Global Tactical Asset Allocation (GTAA)

Weak and volatile returns in global equity and bond markets since 2000 have prompted many institutional investors to reconsider Global Tactical Asset Allocation (GTAA). Given its potential to generate excess returns that are uncorrelated with traditional asset classes, GTAA has been identified by many institutional investors as a way to improve their portfolio's risk/reward profile.

This paper will focus on the basic concepts of GTAA:

- What is GTAA and what are its benefits?
- How is GTAA different from traditional market timing (TAA)?
- How does GTAA work?
- How can it work for you?

A brief history of GTAA

Many investors associate GTAA with tactical asset allocation (TAA) or the traditional market timing strategies of recent decades (the stocks vs. bonds vs. cash decision). While investors have attempted to time the market as long as they have been buying and selling securities, strong academic interest in stock market predictability only began in the 1970s as investors sought to understand whether it made sense to try to time the market.

1970	Eugene Fama presents theory of efficient capital markets, finding limited evidence of profitable trading strategies in US stocks. Skeptics of Fama's Efficient Market Hypothesis later counter that markets are somewhat predictable.
1973-74	Bear market and the advent of cheaper stock index and bond futures drive institutional interest in exclusive market timing strategies.
Mid 1970s	William Fouse at Wells Fargo begins to market "Tactical Asset Allocation".
1987	Well-positioned TAA managers outperform during the stock market crash.
Early 1990s	Global TAA strategies develop with the growth of foreign futures markets and liquidity, as well as increasing evidence of global asset predictability.
Late 1990s	Reputation of GTAA tarnished by poor performance of some value-oriented managers who misjudge the equity boom.
2000-today	Weak equity returns renew interest in the benefits of GTAA.

The benefits of GTAA

GTAA should be an important element in most institutions' investment programs.

GTAA can significantly improve a portfolio's information ratio

In spite of periodic poor performance in mostly value-oriented TAA managers, the largest and most successful GTAA managers have, in the past, generated long-term information ratios above 0.5, which compares favorably with active management in other, more traditional, asset classes. Moreover, the actual implementation of a GTAA program is straightforward and is readily customized to client-specific benchmarks, constraints and objectives. Managed appropriately, GTAA helps to diversify total active risk and can improve a portfolio's overall information ratio due to GTAA's high expected information ratio and low correlation with benchmarks and other forms of active risks.

GTAA active risk is not highly correlated with other sources of active risk

Exhibit 1 demonstrates the low correlation of four GTAA managers with other traditional asset class managers.[1] Over the 6-year period from 1996 to 2001, the correlation of GTAA managers' active risk with the active risks of traditional managers was quite low, averaging only 0.01 across the major asset classes. This correlation is particularly low in light of the average correlation between manager active risks within asset classes of 0.20. Only domestic and international fixed income show average active risk correlations above 0.10 with GTAA. Here we infer that GTAA managers were taking duration bets similar to fixed income managers over this period.

Exhibit 1: Correlation of four GTAA active returns with active manager returns

Asset Class	Number of Managers	Average Correlation within Asset Class	Average Correlation with GTAA Managers
US Large Capitalization Growth	224	0.17	-0.03
US Large Capitalization Value	206	0.16	0.06
US Small Capitalization Growth	131	0.17	-0.04
US small Capitalization Value	137	0.28	-0.08
International Equity	94	0.24	0.05
Domestic Fixed Income	48	0.27	0.16
High Yield	63	0.22	0.02
International Fixed Income	46	0.26	0.17
Average/Total	**949**	**0.20**	**0.01**

Sources: Nelson's; General Motors Investment Management Company

[1] Traditional manager data are from Nelson's institutional manager database. We thank Dmitri Smolyanski at General Motors Investment Management Company for their database of GTAA managers.

The basics: What is GTAA and how does it work?

In essence, GTAA aims to:

- Improve the overall return per unit of risk (information ratio) in a client's portfolio through active management of asset allocation deviations

