# Preparing for a fall...

by Dr. Markus Franke, Dr. Wolfgang Mader and Peter Schmidt

<table>
<thead>
<tr>
<th>08</th>
<th>12</th>
<th>18</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reckless conservatism</strong>&lt;br&gt;The risk of caution...</td>
<td><strong>Decumulation</strong>&lt;br&gt;Winter arrives?</td>
<td><strong>The risk of inflation</strong>&lt;br&gt;Where will it go?</td>
<td><strong>Biographies</strong>&lt;br&gt;About the contributors</td>
</tr>
</tbody>
</table>
Welcome

As we enter the mid-point of the year, we have seen a significant improvement in investment performance, with many equity indices near or breaking all-time highs. Much of the time when we see markets moving upwards it is easy to forget the implications for managing risk. However, in periods like this, risk management is just as crucial as when markets are displaying high levels of volatility, or are falling. We believe it is important to apply stringent risk management to investments in all market environments, and to constantly be at the forefront of developments in the field.

With this in mind our latest edition of Risk matters picks out several key investment themes which we should all be aware of. Our colleagues at risklab have conducted some interesting research into diversification and its importance in portfolio construction. They have studied how diversification strategies perform in periods of substantial volatility, and also how best to capture their benefits. Coupled with this, we also continue to see significant risks posed to investors by financial repression. This is the process whereby central banks use techniques such as quantitative easing to create negative real yields on their governments’ debts. Market participants need to be aware of this trend and the impact it will have on investing over the long term; both myself and Neil Dwane, our CIO Equity Europe, examine this at length.

As always I hope you enjoy the read.

Nick Smith
Managing Director
and Head of Retail Sales for Europe excluding Germany

¹ Dow Jones, FTSE 100, S & P 500 as at 08/05/2013.
Contents

04 PREPARING FOR A FALL: DIVERSIFICATION AND RISK MANAGEMENT AT TIMES OF MARKET STRESS
  04 The benefits of multi-asset diversification
  04 Diversification 101
  06 Quantifying diversification benefits
  06 Diversification in times of crisis
  07 Conclusion

08 RECKLESS CONSERVATISM: THE RISK OF CAUTION...
  10 World of financial repression
  10 How is this changing capital markets?

12 DECUMULATION – WINTER ARRIVES?
  13 The decumulation scenario
  14 How have we done historically?
  15 Volatility matters
  16 Where are the returns?

18 THE RISK OF INFLATION
  18 Inflation – where will it go
  19 How to avoid it
  20 The risk of inactivity

22 BIOGRAPHIES & DISCLAIMER
  22 Biographies
  23 Disclaimer
Preparing for a fall

Diversification and risk management at times of market stress

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DR. MARKUS FRANKE, DR. WOLFGANG MADER AND PETER SCHMIDT

The benefits of multi-asset diversification

Managing portfolio risk and maximising return is the goal of every investor. In order to profit from the only "free lunch" in capital markets, most investors know that they should avoid "putting all their eggs in one basket". Instead they should diversify, i.e. allocate their funds across different assets. This works because generally the returns of the considered assets do not move in perfect lock-step, therefore portfolio risk can be reduced when adding additional assets. We want to take a closer look at the actual benefits of diversification, but also highlight why diversification alone might not be sufficient to manage risk.

Diversification 101

Figure 1 (overleaf) shows historical correlations between different benchmark indices covering the major asset classes for a UK-based investor from 1999 to 2012. The green colour indicates very high diversification benefits between two asset classes, while red indicates low diversification benefits between two asset classes. From this evidence, investors who focus on global and emerging market equity should take into account that the returns of these asset classes exhibit high correlations (over 80% of linear correlation in the considered period). They should consider adding bonds, commodities and maybe further alternative asset classes to reduce the risk of volatile portfolio returns. This means that investors should consider a broad asset universe in order to profit from diversification benefits.

