

Overview of Investment Controlling Part 2

Version 2.0

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- 3.7. How are the results influenced by the guidelines?
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1. TWR- versus IRR-attribution

Initial comments on TWR-attribution

Decomposing the TWR is common practice and the main method implemented by performance attribution software providers, means that:

- Portfolio and benchmark returns are TWRs.
- Segment and stock returns are TWRs.
- Return contributions are calculated using TWRs.
- Use of TWRs assumes that portfolio manager has no discretion over any (external as well as internal) cash flows.
- Impact of internal as well as external cash flows are neutralized.
- Impact of over- / underweighting of segments or stocks is dealt by using weights instead of cash flows.

Initial comments on MWR-attribution

Decomposing the MWR is not common practice and not offered by performance attribution software providers, means that:

- Decomposing the MWR or TWR using the "MWR-concept" is not common practice.
- The effect of cash flows is not allocated properly.
- The management effects may be misleading.

TWR-attribution - some formulas

(1/3)
for a single period

$$(1) ER_{\text{Total}} = R_p - R_b$$

$$(2) ER_{\text{Total}} = AAE_{\text{Total}} + SPE_{\text{Total}} + IAE_{\text{Total}}$$

$$(3) ER_i = AAE_i + SPE_i + IAE_i$$

$$(4) AAE_{\text{Total}} = \sum_{i=1}^n AAE_i = \sum_{i=1}^n (w_p^i - w_b^i) * r_b^i = \sum_{i=1}^n [RC_i(w_p^i; r_b^i) - RC_i(w_b^i; r_b^i)]$$

$$(5) SPE_{\text{Total}} = \sum_{i=1}^n SPE_i = \sum_{i=1}^n (r_p^i - r_b^i) * w_b^i = \sum_{i=1}^n [RC_i(w_b^i; r_p^i) - RC_i(w_b^i; r_b^i)]$$

$$(6) IAE_{\text{Total}} = \sum_{i=1}^n IAE_i = \sum_{i=1}^n [(w_p^i - w_b^i) * (r_p^i - r_b^i)]$$
$$= \sum_{i=1}^n [(w_p^i * r_p^i - w_b^i * r_p^i) - (w_p^i * r_b^i - w_b^i * r_b^i)]$$
$$= \sum_{i=1}^n \left\{ [RC_i(w_p^i; r_p^i) - RC_i(w_b^i; r_p^i)] - [RC_i(w_p^i; r_b^i) - RC_i(w_b^i; r_b^i)] \right\}$$

=> Reference for the attribution approach: "Determinants of portfolio performance" by G.P. Brinson, L.R. Hood and G.L. Beebower (1986)

TWR-attribution - some formulas

(2/3)
for multi-period

$$(7) \text{ERM}_{\text{Total}}^T = \text{ERM}_{\text{Total}}^{T-1} * (1 + R_b^T) + \text{ER}_{\text{Total}}^T * (1 + \text{RM}_p^{T-1})$$

$$(8) \text{ERM}_{\text{Total}}^T = \text{AAEM}_{\text{Total}}^T + \text{SPEM}_{\text{Total}}^T + \text{IAEM}_{\text{Total}}^T$$

$$(9) \text{AAEM}_{\text{Total}}^T = \text{AAEM}_{\text{Total}}^{T-1} * (1 + R_b^T) + \text{AAE}_{\text{Total}}^T * (1 + \text{RM}_p^{T-1})$$

$$(10) \text{SPEM}_{\text{Total}}^T = \text{SPEM}_{\text{Total}}^{T-1} * (1 + R_b^T) + \text{SPE}_{\text{Total}}^T * (1 + \text{RM}_p^{T-1})$$

$$(11) \text{IAEM}_{\text{Total}}^T = \text{IAEM}_{\text{Total}}^{T-1} * (1 + R_b^T) + \text{IAE}_{\text{Total}}^T * (1 + \text{RM}_p^{T-1})$$

Multi-period contribution =

[prior cumulated contribution x (1 + benchmark return current period)]

+ [current period contribution x (1 + prior cumulated portfolio return)]

=> Reference for the linking approach: "Investment Performance Measurement"; by Bruce J. Feibel

TWR-attribution - some formulas

(3/3)
notations

i = asset class i

$p; b$ = portfolio; benchmark

R_p = portfolio return

R_b = benchmark return

$w_{p;b}^i$ = weight asset class i

$r_{p;b}^i$ = return of asset class i

$ER_{i;Total}$ = excess return

$AAE_{i;Total}$ = asset allocation effect

$SPE_{i;Total}$ = stock picking effect

$IAE_{i;Total}$ = interaction effect

RC_i = return contribution

T = end date of the multi period

RM_p = cumulated portfolio return

$ERM_{i;Total}$ = cumulated excess return

$AAEM_{i;Total}$ = cumulated asset allocation effect

$SPE_{i;Total}$ = cumulated stock picking effect

$IAE_{i;Total}$ = cumulated interaction effect

TWR-attribution - example without external cash flows (1/6)

Portfolio			
	Period 1	Period 2	
Dates	31.12.2007	31.12.2008	31.12.2009
	Investment at beginning of period	Investment at beginning of period	Investment at the end of period
Asset A	135.00	18.75	15.00
Asset B	15.00	168.75	185.63
Total assets	150.00	187.50	200.63
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	90.00%	10.00%	7.48%
Asset B	10.00%	90.00%	92.52%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (TWR)
Asset A	30.00%	-20.00%	4.00%
Asset B	-20.00%	10.00%	-12.00%
Total assets	25.00%	7.00%	33.75%

no external cash flows

TWR-attribution - example without external cash flows (2/6)

Benchmark			
	Period 1	Period 2	
Dates	31.12.2007	31.12.2008	31.12.2009
	Investment at beginning of period	Investment at beginning of period	Investment at the end of period
Asset A	15.00	18.60	24.18
Asset B	135.00	167.40	117.18
Total assets	150.00	186.00	141.36
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	10.00%	10.00%	17.11%
Asset B	90.00%	90.00%	82.89%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (TWR)
Asset A	-30.00%	30.00%	-9.00%
Asset B	30.00%	-30.00%	-9.00%
Total assets	24.00%	-24.00%	-5.76%

no external cash flows

TWR-attribution - example without external cash flows (3/6)

	Asset A	Asset B	Total effect
Asset allocation effect	-18.24%	-18.24%	-36.48%
Stock picking effect	-1.69%	10.80%	9.11%
Interaction effect	36.48%	30.40%	66.88%
<i>Total excess return</i>	16.55%	22.96%	39.51%

Why do we have a negative stock picking effect for asset A?

$$\text{SPE (A, 1)} \Rightarrow (30\% - (-30\%)) * 10\% = 6\%$$

$$\text{SPE (A, 2)} \Rightarrow ((-20\%) - 30\%) * 10\% = -5\%$$

$$\text{SPE (A, 1+2)} \Rightarrow 6\% * (1 + (-24\%)) + (-5\%) * (1 + 25\%)$$

$$\Rightarrow 6\% - 1.44\% - 5\% - 1.25\% = -1.69\%$$

=> It seems that the stock picking for asset A added no value despite the fact that we had invested 90% of the assets in asset A in period 1!

TWR-attribution - example without external cash flows (4/6)

	Asset A	Asset B	Total effect
Asset allocation effect	-18.24%	-18.24%	-36.48%
Stock picking effect	-1.69%	10.80%	9.11%
Interaction effect	36.48%	30.40%	66.88%
<i>Total excess return</i>	16.55%	22.96%	39.51%

Why are the asset allocation effects of asset A and B identical?

$$AAE (A, 1) \Rightarrow (90\% - 10\%) * (-30\%) = -24\%$$

$$AAE (A, 2) \Rightarrow (10\% - 10\%) * 30\% = 0\%$$

$$AAE (A, 1+2) \Rightarrow (-24\%) * (1 + (-24\%)) + 0\% * (1 + 25\%)$$

$$\Rightarrow -24\% + 5.76\% + 0\% + 0\% = -18.24\%$$

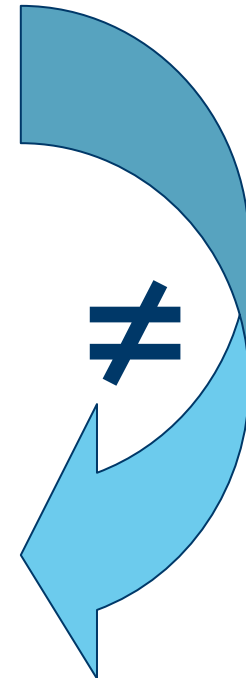
=> It seems that the asset allocation decisions in period 2 did not add any value!

=> The value added is neutralized and moved to another effect! Why!

TWR-attribution - example without external cash flows (5/6)

Return contributions	Period 1	Period 2	Total
SPE (A)	6.00%	-5.00%	-1.69%
SPE (B)	-45.00%	36.00%	10.80%
<i>Total SPE</i>	-39.00%	31.00%	9.11%
AAE (A)	-24.00%	0.00%	-18.24%
AAE (B)	-24.00%	0.00%	-18.24%
<i>Total AAE</i>	-48.00%	0.00%	-36.48%

Profit contributions	Period 1	Period 2	Total
SPE (A)	9.00	-8.13	0.87
SPE (B)	-67.50	61.70	-5.81
<i>Total SPE</i>	-58.50	53.57	-4.94
AAE (A)	-36.00	-2.16	-38.16
AAE (A)	-36.00	19.44	-16.56
<i>Total AAE</i>	-72.00	17.28	-54.72



SPE: Taking benchmark weights and portfolio / benchmark returns => calculation of absolute profit/loss

AAE: Taking benchmark / portfolio weights and benchmark returns => calculation of absolute profit/loss

TWR-attribution - example without external cash flows (6/6)

Some questions to be answered:

- Why are the absolute profit/loss figures not in line with the returns?
- Why do changes in weights have no impact on the management effects?
- Why are the management effects compounded by the benchmark return, the portfolio return or something similar?
- What is the economical interpretation of such a mathematical procedure?

=> With TWRs we neglect implicitly internal cash flows and herewith neutralize their value by moving these contributions to other effects.

IRR-attribution - some formulas

(1/3)

How to calculate the IRR management effects?

