

Global Index and Markets Group

**Analysis of IRRC-CSAG
Terror/Proliferation Screen
Benchmark Risk and Investment Implications**

Table of Contents

Introduction	1
Executive Summary	1
The Screened Securities	
All risk	2
Compound risk	2
Portfolio Analysis/Investment Consideration	2
Country Level Misweights	
All risk	3
Compound risk	4
Sector Level Misweights	
All risk	5
Compound risk	6
Tracking error and Turnover	
All risk	6
Compound risk	7
Transaction Costs	8
Performance Impact	8
Summary and Conclusion	9
Appendix	
Complete data for <i>all risk</i>	10
Complete data for <i>compound risk</i>	13

BGI Investment Analysis of the IRRC-CSAG “Global Security Risk Monitor” Terror/Proliferation Screen

Introduction

In conjunction with the Conflict Securities Advisory Group (CSAG), the Investor Responsibility Research Center (IRRC) has created a tool to help evaluate securities on the basis of global security risk. Specifically, the Global Security Risk Monitor (GSRM) identifies companies with links to any of the six countries identified by the US State Department as state sponsors of terrorism and/or proliferation-related concerns. The six countries are Iran, Iraq, Libya, North Korea, Sudan and Syria.

The purpose of this analysis is to provide our clients with an understanding of the investment implications of screening out these securities from a benchmark-tracking portfolio. BGI views this screen as being similar to any other currently-used (such as “ex-Tobacco”) or former (such as “ex-South Africa”) screen in that the decision involves investment considerations in addition to social and/or political motivations. As investment managers, our primary consideration and area of expertise lies in the investment impact.

Executive Summary

In order to properly evaluate the investment impact of any screened portfolio, one must first understand and evaluate the characteristics of the screen itself. A good screen should be non-subjective, cheap to implement and not systematically impact a portfolio’s performance.

1. Subjectivity

- There appears to be a fair amount of subjectivity in the choices for securities deemed as having “risk”. For example, a company like Volvo appears on the list through its 2001 acquisition of Renault’s truck division, which had delivered 2,400 trucks to Iraq in 1998 and 1999 under the food-for-oil program. Iraq, in turn, converted some of those trucks into mobile biological laboratories.
- The subjectivity is further extended to the categorization of securities as having either “risk” or “compound risk”. A screened strategy can be based on either all securities in the “risk” category (75 securities in the MSCI indices) or the subset of securities in the “compound risk” category (39 securities in the MSCI indices) according to IRRC/CSAG. A “compound risk” security is one in which it has exposure to at least 2 sectors or 2 countries on the list. (This analysis can also be applied to FTSE, S&P and other global indexes.).
- While there is inherent subjectivity in deciding which risk screen to use; “risk” or “compound risk”, it is not clear that “compound risk” securities would pose any greater threat than the securities with just single risk exposure. A security may have minimal revenue exposure to 2 countries yet be deemed as having “compound risk”, whereas a security with large revenue streams from just one country may in reality have more total risk exposure but be deemed as a single risk security.

2. Costs

- The turnover (as high as 19.26% one-way for MSCI EAFE) and associated transaction costs from divesting and re-investing are not insignificant. Depending on the benchmark and application of the screen, the total costs can amount to 14 basis points to the entire strategy.
- Provider cost is likely to be higher as the application of the screen or a custom strategy is more complicated. In addition, custom solution strategies are likely to incur higher transaction costs from the higher turnover required to manage the strategy.

3. Investment implications

- The investment implications are relatively significant. The tracking error of a screened strategy relative to the MSCI EAFE index is 1.85% (or 1.03% if using the “compound risk” definition). For an MSCI ACWI ex-US strategy, the tracking error impact is 1.65% (or 0.93%). Furthermore, the major source of the predicted tracking error comes from the resultant underweight to the energy sector. Shocks to oil prices may actually cause experienced tracking error to be far greater than what would be predicted by an optimizer. In addition, many of the securities on the list are quite large which introduces a size bias to a screened strategy.
- Custom solutions are possible. For example, an optimized strategy in which the remaining securities are optimized to reduce overall tracking error to a plan benchmark can cut the predicted tracking error by about 30%. The tracking error for an optimized strategy tracking MSCI EAFE is 1.28% (or 0.74% if using the “compound risk” definition).
- Although the IRRC/CSAG literature points out the performance impact of being invested in companies exposed to these risks, the reality may, at times, be quite different. In the event of a war with Iraq, oil prices are likely to rise substantially which may favorably impact companies screened out of the portfolio such as Royal Dutch, Total Fina Elf etc. For example, on a relative basis Royal Dutch’s stock outperformed the S&P 500 and MSCI EAFE from June through September of 1990 as oil prices shot up from \$15 to \$40. (Iraq invaded Kuwait on August 2, 1990).