- Generate excess returns uncorrelated with traditional sources of active risk

- Meet individual clients' needs and objectives through customized portfolios

- Employ minimal capital with limited disruption to underlying managers

GTAA can result in an increased information ratio
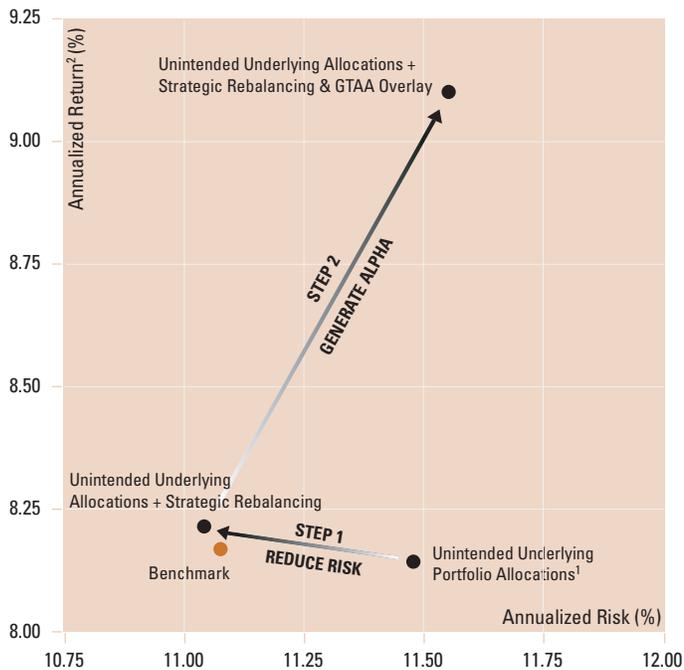
1 Unintended underlying portfolio allocation returns and annualized risk represent the asset allocation of the underlying managers multiplied by the asset class returns. They do not represent the return on the actual underlying portfolio holdings (excess return from security selection) of active managers. Rather, they represent the return and tracking error to the benchmark of the asset allocation "drift" due to changes in asset valuations as well as unintended country and currency exposures by the underlying active managers.

2 Based on gross return annualized since inception (April 1, 1996 – June 30, 2002).

Note: The returns presented herein are gross. Past performance is not indicative of future results, which may vary. All figures are estimated and unaudited. Accordingly, estimated returns are subject to change and actual returns may vary from the performance information presented above. Estimated returns should not be construed as providing any assurance or guarantee as to actual returns. Past performance is not indicative of future results, which may vary. The data shown above is of a representative separate account as of 6/30/02 and such data may vary for each client in the strategy due to market conditions, client guidelines and diversity of portfolio holdings. The data is shown for informational purposes only and is not indicative of future portfolio characteristics or returns. GSAM portfolio holdings are not stagnant and may change over time without prior notice.

The modern Global Tactical Asset Allocation program is comprised of two separate strategies:

Step 1. Strategic Rebalancing – aims to reduce unintentional asset allocation risk, often termed "drift" risk, in the portfolio with limited capital and minimal disruption to underlying investment managers.

Step 2. Overlay – aims to capture excess return through intentional, opportunistic, long and short positions in asset classes and countries (global tactical asset allocation)

Both the strategic rebalancing and overlay elements of a GTAA program can be customized to the specific needs of any portfolio. These include the portfolio's strategic asset allocation, its existing active and passive investment portfolios, and also client-specific objectives and investment constraints such as targeted active risk and constraints on leverage or position sizes.

Step 1: Strategic rebalancing

Over time, increased specialization of active managers has forced plan sponsors to focus on the complexities of their multi-manager structures. In the context of specialized-manager structure, who manages the portfolio's overall asset allocation? Often this is neglected, but it need not be as the strategic rebalancing element of a GTAA program is designed to explicitly remove any unintentional asset allocation risk. This risk can be caused by several factors, including:

- Drift risk due to changes in asset valuations
- Cash holdings
- Currency deviations from stock selection
- Unintentional country deviations within underlying stock/bond portfolios
- Manager or benchmark transitions
- Contributions to and redemptions from the portfolio

The most problematic of these is drift risk. Drift risk occurs when the value of underlying portfolio holdings moves away from the strategic benchmark due to differences in asset class returns.

For example, imagine a 60% stock/40% bond portfolio of index funds that is exactly at benchmark at the end of one month. If stocks outperform bonds by 4% over the next month – approximately a one standard deviation event – the new allocation at the end of the month will be 60.9%/39.1%. This 0.9% mismatch equals about 0.19% of unintentional tracking error to the strategic benchmark – tracking error that you are not being compensated for. Drift risk increases with the amount of time between portfolio rebalances. Using historical simulations, we have calculated the average unintentional drift risk from different rebalancing frequencies:

Rebalance frequency	Quarterly	Semi-annually	Annually	Bi-annually
Annualized drift risk	0.22%	0.27%	0.40%	0.70%

This assumes that underlying assets returns are the same as the benchmark. Therefore, drift risk is highly correlated with the strategic benchmark. Actively managed underlying assets will cause even larger deviations and drift risk. In the example above, 0.19% of unintentional tracking error translates into a 0.17% increase in total portfolio volatility. Such an increase in volatility is equivalent to a 200 bps increase in uncorrelated active risk on the total portfolio. In other words, the drift from a typical one-month return on a typical stocks/bonds portfolio has the same impact on the total risk of the plan as the entire active risk budget for an aggressively managed plan.

Although intentionally not rebalancing might be thought of as an asset class momentum strategy, the returns to such a strategy appear to be zero or slightly negative. Across at least a hundred simulations for a variety of benchmarks and rebalancing frequencies we find the average return is about -5 bps per year.

