

# PMAR 2021

## *Hierarchical Attribution: A “**Must Have**” Situation*



*“Insights and Innovation”*

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# Agenda

- A bit of forgotten history
- The plain vanilla view
- Exposing fake selection
- The true macro view

# Hierarchical Attribution Articles Published in Journal of Performance

ORTEC (2001) \*

**Geenen, Heemskerk, Heerema**

*Decision-Based Evaluation of the Performance of a  
Hierarchically Structured Investment Process*

**Campisi (2008)**

*Balanced Attribution*

**Muralidhar \* (2017)**

*Attribution Hears a Who!*

*The Case for Decision-Maker Based Attribution*

\* *Dietz Award*

# Misuse of History

*Fact becomes Fantasy becomes Fact*

# Context of Brinson Attribution Model

- **Original application:**

- *Multi-asset class pension portfolio analysis*

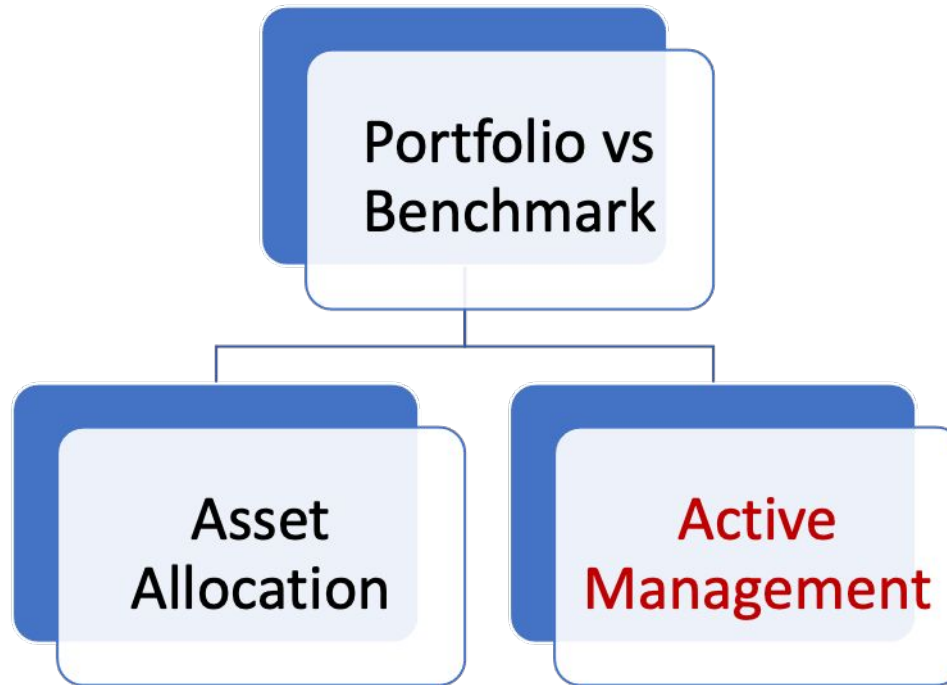
- **Broad purpose:**

- *Determine outcomes of plan sponsor **decisions***
  - *Asset allocation*
  - *Active management*

- **Limited scope:**

- *Focus on **total** attribution effects*
- *“Segment-level” effects were simply a “**means to an end**”*

