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Risk premia in equities, credit and volatility given deleveraging

Quantitative Strategies
Global Markets
EMEA
Anthony Morris
Anthony.morris@nomura.com
+44 207 102 9215

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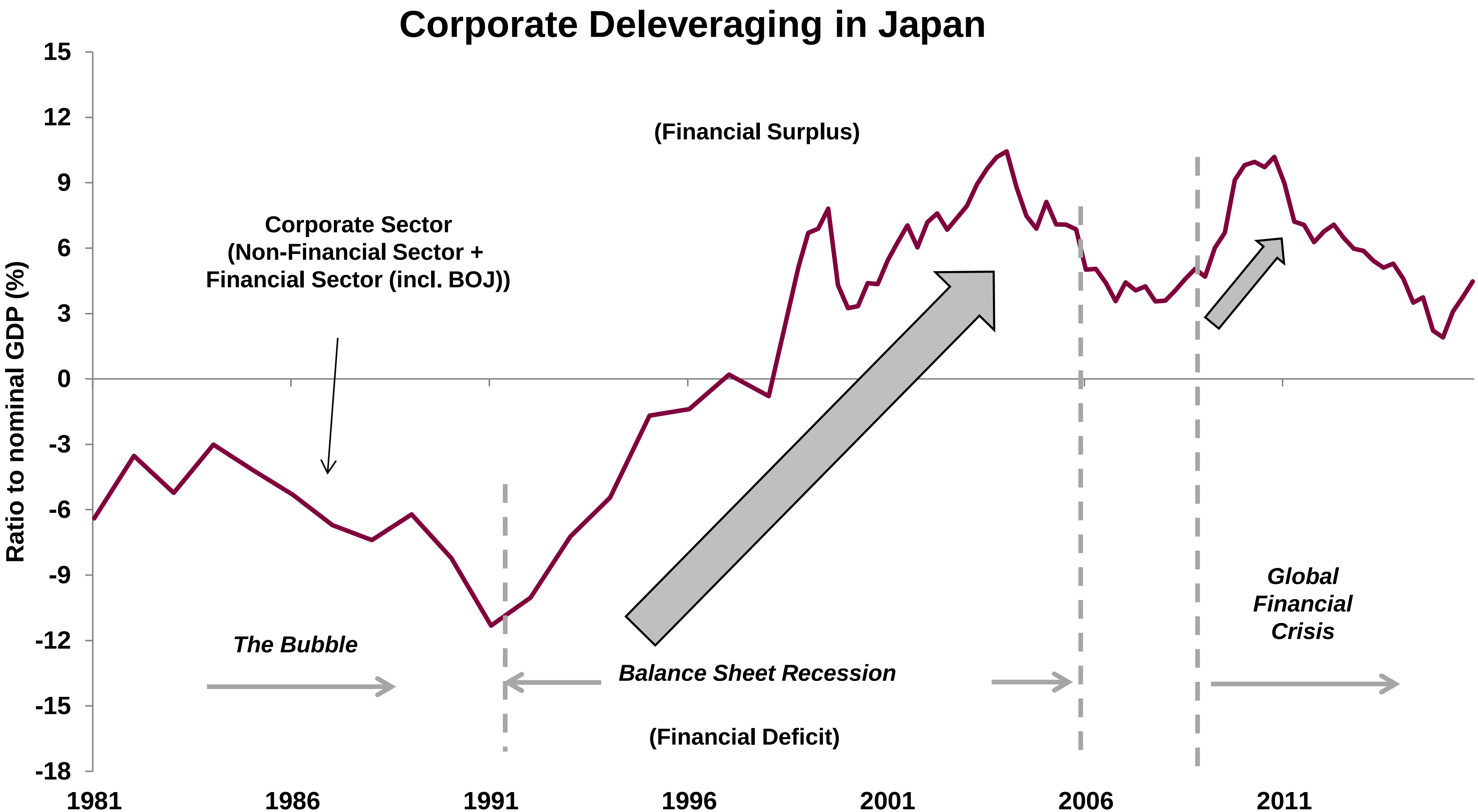
Why does deleveraging matter?

- Done on a large scale, as in Japan after 1990, it can affect many things
  - Balance sheet strength
  - Earnings
  - Return on equity
  - Economic growth
- It does not appear in US-centric historical samples
- It is moving beyond Japan
- It can undermine longstanding, over-arching beliefs about asset classes
  - Do equities actually have a risk premium?
  - Can credit outperform equities?
  - Can “selling volatility” actually be defensive?

What is deleveraging?

Deleveraging by Japanese firms



Note: For the latest figures, 4 quarter averages ending with 2Q/13 are used.
Sources: Bank of Japan, Flow of Funds Accounts, and Government of Japan, Cabinet Office, National Accounts. . Richard Koo presentation 'Post-Honeymoon Abenomics and the Escape from Balance Sheet Recession'

Is 5% per annum really the natural equity risk premium?