Step 2: Overlay

The pure overlay element of a GTAA program is designed to generate excess returns through intentional active deviations in sectors, countries or asset classes. Generally, a GTAA strategy can be viewed as making two major types of decisions:

- **Asset class timing:** Includes stocks vs. bonds vs. cash, small cap vs. large cap stocks, value vs. growth stocks, emerging vs. developed stocks and bonds, credit timing, etc. Often, this type of decision is referred to as TAA.

- **Country or sector decisions within asset classes:** Includes country selection in developed and emerging equity, fixed income and currency markets, as well as the potential for sectors within equity markets, and maturities within fixed income markets. These are the global relative-value decisions which give meaning to the "G" in GTAA and distinguish the strategy from traditional market timing.

The relative importance of these two types of decisions is a critical feature of a well-managed GTAA program. Whereas traditional TAA programs focused exclusively on the first decision, GTAA's ability to add value derives primarily from the second decision. The most successful, modern GTAA strategies predominate their risk in the latter, primarily country selection decisions.

Because country selection strategies potentially trade in many more securities than asset class timing alone, we expect a higher risk-adjusted return from them. Empirical evidence finds a lower forecasting ability in the time series of asset class returns as compared to the relative value of country returns, further raising the importance of the cross-sectional country selection decision in GTAA.

The most common implementation of GTAA today uses all the liquid equity index futures, bond futures and currency forwards in developed markets globally deployed in four different strategies:

1. TAA among global stocks, bonds and cash

2. Country selection within global stock markets

3. Country selection within global bond markets

4. Currency selection within global currency markets.

While it is important to understand the two steps outlined conceptually above, in practice, the strategic rebalancing and overlay portfolios are handled together along with transaction cost projections to create an aggregate GTAA portfolio that maximizes expected return per unit of risk, net of transactions costs.[2]

Sample GTAA portfolio snapshot as of September 16, 2003:

The portfolio snapshot on the following page gives an example of this process:

- We held active positions in 33 different securities in the overlay portfolio with a predicted tracking error of 1.0%.

- We held large equity overweights in Hong Kong, Spain and Germany partially offset by underweights in Australia, Sweden and the UK.

- In bonds, an overweight position in Euroland was offset by underweights in the UK and Japan.

- Our major currency positions were long the Swedish Krona and UK pound sterling, and short Swiss franc and Canadian dollar, with an overall net underweight in the US dollar.

- The position sizes were determined using the optimization process described herein, where returns are maximized subject to a total tracking error constraint as well as constraints on the tracking errors within each of the four GTAA strategies. Despite the very simple optimization problem, the portfolio's risk budget is fairly well balanced, as seen in the tracking error decomposition in the rightmost column. At the individual security level, there are 14 positions contributing more than 5% of risk in absolute terms. That this well balanced portfolio can result from a simple optimization problem is a testament to the Black-Litterman Asset Allocation Model, which was developed primarily to address the problem of unbalanced portfolio optimizations.

A word of caution, however, regarding the use of futures. The strategic rebalancing portfolio cannot track the underlying benchmark as well as the underlying cash instruments used to calculate the benchmark. The additional tracking error derives from three sources:

- Futures do not exist in all countries and asset classes.

- Existing futures have been created for the most popular local indexes of large stocks, but these indexes often do not coincide with the indexes used by institutions in their global portfolios.

- Even if a futures contract exists on the very index used in the benchmark, the futures contract does not track the underlying index perfectly due to short-term mispricing between the two as well as differences in tax treatment that are significant in some countries. This tracking error is termed basis risk.

This is why the strategic rebalancing portfolio is not necessarily equal to the benchmark. In spite of these issues, we believe a strategic rebalancing portfolio of futures and forwards tracks a global multi-asset class benchmark closely enough, and in general, the liquidity and cost benefits of using liquid derivatives outweigh this disadvantage.

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[2] Although managing these two portfolios together is easier and less costly, this is not always the case. The exceptions are typically very large and complex portfolios, or portfolios with significant contributions and redemptions. In these cases, the custodian or a specialized completion manager is often closer to the information flow and can more quickly and more accurately remove unintentional asset allocation risk, and the gains from reducing transaction costs from netting are typically small since the pure overlay portfolio is usually not rebalanced every time there is a new cash inflow or outflow.

