Low Interest Rate Environment Issues Faced by Property-Casualty Insurance Companies (2015)

A Report of the CAS Low Interest Rate Environment Working Party

Jonathan L. Ankney
Waswate Ayana
Andra Ban
Etai Barach
Sandra J. Callanan
Kenneth J. Eiger
Eric J. Gesick
Christopher G. Gross (Chair)
Denis G. Guenthner
Dave Kunka
James M. Maher
Ankit Nanda
William H. Panning
Leonid Rasin
Karen Sonnet (CAS Staff)
Lu Sun
Gayna Swart
Samantha M. Taylor
Susan E. Witcraft
Jianwei Xie

Abstract: The Low Interest Rate Environment Working Party explored issues related to the current environment of historically low levels of interest rates with the purpose of uncovering and communicating potential problems before they occur. There are challenges posed to the property-casualty industry from this new environment, both with regard to income statements (reduced investment income if rates stay low, as well as with the strength of balance sheets) and the market value of fixed income assets, which will drop if rates return to more normal levels. The working party addresses questions related to insurance pricing policy, investment strategy, risks to solvency, use of debt, and long-term impacts, among other issues.

Keywords: interest rates, inflation sensitivity, balance sheets, duration matching

EXECUTIVE SUMMARY

In 2012-2013 the Low Interest Rate Environment Working Party (LIREWP) of the Casualty Actuarial Society (CAS) researched how the new environment of historically low interest rates may impact the property-casualty (P&C) insurance sector. The working party's exploration of the topic led to the following five conclusions:

1. The low interest rate environment puts pressure on sector profitability. However, the industry's response through improved pricing and realigned investment strategies, along with the short term nature of policies, has minimized issues with company solvency solely due to the sustained period of low interest rates.
2. The low interest rate environment creates challenges and risks for the sector should rates suddenly increase. If interest rates were to return suddenly to the higher historical levels, many companies could be negatively impacted by reduced market values of assets coupled with higher expected claim costs.
3. Most P&C insurance liabilities are affected to at least a degree by general inflation. Duration matching approaches that only reflect expected payouts, but not inflation sensitivity, could

prove inadequate to manage interest rate risk, depending on the degree of correlation between interest rates and inflation (i.e., *effective* duration of liabilities could be close to zero, leaving a highly leveraged asset position).

4. In general, the U.S. P&C insurance sector appears to be reacting to the low interest rate environment in a rational manner, reducing the risk posed by the potential for a sudden rise in interest rates by shortening the duration of assets. Accordingly, the risk of widespread solvency problems due to a sudden rise of interest rates appears low.
5. In general, larger companies are reacting more conservatively than small to medium sized companies. Some small to medium sized entities appear to be taking greater investment risk that could negatively impact these companies in the case of a sudden rise in interest rates/inflation.

The remainder of this report provides information and considerations that led to these conclusions.

1. INTRODUCTION

1.1 Background

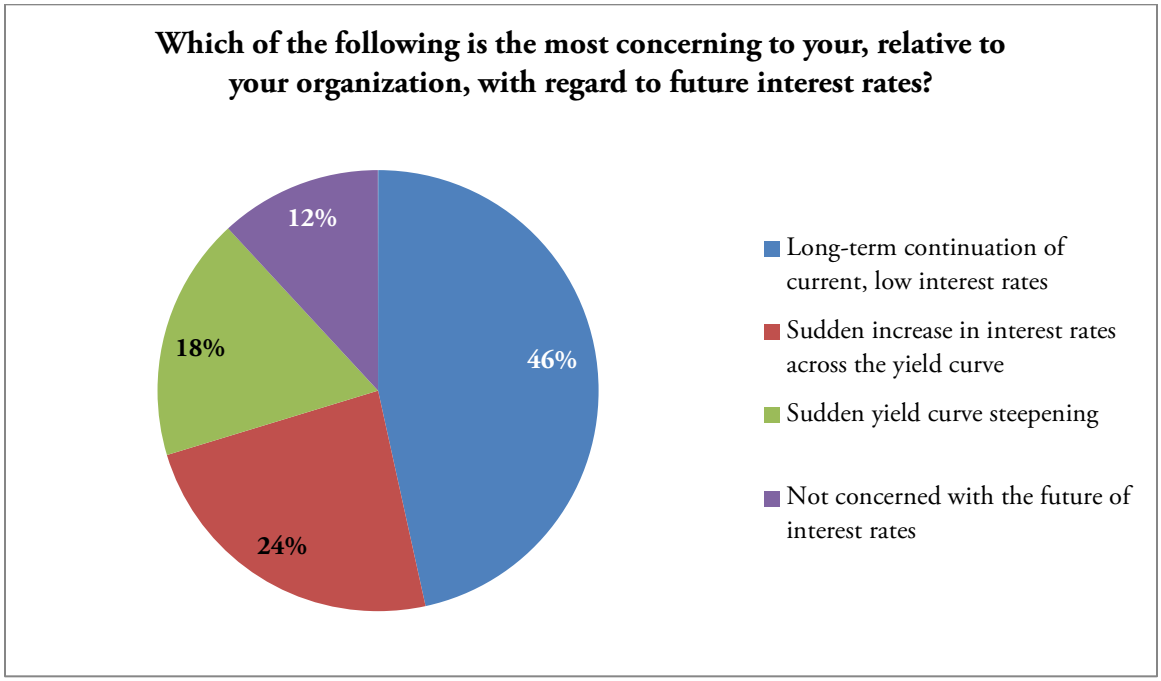
A recent survey[1] conducted by the consulting firm of Towers Watson indicated that over a three-year horizon, one of the biggest concerns for P&C insurance CFOs was the interest rate environment. While all of the survey respondents indicated that they "expect low interest rates to be among their companies' biggest challenges … half of respondents indicated that the risk of rapidly rising rates would also be one of their biggest challenges". This result is not surprising considering that low interest rates erode investment income and create pressure to increase underwriting profitability, while rapidly increasing interest rates have the effect of decreasing the value of bond portfolios which represent the bulk of P&C insurers' assets.