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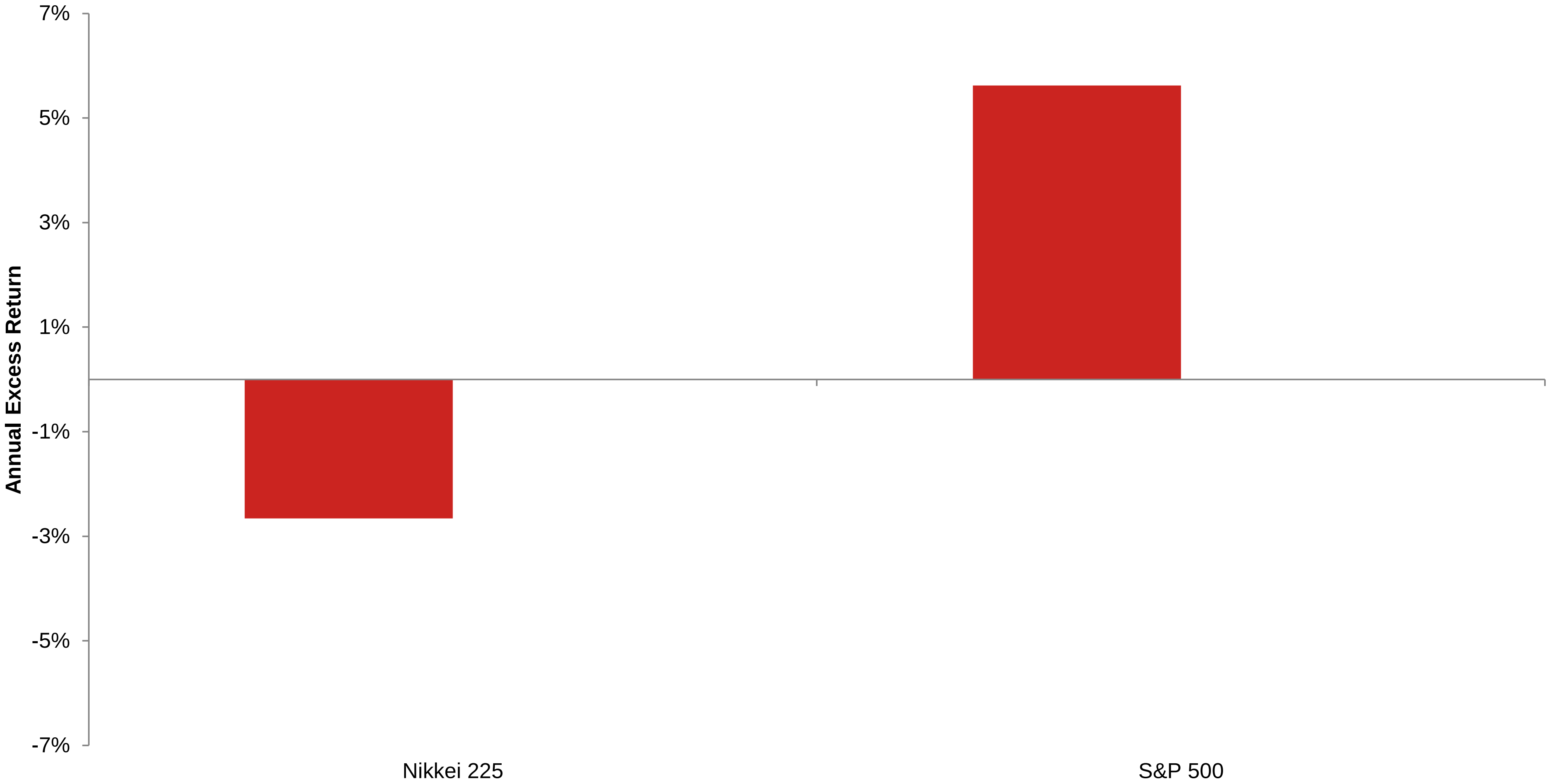
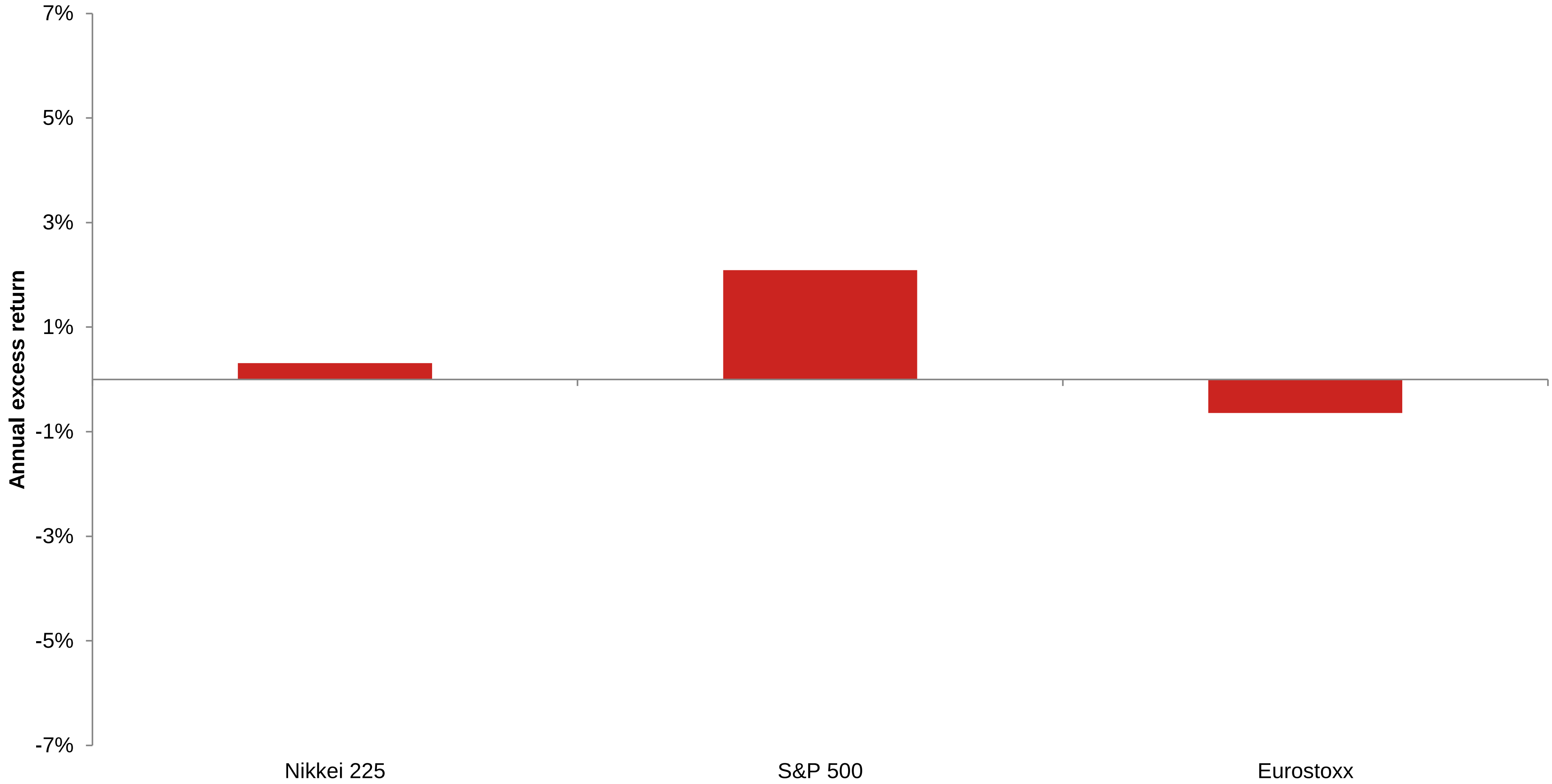
Since 1988, the Nikkei 225 futures contract has delivered negative excess returns