# Original Brinson Model



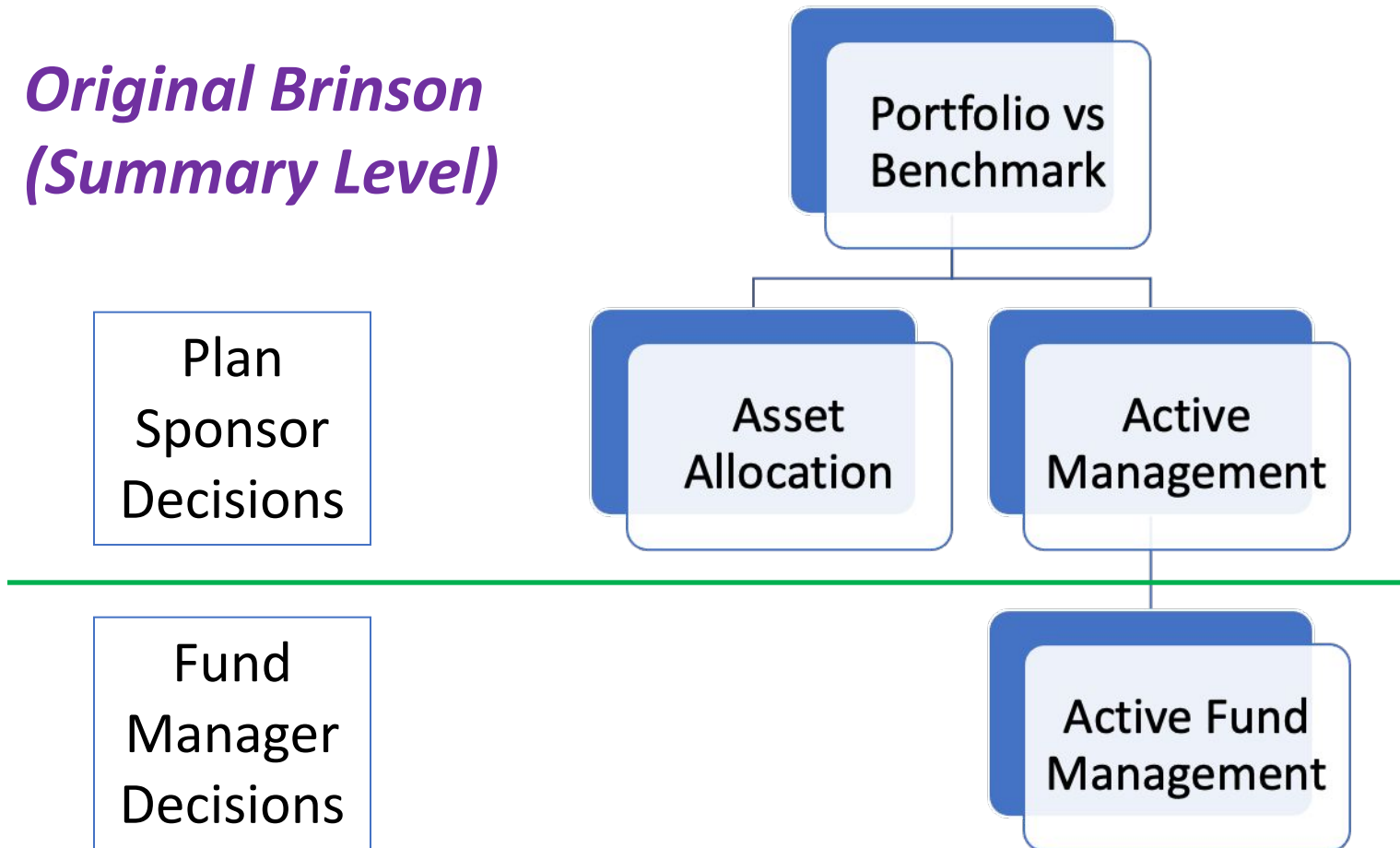
This is **NOT** a  
“Selection” Effect



Brinson’s Conclusion:  
Active management was a **drag** on returns

# Brinson Model is a **Decision** Framework

## *Original Brinson (Summary Level)*



*Current Brinson (Detail Level)*

# Proper Uses of Brinson Model

- *Can we apply this to an individual asset class?*

**“YES”**

- Can we use the sector-level information?

**“YES”**

- *Can we interpret sector info as “Allocation + Selection?”*

**“NO”**



# *“What is this thing called Selection?”*

“Selection is the **active residual** that remains after you stop accounting for allocation decisions.”