=> asset allocation effect	= $IRR (w/c_p; r_b) - IRR (w/c_b; r_b)$
=> stock picking effect	= $IRR (w/c_b; r_p) - IRR (w/c_b; r_b)$
=> interaction effect	= $[IRR (w/c_p; r_p) - IRR (w/c_b; r_p)]$ - $[IRR (w/c_p; r_b) - IRR (w/c_b; r_b)]$

e.g. $IRR (w/c_p; r_b)$: IRR using weights (w) and cash flows ($c_p; c_b$) of portfolio and returns of benchmark ($r_p; r_b$)

IRR-attribution - some formulas

(2/3)

$$(12) \text{ PL}_{\text{Total}} = \sum_{i=1}^n \text{ PL}_i$$

$$(13) \text{ AIC}_{\text{Total}} = \frac{\text{ PL}_{\text{Total}}}{\text{ IRR}_{\text{Total}}}$$

$$(14) \text{ AIC}_i = \frac{\text{ PL}_i}{\text{ IRR}_i}$$

$$(15) \text{ IRR}_{\text{Total}} = \sum_{i=1}^n \text{ RC}_i$$

$$(16) \text{ RC}_i = \frac{\text{ AIC}_i}{\text{ AIC}_{\text{Total}}} * \text{ IRR}_i$$

$$(17) \text{ AIC}_{\text{Total}} \neq \sum_{i=1}^n \text{ AIC}_i !$$

$\text{ PL}_{i;\text{Total}}$ = profit / Loss

$\text{ AIC}_{i;\text{Total}}$ = average invested capital

$\text{ IRR}_{i;\text{Total}}$ = internal rate of return

 RC_i = return contribution

for a single period = for multi-period

IRR-attribution - some formulas

(3/3)

$$(18) ER_{\text{Total}} = AAE_{\text{Total}} + SPE_{\text{Total}} + IAE_{\text{Total}}$$

$$(19) AAE_{\text{Total}} = \sum_{i=1}^n AAE_i = \sum_{i=1}^n [RC_i(w/c_p; r_b) - RC_i(w/c_b; r_b)]$$

$$(20) SPE_{\text{Total}} = \sum_{i=1}^n SPE_i = \sum_{i=1}^n [RC_i(w/c_b; r_p) - RC_i(w/c_b; r_b)]$$

$$(21) IAE_{\text{Total}} = \sum_{i=1}^n IAE_i = \sum_{i=1}^n \left\{ \begin{bmatrix} RC_i(w/c_p; r_p) \\ -RC_i(w/c_b; r_p) \end{bmatrix} - \begin{bmatrix} RC_i(w/c_p; r_b) \\ -RC_i(w/c_b; r_b) \end{bmatrix} \right\}$$

$ER_{i;\text{Total}}$ = excess return

$AAE_{i;\text{Total}}$ = asset allocation effect

$SPE_{i;\text{Total}}$ = stock picking effect

$IAE_{i;\text{Total}}$ = interaction effect

for a single period = for multi-period

IRR-attribution - example without external cash flows (1/5)

Portfolio			
	Period 1	Period 2	
Dates	31.12.2007	31.12.2008	31.12.2009
	Cash flow at beginning of period	Cash flow at beginning of period	Investment at the end of period
Asset A	-135.00	156.75	15.00
Asset B	-15.00	-156.75	185.63
Total assets	-150.00	0.00	200.63
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	90.00%	10.00%	7.48%
Asset B	10.00%	90.00%	92.52%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (IRR)
Asset A	30.00%	-20.00%	56.17%
Asset B	-20.00%	10.00%	15.34%
Total assets	25.00%	7.00%	33.75%

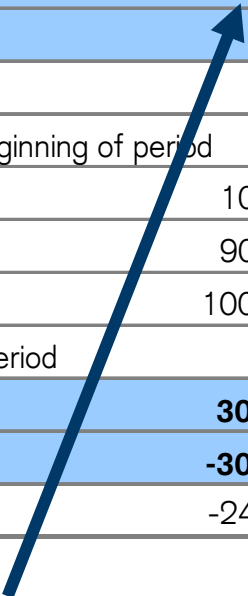


$$156.75 = 135 * (1+30\%) - 150 * (1+25\%) * 10\%$$

no external cash flows

IRR-attribution - example without external cash flows (2/5)

Benchmark			
	Period 1	Period 2	
Dates	31.12.2007	31.12.2008	31.12.2009
	Cash flow at beginning of period	Cash flow at beginning of period	Investment at the end of period
Asset A	-15.00	-8.10	24.18
Asset B	-135.00	8.10	117.18
Total assets	-150.00	0.00	141.36
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	10.00%	10.00%	17.11%
Asset B	90.00%	90.00%	82.89%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (IRR)
Asset A	-30.00%	30.00%	5.69%
Asset B	30.00%	-30.00%	-7.43%
Total assets	24.00%	-24.00%	-5.76%



$$8.10 = 15 * (1-30\%) - 150 * (1+24\%) * 10\%$$

no external cash flows

IRR-attribution - example without external cash flows (3/5)

IRR(c_p, r_b)	31.12.2003	31.12.2004	31.12.2005	Total Period	Ø Capital	Contributions
A: Weights	1 90.00%	3 10.00%				
A: Assets to invest	135.00	11.40	14.82			
A: Return		2 -30.00%	5 30.00%	6 -42.21%	87.85	7 -24.72%
A: Profit/Loss		4 -40.50	3.42	-37.08		-37.08
A: Cash flow	135.00	-83.10				
<hr/>						
B: Weights	10.00%	90.00%				
B: Assets to invest	15.00	102.60	71.82			
B: Return		30.00%	-30.00%	-42.27%	62.17	-17.52%
B: Profit/Loss		4.50	-30.78	-26.28		-26.28
B: Cash flow	15.00	83.10				
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Total: Weights	100.00%	100.00%	0.00%			
Total: Assets to invest	150.00	114.00	86.64			
Total: Return		-24.00%	-24.00%	-42.24%	150.00	-42.24%
Total: Profit/Loss		-36.00	-27.36	-63.36		-63.36
Total: Cash flow	150.00	0.00	0.00			

IRR-attribution - example without external cash flows (4/5)

IRR(c_b, r_b)	31.12.2003	31.12.2004	31.12.2005	Total Period	Ø Capital	Contributions
A: Weights	10.00%	10.00%				
A: Assets to invest	15.00	18.60	24.18			
A: Return		-30.00%	30.00%	5.69%	18.99	0.72%
A: Profit/Loss		-4.50	5.58	1.08		1.08
A: Cash flow	15.00	8.10				
B: Weights	90.00%	90.00%				
B: Assets to invest	135.00	167.40	117.18			
B: Return		30.00%	-30.00%	-7.43%	130.88	-6.48%
B: Profit/Loss		40.50	-50.22	-9.72		-9.72
B: Cash flow	135.000	-8.100				
Total: Weights	100.00%	100.00%	0.00%			
Total: Assets to invest	150.00	186.00	141.36			
Total: Return		24.00%	-24.00%	-5.76%	150.00	-5.76%
Total: Profit/Loss		36.00	-44.64	-8.64		-8.64
Total: Cash flow	150.00	0.00	0.00			

TWR- versus IRR-attribution - example without cash flows

TWR-attribution effects

	Asset A	Asset B	Total effect
Asset allocation effect	-18.24%	-18.24%	-36.48%
Stock picking effect	-1.69%	10.80%	9.11%
Interaction effect	36.48%	30.40%	66.88%
Total excess return	16.55%	22.96%	39.51%

IRR-attribution effects

	Asset A	Asset B	Total effect
Asset allocation effect	-25.44%	-11.04%	-36.48%
Stock picking effect	0.58%	-3.87%	-3.29%
Interaction effect	48.64%	30.64%	79.28%
Total excess return	23.78%	15.73%	39.51%

=> differences in attribution effects can be substantial

TWR-attribution - example with external cash flows (1/2)

Portfolio			
	Period 1	Period 2	
Dates	31.12.2003	31.12.2004	31.12.2005
	Investment at beginning of period	Investment at beginning of period	Investment at the end of period
Asset A	135.00	28.75	23.00
Asset B	15.00	258.75	284.63
Total assets	150.00	287.50	307.63
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	90.00%	10.00%	7.48%
Asset B	10.00%	90.00%	92.52%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (TWR)
Asset A	30.00%	-20.00%	4.00%
Asset B	-20.00%	10.00%	-12.00%
Total assets	25.00%	7.00%	33.75%

with external cash flow at the beginning of period 2 (+100)

TWR-attribution - example with external cash flows (2/2)

Benchmark			
	Period 1	Period 2	
Dates	31.12.2003	31.12.2004	31.12.2005
	Investment at beginning of period	Investment at beginning of period	Investment at the end of period
Asset A	15.00	28.60	37.18
Asset B	135.00	257.40	180.18
Total assets	150.00	286.00	217.36
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	10.00%	10.00%	17.11%
Asset B	90.00%	90.00%	82.89%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (TWR)
Asset A	-30.00%	30.00%	-9.00%
Asset B	30.00%	-30.00%	-9.00%
Total assets	24.00%	-24.00%	-5.76%

with external cash flow at the beginning of period 2 (+100)

IRR-attribution - example with external cash flows (1/2)

Portfolio			
	Period 1	Period 2	
Dates	31.12.2003	31.12.2004	31.12.2005
	Cash flow at beginning of period	Cash flow at beginning of period	Investment at the end of period
Asset A	-135.00	146.75	23.00
Asset B	-15.00	-246.75	284.63
Total assets	-150.00	-100.00	307.63
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	90.00%	10.00%	7.48%
Asset B	10.00%	90.00%	92.52%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (IRR)
Asset A	30.00%	-20.00%	50.24%
Asset B	-20.00%	10.00%	17.16%
Total assets	25.00%	7.00%	29.29%

$$156.75 = 135 * (1+30\%) - (150 * (1+25\%) + 100) * 10\%$$

with external cash flow at the beginning of period 2 (+100)

IRR-attribution - example with external cash flows (2/2)

Benchmark			
	Period 1	Period 2	
Dates	31.12.2003	31.12.2004	31.12.2005
	Cash flow at beginning of period	Cash flow at beginning of period	Investment at the end of period
Asset A	-15.00	-18.10	37.18
Asset B	-135.00	-81.90	180.18
Total assets	-150.00	-100.00	217.36
	weights at beginning of period	weights at beginning of period	weights at the end of period
Asset A	10.00%	10.00%	17.11%
Asset B	90.00%	90.00%	82.89%
Total assets	100.00%	100.00%	100.00%
	Returns for period	Returns for period	Cummulative Returns (IRR)
Asset A	-30.00%	30.00%	17.23%
Asset B	30.00%	-30.00%	-20.60%
Total assets	24.00%	-24.00%	-16.15%

$$18.10 = 15 * (1-30\%) - (150 * (1+24\%) + 100) * 10\%$$

with external cash flow at the beginning of period 2 (+100)

TWR- versus IRR-attribution - example with cash flows

TWR-attribution effects (same as without cash flows)

	Asset A	Asset B	Total effect
Asset allocation effect	-18.24%	-18.24%	-36.48%
Stock picking effect	-1.69%	10.80%	9.11%
Interaction effect	36.48%	30.40%	66.88%
Total excess return	16.55%	22.96%	39.51%

IRR-attribution effects (different from without cash flows)

	Asset A	Asset B	Total effect
Asset allocation effect	-26.74%	0.65%	-26.09%
Stock picking effect	-0.72%	7.82%	7.10%
Interaction effect	43.10%	21.33%	64.43%
Total excess return	15.65%	29.79%	45.44%

General framework for decomposing returns

(1/3)

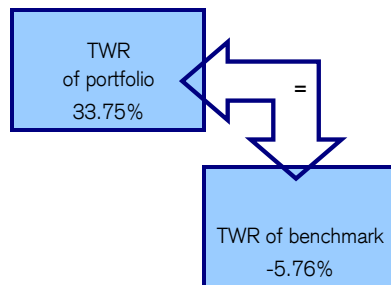
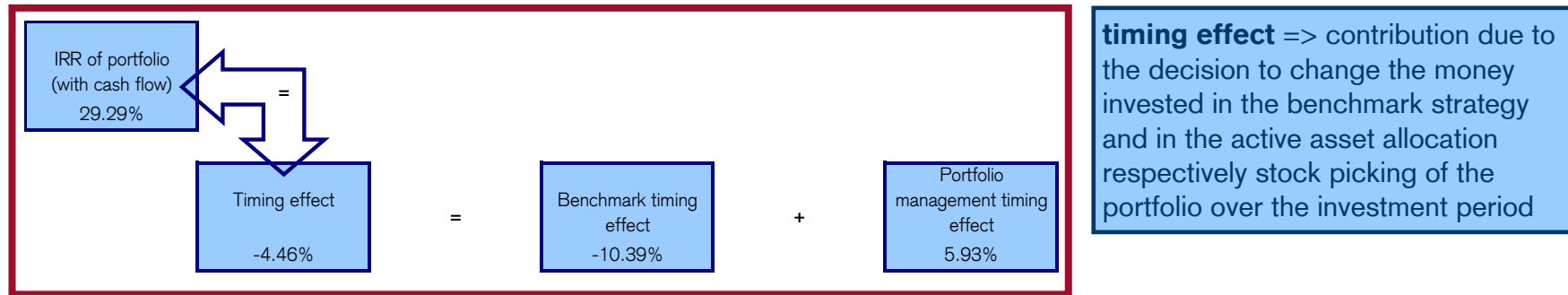
The MWR-calculation and MWR-attribution allow to define a general framework for decomposing returns:

- That combines the different views on performance (client versus portfolio manager).
- That connects the different return measurement methods (TWR and MWR).
- That connects the different return attribution methods (TWR and MWR).
- That corresponds to absolute profit & loss measurement and profit & loss attribution.
- Etc.