GTAA Portfolio Snapshot, as of September 16, 2003

	(A) Benchmark	(B) Underlying Weight	(C) Strategic Rebalancing Trade	(D) Overlay Deviation	(E = B + C + D) Total Portfolio Weights	(F = E − A) Overall Deviation from Benchmark	Risk Decomposition
Equity Country Selection							
Australia	0.42	0.48	-0.20	-0.88	-0.60	-1.02	-2.38
Austria	0.02	0.02	0.00	0.00	0.02	0.00	0.01
Belgium	0.09	0.10	0.00	0.00	0.10	0.01	0.06
Canada	0.54	0.62	0.13	-0.10	0.65	0.11	0.52
Denmark	0.07	0.08	0.00	0.00	0.08	0.01	0.04
Finland	0.15	0.17	0.00	0.00	0.17	0.02	0.15
France	0.82	0.93	0.03	0.25	1.21	0.40	2.19
Germany	0.55	0.63	-0.17	1.16	1.61	1.06	9.38
Greece	0.03	0.04	0.00	0.00	0.04	0.00	0.02
Hong Kong	0.14	0.17	-0.03	1.99	2.13	1.98	18.71
Ireland	0.06	0.07	0.00	0.00	0.07	0.01	0.03
Italy	0.32	0.37	-0.17	0.55	0.75	0.43	1.88
Japan	1.93	2.20	-0.37	0.59	2.42	0.49	2.95
Netherlands	0.44	0.50	-0.23	0.78	1.05	0.62	3.65
Norway	0.04	0.05	0.00	0.00	0.05	0.01	0.02
New Zealand	0.02	0.02	0.00	0.00	0.02	0.00	0.00
Portugal	0.03	0.03	0.00	0.00	0.03	0.00	0.01
Singapore	0.07	0.08	0.00	0.00	0.08	0.01	0.07
Spain	0.30	0.34	-0.14	1.17	1.36	1.07	6.08
Sweden	0.19	0.22	-0.01	-0.63	-0.42	-0.61	-3.89
Switzerland	0.64	0.73	0.00	0.00	0.73	0.09	0.50
United Kingdom	2.19	2.50	-0.37	0.02	2.15	-0.04	-0.16
Eurostoxx 50	0.00	0.00	0.20	-4.16	-3.96	-3.96	-22.81
Emerging Markets	0.96	1.09	0.00	0.00	1.09	0.14	0.83
US Large Cap	50.83	43.31	6.55	0.68	50.54	-0.28	0.02
US Small Cap	4.17	8.81	-3.76	0.00	5.05	0.88	6.44
Total	**65.00**	**63.54**	**1.46**	**1.42**	**66.42**	**1.42**	**24.32**
Fixed Income Country Selection							
Australia	0.00	0.00	0.00	3.54	3.54	3.54	5.50
Canada	0.00	0.00	0.00	0.90	0.90	0.90	1.04
Euroland	0.00	0.00	0.00	15.76	15.76	15.76	16.22
Japan	0.00	0.00	0.00	-6.24	-6.24	-6.24	0.77
Switzerland	0.00	0.00	0.00	-0.63	-0.63	-0.63	-0.39
United Kingdom	0.00	0.00	0.00	-16.19	-16.19	-16.19	-12.05
United States	35.00	27.79	7.21	3.01	38.01	3.01	6.94
Total	**35.00**	**27.79**	**7.21**	**0.16**	**35.16**	**0.16**	**18.03**
Currency Selection							
Australian dollar	0.42	0.48	-0.06	2.89	3.32	2.90	5.68
Canadian dollar	0.54	0.62	-0.08	-3.15	-2.61	-3.15	-0.49
Danish krone	0.07	0.08	0.00	0.00	0.08	0.01	0.01
Euro	2.80	3.19	-0.40	0.91	3.70	0.91	1.07
Hong Kong dollar	0.14	0.17	0.00	0.00	0.17	0.02	0.00
Japanese yen	1.93	2.20	-0.27	1.74	3.67	1.74	0.50
Norwegian krone	0.04	0.05	-0.01	-0.25	-0.22	-0.26	-0.37
New Zealand dollar	0.02	0.02	0.00	-2.16	-2.14	-2.16	-1.82
Singapore dollar	0.07	0.08	-0.03	-1.59	-1.53	-1.60	-0.20
Swedish krona	0.19	0.22	-0.03	6.16	6.35	6.16	19.36
Swiss franc	0.64	0.73	-0.09	-7.46	-6.82	-7.46	0.61
UK pound sterling	2.19	2.50	-0.31	4.17	6.35	4.17	8.36
US dollar	90.96	89.67	1.28	-1.27	89.69	-1.27	0.00
Total	**100.00**	**100.00**	**0.00**	**0.00**	**100.00**	**0.00**	**32.69**
Asset Class Timing							
US Equity	0.00	0.00	0.00	1.96	1.96	1.96	16.68
US Fixed Income	0.00	0.00	0.00	3.47	3.47	3.47	7.98
US Large Cap	0.00	0.00	0.00	0.46	0.46	0.46	3.87
US Small Cap	0.00	0.00	0.00	-0.46	-0.46	-0.46	-3.57
Total	**0.00**	**0.00**	**0.00**	**5.43**	**5.43**	**5.43**	**24.96**

