



October 2016

Daniel Li, PhD  
Senior Research Analyst  
+1.908.608.1558  
Markov Processes International  
(MPI)

## Standard Life GARS Fund: MPI's Factor X-ray

*Using advanced machine learning techniques to understand a complex investment strategy*

### Introduction

The £27bn Standard Life Global Absolute Return Strategy Fund (GARS) has long been considered as one of the largest and most successful absolute return, UCITS, mutual funds in the market. Since its inception in 2008, it has had a superb track record in terms of performance production and risk control. However, it [attracted investors' attention recently](#) as its performance turned lackluster since its peak in April 2015. Why has it underperformed? Have any poor decisions been made? As investors search for answers, they usually conclude that GARS is not an easy fund to comprehend.

GARS is not a traditional mutual fund by any means. According to its [latest update](#) on August 2016, the fund deploys between 20 and 35 different strategies across various asset classes, invests globally and often uses advanced derivatives techniques. Specifically, the fund follows strategies that are more similar to those of a global macro hedge fund than a traditional, balanced mutual fund. These features pose significant challenges for using traditional quantitative fund analysis methodologies to generate an illuminating analysis of the fund.

The objective of this case study is to present tools and techniques that can be used to provide insights into the fund's investment strategy. We will demonstrate, in the sections below, how advanced dynamic return-based modelling techniques can help investors understand the fund's long-term investment strategy as well as identify the fund's short term performance drivers and style/factor exposures.

Note that MPI does not claim to have a detailed knowledge of the fund's actual strategy, positions or holdings beyond publicly available information; nor are we commenting on the quality or merits of GARS' strategy. Instead, we use it as a case study to demonstrate how sophisticated factor analysis

techniques can be used to better understand fund performance, and improve the overall selection and due diligence process when analyzing investment funds for client portfolios.

### Model Selection: Factor Analysis using MPI's DSA Model

Given its massive portfolio with thousands of holdings across various asset classes and in different geographic regions, analyzing and netting the fund's positions would be extremely time-consuming and difficult to implement. On the other hand, factor analysis of the fund's returns is a faster way to infer important exposures using readily-available historical return data. But which factor model is appropriate?

In common with typical global macro hedge funds, GARS can generate positive investment returns by implementing dynamic and opportunistic trading strategies to take advantage of shifts in macroeconomic trends. For this very reason, traditional returns-based approaches that use rolling static regressions to model dynamically changing exposures fail to provide meaningful results. In this study, we use MPI's proprietary and patented [Dynamic Style Analysis \(DSA\)](#) technique to capture GARS' time-varying factor exposures. DSA, being a truly dynamic regression model, is a powerful resource. It has a track record of accurately identifying [short-term hedging trades](#); [spikes in leverage caused by use of derivatives](#), and rapid strategy changes that could be caused, for example, by changes in management team.

### Factor Selection: Mapping fund strategies with factors

Besides selecting the right estimation model, factor selection poses another challenge in analyzing a

complex portfolio such as GARS'. Building a comprehensive and accurate library of factors is critical not only for GARS but also for analyzing similar global absolute return funds.

According to GARS' monthly report, its investment strategies can be categorized into market returns strategies, market directional strategies and relative value strategies. Market returns strategies are long only. These strategies can be proxied with generic market indices. For example, we use the FTSE 250 index and Barclays Sterling Aggregate Bond index to represent long UK equity and long UK bond strategies respectively. Market directional strategies entail taking direct long or short (or both) positions in broad markets such as bonds, interest rates, currencies, equity indices and volatility of equity indices. As an example, we use US Dollar Index (DXY) to represent the fund's market directional strategy being long US dollars against all other major currencies. The fund also employs relative value strategies in bonds, interest rates, equity sectors and equity index volatilities. These arbitrage strategies simultaneously buy and sell related financial instruments with the aim of profiting from their price differentials. To proxy these strategies, we use other factors. For example, we use the Fama-French size factor (SMB) to represent GARS' long large cap and short small cap relative value strategy in US equity.

