Portfolio management: the tale of the mattress

Partners Group Research Flash June 2013

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EXECUTIVE SUMMARY

The current market environment, characterized by low yield levels, poses significant challenges to pension funds globally. Substantial portfolio allocations to asset classes regarded as defensive, such as government or investment grade bonds, and a high propensity to hold cash further aggravate the situation.

Given these starting conditions, pension funds will struggle to reach the target returns they require to meet their long-term payment obligations to pensioners. In other words, today’s pension fund behavior of keeping the majority of their portfolios in low-yielding investments could be characterized as keeping the money under the mattress, rather than putting the capital to work.

Picking up the mattress metaphor, the implications of putting part of the money under the mattress are being examined in an overall portfolio context. While to be taken with a pinch of salt, the mattress experiment demonstrates in a very intuitive way how something that might feel safe in the short term by lowering volatility actually increases the risk of missing long term return targets.

The paper goes on to illustrate that the government bond allocation shares some characteristics with the mattress allocation today: a low yield level, capped upside potential and substantial downside risk in a scenario of heightened inflation.

Turning to an overall portfolio angle again, it is shown that public equities alone are unlikely to fill the return gap by the low yields on public debt and cash: given current pension fund allocations, public equities would need to return >16% every year to close the gap, a scenario which is deemed unlikely against the backdrop of current earnings yields and a low growth environment.

Accepting that the traditional approach of allocating the portfolio to equities and bonds seems to be unsuitable from a forward-looking standpoint, it is argued that a new asset allocation paradigm is needed in order to adapt to today’s market environment of asset inflation. A superior risk/return profile is possible by 1) putting capital to work (i.e. reducing the allocation to defensive assets such as bonds, with limited return potential and an asymmetric risk profile) and 2) investing for the long term by considering the whole liquidity spectrum, including private markets.

Using this understanding, we argue that rather than allocate private markets investments to a separate “alternatives” bucket within a portfolio, private markets assets should sit alongside their respective public market equivalents – i.e. private equity alongside public equities – enhancing the returns of the single asset classes.

Institutional investors applying this concept with a large private markets allocation have achieved long-term outperformance relative to their peers over the last decade.
HOW TO DEAL WITH THE CHALLENGES OF A LOW YIELD ENVIRONMENT

Low interest rates may be the most significant risk incurred by the generation currently saving for retirement, posing considerable challenges for pension funds as will be demonstrated below. The most evident examples of the low interest rate environment are ten-year government bond yields, which have been quoted below 2% across the three major developed economies over the more recent past. Other asset classes such as core real estate, investment grade and high yield corporate bonds are increasingly subject to the low yield environment as well. In addition to the low base rate, those assets are also subject to compressed spread levels. There is no doubt that there are fundamental drivers supporting below average yield levels, such as the macro environment characterized by low growth causing real rates to be capped and the (still) relatively benign inflation levels. Still we are convinced that the major reason behind today’s low yield environment is the liquidity injected into the financial system by central banks, also referred to as financial repression. Distortions occur directly (for example when a central bank buys government debt or mortgage-backed securities, driving up prices and thereby reducing yield levels), via financial intermediaries such as banks (by being able to pledge securities with the central banks in exchange for cash) or indirectly by encouraging increased risk taking, which seems to be affecting disproportionately the asset classes deemed as “safe” by investors. The credit cycle and the “waves of optimistic and pessimistic sentiment” that seem to be driving it may well amplify distortions with investors’ expectations about future developments turning irrationally exuberant in an upswing.

How do pension funds react against this backdrop? In order to examine how pension funds cope with the current situation, a natural starting point is to have a closer look at their asset allocations:

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1 Per 31 March, ten-year government bond yields stood at 1.85% in the United States, 1.29% in Germany and 0.55% in Japan.
2 As result of combining the effects of low base rates and compressed spreads, high yield bonds for example are trading near the lowest absolute yield to maturity levels since inception of the then so-called junk bond market in the early 1980s.
Most eye-catching are the allocations to bonds and cash: pension funds in Switzerland, continental Europe and the UK have allocated about half of their portfolios to those two asset classes. There is no doubt that this has increased returns and lowered risk in the past: a benign inflationary environment characterized by falling interest rates since the early 1980s provided a substantial tailwind for bond portfolios as shown in Exhibit 2 below.