The data shown above is of a representative separate account as of September 16, 2003 and such data may vary for each client in the strategy due to market conditions, client guidelines and diversity of portfolio holdings. The data is shown for informational purposes only and is not indicative of future portfolio characteristics or returns. GSAM portfolio holdings are not stagnant and may change over time without prior notice.
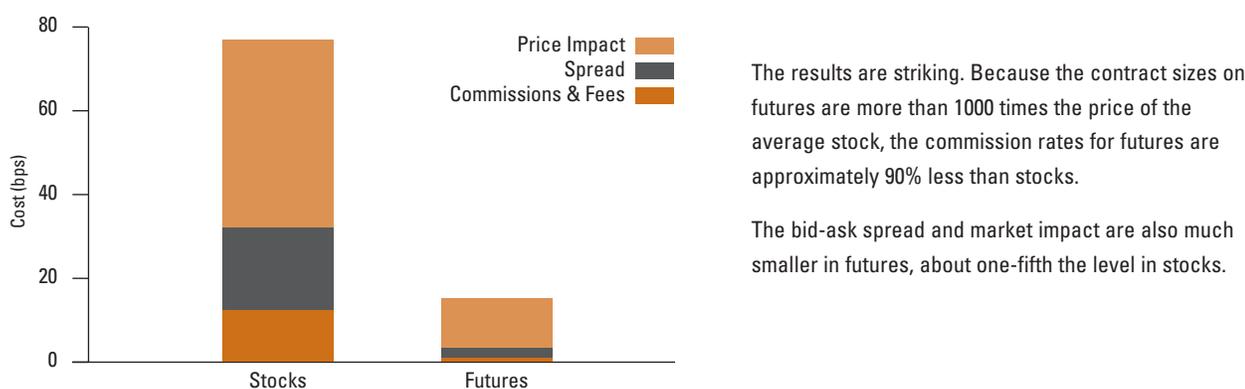
The advantages of implementing GTAA using futures and forwards

Futures and forward contracts make a GTAA overlay possible given the **minimal margin exchange requirements** for these instruments. The initial margin on futures is generally 2% to 10% and the initial collateral on forward and swap contracts is equally small. Yet the use of these derivative instruments offers other advantages: **high liquidity** and **low transaction costs.**

Since liquid futures exist in all of the major global markets and asset classes, and given that they are commensurate in size with trading in underlying cash instruments, liquidity is high in futures markets today. Currently, there are approximately 35 securities in liquid futures and forward instruments in developed countries.[3] Because of this liquidity, it is possible to trade significant positions quickly with minimal market impact. On average, across all major global equity markets, traded futures market volume is 83% that of cash market volume, approximately $90 billion a day. Average daily global bond futures market volume is over twice this amount. While market volumes in bond cash markets are more difficult to measure, in the US 10-year and 30-year markets, futures market volume is about 50% higher than cash markets.

Futures transaction costs are considerably lower than cash instruments. The one-way transaction cost is the sum of commissions and fees, one half of the bid-ask spread and the anticipated market impact from trading a given size order. Exhibit 2 depicts the relative round-trip transaction costs for a $25 million trade in stock index futures versus underlying stocks, on average across fifteen developed equity markets.

Exhibit 2: The cost of trading $25 million in physical stocks versus stock index futures

The results are striking. Because the contract sizes on futures are more than 1000 times the price of the average stock, the commission rates for futures are approximately 90% less than stocks.

The bid-ask spread and market impact are also much smaller in futures, about one-fifth the level in stocks.

Source: Goldman Sachs Asset Management

Why does GTAA work?

Can returns on countries and asset classes be forecasted? We believe they can, for two reasons: market equilibrium and market inefficiency.

Market equilibrium

Individual investors in the market have different perceptions of risk that lead to risk-sharing equilibria in which some investors buy the risks that others sell. Equilibrium models inform us about the relationship between risk and return. GTAA can add value by overweighting markets where the return to risk is high and underweighting those where the return is low. Risk premia also vary through time and across countries due to changing aggregate supply and demand and the absence of perfectly linked country business cycles, which create further opportunities to predict returns.

[3] Liquid stock index futures markets currently exist in Australia, Belgium, Brazil, Canada, Europe, France, Germany, Hong Kong, Italy, Japan, Korea, Malaysia, the Netherlands, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan, the US, and the UK. Bond futures are liquid in Australia, Canada, Europe, Japan, Switzerland, the US and the UK. The liquid currency markets among developed countries are the Australian dollar, Canadian dollar, European Union euro, Hong Kong dollar, Japanese yen, New Zealand dollar, Norwegian krone, Singapore dollar, Swedish krona, Swiss franc, US dollar, and UK pound sterling. We define liquid markets as those with daily volume greater than approximately $100 MM.

Market inefficiency

We believe there are strong reasons to expect market inefficiency or deviations from equilibrium levels especially *across* global capital markets, where relatively less capital chases market inefficiencies than within a given country's local market. Inefficiencies occur due to:

- **Investors' long-term overreaction and short-term underreaction to information**.[4] Japan, for example, has endured a decade of economic decline in the 1990s and shows only sluggish growth today. We believe investors have overreacted to the Japanese story, and believe Japanese equity prices will rise relative to the rest of the world.