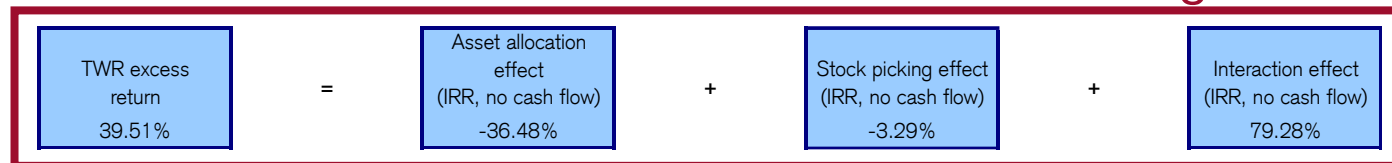
General framework for decomposing returns

(2/3)

Client view



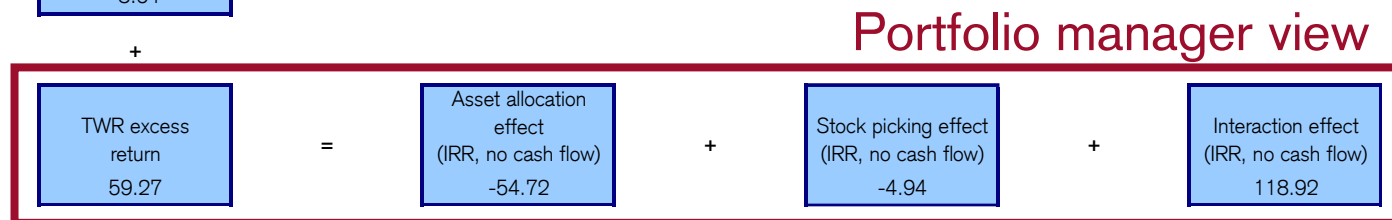
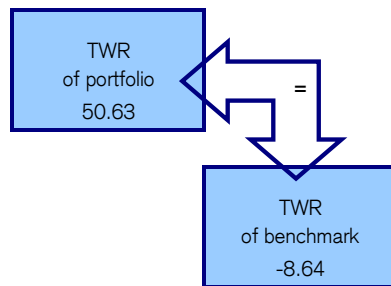
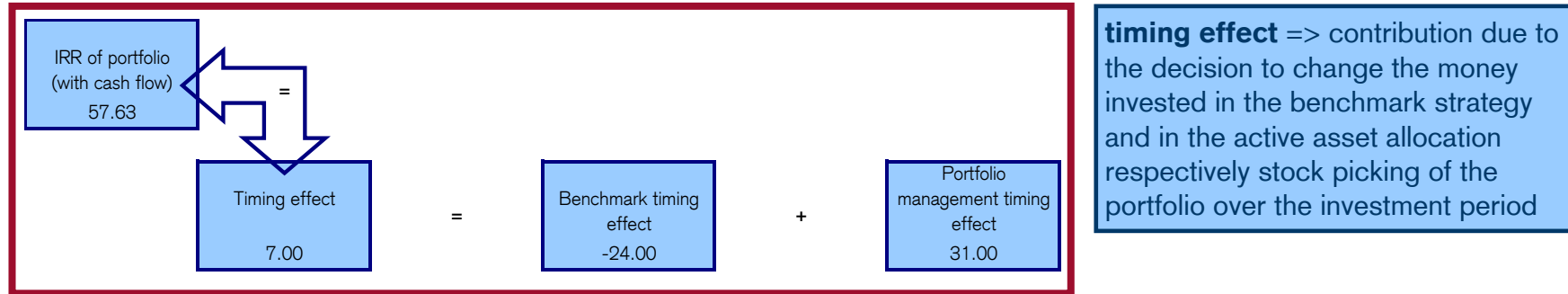
Portfolio manager view



General framework for decomposing returns

(3/3)

Client view



Conclusion

"Odd" questions can be better answered using the general framework for decomposing returns; including MWRs!

The return is positive
but I lost money -
how come?

Multiplying the
weights with the
return does not lead
to my absolute profit
- how come?

The segment return is
positive but its return
contribution is negative
- how come?

What is my on
average invested
capital?

Simple example for an IRR implementation

(1/2)

Asset Class	Asset at 31.12.08	Sum of cash flows	Assets at 30.12.2009	Profit & loss (in CHF)	Profit & loss (in %)	Sum of cash flows in % of assets at 31.12.2008	On average invested capital (in CHF)	On average invested capital (in %)
Cash	77'299'536	-44'553'165	37'028'584	4'282'214	6.77%	-57.64%	64'195'773	8.50%
Bonds CHF	90'532'962	-14'375'791	80'742'922	4'585'751	7.25%	-15.88%	89'041'307	11.79%
Convertibles	11'989'017	12'524'530	28'169'285	3'655'738	5.78%	104.47%	19'773'155	2.62%
Mortages (direct)	88'682'597	-2'828'500	88'446'889	2'592'792	4.10%	-3.19%	86'973'765	11.52%
Mortages (indirect)	78'401'686	-11'744'126	68'594'225	1'936'665	3.06%	-14.98%	71'637'225	9.49%
Swiss Equities	88'308'678	15'142'362	119'931'920	16'480'880	26.04%	17.15%	91'359'125	12.10%
Foreign Equities	82'870'803	37'716'722	141'375'901	20'788'376	32.85%	45.51%	92'020'100	12.19%
Swiss Real Estate	204'598'112	-26'089'690	189'673'326	11'164'904	17.64%	-12.75%	193'225'914	25.59%
Foreign Real Estate	19'409'158	-4'485'424	13'162'380	-1'761'354	-2.78%	-23.11%	15'751'996	2.09%
Hedge Funds	17'680'187	35'756'596	52'996'707	-440'076	-0.70%	202.24%	30'541'714	4.05%
Total	759'772'736	-2'936'486	820'122'139	63'285'889	100.00%	-0.39%	755'014'682	100.00%

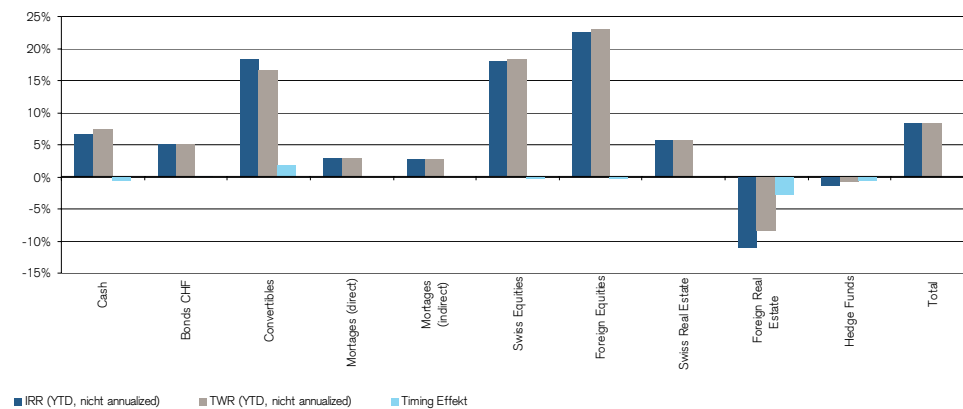
- Data needed:**
- TWRs and TWR contributions
 - Month end valuations
 - Cash flows during the month

Simple example for an IRR implementation

(2/2)

Asset Class	Profit & loss (in CHF)	IRR		TWR	
		(YTD, nicht annualized)	IRR Contribution	(YTD, nicht annualized)	
Cash	4'282'214	6.67%	0.57%	-0.69%	7.36%
Bonds CHF	4'585'751	5.15%	0.61%	-0.01%	5.16%
Convertibles	3'655'738	18.49%	0.48%	1.89%	16.60%
Mortages (direct)	2'592'792	2.98%	0.34%	0.01%	2.97%
Mortages (indirect)	1'936'665	2.70%	0.26%	0.00%	2.70%
Swiss Equities	16'480'880	18.04%	2.18%	-0.44%	18.48%
Foreign Equities	20'788'376	22.59%	2.75%	-0.44%	23.03%
Swiss Real Estate	11'164'904	5.78%	1.40%	0.01%	5.74%
Foreign Real Estate	-1'761'354	-11.18%			
Hedge Funds	-440'076	-1.44%			
Total	63'285'889	8.38%			

IRR versus TWR



2. Portfolio attribution - decomposing the return for multi manager portfolios

Portfolio attribution - overview

The **decision oriented decomposition** of the return allows to quantify the value added of the individual decision makers and is based on the following steps:

- **Step 1:** Identify the circumstances, the investment management setup and derive relevant assumptions for calculation.
- **Step 2:** Mirror the specific investment decisions into (absolute) asset allocations.
- **Step 3:** Calculate the corresponding returns.
- **Step 4:** Assign the returns as well as the return differences to the investment decisions and to the relevant decision makers.

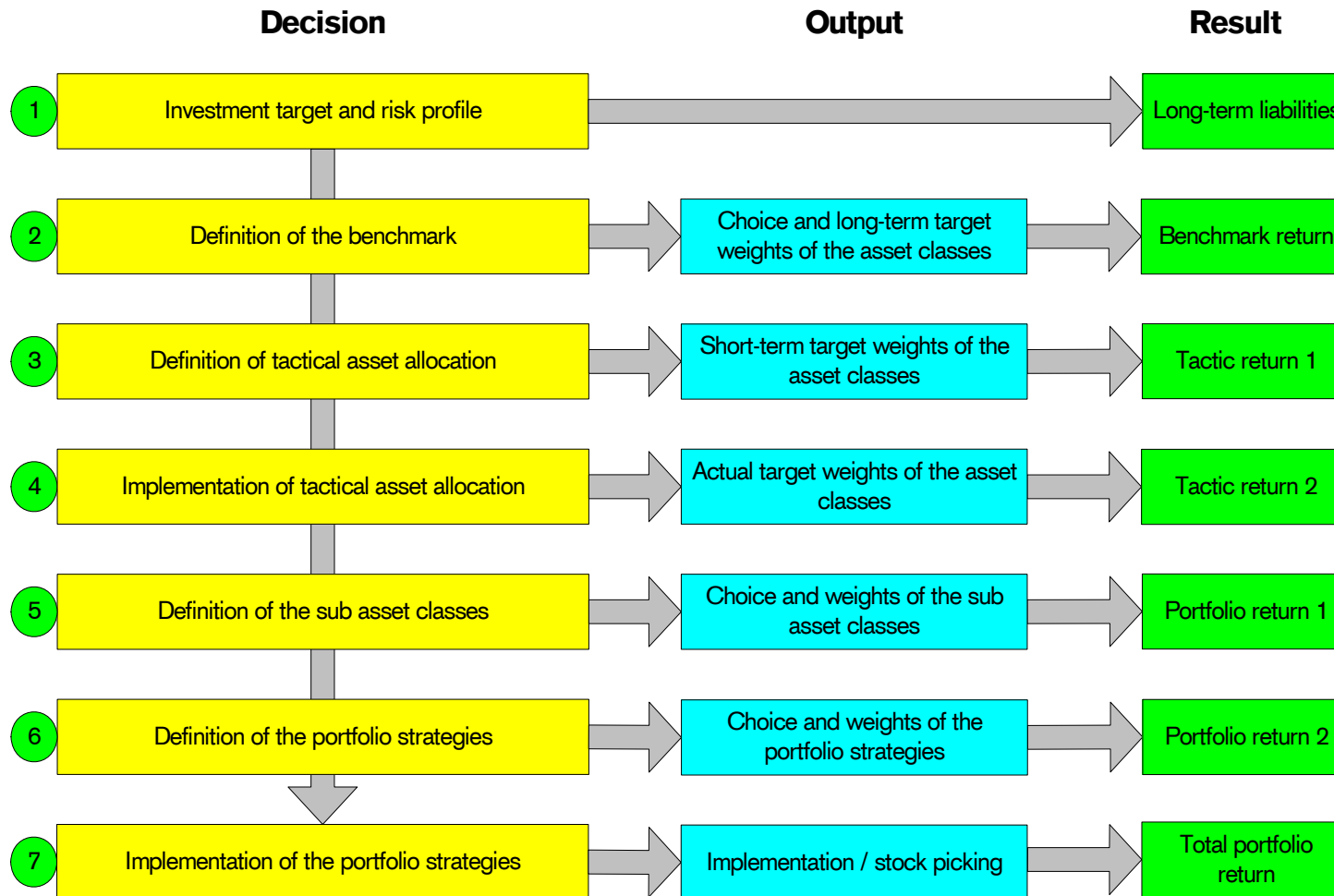
Portfolio attribution - step 1

The following assumptions are considered:

- Return decomposition on a monthly basis for period YTD.
- Monthly time-weighted rate of returns (TWRs).
- No interaction between the different steps of the investment process => no interaction effect.
- Arithmetic return decomposition.
- Spreading of the inter-temporary cross-product using the average invested capital.
- Costs of the implementation of the investment decisions and fees are assigned to the last step of the investment process.
- Use of the Brinson&Fachler return attribution model.
- No monthly rebalancing of benchmark and tactical asset allocation.