In 2011, the Low Interest Rate Environment Working Party (LIREWP) was formed to explore issues related to this new environment of historically low levels of current interest rates with the purpose of uncovering and communicating potential problems before they occur.

A survey of CAS members conducted by the LIREWP showed that the biggest concern for most actuaries (47% of respondents) with regard to the future interest rates is represented by the continuation of low interest rates, but for almost as many (41% of the respondents), a sudden increase in interest rates across the yield curve or a sudden yield curve steepening is even more concerning.

[1] Towers Watson, "Insights — Property & Casualty Insurance CFO Survey #3: Investment Strategies," September 2012, http://www.towerswatson.com/en-US/Insights/IC-Types/Survey-Research-Results/2012/09/Property-Casualty-Insurance-CFO-Survey-3.

Figure 1



As the surveys referenced above indicate, there are challenges posed to the P&C industry from this new environment, both with regard to income statements (reduced investment income if rates stay low) as well as with the strength of balance sheets (market value of fixed income assets will drop if rates return to more normal levels). The working party focused its efforts on the impact of low interest rates on insurance pricing policy, investment strategy, risks to solvency, use of debt, and long-term impacts.

1.2 Disclaimer

In this paper, references to "we," "our," "the working party," and "LIREWP" refer to the CAS Low Interest Rate Environment Working Party.

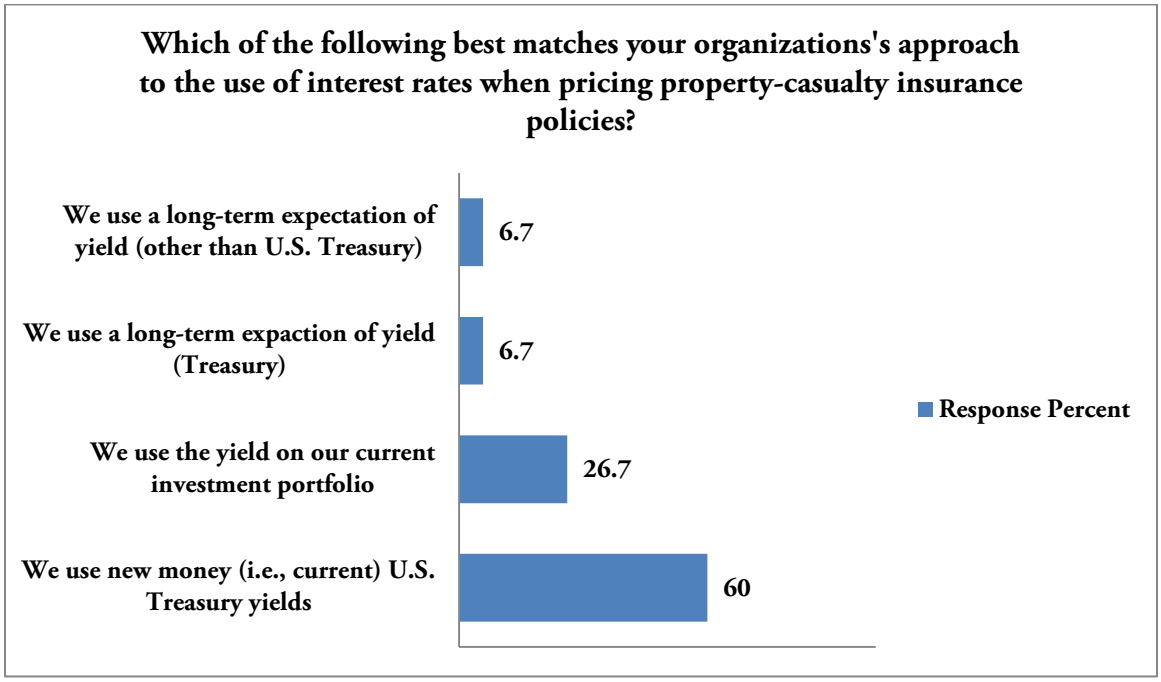
The analysis and opinions expressed in this report are solely those of the authors, the working party members, and in particular are not those of the members' employers, the Casualty Actuarial Society, or the American Academy of Actuaries.

LIREWP makes no recommendations to any other body. LIREWP material is for the information of CAS members, policy makers, actuaries and others who are interested in the issues P&C companies may face in a low interest rate environment.

2. PROFITABILITY AND PRICING

As insurers appear to be shortening the duration of their fixed income investments, one result is a lower total return creating a need to increase prices to offset the reduced investment return. However, for pricing, some insurers are using long term expectations of yields or the yield imbedded in their current investment portfolio. This is shown in Figure 2 by the responses to one of our survey questions.