Source: Nomura, Bloomberg. Returns from 5 September 1988 to 7 June 2016

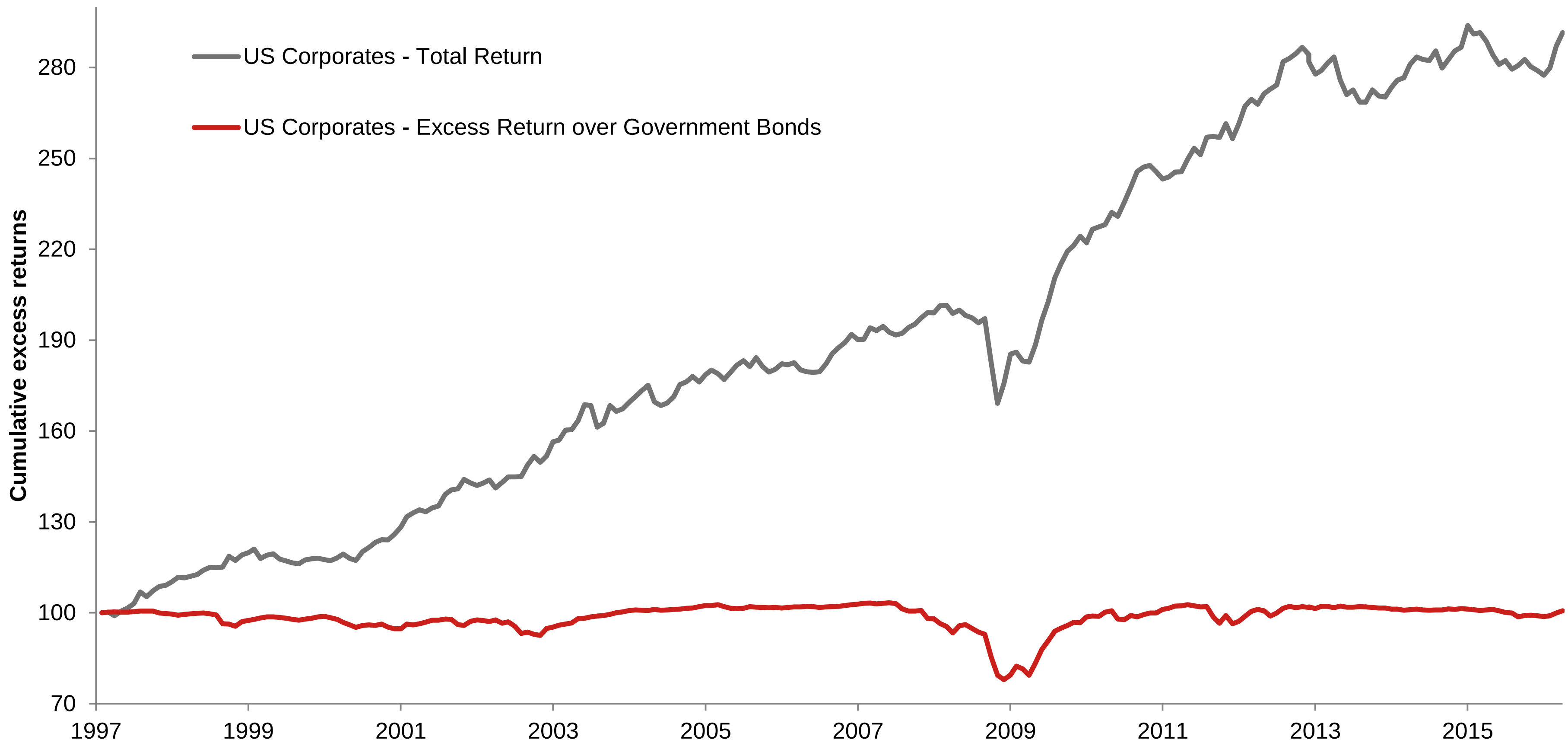
Is the equity risk premium getting smaller globally?

Since 1998, equity returns outside Japan have decreased



Source: Nomura, Bloomberg

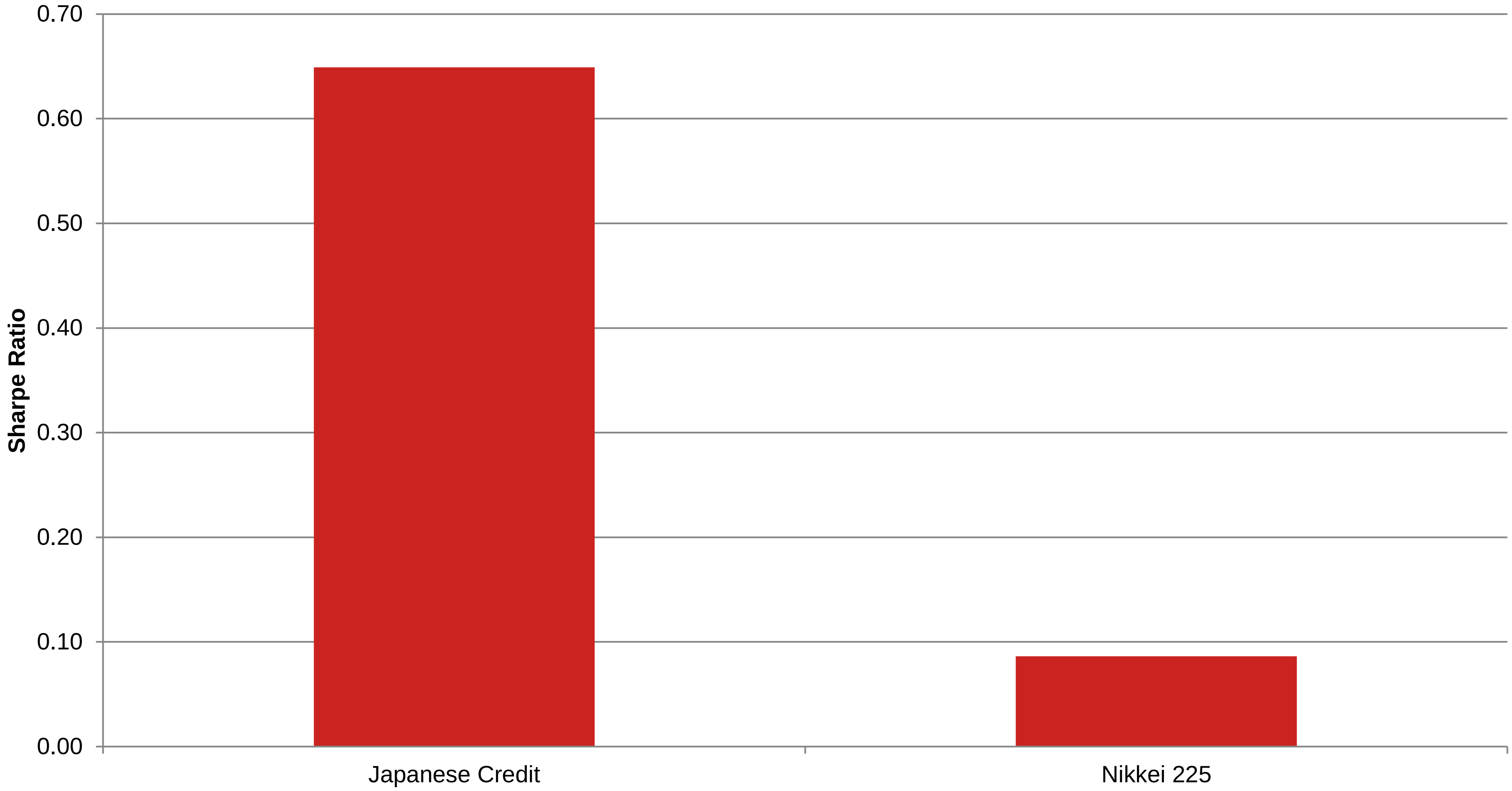
Most US studies suggest credit provides weak risk premia