- **Market segregation** or constraints such as regulatory restrictions on the free flow of capital across markets, e.g., Canada continues to limit the amount of foreign stocks Canadian institutions can own.

- **Non-economically motivated players in capital markets**, such as central banks and governments. Central banks routinely use currency trades and monetary policy to influence exchange rates. However, free-floating exchange rates guarantee that the aggregate market participants will ultimately determine the equilibrium exchange rates. So central bank activity in currency markets is at best a short-term policy that capital markets eventually correct. Governments also periodically intervene in equity and bond markets. For example, during the LTCM crisis of 1998, the Hong Kong Monetary Authority bought approximately 5% of the outstanding equity in Hong Kong stocks over a two-week period in an attempt to stabilize equity prices.

Capitalizing on predictability

Goldman Sachs Asset Management's GTAA models find that trends across and within global markets are predictable. Sources of predictability or investment themes that we believe drive future performance include:

- **Valuation:** i.e., cheap countries typically outperform expensive ones on average

- **Momentum:** i.e., countries with strong momentum typically outperform

- **Macroeconomic growth:** i.e., countries with supportive macro conditions outperform

- **Fund flows:** i.e., countries with positive fund flows typically outperform

- **Risk premia**: i.e., countries with high relative risk premia should be overweighted

Yet it is not enough to recognize trends. One must also use a method of portfolio construction that translates forecasts into meaningful estimates of expected risk and return and then optimizes the portfolio such that the two are balanced. We believe the Black-Litterman Asset Allocation Model provides a superior method to traditional mean-variance optimizers which often introduce constraints. The Black-Litterman model estimates expected returns more consistent with risk assumptions and estimated volatilities by blending views from forecasting models with the market's implicit equilibrium views to create new expected returns. The model reduces the weights on extreme views toward equilibrium and the weights on uncorrelated views toward each other. As such, in contrast to traditional mean-variance optimizers, we believe the Black-Litterman model produces better results in more balanced portfolios with few artificial constraints.
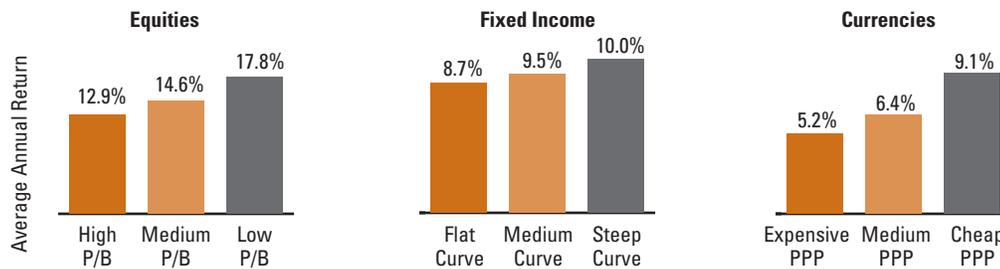
While we look at two simple forecasting measures on the following page (valuation and momentum), there exist a number of additional intuitive investment themes that forecast asset class and country returns, and an exceptionally large universe of specific forecasting measures within each of these. Other investment themes that we believe drive future investment performance include macroeconomic policy, fund flows and proxies for risk premia.

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[4] The primary result supporting this conclusion is the so-called "post-earnings-announcement drift. We observe that in the nine-month period following an earnings surprise – whether positive or negative – the firm's stock price drifts relative to the aggregate market in the same direction as the earnings surprise. Post-earnings-announcement drift also holds in country equity markets, with negative earnings-surprise countries drifting downwards relative to the world, and positive surprise countries drifting upwards. See Foster, Georg, Chris Olsen, and Terry Shevlin, 1984, "Earnings Releases, Anomalies and the Behavior of Security Returns," Accounting Review, October, 574-603, and Bernard, Victor and Jacob Thomas, 1989, "Post-Earnings Drift: Delayed Price Response or Risk Premium?", Journal of Accounting Research, 27, pp. 1-36.

Empirical Evidence

Predictability using valuation

Using only countries in developed global equity markets, imagine that we measure value using a very simple value metric: the price-to-book ratio (P/B). We form a long/short portfolio of country equity indexes using the reported value of this measure, without any adjustments for accounting, discount rate or tax effects across countries. At the beginning of each month, our long/short portfolio consists of equally-weighted long positions in the one third of countries with the lowest P/B and equally-weighted short positions in the third with the highest P/B. We rebalance this portfolio monthly.

