



# Global Investment Committee

## Asset Allocation Models for Investors

### With \$20 Million or More in Investable Assets (Level 3)

Tactical Changes Effective July 8, 2011

Model Portfolios	Global Bonds and Inflation-Linked Securities		Global Bonds, Global Equities and Alternative/Absolute Return Investments										Global Equities and Alternative/Absolute Return Investments			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
	Strategic	Tactical	Strategic	Tactical	Strategic	Tactical	Strategic	Tactical	Strategic	Tactical	Strategic	Tactical	Strategic	Tactical	Strategic	Tactical
Global Cash	25%	23%	13%	11%	8%	6%	5%	3%	3%	1%	2%	0%	-	-	-	-
<b>Global Bonds</b>																
Investment Grade	65	68	55	46	40	30	30	20	20	10	6	1	-	-	-	-
Short Duration	10	7	7	5	7	5	5	3	2	0	3	0	-	-	-	-
Government/ Government-Related	33	27	30	21	21	11	16	6	12	2	2	0	-	-	-	-
Corporate & Securitized	22	34	18	20	12	14	9	11	6	8	1	1	-	-	-	-
High Yield	-	-	2	4	3	5	4	6	5	7	6	6	-	-	-	-
Emerging Markets	-	-	-	-	2	3	3	4	4	5	4	2	-	-	-	-
<b>Total Bonds</b>	<b>65</b>	<b>68</b>	<b>57</b>	<b>50</b>	<b>45</b>	<b>38</b>	<b>37</b>	<b>30</b>	<b>29</b>	<b>22</b>	<b>16</b>	<b>9</b>	-	-	-	-
Total Cash & Short Duration Bonds	35	30	20	16	15	11	10	6	5	1	5	0	-	-	-	-
<b>Global Equities</b>																
US Large	-	-	6	11	8	12	10	14	14	18	18	24	22	24	18	20
Growth	-	-	3	7	4	7	5	8	7	11	9	14	11	14	9	12
Value	-	-	3	4	4	5	5	6	7	7	9	10	11	10	9	8
US Mid	-	-	-	-	2	2	2	3	2	3	4	5	4	4	4	4
Growth	-	-	-	-	1	1	1	2	1	2	2	3	2	2	2	2
Value	-	-	-	-	1	1	1	1	1	1	2	2	2	2	2	2
Canada	-	-	1	1	1	1	1	1	1	1	2	2	3	3	2	2
Europe	-	-	4	3	6	4	7	4	9	5	12	7	16	8	13	4
Europe ex UK	-	-	3	2	4	2	5	2	6	2	8	3	11	4	9	2
UK	-	-	1	1	2	2	2	2	3	3	4	4	5	4	4	2
Developed Asia	-	-	2	1	3	1	4	1	5	2	7	2	9	3	7	2
Japan	-	-	1	0	2	0	3	0	3	0	5	0	6	0	5	0
Asia Pacific ex Japan	-	-	1	1	1	1	1	1	2	2	2	2	3	3	2	2
US Small	-	-	-	-	2	2	2	3	2	3	2	3	4	4	6	6
Growth	-	-	-	-	1	1	1	2	1	2	1	2	2	2	3	4
Value	-	-	-	-	1	1	1	1	1	1	1	1	2	2	3	2
World ex US Small	-	-	1	2	1	2	2	3	2	3	3	3	4	4	7	7
Emerging Markets	-	-	2	4	3	8	4	9	5	11	6	14	8	16	13	21
<b>Total Equity</b>	-	-	<b>16</b>	<b>22</b>	<b>26</b>	<b>32</b>	<b>32</b>	<b>38</b>	<b>40</b>	<b>46</b>	<b>54</b>	<b>60</b>	<b>70</b>	<b>66</b>	<b>70</b>	<b>66</b>
Total US Equity	-	-	6	11	12	16	14	20	18	24	24	32	30	32	28	30
Total Developed ex US Equity	-	-	8	7	11	8	14	9	17	11	24	14	32	18	29	15
Total Developed Market Equity	-	-	14	18	23	24	28	29	35	35	48	46	62	50	57	45
Total Emerging Market Equity	-	-	2	4	3	8	4	9	5	11	6	14	8	16	13	21
<b>Global Alternative/Absolute Return Investments</b>																
REITs	-	-	2	3	2	3	3	4	2	3	2	3	2	3	2	3
Commodities	-	-	2	5	2	5	2	5	2	5	3	6	5	8	5	8
Inflation-Linked Securities	10	9	3	2	3	2	3	2	3	2	2	1	-	-	-	-
Managed Futures	-	-	2	2	4	4	4	4	4	4	5	5	5	5	5	5
Hedge Funds	-	-	5	5	8	8	11	11	11	11	10	10	10	10	10	10
Private Real Estate	-	-	-	-	-	-	-	-	2	2	2	2	3	3	3	3
Private Equity	-	-	-	-	2	2	3	3	4	4	4	4	5	5	5	5
<b>Total Alternative/ Absolute Return Investments</b>	<b>10</b>	<b>9</b>	<b>14</b>	<b>17</b>	<b>21</b>	<b>24</b>	<b>26</b>	<b>29</b>	<b>28</b>	<b>31</b>	<b>28</b>	<b>31</b>	<b>30</b>	<b>34</b>	<b>30</b>	<b>34</b>



## Index Definitions

**BARCLAYS CAPITAL US AGGREGATE CORPORATE INVESTMENT GRADE INDEX** This index provides a broad-based measure of the market for US investment-grade corporate debt.