"Diversification alone might not be sufficient to manage risk"
The diversification benefit of an asset depends on its co-movement with respect to the other portfolio components. The most popular way to measure the degree of co-movement is to calculate the linear correlation coefficient between two assets. A correlation of plus/minus one indicates a perfect positive/negative linear relationship. If two assets’ return series are independent their correlation equals zero.
Quantifying diversification benefits

The impact of diversification on realised portfolio risk is illustrated in figure 2. It shows the realised empirical diversification benefit over the period from 1999 to 2012. In this example we have applied the simplest method of diversification. By using equal weights for each constituent of the portfolio, figure 2 indicates that diversification benefits are realised on a very basic level without making use of additional portfolio optimisation techniques. With a growing number of assets in the portfolio (on the x-axis) the diversification benefit increases. This empirical example using the standard deviation of realised portfolio returns demonstrates that the investor can reduce portfolio risk by more than 22% over the considered period, by adding asset classes to the portfolio that are not perfectly correlated to each other.

Diversification in times of crisis

In the second part of our analysis we focus on changes in diversification during the financial crisis. There are a myriad of studies arguing that not only does risk increase during times of financial turmoil, but also that correlations between assets and even between asset classes increase. This leads some investors to the false conclusion that diversification cannot help during a black swan event. However, the results of our analysis on the diversification benefit reveal that, while the risk level increases, the marginal benefit of diversification is even higher in times of crisis. Figure 3 shows the previous analysis of realised portfolio diversification benefits in a high correlation environment (such as the 2007/2008 financial crisis) compared to the rest of the data sample (during non-crisis times). The upper line in the chart indicates that in times of crisis diversification is even more important: while the level of risk is higher during turbulent markets, the marginal benefit of adding more asset classes to the portfolio is also higher. Having eight asset classes in a portfolio decreases risk by almost 30% on average compared to holding an equally weighted portfolio with perfectly correlated assets (i.e. not taking diversification benefits into account). While the level of risk is higher during turbulent times, the difference between the two lines indicates that the marginal diversification benefit also increases (despite higher correlations).

Beyond diversification

Therefore, diversification is beneficial in every market environment. Simple risk budgeting may force investors to exclude certain asset classes from their portfolios, hence missing some of the opportunities of diversification. This can have a negative impact on realised portfolio performance. As a consequence investors should also make use of dynamic risk management strategies in order to be prepared for negative market environments.

Active risk management techniques which adapt to different market environments are beneficial for portfolios, as they allow for access to the full benefits of diversification. Those that are based on forward-looking
AllianzGI Risk matters

Analysis and use downside-oriented risk measures allow portfolios to be optimised to avoid risk clustering, and reduce losses in negative market environments. This requires the investor to specify an appropriate risk measure and a dynamic risk budget in terms of the chosen risk measure, which does not lead to the complete exclusion of a certain asset class in times of turmoil, which therefore allows for the full benefits of diversification to be realised. An example of a downside-oriented risk measure is the conditional value-at-risk (CVaR) presented in an earlier article in Risk matters. Risk management is important, but at the same time upside return potential should be kept. In addition to forward-looking portfolio diversification, dynamic risk management should be applied to ensure that the portfolio is adjusted to weather turbulent market environments, and at the same time offers an attractive return over the mid- to long-term.

Conclusion

In conclusion, investors should always look to hold a well-diversified portfolio. This offers benefits in all market conditions, and those investors who gain optimal diversification will reap rewards as a result. This is especially true during periods of market stress. While losses in these periods will be larger, there is even more to gain from diversification by reducing the drawdown of a portfolio. However, in many portfolios with fixed risk budgets diversification benefits cannot be fully realised without correct risk management techniques in place. Therefore investors need to apply robust risk measures and a dynamic risk management, which allows them to profit from diversification benefits.

Figure 3: Diversification in times of crisis

Active risk management techniques which adapt to different market environments are beneficial for portfolios, as they allow access to the full benefits of diversification.
Reckless conservatism: The risk of caution...

NEIL DWANE

“Financial repression is likely to be a long-running theme for investors which will change how we look at investment risk, and this should be mirrored in how we invest.”
Investors entered a new domain in the traumatic days of the global financial crisis, as politicians and policy makers fought to save the world economy from its overleveraged financial positioning and reckless speculation. The early and massive quantitative easing (QE) policies in the USA and China stabilised the financial system and economy respectively, but the shock and consequences of the previous 30 years have meant that the economic recovery has been extremely muted so far; in fact the weakest on record.