To help reduce hundreds of related factors to a reasonable set that can predictively explain the fund's returns, we also employ a proprietary intelligent factor selection technique called Factor Search™. This machine learning technique is able to sift through a large universe of possible factors or risk premia in a short period of time to identify meaningful factor combinations. This proprietary [guided search](#) employs a clustering technique to associate indices and factors based on the correlation of their returns. It also provides feedback iteratively improving the model as it sequentially progresses from the least to most correlated indices down the factor tree.

The list of factors determined by MPI's machine learning algorithms to be most predictive for GARS and similar global macro strategies could be found in the table below:

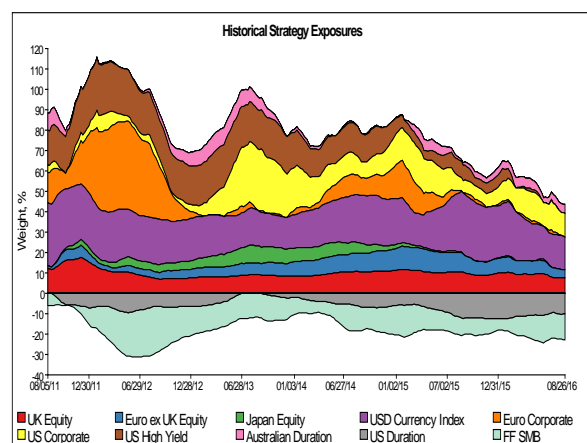
Market Factor	Index Proxy
UK Equity	FTSE 250 TR GBP
Europe ex UK Equity	MSCI Europe ex UK LOC
Japan Equity	MSCI Japan LOC
USD Currency Index	US Dollar Index (DXY)
Europe Corporate Bond	BofA Merrill Lynch Euro Corporate Index LOC

US Corporate Bond	Barclays US Corporate Investment Grade
US High Yield	Barclays US High Yield
US Duration	Barclays US Long Government minus BofA Merrill Lynch US 3M T-bill
Australian Duration	BofA Merrill Lynch 10+ Year Australian Government minus Australian Dollar 3M Deposit
US FF SMB	Fama-French US SMB Size Factor

## Strategy Review: Long-term Analysis (Past 5 Years)

When conducting research on a specific fund, understanding the manager's persistent biases might be one of the most important considerations. Although mutual funds like Standard Life GARS could provide monthly reports detailing trades, it is difficult to stitch them all together to present a long-term picture of the manager's investment decisions. The advantage of returns-based techniques is that they only require a time series of the fund's NAVs to infer the fund's investment exposures through time. The results of analysis presented in Figure 1 represent the fund's major exposures obtained applying DSA to 5 years of GARS' weekly NAVs and generic factor indices.

Figure 1  
Long-Term DSA Exposures – 5 Years

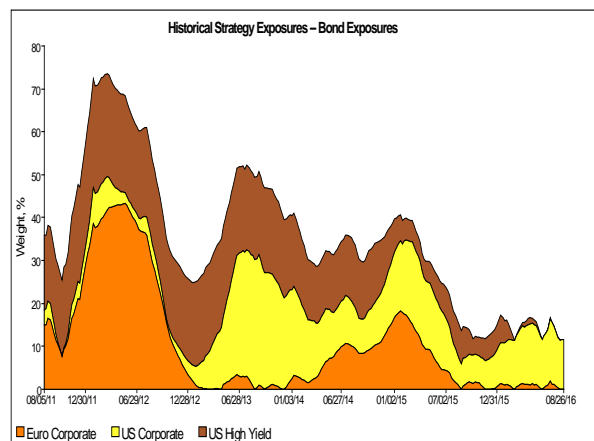


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By looking at the direction and scale of the time-varying exposures we're ready to make some observations. According to Figure 1, GARS' investment profile has some distinct features:

- The fund’s total inferred gross exposure across all factors also varies over time. It appears that the fund has been greatly reduced its gross factor exposure from over 140% in June 2012 to less than 50% at the end of August 2016.
- Most of GARS’ major investment themes are consistently apparent throughout the five-year period. However, the net exposures of individual factors can change quite significantly through time. For instance, the fund historically maintained significant net long exposures to US and Euro Corporate bonds, which helped it to deliver fixed-income-like risk/returns and thus a similar Sharpe ratio to bonds in the past. However, the bond exposures appear to have been reduced abruptly in mid-2015 as shown in Figure 2. At the same time, the fund maintained a significant but stable long US dollar exposure.

