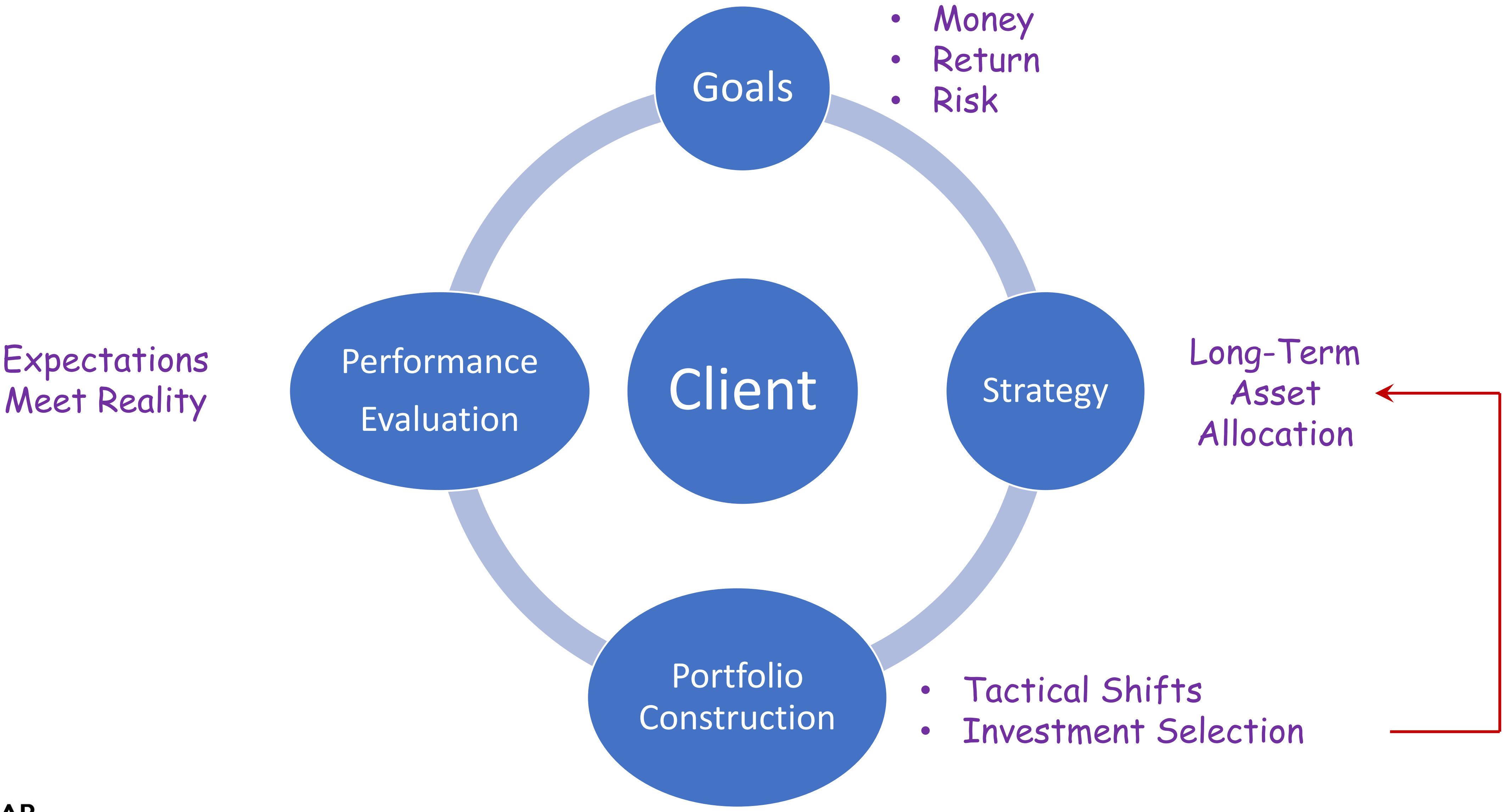
Initial Questions

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

Looking Deeper in 2024

- Finding best way to identify mismatch risk
- How to reflect the investment decision process
- Balancing judgement and mathematical rigor

The Investment Process



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Portfolio Construction Using Indexes

Simple…

No Surprises

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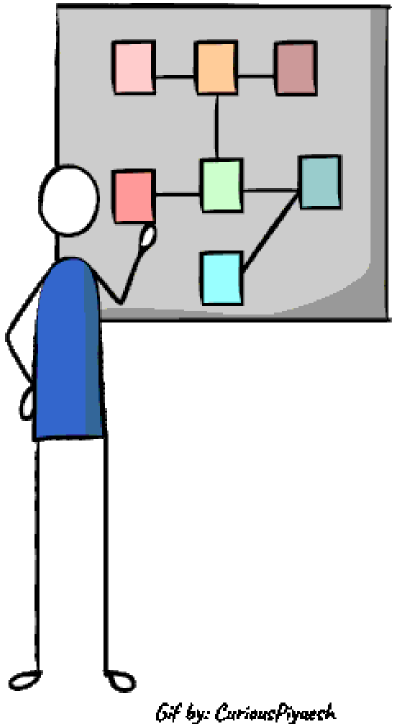
Portfolio Construction by Active Managers



Asset Allocation

Fund Selection

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What Investment Performance Often Reveals

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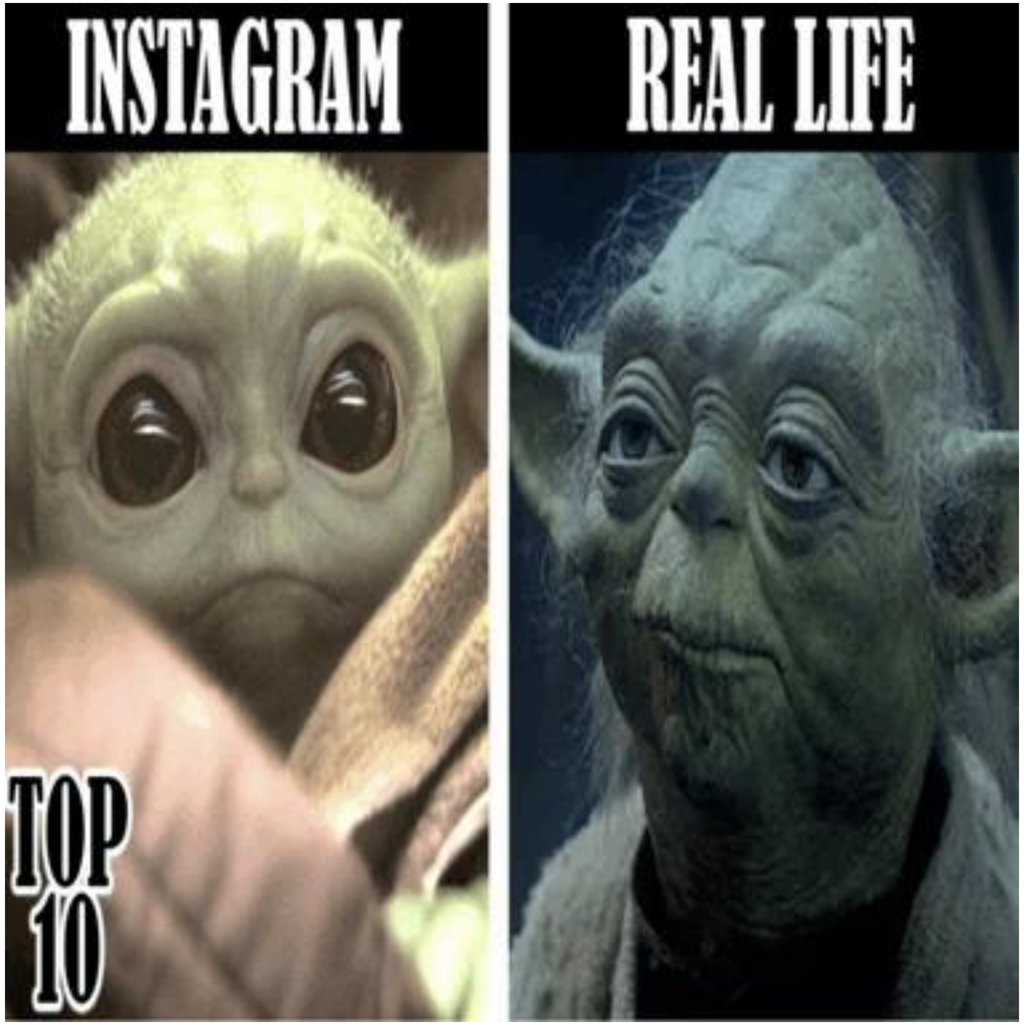
What if I said:
"Your Funds Deliver a Different Asset Allocation"