Governments have been caught by surprise since this economic malaise has cast a pall over their finances, such that they are labouring under the weight of higher unemployment, the need to support banks, and lower taxation revenues, albeit with lower interest costs. They also face a key challenge of either restructuring and more competition, and inflations, but they also enforce more restructurings and more competition, and eventually may lead to trade protectionism.

Inflation is thus eating slowly away at purchasing power, and must do so over a sustained period of time to be effective for governments. Indeed, this policy challenge is even more delicate because if inflation becomes too hot, then it is likely that a more normal cycle of rising wages will break the spell over interest rates and bond yields. Our research into inflation expectations shows that they can remain very stable for long periods of time, before suddenly and unexpectedly changing, such that changes to asset allocation or portfolio preferences are impossible to effect; though, of course, timing is also difficult. Cash is thus a poor and unsafe asset over the long term, however it can be used opportunistically to benefit from any falls in other assets — it is returnless on any medium-term horizon.

How is this changing capital markets?

Financial markets are coming to terms with financial repression and QE. Bond markets are discovering that QE policies are consuming more and more of the stock of sovereign bonds. Even where it is not called QE — for example the European Central Bank’s (ECB) Long Term Refinancing Operation (LTRO) has gobbled up large portions of the investable markets in these assets. Investors who have thus “sold to the central bank” are forced to hunt for higher-yielding and riskier assets which may not in the longer term prove risky. For example, the yields on corporate bonds and some sections of the high yield market do not offer adequate compensation for the risk on offer.

Banks themselves, who can almost uniquely access this “zero cost money”, are finding their margins under pressure, and that there is lessening demand for loans, especially now that they have rediscovered the art and skill of credit analysis. Financial repression can be seen here, as regulators obey their political masters and force investors to “own their sovereign bonds”, hardwiring the health of the sovereign into more and more of society’s wealth, and in some cases even nationalising pension assets to access new cash.

Many companies have seen dramatic changes in their cost of capital and debt, meaning they can afford to make investments whose returns might be negligible if proper interest rate hurdles were used, thereby becoming malinvestments. This makes life hard for equity investors who need to judge stocks on a case by case basis. Allowing some companies access to low cost debt, and a rising reach for yield, have also allowed many weak companies to survive these difficult times. This has stayed the rejuvenating hand of capitalism; which has been evidenced in France as they have supported parts of the automotive industry.

Currencies are also becoming a crucial tool for nation states during financial repression, as countries seek to access the growth of their more successful or stronger competitors. Investors need to look out for devaluations like that which we have seen in Japan in the last 6 months. These events have the potential to threaten returns as volatilities and losses on currencies start to rise — yet another factor to be assessed and constantly re-evaluated. Stronger currencies may indeed arrest inflation, but they also enforce more restructuring and more competition, and eventually may lead to trade protectionism.

So the investment challenges are both obvious and subtle — how to play the game and earn good returns from these policies, whilst being aware that QE is designed to mis-price all assets, and to force you to take risks. Success in financially repressive policies could lead to a normalisation of economies and interest rates, which may sound good for equities and other real assets and truly painful for all bond and financial assets, as rates go back to 5% plus.
Nevertheless, many companies and consumers will not adjust to that environment well, and losers will be evident. The success of these policies seems to be a long way off, and so too does defeat, which would be typified by political instability and possible hyper-inflation. In the meantime investors need to be vigilant on how markets have changed, and adjust their portfolios in line with this. Financial repression is likely to be a long-running theme for investors which will change how we look at investment risk, and this should be mirrored in how we invest.

“Currencies are also becoming a crucial tool for nation states during financial repression, as countries seek to access the growth of their more successful or stronger competitors”
Decumulation – Winter arrives?