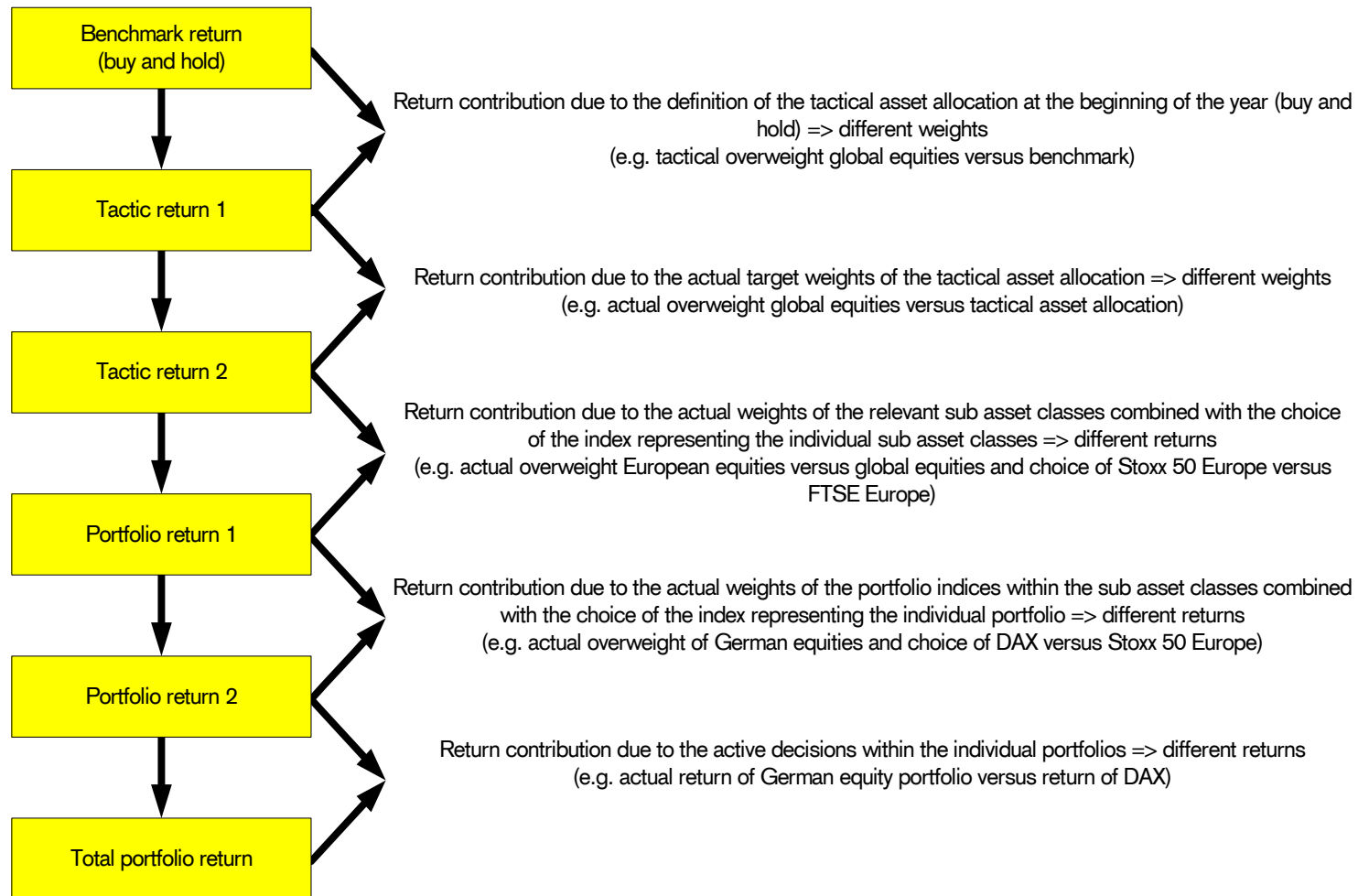
Portfolio attribution - step 2

(1/3)



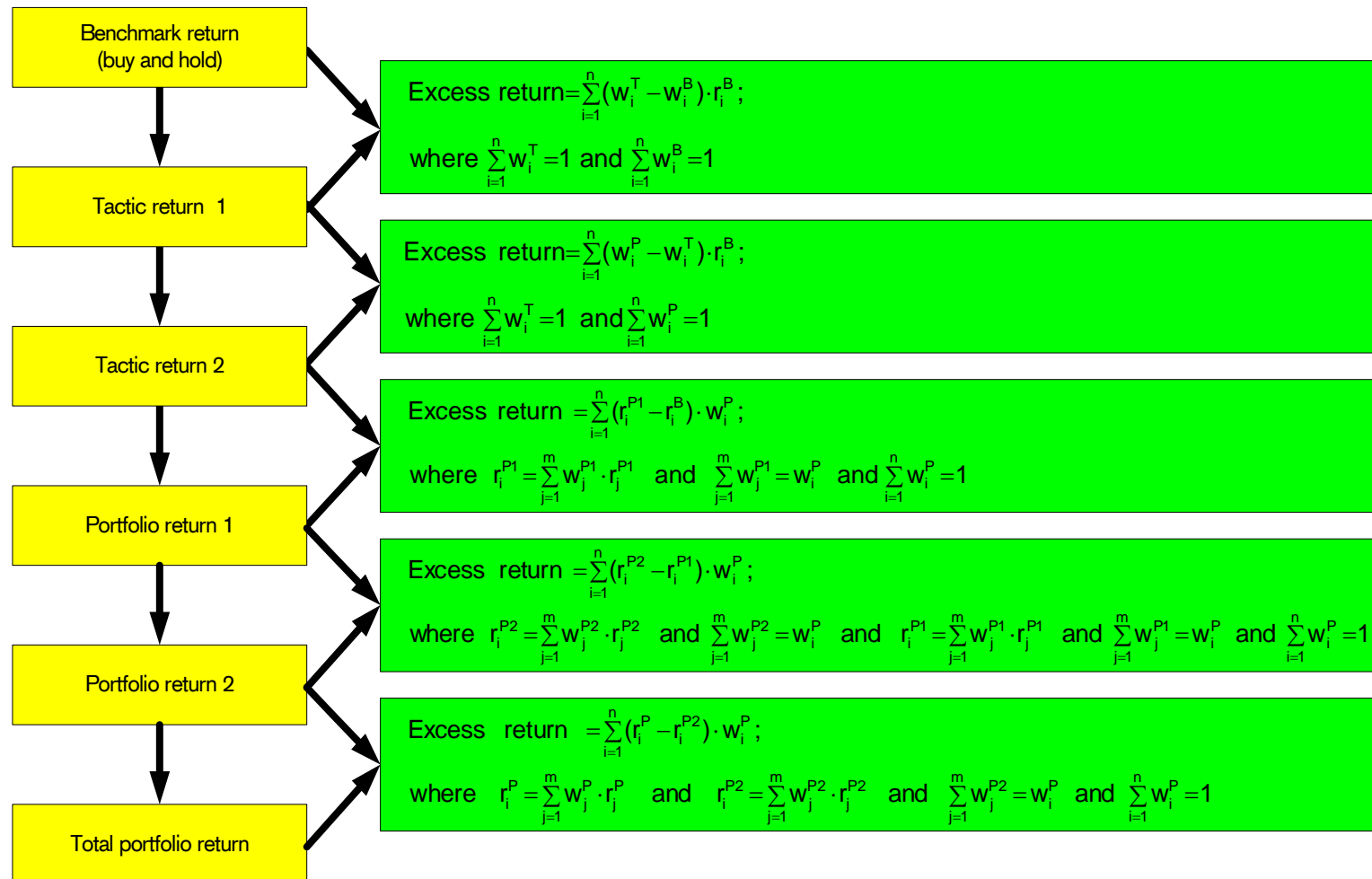
Portfolio attribution - step 2

(2/3)



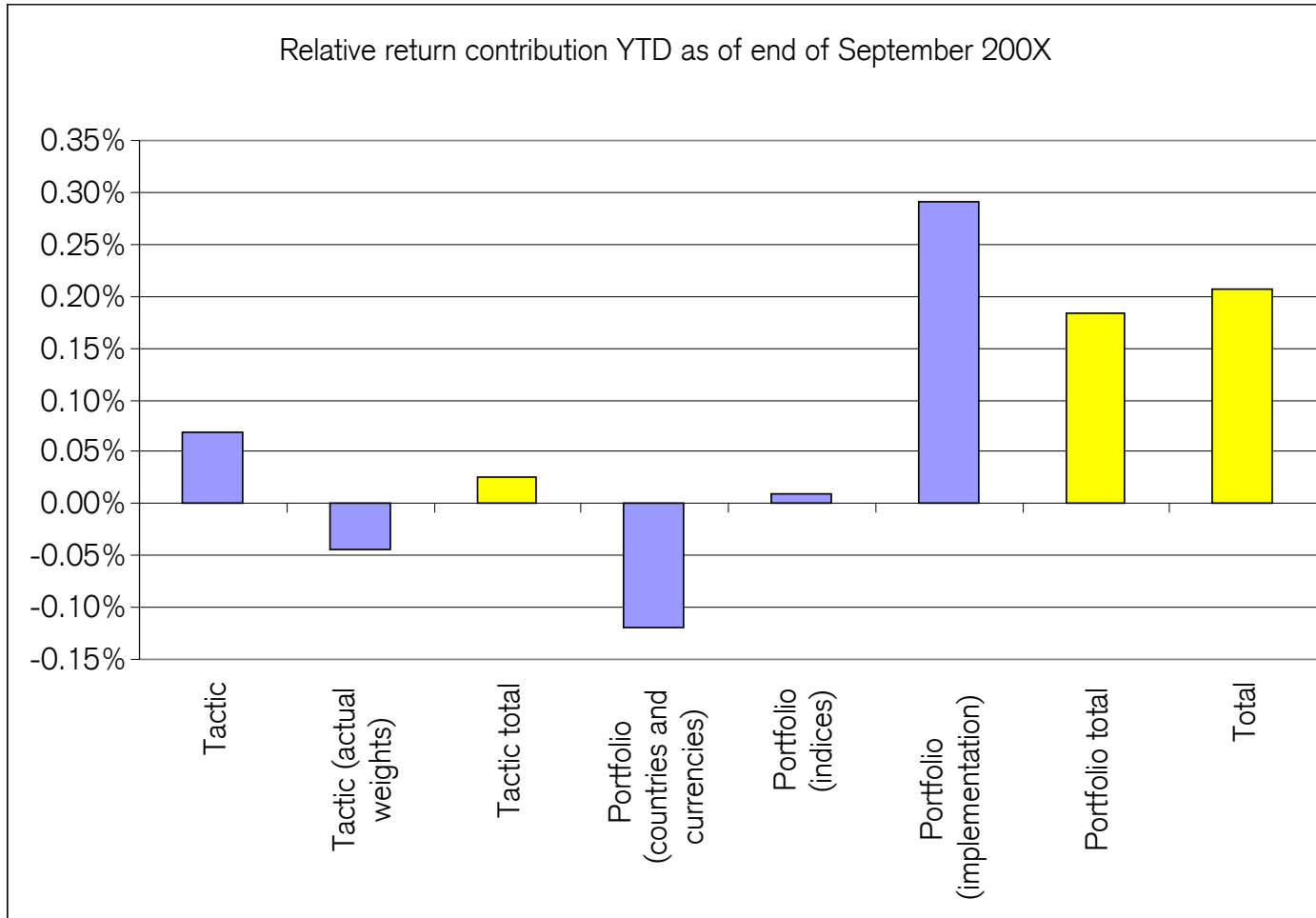
Portfolio attribution - step 2

(3/3)