The Screened Securities

IRRC/CSAG identifies a company as having “risk” if it has operations in any one of five sectors (energy, finance, manufacturing, metals/mining or telecommunications) in any of the six aforementioned countries. However, a company is further labeled as having “compound risk” should it be exposed to at least 2 of the sectors or 2 of the countries. In other words, the “compound risk” securities are a subset of the greater list of securities identified as having risk exposure. In the following analysis, we have taken a look at both the impact of screening out all securities (which we call all risk) or just those with compound risk.

□ All risk

75 of the securities identified by IRRC/CSAG as having some level of risk exposure are members of the MSCI indices. Though that may seem to be a small number of securities, their total market capitalization amounts to 19.26% of MSCI EAFE, 8.19% of MSCI World and 18.15% of MSCI ACWI ex-US.

□ Compound risk

Of the 75 “risk” securities, 39 have “compound risk” associated with them. The securities amount to 8.84% of MSCI EAFE, 4.61% MSCI World and 9.01% of MSCI ACWI ex-US.

Portfolio Analysis/Investment Considerations

There are a number of approaches to applying the “terror/proliferation screen” to an investment strategy. The first potential solution would be to simply eliminate the securities and capitalization-weight the remaining securities, hereafter referred to as the “*screened* strategy”. A second solution is to create an optimized portfolio of the remaining securities that most closely resembles the complete unscreened benchmark. Please note that in the following analysis, this second, optimized portfolio is referred to as the “*optimized* strategy,” as we believe that most investors would want to minimize the overall tracking-risk to their standard benchmark. An investor could, of course, choose to switch policy benchmarks, to a custom-calculated benchmark, which incorporates their preferred screening methodology.

Country Level Misweights

□ All risk

An application of the “all risk” screen would create significant changes in country weights, particularly in the international (non-US) benchmarks. As shown in the table below, the largest underweights for a “terror-screened” portfolio relative to a plan benchmark are in Germany (Siemens, DaimlerChrysler and Deutsche Bank are among the larger screened out securities) France (Total Fina and BNP) and The Netherlands (Royal Dutch and ING). An “all risk terror-screened” EAFE strategy would be underweight by 2.15% in Germany, 1.66% in The Netherlands and 1.17% in France relative to the unscreened EAFE index. Only one US security, Halliburton, made the list. Therefore, the US weight within an MSCI World strategy would increase dramatically, by 5.00%, as the weights of the other markets are reduced. The following are the country weights most affected by a screened strategy. *The full list of country misweights can be found in the appendix of this paper.*

Country misweights for screened strategy relative to plan benchmark

Country	World	World ex-US	EAFE	ACWI ex-US
Germany	(1.11)	(2.07)	(2.15)	(1.93)
Netherlands	(0.88)	(1.60)	(1.66)	(1.49)
France	(0.88)	(1.16)	(1.17)	(1.12)
Finland	(0.47)	(1.01)	(1.06)	(0.93)
South Korea	-	-	-	(0.52)
UK	(1.43)	(0.31)	(0.16)	(0.47)
Italy	(0.34)	(0.42)	(0.42)	(0.40)
Belgium	(0.12)	(0.20)	(0.21)	(0.19)
Switzerland	0.27	1.70	1.85	1.50
Japan	0.01	2.74	3.04	2.36
USA	5.00	-	-	-

In the aforementioned “optimized strategy,” designed to minimize tracking error, most of the country misweights are substantially reduced, in many cases to an immaterial level. For example, the misweights for Germany and The Netherlands in an optimized EAFE strategy can be cut to just 0.85% and 0.72% relative to the unscreened EAFE index. The underweight to France is eliminated entirely. Similarly, the overweight to US equities (within a World strategy) can be reduced to a minimal level.

Country misweights for optimized strategy relative to plan benchmark

Country	World	World ex-US	EAFE	ACWI ex-US
Germany	(0.29)	(0.78)	(0.85)	(0.82)
Netherlands	(0.32)	(0.73)	(0.72)	(0.54)
France	(0.03)	(0.01)	0.03	(0.03)
Finland	0.17	0.41	0.47	0.27
South Korea	-	-	-	(0.31)
UK	0.01	0.26	0.31	(0.14)

Italy	(0.16)	(0.47)	(0.49)	(0.37)
Belgium	(0.08)	(0.10)	(0.15)	(0.07)
Switzerland	0.07	0.40	0.44	0.44
Japan	(0.15)	(0.32)	(0.40)	(0.00)
USA	0.26	-	-	-

□ Compound risk

An application of the “compound risk” screen would also create significant changes in country weights. As with the “all risk” screen the largest underweights occur in The Netherlands, France and Germany. Since DaimlerChrysler does not have compound risk, its exclusion from this screen results in a lesser underweight to Germany than in a strategy with an “all risk” screen. A “compound risk terror/proliferation-screened” EAFE strategy would be underweight by 2.08% in The Netherlands, 1.77% in France and 1.45% in Germany relative to the unscreened EAFE index with much of the overweight falling to the UK and Japan. The following are the country weights most affected by a screened strategy. *The full list of country misweights can be found in the appendix of this paper.*