The sustainable rate of decumulation is crucial in financial planning. This measure, however, needs to take account of volatility in order to be truly effective.
The sustainable rate of decumulation is crucial in financial planning. This measure, however, needs to take account of volatility in order to be truly effective. Determining a sustainable rate of withdrawal impacts the ‘income’ available to individuals from their accumulated assets, but also drives the size of the accumulated assets required in the first place.

**The decumulation scenario**

For example, an individual who is seeking an additional £25,000 annual starting income in retirement from their accumulated investment assets will need investment capital of £625,000 if they assume a sustainable withdrawal rate of 4% per annum, but this increases to £833,333 if they reduce their sustainable withdrawal rate to 3% per annum. An increase in the capital required of 33%.

A straw poll amongst UK financial planners revealed that a 3% p.a. real investment return (investment return less inflation and charges) was a common assumption in compiling decumulation cash flows for clients. In turn, this was thought to support sustainable...
How have we done historically?

To examine these questions, in the remainder of this article we’ll assume a standard 50/50 bond/shares portfolio, in line with how Harry Markowitz invested his own money. The long run data is taken from the US market, 50% five year Treasuries total return and 50% S&P 500 total return index, rebalanced annually, with a 2% p.a. allowance for charges (adviser charges, platform charges and underlying fund charges). The data covers the period 1 January 1926 to 28 February 2013. The returns are in US dollars terms, therefore there is no currency implication. A slight note of caution is required, as the returns on both US bonds and shares were amongst the best in developed nations over this period.

If we take a 6% p.a. investment return after charges, and a 3% p.a. inflation rate, to yield a 3% p.a. real return after both inflation and charges, applied to a starting sum of £1 million, an initial 3% (£30,000) income can be drawn. The income could rise in line with inflation, and the invested capital would also rise in line with inflation. If the client is prepared to exhaust their capital over the 30 year period, then a starting level of £52,000 p.a. (5.2% p.a.) and indexed at 3% p.a. would see them run out of money in the 30th year. Between these upper and lower boundaries of invested capital keeping pace with inflation and being exhausted over 30 years, a 4% p.a. (£40,000) starting level of withdrawal could be delivered, with capital of £1.3 million being available at the end of the 30 years, providing inflation-adjusted income by that time of £94,000 per annum.

Is the relatively comfortable position described above really accurate? Two thoughts come to mind: firstly, that investment returns do not arrive in a straight line – and the calculation above makes no allowance for volatility – and secondly, are 3% p.a. real investment returns after charges a realistic assumption?

How inflation-linked withdrawals of between 3% and 5% per annum (p.a.) of the starting capital over a period of 30 years. This calculation is certainly supported by a simple spreadsheet approach.
Each data point on figure 4 shows the rolling 20 year returns, for the preceding 20 years, in respect of the portfolio described previously (the green line), the volatility (as measured by annualised standard deviation) (the blue line) of the portfolio and inflation (CPI) (the purple line).

As may be seen from figure 4, nominal 20 year annualised returns were lowest over the period September 1929 - August 1949 at 1.35% p.a., and peaked over the period February 1980 - March 2000 at 12% p.a. Volatility peaked over the period 1926 - 1948 at 14.4%, and fell to 5.95% p.a. over the period December 1948 to November 1968. The mean average result for the 20 year periods covered is 8.6% p.a. Inflation fell to zero for the 20 year period January 1926 to December 1945, and peaked at 6.4% p.a. over the 20 year period ending in January 1986.

From figure 4 we might infer that volatility tends to be highest at extremes of inflation both low and high (and this is supported by other studies) and that both inflation and 20 year returns from the portfolio are declining.

The chart tends to bear out 3% p.a. as a reasonable inflation constant to be used in financial planning cash flow models.

Volatility matters

If we now go back to our earlier cash flow assumptions and insert volatility at 8.6% p.a. in a model that can account for volatility, the likely range of scenarios for the 4% p.a. starting withdrawal level are shown in figure 5. The chart is based on 95% confidence intervals, which means we can assume a 95% chance that a particular outcome is displayed within the range of results.