# Guiding Principles

Attribution must reflect  
investment decision  
process

Asset allocation decision  
process  
is inherently hierarchical

# Sample Stock Hierarchy

Level  
1



Level  
2



Level  
3



Level  
4

Style

# Sample Bond Hierarchy

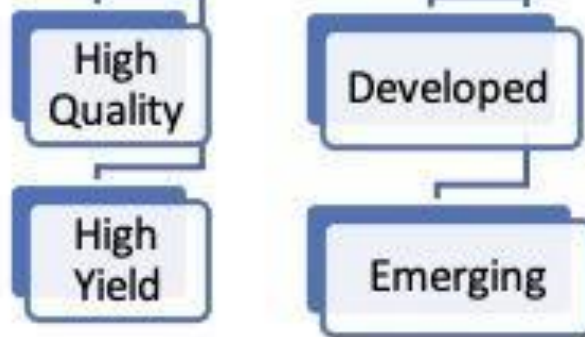
Level  
1



Level  
2



Level  
3



Level  
4

Ratings

# Alternatives Hierarchy

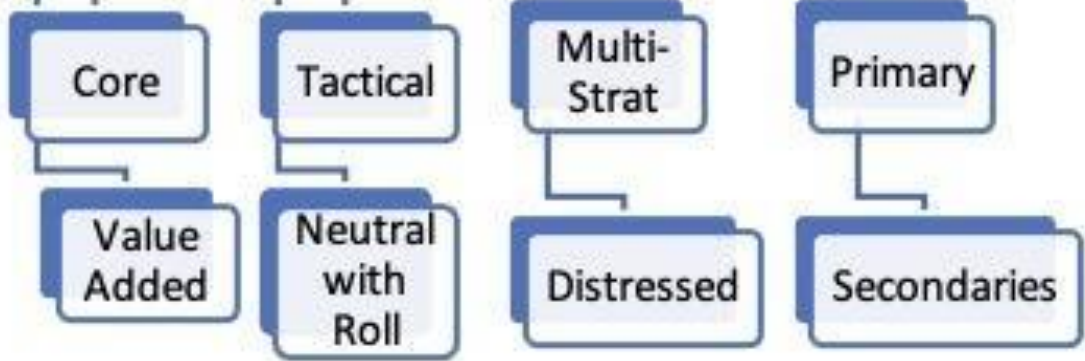
Level  
1



Level  
2



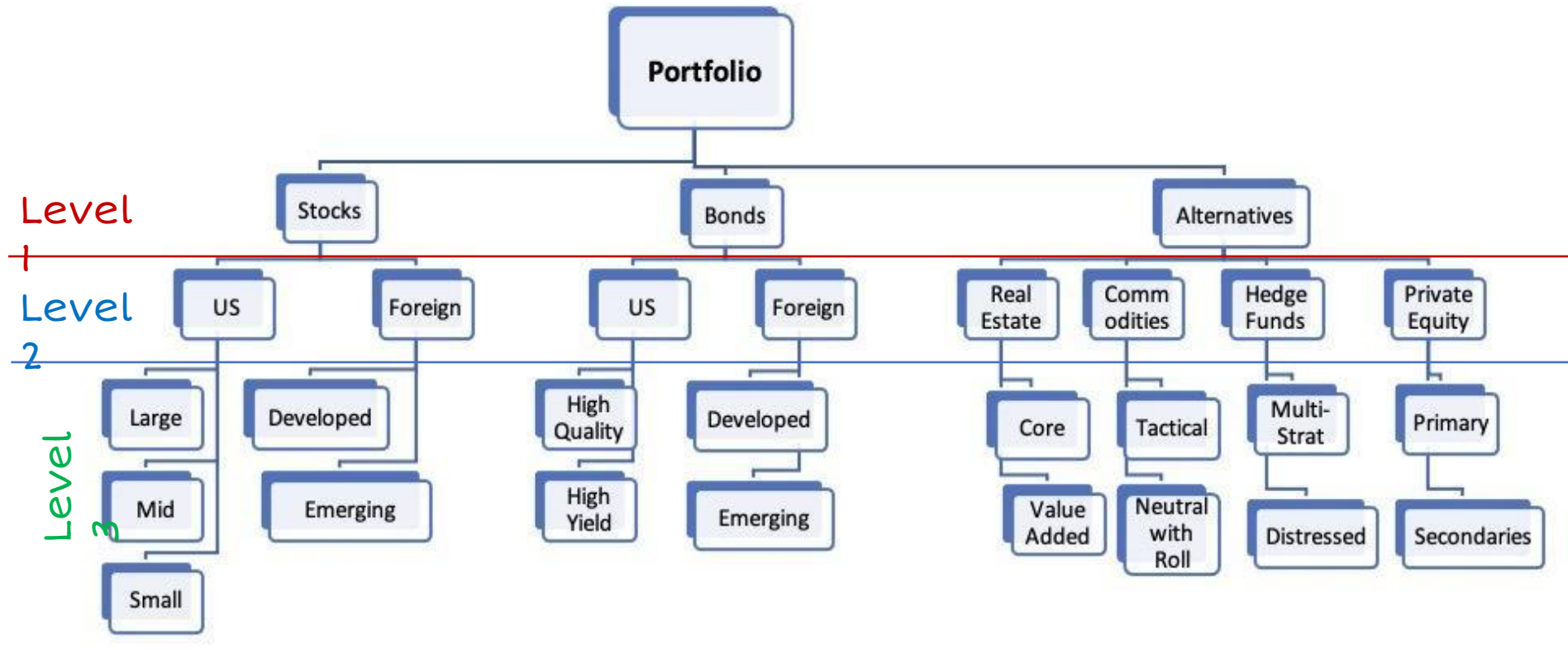
Level  
3



Level  
4

Relevant groupings

# Typical Portfolio Asset Hierarchy



# Misuse of the Model

*When “The Obvious Way” is Wrong*

# Non-Hierarchical Attribution Components

Portfolio			Benchmark		Weighting Difference	Sector Opportunity	Excess Return	
	Weight	Return	Weight	Return				
Large	30%	6.25	33%	6.00	-3%	-0.01	0.25	
Mid	15%	7.50	21%	7.00	-6%	0.99	0.50	
Small	5%	8.75	6%	8.00	-1%	1.99	0.75	
Developed	15%	4.50	11%	5.00	5%	-1.01	-0.50	
Emerging	5%	7.00	5%	9.00	1%	2.99	-2.00	
High Quality	23%	4.25	18%	4.00	5%	-2.01	0.25	
High Yield	8%	5.00	8%	6.00	0%	-0.01	-1.00	
		<b>5.79</b>			<b>6.01</b>			<b>-0.22</b>

*Tactical  
allocation*

*Neutral  
allocation*



# Non-Hierarchical Attribution Results

	Weighting Difference	Sector Opportunity	Excess Return	Attribution Analysis		
				Allocation	Selection	Total
Large	-3%	-0.01	0.25	0.0003	0.08	0.08
Mid	-6%	0.99	0.50	-0.06	0.08	0.02
Small	-1%	1.99	0.75	-0.02	0.04	0.02
Developed	5%	-1.01	-0.50	-0.05	-0.08	-0.12
Emerging	1%	2.99	-2.00	0.01	-0.10	-0.09
High Quality	5%	-2.01	0.25	-0.10	0.06	-0.04
High Yield	0%	-0.01	-1.00	0.00	-0.08	-0.08
			<b>-0.22</b>	<b>-0.21</b>	<b>-0.01</b>	<b>-0.22</b>

“Just because it adds up does not make it correct!”