From a forward-looking perspective, we see two issues associated with such positioning: first, at such extremely low yield levels on half of the portfolio, pension funds will struggle to meet their long-term return targets, which typically lie between 4-8%. Second, should interest rate levels rise, the bond portfolio is likely to experience significant losses. As regular readers of Partners Group publications know, we have been concerned for several years about a massive asset price inflation, which is not anchored in sustained economic progress but driven by liquidity (see info box on the following page). This results in significant value destruction for most pension funds and retirement savings. The return gap pension funds are currently incurring – and the potential bond losses associated with a rise in interest rates – are discussed in more detail below.

An important implication of pension funds positioning themselves according to standard portfolio theory is that, while the risk in terms of monthly standard deviation is low due to the high bond allocation, the risk of not actually being able to honor future obligations to pensioners is substantial given the low yield environment. How to deliver the required 4-8% p.a. if half of the portfolio has a maximum return of less than 2%? Metaphorically speaking, one could ask whether pension funds are keeping their money under the mattress.

4 Typical pension fund return targets range between 4-4.7% for Europe (Source: Swisscanto Study 2012, undisclosed German pension fund) and 7.5-8% for the United States (Source: NASRA Survey, Goldman Sachs).
6 For the avoidance of doubt: we acknowledge that there are valid reasons for a private individual to keep part of her/his wealth "under the mattress" in the sense of holding investments in a tangible format, be it in the form of cash, gold, jewelry or real assets, such as real estate. Examples for such reasons are (immediate) liquidity needs, banking fees (for low incomes), bank default risk or confiscation risk to name a few.
Since the onset of the financial crisis, the four major central banks (the US Federal Reserve (Fed), the Bank of England (BoE), the ECB and the Bank of Japan) have increased the monetary base by unprecedented amounts, more than doubling the size of their combined balance sheets since the end of 2007. We believe this tide of excess liquidity is leading to asset price inflation as already witnessed in a number of asset classes, for example, the record low yields from high-yield corporate bonds. We agree with the general consensus that broad inflation rates should remain anchored in the near future. However, as we have pointed out many times before, inflation will not initially be felt by the average consumer and it will also not be reflected in conventional inflation measures, such as Consumer Price Indices. Instead, we envisage that eventually liquidity will search for higher yielding assets, finding its way – for example – into equities and real estate. As a result, rising equities and home prices should lift private wealth, to the extent where supply may not be able to meet demand as a consequence of capacity limitations. As these developments become embedded in the economy, inflation should accelerate across the board. In addition, given low overall growth and fiscal austerity, central banks are likely to move behind the curve with reducing their highly accommodative monetary policy stance. Already, some central banks have forfeited some of their independence, partially driven by pressure from fiscal policy makers (e.g. Japan). As such, we expect inflation expectations to take off once a recovery sets in and confidence picks up.

For now, inflation expectations remain anchored. In some economies, however, a flight into real assets can already be observed: Germany and Switzerland, countries that did not experience a real estate correction during the crisis, are seeing considerable real estate price increases.

Source: Partners Group, Bloomberg
THE MATTRESS EXPERIMENT

Why not put the money under the mattress – isn’t that the epitome of safety? While this form of “investment” is not totally uncommon for private individuals, it is not widely applied throughout the institutional investment world to say the least. Nevertheless, let’s quickly digress and follow the mattress train of thought for the moment – putting it in the context of a typical pension fund portfolio. In order to examine the mattress’ impact on the overall portfolio, its risk-return characteristics need to be defined as a starting point. With regards to the expected return, the mattress allocation returns 0% in almost all years. What about the risks of keeping the money under the mattress? For the sake of simplicity, we focus on what we believe are the two main risks: burglary (the money being stolen) and fire (the house burning down), which are both assumed to result in a total loss, i.e. a return of -100%. Table 1 below summarizes our research into the statistical risk of burglary:

<table>
<thead>
<tr>
<th>Table 1: Money under the mattress - burglary risk</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing units in the United States</td>
<td>132'312'404</td>
<td>100.00%</td>
</tr>
<tr>
<td>Burglary offenses in the United States per annum</td>
<td>1'919'600</td>
<td>1.45%</td>
</tr>
<tr>
<td>... whereof relating to residential houses</td>
<td>1'430'740</td>
<td>1.08%</td>
</tr>
<tr>
<td>Lock the door carefully: only 60.3% of burglaries involve forcible entry</td>
<td>952'814</td>
<td>0.72%</td>
</tr>
<tr>
<td>9.5% of forcible entries are unsuccessful</td>
<td>862'508</td>
<td>0.65%</td>
</tr>
<tr>
<td>11.7% of burglary cases are cleared by the police</td>
<td>761'594</td>
<td>0.58%</td>
</tr>
<tr>
<td>Cases where money is lost due to burglary</td>
<td>761'594</td>
<td>0.58%</td>
</tr>
</tbody>
</table>

Relating the number of housing units to the number of burglary offenses and singling out the relevant cases, we find that the chance of losing money due to burglary in the US is 0.58% or 1 in 174 years. Similar considerations for Switzerland result in a chance of 0.43% or 1 in 233 years. As per Table 2 on the next page, the risk of the house burning down seems to be much less of a concern.

7 The reader is asked to take the mattress experiment with a pinch of salt. While we have collected data to the best of our knowledge from what we believe are reputable sources and used as plausible and as few assumptions as possible, we are sure there are professional experts who are able to give a much better assessment when it comes to insuring a house against burglary or fire risk. Rather, the purpose of performing the mattress experiment is limited to illustrating the presence and effect of asymmetrical return distributions in an overall portfolio context.

8 The findings are based on data from the respective agencies and a number of simplifying assumptions. Sources: U.S. Department of Commerce, Census Bureau, Statistical Abstract of the United States: 2012, US Department of Justice, FBI - Uniform Crime Report 2011, Bundesamt für Statistik, Polizeiliche Kriminalstatistik Schweiz Jahresbericht 2011. Simplifying assumptions relate to a pro-rata application of certain circumstances where more granular data is missing (e.g. assuming that the percentage of forcible entries is the same for both US burglary offenses in general and those burglary offenses concerning residential houses only).

Table 2: Money under the mattress - fire risk

<table>
<thead>
<tr>
<th></th>
<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing units in the United States</td>
<td>132'312'404</td>
<td>100.00%</td>
</tr>
<tr>
<td>Home structure fires in the United States per annum</td>
<td>370'000</td>
<td>0.28%</td>
</tr>
<tr>
<td>... whereof affecting the whole floor, building or even multiple buildings</td>
<td>90'100</td>
<td>0.07%</td>
</tr>
<tr>
<td>Adding 7% of the single room fires affecting the bedroom</td>
<td>94'531</td>
<td>0.07%</td>
</tr>
<tr>
<td>Installing a sprinkler reduces the expected damage by 69%</td>
<td>29'305</td>
<td>0.02%</td>
</tr>
<tr>
<td>Cases where money is lost due to fire</td>
<td>29'305</td>
<td>0.02%</td>
</tr>
</tbody>
</table>

We find the chance of losing money due to fire in the US is 0.02% or 1 in 4515 years. Similar considerations for Switzerland result in 0.03% or 1 in 3208 years.

Furthermore, we assume that the house burning down and being robbed are independent of each other and also of financial asset performance. Probability theory tells us that the combined chance of the house burning down and/or being robbed is 0.52% or once every 193 years\(^\text{10}\). From a statistical viewpoint, the probability distribution of the mattress allocation can be compared to tossing an unfair coin with heads = “the money is safe (in almost all cases)” and tails = “the money is lost due to burglary and/or fire (in very rare cases)”. The first two moments therefore can be found using the binomial distribution\(^\text{11}\), resulting in an expected return of the mattress allocation of -0.52% p.a. and the risk expressed as annual standard deviation of 7.17% p.a.

Summarizing the risk/return characteristics of the mattress allocation we obtain:

<table>
<thead>
<tr>
<th>Expected return</th>
<th>-0.52% p.a.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard deviation</td>
<td>7.17% p.a.</td>
</tr>
<tr>
<td>Correlation</td>
<td>0 to all other asset classes</td>
</tr>
</tbody>
</table>

**AN OPTIMAL MATTRESS ALLOCATION?**

Having defined its risk/return characteristics, we are ready to put the mattress allocation into the mix of portfolio optimization, applying standard portfolio theory. Next to the mattress, four assets have been included: bonds, equities, core real estate and alternatives\(^\text{12}\). Furthermore, forward-looking expected returns based on current yield characteristics of the various asset classes have been used. Volatilities and correlations have been derived from historical benchmark index return data.