Country misweights for screened strategy relative to plan benchmark

Country	World	World ex-US	EAFE	ACWI ex-US
Netherlands	(0.94)	(1.99)	(2.08)	(1.83)
France	(0.91)	(1.71)	(1.77)	(1.57)
Germany	(0.72)	(1.40)	(1.45)	(1.29)
Italy	(0.30)	(0.53)	(0.55)	(0.49)
South Korea	-	-	-	(0.46)
Belgium	(0.14)	(0.28)	(0.29)	(0.26)
Spain	(0.17)	(0.24)	(0.25)	(0.22)
Switzerland	0.11	0.72	0.79	0.66
Japan	0.08	1.38	1.55	1.26
UK	0.45	2.58	2.83	2.36
USA	2.34	-	-	-

Most of the country misweights can be reduced to very low levels in an optimized strategy. For example, the misweights for The Netherlands and France in an optimized EAFE strategy can be cut to just 0.82% and 0.45% relative to the unscreened EAFE index while the misweight to Germany can be eliminated.

Country misweights for optimized strategy relative to plan benchmark

Country	World	World ex-US	EAFE	ACWI ex-US
Netherlands	(0.37)	(0.80)	(0.82)	(0.77)
France	(0.21)	(0.43)	(0.45)	(0.38)
Germany	0.01	(0.04)	(0.02)	(0.15)
Italy	(0.10)	(0.34)	(0.32)	(0.27)
South Korea	-	-	-	(0.20)

Belgium	0.07	0.11	0.08	0.11
Spain	(0.04)	(0.10)	(0.12)	(0.06)
Switzerland	0.07	0.27	0.28	0.24
Japan	(0.01)	0.03	0.11	0.06
UK	0.08	0.29	0.39	0.15
USA	0.12	-	-	-

Sector Level Misweights

□ All risk

Not surprisingly, the majority of the underweights occur in the energy sector with companies like Royal Dutch, Total Fina Elf, Shell T&T, Lukoil and Halliburton among the names that would be screened out. However, a fair number of banks are also on the list, such as Deutsche Bank, Banco Santander and HSBC among the larger ones. The following are the sector weights most affected by a screened strategy. *The full list of sector misweights can be found in the appendix of this paper.*

Sector misweights for screened strategy relative to plan benchmark

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(2.04)	(4.68)	(4.52)	(4.35)
Technology Hardware & Equipment	(0.20)	(1.18)	(1.26)	(1.47)
Banks	(1.09)	(1.70)	(1.96)	(1.44)
Telecommunication Services	(0.47)	(0.88)	(0.92)	(0.68)
Capital Goods	(0.09)	(0.72)	(0.76)	(0.67)
Insurance	0.40	1.03	1.00	0.94
Food Beverage & Tobacco	0.51	1.35	1.46	1.29
Pharmaceuticals & Biotechnology	0.92	2.11	2.28	1.90

Many of the remaining energy securities are overweighted in the optimized strategy as a way to minimize the underweight in the sector at large. The energy underweight is reduced by over half of the original underweight in the screened strategy. For example, the 4.52% underweight to Energy in a screened EAFE strategy can be reduced to 2.13% in an optimized EAFE strategy relative to the unscreened EAFE index. The following is the same list as above with their respective misweights in the optimized strategy.

Sector misweights for optimized strategy relative to plan benchmark

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(0.50)	(1.76)	(2.13)	(1.38)
Technology Hardware & Equipment	(0.49)	(1.24)	(1.31)	(1.03)
Banks	(0.54)	(0.96)	(1.06)	(0.97)
Telecommunication Services	0.09	0.49	0.50	0.46
Capital Goods	0.13	0.07	(0.02)	(0.04)
Insurance	0.54	1.40	1.48	1.12

Food Beverage & Tobacco	(0.10)	(0.42)	(0.45)	(0.49)
Pharmaceuticals & Biotechnology	0.24	0.82	0.93	0.83

□ Compound risk

The energy sector again dominates the sector misweights in the narrower “compound risk” screened strategy. The biggest difference occurs from the exclusion of Shell T&T from the screened list.

Sector misweights for screened strategy relative to plan benchmark

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(1.57)	(3.49)	(3.61)	(3.28)
Diversified Financials	(0.23)	(0.82)	(0.88)	(0.73)
Banks	(0.53)	(0.79)	(0.88)	(0.62)
Capital Goods	(0.16)	(0.59)	(0.62)	(0.55)
Technology Hardware & Equipment	0.17	0.12	0.12	(0.36)
Food Beverage & Tobacco	0.24	0.59	0.65	0.59
Telecommunication Services	0.22	0.68	0.73	0.72
Pharmaceuticals & Biotechnology	0.44	0.93	1.01	0.87

In the optimized strategy, the energy underweight can be reduced by over half of the underweight in the screened strategy. For example, the 3.61% underweight to Energy in a screened EAFE strategy can be reduced to 1.64% in an optimized EAFE strategy relative to the unscreened EAFE index.