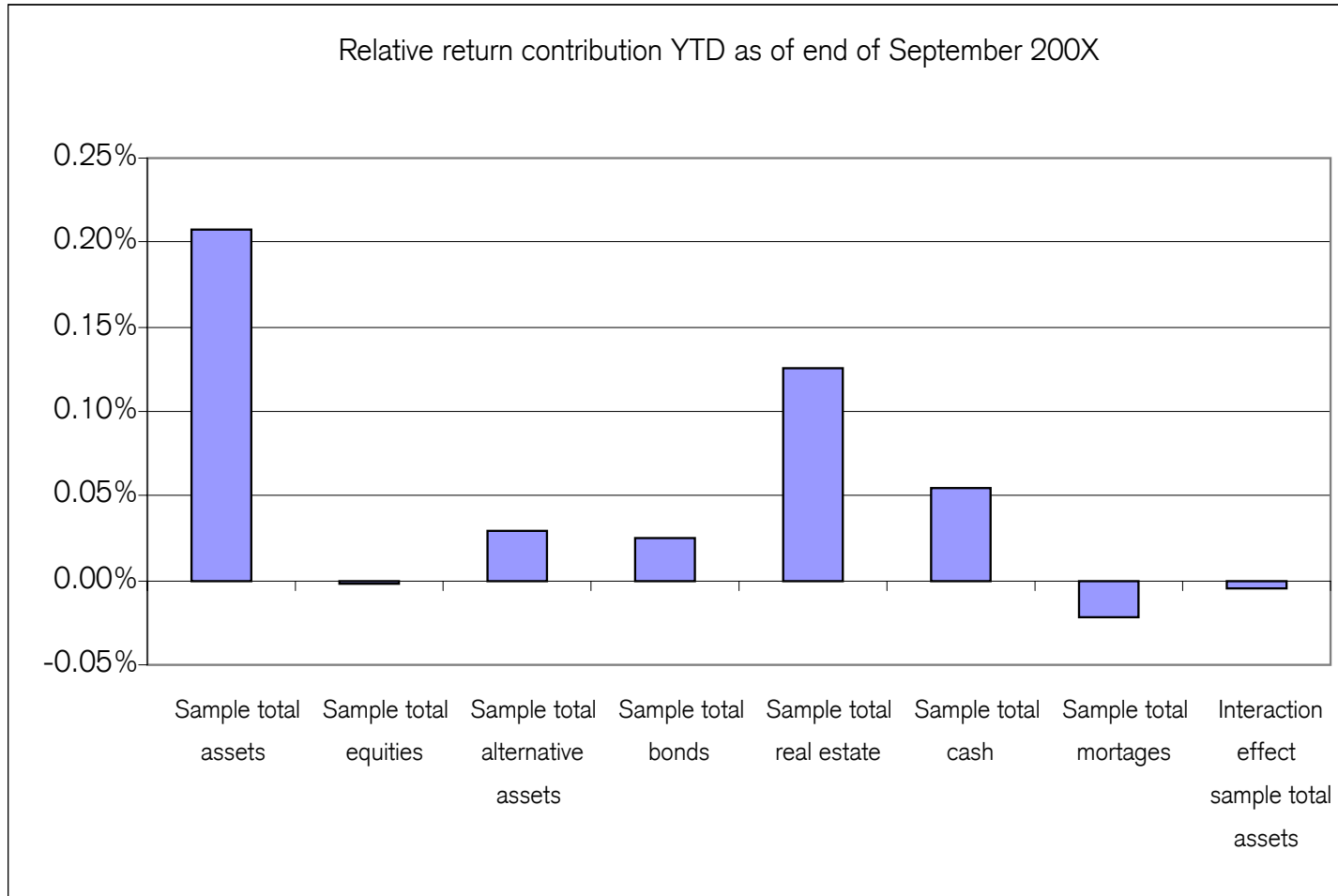
Portfolio attribution - step 3 and 4

(1/4)



Portfolio attribution - step 3 and 4

(2/4)



Portfolio attribution - step 3 and 4

(3/4)

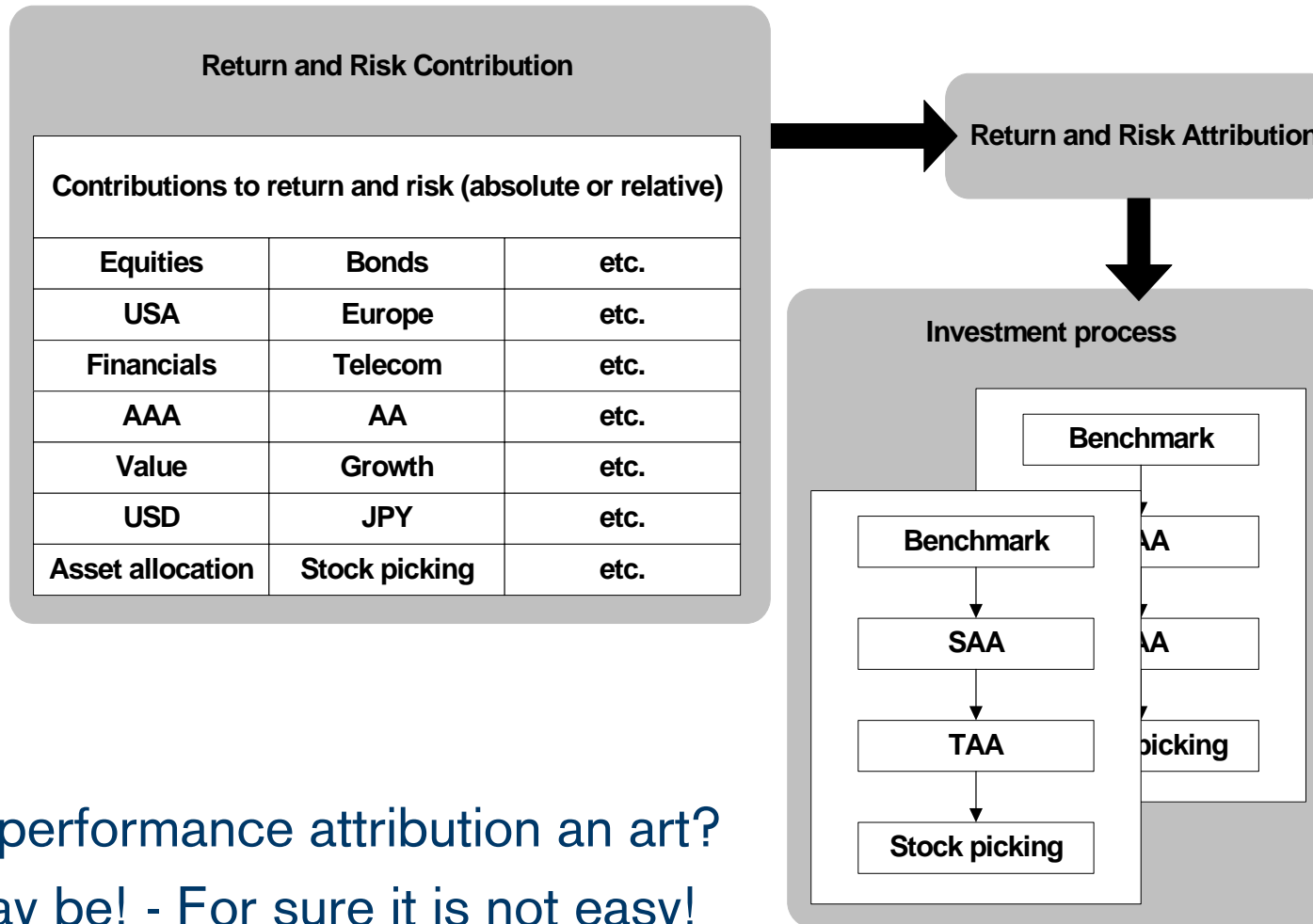
Return contribution YTD as of end of September 200X	Sample total equities	Sample total alternative assets	Sample total bonds	Sample total real estate	Sample total cash	Sample total mortgages	Sample total assets excl. interaction effect	Interaction effect sample total assets	Sample total assets
Benchmark	1.35%	0.05%	-0.01%	-0.02%	0.00%	0.15%	1.52%	0.00%	1.52%
Portfolio	1.35%	0.08%	0.01%	0.11%	0.06%	0.13%	1.74%	-0.01%	1.73%
Total	0.00%	0.03%	0.02%	0.13%	0.05%	-0.02%	0.21%	-0.01%	0.21%
Tactic	0.04%	0.04%	0.00%	-0.01%	0.02%	0.00%	0.08%	-0.01%	0.07%
Tactic (actual weights)	0.02%	0.00%	-0.01%	0.00%	-0.02%	0.00%	-0.01%	-0.03%	-0.04%
Tactic total	0.05%	0.03%	-0.01%	-0.01%	0.01%	0.00%	0.07%	-0.05%	0.02%
Portfolio (countries and currencies)	-0.08%	0.00%	-0.01%	0.00%	0.00%	0.00%	-0.09%	-0.03%	-0.12%
Portfolio (indices)	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.01%	0.01%
Portfolio (implementation)	-0.04%	-0.02%	0.06%	0.13%	0.06%	0.00%	0.19%	0.10%	0.29%
Portfolio total	-0.10%	-0.02%	0.05%	0.13%	0.06%	0.00%	0.11%	0.07%	0.18%

Portfolio attribution - step 3 and 4

(4/4)

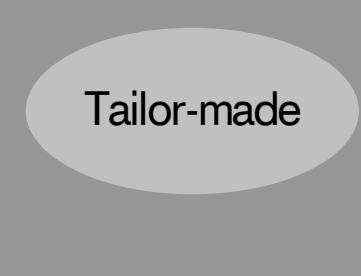
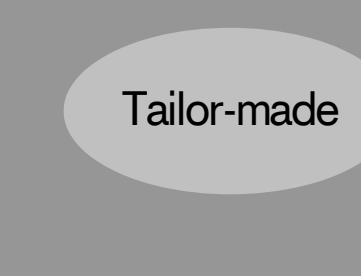

	Assets as of end of September 200X in % of total assets	Portfolio return YTD	Relative portfolio return YTD	Tactical return contribution to relative total portfolio return YTD	Portfolio return contribution to relative total portfolio return YTD	Return contribution to relative total portfolio return YTD
Sample Equity CH SMI passive	5.67%	3.99%	0.02%	0.11%	-0.06%	0.04%
Sample Equity CH SPI large cap.	2.16%	3.93%	0.24%	0.00%	-0.03%	-0.03%
AM abc Equity CH	1.87%	3.20%	-1.97%	-0.01%	-0.04%	-0.05%
Sample SPI small & mid cap	1.45%	11.52%	1.09%	-0.04%	0.08%	0.04%
Sample Equity Euroland	1.81%	2.10%	-0.98%	0.00%	-0.05%	-0.05%
Sample Equity Euro 50 passiv	1.98%	2.00%	0.69%	0.00%	-0.06%	-0.06%
AM xyz Equity UK	1.71%	5.86%	1.57%	-0.01%	0.01%	0.00%
AM 123 Equity USA	2.95%	5.07%	0.32%	0.04%	0.00%	0.04%
Sample Equity USA passiv	2.50%	4.76%	0.00%	0.02%	-0.01%	0.01%
AM 567Equity USA small	2.86%	9.69%	2.25%	0.02%	0.12%	0.14%
AM 789 Equity Asien	1.59%	2.14%	-5.34%	-0.02%	-0.05%	-0.06%
Equity Asien passiv	0.83%	7.45%	-0.03%	-0.04%	0.02%	-0.03%
Sample alternative assets	2.12%	4.32%	-0.78%	0.03%	-0.02%	0.02%
Sample Bonds CHF	45.66%	0.13%	0.19%	0.02%	0.09%	0.11%
Sample Bonds Euro	4.86%	-1.01%	-0.64%	-0.04%	-0.05%	-0.09%
AM 345 Bonds Euro	3.25%	-0.44%	-0.07%	-0.02%	-0.02%	-0.03%
Sample Bonds USD	0.70%	1.53%	0.64%	0.02%	0.01%	0.03%
AM GHI Bonds USD	1.91%	0.93%	0.04%	0.00%	0.02%	0.02%
Sample Real Estate	3.28%	4.50%	5.38%	-0.01%	0.13%	0.12%
Sample Cash	2.47%	2.06%	1.99%	0.01%	0.06%	0.06%
Sample Mortgages	8.36%	1.49%	0.00%	0.00%	0.00%	0.00%
Sample Total Assets	100.00%	1.73%	0.21%	0.02%	0.18%	0.21%

Outlook and conclusion



=> Is performance attribution an art?
 => May be! - For sure it is not easy!