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\(^{10}\) The combined probability is \(P(A \text{ and/or } B) = P(A) + P(B) - P(A \text{ and } B) = P(A) + P(B) - P(A) \times P(B)\), resulting in 0.517% or once every 193 years. Average fire and burglary probabilities from US and Swiss data have been used.

\(^{11}\) The binomial distribution yields the probability of a number of successes in a sequence of independent coin tosses, each with success probability \(p\). Its expected return equals \(n \times p\) and its variance is given by \(n \times p \times (1 - p)\). For the mattress allocation, using \(p=0.52\)% and \(n=1\) results in an expected return of -0.52% p.a. and an annualized standard deviation of 7.17%.

\(^{12}\) Private market investments have been excluded deliberately in order to reduce complexity and to single out the effect of adding the mattress for this chapter. The effect of adding private market investment to a typical pension fund portfolio is discussed in more detail in subsequent chapters.
Portfolio management: the tale of the mattress

Exhibit 3: Optimal portfolios and the mattress

The result is somewhat puzzling at first sight: a sizeable mattress allocation for “low risk” portfolios\(^{13}\). Furthermore, a portfolio containing a 20% allocation to the mattress can be found which achieves a similar expected return with a lower volatility compared to the average pension fund allocation\(^{14}\). Let’s shed some light on this rather puzzling result. It will come as no surprise to readers who are familiar with the mean-variance portfolio theory developed by Markowitz more than 60 years ago that the reason lies in an erroneous assumption regarding the underlying distribution of the mattress allocation. Traditional portfolio theory is based on the symmetrical normal distribution, which means that an asset’s risk/return characteristics are solely defined by its expected return and standard deviation\(^{15}\). However, we know that the mattress returns follow a different distribution in reality, one which is highly asymmetrical. In other words, standard portfolio theory treats the mattress as a normally distributed investment with an expected return of -0.52% and a standard deviation of 7.17%. To illustrate this further, this implies that about two thirds of the time returns will end up within the one standard deviation range around the mean (in this case between -7.69% and +6.65%). However, having modeled the returns of the mattress allocation above, we know that the mattress will never return more than 0%! Exhibit 4 illustrates the assumed versus the actual distribution of the mattress allocation.

\(^{13}\) Low risk portfolios are approximated by the area labeled “mattress zone” in the left chart of Exhibit 3. Depending on the country chosen, the mattress is part of efficient frontier portfolios up to a target return of 3.1%, receiving allocations of >30% in some cases.

\(^{14}\) While Exhibit 3 shows the risk/return of the current average pension fund allocation in the blue dot, the red dot represents the risk profile of a portfolio containing a 20% mattress allocation with the same expected return but a lower expected risk.

Portfolio management: the tale of the mattress

As the assumption regarding the underlying return distribution of the asset is flawed, traditional portfolio optimization captures neither the limited upside of the mattress, nor its extremely high tail risk. Another reason for the positive allocation to the mattress lies in the very definition of the quarterly standard deviation as a risk measure. A positive allocation to the mattress lowers the volatility with only a marginal impact on returns – as the opportunity cost versus bonds and cash is limited in a low yield environment. At the same time, putting money under the mattress will certainly not help a pension fund to reach the target return required to match its long-term liabilities!

What, then, should we make of these results – to what extent is the mattress experiment relevant for today’s pension fund asset allocation?

**BONDS DON’T SOLVE THE PROBLEM EITHER!**

Asymmetrical return distributions, such as those seen in the mattress metaphor, can be observed in a couple of other places in today’s financial market environment, most evidently in the bond markets. Taking today’s government bond yields as an example, we observe very low levels of yields of between 0-2% for government bonds from countries deemed as risk-free.

It can be argued that from a long-term perspective, the expected return of an allocation to bonds is at maximum the current yield to maturity. To illustrate this, unless someone is able to successfully time the market, the following holds true: if a bond trading at a 2% yield-to-maturity returns 4% over the next twelve months, the expected return over its then remaining

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For this study quarterly data have been used. Typically, even shorter time horizons such as monthly or weekly are applied.