Figure 2

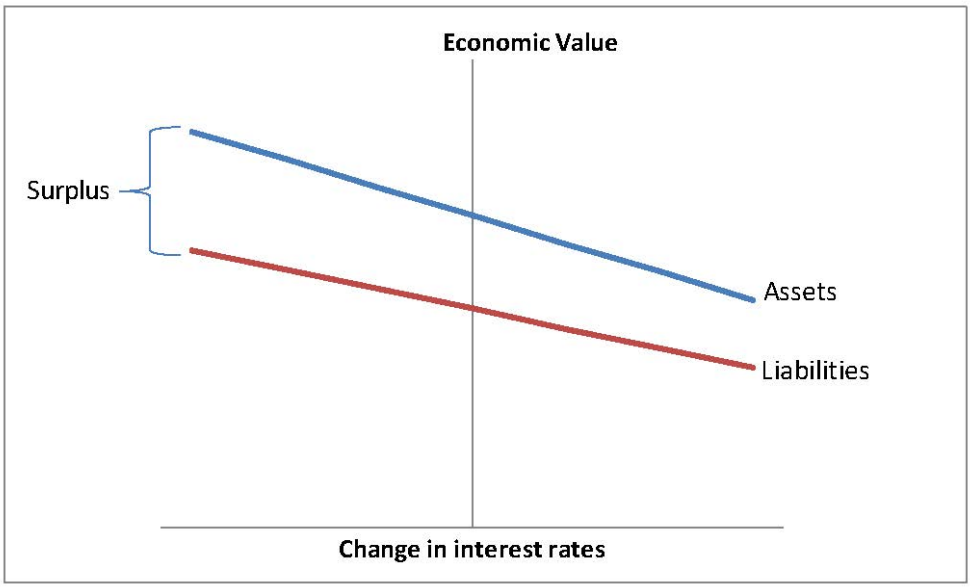


In most contexts, it is commonly assumed that new money yields are more appropriate than portfolio yields for pricing financial contracts such as insurance policies. Relying on a portfolio yields when pricing insurance policies could be problematic in the current low rate environment, as actual future returns on invested premiums would be less than assumed in pricing. However, since P&C insurance contracts are short-term contracts, generally with one-year terms with the potential for re-pricing, this problem is generally foreseeable and manageable. The bigger potential risk is with regard to balance sheet strength, if interest rates rise suddenly.

3. BALANCE SHEET RISK AND THE IMPACT OF INFLATION

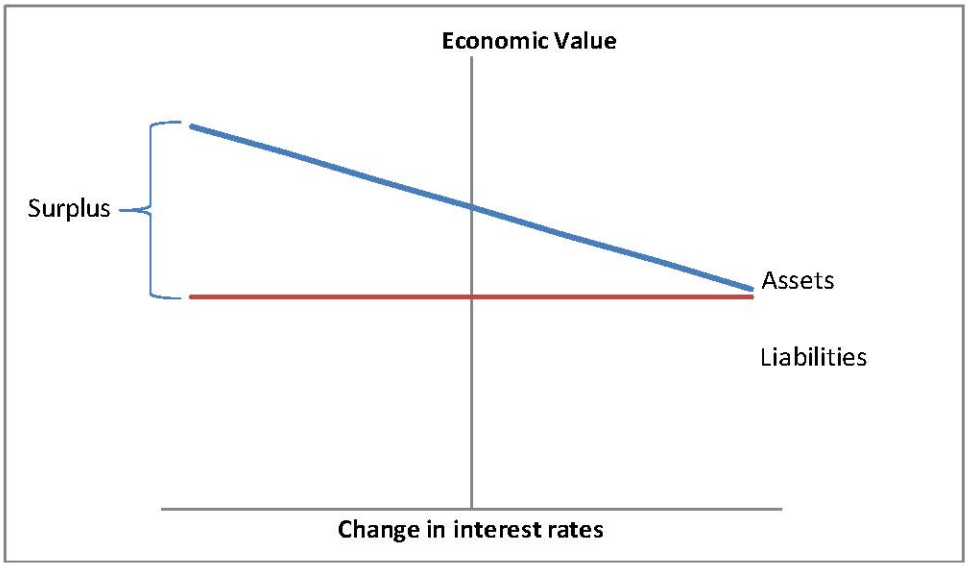
Classic asset-liability management deals with potential impacts to the balance sheet from changes in interest rates. The following chart reflects a scenario in which duration of assets is set equal to the duration of liabilities. This results in a duration of surplus that is also equal to that of the liabilities and a relatively stable balance sheet, at least with regard to changes in interest rates.

Figure 3



However, if we assume that inflation and interest rates move perfectly together, and that the inflation impacts future claims payments through the payment date, the present value of the liabilities is unchanged when interest rates change. This is illustrated in Figure 4.

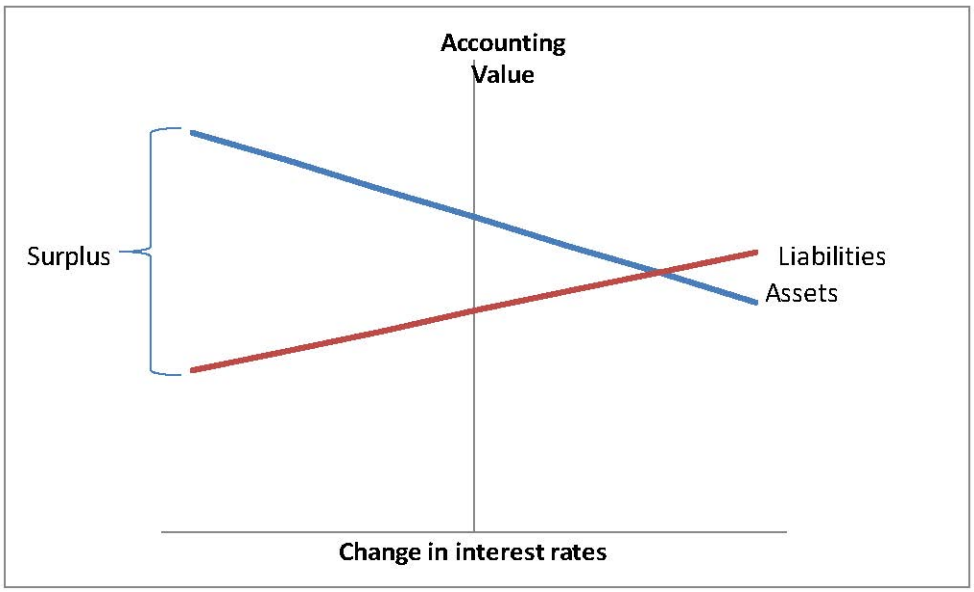
Figure 4



So if these assumptions are correct, classic immunization approaches become useless, and the surplus can be thought of as a very leveraged position with regard to the asset duration. This illustrates the importance of ascertaining the inflation sensitivity of P&C reserves, which is considered in the next section.