Comprehensive performance attribution

	Return decomposition (ex post)	Risk decomposition (ex ante)
Single asset class and/or „simple“ investment process	Industry standard	Industry standard
Multi asset class and/or „complex“ investment process		
		

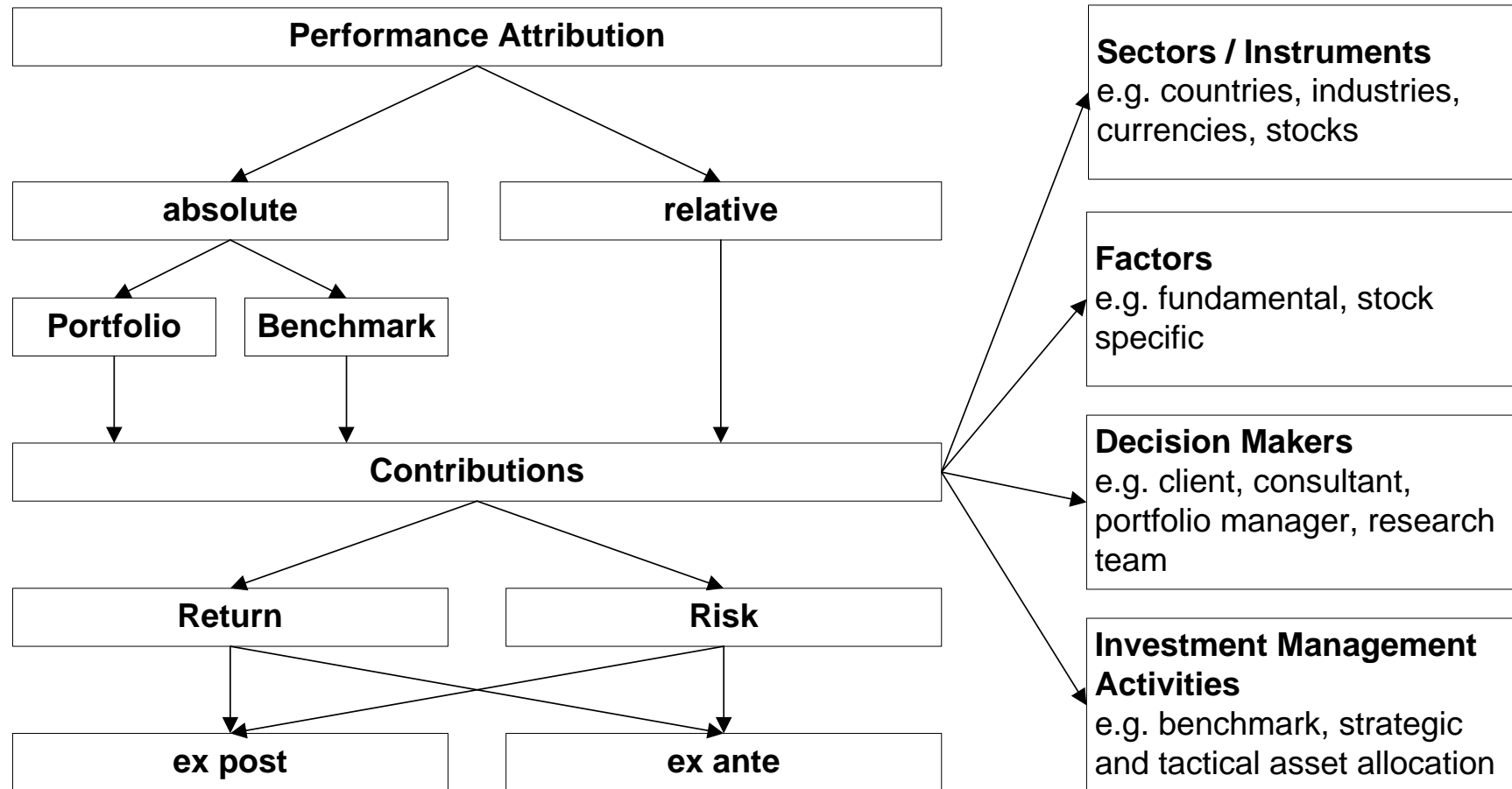
Summary

- It is not only important to know the sources of the (excess) return / risk with respect to the underlying securities but also with respect to the underlying decisions and decision makers.
- Tailor-made return / risk attribution and the decision oriented decomposition of returns / risk enhances transparency and is therefore essential for an effective investment controlling and an useful feedback into the investment process.

3. Some critical issues in performance attribution

Performance analysis

(1/2)



Performance analysis

(2/2)

Performance analysis is very sensitive to misinterpretations because performance

- Is a result from several obvious and less obvious decisions.
- Originates from several obvious and less obvious decision makers.
- Can vary over time.

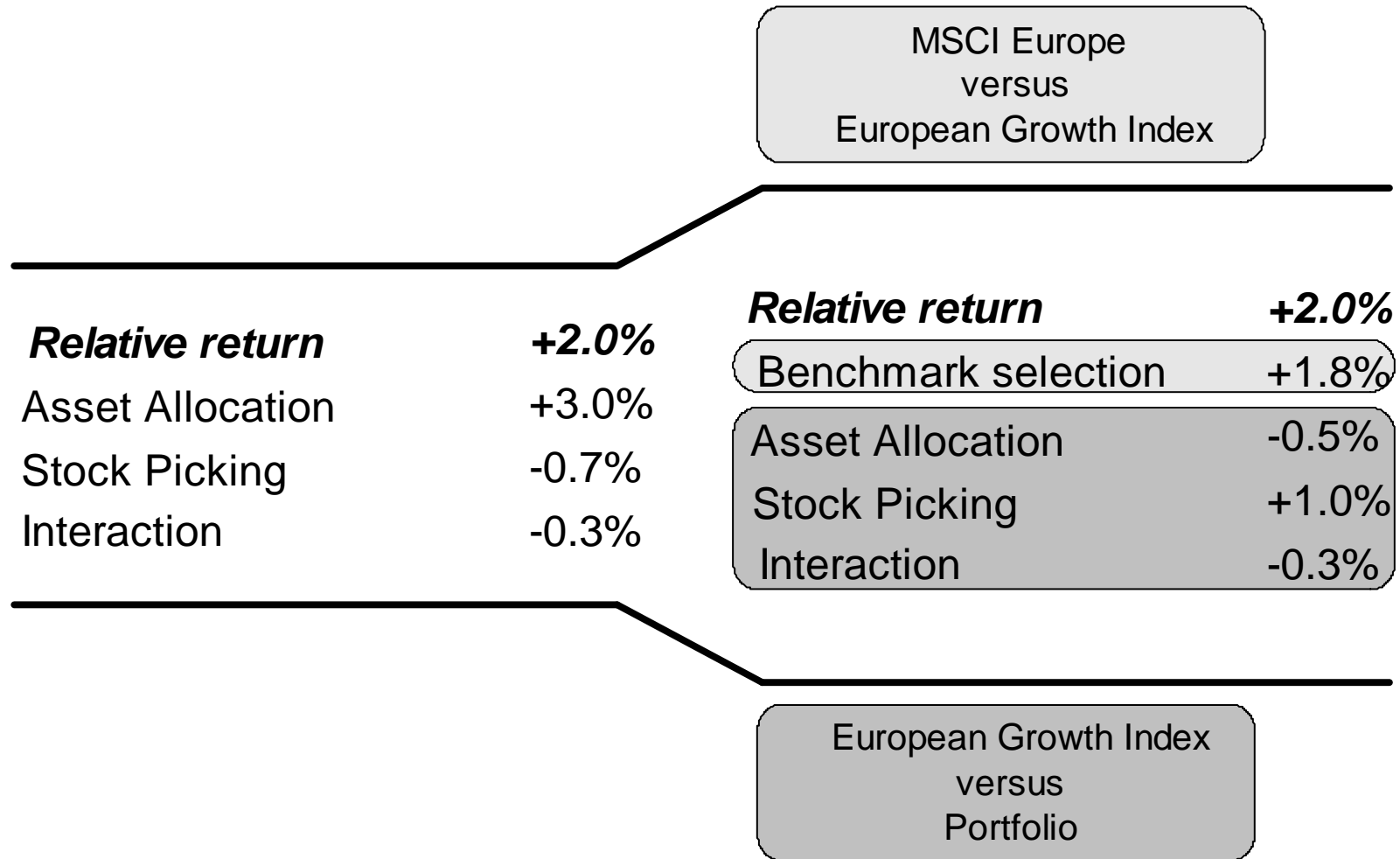
Misinterpretation of the historical performance may lead to erroneous or even wrong decisions as they

- Asses the quality of the decision makers.
- Give feedback into the decision making process.

Are all steps of the decision making process reflected?

