

## Rethinking Risk: Pension Plans Should Adjust to Global Realities

External influences are constantly reshaping American businesses, which either adapt to the changing environment around them or risk extinction. The gasoline shortage and oil crisis of the 1970s, for example, combined with technological advances in the manufacturing of jet airplane engines, led to the elimination of some overbearing regulations in the airline industry, which increased competition and ultimately lowered transportation costs for consumers.



**Jeff Helsing**

Senior Vice President  
Product Manager

In our view, high government debt levels, greater volatility and low return expectations will force pension plans to make adjustments similar to the forces that encouraged change in the airline industry. For example, while most plans have guidelines that strictly limit the amount of exposure the plan might have to emerging markets, changing global growth dynamics are encouraging a fresh, new look at allocations to this asset class.

The rules and investment policies that currently guide investment decisions are likely to be challenged by the conditions mentioned above, in particular:

- Many investment portfolios could actually have a shorter duration than investors realize.
- Credit investments carry higher levels of equity beta (higher sensitivity to equity returns) than investors may recognize.
- Emerging markets do not carry the same risk levels as they did when investment guidelines were written.

These issues are all related to the higher debt levels in many developed countries and better initial conditions for select emerging market countries.

### **Accounting for willingness and ability to pay**

As most pension plan administrators know, duration is a linear approximation of the sensitivity of a bond to changes in interest rates. For example, the price of a bond with an effective duration of two years will rise two percent for every one percent decrease in its yield. Pension plans rely heavily on such linear estimates to assess the sensitivity of both their assets (investments) and their liabilities (retirement claims). However, on the asset side of the plan's investments, investors need to be aware that their durations may be "overstated" due to an assumption used by most index providers – namely, that coupons and principal

---

## What is a CDS?

Credit default swap (CDS) is the most highly utilized type of credit derivative. In a CDS, one party sells risk and the counterparty buys that risk. The seller of credit risk -- who also tends to own the underlying credit asset -- pays a periodic fee to the risk buyer. In return, the risk buyer agrees to pay the seller a set amount if there is a default (technically, a credit event). CDS are designed to cover many risks, including defaults, bankruptcies and credit rating downgrades.

Please keep in mind that credit derivatives such as CDS carry risks and costs. For more information on CDS risk, please read the disclosures at the end of this article and visit the education section of PIMCO.com.

are actually paid in accordance with the security details. Markets are challenging this assumption with certain European sovereigns, which used to be viewed as being essentially void of default risk.

One of the attributes used to account for the likelihood that coupons and principal are paid on time is debt relative to the income a country or company can generate to pay those claims. John Maynard Keynes, the acclaimed British economist, captured this attribute well in the early 1900s when he said, "Owe your banker £1000 and you are at his mercy; owe him £1 million and the position is reversed." In other words, when the debt stock becomes relatively high, it becomes increasingly questionable as to whether the issuer will be willing, or in some cases able, to pay creditors. Given the amount of debt in the government sector in several advanced economies, what used to be considered pure interest rate duration is taking on characteristics of credit risk. This means that investors need to incorporate more of the issuer's willingness and ability to pay into their risk assessments.

## How CDS affect duration calculations

Factoring in the likelihood of default and recovery implied by market measures such as credit default swaps (CDS) can cause a meaningful change in duration. For example, consider a bond with an annual coupon and one-year maturity issued today. If the bond has no default risk, then it has a one-year duration. Let's say, however, that the CDS hypothetically implies a 10% chance of default within the year. When we adjust the duration to reflect this new weighted probability implied by the CDS, the duration (default risk) adjusts to .92 years rather than the one year we started out with.