# A Common Error:

## *Ignoring Major Groupings*

	Portfolio		Benchmark	Over or Under Weight	Weighting Difference
US Equity	Large	30%	33%	<del>Under</del>	<del>-3%</del>
	Mid	15%	21%	<del>Under</del>	<del>-6%</del>
	Small	5%	6%	<del>Under</del>	<del>-1%</del>
Fgn Equity	Developed	15%	11%	Over	5%
	Emerging	5%	5%	Over	1%
Bonds	High Quality	23%	18%	Over	5%
	High Yield	8%	8%	Equal	0%

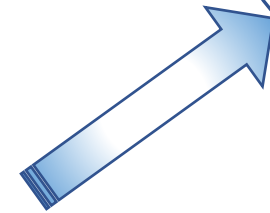


Tactical  
positioning  
Is **WRONG**

# Fixing the Error:

## *Start with the Right Context*

	Portfolio	Benchmark	Weighting Difference	Over or Under Weight	Relative Weighting Difference
US Equity	50%	60%	-10%	Under	-17%
Fgn Equity	20%	15%	5%	Over	33%
Bonds	30%	25%	5%	Over	20%



- Find Level-1 Relative Weights
- Use these weights to create level-2 adjusted benchmark weights

# Comparing Sector Weightings

*Proportionate Allocation at 50% asset weighting*

	Traditional Weighting	Hierarchical Neutral Weight	Traditional Weighting Difference	Hierarchical Weighting Difference	Traditional Under/Over	Hierarchical Under/Over	Relative Weighting Error
US Equity	30%	27.5%	-3.0%	2.5%	Under	Over	5.5%
	15%	17.5%	-6.0%	-2.5%	Under	Under	3.5%
	5%	5.0%	-1.0%	0.0%	Under	Equal	1.0%
Fgn Equity	15%	14.0%	4.5%	1.0%	Over	Over	-3.5%
	5%	6.0%	0.5%	-1.0%	Over	Under	-1.5%
Bonds	23%	21.0%	5.0%	1.5%	Over	Over	-3.5%
	8%	9.0%	0.0%	-1.5%	Equal	Under	-1.5%

Orig:  
33%  
21%  
6%

Must adjust using **RELATIVE** weightings...

Or tactical weightings will be **WRONG**:

- 1/2 wrong direction
- 1/2 wrong amount

# Proper use of the Model

*Hierarchical Approach  
Ties everything together*

# Asset Allocation Effect

## *Level 1 Analysis*

	Portfolio		Benchmark		Allocation	Active Residual	Total
	Weight	Return	Weight	Return			
US Equity	50%	6.88	60%	6.55	-0.05	<b>0.16</b>	0.11
Fgn Equity	20%	5.13	15%	6.20	0.01	<b>-0.22</b>	-0.21
Bonds	30%	4.44	25%	4.60	-0.07	<b>-0.05</b>	-0.12
		<b>5.79</b>		<b>6.01</b>	-0.12	<b>-0.10</b>	-0.22

- Portfolio underperformed by 22 bps
- 12 bps from asset allocation
  - 10 bps from **other active effects**
    - US Equity was strongest contributor
    - Fgn Equity was greatest detractor

# Unbundling Active Residual

## *Level 2 Analysis*

<b>Portfolio</b>			<b>Benchmark</b>		<b>Asset Class Return Differences</b>
	<b>Weight</b>	<b>Return</b>	<b>Weight</b>	<b>Return</b>	
<b>US Equity</b>	<b>50%</b>	<b>6.875</b>	<b>60%</b>	<b>6.55</b>	<b>0.3250</b>
LC	60%	6.25	55%	6.00	
MC	30%	7.50	35%	7.00	
SC	10%	8.75	10%	8.00	
<b>Fgn Equity</b>	<b>20%</b>	<b>5.13</b>	<b>15%</b>	<b>6.20</b>	<b>-1.0750</b>
Devl	75%	4.50	70%	5.00	
EM	25%	7.00	30%	9.00	
<b>Bonds</b>	<b>30%</b>	<b>4.44</b>	<b>25%</b>	<b>4.60</b>	<b>-0.1625</b>
HQ	75%	4.25	70%	4.00	
HY	25%	5.00	30%	6.00	

Explain these  
Excess  
Returns

Treat each sector as its own portfolio

# Unbundling the Active Residual

## Level 2 “Sector” Analysis

	<b>Portfolio</b>		<b>Benchmark</b>		<b>Sector Attribution</b>			
	<b>Weight</b>	<b>Return</b>	<b>Weight</b>	<b>Return</b>	<b>Allocation</b>	<b>Selection</b>	<b>Total</b>	
Fund 1	<b>US Equity</b>	<b>50%</b>	<b>6.875</b>	<b>60%</b>	<b>6.55</b>	<b>-0.050</b>	<b>0.375</b>	<b>0.325</b>
	LC	60%	6.25	55%	6.00	-0.028	0.150	0.123
	MC	30%	7.50	35%	7.00	-0.023	0.150	0.128
	SC	10%	8.75	10%	8.00	0.000	0.075	0.075
Fund 2	<b>Fgn Equity</b>	<b>20%</b>	<b>5.13</b>	<b>15%</b>	<b>6.20</b>	<b>-0.200</b>	<b>-0.875</b>	<b>-1.075</b>
	Devl	75%	4.50	70%	5.00	-0.060	-0.375	-0.435
	EM	25%	7.00	30%	9.00	-0.140	-0.500	-0.640
Fund 3	<b>Bonds</b>	<b>30%</b>	<b>4.44</b>	<b>25%</b>	<b>4.60</b>	<b>-0.100</b>	<b>-0.063</b>	<b>-0.1625</b>
	HQ	75%	4.25	70%	4.00	-0.030	0.188	0.158
	HY	25%	5.00	30%	6.00	-0.070	-0.250	-0.320