Finding Out Your Funds Undermine Your Asset Allocation

Do You Say:
"It's Not Necessarily Bad…"

"It's Just Different – That's OK"



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Here's the Problem:
It LOOKS the Same but ACTS Different

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How Alpha Seeking Drives Structural Drift

US Large Cap Growth Fund

LCG

LCV

Fgn-G

Style

Domicile

Size Premium

MCG

SCG

Driven by Stock Selection

US AGG Bond Fund

Underweight Treasury

Overweight Corporate

Acts like High Yield

Overweight Lower-Quality Corporate

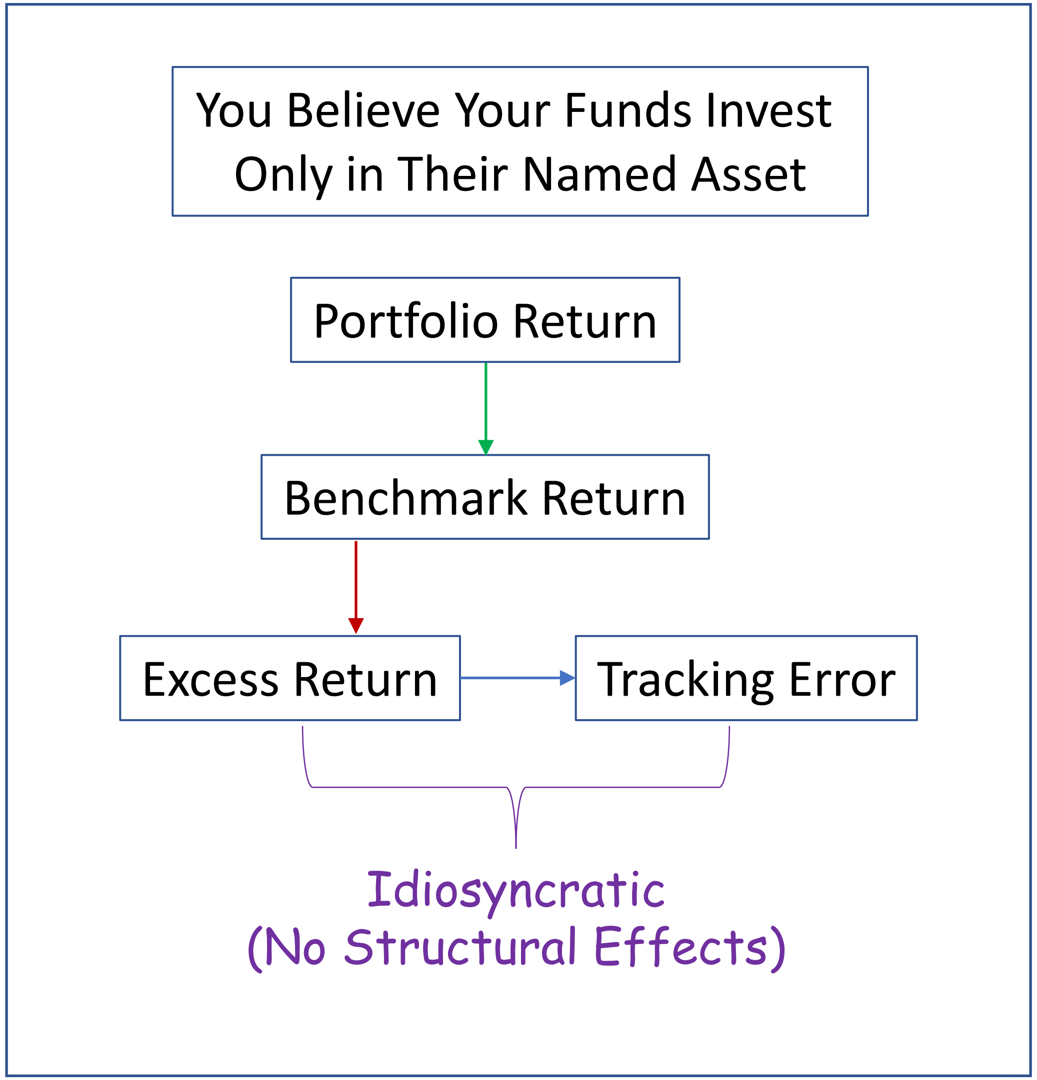
High Yield

Emerging Markets

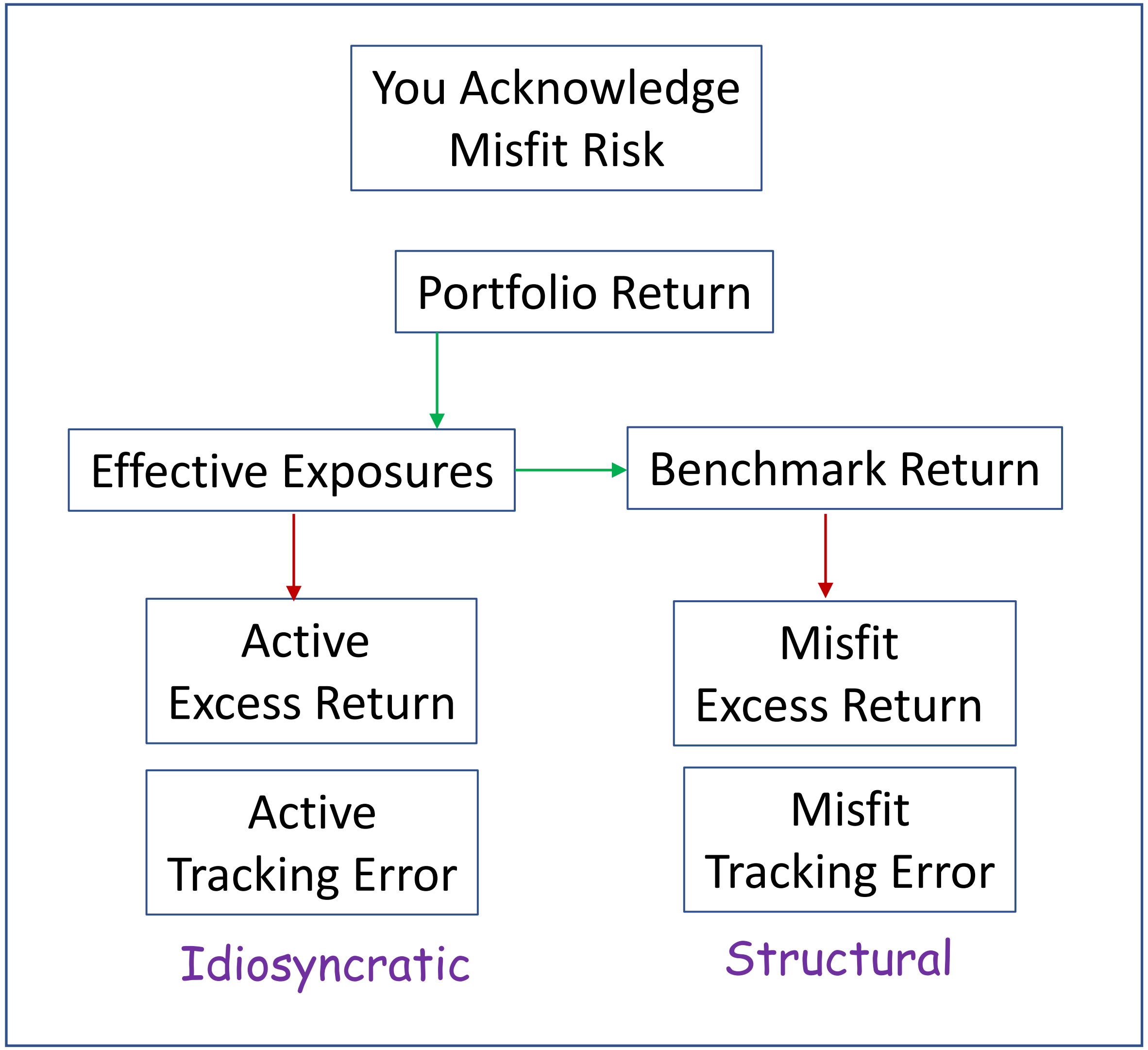
Driven by Structure

Ignore Benchmark Misfit: Mistake Risk for Skill

“Blue Pill”