Equities

High P/B	Medium P/B	Low P/B
12.9%	14.6%	17.8%

Fixed Income

Flat Curve	Medium Curve	Steep Curve
8.7%	9.5%	10.0%

Currencies

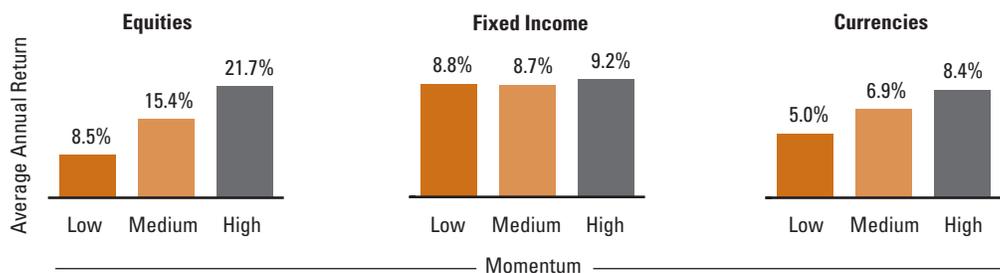| Expensive PPP	Medium PPP	Cheap PPP
5.2%	6.4%	9.1%

(Y-axis: Average Annual Return)

Source: Goldman Sachs Asset Management. Note: For equities and currencies, simulated returns are for the period January 1980 to December 2001. Fixed Income simulated returns are for the period January 1985 to December 2001. Indices include all for which we currently forecast returns.

The average annual excess return on this equity country selection portfolio is 4.9%, which means that on average, the cheapest third of equity countries outperform the most expensive third of equity countries by 4.9% per year. In global bond and currency markets, where valuation effects also exist, we repeat the long/short portfolio construction methodology using the bond and currency markets in the developed world, once again buying the cheapest third and shorting the most expensive third. We measure value in bonds by the slope of the yield curve, and in currencies by trailing 5-year excess returns, which is a simple purchasing power parity measure. Consistent with global equity markets, there is a valuation effect in both global bond and currency markets. Taken together, the evidence in global asset returns strongly supports predictability from valuation models.

Predictability using momentum

Momentum means using measures of short-term performance to predict future performance. Recent past returns should forecast future returns if investors underreact to short-term information, or if some non-economically-motivated market participants are "leaning against the wind." To be succinct, we define momentum as the prior year's total return. Once again, we form long/short portfolios in global equity, bond and currency markets, long the highest third based on prior year return, and short the lowest third based on the same measure. As before, the momentum effect is robust across countries in all three asset classes.

Equities

Low	Medium	High
8.5%	15.4%	21.7%

Fixed Income

Low	Medium	High
8.8%	8.7%	9.2%

Currencies

Low	Medium	High
5.0%	6.9%	8.4%

(Y-axis: Average Annual Return; X-axis: Momentum)

Source: Goldman Sachs Asset Management. Note: For equities and currencies, simulated returns are for the period January 1980 to December 2001. Fixed Income simulated returns are for the period January 1985 to December 2001. Indices include all for which we currently forecast returns.

Simulated performance results do not reflect actual trading and have certain inherent limitations. Please see appendix for further disclosures.

Implementation: How to make GTAA work for you

The following Q&A summarizes key issues institutional investors should consider when investing in a GTAA strategy:

Q: Is GTAA appropriate for my portfolio?

A: GTAA is suitable for almost any institutional portfolio. However, clients that understand the importance of removing unintended risks, the use of derivatives, risk budgeting and risk management gain the full advantages from a GTAA program. The size of the portfolio is generally not a binding constraint, however in some markets futures contracts have large denominations.[5] Moreover, if the GTAA program is viewed as two separate portfolios (one portfolio for strategic rebalancing and one portfolio for pure overlay), the efficacy of the customized strategic rebalancing portfolio depends solely on the size of the underlying portfolio deviations from benchmark. The overlay portfolio, meanwhile, can be implemented through a commingled vehicle, thus eliminating the concern about portfolio size.

Q: Can GTAA be customized to my strategic asset allocation, investments and goals?

A: GTAA can be customized to the specific needs of any portfolio. These include:

- The portfolio's strategic asset allocation
- Existing active and passive underlying investment portfolios
- Client-specific objectives and investment constraints (e.g., targeted risk, leverage or position size/exposure constraints)

Q: Should I implement GTAA as an overlay to my strategic benchmark or as a portable alpha strategy over a passive/low risk allocation?

A: GTAA can fit anywhere in a client's portfolio. Some clients carve out an entire slice of their strategic benchmark, while others prefer to carve the overlay out of an area of their portfolio that is passively managed or maintains low active risk, such as US large capitalization equities or US core fixed income. The right approach can be determined through a risk budgeting analysis.

GTAA can also be implemented as a **portable alpha strategy** on a specific piece of a client's portfolio, for example, over a global equity portfolio or a US enhanced index portfolio. Used in this manner, GTAA is just another source of active risk, but a special source in that so little capital is required. This makes it easy to combine GTAA with other sources of active risk within the same portfolio. This is in contrast to more common portable alpha strategies that typically transport alpha from fixed income strategies onto equity benchmarks, where substantial capital is required for the fixed income strategy to generate excess return.