Figure 2  
**Historical Bond Exposures – 5 Years**

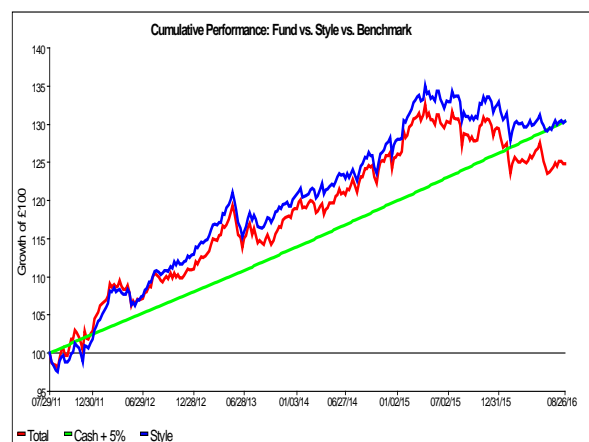


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- The fund’s main reported market returns strategies include long US and European corporate bonds, long UK and Europe ex-UK equity. Its main reported market directional strategies include long US dollar, short US duration. Its main reported relative value strategies include longing exposure to US large cap stocks versus shorting exposure to US small cap, which is represented as a negative (below the X-axis) exposure to Fama-French size factor. These match our factor exposure mappings.

The chart in Figure 3 shows the cumulative performance of the fund (“Total”, in red) compared to the returns of the synthetic factor portfolio (“Style”, in blue), which reflects the exposure weights shown in Figure 1 over the past 60 months. (Note that the green line represents Standard Life GARS’ cash+5% benchmark.) This synthetic portfolio is essentially a tracking portfolio created from the exposures of the market factors identified by the DSA model. The tight linkage between these two time series indicates that the fund’s performance has historically been effectively explained by the dynamic factor exposures depicted in Figure 1.

Figure 3  
**Cumulative Performance of the Fund Vs. Its Factor/Style Portfolio**



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The fact that a portfolio of over 1,300 securities, representing dozens of strategies across the globe, can be closely tracked (with a 90% R-squared) by a portfolio comprised of a handful of generic investment themes, consistent with GARS’ disclosures, already provides credibility for our analysis.

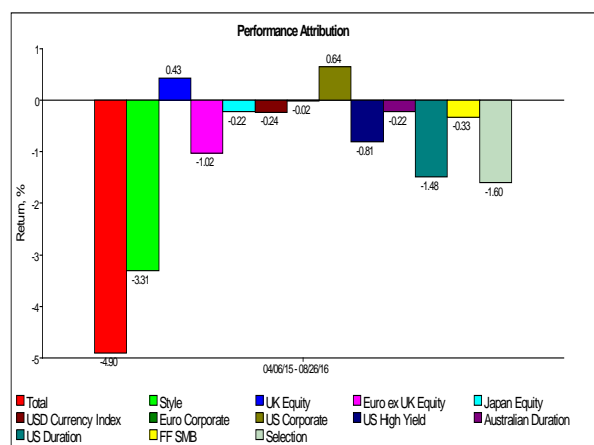
Additionally, DSA’s proprietary cross-validation measure *Predicted R-Squared* of 72% suggests that the current exposures could provide sufficient guidance for the fund’s short-term future performance.

**Strategy Review:  
Short-term Performance Attribution (Past 16 months)**

The cumulative performance chart in Figure 3 also highlights some recent investor concerns regarding the fund. Since its peak in April 2015, the fund’s performance has deteriorated and it has underperformed its cash + 5% benchmark.

Standard Life offered its [own explanation](#) on the fund’s recent underperformance. Investors might complement this by conducting independent research with the help of a factor analysis. The performance attribution chart below breaks down the fund’s performance since April 2015 into components. These are then attributed to the various strategy factor exposures identified in Figure 1, with the residual or unexplained portion of the fund’s returns (that are not explained by the dynamic factors) referred to as “Selection”.