“Red Pill”



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"Red-Pill Reality"

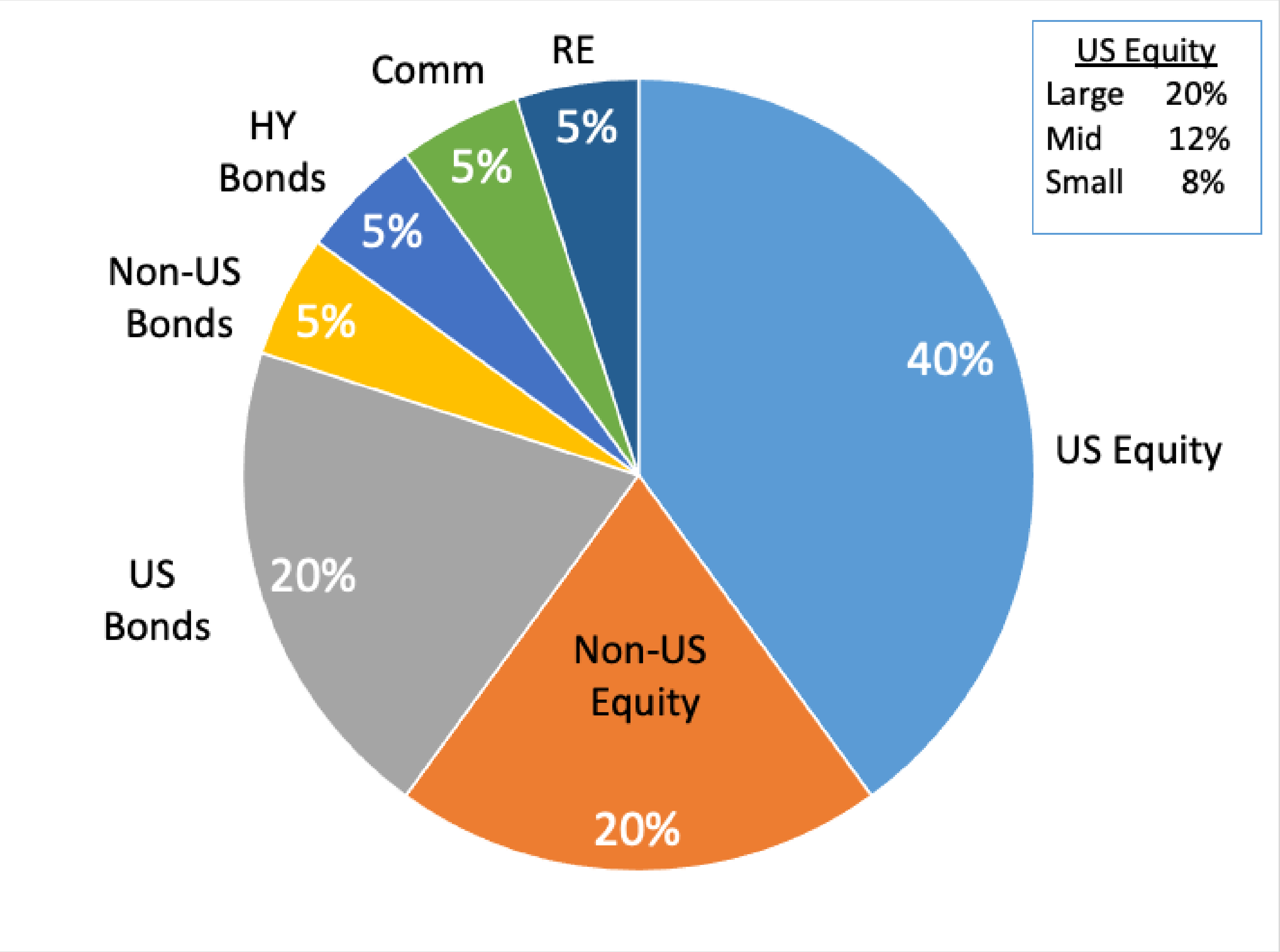
Focus on how investments BEHAVE,
Not what they are CALLED

Our case study

- Start with a diversified asset allocation
- Fill each segment with an active fund
- Match the allocations
- Rebalance the portfolio and the benchmark monthly

No structural differences

Asset Allocation = Benchmark



LCG	10%
LCV	10%
MCG	6%
MCV	6%
SCG	4%
SCV	4%
EAFEG	8%
EAFEV	8%
EM	4%
US Bonds	20%
Non-US Bonds	5%
HY	5%
Comm	5%
RE	5%

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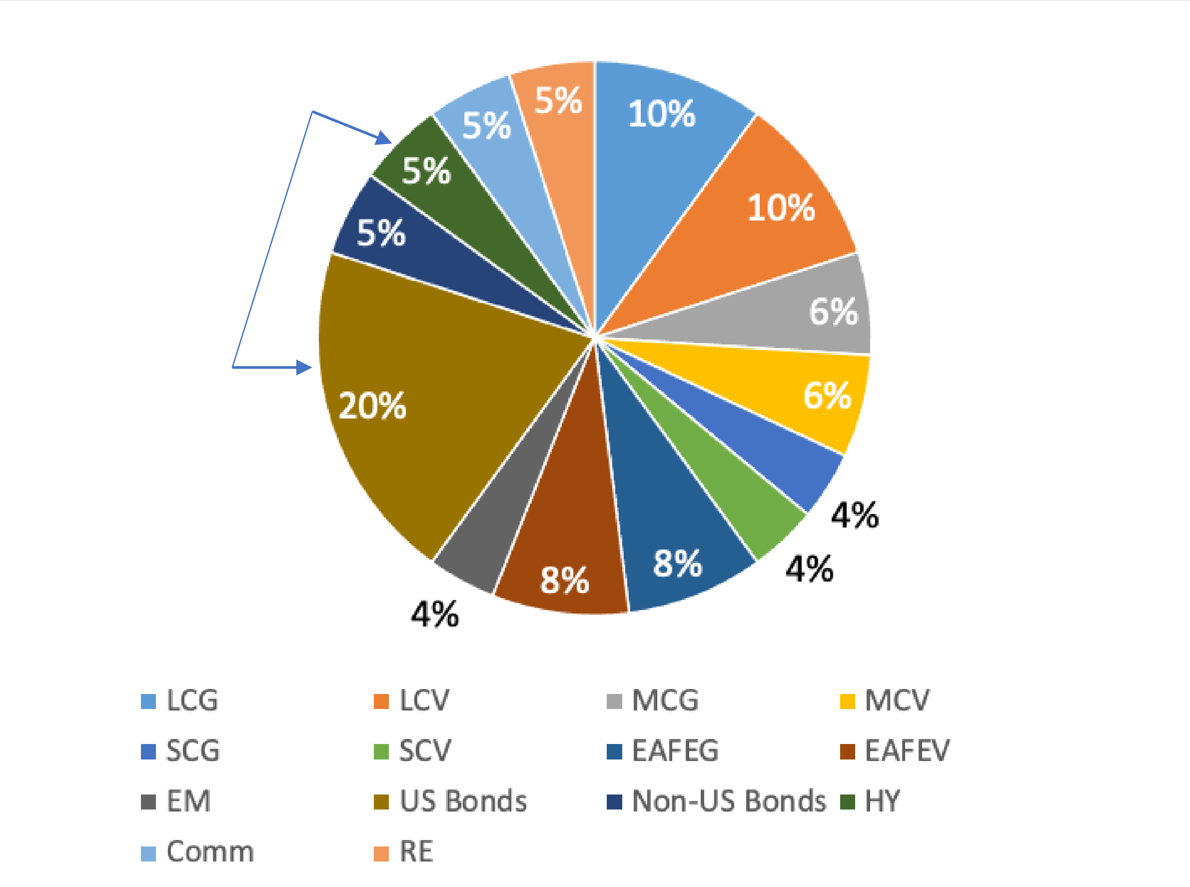
How We Find *"Effective Exposures"*

- *Analyze each **FUND** separately*
- Assign **weights** to market segments to create a mix with highest correlation to each fund
- Summarize results across <u>all</u> funds