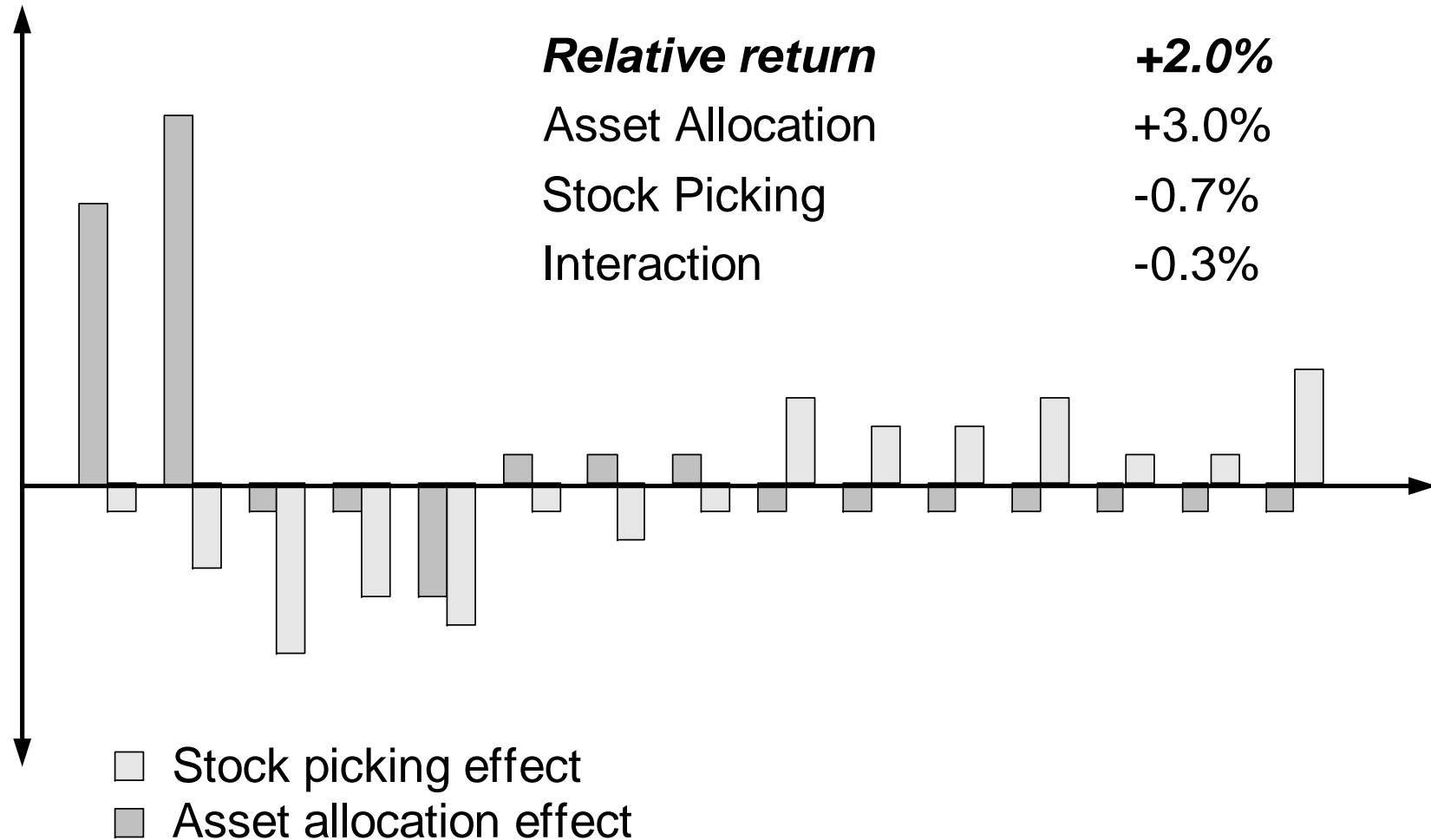
Relative return	+2.0%	Relative return	+2.0%
Asset allocation	+3.0%	Benchmark selection	+0.3%
Stock picking	-0.7%	Asset allocation team	+1.0%
Interaction	-0.3%	FI-Specialist	-0.5%
		EQ-Specialist	+0.8%
		Stock picking	+0.7%
		Interaction	-0.3%

Is a product or an asset manager under review?



Does the management effects vary over time?

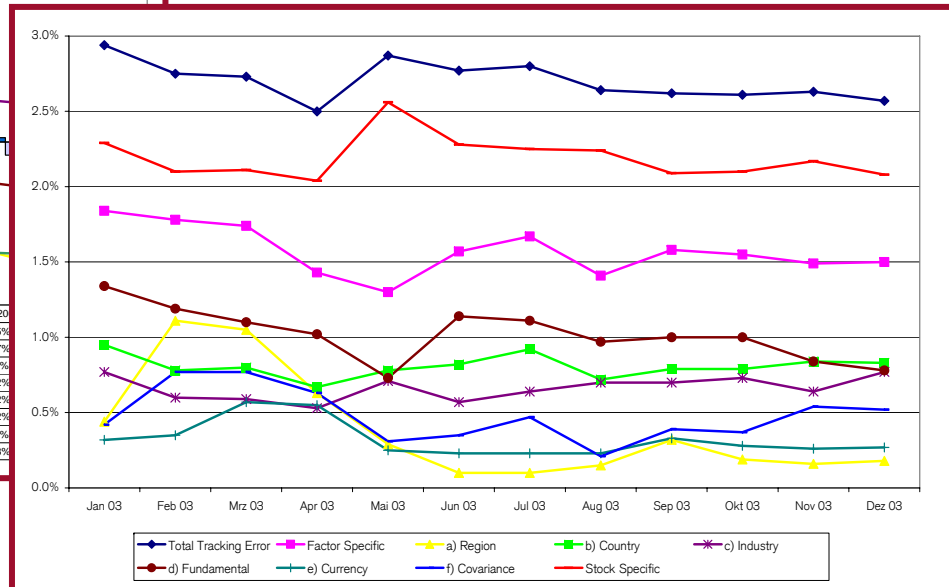
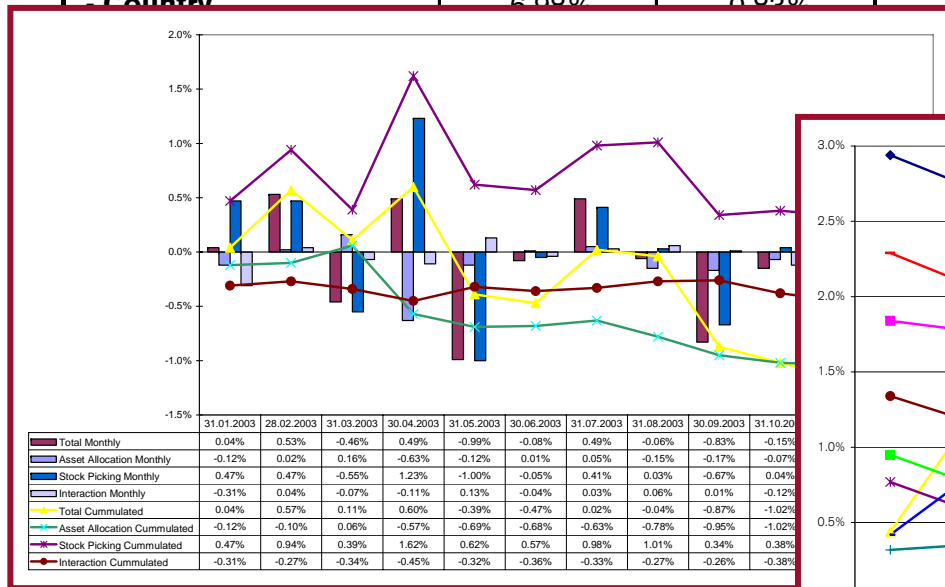
(1/2)



Does the management effects vary over time?

(2/2)

Risk Model : Global	Portfolio	Tracking Error
Total Risk (ex-ante)	18.81%	2.57%
Factor Specific Risk	18.66%	1.50%
- Region	11.50%	0.18%
- Country	6.98%	0.82%



Is the investment style reflected correctly?

MSCI Europe with sector-approach		MSCI Europe with country-approach	
Relative return	+2.0%	Relative return	+2.0%
Asset allocation	+3.0%	Asset allocation	-0.5%
Stock picking	-0.7%	Stock picking	+2.7%
Interaction	-0.3%	Interaction	-0.2%

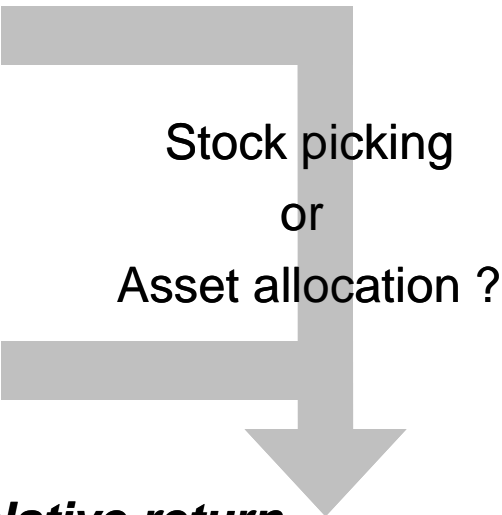
Is each decision in the investment process reflected?

A) Benchmark SMI
Investment universe SPI

20% Investments in Small&Mid Cap

B) Benchmark MSCI World
 with 10 sub accounts

with sub account US-Biotech



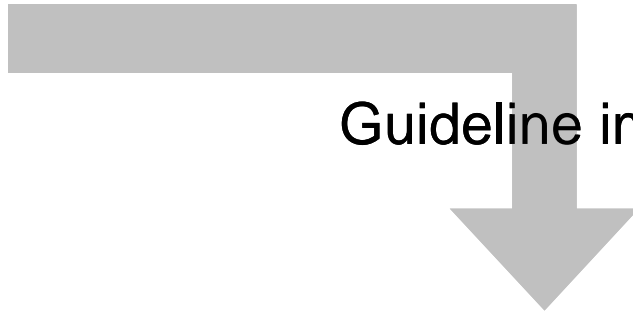
Relative return	+2.0%
Asset allocation	-0.5%
Stock picking	+2.7%
Interaction	-0.2%

How are the results influenced by the guidelines?

Benchmark SMI

Investment universe SMI

maximum 10% of a security

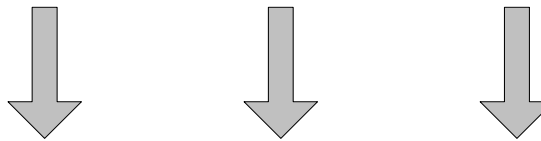


Guideline impact?

Relative return	+2.0%
Asset allocation	-0.5%
Stock picking	+2.7%
Interaction	-0.2%

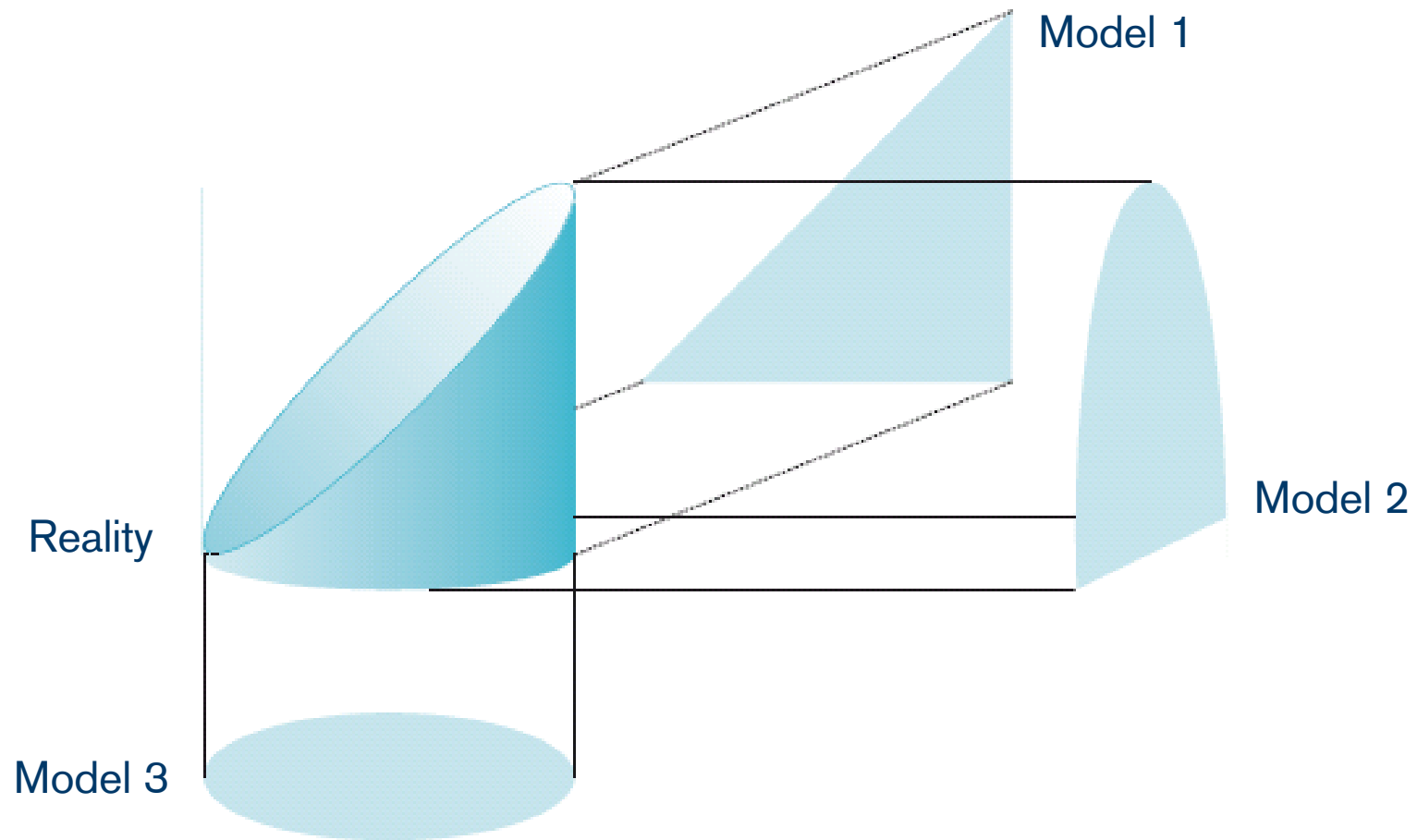
Does the risk attribution reflect the investment process?