Whether those bonds are really risk-free is left for a different discussion. Deducting the respective costs of corresponding insurance results in yield levels that are approximately 50bp lower, although the sovereign credit default swap market shows limited liquidity since Greece was ruled not to be a default event.

Slightly less due to the non-zero default risk.

While there might be smart people out there who have the ability to time the bond market, we certainly don’t consider ourselves to be among them. More importantly, we believe it’s a fair assumption that pension funds as a whole group can’t get around the low yield issue by timing the market.
lifetime will be less than the 2%. Any above-trend year has borrowed from the bond’s remaining return potential! Furthermore, the risk of temporary mark-to-market losses is heavily skewed to the downside – one example are Swiss government bonds that have recently been trading at yield to maturity levels of less than 0.7%. While the maximum capital gain is limited to less than 6%, the mark-down in an inflation-scare scenario (e.g. pushing yields up to 4%, which is still below their long-term average) would result in mark-to-market losses of more than 20%. Exhibit 5 shows potential mark-to-market changes should bond yields move to absolute 0% versus increasing to their long-term average:

<table>
<thead>
<tr>
<th>10-year government bonds</th>
<th>Scenario</th>
<th>Yield change</th>
<th>10y yield level</th>
<th>Outcome</th>
<th>Change in bond value</th>
</tr>
</thead>
<tbody>
<tr>
<td>European bonds</td>
<td>Decrease</td>
<td>-121 bps</td>
<td>0.00%</td>
<td></td>
<td>+11.7%</td>
</tr>
<tr>
<td></td>
<td>No change</td>
<td></td>
<td>1.21%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase</td>
<td>+484 bps</td>
<td>6.00%</td>
<td></td>
<td>-32.3%</td>
</tr>
<tr>
<td>US government bonds</td>
<td>Decrease</td>
<td>-170 bps</td>
<td>0.00%</td>
<td></td>
<td>+16.6%</td>
</tr>
<tr>
<td></td>
<td>No change</td>
<td></td>
<td>1.70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase</td>
<td>+537 bps</td>
<td>7.00%</td>
<td></td>
<td>-37.3%</td>
</tr>
<tr>
<td>Swiss government bonds</td>
<td>Decrease</td>
<td>-61 bps</td>
<td>0.00%</td>
<td></td>
<td>+5.4%</td>
</tr>
<tr>
<td></td>
<td>No change</td>
<td></td>
<td>0.61%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase</td>
<td>+339 bps</td>
<td>4.00%</td>
<td></td>
<td>-23.6%</td>
</tr>
</tbody>
</table>

Source: Partners Group, Bloomberg, SNB, Bundesbank, current yield levels as of April 2013. Ten-year average government bond yield levels over the period from 1980 to 2010 rounded (CH: 3.96%, USA: 7.07%, Germany: 6.05%).

The distribution of bond returns from today’s perspective materially differs from what historical averages would tell investors – depending on the country, over the last 30 years bonds showed historical returns of between 4-7% p.a., with a standard deviation of ~4%. Using the understanding from the scenario analysis above – as in the mattress case – from today’s perspective we know for sure that a government bond portfolio will not return positive 7%, despite traditional portfolio theory assigning a material positive probability to it. Exhibit 6 shows a normal distribution using the historical risk/return characteristics of a Swiss government bond compared to an illustration of the current risk/return profile.

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20 Assume a bond with an annual coupon of 4% as having a coupon of 2% and a maturity of two years. At a 2% yield to maturity, the bond trades at a price of ~104 (in the following two years it will earn two times 4 CHF coupon and lose CHF 4 in price being paid back at 100, resulting in a total gain of 4 CHF over a period of two years, which is approximately 2%. If the bond returns 4% in year one, its price will remain at 104 (4 CHF coupon gain, no price change = total gain of 4 CHF, which is approximately 4%). The expected return for year two is then 0%: trading at a price of 104, the bond will lose 4 CHF as it is paid back at 100, but gain 4 CHF with the coupon. Performance has been borrowed in year one from year two.

21 Assuming yields don’t fall below zero, which admittedly has been observed temporarily during periods of heightened risk aversion for shorter-dated Swiss and German government bonds.