**BARCLAYS CAPITAL US AGGREGATE CORPORATE HIGH YIELD INDEX** This index provides a broad-based measure of the market for US high yield fixed income securities.

**STANDARD & POOR'S 500 INDEX** Widely regarded as the best single gauge of the US equities market, this capitalization-weighted index includes a representative sample of 500 leading companies in leading industries of the US economy.

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Bonds are subject to interest rate risk. When interest rates rise, bond prices fall; generally the longer a bond's maturity, the more sensitive it is to this risk. Bonds may also be subject to call risk, which is the risk that the issuer will redeem the debt at its option, fully or partially, before the scheduled maturity date. The market value of debt instruments may fluctuate, and proceeds from sales prior to maturity may be more or less than the amount originally invested or the maturity value due to changes in market conditions or changes in the credit quality of the issuer. Bonds are subject to the credit risk of the issuer. This is the risk that the issuer might be unable to make interest and/or principal payments on a timely basis. Bonds are also subject to reinvestment risk, which is the risk that principal and/or interest payments from a given investment may be reinvested at a lower interest rate.

Bonds rated below investment grade may have speculative characteristics and present significant risks beyond those of other securities, including greater credit risk and price volatility in the secondary market. Investors should be careful to consider these risks alongside their individual circumstances, objectives and risk tolerance before investing in high-yield bonds. High yield bonds should comprise only a limited portion of a balanced portfolio.

Treasury Inflation Protection Securities' (TIPS) coupon payments and underlying principal are automatically increased to compensate for inflation by tracking the consumer price index (CPI). While the real rate of return is guaranteed, TIPS tend to offer a low return. Because the return of TIPS is linked to inflation, TIPS may significantly underperform versus conventional US Treasuries in times of low inflation.

Equity securities may fluctuate in response to news on companies, industries, market conditions and general economic environment.

Investing in smaller companies involves greater risks not associated with investing in more established companies, such as business risk, significant stock price fluctuations and illiquidity.

Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets.

The indices are unmanaged. An investor cannot invest directly in an index. They are shown for illustrative purposes only and do not represent the performance of any specific investment.

REITs investing risks are similar to those associated with direct investments in real estate: property value fluctuations, lack of liquidity, limited diversification and sensitivity to economic factors such as interest rate changes and market recessions.

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## STRATEGIC ASSET ALLOCATION

**Table 1: Strategic Return and Volatility Estimates\***

	ANNUALIZED RETURN ESTIMATE	AVERAGE RETURN ESTIMATE**	ANNUALIZED VOLATILITY ESTIMATE
Cash (USD three-month Libor)	4.2%	4.2%	0.6%
Global Investment-Grade Bonds	5.6%	5.6%	3.1%
US Short-Duration Bonds	4.3%	4.3%	1.7%
US Investment-Grade Bonds	5.6%	5.7%	3.9%
US Municipal Bonds	4.0%	4.1%	4.4%
Non-US Bonds (hedge to USD)	5.5%	5.5%	3.0%
Global High Yield Bonds	7.6%	8.1%	10.4%
US High Yield Bonds	7.6%	8.0%	9.6%
Emerging Market Debt	8.6%	9.5%	14.4%
Global Developed-Market Stocks	9.1%	10.2%	15.5%
US Stocks	9.6%	10.6%	15.2%
US Large-Cap Stocks	9.4%	10.4%	15.0%
US Large-Cap Value	9.4%	10.4%	14.7%
US Large-Cap Growth	9.4%	10.8%	17.5%
US Mid-Cap Stocks	10.0%	11.2%	16.8%
US Mid-Cap Value	10.0%	11.1%	16.0%
US Mid-Cap Growth	10.0%	12.0%	21.5%
US Small-Cap Stocks	10.2%	11.9%	19.5%
US Small-Cap Value	10.2%	11.5%	17.0%
US Small-Cap Growth	10.2%	12.6%	23.4%
Developed World ex US Stocks	8.5%	9.9%	17.4%
Canada Stocks	9.1%	10.8%	19.7%
Europe Stocks	8.7%	10.0%	17.1%
Developed Asia ex Japan Stocks	9.6%	11.5%	21.0%
Japan Stocks	7.4%	9.8%	23.3%
Global Emerging Markets Stocks	11.6%	14.1%	24.5%

\*Based on the Strategic Asset Allocation model, which is a long-term, risk-adjusted, and diversified portfolio of assets. The model is based on the assumption that the portfolio will be held for a long period of time (e.g., 10 years or more) and that the portfolio will be rebalanced annually. The model is based on the assumption that the portfolio will be held for a long period of time (e.g., 10 years or more) and that the portfolio will be rebalanced annually.

\*\*The average return estimate is based on the historical average return of the asset class over the period 1970-2010. The average return estimate is based on the historical average return of the asset class over the period 1970-2010.

The volatility estimate is based on the historical volatility of the asset class over the period 1970-2010. The volatility estimate is based on the historical volatility of the asset class over the period 1970-2010.

Investor Suitability: The Strategic Asset Allocation model is designed for long-term investors with a moderate risk tolerance. The model is designed for long-term investors with a moderate risk tolerance. The model is designed for long-term investors with a moderate risk tolerance.