Figures 4 and 5 reflect the economic value of assets and liabilities. What about the results reflected in financial statements at the time of the shock? If we assume that companies understand the full extent of a shift to a higher inflation environment, and reflect the new environment in their booked (undiscounted) loss reserves within their accounting value, the result could look like Figure 6.

Figure 6



This is potentially an even more dire view, although it is not clear that companies would fully react to the change in inflation/interest environment in their reserving. Note also that the graph above assumes that assets are booked at market value. To the extent that fixed income assets may be held at amortized cost, the asset line would be flatter, providing some relief on the accounting view. It is important to remember regardless, that the reconciling item between accounting value and economic value is time. Anything that is true from an economic perspective, but not an accounting one, will emerge over time in the accounting. Any differences are temporary in nature only.

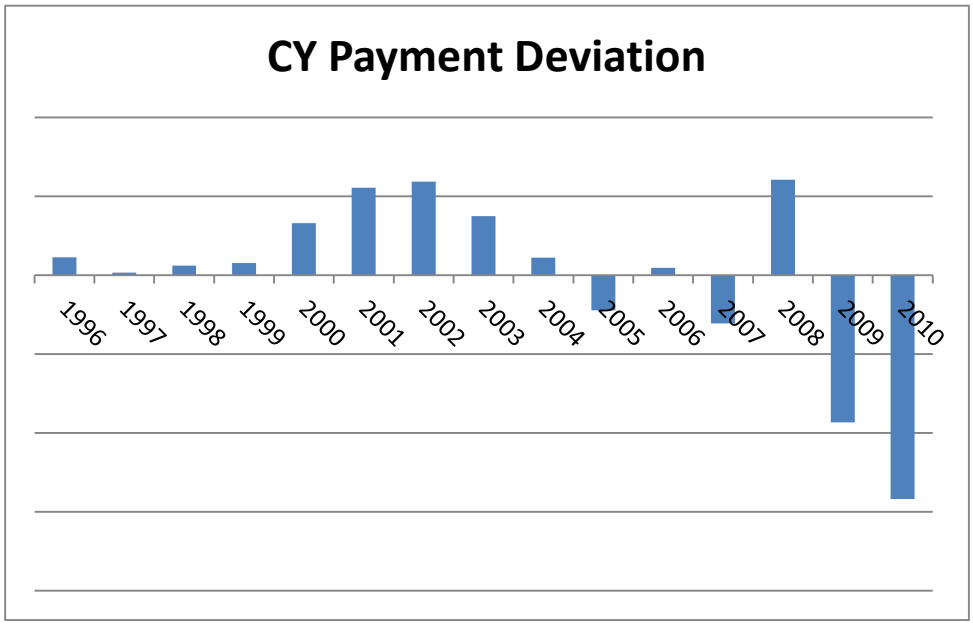
4. INFLATION SENSITIVITY OF P&C CLAIM PAYMENTS

It is difficult to measure the inflation sensitivity of reserves directly, because the true impact of inflation on the actual future payments may not be discerned by the actuary estimating the reserves, and the reserve amount booked by company management may be influenced by other considerations which obscure the effect of changes in inflation.

Claim payments themselves, however, are much less likely to suffer from these types of effects, and we should be able to test the hypothesis of inflation sensitivity by the following reasoning. In calendar periods with increased inflation, if the claim payments are inflation sensitive, we should see higher observed loss development factors. If the inflation is lower, we should see lower development factors. Therefore if we calculate long term average development factors, and "predict" the historical payments using these patterns, the errors of these predictions should coincide with inflation by calendar period.

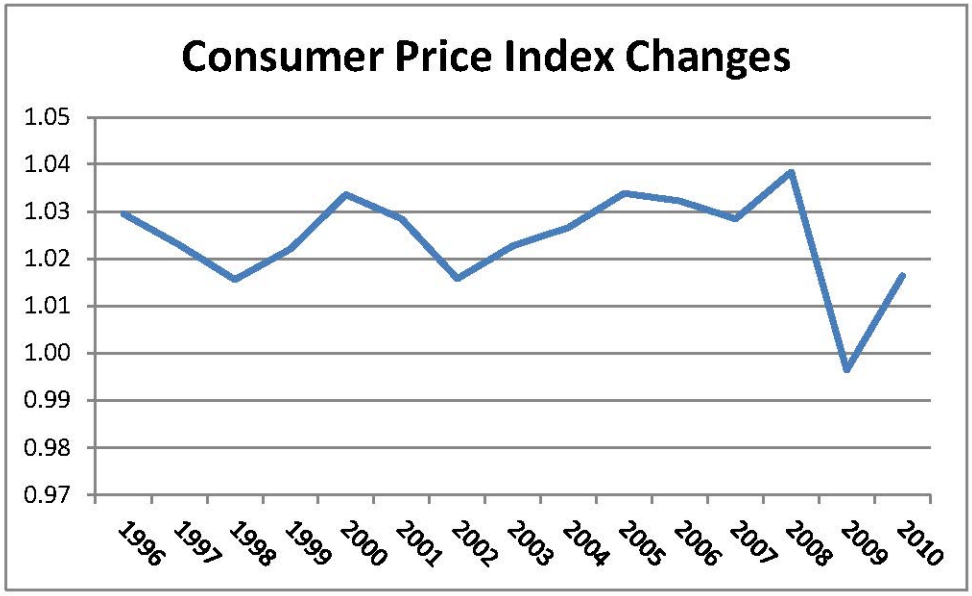
Using Schedule P paid triangles from AM Best Aggregates and Averages, the percentage of incremental paid claims at each point in development, relative to the first year of paid claims, was calculated by Schedule P line. This triangle gave us a benchmark of paid ratios. The average paid ratio across all years by age was calculated as our "expected paid ratio." The deviation from this expectation was calculated by line, accident year and age. This error term was then aggregated across calendar periods and lines, and is shown in Figure 7.

