July 2014

Interest Rate Risk

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Two reports came out recently discussing how insurers manage interest rate risk, one from the NAIC's Capital Markets Bureau (June 26, 2014 titled Quantifying Market Risk: Duration and Convexity) and one from Swiss Re (sigma No 3/2014, World insurance in 2013: steering towards recovery). To put this in context for me, I recently completed a research paper on sustained low interest rate scenarios and what could cause them (https://www.soa.org/Research/Research-Projects/Risk-Management/research-2014-sustained-low-interest.aspx) and am currently working on a project looking at potential transitions to increasing interest rate scenarios and how that might impact the insurance industry. So I have been giving the topic a lot of thought for over a year. That why these two reports were so interesting, especially when one showed how poorly insurance industry regulators understand this risk (I should note that, in my opinion, they understand it better than banking regulators).

Capital Markets Special Report

Several years ago the NAIC set up a Capital Markets Bureau to improve their understanding of the asset side of the balance sheet. As part of this, they regularly release Special Reports, and this one was released June 26, 2014. In the past some of the reports have been pretty good, while others have given the perception that it was ghostwritten by someone trying to enter the insurance market who did not quite understand the nuances. This report follows in that vein.

I should also note that data used in these reports are statutorily based so is limited by what information is available for that purpose.

Duration and Convexity

It amazes me that this paper introduces duration and convexity metrics and leaves all the charts to the appendix. It is much easier to understand when looking at a picture. I remember my introduction to Macaulay duration, and a playground teeter totter was used to present the concept that this single point in time could be used to represent a series of cash flows.

A common fallacy among investment professionals is that the assets can be managed effectively and separately from the liabilities. They think liabilities are simple, and that the metrics they receive are essentially fixed cash flows. The reality is that assets and liabilities should be managed together, but very few professionals have the skill set to do it. An insurance company forms a kind of financial complex adaptive system, with interactions between elements and a constantly changing landscape.

This paper focuses on Macaulay and modified durations, which is great for a teaching tool but poor to reflect the real risks. This is especially true for life insurers, where ALM can be their greatest risk exposure. Unfortunately this is limited by the data available in statutory reports. Cash flows for both assets and liabilities vary based on relative levels of interest rates. Liability cash flows react to asset cash flows. For example, if I back a deferred annuity with a floating rate bond, and rates decrease, credited rates will lag since they are often guaranteed for 12 months. The same is true when rates rise.

Immunization

The process described in the Capital Markets paper is duration immunization. A better, and more easily understood, method is cash flow immunization. If you match the cash flows exactly, there is no interest rate risk because both assets and liabilities move in the same direction in all cases. Duration immunization has shortcomings as it can be manipulated. It works only for the exact point in time it is calculated. Some insurers manage to duration while ignoring convexity, using what is called a barbell approach of short and long duration assets with the same overall duration as the liabilities. This only works until rates move, as very few value curves move with interest rates directly. Most are not straight lines. You are really talking about the rate of change (duration, like speed if you are driving) and the rate of change of the duration (convexity, like acceleration). Analytical tools develop how quickly the value is changing. Using a more sophisticated metric, key rate durations (or partial durations) builds results around points in the yield curve when it shifts in a non-parallel fashion (there is lots of model risk when balancing run time and model sophistication).

Financial Disclosures

This section of the paper probably frustrated me the most. Duration gaps are reported, but no mention is made if these are product portfolio assets only or if surplus assets are included. Insurers always have more assets than liabilities, so matching the duration of all the assets with the liabilities is not appropriate. Plus, there are many assets where duration is not clearly defined. This is especially true of equities, where some say the impact of interest rates is zero and others use something longer (some even state that equity duration is infinity). My preference is to treat equities as a perpetual bond and use 1/earnings rate of the firm. The paper thinks it knows a lot about one company, but both disclosures lead to more questions than answers for me.

What would be a lot more useful would be for insurers to explain how they view their business. Is the investment function set up to back liabilities, or is the primary value added by the investment function and liabilities designed to create float (similar to a loan).

Considerations

I have heard (third hand) that when federal regulators come to an insurance company, they are overly focused on duration and don’t seem to understand cash flow

immunization. These are the same regulators who handled the S&L crisis, so are likely fighting the last battle (they lost that one badly). If the Treasury or Federal Reserve Bank wants to regulate insurance, and there are reasons why they should be involved, then they need to hire experts. Actuaries should be considered for these jobs, and they should be apolitical like the Congressional Budget Office (CBO).

There are 11 limitations of duration listed.

a) Market risk – does not mention that liabilities change their intrinsic value too
b) Immunization strategy – cash flows are all that matters, so defaults are very important to integrate into a strategy
c) Liabilities – include surplus in analysis, utilize David Babbel's paper on enterprise duration
d) Dynamic – insurers should consider cash flows along with duration and at least convexity among higher order statistics
e) Future – duration is not predictive
f) Derivatives – adding other asset classes brings counterparty risk and liquidity issues
g) Duration calculation – it's not clear what their goal is here, as they spent the entire paper talking up duration then mention here that solvency won't be impacted by small changes in rates
h) Asset duration impact – the enterprise duration is impacted by the amount of deferred annuities on the books, as this acts as leverage, along with the duration gap between assets and liabilities.
i) Duration types – very little time is spent on option adjusted duration (effective duration), although for most insurers this is the metric that matters most. What I see happening in the market today is similar to 2006 in that insurers are reaching for yield, often finding capital charge mispricing (RMBS had too low a capital charge and no liquidity charge, but paid an extra 10 bp so became the asset of choice to back competitive products like deferred annuities. This expanded to CDO products.).
j) Parallel shifts – it's a blended metric that can be viewed at more detailed levels using KRD
k) Asset classes – all liabilities have sensitivity to interest rates too

Overall it is very frustrating to see companies "manage" their assets while forgetting that their liabilities interact with them in unintended ways.

Sigma

Swiss Re, through a sigma research paper, published a summary of the world insurance industry (http://media.swissre.com/documents/sigma3_2014_en.pdf). Included was a section, pages 14-17, titled The interest rate legacy for the insurance sector. While most of the information was fairly basic, they did their usual good job of summarizing a topic using layman's terms. Their most interesting point, given current low rates, is that

portfolio yields will lag when rates start to rise as maturing assets will still be at higher levels than new money purchases (if the rate increases are slow and steady rather than spiking).

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