Risk Model: Global	Portfolio	Tracking Error
Total Risk (ex-ante)	18.81%	2.57%
Factor Specific Risk	18.66%	1.50%
- Region	11.50%	0.18%
- Country	6.98%	0.83%
- Industry	2.64%	0.77%
- Fundamental	1.44%	0.78%
- Currency	8.42%	0.27%
- Covariance (+/-)	9.35%	0.52%
Stock Specific Risk	2.39%	2.08%

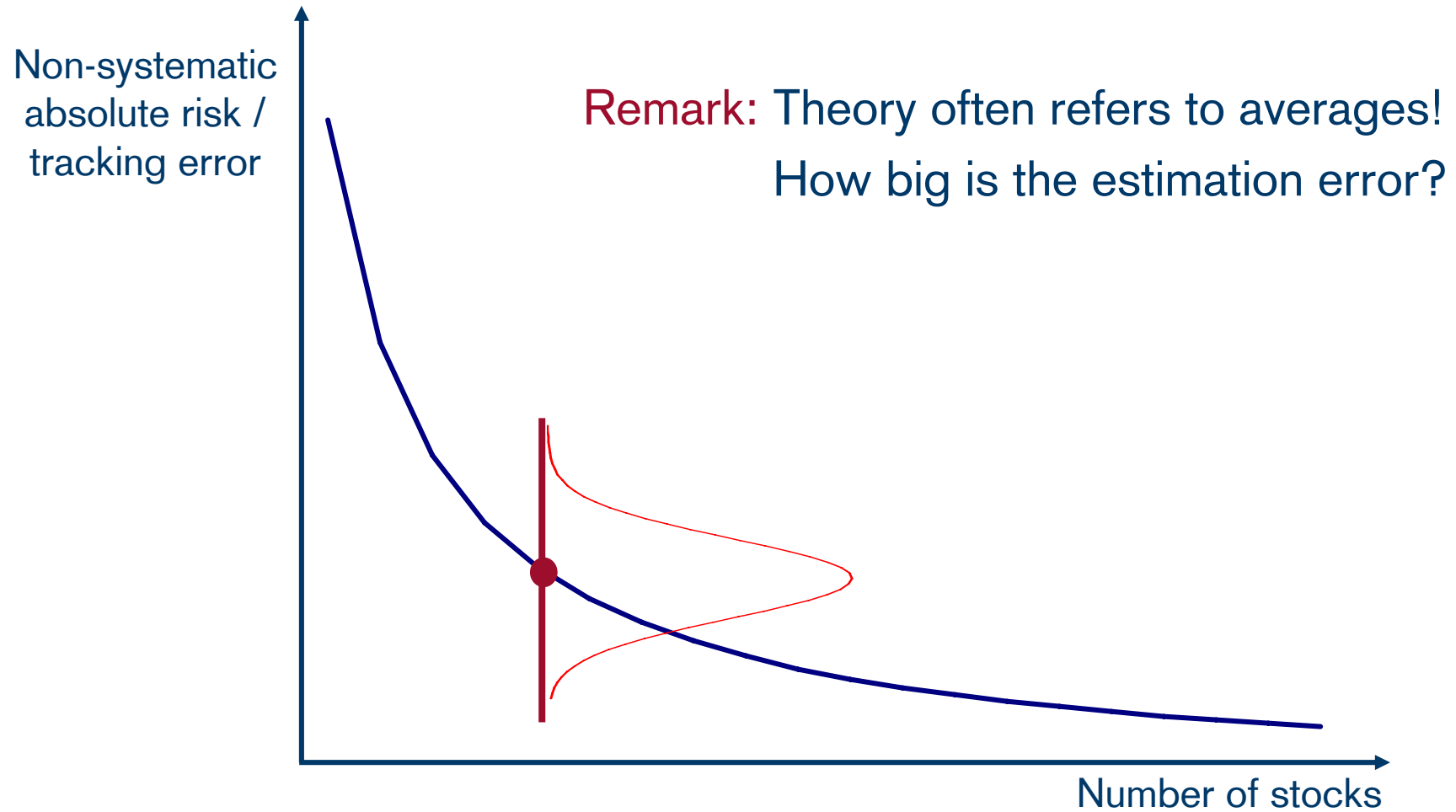


by MSCI Sector	Asset Allocation	Stock Selection	Interaction	Total
Consumer Discretionary	0.00%	-0.86%	-0.03%	-0.89%
Consumer Staples	0.05%	0.28%	0.03%	0.36%
Energy	0.00%	-0.19%	-0.02%	-0.21%
Financials	-0.10%	-0.21%	0.01%	-0.30%
Health Care	0.20%	0.35%	-0.03%	0.52%
Industrials	-0.04%	0.99%	0.12%	1.07%
Information Technology	-0.21%	-0.91%	0.01%	-1.11%
Materials	0.01%	-0.28%	-0.08%	-0.35%
Telecomm Services	-0.11%	0.21%	-0.08%	0.02%
Utilities	0.02%	0.74%	-0.41%	0.35%
Cash	-0.78%	0.00%	0.00%	-0.78%
Total	-0.96%	0.13%	-0.49%	-1.32%

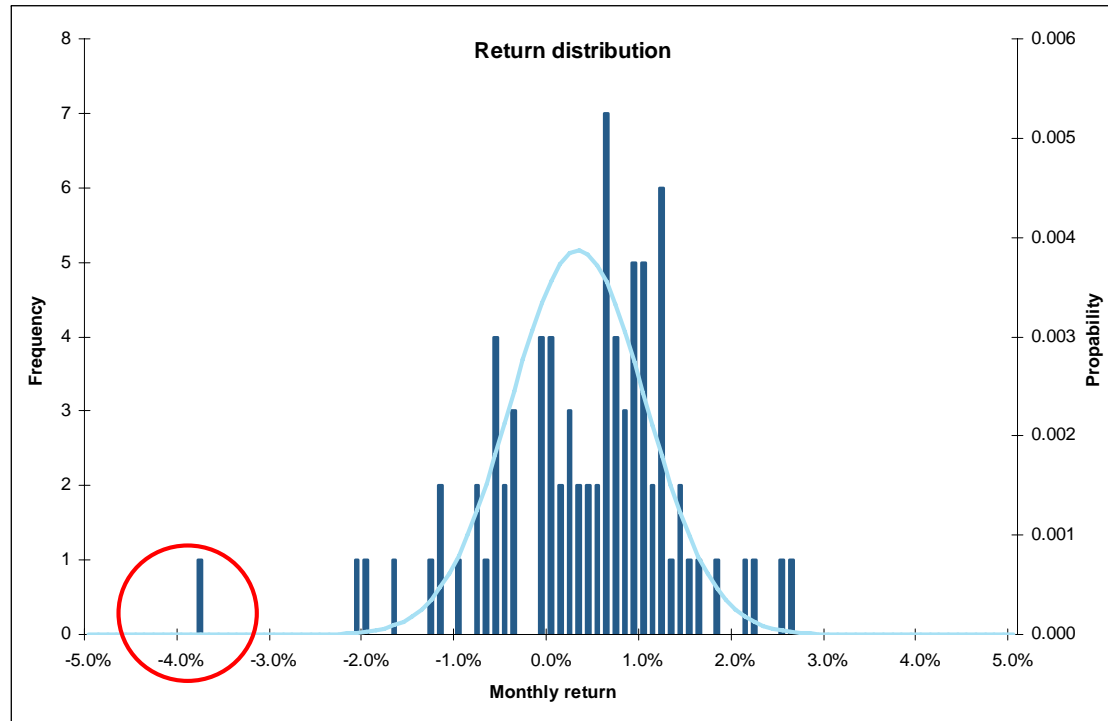
Does the risk model reflect the investment process?



Is the risk model applicable for non-diversified portfolios?



Do risk measurement / attribution reflect worst cases?



Remark: Theory is often designed for "normal" times - what about "un-normal" times?

Conclusion

The following rules ensure a meaningful performance discussion

- Reflect each step of the investment process.
- Reflect each decision in the investment process.
- Mirror the investment style correctly.
- Analyze the impact of the investment guidelines.
- Define whether a certain product or an asset manager has to be assessed.
- Analyze the variation of the management effect over time.
- Analyze the impact of leverage.
- Etc.

Transparency within the performance analysis

GIPS compliant performance presentation

Performance Presentation Standards Report						
Composite Benchmark	Equities Switzerland SPT active Mandates Swiss Performance Index (i) in CHF		Inception Date	01 Jan 1997 CHF		
	Total Return (%)	Benchmark Return (%)	Number of Portfolios	Composite Dispersion (%)	Total Assets at End of Period (trillions)	Percentage of Firm Assets (%)
YTD Mar 08	4.3	4.1	19	0.1	1,331.2	1.2
2001	-22.4	-22.0	18	0.4	1,240.6	1.2
2000	11.8	11.9	16	0.5	1,407.7	1.3
1999	10.4	11.7	13	1.0	1,169.3	1.3
1998	14.5	15.4	12	2.4	936.3	1.4
1997	59.0	55.2	11	1.3	836.2	1.7

CREDIT SUISSE ASSET MANAGEMENT Switzerland
Equities Switzerland SPT active Mandates Composite
Accompanying Notes

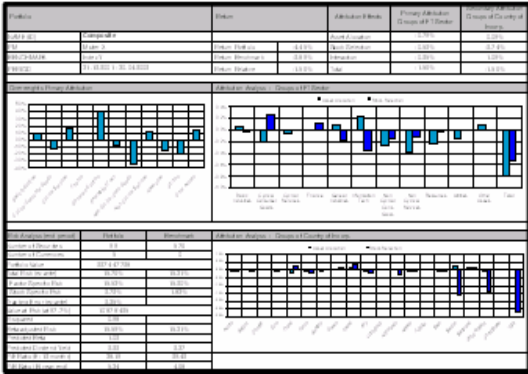
Compliance Statement
Credit Suisse Asset Management (Switzerland) has prepared and presented this report in compliance with the Global Investment Performance Standards (GIPS) (TM), the Swiss Performance Presentation Standards (SPPS) and the Performance Presentation Standards of the Association of Investment Management and Research (AIMM) (PMS) (TM). The Swiss Reporting Association and AIMM have not been involved with the preparation or review of this report.

Definition of the Firm
Credit Suisse Asset Management (Switzerland) is an independent investment management firm established in 1987. Credit Suisse Asset Management (Switzerland) manages a variety of equity, fixed income, and alternative assets for private Swiss and European clients.

Benchmark
This composite has a customized benchmark the details are not shown in the above report file. However the S&P details are available on request. Sources of foreign exchange rates may be different.



And what about the attached attribution report?



Summary

- Investment controlling is in its closer but also in its wider meaning an absolute must.
- Complying with GIPS Standards is imperative for a sound and convincing investment controlling.
- The client perspective has to be always reflected.
- Transparency is the key for a meaningful feedback into the decision making or investment process.