Source: Nomura, Bloomberg

But in Japan things look different

Since 1996, credit has outperformed equities in Japan



Source: Nomura, Bloomberg

Equity volatility risk premia also outperformed equities

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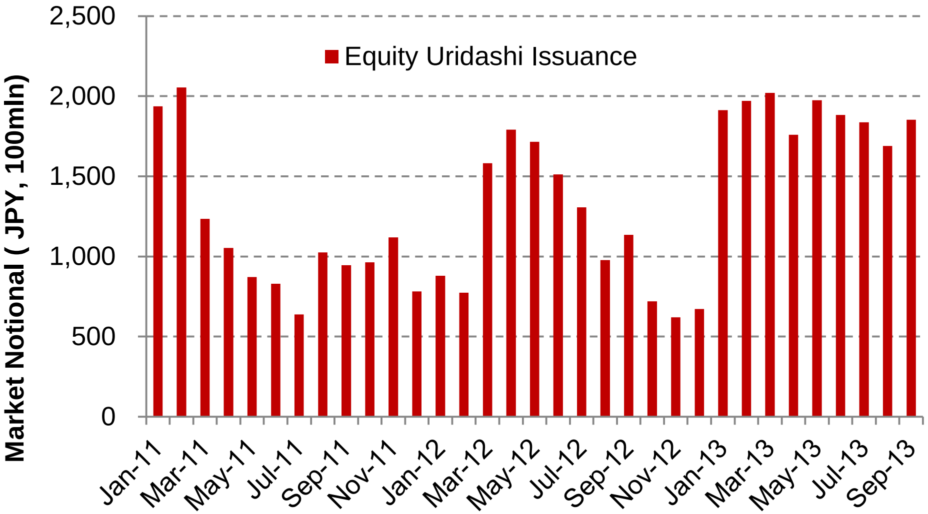
Investors in Japan has migrated from equities to equity volatility

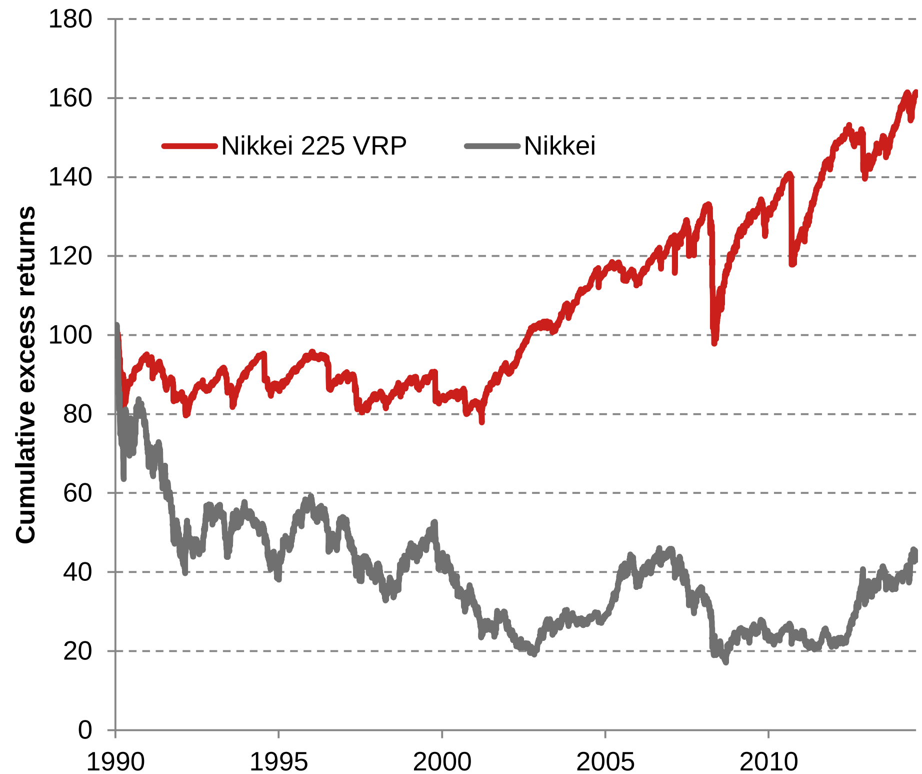
Big market in Equity index-linked Uridashi (~15 bn USD p.a.)



While the Uridashi structure can't be fully replicated with simple options, it is most akin to the:

- **investor selling the bank a down & in put**
- owning a series of digital options with an upside knock-out

Popularity is at least partly attributable to VRP outperformance



Source: Bloomberg, Nomura Research. Neil Sheppard and Vincent Li presentation 'The Japan Uridashi Market, Jan 2013'.

Volatility selling also works in the US and Europe

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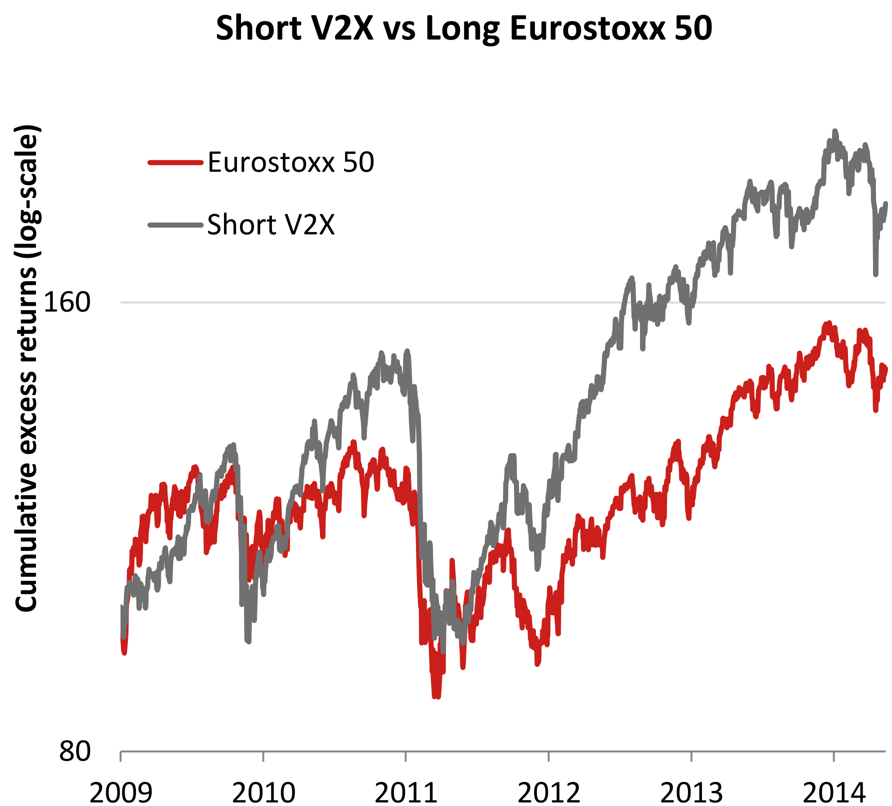
Volatility risk premia have beta similar to equities, but higher returns



Source: Bloomberg, Nomura research.