Figure 7



We then compared the deviation from expected (the sum of the errors) to calendar year inflation. The change in the Consumer Price Index (shown in the chart below) was used as our measure of inflation.

Figure 8



While more research could certainly be done in this area, this initial comparison suggests that P&C insurance liabilities give some evidence of inflation sensitivity, in particular regarding 2009 and 2010. Duration matching approaches that only reflect expected payouts, but not this inflation sensitivity, could prove inadequate to manage interest rate risk if interest rates and inflation move together (i.e., *effective* duration of liabilities could be close to zero, leaving a highly leveraged asset position).

5. INVESTMENT RISK IN THE CURRENT ENVIRONMENT

The Towers Watson survey referenced in the introduction found that 31% of CFOs expect that their companies' investment strategies over the following year to become "slightly more aggressive," while none expected their strategies to become more conservative or significantly more aggressive. This investment approach may result from the low interest rate environment creating an incentive for some companies to take more risk in order to improve portfolio returns.

However, how can P&C companies improve their portfolio returns? First, they could change their investment portfolio structure towards riskier investments, such as stock, high yield debt and real estate. AM Best data shows the percentage of riskier investments has increased over time, though this might be due to credit downgrades of existing investments. In addition, there are regulatory restrictions on these types of investments.

Second, portfolio returns could be improved by increasing the duration of fixed income assets.

Given that the term structure of interest rates is upward sloping, companies can choose to increase the duration of their bond portfolio to gain higher yields on their investments, but doing so will result in locking funds into relatively low yields. In fact, it has been observed that the duration of bond portfolio across the P&C industry has shrunk, which may indicate companies are willing to wait for Federal Reserve to increase interest rates rather than tie their assets in long term duration investments. In other words, companies are willing to sacrifice present investment income rather than risk losing future investment income and losing the market value of their portfolios if interest rates decrease.

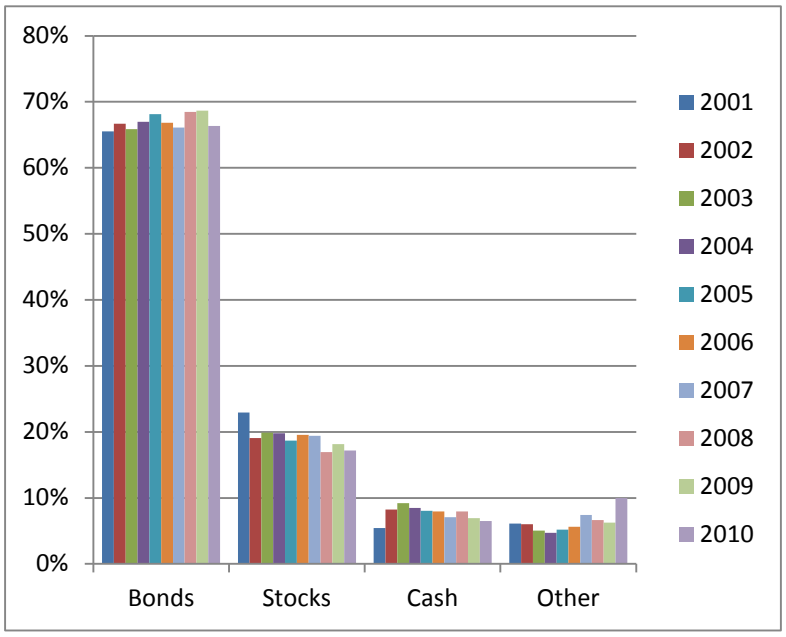
In the LIREWP survey of actuaries, 41% of respondents indicated that their organization's risk management strategy or tactics changed as a result of the current low interest rate environment. The changes undertaken involved adjusting investment strategy and reducing interest rate/investment income assumptions. The lower yield assumptions would result (all else being equal) in lower target combined ratios for underwriting.

A review of the mix of invested assets by asset class (stock, bond, etc.) and the mix of bonds by type (government, corporate, etc.) was performed to study changes in investment decisions in light of the interest rate environment (and the recent financial crisis). Our study of investments by P&C companies resulted in the following observations:

- The percentage of invested assets in stocks decreased in 2008 and, while it increased slightly in 2009, it returned to the lower level in 2010. Because the market had made up a sizeable portion of the 2008/09 loss by 12/31/10, it appears the insurers have not moved to stocks in an effort to achieve higher total returns and may have, in fact, reduced their exposure to stocks in light of the very recent reminder of their volatility.
- There appears to have been some movement of invested assets from Bonds to "Other" in 2010 that could be considered an attempt by insurers to achieve higher returns. However, the entirety of the change is driven by one large entity. Also, the data we have available to us is not in enough detail to shed more light on this change.

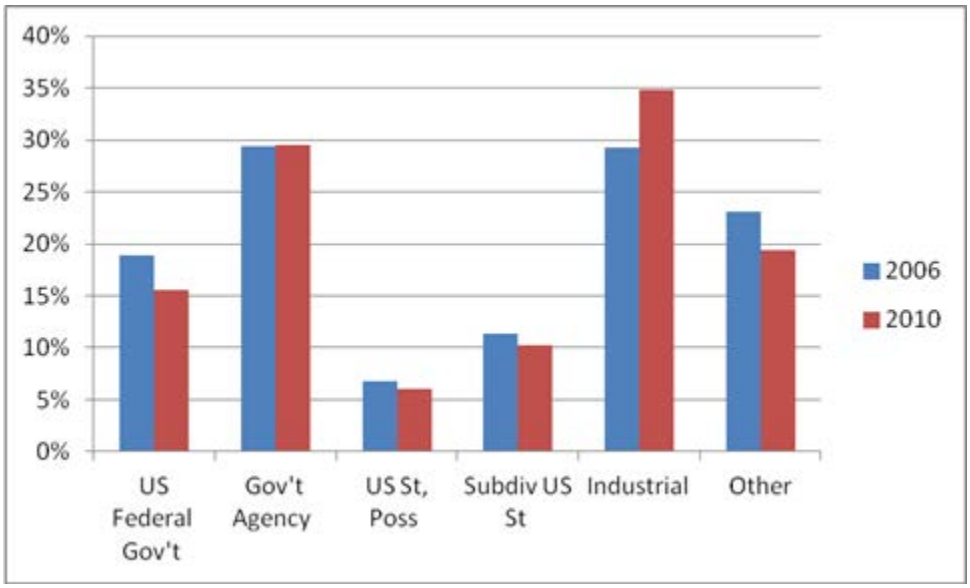
Figure 9 shows the mix of investments over time:

Figure 9



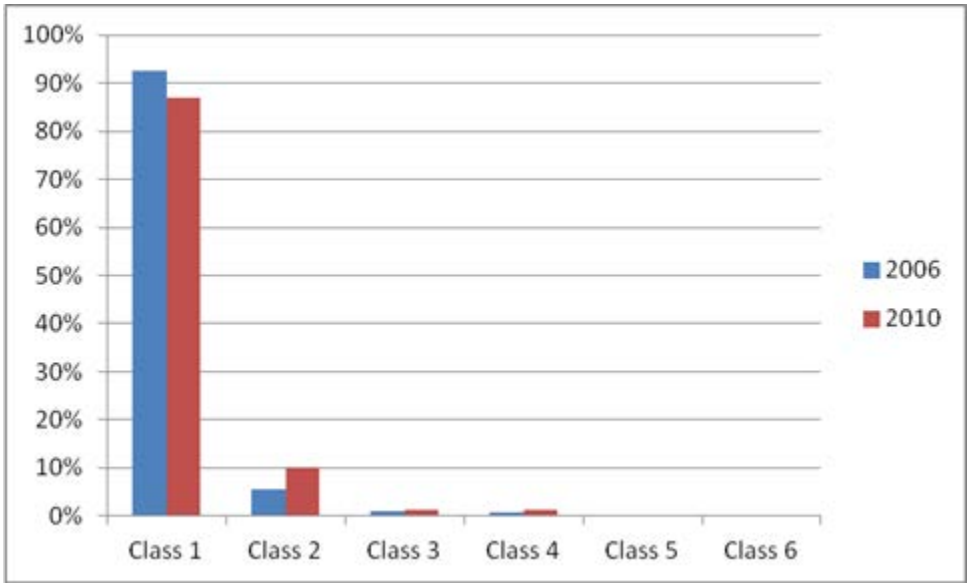
As is shown in the Figure 10, there is a shift in the mix of bonds from the various categories of government bonds (excluding government agencies which are presumably primarily MBS) to corporate bonds, as insurers try to achieve the higher returns typically available from corporate bonds relative to government bonds. There is a slight shift away from municipal bonds, but it appears to be the result of the shift to corporate bonds from government bonds generally and does not appear to us to be primarily driven by a change in strategy driven by income tax rules.

Figure 10



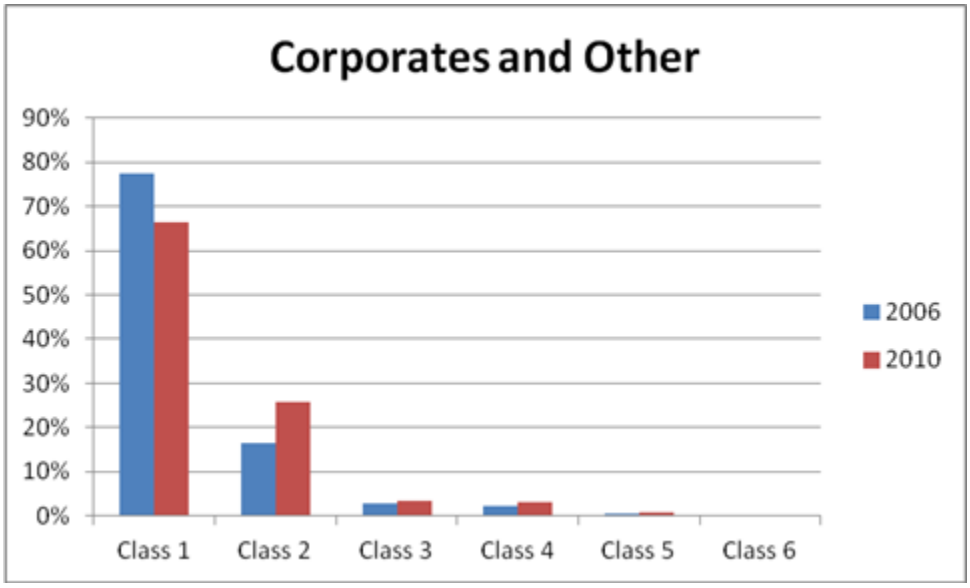
There is also a reduction in the percentage of bonds in Class 1 and increases in classes 2 – 4 (shown in Figure 11 below).

Figure 11



Even if the various types of government bonds are excluded from Class 1 (as shown on the chart below), there is a significant shift in the mix of bonds between Classes 1 and 2, indicating that not only are insurers moving to Corporates to attain higher yields, but are also carrying lower quality corporates. It is important to note, however, that the bond classes over time may not necessarily be static in terms of their measurement of credit quality. It is possible that a bond with identical risk characteristics could be rated differently at different points in time. In this particular case, the financial crisis may well have resulted in more bonds being rated Class 2 than would have been before the crisis.