**Table 1: Strategic Return and Volatility Estimates\* (continued)**

	ANNUALIZED RETURN ESTIMATE	AVERAGE RETURN ESTIMATE**	ANNUALIZED VOLATILITY ESTIMATE
Global REITs	8.0%	9.6%	19.0%
Commodities	7.9%	8.6%	12.5%
Global Inflation-Linked Securities	5.3%	5.4%	5.0%
US Inflation-Linked Securities	5.1%	5.2%	5.2%
Broad Fund of Hedge Funds	9.0%	9.7%	12.7%
Relative-Value Arbitrage	8.1%	8.5%	9.3%
Event Driven	9.3%	9.7%	8.8%
Equity Long-Short	11.2%	11.7%	10.7%
Global Macro	9.6%	10.0%	9.2%
Managed Futures	8.4%	9.4%	15.0%
US Private Equity	12.6%	14.8%	22.6%
Global Private Real Estate	8.0%	8.5%	10.8%

\*Source: Argus Associates, Inc. Strategic Investment Services, Inc. (ASIS) 2019.

\*\*Annualized return is average return of a multi-asset portfolio of the above assets, based on historical data from 1970 to 2018. Annual portfolio standard deviation is 14.1% through December 31, 2018.

†Returns are shown as the historical average return of the asset class. Past performance does not guarantee a similar outcome. Actual performance may vary significantly from the historical average.

††The target return is a long-term estimate of the return of the asset class, based on historical data and assumptions. Actual performance may vary significantly from the target return.

**Investor Suitability:** These estimates are based on historical data and assumptions. Actual performance may vary significantly from the estimates. These estimates are not intended to be a basis for investment decisions. Investors should consult with their investment advisor for more information.

## STRATEGIC ASSET ALLOCATION

**Table 2: Correlation Matrix**

	1	2	3	4	5	6	7	8	9	10
1 Cash (US dollar 3-month Libor)	1.00	0.12	0.31	0.07	0.01	0.12	-0.11	-0.13	-0.03	-0.06
2 Global Investment-Grade Bonds	0.12	1.00	0.78	0.95	0.69	0.86	0.22	0.18	0.32	0.13
3 US Short-Duration Bonds	0.31	0.78	1.00	0.80	0.48	0.59	-0.08	-0.10	0.08	-0.12
4 US Investment-Grade Bonds	0.07	0.95	0.80	1.00	0.72	0.67	0.26	0.24	0.34	0.15
5 US Municipal Bonds	0.01	0.69	0.48	0.72	1.00	0.48	0.31	0.33	0.29	0.17
6 Non-US Bonds (hedge to USD)	0.12	0.86	0.59	0.67	0.48	1.00	0.10	0.06	0.23	0.08
7 Global High Yield Bonds	-0.11	0.22	-0.08	0.26	0.31	0.10	1.00	0.92	0.82	0.64
8 US High Yield Bonds	-0.13	0.18	-0.10	0.24	0.33	0.06	0.92	1.00	0.52	0.59
9 Emerging Market Debt (in USD)	-0.03	0.32	0.08	0.34	0.29	0.23	0.82	0.52	1.00	0.55
10 Global Developed-Market Stocks	-0.06	0.13	-0.12	0.15	0.17	0.08	0.64	0.59	0.55	1.00