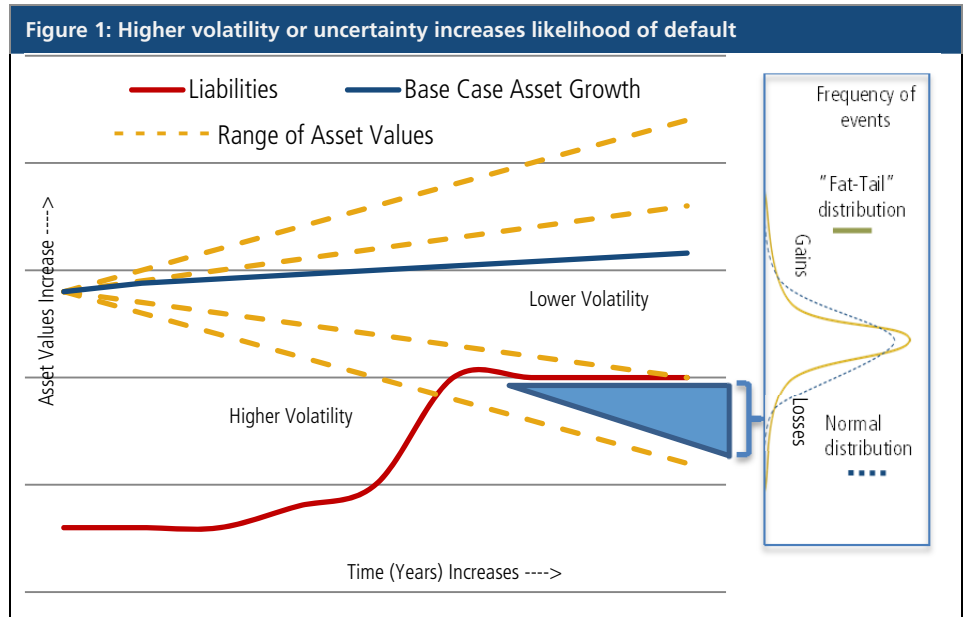
This illustration is simple because it uses an annual pay coupon with a one-year maturity. When applying the same type of analysis to the securities held in a portfolio, or for the various indexes that are often used in fixed income markets, the adjusted results can be even more dramatic.

For example, we believe that the duration for the Barclays Government Credit Index and the Barclays Credit Index may have been overstated by more than  $\frac{3}{4}$  of one year to 1.4 years respectively, using market implied default measures at the end of the third quarter of 2011. The reason we believe duration is actually lower than most data services and indexes provide is that we incorporate the default risk for all of the securities in the indexes and apply a factor to their coupons and principal payments to reflect the chance that those cash flows will not be received. In other words, as default risk increases, we believe duration calculations should factor in the probability that some payments of coupon or principal will not be paid.

Some observers may argue that a bond's yield already reflects a discount for default risk, and therefore there is no need for additional consideration for default risk when reassessing durations. But we believe that when we factor in the (low) probability that principal and coupons will be paid until maturity, duration is significantly lower.

Figure 1 illustrates why this issue is more relevant today than it has been in the past. Let's assume we are looking at the assets and liabilities of a company, where the base case for asset growth is the dark blue line and liabilities are in red. The orange dotted forecasted lines represent two ranges of outcomes, a lower and a higher range of volatility in an asset.

The shaded triangle in Figure 1 focuses on the area of a normal distribution and one with fatter tails to illustrate where the default probability is extremely likely because the assets have fallen below the value of the liabilities (i.e. negative



Source: PIMCO

**Hypothetical example for illustrative purposes only.**

Volatility is % change in plan assets.

Distribution curve on the right is a hypothetical representation of a "normal distribution" and "fat tail" distribution of investment returns, where the Y axis represents the probability of a return falling within a given range and the X axis represents returns.

equity). While, overall, the probability of default is relatively small, as highlighted by the probability distribution to the right of the shaded region, an increase in volatility increases the probability of default, which impacts the cost of capital. When looking at the balance sheets of select corporates or applying similar logic to sovereign securities, the likelihood of default increases substantially in periods where debt levels and uncertainty or volatility in the business are high (change in value of assets). As a creditor, this logic helps drive the cost of capital. In today's markets, this also helps to explain why we believe duration on the investment side of many portfolios' plan assets is probably lower than most plans estimate.

This is in contrast to the liability side of the pension plan. While pension liabilities are discounted using a credit curve, either AA or A or better depending on whether we are discussing accounting or funding liabilities, here the duration is affected by the higher spread but *not* the default probability adjustment to the cash flows. This is because the yield curves used for discounting drop the reference credits when they fall below the required rating levels. As such, plan sponsors need to consider the composition of asset and liability credit compositions carefully and realize that although a portfolio may seem to be duration- and credit-matched, in reality it may not be.

