

## Alpha in tactical asset allocation

### Formulas - part 1

Rolf Banz

August 2012

#### *Return of benchmark I in period t*

$$R_{It} = \sum_{i=1}^N x_{it} \cdot R_{lit} \quad (1)$$

where

$R_{It}$  return of benchmark I in period t

$x_{it}$  weight of asset class i included in I at beginning of period t

$R_{lit}$  return of index of asset class i in period t

N number of asset classes included in I

#### *Return of portfolio P in period t*

$$R_{Pt} = \sum_{i=1}^N w_{it} \cdot R_{Pit} + \sum_{j=1}^L w_{jt} \cdot R_{Pjt} \quad (2)$$

where

$R_{Pt}$  return of portfolio P in period t

$w_{it}$  weight of asset class i in portfolio P at beginning of period t

$R_{Pit}$  return of component of portfolio P invested in asset class i in period t

$w_{jt}$  weight of asset class j in portfolio P at beginning of period t (where j is not included in I)

$R_{Pjt}$  return of component of portfolio P invested in asset class j in period t

L number of asset classes included in portfolio P but not included in I

$$\sum_{i=1}^N w_{it} + \sum_{j=1}^L w_{jt} = 1$$

#### *Return of replication portfolio R in period t*

$$R_{Rt} = \sum_{i=1}^N u_i \cdot R_{lit} + \sum_{j=1}^L u_j \cdot R_{ljt} \quad (3)$$

where

$R_{Rt}$  return of replication portfolio R in period t

$u_i$  strategic weight of asset class i in portfolio P (see text for details)

$u_j$  strategic weight of asset class j in portfolio P

$R_{ljt}$  return of the index of asset class j in period t

$$\sum_{i=1}^N u_i + \sum_{j=1}^L u_j = 1$$

#### *Return of TAA portfolio T in period t*

$$R_{Tt} = \sum_{i=1}^N w_{it} \cdot R_{lit} + \sum_{j=1}^L w_{jt} \cdot R_{ljt} \quad (4)$$

where

$R_{Tt}$  return of portfolio T in period t with strategic biases and TAA decisions before all other decisions

## Alpha in tactical asset allocation

### Formulas - part 2

Rolf Banz

August 2012

#### *Value added/subtracted by strategic bias in period t*

$$\Delta_{Rt} = R_{Rt} - R_{It} = \sum_{i=1}^N (u_i - x_{it}) \cdot R_{iit} + \sum_{j=1}^L u_j \cdot R_{ijt} \quad (5)$$

where

$\Delta_{Rt}$  value added/subtracted by strategic bias in period t

#### *Value added/subtracted by TAA relative to replication portfolio in period t*

$$\Delta_{\pi t} = R_{\pi t} - R_{Rt} = \sum_{i=1}^N (w_{it} - u_i) \cdot R_{iit} + \sum_{j=1}^L (w_{jt} - u_j) \cdot R_{ijt} \quad (6)$$

where

$\Delta_{\pi t}$  value added/subtracted by TAA relative to replication portfolio in period t

#### *Value added/subtracted by strategic bias and TAA in period t*

$$\Delta_{TOTt} = R_{\pi t} - R_{It} = \sum_{i=1}^N (w_{it} - x_{it}) \cdot R_{iit} + \sum_{j=1}^L w_{jt} \cdot R_{ijt} \quad (7)$$

where

$\Delta_{TOTt}$  value added/subtracted in period t by strategic bias and TAA relative to benchmark I

#### *"Left over" return in period t*

$$\Delta_{REST} = R_{Pt} - R_{\pi t} = \sum_{i=1}^N w_{it} \cdot (R_{Pit} - R_{iit}) + \sum_{j=1}^L w_{jt} \cdot (R_{Pjt} - R_{ijt}) \quad (8)$$

where

$\Delta_{REST}$  value added/subtracted in period t by all other decisions