11 US All-Cap Stocks	0.03	0.15	-0.08	0.17	0.19	0.10	0.66	0.61	0.56	0.89
12 US Large-Cap Stocks	0.04	0.17	-0.06	0.19	0.19	0.11	0.63	0.58	0.55	0.88
13 US Large-Cap Value	0.02	0.19	-0.05	0.20	0.21	0.14	0.62	0.57	0.54	0.82
14 US Large-Cap Growth	0.04	0.11	-0.08	0.14	0.15	0.06	0.60	0.55	0.50	0.85
15 US Mid-Cap Stocks	-0.03	0.13	-0.13	0.16	0.21	0.07	0.69	0.65	0.56	0.86
16 US Mid-Cap Value	-0.05	0.18	-0.10	0.20	0.25	0.12	0.67	0.64	0.52	0.79
17 US Mid-Cap Growth	0.00	0.05	-0.15	0.09	0.14	0.01	0.61	0.58	0.50	0.82
18 US Small-Cap Stocks	-0.04	0.04	-0.18	0.07	0.12	0.03	0.66	0.62	0.52	0.78
19 US Small-Cap Value	-0.06	0.09	-0.15	0.11	0.16	0.07	0.65	0.63	0.49	0.73
20 US Small-Cap Growth	-0.03	0.01	-0.20	0.03	0.08	0.01	0.62	0.58	0.49	0.77
21 Developed Market ex-US All-Cap Stocks	-0.09	0.12	-0.11	0.14	0.15	0.08	0.58	0.53	0.51	0.96
22 Canada All-Cap Stocks	-0.08	0.08	-0.14	0.13	0.18	0.00	0.67	0.59	0.58	0.80
23 Europe All-Cap Stocks	-0.03	0.12	-0.12	0.14	0.16	0.07	0.60	0.58	0.47	0.91
24 Developed Asia ex-Japan All-Cap Stocks	-0.11	0.15	-0.10	0.16	0.23	0.09	0.67	0.58	0.62	0.78
25 Japan All-Cap Stocks	-0.12	0.06	-0.05	0.09	0.03	0.02	0.31	0.27	0.32	0.69
26 Global Emerging Markets Stocks	-0.14	0.00	-0.20	0.02	0.07	-0.03	0.70	0.59	0.65	0.75
27 Global REITs	-0.12	0.22	-0.04	0.22	0.28	0.17	0.63	0.58	0.57	0.78
28 Commodities	-0.05	-0.06	-0.14	0.00	-0.03	-0.17	0.32	0.29	0.25	0.33
29 Global Inflation-Linked Securities	0.00	0.64	0.44	0.69	0.51	0.47	0.32	0.31	0.36	0.19
30 US Inflation-Linked Securities	-0.03	0.61	0.47	0.68	0.50	0.41	0.28	0.25	0.34	0.11
31 US Convertible Bonds All Qualities	-0.04	0.14	-0.11	0.18	0.23	0.05	0.75	0.72	0.57	0.81
32 US Convertible Bonds Investment Grade	0.01	0.27	0.02	0.31	0.31	0.17	0.70	0.66	0.57	0.80
33 Euro Convertible Bonds All Qualities	0.05	0.17	-0.16	0.15	0.23	0.11	0.62	0.55	0.51	0.68
34 Broad Fund of Hedge Funds	0.08	0.12	-0.06	0.14	0.21	0.05	0.57	0.47	0.56	0.57
35 Relative-Value Arbitrage	0.05	0.08	-0.14	0.11	0.21	0.00	0.69	0.67	0.51	0.54
36 Event Driven	0.01	0.12	-0.13	0.13	0.21	0.05	0.78	0.72	0.61	0.76
37 Equity Long-Short	0.11	0.11	-0.08	0.12	0.15	0.04	0.59	0.52	0.53	0.76
38 Global Macro	0.05	0.34	0.22	0.29	0.27	0.35	0.35	0.25	0.42	0.35
39 Managed Futures	0.04	0.20	0.23	0.18	0.14	0.14	-0.11	-0.12	-0.02	-0.09
40 US Private Equity	0.10	-0.14	-0.24	-0.17	-0.08	-0.11	0.41	0.36	0.42	0.66
41 Global Private Real Estate	0.18	-0.06	-0.12	-0.07	-0.02	-0.03	0.21	0.23	0.15	0.31