Equity VRP overlaps with credit

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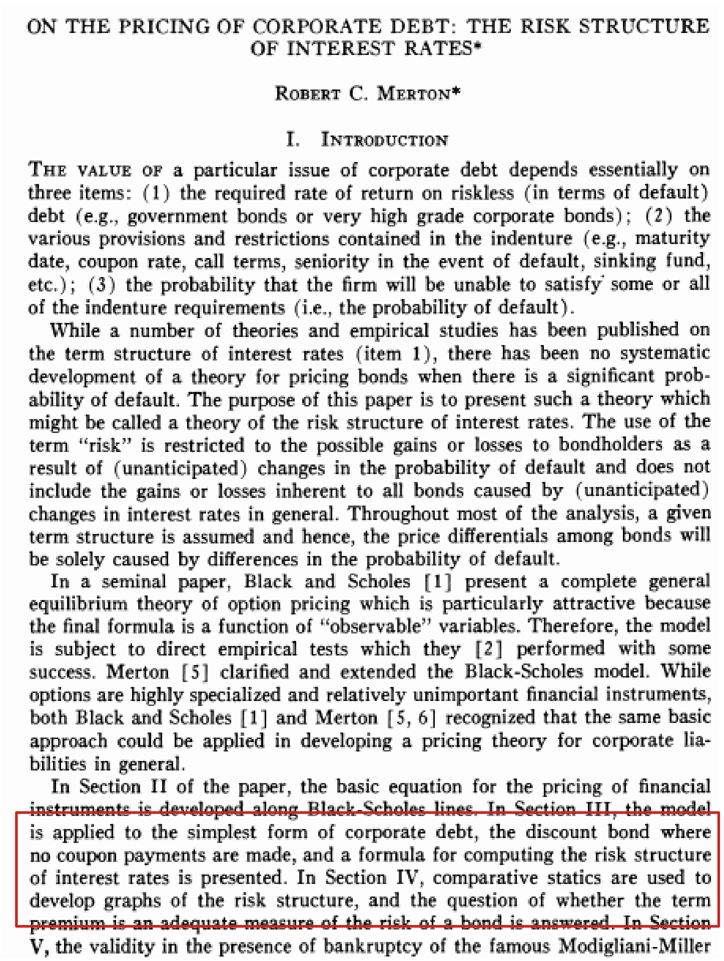
In theory, long credit is short a put on the assets of a firm (Merton 1974)

The “Merton model” of credit risk



ON THE PRICING OF CORPORATE DEBT: THE RISK STRUCTURE OF INTEREST RATES*

ROBERT C. MERTON*

I. INTRODUCTION

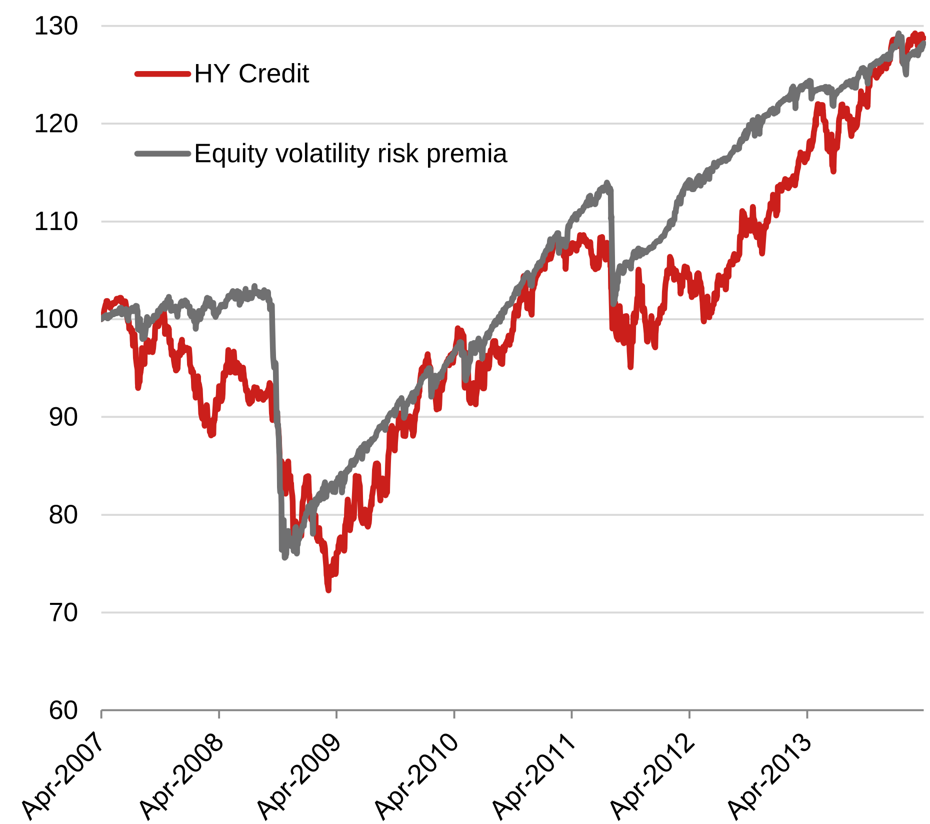
THE VALUE OF a particular issue of corporate debt depends essentially on three items: (1) the required rate of return on riskless (in terms of default) debt (e.g., government bonds or very high grade corporate bonds); (2) the various provisions and restrictions contained in the indenture (e.g., maturity date, coupon rate, call terms, seniority in the event of default, sinking fund, etc.); (3) the probability that the firm will be unable to satisfy some or all of the indenture requirements (i.e., the probability of default).

While a number of theories and empirical studies has been published on the term structure of interest rates (item 1), there has been no systematic development of a theory for pricing bonds when there is a significant probability of default. The purpose of this paper is to present such a theory which might be called a theory of the risk structure of interest rates. The use of the term “risk” is restricted to the possible gains or losses to bondholders as a result of (unanticipated) changes in the probability of default and does not include the gains or losses inherent to all bonds caused by (unanticipated) changes in interest rates in general. Throughout most of the analysis, a given term structure is assumed and hence, the price differentials among bonds will be solely caused by differences in the probability of default.

In a seminal paper, Black and Scholes [1] present a complete general equilibrium theory of option pricing which is particularly attractive because the final formula is a function of “observable” variables. Therefore, the model is subject to direct empirical tests which they [2] performed with some success. Merton [5] clarified and extended the Black-Scholes model. While options are highly specialized and relatively unimportant financial instruments, both Black and Scholes [1] and Merton [5, 6] recognized that the same basic approach could be applied in developing a pricing theory for corporate liabilities in general.