# Create Portfolio-Level Effects

## *Pro-rate the Level 2 Analysis*

### Portfolio Weight

#### Sector Attribution

#### Portfolio Effects

50%

US Equity	Allocation	Selection	Total
	<b>-0.050</b>	<b>0.375</b>	<b>0.325</b>
LC	-0.028	0.150	<b>0.123</b>
MC	-0.023	0.150	<b>0.128</b>
SC	0.000	0.075	<b>0.075</b>

Allocation	Selection	Total
<b>-0.03</b>	<b>0.19</b>	<b>0.16</b>
-0.014	0.075	<b>0.06</b>
-0.011	0.075	<b>0.06</b>
0.000	0.038	<b>0.04</b>

20%

Fgn Equity	Allocation	Selection	Total
	<b>-0.200</b>	<b>-0.875</b>	<b>-1.075</b>
Dev	-0.060	-0.375	-0.435
EM	-0.140	-0.500	-0.640

Allocation	Selection	Total
<b>-0.040</b>	<b>-0.175</b>	<b>-0.22</b>
-0.012	-0.075	-0.09
-0.028	-0.100	-0.13

30%

Bonds	Allocation	Selection	Total
	<b>-0.100</b>	<b>-0.063</b>	<b>-0.1625</b>
HQ	-0.030	0.188	0.158
HY	-0.070	-0.250	-0.320

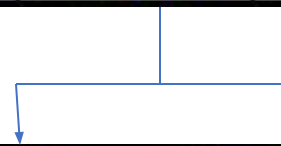
Allocation	Selection	Total
<b>-0.030</b>	<b>-0.019</b>	<b>-0.05</b>
-0.009	0.056	0.05
-0.021	-0.075	-0.10

Summarize



# Presenting Attribution Results

	Allocation	Active Residual	Total
US Equity	-0.054	<b>0.163</b>	0.109
Fgn Equity	0.009	<b>-0.215</b>	-0.206
Bonds	-0.071	<b>-0.049</b>	-0.119
<b>Total</b>	<b>-0.115</b>	<b>-0.101</b>	<b>-0.216</b>



	Asset Allocation	Style Allocation	Selection (Residual)	Total
<b>US Equity</b>	-0.054	-0.025	0.188	0.109
<b>Fgn Equity</b>	0.009	-0.040	-0.175	-0.206
<b>Bonds</b>	-0.071	-0.030	-0.019	-0.119
<b>Total</b>	<b>-0.115</b>	<b>-0.095</b>	<b>-0.006</b>	<b>-0.216</b>

# Hierarchical Attribution

## Reflects Investment Process

Attribution Summary	
Asset Allocation	-0.115
Sector Allocation	-0.095
Selection	-0.006
<b>Total</b>	<b>-0.216</b>

Hierarchical Attribution Analysis			
	Sector Allocation	True Selection	Total
Large	-0.014	0.075	0.061
Mid	-0.011	0.075	0.064
Small	0.000	0.038	0.038
Developed	-0.012	-0.075	-0.087
Emerging	-0.028	-0.100	-0.128
High Quality	-0.009	0.056	0.047
High Yield	-0.021	-0.075	-0.096
<b>Total</b>	<b>-0.095</b>	<b>-0.006</b>	<b>-0.101</b>

# Should You Add Another Attribution Level in a Multi-Asset Portfolio?

*A look at US Equity Segment's  
**19 bps** "Stock Selection" effect*

# First Breakout of Active Residual

	Portfolio		Benchmark		Asset Class			
	Weight	Return	Weight	Return		Allocation	Active Residual	Total
US Equity	50%	6.88	60%	6.55	US Equity	-0.05	0.16	0.11
Fgn Equity	20%	5.13	15%	6.20	Fgn Equity	0.01	-0.22	-0.21
Bonds	30%	4.44	25%	4.60	Bonds	-0.07	-0.05	-0.12
		<b>5.79</b>		<b>6.01</b>	<b>Total</b>	<b>-0.12</b>	<b>-0.10</b>	<b>-0.22</b>

Secto			
	Allocation	Selection	Total
US Equity	-0.03	0.19	0.16
LC	-0.014	0.075	0.06
MC	-0.011	0.075	0.06
SC	0.000	0.038	0.04
Fgn Equity	-0.040	-0.175	-0.22
Dev	-0.012	-0.075	-0.09
EM	-0.028	-0.100	-0.13
Bonds	-0.030	-0.019	-0.05
HQ	-0.009	0.056	0.05
HY	-0.021	-0.075	-0.10

“Lumpy”  
(Concentrated)