Source: JPMorgan Chase & Co. Global Asset Allocation Committee. Data as of 12/31/2019.

Note: All correlations are based on monthly returns from 1990 to 2019.

Correlation does not imply causation. Correlation is a statistical measure of the degree to which two variables move together. It does not indicate the direction or strength of the relationship between the variables.

**Table 2: Correlation Matrix (continued)**

		11	12	13	14	15	16	17	18	19	20
1	Cash (US dollar 3-month Libor)	0.03	0.04	0.02	0.04	-0.03	-0.05	0.00	-0.04	-0.06	-0.03
2	Global Investment-Grade Bonds	0.15	0.17	0.19	0.11	0.13	0.18	0.05	0.04	0.09	0.01
3	US Short-Duration Bonds	-0.08	-0.06	-0.05	-0.08	-0.13	-0.10	-0.15	-0.18	-0.15	-0.20
4	US Investment-Grade Bonds	0.17	0.19	0.20	0.14	0.16	0.20	0.09	0.07	0.11	0.03
5	US Municipal Bonds	0.19	0.19	0.21	0.15	0.21	0.25	0.14	0.12	0.16	0.08
6	Non-US Bonds (hedge to USD)	0.10	0.11	0.14	0.06	0.07	0.12	0.01	0.03	0.07	0.01
7	Global High Yield Bonds	0.66	0.63	0.62	0.60	0.69	0.67	0.61	0.66	0.65	0.62
8	US High Yield Bonds	0.61	0.58	0.57	0.55	0.65	0.64	0.58	0.62	0.63	0.58
9	Emerging Market Debt (in USD)	0.56	0.55	0.54	0.50	0.56	0.52	0.50	0.52	0.49	0.49
10	Global Developed-Market Stocks	0.89	0.88	0.82	0.85	0.86	0.79	0.82	0.78	0.73	0.77
11	US All-Cap Stocks	1.00	0.99	0.93	0.96	0.96	0.89	0.90	0.85	0.81	0.83
12	US Large-Cap Stocks	0.99	1.00	0.93	0.95	0.92	0.87	0.85	0.79	0.76	0.77
13	US Large-Cap Value	0.93	0.93	1.00	0.78	0.89	0.95	0.71	0.74	0.81	0.65
14	US Large-Cap Growth	0.96	0.95	0.78	1.00	0.89	0.74	0.93	0.79	0.67	0.82
15	US Mid-Cap Stocks	0.96	0.92	0.89	0.89	1.00	0.93	0.93	0.92	0.89	0.89
16	US Mid-Cap Value	0.89	0.87	0.95	0.74	0.93	1.00	0.73	0.81	0.90	0.71
17	US Mid-Cap Growth	0.90	0.85	0.71	0.93	0.93	0.73	1.00	0.90	0.75	0.94
18	US Small-Cap Stocks	0.85	0.79	0.74	0.79	0.92	0.81	0.90	1.00	0.94	0.97
19	US Small-Cap Value	0.81	0.76	0.81	0.67	0.89	0.90	0.75	0.94	1.00	0.83
20	US Small-Cap Growth	0.83	0.77	0.65	0.82	0.89	0.71	0.94	0.97	0.83	1.00
21	Developed Market ex-US All-Cap Stocks	0.74	0.73	0.70	0.69	0.73	0.68	0.68	0.65	0.62	0.63
22	Canada All-Cap Stocks	0.77	0.75	0.70	0.73	0.80	0.71	0.77	0.73	0.67	0.73
23	Europe All-Cap Stocks	0.79	0.78	0.75	0.73	0.78	0.73	0.72	0.70	0.68	0.67
24	Developed Asia ex-Japan All-Cap Stocks	0.70	0.69	0.66	0.65	0.72	0.66	0.66	0.65	0.62	0.63
25	Japan All-Cap Stocks	0.40	0.39	0.34	0.40	0.39	0.33	0.40	0.36	0.29	0.38
26	Global Emerging Markets Stocks	0.69	0.67	0.62	0.65	0.71	0.64	0.68	0.68	0.62	0.67
27	Global REITs	0.66	0.64	0.69	0.55	0.70	0.73	0.56	0.63	0.69	0.56
28	Commodities	0.25	0.24	0.26	0.22	0.29	0.28	0.26	0.22	0.20	0.22
29	Global Inflation-Linked Securities	0.18	0.18	0.18	0.15	0.20	0.22	0.15	0.12	0.14	0.10
30	US Inflation-Linked Securities	0.10	0.10	0.13	0.07	0.12	0.16	0.06	0.03	0.07	0.01
31	US Convertible Bonds All Qualities	0.86	0.82	0.72	0.85	0.90	0.75	0.92	0.86	0.75	0.88
32	US Convertible Bonds Investment Grade	0.87	0.85	0.80	0.83	0.87	0.80	0.83	0.79	0.75	0.77
33	Euro Convertible Bonds All Qualities	0.65	0.64	0.54	0.66	0.64	0.53	0.65	0.58	0.49	0.59
34	Broad Fund of Hedge Funds	0.54	0.51	0.42	0.54	0.58	0.44	0.62	0.58	0.46	0.60
35	Relative-Value Arbitrage	0.52	0.49	0.50	0.46	0.56	0.54	0.50	0.55	0.54	0.52
36	Event Driven	0.79	0.75	0.72	0.73	0.83	0.74	0.80	0.83	0.77	0.81
37	Equity Long-Short	0.78	0.74	0.63	0.78	0.81	0.64	0.86	0.82	0.68	0.85
38	Global Macro	0.33	0.31	0.28	0.31	0.35	0.27	0.35	0.36	0.30	0.36
39	Managed Futures	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.12	-0.12	-0.12
40	US Private Equity	0.70	0.71	0.63	0.69	0.66	0.56	0.68	0.62	0.50	0.65
41	Global Private Real Estate	0.31	0.31	0.40	0.21	0.31	0.38	0.19	0.30	0.37	0.22

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## STRATEGIC ASSET ALLOCATION