Figure 12

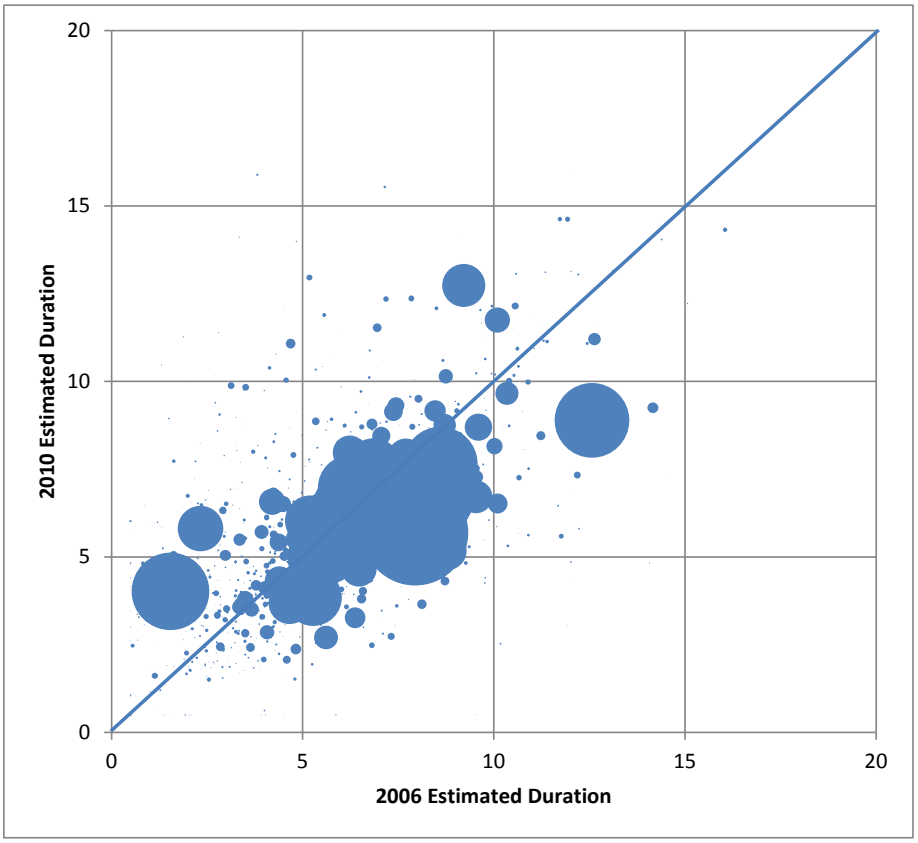


While there may be some indication that asset class mix may be somewhat more aggressive in the current environment, the asset mix is generally still conservative. The heavy use of fixed income assets within the industry leaves interest rate sensitivity as a significant threat to balance sheet strength. Here we find the industry generally acting prudently with regard to this risk.

To reach this conclusion, we utilized statutory Schedule D data for the U.S. P&C insurance industry (Source: SNL FINANCIAL LC). We estimated the duration of assets in years for each U.S. P&C insurance company group based upon examining the term of the assets they held and making assumptions regarding coupon rates that incorporated the term structure of interest rates. We performed these calculations for each company group as of December 31, 2006, and December 31, 2010.

In the Figure 13, each bubble represents a U.S. P&C insurance company group, with the area of the bubbles corresponding to the size of each company group as measured by the average total carrying value of bonds between 2006 and 2010. Company groups that are plotted below the blue diagonal line have lower estimated durations as of year-end 2010 than they had as of year-end 2006, and company groups plotted above the diagonal showed an increase in estimated duration over the same period. We observed that the estimated durations as of year-end 2010 are generally lower than those estimated as of year-end 2006. This shift would allow the majority of company groups to mitigate the risk posed by a sudden rise in interest rates.

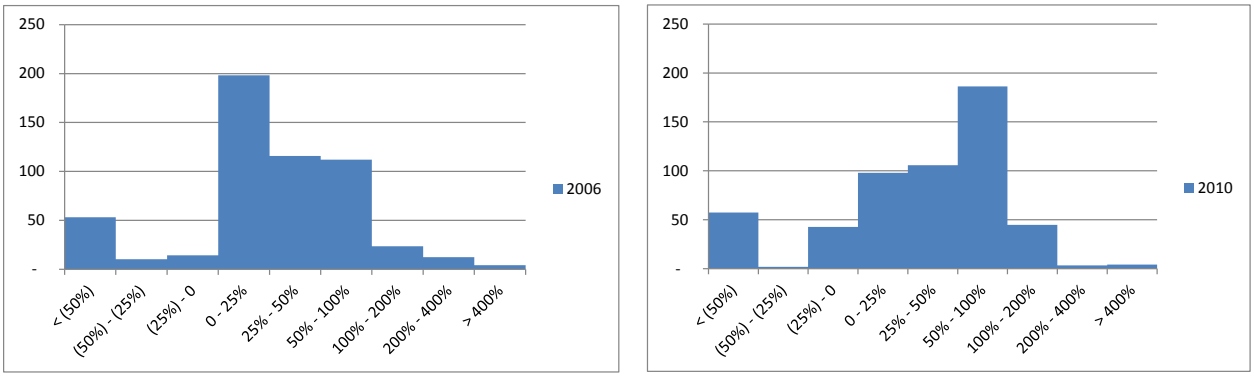
Figure 13



Upon further scrutiny of these results, the larger company groups appear to be behaving more conservatively in this regard than some of their smaller competitors. Some small- to medium-sized entities appear to be taking greater risk that could become problematic in the case of a sudden rise in interest rates/inflation. One potential explanation could be that the smaller company groups which are above the diagonal are attempting to boost their investment returns.

Using statutory Schedule D and balance sheet data for U.S. P&C insurance company groups, we also analyzed the carrying value of bonds held relative to loss reserve levels as of year-end 2006 and year-end 2010 and sensitivity tested the results for increases in interest rates and inflation. We first established a baseline understanding of the underlying data by producing the following graphs in Figure 14.