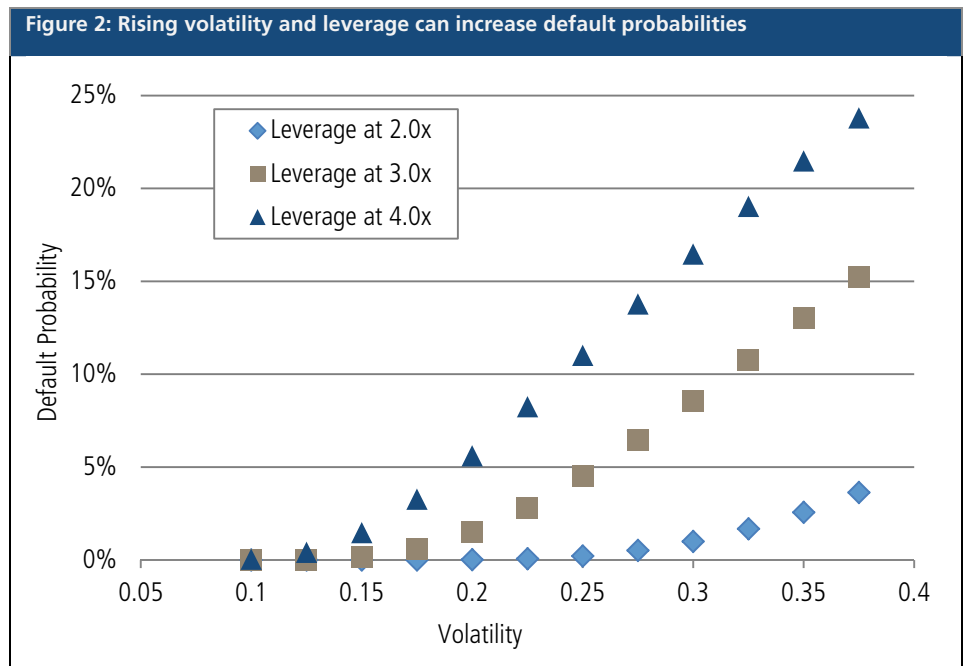
**Embedded equity betas**

Along the same lines as duration, we believe fixed income allocations in many pension plans also have more equity beta (sensitivity to equity markets), than the plans are accounting for. In credit securities, equity beta typically rises when the amount of leverage of the underlying company as well as the volatility of its underlying business rise.

The relationship is more closely correlated for levered companies because the sensitivity to default has increased, so changes in the value of assets become

more meaningful for both creditors and equity holders. Figure 2 illustrates this interplay between volatility and leverage and shows how dramatically default risk increases as leverage goes up (2.0x, 3.0x, and 4.0x leverage are shown) at various levels of volatility. The point of this analysis is to look at both leverage and expected volatility of assets, which ultimately impacts duration sensitivity and equity beta in a portfolio. This is an important point for pensions to consider, especially during periods of uncertainty, higher volatility and higher debt levels.

The interplay between leverage and default probabilities is very relevant to how ratings are determined as well. As traditional lines between investment grade corporate bonds and high yield bonds are determined mostly by similar factors of leverage and business volatility, where investment grade corporate issuers tend to have lower leverage and less business volatility than high yield rated companies.



Source: PIMCO

**Hypothetical example for illustrative purposes only.**

Volatility is % change in plan assets.

### Emerging markets and credit risk

Extending the same measurement of credit risk to emerging markets today helps support why some developing countries are becoming more interest-rate-like, where cost of capital is behaving more credit-like in developed countries. This is why pension plans need to re-evaluate if the definition of emerging markets still has much relevance in determining risk. All emerging markets are not the same – there are opportunities where we believe fundamental attributes in emerging market countries or companies compare very favorably against developed markets in terms of leverage, expected growth and volatility.

For example, Figure 3 shows the traditional credit risk information a hypothetical investor might have for Brazil and Portugal sovereign debt in 2009 and 2011, where credit risk is reflected by agency credit ratings, five-year CDS spreads (the cost of the CDS) and government debt-to-GDP ratios. These numbers show that

a pension plan's capital market allocations that were driven by standard investment guidelines in 2009 could have resulted in poor returns, as an investor might have been attracted to Portugal's superior credit rating and only modestly lower spread versus Brazil. However, by December 2011, Portugal's spread increased 1,000 bps, its credit ratings fell significantly, and debt levels increased more dramatically than Brazil's. The problem with traditional guidelines is that the lines are blurring between credit risk and interest rate risk for emerging market countries. So, investment guidelines that didn't allow investments in emerging markets, yet were seeking A/AA-rated government debt, can miss the fundamental view on actual credit risk.

Another problematic area for pension plan investment guidelines is the way the World Bank defines emerging markets – using Gross National Income per capita. Now, imagine how quirky allocations of capital would be if portfolio managers used the same general approach and allocated credit risk across a company's capital structure based on revenue per employee. In 2010, MF Global reported global revenue per employee of around \$650,000 (in the year before the company defaulted), whereas Wal-Mart reported global revenue per employee around \$200,000. Is revenue per employee, or income per person, really how you want to look at risk? Pension plans with high levels of equity exposure should consider increasing durations and credit exposure and revising their guidelines so they don't measure credit risk by simply using the World Bank's definition of emerging markets.