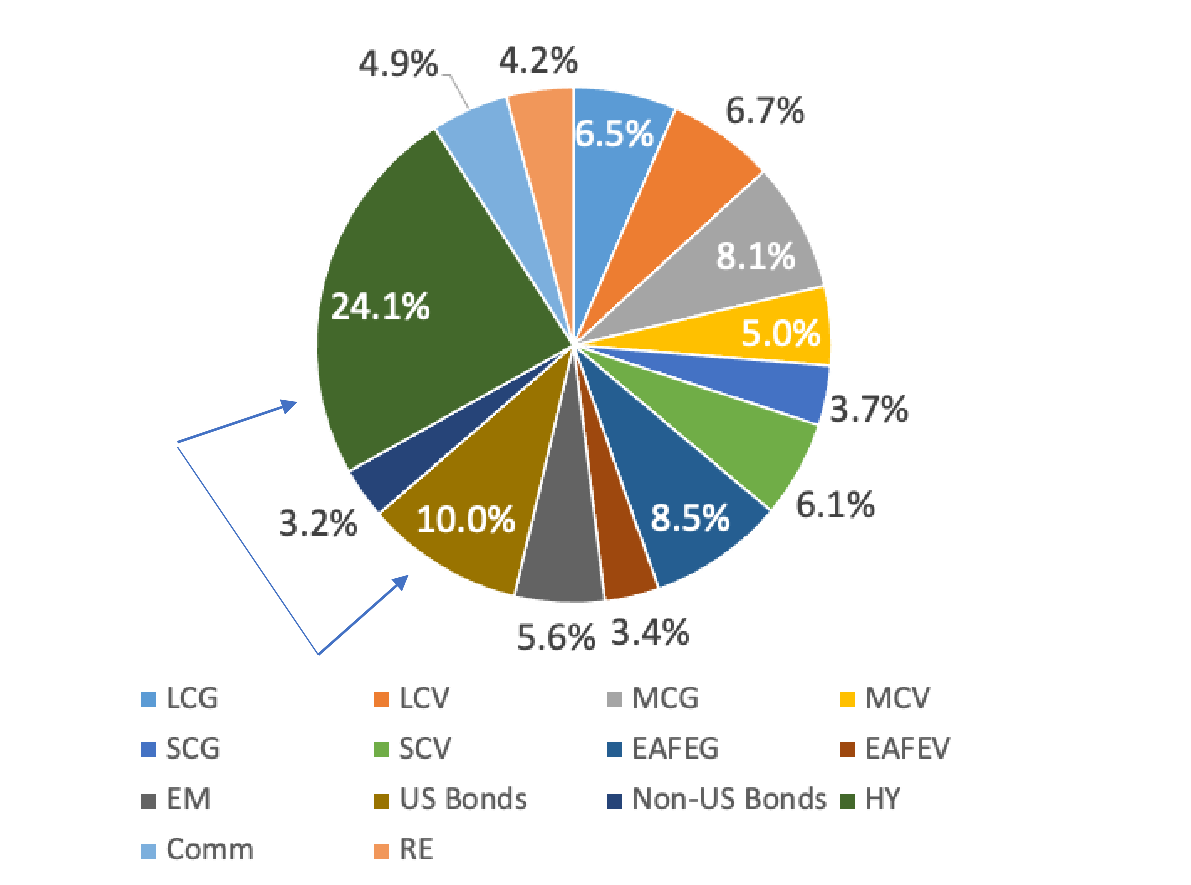
This is what your portfolio "acts like"

Results:

What the Portfolio **LOOKS** Like



What the Portfolio **ACTS** Like



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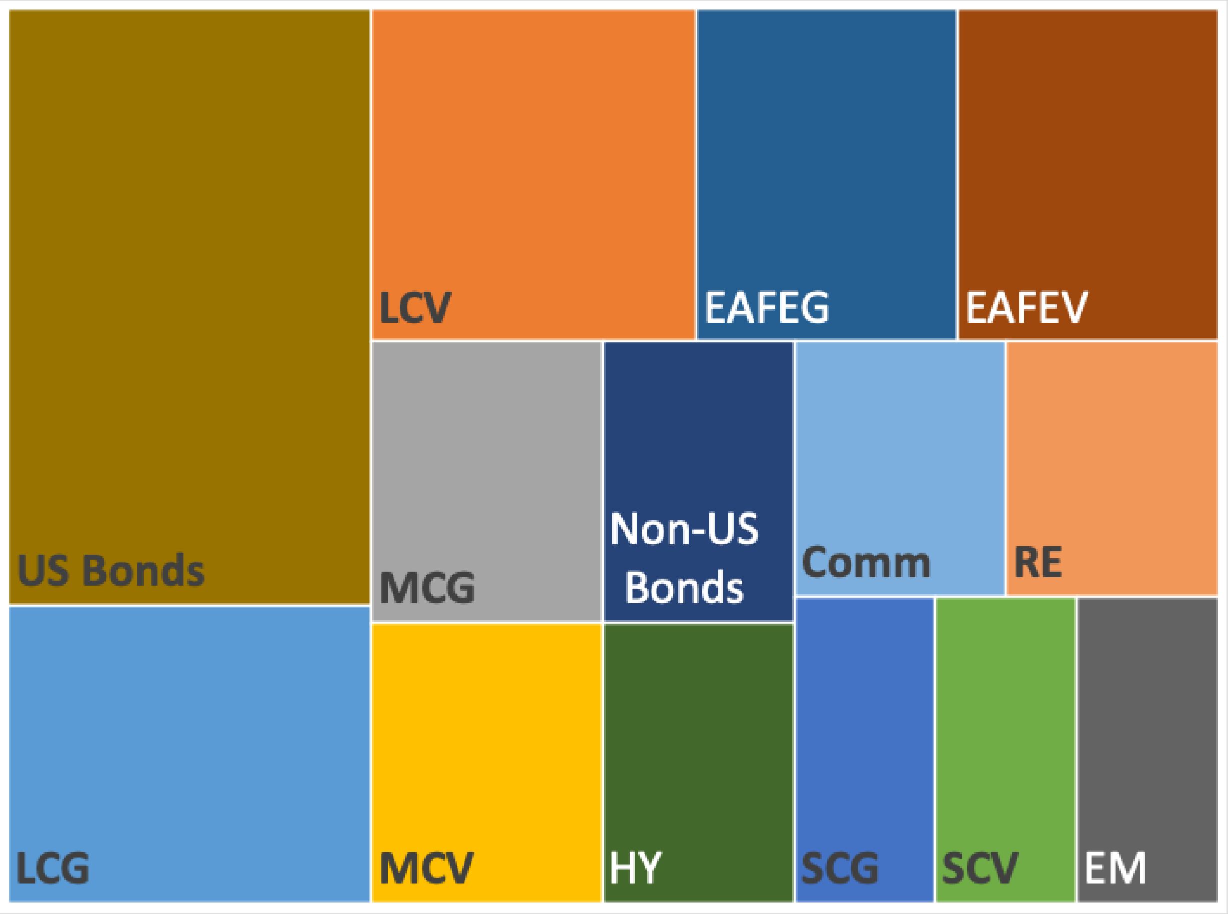
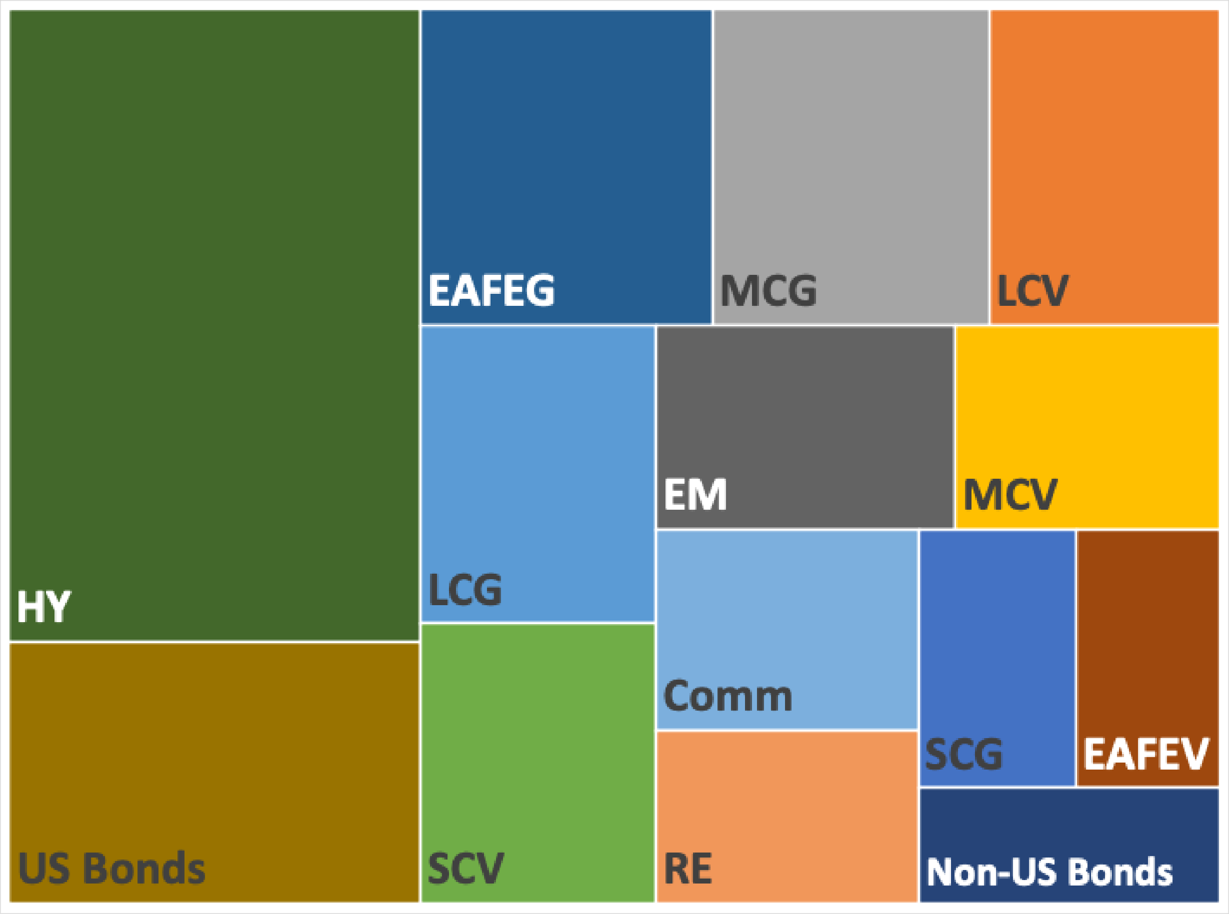
Looks Like One Thing
Acts Like Another