## Large Cap Attribution

Large Cap Sector Attribution	Portfolio Weight	Portfolio Return	Benchmark Weight	Benchmark Return	Allocation	Selection	Total
Communications	14.3%	7.20	12.1%	7.80	0.04	-0.09	-0.05
Consumer Discretionary	15.5%	10.50	13.6%	10.60	0.09	-0.02	0.07
Consumer Staples	6.6%	3.50	7.3%	3.60	0.02	-0.01	0.01
Energy	1.0%	-10.00	2.5%	-9.80	<b>0.24</b>	-0.002	0.24
Financials	13.0%	-1.50	13.1%	-1.30	0.01	-0.03	-0.02
Health Care	15.6%	4.80	16.5%	5.10	0.01	-0.05	-0.04
Industrials	9.3%	3.30	9.7%	3.70	0.01	-0.04	-0.03
Information Technology	17.2%	14.60	17.0%	14.60	0.02	0.00	0.02
Materials	3.0%	5.70	2.7%	6.20	0.00	-0.015	-0.01
Real Estate	2.0%	-2.30	2.5%	-2.10	0.04	-0.004	0.04
Utilities	2.5%	-1.40	3.0%	-1.00	0.04	-0.01	0.03
<b>Total</b>		<b>6.25</b>		<b>6.00</b>	<b>0.50</b>	<b>-0.25</b>	<b>0.25</b>

## Mid Cap Attribution

Mid Cap Sector Attribution	Portfolio Weight	Portfolio Return	Benchmark Weight	Benchmark Return	Allocation	Selection	Total
Communications	14.6%	9.10	11.7%	9.10	0.14	<b>0.00</b>	0.14
Consumer Discretionary	15.9%	12.40	13.6%	12.40	0.18	<b>0.00</b>	0.18
Consumer Staples	6.8%	4.20	6.8%	4.20	0.00	<b>0.00</b>	0.00
Energy	1.0%	-11.40	9.1%	-11.40	1.28	<b>0.00</b>	1.28
Financials	12.7%	-1.50	10.0%	-1.50	-0.16	<b>0.00</b>	-0.16
Health Care	15.8%	6.00	8.8%	6.00	0.11	<b>0.00</b>	0.11
Industrials	9.5%	4.40	7.2%	4.40	0.00	<b>0.00</b>	0.00
Information Technology	16.0%	17.00	24.8%	17.00	-1.11	<b>0.00</b>	-1.11
Materials	3.0%	7.20	2.6%	7.20	0.01	<b>0.00</b>	0.01
Real Estate	2.1%	-2.50	2.5%	-2.50	0.03	<b>0.00</b>	0.03
Utilities	2.6%	-1.20	2.9%	-1.20	0.02	<b>0.00</b>	0.02
<b>Total</b>		<b>7.50</b>		<b>7.00</b>	<b>0.50</b>	<b>0.00</b>	<b>0.50</b>

## Small Cap Attribution

Small Cap Sector Attribution	Portfolio Weight	Portfolio Return	Benchmark Weight	Benchmark Return	Allocation	Selection	Total
Communications	9.4%	8.32	12.0%	10.40	-0.16	-0.20	-0.35
Consumer Discretionary	10.6%	13.13	13.5%	14.20	-0.28	-0.11	-0.40
Consumer Staples	6.3%	3.63	7.0%	4.80	0.00	-0.07	-0.08
Energy	1.2%	0.00	5.8%	-13.00	<b>0.80</b>	0.16	0.96
Financials	19.9%	0.00	11.6%	-1.70	-0.51	0.34	-0.17
Health Care	10.8%	5.35	12.7%	6.90	-0.05	-0.17	-0.21
Industrials	7.8%	3.46	8.3%	5.00	0.00	-0.12	-0.12
Information Technology	25.1%	21.18	20.9%	19.40	<b>0.63</b>	0.45	1.08
Materials	3.1%	5.86	2.7%	8.20	0.02	-0.07	-0.06
Real Estate	3.7%	0.00	2.5%	-2.90	-0.09	0.11	0.02
Utilities	2.1%	0.00	3.0%	-1.50	0.05	0.03	0.08
<b>Total</b>		<b>8.75</b>		<b>8.00</b>	<b>0.41</b>	<b>0.34</b>	<b>0.75</b>

Positive Selection



# Level Three Insights

## Sector Attribution

	Allocation	Selection	Total
<b>US Equity</b>	<b>-0.050</b>	<b>0.375</b>	<b>0.325</b>
<b>LC</b>	-0.028	0.150	<b>0.123</b>
<b>MC</b>	-0.023	0.150	<b>0.128</b>
<b>SC</b>	0.000	0.075	<b>0.075</b>

## Portfolio Effects

Allocation	Selection	Total
<b>-0.03</b>	<b>0.19</b>	<b>0.16</b>
-0.014	0.075	<b>0.06</b>
-0.011	0.075	<b>0.06</b>
0.000	0.038	<b>0.04</b>

## Level Three US Equity Attribution

	Allocation	Selection	Total
LC	0.15	-0.07	0.07
MC	0.07	0.00	0.07
SC	0.02	0.02	0.04
<b>Total</b>	<b>0.25</b>	<b>-0.06</b>	<b>0.19</b>

Pro-rate attribution  
by Asset Class  
weight  
(50%)  
And Sector weights  
(60/30/10)