**Figure 3: Brazil and Portugal credit risk as measured by ratings, CDS spreads, debt**

	Dec 09 Ratings: Moody's/S&P	5yr CDS bps	Government Debt/GDP as of Dec 08	Dec 11 Ratings: Moody's/S&P	5yr CDS bps	Government Debt/GDP as of Dec 2010
Brazil	Baa3/BBB	130	39%	Baa2/BBB	165	55%
Portugal	Aa2/A+	100	66%	Ba2/BB-	1100	93%

Source: Bloomberg as of 30 December 2011

### Implications for pension plans

What does all this mean for pension plans in today's uncertain environment?

Given higher debt levels in segments of the global public sector and segments of the private sector, we believe asset volatility will likely be higher than normal for the foreseeable future – which suggests that, while default risk may be a relatively low probability, it has increased by market measures. Remember, higher default risk in fixed income portfolios decreases duration and can increase equity beta.

In the context of pension plans assets, this likely suggests:

- adding duration or increasing discretion around duration,
- using market information and metrics other than credit ratings alone in guiding portfolio construction and allocations,
- allowing increased flexibility towards select emerging market corporates and sovereigns,
- and recognizing that allocations to credit, at the expense of equity, in periods of higher volatility may reduce overall surplus or plan volatility.

The credit allocation return could be higher than traditional fixed income allocations given credit's higher equity beta, while the duration in credit could

---

further serve to reduce the volatility around the plan's liabilities, thus reducing overall plan or surplus volatility.

At PIMCO, our investment process continually re-evaluates global dynamics from both top-down and bottom-up perspectives in order to enhance capital allocation decisions. Similarly, pension plans may consider the need to re-evaluate their guidelines and their capital allocation decisions as world growth dynamics change, much like technological advances and regulations have encouraged change in other industries.

## Biography

Mr. Helsing is a senior vice president and product manager in the Newport Beach office. He previously spent eight years in the portfolio management group, with a focus on trading investment grade corporate securities. He joined PIMCO in 1999. He has 14 years of investment experience and holds an MBA from the University of Southern California Marshall School of Business. He received his undergraduate degree from Arizona State University.

Past performance is not a guarantee or a reliable indicator of future results. Investing in the bond market is subject to certain risks including market, interest-rate, issuer, credit, and inflation risk. Investing in foreign denominated and/or domiciled securities may involve heightened risk due to currency fluctuations, and economic and political risks, which may be enhanced in emerging markets. Sovereign securities are generally backed by the issuing government, obligations of U.S. Government agencies and authorities are supported by varying degrees but are generally not backed by the full faith of the U.S. Government; portfolios that invest in such securities are not guaranteed and will fluctuate in value. Corporate debt securities are subject to the risk of the issuer's inability to meet principal and interest payments on the obligation and may also be subject to price volatility due to factors such as interest rate sensitivity, market perception of the creditworthiness of the issuer and general market liquidity. Credit default swap (CDS) is an over-the-counter (OTC) agreement between two parties to transfer the credit exposure of fixed income securities. Derivatives may involve certain costs and risks such as liquidity, interest rate, market, credit, management and the risk that a position could not be closed when most advantageous. Investing in derivatives could lose more than the amount invested. There is no guarantee that these investment strategies will work under all market conditions or are suitable for all investors and each investor should evaluate their ability to invest long-term, especially during periods of downturn in the market.

Hypothetical and simulated examples have many inherent limitations and are generally prepared with the benefit of hindsight. There are frequently sharp differences between simulated results and the actual results. There are numerous factors related to the markets in general or the implementation of any specific investment strategy, which cannot be fully accounted for in the preparation of simulated results and all of which can adversely affect actual results. No guarantee is being made that the stated results will be achieved.

This material contains the current opinions of the author but not necessarily those of PIMCO and such opinions are subject to change without notice. This material is distributed for informational purposes only. Forecasts, estimates, and certain information contained herein are based upon proprietary research and should not be considered as investment advice or a recommendation of any particular security, strategy or investment product. Information contained herein has been obtained from sources believed to be reliable, but not guaranteed.