What the Portfolio **LOOKS** Like



What the Portfolio **ACTS** Like



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Effective **Segment** Exposures

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bond	Non-US Bond	HY	Comm	RE	Assigned Weight
LCG	**49.5%**		26.7%		1.1%		19.5%		1.6%		1.5%				10%
LCV	9.1%	**59.7%**	1.8%			20.6%		0.6%	8.2%						10%
MCG	5.0%		**57.8%**				8.4%			28.7%					6%
MCV		7.1%	9.2%	**77.9%**		1.9%	0.0%	2.3%	1.1%			0.6%			6%
SCG			16.0%		**84.0%**										4%
SCV		8.2%	7.1%	0.7%	4.8%	**67.4%**		11.9%							4%
EAFEG	3.9%					2.7%	**62.4%**		10.3%	19.4%		1.4%			8%
EAFEV						12.1%	13.3%	**32.6%**	7.6%	19.4%		15.0%			8%
EM					2.1%	0.9%			**67.5%**	26.5%			3.0%		4%
US Bond										**7.0%**		88.0%		5.0%	20%
Non-US Bond								2.8%	9.2%	2.6%	**60.7%**	24.7%			5%
HY			3.5%	5.5%						11.1%		**77.8%**	2.1%		5%
Comm	0.3%						0.5%			5.8%	0.6%		**92.8%**		5%
RE			2.1%							34.0%				**63.9%**	5%

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Effective **Portfolio** Exposures

	LCG	**LCV**	**MCG**	**MCV**	**SCG**	**SCV**	**EAFEG**	**EAFEV**	**EM**	**US Bonds**	**Non-US Bonds**	**HY**	**Comm**	**RE**
LCG	**5.0%**		2.7%		0.1%		2.0%		0.2%		0.1%			
LCV	0.9%	**6.0%**	0.2%			2.1%		0.1%	0.8%					
MCG	0.3%		**3.5%**				0.5%			1.7%				
MCV		0.4%	0.6%	**4.7%**		0.1%	0.0%	0.1%	0.1%			0.0%		
SCG			0.6%		**3.4%**									
SCV		0.3%	0.3%	0.03%	0.2%	**2.7%**		0.5%						
EAFEG	0.3%					0.2%	**5.0%**		0.8%	1.5%		0.1%		
EAFEV						1.0%	1.1%	**2.6%**	0.6%	1.5%		1.2%		
EM					0.1%	0.04%			**2.7%**	1.1%			0.1%	
US Bonds										**1.4%**		17.6%		1.0%
Non-US Bonds								0.1%	0.5%	0.1%	**3.0%**	1.2%		
HY			0.2%	0.3%						0.6%		**3.9%**	0.1%	
Comm	0.01%						0.02%			0.3%	0.03%		**4.6%**	
RE			0.1%							1.7%				**3.20%**
Effective Weights	**6.5%**	**6.7%**	**8.1%**	**5.0%**	**3.7%**	**6.1%**	**8.5%**	**3.4%**	**5.6%**	**10.0%**	**3.2%**	**24.1%**	**4.9%**	**4.2%**

Effective Weights Drive Active Weights

LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY	Comm	RE
-3.5%	-3.3%	2.1%	-1.0%	-0.3%	2.1%	0.5%	-4.6%	1.6%	-10.0%	-1.8%	19.1%	-0.1%	-0.8%

Active weights create long-Term Allocation effect

- Excess Return
- Tracking Error

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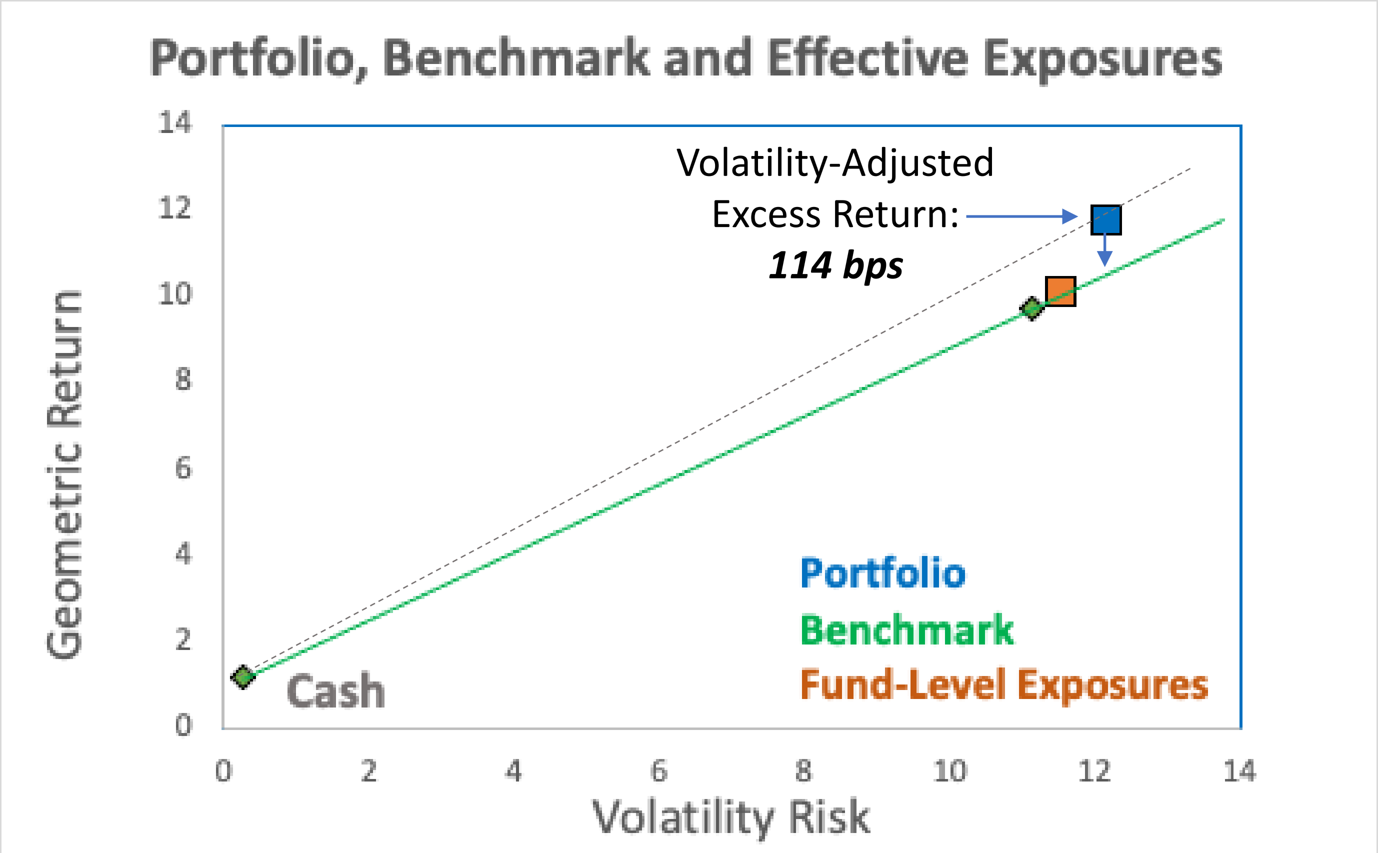
Performance Results