Correct analysis:  
Good Allocation  
Poor stock selection

# **Hierarchical Attribution for Single-Asset Portfolios**

*A Necessity for Fund Managers*

Level One Analysis for Large Cap Fund

Large Cap Sector Attribution	Portfolio Weight	Portfolio Return	Benchmark Weight	Benchmark Return	Allocation	Selection	Total
Communications	14.3%	7.20	12.1%	7.80	0.04	-0.09	-0.05
Consumer Discretionary	15.5%	10.50	13.6%	10.60	0.09	-0.02	0.07
Consumer Staples	6.6%	3.50	7.3%	3.60	0.02	-0.01	0.01
Energy	1.0%	-10.00	2.5%	-9.80	0.24	-0.002	0.24
Financials	13.0%	-1.50	13.1%	-1.30	0.01	-0.03	-0.02
<b>Health Care</b>	<b>15.6%</b>	<b>4.80</b>	<b>16.5%</b>	<b>5.10</b>	<b>0.01</b>	<b>-0.05</b>	<b>-0.04</b>
Industrials	9.3%	3.30	9.7%	3.70	0.01	-0.04	-0.03
Information Technology	17.2%	14.60	17.0%	14.60	0.02	0.00	0.02
Materials	3.0%	5.70	2.7%	6.20	0.00	-0.015	-0.01
Real Estate	2.0%	-2.30	2.5%	-2.10	0.04	-0.004	0.04
Utilities	2.5%	-1.40	3.0%	-1.00	0.04	-0.01	0.03
<b>Total</b>		<b>6.25</b>		<b>6.00</b>	<b>0.50</b>	<b>-0.25</b>	<b>0.25</b>

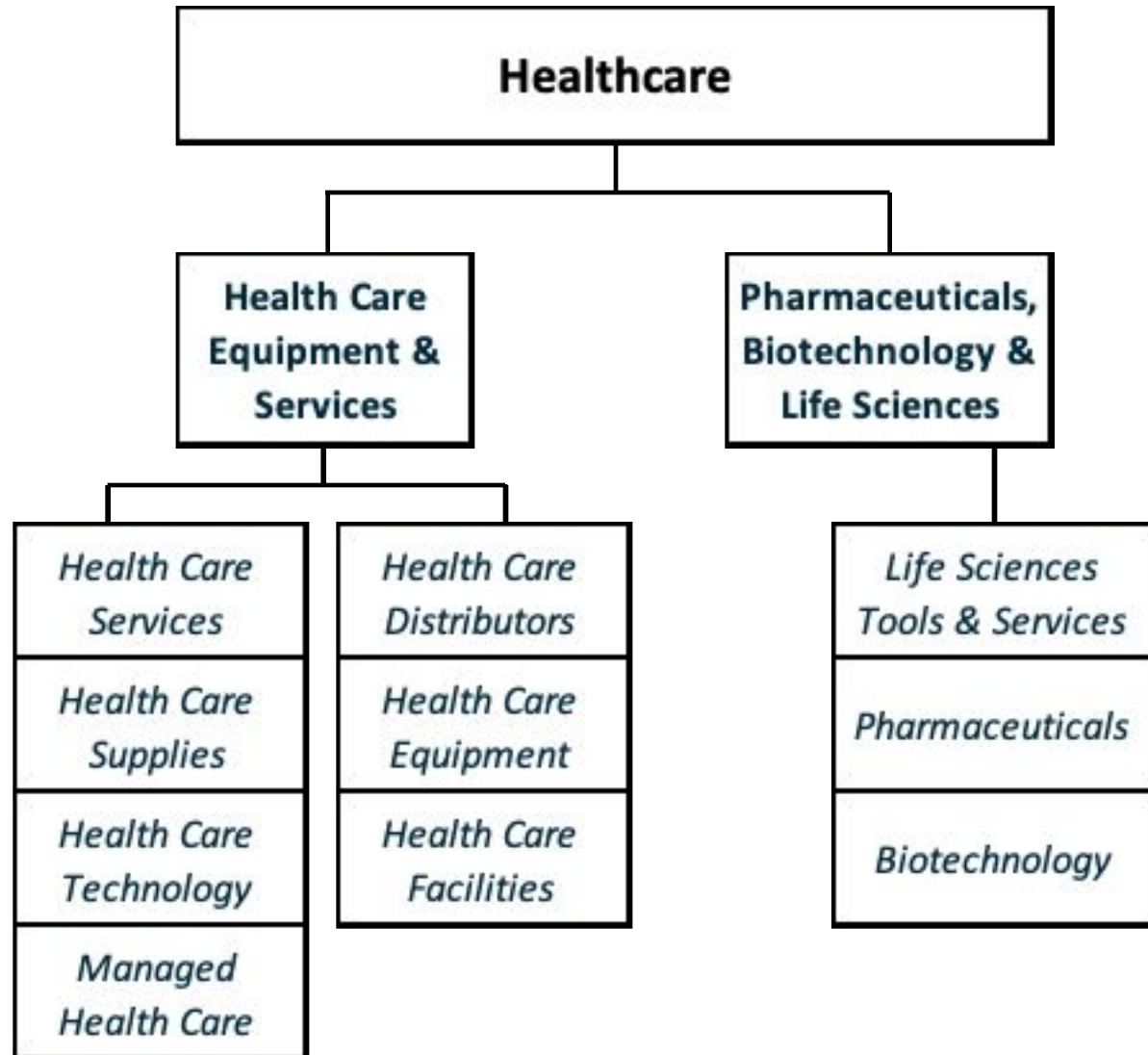
-30 bps Selection Effect



Good Allocation,  
Bad stock picking?