**Table 2: Correlation Matrix (continued)**

	21	22	23	24	25	26	27	28	29	30
1 Cash (US dollar 3-month Libor)	-0.09	-0.08	-0.03	-0.11	-0.12	-0.14	-0.12	-0.05	0.00	-0.03
2 Global Investment-Grade Bonds	0.12	0.08	0.12	0.15	0.06	0.00	0.22	-0.06	0.64	0.61
3 US Short-Duration Bonds	-0.11	-0.14	-0.12	-0.10	-0.05	-0.20	-0.04	-0.14	0.44	0.47
4 US Investment-Grade Bonds	0.14	0.13	0.14	0.16	0.09	0.02	0.22	0.00	0.69	0.68
5 US Municipal Bonds	0.15	0.18	0.16	0.23	0.03	0.07	0.28	-0.03	0.51	0.50
6 Non-US Bonds (hedge to USD)	0.08	0.00	0.07	0.09	0.02	-0.03	0.17	-0.17	0.47	0.41
7 Global High Yield Bonds	0.58	0.67	0.60	0.67	0.31	0.70	0.63	0.32	0.32	0.28
8 US High Yield Bonds	0.53	0.59	0.58	0.58	0.27	0.59	0.58	0.29	0.31	0.25
9 Emerging Market Debt (in USD)	0.51	0.58	0.47	0.62	0.32	0.65	0.57	0.25	0.36	0.34
10 Global Developed-Market Stocks	0.96	0.80	0.91	0.78	0.69	0.75	0.78	0.33	0.19	0.11
11 US All-Cap Stocks	0.74	0.77	0.79	0.70	0.40	0.69	0.66	0.25	0.18	0.10
12 US Large-Cap Stocks	0.73	0.75	0.78	0.69	0.39	0.67	0.64	0.24	0.18	0.10
13 US Large-Cap Value	0.70	0.70	0.75	0.66	0.34	0.62	0.69	0.26	0.18	0.13
14 US Large-Cap Growth	0.69	0.73	0.73	0.65	0.40	0.65	0.55	0.22	0.15	0.07
15 US Mid-Cap Stocks	0.73	0.80	0.78	0.72	0.39	0.71	0.70	0.29	0.20	0.12
16 US Mid-Cap Value	0.68	0.71	0.73	0.66	0.33	0.64	0.73	0.28	0.22	0.16
17 US Mid-Cap Growth	0.68	0.77	0.72	0.66	0.40	0.68	0.56	0.26	0.15	0.06
18 US Small-Cap Stocks	0.65	0.73	0.70	0.65	0.36	0.68	0.63	0.22	0.12	0.03
19 US Small-Cap Value	0.62	0.67	0.68	0.62	0.29	0.62	0.69	0.20	0.14	0.07
20 US Small-Cap Growth	0.63	0.73	0.67	0.63	0.38	0.67	0.56	0.22	0.10	0.01
21 Developed Market ex-US All-Cap Stocks	1.00	0.74	0.91	0.75	0.79	0.72	0.78	0.36	0.19	0.11
22 Canada All-Cap Stocks	0.74	1.00	0.73	0.77	0.44	0.74	0.68	0.52	0.24	0.20
23 Europe All-Cap Stocks	0.91	0.73	1.00	0.74	0.52	0.71	0.73	0.32	0.18	0.09
24 Developed Asia ex-Japan All-Cap Stocks	0.75	0.77	0.74	1.00	0.47	0.84	0.82	0.41	0.20	0.17
25 Japan All-Cap Stocks	0.79	0.44	0.52	0.47	1.00	0.47	0.55	0.27	0.14	0.10
26 Global Emerging Markets Stocks	0.72	0.74	0.71	0.84	0.47	1.00	0.69	0.39	0.13	0.10
27 Global REITs	0.78	0.68	0.73	0.82	0.55	0.69	1.00	0.35	0.29	0.24
28 Commodities	0.36	0.52	0.32	0.41	0.27	0.39	0.35	1.00	0.21	0.28
29 Global Inflation-Linked Securities	0.19	0.24	0.18	0.20	0.14	0.13	0.29	0.21	1.00	0.91
30 US Inflation-Linked Securities	0.11	0.20	0.09	0.17	0.10	0.10	0.24	0.28	0.91	1.00
31 US Convertible Bonds All Qualities	0.69	0.80	0.74	0.69	0.40	0.72	0.60	0.32	0.25	0.18
32 US Convertible Bonds Investment Grade	0.68	0.75	0.71	0.67	0.39	0.66	0.64	0.29	0.31	0.25
33 Euro Convertible Bonds All Qualities	0.66	0.64	0.70	0.55	0.35	0.59	0.46	0.20	0.20	0.09
34 Broad Fund of Hedge Funds	0.52	0.68	0.55	0.61	0.32	0.66	0.45	0.37	0.22	0.15
35 Relative-Value Arbitrage	0.50	0.60	0.52	0.53	0.29	0.54	0.51	0.45	0.20	0.21
36 Event Driven	0.66	0.76	0.71	0.69	0.38	0.72	0.60	0.34	0.18	0.12
37 Equity Long-Short	0.65	0.76	0.68	0.67	0.42	0.68	0.53	0.36	0.16	0.08
38 Global Macro	0.34	0.42	0.33	0.43	0.21	0.42	0.33	0.22	0.21	0.16
39 Managed Futures	-0.07	0.00	-0.10	-0.02	-0.03	-0.03	-0.05	0.10	0.14	0.14
40 US Private Equity	0.58	0.62	0.50	0.63	0.33	0.46	0.45	0.18	0.02	-0.19
41 Global Private Real Estate	0.29	0.34	0.22	0.31	0.12	0.15	0.40	0.32	0.03	0.00

Source: Bloomberg Barclays Indices, 1990-2014. Data as of 12/31/2014. All correlations are based on monthly returns.