Sector misweights for optimized strategy relative to plan benchmark

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(0.49)	(1.35)	(1.64)	(1.08)
Diversified Financials	(0.16)	(0.47)	(0.52)	(0.50)
Banks	(0.01)	(0.04)	(0.04)	(0.11)
Capital Goods	(0.12)	(0.23)	(0.17)	(0.26)
Technology Hardware & Equipment	(0.06)	(0.23)	(0.20)	(0.24)
Food Beverage & Tobacco	(0.03)	(0.09)	(0.10)	(0.02)
Telecommunication Services	0.05	0.18	0.18	0.04
Pharmaceuticals & Biotechnology	0.15	0.33	0.35	0.23

Tracking Error and Turnover

□ All risk

As detailed in the table, below, depending on the policy benchmark, the overall tracking error impact ranges from 0.90% (vs. MSCI World) annualized standard deviation to 1.85% (vs. MSCI EAFE) annualized standard deviation. By optimizing the strategy to account for the screened securities, the tracking error can be cut by about 30% to 0.52% vs. MSCI World and to 1.28% vs. MSCI EAFE. However, that would incur additional turnover above and beyond the turnover required to sell out of the “terror-screened” securities. For example, an EAFE strategy would have

to incur 19.26% of transactions¹ from selling the securities and then an additional 14.62% to reach the optimal portfolio. A preferred solution might be to incur just 5% of additional turnover as that portfolio's tracking error of 1.36% compares favorably to the optimal solution of 1.28%.

Screened Strategy

	World	World ex-US	EAFE	ACWI ex-US
Predicted Tracking Error*	0.90	1.75	1.85	1.65
Turnover	8.19	18.76	19.26	18.15

Optimized Strategy

	World	World ex-US	EAFE	ACWI ex-US
Predicted Tracking Error*	0.52	1.21	1.28	1.11
Turnover**	8.63	14.79	14.62	15.29

Predicted Tracking Error for lesser turnover amounts*

Turnover Amount	World	World ex-US	EAFE	ACWI ex-US
10%	-	1.22	1.29	1.12
7%	-	1.25	1.31	1.14
5%	0.53	1.29	1.36	1.18
3%	0.59	1.37	1.43	1.26
2%	0.77	1.55	1.63	1.50

* Annualized standard deviation.

** Additional t/o to the selling of the screened names.
Source: Barra, BGI.

□ Compound risk

The tracking error and turnover implications are, roughly, cut in half if the screen was limited to those securities with “compound risk”. The overall tracking error impact ranges from 0.54% vs. MSCI World annualized standard deviation to 1.03% vs. MSCI EAFE annualized standard deviation. An optimized strategy can reduce that tracking error to 0.30% vs. MSCI World)and 0.74% vs. MSCI EAFE. In terms of turnover, an EAFE strategy would incur 9.60% of transactions from selling the securities and an additional 8.84% to reach the optimal portfolio. Again, a preferred solution might be to incur just 5% of additional turnover as that portfolio's tracking error of 0.76% is very similar to the optimal portfolio's tracking error of 0.74%.

¹ All turnover figures are one-way.

Screened Strategy

	World	World ex-US	EAFE	ACWI ex-US
Predicted Tracking Error*	0.54	0.98	1.03	0.93
Turnover	4.06	9.24	9.60	9.21

Optimized Strategy

	World	World ex-US	EAFE	ACWI ex-US
Predicted Tracking Error*	0.30	0.70	0.74	0.65
Turnover**	4.61	8.71	8.84	9.01

Predicted Tracking Error for lesser turnover amounts*

Turnover Amount	World	World ex-US	EAFE	ACWI ex-US
5%	-	0.71	0.76	0.67
3%	0.31	0.76	0.80	0.71
2%	0.33	0.79	0.84	0.74

* Annualized standard deviation.

** Additional t/o to the selling of the screened names.
Source: Barra, BGI.

Transaction Costs

For an “all risk” screened strategy, our transaction cost analysis for a \$1 billion EAFE strategy shows that the 19.26% one-way turnover (of selling out of the screened securities and re-investing in the remaining securities) would result in about 35 basis points of total transaction costs on the trade. At the total strategy level, these transaction costs amount to nearly 14 basis points (38.52% total turnover * 35 bps). The 35 basis points breaks down to about 10 basis points of commissions, 20 basis points in bid/ask spreads and market impact and 5 basis points from taxes. For a \$4 billion EAFE strategy, the estimated transaction costs on the trade would be 57 basis points (or 22 basis points to the strategy), as the market impact would increase by about 22 basis points.

For a \$1 billion EAFE “compound risk” screened strategy, the 9.60% of one-way turnover would result in about 30 basis points in total transaction costs. The sells would cost about 26 basis points while the purchases would cost about 34 basis points. For the entire strategy, these costs amount to 6 basis points. For the \$4 billion EAFE strategy, the estimated transaction costs on the trade would be 46 basis points (or 9 basis points to the strategy).

As expected, the costs of divesting from the emerging markets securities are higher. For example, for a \$300 million emerging markets strategy the sells and buys would cost about 57 basis points each for an “all risk” screen, of which the bid/ask spread and market impact makes up the majority (47 basis points). For an MSCI EMF strategy, we estimate the total costs would be 11 basis points to the total strategy. For a “compound risk” screen, the total transaction costs would be much higher at 93 basis points (sells would be 123 basis points while the buys would be about 51 basis points). However, since the overall turnover is much lower, the MSCI EMF strategy would only incur 6 basis points in costs at strategy level.