---

**Newport Beach** Headquarters  
840 Newport Center Drive  
Newport Beach, CA 92660  
+1 949.720.6000

---

**Amsterdam**

---

**Hong Kong**

---

**London**

---

**Milan**

---

**Munich**

---

**New York**

---

**Singapore**

---

**Sydney**

---

**Tokyo**

---

**Toronto**

---

**Zurich**

---

**pimco.com**

**P I M C O**

PIMCO provides services only to qualified institutions and investors. This is not an offer to any person in any jurisdiction where unlawful or unauthorized. | **Pacific Investment Management Company LLC**, 840 Newport Center Drive, Newport Beach, CA 92660 is regulated by the United States Securities and Exchange Commission. | **PIMCO Europe Ltd** (Company No. 2604517), PIMCO Europe, Ltd Munich Branch (Company No. 157591), PIMCO Europe, Ltd Amsterdam Branch (Company No. 24319743), and PIMCO Europe Ltd - Italy (Company No. 07533910969) are authorised and regulated by the Financial Services Authority (25 The North Colonnade, Canary Wharf, London E14 5HS) in the UK. The Amsterdam, Italy and Munich Branches are additionally regulated by the AFM, CONSOB in accordance with Article 27 of the Italian Consolidated Financial Act, and BaFin in accordance with Section 53b of the German Banking Act, respectively. PIMCO Europe Ltd services and products are available only to professional clients as defined in the Financial Services Authority's Handbook and are not available to individual investors, who should not rely on this communication. | **PIMCO Deutschland GmbH** (Company No. 192083, Seidlstr. 24-24a, 80335 Munich, Germany) is authorised and regulated by the German Federal Financial Supervisory Authority (BaFin) (Lurgiallee 12, 60439 Frankfurt am Main) in Germany in accordance with Section 32 of the German Banking Act (KWG). The services and products provided by PIMCO Deutschland GmbH are available only to professional clients as defined in Section 31a para. 2 German Securities Trading Act (WpHG). They are not available to individual investors, who should not rely on this communication. | **PIMCO Asia Pte Ltd** (501 Orchard Road #08-03, Wheelock Place, Singapore 238880, Registration No. 199804652K) is regulated by the Monetary Authority of Singapore as a holder of a capital markets services licence and an exempt financial adviser. PIMCO Asia Pte Ltd services and products are available only to accredited investors, expert investors and institutional investors as defined in the Securities and Futures Act. | **PIMCO Asia Limited** (24<sup>th</sup> Floor, Units 2402, 2403 & 2405 Nine Queen's Road Central, Hong Kong) is licensed by the Securities and Futures Commission for Types 1, 4 and 9 regulated activities under the Securities and Futures Ordinance. | **PIMCO Australia Pty Ltd** (Level 19, 363 George Street, Sydney, NSW 2000, Australia), AFSL 246862 and ABN 54084280508, offers services to wholesale clients as defined in the Corporations Act 2001. | **PIMCO Japan Ltd's** (Toranomon Towers Office 18F, 4-1-28, Toranomon, Minato-ku, Tokyo, Japan 105-0001) Financial Instruments Business Registration Number is Director of Kanto Local Finance Bureau (Financial Instruments Firm) No.382. PIMCO Japan Ltd is a member of Japan Securities Investment Advisers Association and Investment Trusts Association. Investment management products and services offered by PIMCO Japan Ltd are offered only to persons within its respective jurisdiction, and are not available to persons where provision of such products or services is unauthorized. The value of assets fluctuate based upon prices of securities in the portfolio, market conditions, interest rates, and credit risk, among others. Investments in foreign currency denominated assets will be affected by foreign exchange rates. All profits and losses incur to the investor. There is no guarantee that the principal amount of the investment will be preserved, or that a certain return will be realized; the investment could suffer a loss. The fee charged will vary depending on the investment trust acquired or the investment advisory agreement entered into; these materials do not set forth specific fee amounts or their calculation methodologies. | **PIMCO Canada Corp.** (120 Adelaide Street West, Suite 1901, Toronto, Ontario, Canada M5H 1T1) services and products may only be available in certain provinces or territories of Canada and only through dealers authorized for that purpose. | No part of this publication may be reproduced in any form, or referred to in any other publication, without express written permission. © 2012 PIMCO

---

**Newport Beach Headquarters**  
840 Newport Center Drive  
Newport Beach, CA 92660  
+1 949.720.6000

---

**Amsterdam**

---

**Hong Kong**

---

**London**

---

**Milan**

---

**Munich**

---

**New York**

---

**Singapore**

---

**Sydney**

---

**Tokyo**

---

**Toronto**

---

**Zurich**

---

**pimco.com**

**P I M C O**