# Hierarchy of Three Decisions

Sector  
Industry  
Groups  
Industries



Level 2: Industry Groups

Sector	Benchmark Return	Portfolio Return
Health Care	5.10	4.80

-0.30

Bad stock picking?

Industry Group	Benchmark Weight	Benchmark Return	Portfolio Weight	Portfolio Return
Health Care Equipment & Services	46.7%	2.72	60.3%	3.35
Pharmaceuticals, Biotechnology & Life Sciences	53.3%	7.19	39.7%	7.00

0.63

-0.18



Sector Attribution	Industry Group Allocation	Other Active Decisions	Total
Health Care Equipment & Services	-0.32	0.38	0.06
Pharmaceuticals, Biotechnology & Life Sciences	-0.28	-0.07	-0.36
<b>Total</b>	<b>-0.61</b>	<b>0.31</b>	<b>-0.30</b>

Switches to good stock picking?



	<b>Industry Analysis (Level Three)</b>	<b>Benchmark Weight</b>	<b>Benchmark Return</b>	<b>Portfolio Weight</b>	<b>Portfolio Return</b>	<b>Non- Nested Active Weight</b>	<b>Nested Active Weight</b>
	Health Care Distributors	1.7%	1.40	3.5%	2.2	1.9%	2.3%
	Health Care Equipment	25.7%	2.50	31.2%	3.2	<b>5.5%</b>	<b>-3.3%</b>
	Health Care Facilities	1.1%	<b>-3.50</b>	5.1%	-0.1	4.0%	6.2%
<b>(A)</b>	Health Care Services	4.8%	<b>7.50</b>	6.1%	8.8	<b>1.3%</b>	<b>-0.2%</b>
	Health Care Supplies	1.6%	2.90	4.5%	2.0	2.9%	4.0%
	Health Care Technology	0.5%	1.40	1.5%	1.9	1.0%	1.3%
	Managed Health Care	11.3%	2.00	8.4%	3.5	<b>-2.9%</b>	<b>-10.3%</b>
	Life Sciences Tools & Services	8.6%	<b>4.50</b>	5.8%	3.8	-2.8%	-1.5%
<b>(B)</b>	Pharmaceuticals	29.1%	7.00	24.4%	6.4	<b>-4.7%</b>	<b>6.9%</b>
	Biotechnology	15.7%	<b>9.00</b>	9.5%	10.5	-6.2%	-5.5%
			<b>5.10</b>		<b>4.80</b>		

- Huge Range of Industry Returns
- Non-nested Weightings are Wrong

## Health Care Equipment & Services

Industry	Benchmark Weight	Benchmark Return	Portfolio Weight	Portfolio Return	Allocation	Selection	Total
Health Care Distributors	3.5%	1.4	5.8%	2.2	-0.03	0.05	0.02
Health Care Equipment	55.1%	2.5	51.7%	3.2	0.01	0.36	0.37
Health Care Facilities	2.3%	-3.5	8.5%	-0.1	-0.38	0.29	-0.10
Health Care Services	10.3%	7.5	10.1%	8.8	-0.01	0.13	0.12
Health Care Supplies	3.5%	2.9	7.5%	2.0	0.01	-0.07	-0.06
Health Care Technology	1.2%	1.4	2.5%	1.9	-0.02	0.01	-0.01
Managed Health Care	24.2%	2.0	13.9%	3.5	0.07	0.21	0.28
		2.72		3.35	-0.35	0.98	0.63

## Pharmaceuticals, Biotechnology & Life Sciences

Industry	Benchmark Weight	Benchmark Return	Portfolio Weight	Portfolio Return	Allocation	Selection	Total
Life Sciences Tools & Services	16.1%	4.5	14.6%	3.8	0.04	-0.10	-0.06
Pharmaceuticals	54.6%	7.0	61.5%	6.4	-0.01	-0.37	-0.38
Biotechnology	29.4%	9.0	23.9%	10.5	-0.10	0.36	0.26
		7.19		7.00	-0.07	-0.11	-0.18

## Health Care Sector Attribution Analysis


Health Care Sector Attribution Analysis	Industry GROUP Allocation	INDUSTRY Allocation	Selection Residual	Total
<i>Health Care Equipment &amp; Services</i>	-0.32	-0.21	0.59	0.06
<i>Pharmaceuticals, Biotechnology &amp; Life Sciences</i>	-0.28	-0.03	-0.04	-0.36
<b>Total</b>	<b>-0.61</b>	<b>-0.24</b>	<b>0.55</b>	<b>-0.30</b>

**An amazing “Reversal of Fortune” for Stock Picking!**

- **-30 bps stock selection effect (non-hierarchical approach)**
- **-85 bps industry allocation and +55 bps stock selection effect**



# Summary Insights

- Active investing is driven by an allocation hierarchy - *“where to invest”*
- “Nested” attribution is only process that *reflects investment decision process*
- **Essential for accuracy** in **BOTH** multi-asset and single-asset-type portfolios (funds)
- Critical for **evaluating significant resources** devc  analysts recommending securities

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“You can do this!”