(5 years of monthly returns)



	Return	Risk
Effective Exposures	10.06	11.57
Benchmark	9.74	11.11
Portfolio	11.72	12.21
Cash	1.19	0.27

Contributions	Excess Return	Tracking Error
Misfit Excess Return	0.33	0.66
Active Excess Return	1.66	1.23
Total	**1.99**	**1.89**

Contributions	Excess Return	Tracking Error	Efficiency
Misfit Excess Return	16%	35%	-18%
Active Excess Return	84%	65%	18%

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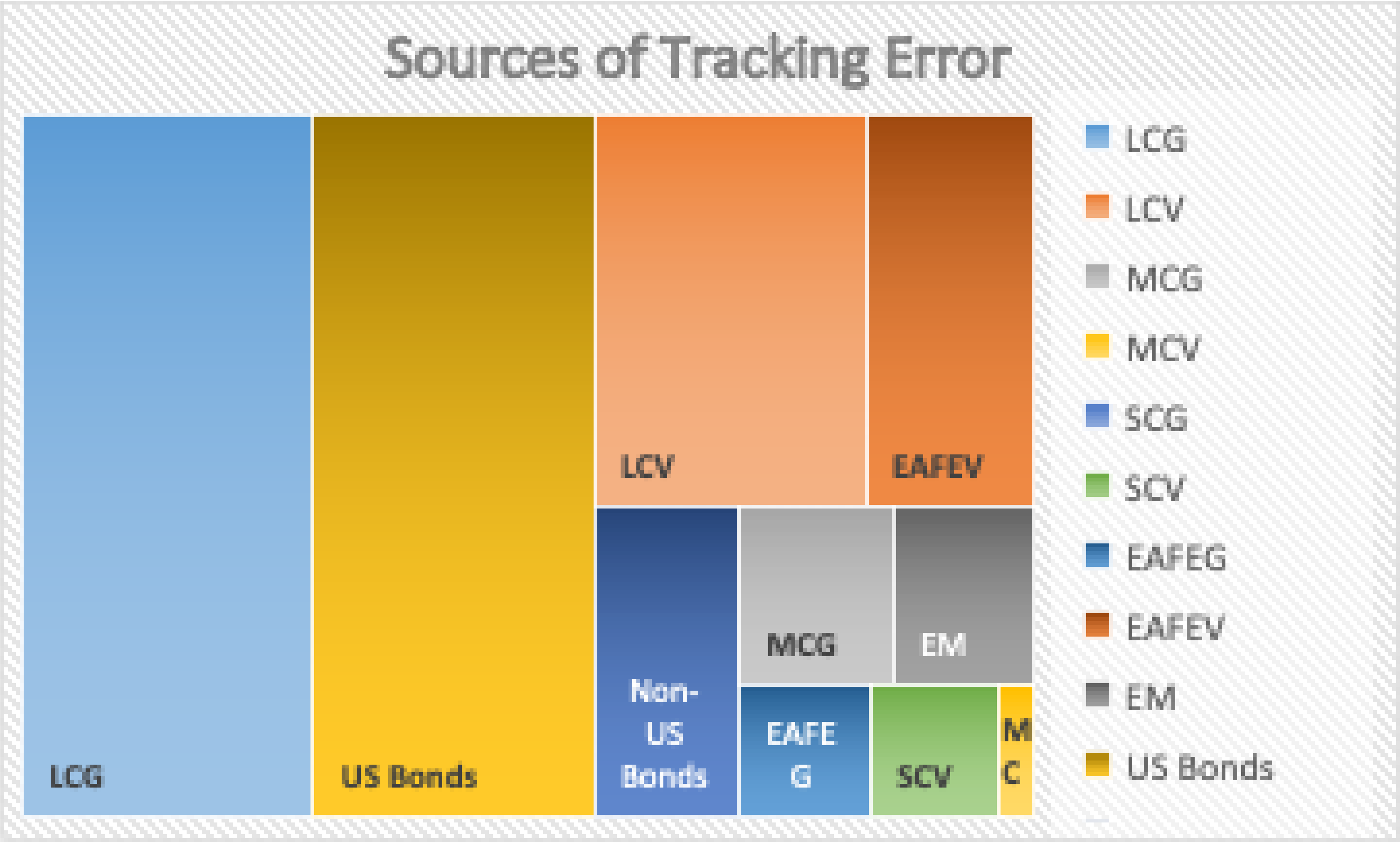

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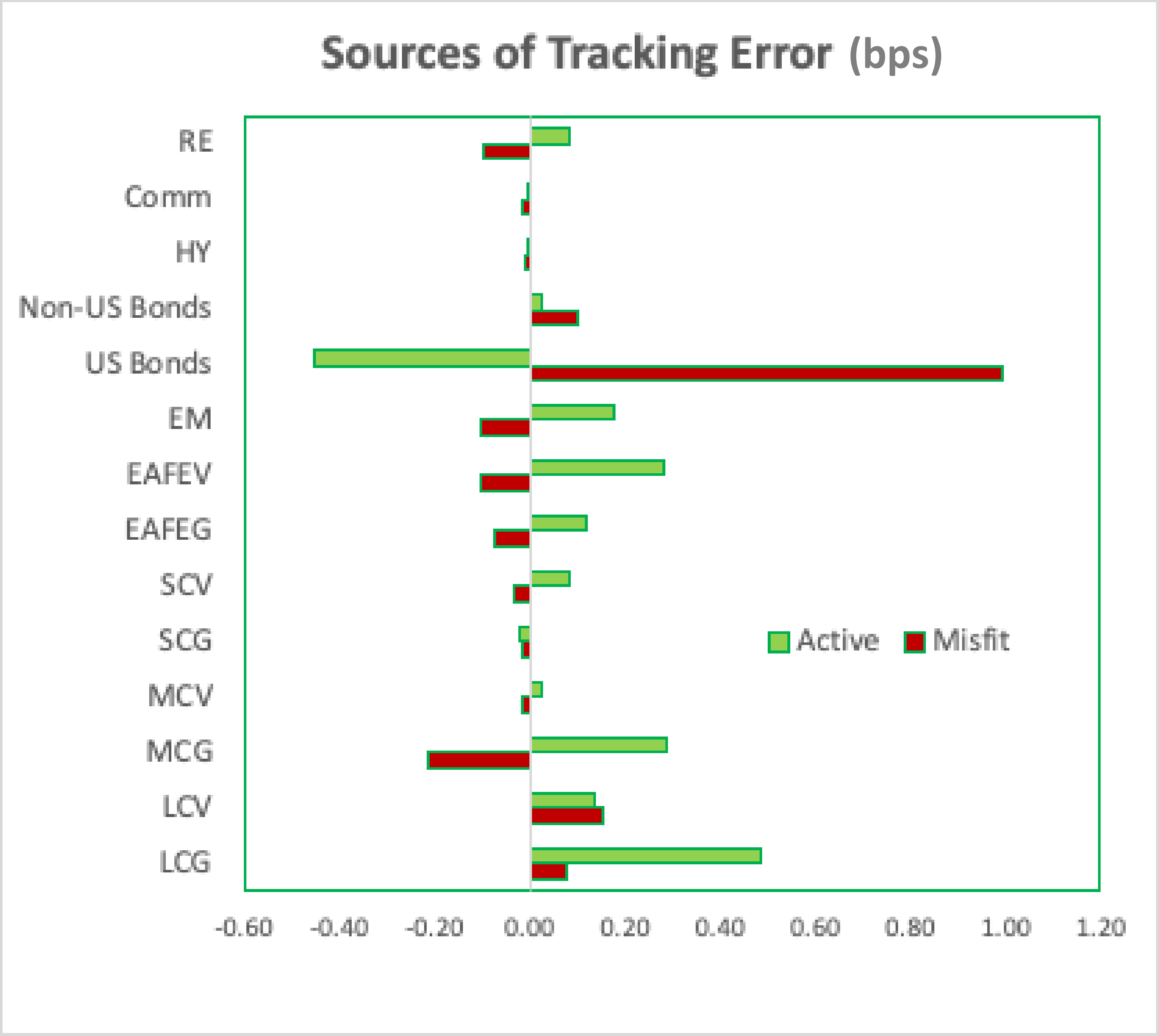