22 Source: Partners Group, Bloomberg, SNB, Bundesbank, over the 30-year period from 1980 to 2010.
In striking analogy to the mattress, the illustration shows that the current distribution of returns has limited upside potential and a higher risk on the downside compared to a normal distribution based on historical risk/return characteristics. We conclude that the government bond allocation in today’s pension fund portfolios causes potential problems which are not too dissimilar from the mattress allocation. While government bonds exhibit the most obvious asymmetry with regards to return distributions, similar considerations can be applied to other asset classes with compressed yield levels, such as high yield bond spreads or core real estate capitalization rates for certain trophy assets.

WILL EQUITIES FILL THE GAP?

From the previous chapter we have seen that pension funds are unlikely to meet their targets of 4-8% p.a. from return contributions stemming from their current bond allocation. As a next step, we aim at quantifying the return gap arising from the current low yield environment. Going back to the average asset allocation of pension funds, which has been the starting point for this publication, we can break down the components of the target return into the contribution of the single asset classes. In order to ascertain the expected return contribution of an asset class to the overall portfolio, its allocation is multiplied by its expected return, e.g. for bonds we get 0.7% x 39% = 0.3% for Swiss pension funds. Summing up the return contributions across the differently yielding asset classes and subtracting them from the target return, we obtain a return gap of 3.3% as outlined in Exhibit 7.
Portfolio management: the tale of the mattress

Exhibit 7: Can equities fill the gap?

Staying within the realm of traditional asset allocation for the moment, the only candidate left to close the gap in pension funds’ current portfolios is the public equity allocation, which represents less than 20% of a typical European pension fund portfolio. A quick calculation on the back of an envelope tells you that if you need to achieve a contribution of 3.2% from a fifth of the portfolio, the equity allocation needs to return >16% every year, which is equivalent to public equities doubling in value every five years. Unfortunately it is not possible to precisely ascertain what the future holds in store regarding equity returns. More than 16% p.a. certainly seems to lie at the high end of what is typically assumed regarding the equity risk premium or compared to a current earnings yield of less than 7%.

HOW TO TACKLE THE LONG-TERM RETURN GAP

By using the mattress experiment, examining the current risk/return characteristics of bond allocations and analyzing the gap in returns, we conclude that the current market environment poses significant challenges to pension funds. Moreover, we believe it will be difficult to meet future obligations while sticking to traditional asset allocation approaches. Turning our attention to the search for solutions, institutional investors will have to look beyond the rim of their teacup. A new asset allocation paradigm is needed in order to prepare for the challenges to come. We are convinced that a better risk/return profile can be achieved by adopting two steps designed to improve overall asset allocation:

Step 1: Put capital to work

Adopt a new concept of risk: rather than allocating 50% to bonds and cash, thereby keeping short-term portfolio volatility in check, pension funds are advised to draw their attention to the main long-run risk they face – reducing the probability of not being in a position to meet future payment obligations to pensioners. Therefore, allocations with limited return potential need to be reduced and capital has to be put to work in order to earn a decent rate of return. In other

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23 Return gap analyses across different regions/countries lead to similar conclusions. In the US, the return gap is higher due to target returns in the range between 7.5 and 8%, the higher typical equity allocation of ~50% keeps the required public equity return in the 11-12% range, however. The gap is most pronounced in continental Europe, where the small equity allocation of <20% leads to a required equity return of >17% p.a.

24 Typical assumptions for the equity risk premium range between 4-6%. Historically, equities have earned a 6.3% real return p.a. over the last 200 odd years. Source: Ilmanen, Antti – “Expected Returns”, (2011), which provides a good overview over research regarding the equity risk premium.
words: putting the money under the mattress won’t suffice to pay out the promised pensions in the future.

**Step 2: Invest for the long term**

Furthermore, pension funds are advised to take a long-term view linked to the retirement planning of pensioners, rather than focusing on short-term liquidity – as requested by most regulatory frameworks aimed at institutional investors such as banks or insurance companies, which are driven by more short-term risk considerations (e.g. Solvency II). Adopting a holistic approach across the liquidity spectrum allows the addition of private market investments to the overall asset allocation, capturing the full set of investment opportunities per asset class. We argue that private markets should sit alongside public market assets within the individual categories, enhancing the returns of the single asset classes. Conceptually, this entails the construction of portfolios according to the allocations to different risk premiums. Using this understanding, the equity risk premium comprises public equity and private equity, the credit risk premium comprises public debt and private debt and the real estate risk premium comprises core investments complemented with opportunistic and value-added investments. Especially with regards to investments that provide the portfolio with protection against rising inflation, private markets offer investment options that are not available to public investors, e.g. in the infrastructure and real estate asset classes.