**Table 2: Correlation Matrix (continued)**

		31	32	33	34	35	36	37	38	39	40	41
1	Cash (US dollar 3-month Libor)	-0.04	0.01	0.05	0.08	0.05	0.01	0.11	0.05	0.04	0.10	0.18
2	Global Investment-Grade Bonds	0.14	0.27	0.17	0.12	0.08	0.12	0.11	0.34	0.20	-0.14	-0.06
3	US Short-Duration Bonds	-0.11	0.02	-0.16	-0.06	-0.14	-0.13	-0.08	0.22	0.23	-0.24	-0.12
4	US Investment-Grade Bonds	0.18	0.31	0.15	0.14	0.11	0.13	0.12	0.29	0.18	-0.17	-0.07
5	US Municipal Bonds	0.23	0.31	0.23	0.21	0.21	0.21	0.15	0.27	0.14	-0.08	-0.02
6	Non-US Bonds (hedge to USD)	0.05	0.17	0.11	0.05	0.00	0.05	0.04	0.35	0.14	-0.11	-0.03
7	Global High Yield Bonds	0.75	0.70	0.62	0.57	0.69	0.78	0.59	0.35	-0.11	0.41	0.21
8	US High Yield Bonds	0.72	0.66	0.55	0.47	0.67	0.72	0.52	0.25	-0.12	0.36	0.23
9	Emerging Market Debt (in USD)	0.57	0.57	0.51	0.56	0.51	0.61	0.53	0.42	-0.02	0.42	0.15
10	Global Developed-Market Stocks	0.81	0.80	0.68	0.57	0.54	0.76	0.76	0.35	-0.09	0.66	0.31
11	US All-Cap Stocks	0.86	0.87	0.65	0.54	0.52	0.79	0.78	0.33	-0.10	0.70	0.31
12	US Large-Cap Stocks	0.82	0.85	0.64	0.51	0.49	0.75	0.74	0.31	-0.10	0.71	0.31
13	US Large-Cap Value	0.72	0.80	0.54	0.42	0.50	0.72	0.63	0.28	-0.10	0.63	0.40
14	US Large-Cap Growth	0.85	0.83	0.66	0.54	0.46	0.73	0.78	0.31	-0.10	0.69	0.21
15	US Mid-Cap Stocks	0.90	0.87	0.64	0.58	0.56	0.83	0.81	0.35	-0.10	0.66	0.31
16	US Mid-Cap Value	0.75	0.80	0.53	0.44	0.54	0.74	0.64	0.27	-0.10	0.56	0.38
17	US Mid-Cap Growth	0.92	0.83	0.65	0.62	0.50	0.80	0.86	0.35	-0.10	0.68	0.19
18	US Small-Cap Stocks	0.86	0.79	0.58	0.58	0.55	0.83	0.82	0.36	-0.12	0.62	0.30
19	US Small-Cap Value	0.75	0.75	0.49	0.46	0.54	0.77	0.68	0.30	-0.12	0.50	0.37
20	US Small-Cap Growth	0.88	0.77	0.59	0.60	0.52	0.81	0.85	0.36	-0.12	0.65	0.22
21	Developed Market ex-US All-Cap Stocks	0.69	0.68	0.66	0.52	0.50	0.66	0.65	0.34	-0.07	0.58	0.29
22	Canada All-Cap Stocks	0.80	0.75	0.64	0.68	0.60	0.76	0.76	0.42	0.00	0.63	0.31
23	Europe All-Cap Stocks	0.74	0.71	0.70	0.55	0.52	0.71	0.68	0.33	-0.10	0.62	0.34
24	Developed Asia ex-Japan All-Cap Stocks	0.69	0.67	0.55	0.61	0.53	0.69	0.67	0.43	-0.02	0.50	0.22
25	Japan All-Cap Stocks	0.40	0.39	0.35	0.32	0.29	0.38	0.42	0.21	-0.03	0.33	0.12
26	Global Emerging Markets Stocks	0.72	0.66	0.59	0.66	0.54	0.72	0.68	0.42	-0.03	0.46	0.15
27	Global REITs	0.60	0.64	0.46	0.45	0.51	0.60	0.53	0.33	-0.05	0.45	0.40
28	Commodities	0.32	0.29	0.20	0.37	0.45	0.34	0.36	0.22	0.10	0.18	0.32
29	Global Inflation-Linked Securities	0.25	0.31	0.20	0.22	0.20	0.18	0.16	0.21	0.14	0.02	0.03
30	US Inflation-Linked Securities	0.18	0.25	0.09	0.15	0.21	0.12	0.08	0.16	0.14	-0.19	0.00
31	US Convertible Bonds All Qualities	1.00	0.90	0.72	0.69	0.67	0.86	0.86	0.40	-0.09	0.64	0.24
32	US Convertible Bonds Investment Grade	0.90	1.00	0.66	0.58	0.63	0.80	0.77	0.37	-0.09	0.59	0.27
33	Euro Convertible Bonds All Qualities	0.72	0.66	1.00	0.71	0.62	0.67	0.68	0.40	0.00	0.56	0.19
34	Broad Fund of Hedge Funds	0.69	0.58	0.71	1.00	0.58	0.73	0.79	0.67	0.29	0.52	0.25
35	Relative-Value Arbitrage	0.67	0.63	0.62	0.58	1.00	0.72	0.62	0.26	-0.15	0.37	0.32
36	Event Driven	0.86	0.80	0.67	0.73	0.72	1.00	0.83	0.47	-0.05	0.58	0.35
37	Equity Long-Short	0.86	0.77	0.68	0.79	0.62	0.83	1.00	0.53	0.03	0.61	0.26
38	Global Macro	0.40	0.37	0.40	0.67	0.26	0.47	0.53	1.00	0.45	0.22	0.04
39	Managed Futures	-0.09	-0.09	0.00	0.29	-0.15	-0.05	0.03	0.45	1.00	-0.14	-0.07
40	US Private Equity	0.64	0.59	0.56	0.52	0.37	0.58	0.61	0.22	-0.14	1.00	0.30
41	Global Private Real Estate	0.24	0.27	0.19	0.25	0.32	0.35	0.26	0.04	-0.07	0.30	1.00

Source: Morgan Stanley Global Asset Management, as of 12/31/2013.  
 Data is presented based on trailing 12-month correlation.

## Alternative Investments, Strategies Descriptions

The Relative Value Arbitrage & Event Driven category includes strategies that typically display lower correlations to equities than Equity Long/Short and lower volatility than Equity Long/Short, Global Macro and Managed Futures. The strategies included in the grouping are Equity Market Neutral, Statistical Arbitrage, Fixed Income Arbitrage, Convertible Arbitrage, Merger Arbitrage, Relative Value Arbitrage and Distressed Securities and may generally be described as follows:

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- Convertible Arbitrage involves purchasing a portfolio of convertible securities, generally convertible bonds, and hedging a portion of the equity risk by selling short the underlying common stock.
- Merger Arbitrage, sometimes called Risk Arbitrage, involves investment in event-driven situations such as leveraged buy-outs, mergers and hostile takeovers.
- Relative Value Arbitrage attempts to take advantage of relative pricing discrepancies between instruments including equities, debt, options and futures. Managers may use mathematical, fundamental or technical analysis to determine misvaluations.
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Asset allocation does not assure a profit or protect against loss in declining financial markets.