In Section II of the paper, the basic equation for the pricing of financial instruments is developed along Black-Scholes lines. In Section III, the model is applied to the simplest form of corporate debt, the discount bond where no coupon payments are made, and a formula for computing the risk structure of interest rates is presented. In Section IV, comparative statics are used to develop graphs of the risk structure, and the question of whether the term premium is an adequate measure of the risk of a bond is answered. In Section V, the validity in the presence of bankruptcy of the famous Modigliani-Miller

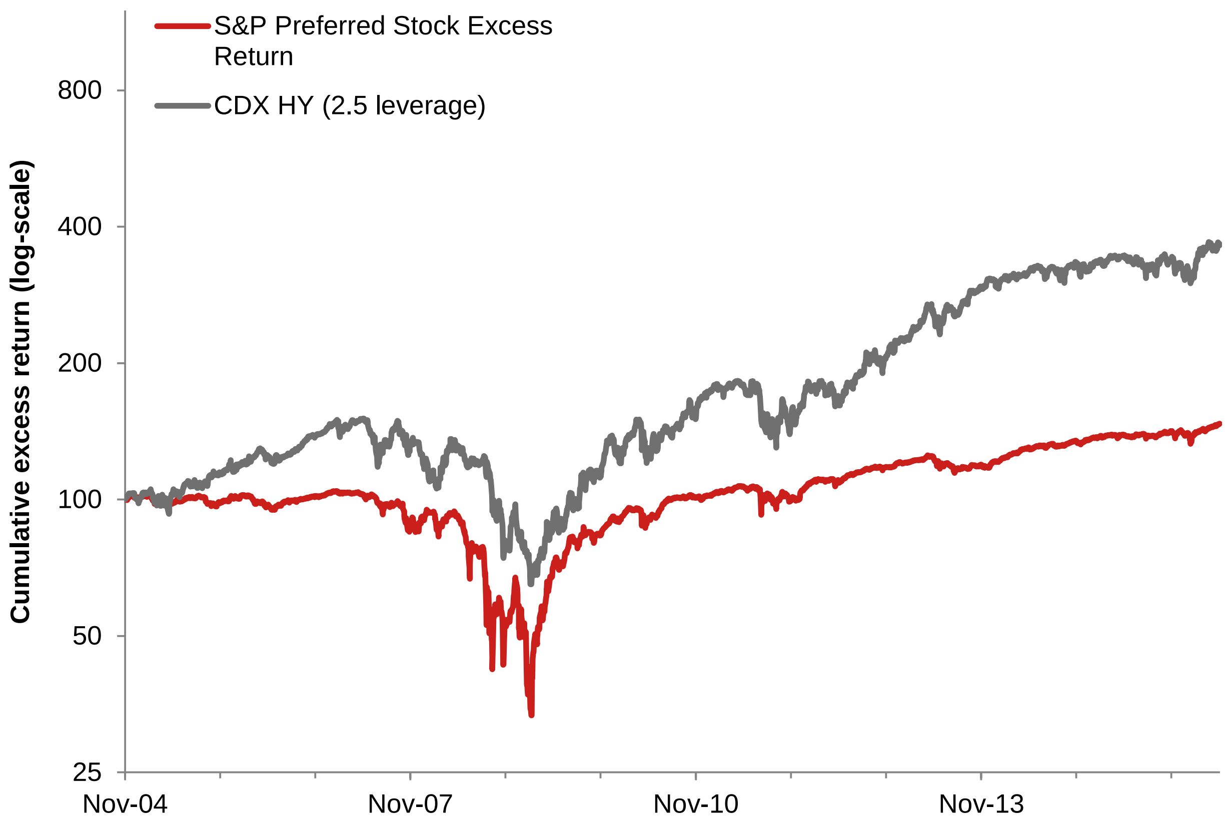
The empirical evidence supports the theory in the US



Source: Merton 1974, On the pricing of corporate debt: The risk structure of interest rates, Journal of Finance, Bloomberg, Nomura. HY Credit is CDX HY on-the-run index. eVRP is short variance swaps on S&P 500.

Credit overlaps with preferred equity

Credit outperforms preferred shared on a risk-adjusted basis



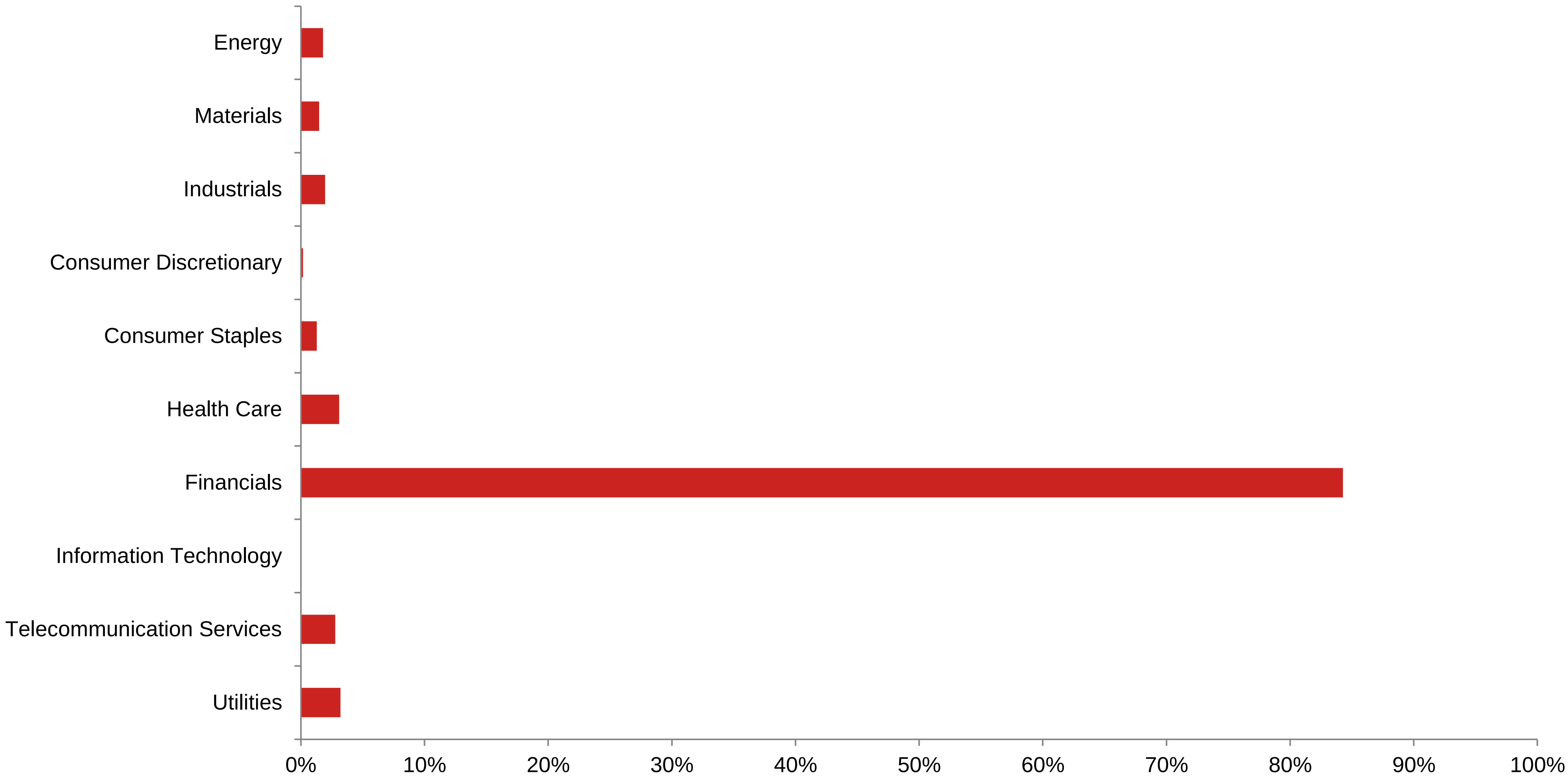
Performance statistics

	Preferred shares	CDX HY (2.5x leverage)
Avg. excess returns (p.a., %)	5.3%	12.8%
Volatility (p.a., %)	20.8%	20.1%
Maximum drawdown (%)	68.0%	56.9%
Sharpe Ratio	0.26	0.64
Calmar Ratio	0.22	0.22