Now we see that far from being a comfortable position at the end of 30 years, one in four clients would have exhausted their capital at that stage. At 3% p.a. withdrawal, 4 in 100 clients would exhaust their capital, and at 5% p.a. withdrawals 6 out of 10 clients would run out of capital, some as early as year 16.

We can conclude that a volatility estimate is an essential piece of the sustainable withdrawal calculation.
We can conclude that a volatility estimate is an essential piece of the sustainable withdrawal calculation.

Figure 6 shows the approximate levels of indexed starting levels of income that may be withdrawn assuming a combination of annualised real return and the annualised volatility of that portfolio over 30 years with a 10% failure rate. For example, a 3% p.a. real return, coupled with 14% p.a. volatility, would allow for a starting level of withdrawal at 2.5% p.a., provided the client is comfortable with a 1 in 10 chance of having lost their capital at the end of thirty years.

The importance of volatility within the calculation is underlined by the observation shown in the chart above, that a 4% p.a. real return at portfolio volatility of 7% p.a. allows for a 4% p.a. initial withdrawal, whereas an improved 5% p.a. real return if accompanied by volatility of 16% p.a. only permits a 3% initial withdrawal, 25% less ‘income’ for the client.

Where are the returns?

Now, let’s consider whether a 3% p.a. real return on investments is likely to be a reasonable assumption.

Figure 7 shows the 20 year rolling real returns (for the preceding 20 years at each data point) for our standard portfolio (purple line) as previously described. Also shown are the corresponding figures for the Treasuries (yellow) and shares (green). As before, a 2% p.a. allowance has been deducted for charges.

The chart displays pretty much what we would expect to see from shares, the long run, roughly 40 years, cycle of equity returns rising to 11% p.a. real returns, for 20 year periods ending in the 60s and just prior to 2000, and falling to around minus 1.5% p.a. for the 20 year periods ending in the late 40s and early 80s.

The chart shows that the recent returns from our traditional 50/50 portfolio have been in excess of 3% p.a. real, for the 20 year period ending in 1993 and for virtually all subsequent 20 year periods up to the present day. Historically though, this period appears to be a particularly favourable slice of time, supported by record returns in both bonds and equities.

Figure 6: Sustainable Withdrawal Rates over a 30 year term with a 10% Failure Rate

Figure 7: Where are the returns?

Please note: Past performance is not a reliable indicator of future results.
The combined traditional portfolio, due mainly to the higher returns and volatilities of equities, tends to follow a similar path to the equities, with 20 year returns bottoming out at 0% p.a. and minus 2% p.a. for the 20 year periods ending in the late 40s and early 80s. 20 year returns peaked for the portfolio in the late 60s and late 90s at 5% p.a. and 8% p.a. respectively.

The returns on Treasuries appear to possibly follow a longer cycle than equities, with the worst 20 year returns at minus 4% p.a. in the late 50s and the best at 4% p.a. early this century. Unfortunately, the downswing in returns for both Treasuries and shares now seems to be aligned, meaning if the cycles continue to repeat we are likely to see balanced traditional Treasury and share portfolio 20 year returns of at least minus 2% per annum, sometime in the early 2020s.

Even more disconcerting is that the ten year return to February 2013 for the standard portfolio is 2.5% p.a., therefore in the second half of the 20 year cycle real returns would need to fall to minus 6% p.a. to pull the overall 20 year real return back to minus 2% p.a. Shares, of course, are in a similar position with the ten year real return to February 2013 standing at 5.7% p.a., requiring the ten year real return to 2023 to be minus 8% p.a. real to reduce the overall return back to minus 1.5% p.a. real. Hopefully, the winter of this investment cycle will not prove to be that bleak, but it does seem a reasonable proposition that we should prepare for an era of lower returns, and that 3% p.a. real appears to be out of reach for a traditional buy and hold, Treasury/equity portfolio for many years to come.

If we face a period of lower returns for traditional portfolios, it might be wise to consider incorporating strategies such as volatility-sized asset allocation, market-phased asset allocation, multi-asset portfolios and more aggressive rebalancing, to extract whatever returns are available.