Figure 4  
**Performance Attribution**



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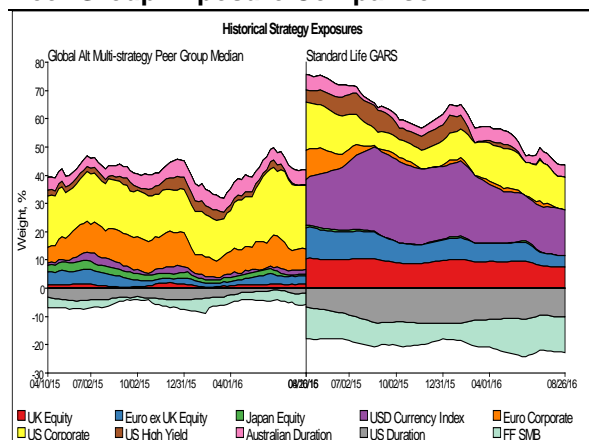
- The fund lost -4.90% since April 2015. Our analysis infers that the majority of the loss is explained by its “Style” as determined by factor exposures. The Style return can be divided amongst individual strategy factors. According to Figure 4, the most significant inferred detractors from performance are long Europe ex UK Equity and short US duration (expecting US rates to rise). All but two factor exposures contributed negatively to total fund return over this period with long UK equity and long US corporate bond the only ones making positive contributions.
- Selection return (in light green), which can be defined as “alpha” (relative to this basket of factor benchmarks), was negative. This may suggest that the fund’s active selection choices within factors (such as security, instrument, sector, duration, quality and other effects (such as fees and trading costs) have had a negative impact on fund’s total performance. (It could also imply that an omitted factor explains the additional losses).

## Peer Analysis: SLI GARS vs. Peer Group Average

One of the main advantages of returns-based analysis is how it facilitates peer comparison. As Standard Life GARS [currently ranks 59<sup>th</sup> out of 68 funds](#) in its Morningstar category, it is important to understand how the fund’s investment strategy differs from its peers. Using the same factors as in our analysis of GARS, we analyzed 37 largest funds from the 68 global alternative multi-strategy funds in the same Morningstar category, but limiting the timeframe of the analysis to a shorter period since GARS’ performance peak in April 2015. Figure 5 compares factor exposures of SLI GARS with median exposures of its peers.

Looking at Figure 5, we observe that both the direction and tendency of exposures for the fund and its peers are somewhat similar (on average), with the most significant differences observed in US/European fixed income.

Figure 4  
**Peer Group Exposure Comparison**



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Compared to GARS, its peers have larger (relative to other investments) long positions in US and Euro bonds, which have so far delivered positive performance in 2016 (as many European government bonds have rallied, and their yields have fallen into negative territory). The peer group funds, on average, maintained significant exposure to bonds throughout 2015 and most of 2016. And while US and European corporate bond exposures were inferred to be a substantial component of GARS’ returns in April last year, this had been scaled back by the third quarter of 2015. Based on our purely quantitative analysis above, if GARS had maintained its large bond exposure throughout 2015 and into 2016, this would have

helped to offset the negative effect that other factors had on the fund's performance.

There has been a lot of discussion in the media about potential [capacity issue at GARS](#) impacting its performance. Our analysis could not confirm or refute any of such concerns. What we do observe is that the fund's returns exhibit significant and strategic factor bets. If for example, the US dollar strengthens and US interest rates rise the fund may be able to recover some of the losses this year.

At a time when transparency and liquidity are the focus of investor concerns, advanced machine learning techniques such as DSA, together with the use of higher frequency data – daily or weekly fund NAVs – could significantly enhance investment due diligence processes. These techniques can help to corroborate reported portfolio exposures; monitor rapid shifts in style and leverage levels, and insights into factor exposures can also help investors to better anticipate fund's performance's behavior in light of observed financial market trends.

## Summary

Our analysis demonstrates that factor analysis can shed light on complex global “go anywhere” funds' performance results. With regards to the highly visible Standard Life GARS Fund or other “nontraditional” mutual funds, proper tools and methodologies – more typically used in the hedge fund space – can be used to uncover dynamic factor exposures, directional market bets or alpha generators.

### **About MPI**

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### **Contact Information**

US

Jeff Schwartz

[info@markovprocesses.com](mailto:info@markovprocesses.com)

EMEA

Victor Rey

[vrey@markovprocesses.com](mailto:vrey@markovprocesses.com)