Source: Bloomberg,, Nomura Global Markets

Practicalities: preferred equity is dominated by financials

84% of the standard index is made up of financials



Practicalities: supply of cash credit decreases with deleveraging

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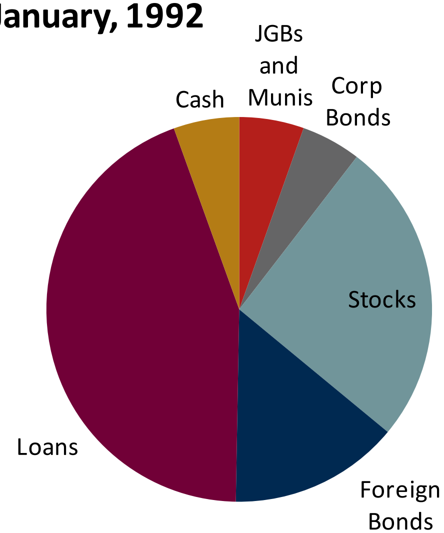
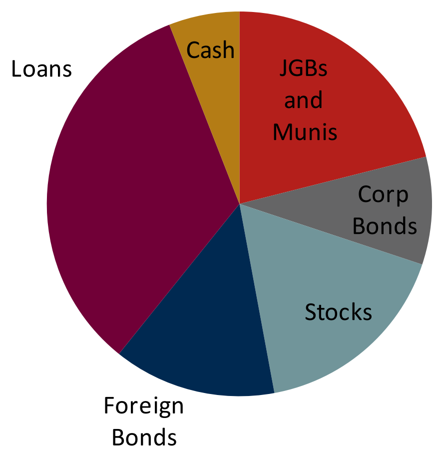
Lifers' increased allocation to JGBs, credit and foreign securities and increased duration as yields fell

