U.S. Portfolio Strategy

The β-Plus Measure in Asset Allocation

2004 IAFE Annual Conference

June 3, 2004

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Morgan Stanley

Please see analyst certification and other important disclosures starting on page 8.

Return/Covariance Matrix

Exhibit 1

	Return	Sigma	US Equity	Global Equity	Emerging Mkt Equity	Absolute Return	Equity Hedge Funds	Venture Capital	Private Equity	REITS	Real Estate	Commodities	US Bonds	Cash
US Equity	7.25	16.5	1	0.65	0.45	0.5	0.85	0.35	0.7	0.55	0.1	-0.25	0.3	0.35
International Equity	7.25	19.5	0.65	1	0.6	0.55	0.55	0.3	0.6	0.4	0.15	-0.1	0.2	0.2
Emerging Mkt Equity	9.25	28	0.45	0.6	1	0.5	0.65	0.35	0.3	0.25	-0.3	-0.05	-0.15	0
Absolute Return	5.25	9.25	0.5	0.55	0.5	1	0.65	0.1	0.35	0.55	-0.05	-0.05	0.15	0.2
Equity Hedge Funds	5.75	12.75	0.85	0.55	0.65	0.65	1	0.5	0.6	0.5	0	-0.15	0.15	0.35
Venture Capital	12.25	27.75	0.35	0.3	0.35	0.1	0.5	1	0.65	-0.05	0.15	0.2	-0.25	0.05
Private Equity	10.25	23	0.7	0.6	0.3	0.35	0.6	0.65	1	0.2	0.2	-0.05	-0.1	0.25
REITS	6.5	14.5	0.55	0.4	0.2	0.55	0.5	-0.05	0.2	1	0	-0.2	0.3	0.2
Real Estate	5.5	12	0.1	0.15	-0.3	-0.05	0	0.15	0.2	0	1	-0.05	0	0.4
Commodities	5.25	19	-0.25	-0.1	-0.05	-0.05	-0.05	0.2	-0.05	-0.2	-0.05	1	-0.1	-0.2
US Bonds	3.75	7.5	0.3	0.2	-0.15	0.15	0.15	-0.25	-0.1	0.3	0	-0.1	1	0.45
Cash	1.5	0	0.35	0.2	0	0.2	0.35	0.05	0.25	0.2	0.4	-0.2	0.45	1

Source: Morgan Stanley Research

β Calculation: International Equity

Exhibit 2

$$\beta_i = \rho_{i,eq}(\sigma_i/\sigma_{eq})$$

$$= .65(19.5/16.5)$$

$$= .77$$

Source: Morgan Stanley Research

Asset Class Characteristics

Exhibit 3

Asset Class	Expected Return $E(r_i)$	Standard Deviation σ_i	**Beta** β_i	Beta Sigma $\beta_i\sigma_e$
US Equity	7.25	16.50	**1.00**	16.50
International Equity	**7.25**	**19.50**	**0.77**	**12.68**
Emerging Mkt Equity	9.25	28.00	**0.76**	12.60
Absolute Return	5.25	9.25	**0.28**	4.63
Equity Hedge Funds	5.75	12.75	**0.66**	10.84
Venture Capital	12.25	27.75	**0.59**	9.71
Private Equity	10.25	23.00	**0.98**	16.10
REITS	6.50	14.50	**0.48**	7.98
Real Estate	5.50	12.00	**0.07**	1.20
Commodities	5.25	19.00	**-0.29**	-4.75
US Bonds	3.75	7.50	**0.14**	2.25
Cash	1.50	0.00	**0.00**	0.00

Source: Morgan Stanley Research

Model Portfolios

Exhibit 4

Asset Class	A	B	C	D
US Equity	60	60	20	
International Equity			15	
Emerging Mkt Equity			5	
Absolute Return			10	20
Equity Hedge Funds				
Venture Capital			10	20
Private Equity			10	
REITS				
Real Estate			10	20
Commodities				20
US Bonds		40	20	20
Cash	40			
Expected Return	4.95	5.85	7.08	6.40
Exact σ	9.90	11.17	10.83	8.04
Portfolio β	0.60	0.65	0.57	0.16
β-Based σ	9.90	10.80	9.45	2.61
β-Based σ/Exact σ Ratio	100.0%	96.7%	87.2%	32.4%

Source: Morgan Stanley Research

The β-Plus Concept

Exhibit 5

$$\sigma_\alpha\text{-Plus} = \sqrt{\Sigma \omega^2_i \, \sigma^2_{\alpha i}}$$

$$\beta\text{-Plus} = \sqrt{(\beta_p \sigma_{eq})^2 + (\sigma_\alpha\text{-Plus})^2}$$

Source: Morgan Stanley Research

Risk/Return Summary

Exhibit 6

	A	B	C	D
% Cash	40			
% Equity	60	60	20	
% Bonds		40	20	20
% Other			60	80
Total Return	4.95	5.85	7.08	6.40
β	0.60	0.65	0.57	0.16
Exact σ	9.90	11.17	10.83	8.04
β-Based σ	9.90	10.80	9.45	2.61
β-Based σ/Exact σ Ratio	100.0%	96.7%	87.2%	32.4%
σα-Plus	0.00	2.86	4.48	7.13
β-Plus σ	9.90	11.17	10.45	7.59
β-Plus σ/Exact σ Ratio	100.0%	100.0%	96.5%	94.5%

Source: Morgan Stanley Research

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