Investing in commodities entails significant risks. Commodity prices may be affected by a variety of factors at any time, including but not limited to, (i) changes in supply and demand relationships, (ii) governmental programs and policies, (iii) national and international political and economic events, war and terrorist events, (iv) changes in interest and exchange rates, (v) trading activities in commodities and related contracts, (vi) pestilence, technological change and weather and (vii) the price volatility of a commodity. In addition, the commodities markets are subject to temporary distortions or other disruptions due to various factors, including lack of liquidity, participation of speculators and government intervention.

The initial interest rate on an inflation-linked security may be lower than that of a fixed-rate security of the same maturity because investors expect to receive additional income due to future increases in CPI. However, there can be no assurance that these increases in CPI will occur. Some inflation-linked securities may be subject to call risk.

Security prices will fluctuate. The value of your investment may fall over time.

Equity securities' prices may fluctuate in response to specific situations for each company, industry, market conditions and general economic environment.

Common stocks do not assure dividend payments. Dividends are paid only when declared by an issuer's board of directors, and the amount of any dividend may vary over time.

Growth investing does not guarantee a profit or eliminate risk. The stocks of these companies can have relatively high valuations. Because of these high valuations, an investment in a growth stock can be more risky than an investment in a company with more modest growth expectations.

Value investing involves the risk that the market may not recognize that securities are undervalued and they may not appreciate as anticipated.

Interest on municipal bonds is generally exempt from federal income tax; however, some bonds may be subject to the alternative minimum tax (AMT). Typically, state tax-exemption applies if securities are issued within one's state of residence and, if applicable, local tax-exemption applies if securities are issued within one's city of residence.

Treasury Inflation Protection Securities' (TIPS) coupon payments and principal are increased to compensate for inflation by tracking the consumer price index (CPI). While the real rate of return is guaranteed, TIPS tend to offer a low return. There is no guarantee that investors will receive par if TIPS are sold prior to maturity. Because the return of TIPS is linked to inflation, TIPS may significantly underperform versus conventional US Treasuries in times of low inflation.

REITs' investing risks are similar to those associated with direct investments in real estate: lack of liquidity; limited diversification; and sensitivity to economic factors such as interest rate changes and economic recessions. Bonds are subject to interest rate risk. When interest rates rise, bond prices fall; generally, the longer a bond's maturity, the more sensitive it tends to be to this risk. Bonds may also be subject to call risk, which is the risk that the issuer will redeem the debt at its option, fully or partially, before the scheduled maturity date. The market value of debt instruments may fluctuate, and proceeds from sales prior to maturity may be more or less than the amount originally invested or the maturity value due to changes in market conditions or changes in the credit quality of the issuer.

Because of their narrow focus, sector investments tend to be more volatile than investments that diversify across many sectors and companies.

Private funds are highly illiquid and are only suitable for long-term investors willing to forgo liquidity and put capital at risk for an indefinite period of time. Private funds often engage in leverage and other investment practices that may increase the risk of investment loss. Private funds may involve complex tax structures and there may be delays in distributing important tax information. Private funds typically have significantly higher fees and expenses than other investment vehicles. Private funds are not subject to the same regulatory requirements as mutual funds and are not required to provide periodic pricing or valuation information to investors.

Managed futures involve a high degree of risk, often involve leveraging and other speculative investment practices that may increase the risk of investment loss, can be highly illiquid, are not required to provide periodic pricing or valuation information to investors, may involve complex tax structures and delays in distributing important tax information, are not subject to the same regulatory requirements as mutual funds, often charge high fees which may offset any trading profits, and in many cases the underlying investments are not transparent and are known only to the investment manager.

The commodities markets may fluctuate widely based on a variety of factors including, but not limited to, changes in supply and demand relationships; governmental programs and policies; national and international political and economic events, war and terrorist events; changes in interest and exchange rates; trading activities in commodities and related contracts; pestilence, technological change and weather; and the price volatility of a commodity.

As further described in the offering documents, an investment in alternative investments can be highly illiquid, is speculative and not suitable for all investors. Investing in alternative investments is only intended for experienced and sophisticated investors who are willing to bear the high economic risks associated with such an investment. Investors should carefully review and consider potential risks before investing. Certain of these risks may include:

- loss of all or a substantial portion of the investment due to leveraging, short-selling or other speculative practices;
- lack of liquidity in that there may be no secondary market for the fund and none is expected to develop;
- volatility of returns;
- restrictions on transferring interests in the Fund;
- potential lack of diversification and resulting higher risk due to concentration of trading authority when a single advisor is utilized;
- absence of information regarding valuations and pricing;
- complex tax structures and delays in tax reporting;
- less regulation and higher fees than mutual funds; and
- advisor risk.

Futures contracts are leveraged and involve inherent risks. Futures transactions are not appropriate for every investor and clients should refrain from investing in futures unless they fully understand the terms and risks, including the extent of the potential risk of loss.

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