Figure 14

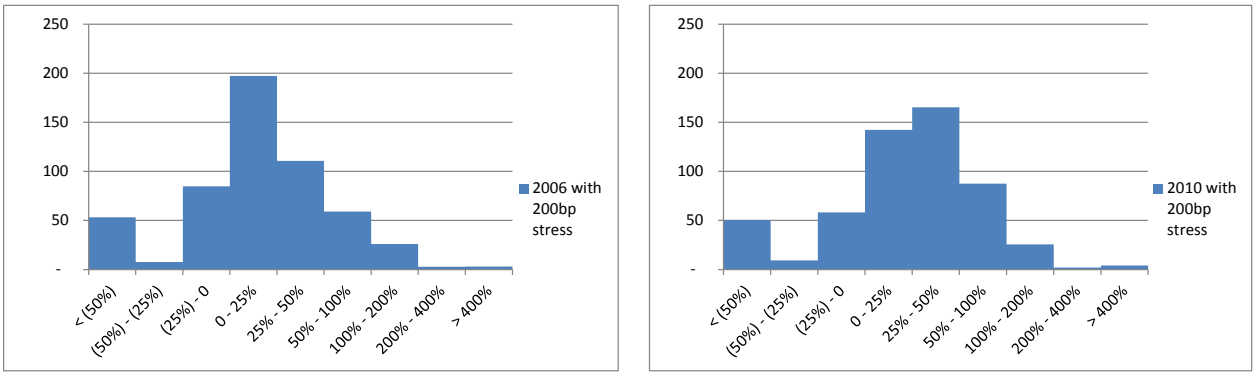


The X-axis represents the "loss reserve coverage ratio" of (Carrying Value of Bonds – Loss Reserves) / Loss Reserves, with common tiers of this percentage established to facilitate visual comparisons between the two dates. This ratio was established as a proxy for the level of risk that investments would not adequately fund the loss reserves. The Y-axis represents the total $ billion value of loss reserves for the company groups that fell into each X-axis tier.

We note that between year-end 2006 and year-end 2010, there has been a general shift toward higher loss reserve coverage ratios, meaning that company groups have generally moved toward higher carrying values of bonds relative to loss reserves as interest rates have declined.

Next, we evaluated the impact on the baseline graphs by stressing the interest rate upward by 200 basis points (Figure 15). In this scenario, we assumed no inflationary impact/increase on loss reserves.

Figure 15

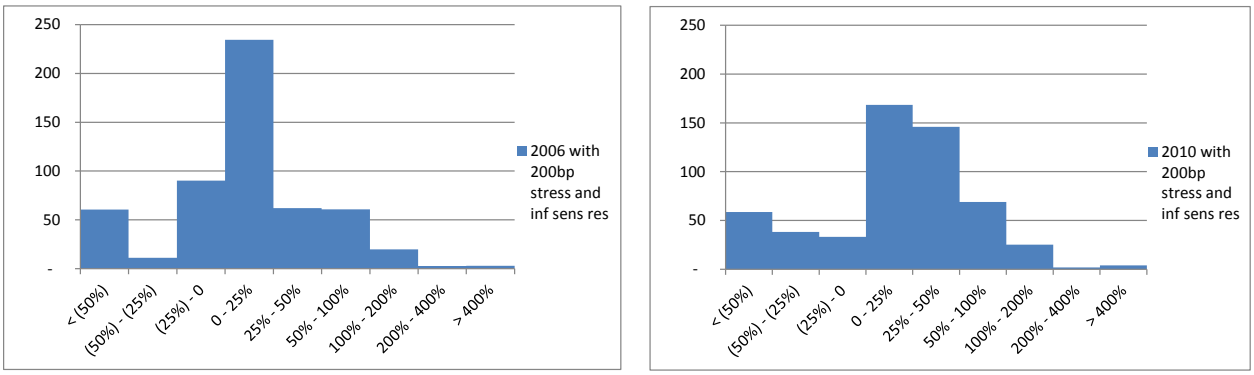


As would be expected, the loss reserve coverage ratios declined under this scenario as of both year-end 2006 and year-end 2010. However, the 2010 results indicate that fewer company groups would have loss reserve coverage ratios that fall below the theoretical "break even" point of 0%.

Finally, we sensitivity tested the results to include the impact of a 200 basis point increase in

interest rates coupled with a corresponding inflationary increase in loss reserve balances (Figure 16).

Figure 16



Under this scenario, the 2006 results were once again more severely impacted than the 2010 results, with a significant increase observed in loss reserve coverage ratios less than 0%.

Figure 17 summarizes the percentage of total industry loss reserves with loss coverage ratios below 0% under each scenario.

Figure 17

Scenario Description	2006	2010
Baseline	14%	19%
Interest Rates + 200 basis points	27%	22%
Interest Rates + 200 basis points and Inflationary Increase in Loss Reserves	30%	24%

6. CONCLUSIONS

The Low Interest Rate Environment Working Party's (LIREWP) of the Casualty Actuarial Society (CAS) exploration of the impact of low interest rates led them to the following five conclusions:

- The low interest rate environment puts pressure on profitability, but companies are generally able to respond appropriately with regard to pricing of insurance products.
- P&C insurance liabilities give some evidence of inflation sensitivity, which is potentially an important consideration if interest rates and inflation move together.
- If interest rates were to rise suddenly to higher historical levels, balance sheet problems could emerge for some companies.
- The risk of widespread solvency problems due to a sudden rise in interest rates appears low.
- The largest companies appear to be behaving more conservatively on duration changes compared to some smaller competitors.

Perhaps the biggest conclusion drawn in the review by LIREWP is that the interest rate environment requires continued attention of actuaries in the work that they do. The impacts of interest rates on pricing, reserving, investment strategy, and solvency require monitoring and potential action.

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