In conclusion, cash flow models that do not incorporate a measure of volatility are likely to provide a false degree of comfort regarding the future sustainability of withdrawals and capital, and traditional buy and hold, stock/share portfolios seem poorly positioned in the investment cycle to continue to provide the real returns seen over the last 40 years. Maybe this time will be different, and the central bankers have all this covered. Unfortunately, history tells us the last time the US Federal Reserve ate all the bonds, in the 1940s, coincided with poor 20 year returns, and the next bull market didn’t commence until markets were allowed to normalise in the 1950s.

Mark Cherrill APFS AIFP, Partner, Incisive Wealth Strategies LLP.

1 Harry Markowitz, Nobel prize-winning American economist and originator of modern portfolio theory.

Sources:
- S&P 500 - Standard & Poor’s Index Services Group
- Five-Year US Treasury Notes - Morningstar
The risk of inflation

NICK SMITH

"In a world of inflation the biggest risk for investors is not taking risk"

Today we live in a world of financial repression, as is often mentioned across the pages of this magazine. One of the key elements we are likely to see during financial repression is elevated levels of inflation. Investors and their clients should see this as a major threat to portfolios, and asset allocations need to be adjusted to accommodate this. In a world of inflation the biggest risk for investors is not taking risk. Investors therefore need to reassess their views of so-called low risk assets, and create well-diversified portfolios that are able to adjust to inflation surprises and minimise potential losses.

Inflation – where will it go

We believe that we are now at the beginning of a long period of financial repression which could last many years. Looking back at other eras of financial repression, such as that shown in figure 8, you can see that after World War II the US debt-to-GDP (Gross Domestic Product) level was 122%; it took decades of financial repression for it to reach 30% in the late 1970s. This reduction of debt-to-GDP was previously achieved by the value of debt being eroded by inflation.
Currently we are at the beginning of an era of financial repression much like the one shown in figure 8. Research we have conducted shows that during periods of financial repression and deleveraging, like the one we are in now, there is a much greater likelihood of upside inflation surprises. Our research shows that inflation often surprises, a little like ketchup in a bottle; when you shake the bottle none comes out for some time, and then it all comes out at once. During deleveraging these kinds of events are much more likely; this will have the effect of rapidly rising bond yields, falling bond values and the erosion of cash deposits. Therefore those investments that you now see as low risk could well become much riskier.

In the US in the 5 years following World War II, debt was still in excess of 90% GDP and the average inflation rate was 13.3%. However, during this period the level of inflation was itself volatile. In fact, 95% of the time it exceeded or fell short of the average by as much as 20%.

In contrast, in the 10 years following major deleveraging where debt-to-GDP was below 90%, inflation averaged 4.1%. During this period inflation was much less volatile, staying much closer to the average. In fact, 95% of the time it exceeded or fell short of the average by 8%. Therefore, inflation surprises are much more likely in periods of major deleveraging, and the implications for asset allocation in these periods are profound.

How to avoid it

We believe that in the medium and long term inflation could become a problem for investors. It is therefore crucial to adjust portfolios to account for this. The only way to mitigate inflation and the potential of a significant inflation surprise is to add risk in order to generate returns in excess of inflation – ‘real returns’.

When investors need to add risk our obvious choice would be to simply to invest in equities over the long term. This has historically proven to be a relatively good investment, as is shown in figure 9. You can see that the rolling 10 year return for the MSCI World has proven to deliver real returns. However, many investors are not willing to put up with the volatility associated with a pure equity exposure as shown in figure 10. Therefore the answer to dealing with the potential of significant inflation is to look at a range of alternatives to build a diversified portfolio. Investors would, for example,
be wise to look at emerging market bonds, high yield bonds and some alternatives like defensive hedge funds to deliver potential returns in this environment.