Attribution of Tracking Error

- Misfit Risk is Unmanaged and Uncontrolled
- Active Effects should be the source of most of the Tracking Error
- Some Tracking Error subtracts risk from portfolio

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A Study in Risk Concentration

Negatively-Correlated Active Effects

HY Exposure

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY	Comm	RE	Total
Misfit Risk	0.08	0.16	-0.21	-0.02	-0.01	-0.03	-0.07	-0.10	-0.11	0.99	0.10	-0.01	-0.01	-0.10	0.66
Active Risk	0.49	0.14	0.29	0.03	-0.02	0.08	0.12	0.28	0.17	-0.45	0.02	0.00	0.00	0.08	1.23
Total Tracking Error	0.57	0.29	0.08	0.01	-0.04	0.05	0.05	0.18	0.07	0.54	0.13	-0.01	-0.01	-0.01	1.89

- Over **1/3** of Tracking Error came from unmanaged **Misfit Risk**
- Nearly **60%** of Tracking Error came from two sectors: **LCG** and **US Bonds**
- Misfit Risk was primarily caused by **one** sector: **US Bonds**

Firing the Winners and Rewarding the Losers

- Ignore misfit risk = misunderstand how funds affect portfolio:
  - ***Excess Return***
  - ***Contribution to Information Ratio***

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY	Comm	RE	Total
Naïve Active Contribution	0.21	0.15	0.27	0.01	0.12	0.06	0.19	0.33	0.16	0.37	0.09	0.04	0.02	-0.02	1.99
Misfit Adjusted Active	0.60	0.00	0.59	-0.04	0.12	0.05	0.24	0.10	0.28	-0.27	0.01	0.04	0.00	-0.04	1.66

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY	Comm	RE
Naïve Ranking	4	7	3	13	8	10	5	2	6	1	9	11	12	14
Misfit Adjusted Ranking	1	10	2	13	5	7	4	6	3	14	9	8	11	12

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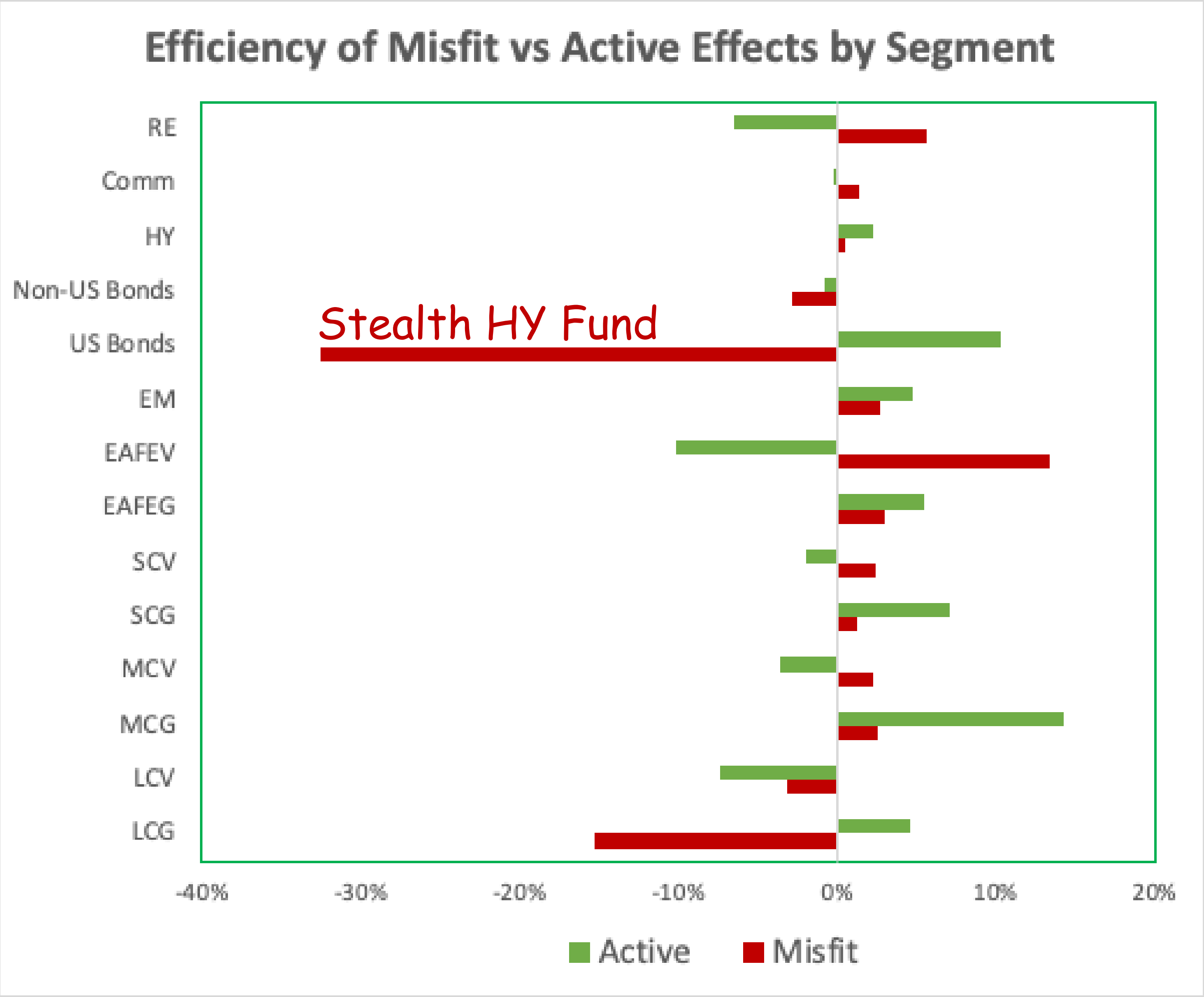

Efficiency:

Contribution to Return

minus

Contribution to Risk

- *Misfit Efficiency*
- *Active Efficiency*

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Efficiency Analysis

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY	Comm	RE	Total
Misfit	-15.3%	-3.1%	2.6%	2.3%	1.3%	2.4%	3.0%	13.4%	2.7%	-32.6%	-2.8%	0.5%	1.4%	5.7%	-18.3%
Active	4.6%	-7.4%	14.2%	-3.5%	7.1%	-2.0%	5.5%	-10.1%	4.7%	10.4%	-0.8%	2.2%	-0.2%	-6.4%	18.3%
Total	-10.7%	-10.5%	16.8%	-1.2%	8.3%	0.4%	8.5%	3.3%	7.4%	-22.2%	-3.6%	2.8%	1.2%	-0.7%	0.0%