Performance Impact

While the IRRC/CSAG literature points out the performance impact of being invested in companies exposed to these risks, the reality may, at times, be the quite different. For example, in the event of a

war with Iraq, oil prices are likely to rise substantially which may well impact favorably companies such as Royal Dutch, Total Fina Elf in the energy sector. As an example, oil prices shot up \$25/barrel to \$40/barrel leading up to and just after Iraq's invasion of Kuwait in 1990 before falling back down to the \$20/barrel range. While the S&P 500 and MSCI EAFE fell 13.7% and 2.2% during those three months (June through September), Royal Dutch's stock actually appreciated 4.6%.

Another consideration is that the predicted tracking error may actually underestimate the future risks because it is heavily based on the misweight to one sector, energy. An event such as war could cause spikes in oil prices. Such spikes are generally not captured by optimizers in which past data and price movements are used as the basis for predicting future tracking error. Similarly, an additional source for mistracking comes from the size biases introduced through the screening of a number of relatively large securities. This is a main reason behind our construction of the optimized strategy in which incidental sector and size bets (from screening out the securities) are minimized.

Summary and Conclusions

Before investing in a “terror/proliferation-screened” strategy, investors should carefully assess the pros and cons of implementing such a policy screen. There is no “free lunch” available and portfolio performance can be significantly impacted.

The tracking error implications of an “all risk terror-screened” strategy is likely higher than many plan sponsors may feel comfortable with. Meanwhile, a quick review of the tracking error implications of applying the “compound risk” screen could lead to other conclusions. Not only is the tracking error at comparatively low levels versus a plan benchmark, but the transaction costs of divesting from those 39 securities are also quite reasonable.

However, the overall investment rationale supporting some of the screening decisions is questionable. For example, Volvo appears on the monitor as a security having “risk” partly through its association with Renault. In 1998 and 1999, Renault delivered some 2,400 trucks to Iraq under the oil-for-food program (Volvo bought Renault's truck division in January 2001). According to reports, Iraq transformed some of the refrigerated trucks into mobile biological weapons laboratories.

In addition, it is not clear why “compound risk” securities pose any greater threat than the securities with just single risk exposure. For example, a security with minimal revenue exposure to 2 countries will be deemed as having “compound risk”, whereas a security with large revenue streams from just one country may, in reality, have more total risk exposure but be deemed as a single risk security. A detailed analysis of the assumptions and implementations that underlie the GSRM tool would therefore be recommended for a plan sponsor contemplating such a shift.

Meanwhile, the predicted tracking error figures may underestimate the true risks of not investing in the screened out names. The software used to predict tracking error generally uses past data and security relationships which may not capture future shocks such as a spike in oil prices, should there be a war.

Although an optimized strategy can mitigate much of that exposure, it would be a more costly way to manage a benchmarked strategy. The optimized strategy would likely incur higher investment management fees, relatively high initial transition costs and higher on-going turnover and associated transaction costs. The optimized strategy, also, doesn't fully eliminate sector or country misweights. Another alternative may be to apply tighter constraints to the sector and country level misweights, which may provide a more effective way to eliminate risk exposure.

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Appendix:

Complete data for *All* risk screens

Country level misweights

Screened strategy vs MSCI index

Country	World	World ex-US	EAFE	ACWI ex-US
USA	5.00	-	-	-
UK	(1.43)	(0.31)	(0.16)	(0.47)
Japan	0.01	2.74	3.04	2.36
France	(0.88)	(1.16)	(1.17)	(1.12)
Switzerland	0.27	1.70	1.85	1.50
Germany	(1.11)	(2.07)	(2.15)	(1.93)
Netherlands	(0.88)	(1.60)	(1.66)	(1.49)
Canada	(0.02)	0.59	-	0.50
Australia	0.02	0.58	0.64	0.50
Italy	(0.34)	(0.42)	(0.42)	(0.40)
Spain	(0.12)	0.07	0.09	0.04
South Korea	-	-	-	(0.52)
Sweden	(0.04)	0.10	0.12	0.08
Finland	(0.47)	(1.01)	(1.06)	(0.93)
Hong Kong	0.06	0.35	0.38	0.30
Taiwan	-	-	-	0.26
South Africa	-	-	-	0.22
Belgium	(0.12)	(0.20)	(0.21)	(0.19)
Singapore	0.03	0.18	0.19	0.16
Ireland	0.03	0.18	0.20	0.16
Mexico	-	-	-	0.15
Denmark	0.03	0.16	0.17	0.14
China	-	-	-	0.13
Brasil	-	-	-	0.11
Malaysia	-	-	-	0.11
Norway	(0.04)	(0.03)	(0.03)	(0.03)
Russia	-	-	-	(0.09)
India	-	-	-	0.06
Greece	0.01	0.07	0.08	0.06
Israel	-	-	-	0.07
Portugal	0.01	0.07	0.07	0.06
Thailand	-	-	-	0.03
Chile	-	-	-	0.03
New Zealand	0.01	0.03	0.03	0.03
Austria	(0.01)	(0.01)	(0.01)	(0.01)
Indonesia	-	-	-	0.02
Poland	-	-	-	0.02
Hungary	-	-	-	0.02
Turkey	-	-	-	0.02
Philippines	-	-	-	0.01
Czech Republic	-	-	-	0.01
Peru	-	-	-	0.01
Argentina	-	-	-	0.01
Egypt	-	-	-	0.00
Morocco	-	-	-	0.00
Pakistan	-	-	-	0.00
Jordan	-	-	-	0.00
Venezuela	-	-	-	0.00
Colombia	-	-	-	0.00