## The risk of inactivity

We believe that in the current environment of financial repression and the elevated chances of inflation surprises, investors need to allocate actively between asset classes to target consistent and stable returns. This is particularly important in portfolios intended for lower risk clients. For example, a typical low risk UK portfolio might include a 5% to 10% cash allocation, and an allocation of between 30% and 40% to UK corporate bonds and UK Gilts. Yet still, this puts between 35% and 50% of the portfolio in assets that would be sensitive to a rise in inflation. Given the volatility preferences of such an investor this asset allocation is credible; nonetheless, it needs to be managed actively. This is particularly true of UK Gilts, which in the current environment of financial repression, with yields at rock bottom levels, offer little chance of capital appreciation. Were inflation to rise, investors could feel significant losses. Those portfolios that employ an asset allocation which is changed annually or bi-annually could well find themselves victim to these inflation surprises. Only by allocating actively to a range of asset classes can investors truly manage today’s inflation risks.
Investors need to allocate actively between asset classes to target consistent and stable returns
Nick Smith is Managing Director and Head of Retail Sales for Europe ex-Germany. Nick joined Allianz Global Investors in October 2000 as Head of UK Institutional & Retail Marketing. In November 2001 he assumed the role of Head of Retail Sales & Marketing for AllianzGI (UK). In October 2011 he was appointed Head of Retail Sales for Europe ex-Germany for AllianzGI Europe. Prior to joining AllianzGI, Nick was Head of Marketing for Investec Asset Management, and prior to that he was Marketing Manager for Standard Chartered’s fund management business. He has 29 years of funds marketing experience. He graduated from London School of Economics with a Law Degree in 1983.

Dr. Wolfgang Mader is Director and Head of Asset Allocation Strategies at risklab GmbH/AllianzGI Global Solutions. Before joining risklab, Dr. Mader was a consultant for insurance and investment advisory companies. He also worked as a researcher and lecturer at the Department of Banking and Finance at the University of Augsburg. Dr. Mader completed his studies in Business Administration at the University of Augsburg. He received his Ph.D. after defending his thesis on "Hedge Funds – Alternative Investment Strategies and Portfolio Models". He is a frequent speaker at conferences on topics related to investment strategies and risk management. He is the editor of the German editions of the standard textbooks of John C. Hull.

Neil Dwane is Chief Investment Officer Equity Europe for Allianz Global Investors, based in Frankfurt, and is responsible for all portfolio management, research and trading activities in Frankfurt, Paris and London. Neil is a member of the AllianzGI European Executive Committee, and is Chairperson of the European Equity Management Group, which consists of the most senior investment team leaders in Europe. Neil joined the Group in 2001 as Head of UK and European Equity Management from JP Morgan Investment Management, where he had been a UK and European specialist portfolio manager since 1996. He began his investment career in 1988 with Kleinwort Benson Investment Management as an analyst, later as a fund manager, before moving to Fleming Investment Management in 1992. Neil holds a BA in Classics from Durham University, and is a member of the Institute of Chartered Accountants.

Dr. Markus Franke works on research and development of dynamic strategies within the Asset Allocation Team of risklab/AllianzGI Global Solutions, as well as on investment advice for fiduciary clients. Prior to joining risklab, Markus was a quantitative researcher at Columbia Business School and Ludwig-Maximilians-University München (LMU), worked as Investment Banking Analyst at Merrill Lynch, and gathered experience in the Equity Derivatives Group of J.P. Morgan. Markus holds a Ph.D. in quantitative finance from LMU München, and obtained a diploma in business administration and economics from WHU-Otto Beisheim School of Management.
Mark Cherrill started in financial services in 1979 by joining a local, forward-thinking IFA firm. He moved to Mercers (the international actuarial consultants) in 1983, before starting an advisory firm in 1986. From the mid-90s Mark worked in London with advisory firms, normally allied to the accountancy profession, rising to Director of the financial services arm of Mazars, the international accountancy firm. Mark and Andrew Jenkins formed Incisive Wealth Strategies LLP in 2005, advising high net worth clients and developing mathematically optimised investment strategies. Mark is a Chartered Financial Planner, gaining that status as it was introduced, in 2006.

Peter Schmidt is an analyst within the Asset Allocation Strategies Team of risklab/AllianzGI Global Solutions – Global Solutions. He is primarily responsible for Risk Management. He also works as a Lecturer in Finance at the Munich University of Applied Sciences. Peter Schmidt holds a Diploma in Mathematical Finance from the University of Constance.