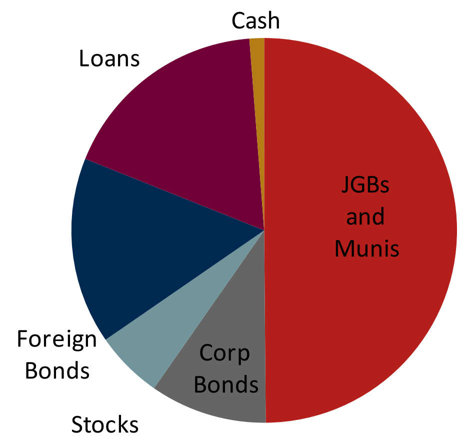
January, 1992



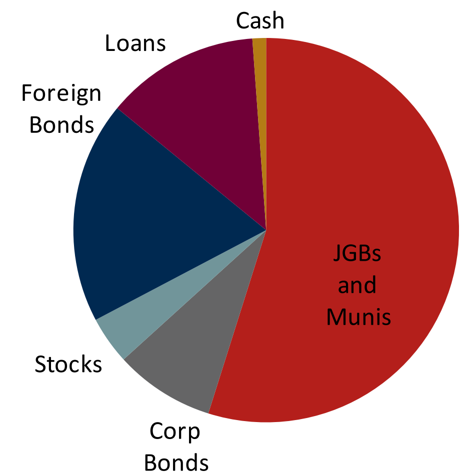
January, 2000



January, 2010



January, 2014

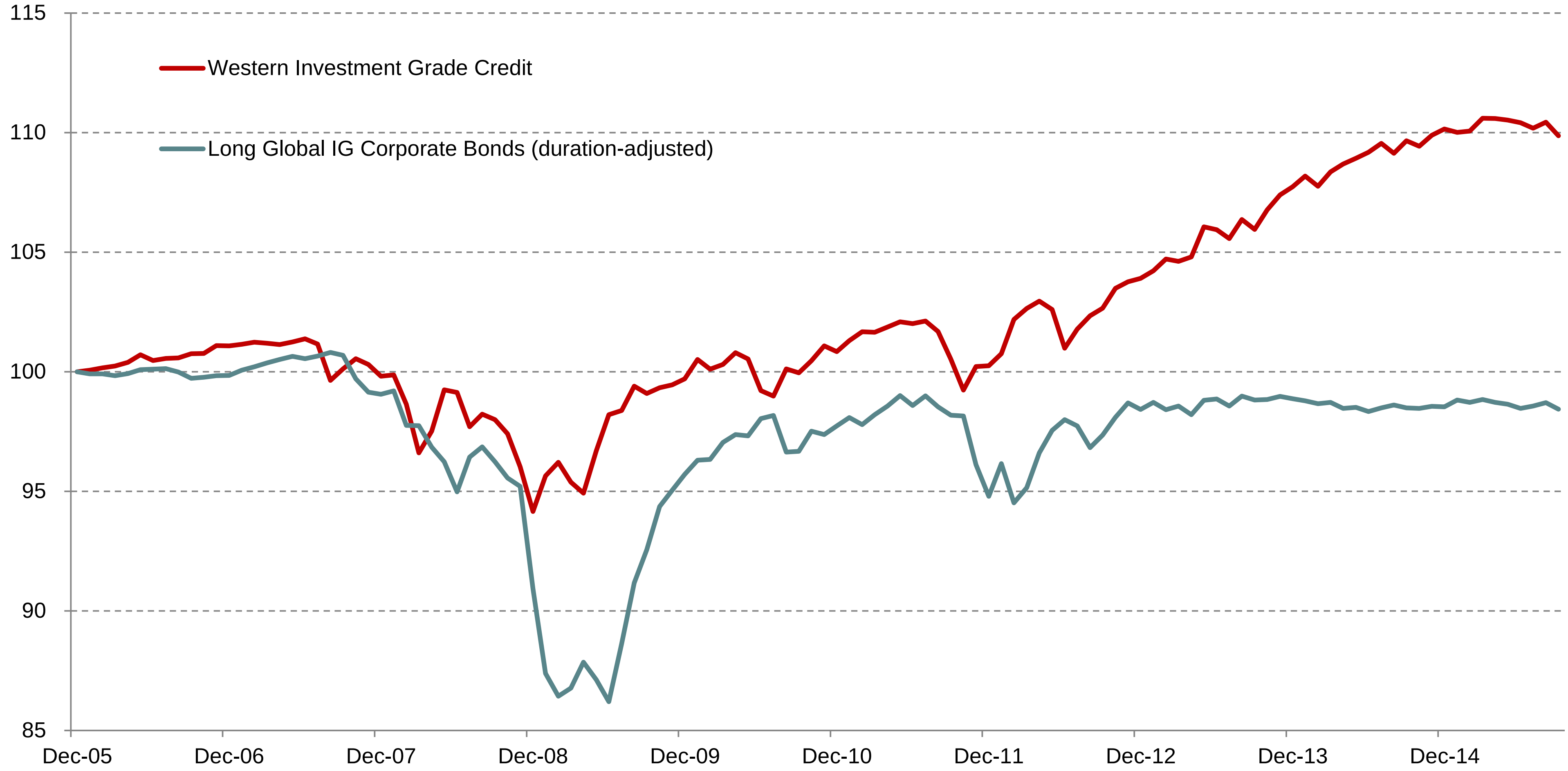


Source: Nomura, Life Insurance Association of Japan, diagrams on this slide include asset holdings from Japan Post from 2009 onwards. Duration data based on 43 Japanese life insurers excluding Japan Post.

Practicalities: CDS better than cash credit

- Liquid
- Duration-free
- Equally-weighted
- Sector-caps
- Geographically-clear
- Six-month roll
- Repo included

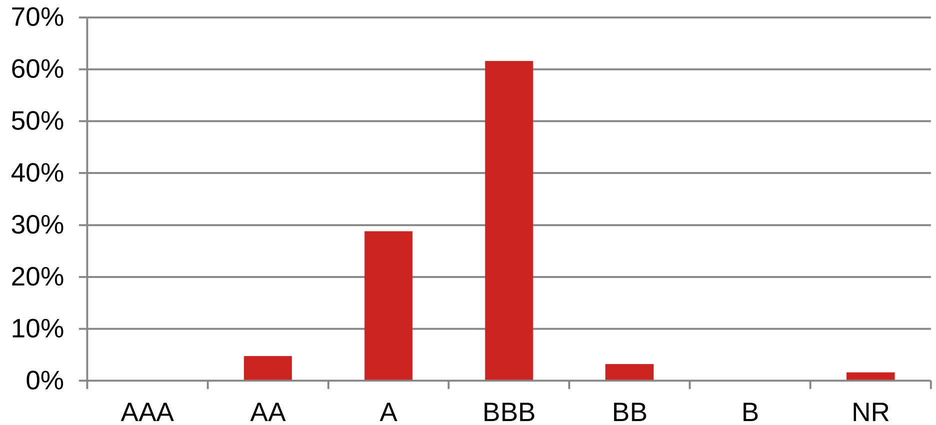
These things make a difference



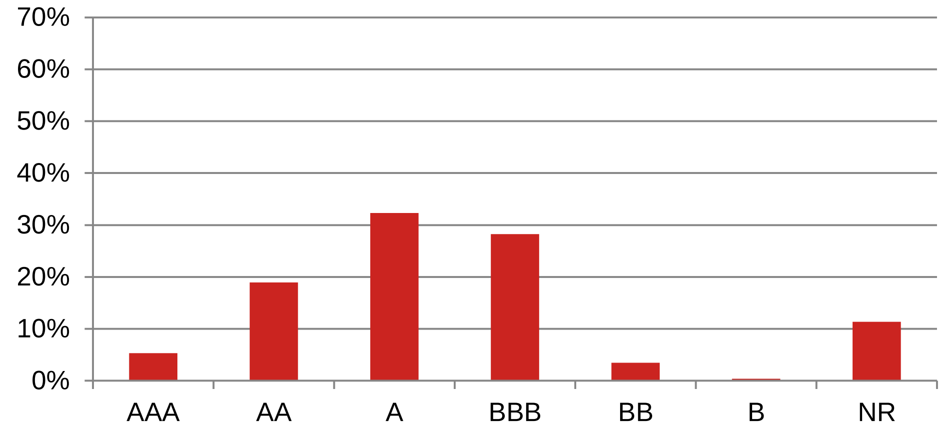
Source: Bloomberg, Nomura Research. Data from 1 Dec 2005 to 30 Sep 2015. Past performance is no indication of future performance.

Practicalities: eVRP might be better than credit

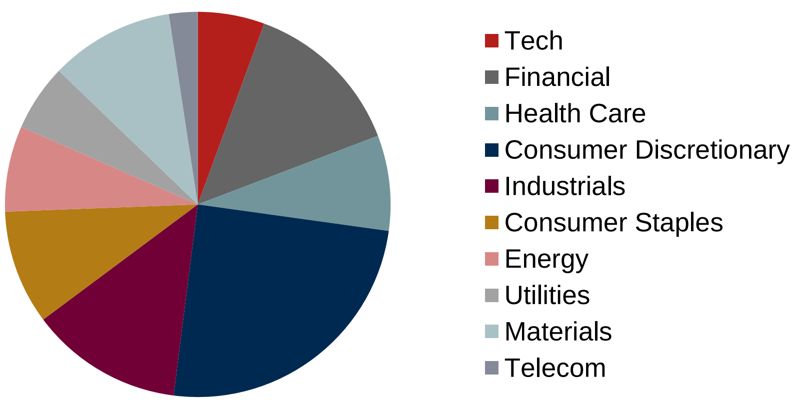
Credit rating distribution



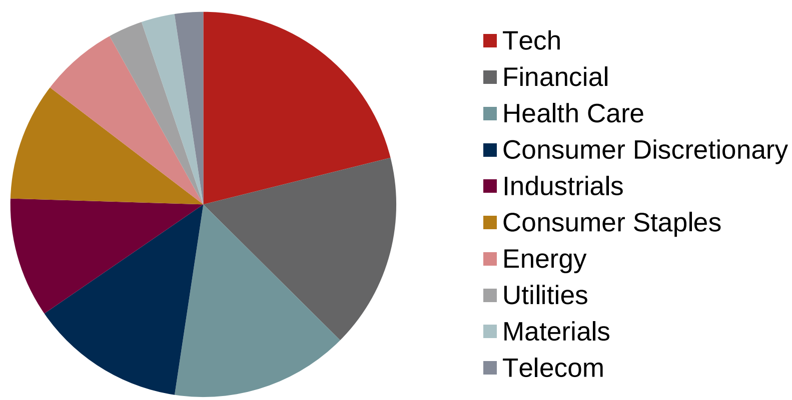
S&P rating distribution



Credit sector distribution



S&P sector distribution



Source: Bloomberg. Markit, Nomura Research. Credit members of CDX IG series 25

Recap: why does deleveraging matter?

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• Uncovered call writing: The risk of selling an uncovered call is unlimited and may result in losses significantly greater than the premium received.

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• Call or put vertical spread purchasing (same expiration month for both options): The basic risk of effecting a long spread transaction is limited to the premium paid when the position is established.

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