Complete data for *All* risk screens

Country level misweights

Optimized strategy vs MSCI index

Country	World	World ex-US	EAFE	ACWI ex-US
USA	0.26	-	-	-
UK	0.01	0.26	0.31	(0.14)
Japan	(0.15)	(0.32)	(0.40)	(0.00)
France	(0.03)	(0.01)	0.03	(0.03)
Switzerland	0.07	0.40	0.44	0.44
Germany	(0.29)	(0.78)	(0.85)	(0.82)
Netherlands	(0.32)	(0.73)	(0.72)	(0.54)
Canada	(0.14)	0.30	-	(0.03)
Australia	(0.13)	(0.37)	(0.36)	(0.37)
Italy	(0.16)	(0.47)	(0.49)	(0.37)
Spain	(0.08)	(0.32)	(0.36)	(0.24)
South Korea	-	-	-	(0.31)
Sweden	0.15	0.40	0.41	0.39
Finland	0.17	0.41	0.47	0.27
Hong Kong	0.07	0.21	0.29	0.11
Taiwan	-	-	-	(0.01)
South Africa	-	-	-	(0.05)
Belgium	(0.08)	(0.10)	(0.15)	(0.07)
Singapore	(0.02)	(0.02)	(0.01)	(0.06)
Ireland	0.00	0.03	0.03	0.06
Mexico	-	-	-	0.11
Denmark	0.12	0.29	0.38	0.26
China	-	-	-	0.18
Brasil	-	-	-	0.02
Malaysia	-	-	-	(0.03)
Norway	0.14	0.39	0.51	0.27
Russia	-	-	-	(0.03)
India	-	-	-	(0.23)
Greece	0.04	0.15	0.16	0.10
Israel	-	-	-	0.12
Portugal	(0.03)	(0.13)	(0.13)	(0.07)
Thailand	-	-	-	0.08
Chile	-	-	-	0.07
New Zealand	0.09	0.23	0.24	0.22
Austria	0.07	0.07	0.08	0.09
Indonesia	-	-	-	(0.06)
Poland	-	-	-	0.02
Hungary	-	-	-	0.04
Turkey	-	-	-	0.00
Philippines	-	-	-	0.06
Czech Republic	-	-	-	0.07
Peru	-	-	-	(0.01)
Argentina	-	-	-	0.06
Egypt	-	-	-	0.15
Morocco	-	-	-	0.07
Pakistan	-	-	-	0.02
Jordan	-	-	-	0.22
Venezuela	-	-	-	(0.01)
Colombia	-	-	-	(0.01)

Complete data for *All* risk screens

Sector level misweights

Screened strategy vs MSCI index

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(2.04)	(4.68)	(4.52)	(4.35)
Technology Hardware & Equipment	(0.20)	(1.18)	(1.26)	(1.47)
Banks	(1.09)	(1.70)	(1.96)	(1.44)
Telecommunication Services	(0.47)	(0.88)	(0.92)	(0.68)
Capital Goods	(0.09)	(0.72)	(0.76)	(0.67)
Diversified Financials	0.02	(0.56)	(0.63)	(0.49)
Automobiles & Components	(0.21)	(0.23)	(0.24)	(0.20)
Health Care Equipment & Services	0.22	0.17	0.18	0.15
Software & Services	0.29	0.22	0.23	0.23
Materials	(0.13)	0.16	0.04	0.23
Household & Personal Products	0.17	0.25	0.27	0.23
Hotels Restaurants & Leisure	0.10	0.25	0.25	0.24
Commercial Services & Supplies	0.16	0.28	0.31	0.25
Real Estate	0.08	0.34	0.36	0.31
Food & Drug Retailing	0.15	0.47	0.48	0.42
Retailing	0.36	0.46	0.49	0.44
Transportation	0.15	0.56	0.55	0.51
Media	0.29	0.59	0.59	0.54
Consumer Durables & Apparel	0.18	0.80	0.87	0.73
Utilities	0.25	0.92	0.94	0.86
Insurance	0.40	1.03	1.00	0.94
Food Beverage & Tobacco	0.51	1.35	1.46	1.29
Pharmaceuticals & Biotechnology	0.92	2.11	2.28	1.90