As a drawback, private markets come with lower liquidity and require long-term commitments as well as a high degree of specialization when it comes to the selection and management of the investments. We acknowledge that each investor has to find its own individual mix of how much to allocate to private markets across asset classes, depending on regulation, liquidity needs, target returns, asset-liability structures and various other factors. Living up to this philosophy, the pension fund of Partners Group has opted for an overall target allocation to private market investments of 35%, sub-divided into these different categories: equities, credit, real estate and infrastructure. Exhibit 8 below schematically shows how the expected risk/return profile can be improved adopting the steps outlined above:

![Exhibit 8: Attractive risk/return profile possible](image-url)

**Source:** Partners Group, using expected return assumptions outlined above. For private markets, the following expected returns have been used: \( E[\text{private equity}] = \text{public equity} + 4\% \), \( E[\text{private debt}] = 3\% \text{LIBOR} + 5\% \), \( E[\text{private real estate}] = \text{core real estate} + 2\% \), \( E[\text{private infrastructure}] = 3\% \text{LIBOR} + 6\% \). Volatilities and standard deviations of the asset classes have been derived from historical quarterly returns between 12/31/1994 and 12/31/2012. The Partners Group Pension Fund has a strategic asset allocation of 35% to private markets. Efficient frontier added to the graph for illustrative purposes only.
INVESTORS LEADING THE WAY

How have other investors that adopted a similar approach fared historically? As a matter of fact, certain groups of investors have been early adopters of the trend to include significant private market allocations in their overall approach. Exhibit 9 shows that some of the most reputable investors among North American pension and endowment funds have invested a substantial portion of their assets in private markets, achieving superior results over the last ten years:

Exhibit 9: Long term outperformance with a significant private market allocation

<table>
<thead>
<tr>
<th>Returns p.a.</th>
<th>Allocation to private markets</th>
<th>5-year</th>
<th>10-year</th>
<th>Outperformance vs. U.S. pension funds over 10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.K. pension funds</td>
<td>1%</td>
<td>1.9%</td>
<td>2.1%</td>
<td></td>
</tr>
<tr>
<td>U.S. pension funds</td>
<td>5%</td>
<td>0.4%</td>
<td>1.0%</td>
<td></td>
</tr>
<tr>
<td>Endowments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvard Management Company Endowment</td>
<td>16%</td>
<td>1.2%</td>
<td>9.5%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Yale Endowment</td>
<td>35%</td>
<td>1.8%</td>
<td>10.6%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Pension Fund</td>
<td>Canada Pension Plan</td>
<td>37%</td>
<td>2.2%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>


The implications of such differences in annual performance rates are not to be underestimated. Exhibit 10 shows the potential outperformance compounding over a pensioner’s life – modelling an annual contribution of 100 over a typical total employment period of 40 years:

Exhibit 10: A simple calculation – but a severe impact on society

Source: Partners Group illustration, see Exhibit 9.

The difference between pension fund investments compounding at a rate in-line with endowment returns over the last ten years, compared to what the average pension fund would return, can result in up to 10.6x more retirement savings over a pensioners working life. A simple calculation – but a potentially severe impact on society.
CONCLUSION

In summary, we find that today’s low interest rate environment poses significant challenges to global pension funds. The low yields on various parts of portfolios lead to a gap versus target returns which is unlikely to be closed by the performance of public equity portfolios. A new asset allocation paradigm is needed in order to deal with future challenges. Firstly, capital needs to be put to work and allocations to asset classes with limited return potential and asymmetric risk profile need to be reduced.

Pension funds are advised to focus on the very real risk of not being able to fulfil payment promises to pensioners, rather than reducing their monthly standard deviation. Unless portfolios are re-positioned such that they are equipped with the necessary return potential, pension funds risk an uncertain future. Target returns will definitely not be reached by keeping money under the mattress. Furthermore, we advocate a long-term investment approach, taking into consideration the full liquidity spectrum of investments and thereby including private markets investments as part of the overall asset allocation, alongside their public counterparts.
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