The strategic rebalancing portfolio in a GTAA program can also make portable alpha strategies possible. A plan sponsor portfolio that needs more active risk from its equity managers but does not want to increase its strategic equity weighting can transfer capital from its fixed income managers to its equity managers. Then, the plan can "un-do" this implicit stock overweight/bond underweight timing bet by selling equity index futures and buying bond futures in equivalent proportions in order to return the portfolio to benchmark exposure. Essentially, the strategic rebalancing portfolio frees the linkage between a portfolio's strategic asset allocation and the asset classes where active risk is derived, allowing for a more optimal allocation of active risk.

Q: What are the capital outlay requirements?

A: GTAA can be implemented with limited capital. In a GTAA portfolio, capital is used as initial margin and as a cushion for investment performance. The small account size required for a GTAA program is a tremendous advantage from a risk budgeting viewpoint. In practice, the limited tracking error capacity of traditional managers severely limits the achievable active risk in a portfolio. It is exactly this problem that drives investors to seek absolute return strategies.

Another practical motivation for limiting the size of the GTAA overlay portfolio is to **minimize the disruption to underlying portfolio managers**, since a GTAA account can be carved out of existing cash assets in a portfolio. The actual size requirements vary depending on the degree of strategic rebalancing required, the amount of GTAA active risk desired, and the sensitivity of the client to making periodic contributions to the strategy. As a general rule, a pure overlay portfolio requires about 3% capital for every 1% active risk, and the strategic rebalancing portfolio requires another 1%.

[5] The largest contracts are the 10-year JGB futures at $860,000 per contract, the S&P 500 futures at $200,000 per contract, and the Russell 2000 futures at $190,000 per contract. In some markets, miniature contract sizes have gained popularity, for example, in the S&P 500 where the S&P 500 mini contract trades at $40,000 per contract.

Q: What level of active risk should I target?

A: The GTAA active risk budget varies across client portfolios. Since GTAA is relatively uncorrelated with other forms of active risks, a risk budgeting exercise will generally place significant risk capital in a GTAA strategy. Of course, the assumed information ratio on the strategy also critically determines its size; it is common to set this equal to the average IR on other active management activities. In our experience, clients typically target GTAA active risk on their overall portfolio between 0.25% (contributing about 2% of the total active risk) to 2.0% (contributing more than half of the total active risk), although the potential for GTAA active risk is virtually unlimited.[6] The most common target is 1.0% on the overall portfolio, in which case GTAA consumes about one quarter of the total active risk budget and requires about 4% of the portfolio's assets. GTAA is almost always the most efficient source of active risk in a portfolio.

Q: Should currency management be included in GTAA?

A: Global currency management should be included in a GTAA program. Historically, many institutions have created separate currency and TAA/GTAA overlay portfolios. We believe that separating currencies from GTAA is suboptimal, as currency allocation is an integral element of GTAA. First, the best currency managers are also often the best GTAA managers since the best quantitative approaches to forecasting returns across global equity and fixed income markets apply equally well to currencies. Second, separating the two mandates increases the amount of capital that must be devoted to the program since both the currency and GTAA overlay portfolios need a buffer for profits and losses. The diversification benefit from combining the two overlay accounts results in a smaller total profit/loss buffer. Finally, the total management fees will generally be lower in a GTAA mandate that includes currency management than in two separate mandates, one for currencies and one for GTAA without currencies. This is especially true if the two overlay accounts each have performance fees, since the client may end up paying performance fees for one of the two portfolios in years when the total excess returns for both portfolios as a whole are negative.

Q: How do I select the right GTAA manager?

A: There are approximately 25 investment firms globally that credibly offer TAA/GTAA services. Some firms do not have the resources to offer a global product and thus only offer domestic asset class timing strategies (TAA). However, there are about 10 major global GTAA players, with more than 80% of market share concentrated in the top four.[7] Excess return expectations should be a function of the amount of active risk a GTAA manager takes as well as the manager's information ratio and investment style. While performance comparisons across GTAA managers can be difficult due to the extremely customized nature of the strategy, every GTAA portfolio should have a benchmark, and as a result, excess performance should be easily measured. We believe the information ratio on an AIMR-compliant GTAA composite is the best single measure of performance, and this is readily comparable across managers. Long-term information ratios on the best GTAA managers are generally between 0.5 and 1.0, and in some cases even exceeding 1.0.

We believe a strong GTAA manager possesses the following key traits:

- A sound investment philosophy based on strong theoretical and proven empirical evidence

- A quantitative approach that can be intuitively explained

- A program that offers diversification in active risk across strategies, across investment themes, and across securities held in the portfolio

- An appropriate risk budget that does not rely too heavily on market timing

- An independent risk management group ensuring that investment philosophy and client guidelines are followed

- A strong commitment to continued research as models and markets evolve

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[6] The practical limit occurs when the client places 100% of their assets in GTAA and the strategy is run at its maximum tracking error of approximately 40%.

[7] Based on our estimates from publicly available data.