Optimized strategy vs MSCI index

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(0.50)	(1.76)	(2.13)	(1.38)
Technology Hardware & Equipment	(0.49)	(1.24)	(1.31)	(1.03)
Banks	(0.54)	(0.96)	(1.06)	(0.97)
Telecommunication Services	0.09	0.49	0.50	0.46
Capital Goods	0.13	0.07	(0.02)	(0.04)
Diversified Financials	0.09	(0.27)	(0.27)	(0.34)
Automobiles & Components	(0.30)	(0.58)	(0.58)	(0.60)
Health Care Equipment & Services	(0.25)	(0.32)	(0.33)	(0.22)
Software & Services	0.19	0.58	0.62	0.42
Materials	0.27	0.62	0.66	0.81
Household & Personal Products	0.19	0.33	0.33	0.27
Hotels Restaurants & Leisure	(0.06)	(0.09)	(0.07)	(0.01)
Commercial Services & Supplies	(0.09)	(0.01)	(0.02)	(0.01)
Real Estate	(0.19)	(0.33)	(0.32)	(0.29)
Food & Drug Retailing	0.10	0.16	0.19	0.23
Retailing	0.12	0.18	0.15	0.35
Transportation	(0.06)	(0.15)	(0.12)	(0.19)
Media	0.10	0.28	0.39	0.18
Consumer Durables & Apparel	0.07	0.37	0.40	0.38
Utilities	0.20	0.74	0.85	0.56
Insurance	0.54	1.40	1.48	1.12
Food Beverage & Tobacco	(0.10)	(0.42)	(0.45)	(0.49)
Pharmaceuticals & Biotechnology	0.24	0.82	0.93	0.83

Complete data for *Compound* risk screens

Country level misweights

Screened strategy vs MSCI index

Country	World	World ex-US	EAFE	ACWI ex-US
USA	2.34	-	-	-
UK	0.45	2.58	2.83	2.36
Japan	0.08	1.38	1.55	1.26
France	(0.91)	(1.71)	(1.77)	(1.57)
Switzerland	0.11	0.72	0.79	0.66
Germany	(0.72)	(1.40)	(1.45)	(1.29)
Netherlands	(0.94)	(1.99)	(2.08)	(1.83)
Canada	0.04	0.38	-	0.34
Australia	0.08	0.42	0.46	0.39
Italy	(0.30)	(0.53)	(0.55)	(0.49)
Spain	(0.17)	(0.24)	(0.25)	(0.22)
South Korea	-	-	-	(0.46)
Sweden	(0.03)	0.01	0.02	0.01
Finland	0.03	0.17	0.18	0.15
Hong Kong	0.03	0.15	0.17	0.14
Taiwan	-	-	-	0.12
South Africa	-	-	-	0.10
Belgium	(0.14)	(0.28)	(0.29)	(0.26)
Singapore	0.02	0.09	0.10	0.08
Ireland	0.01	0.08	0.09	0.07
Mexico	-	-	-	0.07
Denmark	0.01	0.07	0.08	0.07
China	-	-	-	0.06
Brazil	-	-	-	0.05
Malaysia	-	-	-	0.05
Norway	0.01	0.04	0.04	0.04
Russia	-	-	-	(0.12)
India	-	-	-	0.03
Greece	0.01	0.04	0.04	0.03
Israel	-	-	-	0.03
Portugal	0.01	0.03	0.03	0.03
Thailand	-	-	-	0.01
Chile	-	-	-	0.01
New Zealand	0.00	0.01	0.02	0.01
Austria	(0.01)	(0.01)	(0.01)	(0.01)
Indonesia	-	-	-	0.01
Poland	-	-	-	0.01
Hungary	-	-	-	0.01
Turkey	-	-	-	0.01
Philippines	-	-	-	0.01
Czech Republic	-	-	-	0.00
Peru	-	-	-	0.00
Argentina	-	-	-	0.00
Egypt	-	-	-	0.00
Morocco	-	-	-	0.00
Pakistan	-	-	-	0.00
Jordan	-	-	-	0.00
Venezuela	-	-	-	0.00
Colombia	-	-	-	0.00