Most Inefficient Sector: US Bonds

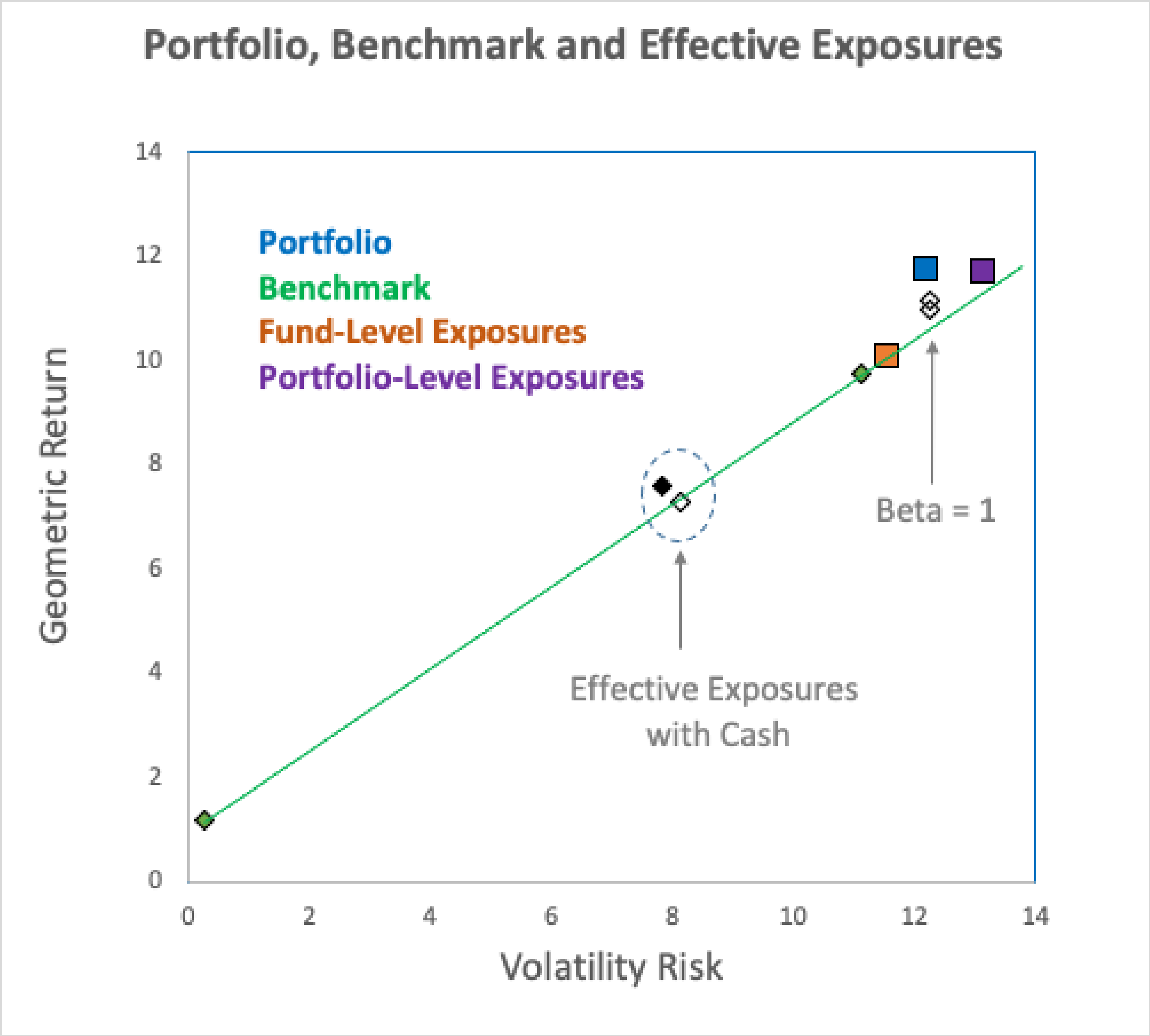
- Contributes **20%** of Misfit excess return BUT **53%** of Misfit risk
- HY holdings in Bond Fund contribute over half of portfolio tracking error

Other Approaches to Finding Effective Exposures

- Use **Total Portfolio** return for regression analysis

- Add **Cash** as an asset segment
  - *For fund-level analysis*
  - *For total portfolio return analysis*

- Add **Constraint**: Solution must have Beta = 1 to portfolio
  - *Add cash as an asset segment*



Audience Poll:

*Which solution has the **highest** correlation to the portfolio?*

Mind the Gap(s)

Load the Boat

	LCG	LCV	MCG	MCV	SCG	SCV	EAFEG	EAFEV	EM	US Bonds	Non-US Bonds	HY	Comm	RE	Cash	RSQ
Fund Level	6.5%	6.7%	8.1%	5.0%	3.7%	6.1%	8.5%	3.4%	5.6%	10.0%	3.2%	24.1%	4.9%	4.2%		0.9877
Portfolio Level	7.5%		10.0%	8.5%	11.2%	3.8%	13.0%	1.9%	9.9%	5.6%		22.5%	3.4%	2.8%		0.9934
Portfolio Level Beta = 1	7.2%		8.6%	9.2%	10.8%	3.4%	11.3%	3.0%	9.0%	12.9%		19.9%	3.8%	1.0%		0.9933
Fund Level with Cash	2.7%	6.1%	3.8%	1.7%	1.5%	4.1%	6.9%	3.0%	5.6%	7.9%	3.1%	23.2%	4.9%	1.8%	23.6%	0.9757
Portfolio Level with Cash	4.5%		5.3%	5.2%	6.9%	2.5%	8.0%	0.7%	6.0%	2.6%		14.5%	1.9%	1.4%	40.4%	0.9935
Portfolio Level with Cash and Beta = 1	7.0%		9.3%	7.8%	10.4%	3.6%	12.2%	1.6%	9.2%	4.4%		21.2%	3.1%	2.7%	7.5%	0.9934

- Portfolio-Level solutions have asset gaps
- Cash solutions have unreasonably high allocations
- Beta constraint helps to limit high cash allocation

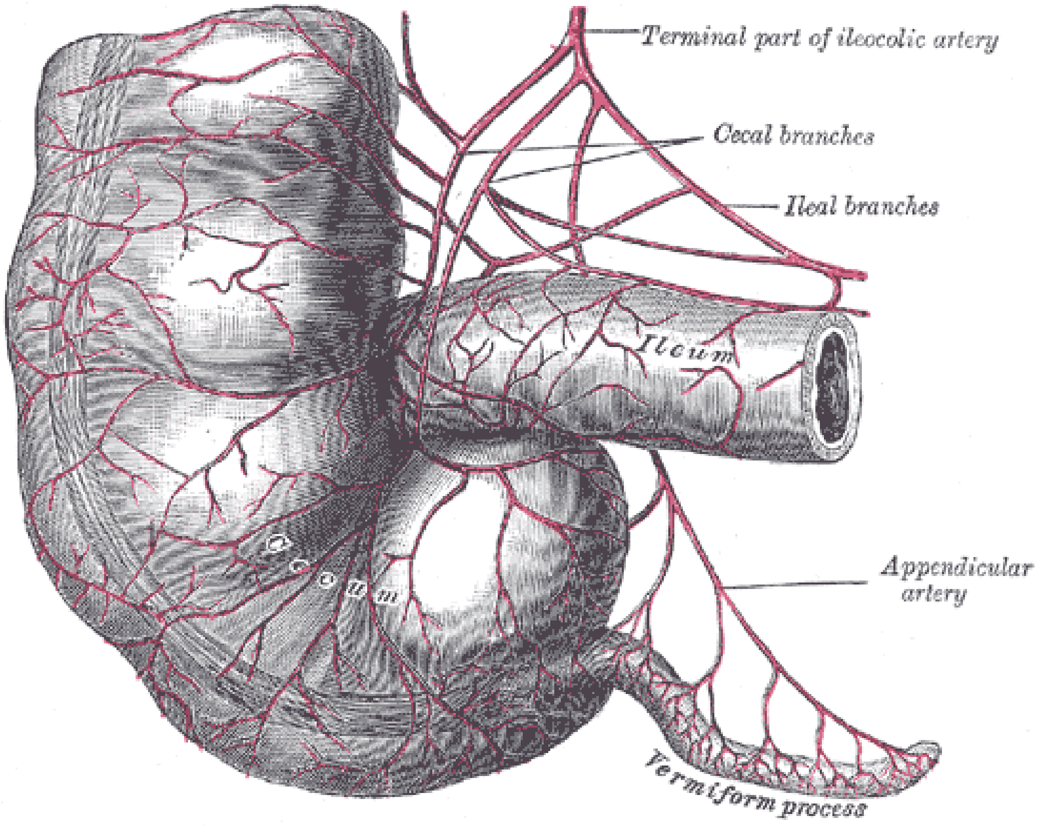
Useful Takeaways

- Portfolio construction is key to delivering your strategy
- Active managers wander outside their mandates
- Benchmark misfit undermines your asset allocation
- Misfit risk is managed through a "team of funds" approach

End the "Beauty Contest" approach to selecting funds!

Build a "Winning Team"

Appendix


Terminal part of ileocolic artery
Cecal branches
Ileal branches
Ileum
Appendicular artery
Cecum
Vermiform process

Contribution to Misfit Risk

	Individual Tracking Error	Correlation to Portfolio Tracking Error	Contribution to Portfolio Tracking Error
Misfit	1.03	0.63	0.66
Active	1.47	0.84	1.23
		Total Tracking Error	**1.89**

Contribution to Volatility = Weight * Volatility * Correlation to Portfolio

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