Complete data for *Compound* risk screens

Country level misweights

Optimized strategy vs MSCI index

Country	World	World ex-US	EAFE	ACWI ex-US
USA	0.12	-	-	-
UK	0.08	0.29	0.39	0.15
Japan	(0.01)	0.03	0.11	0.06
France	(0.21)	(0.43)	(0.45)	(0.38)
Switzerland	0.07	0.27	0.28	0.24
Germany	0.01	(0.04)	(0.02)	(0.15)
Netherlands	(0.37)	(0.80)	(0.82)	(0.77)
Canada	(0.04)	0.14	-	(0.07)
Australia	(0.06)	(0.19)	(0.15)	(0.26)
Italy	(0.10)	(0.34)	(0.32)	(0.27)
Spain	(0.04)	(0.10)	(0.12)	(0.06)
South Korea	-	-	-	(0.20)
Sweden	0.10	0.23	0.27	0.26
Finland	0.06	0.12	0.18	0.12
Hong Kong	0.03	0.07	0.12	0.03
Taiwan	-	-	-	0.01
South Africa	-	-	-	0.02
Belgium	0.07	0.11	0.08	0.11
Singapore	(0.06)	(0.10)	(0.12)	(0.14)
Ireland	(0.02)	(0.04)	(0.04)	0.02
Mexico	-	-	-	0.00
Denmark	0.03	0.19	0.21	0.18
China	-	-	-	0.05
Brazil	-	-	-	(0.02)
Malaysia	-	-	-	(0.04)
Norway	0.14	0.37	0.44	0.27
Russia	-	-	-	(0.05)
India	-	-	-	(0.08)
Greece	0.02	0.08	0.07	0.04
Israel	-	-	-	0.10
Portugal	(0.01)	(0.04)	(0.06)	0.01
Thailand	-	-	-	0.05
Chile	-	-	-	0.03
New Zealand	0.00	0.01	0.03	0.08
Austria	0.03	0.04	0.03	0.04
Indonesia	-	-	-	0.07
Poland	-	-	-	(0.03)
Hungary	-	-	-	0.01
Turkey	-	-	-	(0.02)
Philippines	-	-	-	(0.01)
Czech Republic	-	-	-	(0.01)
Peru	-	-	-	0.00
Argentina	-	-	-	0.04
Egypt	-	-	-	0.03
Morocco	-	-	-	0.20
Pakistan	-	-	-	0.01
Jordan	-	-	-	0.09
Venezuela	-	-	-	0.02
Colombia	-	-	-	0.01

Complete data for *Compound* risk screens

Sector level misweights

Screened strategy vs MSCI index

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(1.57)	(3.49)	(3.61)	(3.28)
Diversified Financials	(0.23)	(0.82)	(0.88)	(0.73)
Banks	(0.53)	(0.79)	(0.88)	(0.62)
Capital Goods	(0.16)	(0.59)	(0.62)	(0.55)
Technology Hardware & Equipment	0.17	0.12	0.12	(0.36)
Health Care Equipment & Services	0.10	0.08	0.08	0.07
Software & Services	0.14	0.10	0.10	0.10
Household & Personal Products	0.08	0.11	0.12	0.11
Hotels Restaurants & Leisure	0.05	0.11	0.11	0.11
Commercial Services & Supplies	0.07	0.12	0.14	0.12
Real Estate	0.04	0.15	0.16	0.14
Food & Drug Retailing	0.07	0.21	0.21	0.19
Retailing	0.17	0.20	0.22	0.20
Transportation	0.07	0.25	0.24	0.24
Media	0.14	0.26	0.26	0.25
Materials	(0.02)	0.18	0.14	0.29
Automobiles & Components	0.06	0.30	0.32	0.29
Consumer Durables & Apparel	0.08	0.35	0.39	0.34
Insurance	0.19	0.45	0.44	0.43
Utilities	0.16	0.51	0.53	0.50
Food Beverage & Tobacco	0.24	0.59	0.65	0.59
Telecommunication Services	0.22	0.68	0.73	0.72
Pharmaceuticals & Biotechnology	0.44	0.93	1.01	0.87

Optimized strategy vs MSCI index

Industry Group	World	World ex-US	EAFE	ACWI ex-US
Energy	(0.49)	(1.35)	(1.64)	(1.08)
Diversified Financials	(0.16)	(0.47)	(0.52)	(0.50)
Banks	(0.01)	(0.04)	(0.04)	(0.11)
Capital Goods	(0.12)	(0.23)	(0.17)	(0.26)
Technology Hardware & Equipment	(0.06)	(0.23)	(0.20)	(0.24)
Health Care Equipment & Services	(0.11)	(0.12)	(0.12)	(0.09)
Software & Services	0.13	0.19	0.26	0.18
Household & Personal Products	0.09	0.17	0.18	0.16
Hotels Restaurants & Leisure	(0.05)	(0.06)	(0.07)	(0.09)
Commercial Services & Supplies	(0.09)	(0.03)	(0.07)	(0.00)
Real Estate	(0.05)	(0.08)	(0.11)	(0.08)
Food & Drug Retailing	(0.00)	0.02	0.06	0.06
Retailing	(0.03)	0.00	0.04	0.10
Transportation	(0.09)	(0.22)	(0.25)	(0.17)
Media	0.10	0.16	0.17	0.11
Materials	0.18	0.50	0.60	0.51
Automobiles & Components	(0.02)	0.10	0.11	0.04
Consumer Durables & Apparel	0.06	0.21	0.25	0.17
Insurance	0.13	0.33	0.38	0.36
Utilities	0.25	0.62	0.76	0.50
Food Beverage & Tobacco	(0.03)	(0.09)	(0.10)	(0.02)
Telecommunication Services	0.05	0.18	0.18	0.04
Pharmaceuticals & Biotechnology	0.15	0.33	0.35	0.23

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- Names and benchmark weights of companies in “risk” and “compound risk” categories fall under this provision, as well as being BGI-proprietary research