

# **Extra Recitation – Trading Game Strategy**

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# Preview of Recitation

- Brief Overview of the Case.
- **First Step**: Analyzing your Assets and Liabilities.
  - Ways to assess the value of your liabilities.
  - Nature of your investment problem.
- **Hazard #1**: Don't blindly equate durations!
- **Hazard #2**: Don't try perfectly matching your Asset CFs and your Liability CFs.
- **Strategy #1**: Undertake some risks.
  - Riding the yield curve.
  - Undertaking some credit risk.
- **Hazard #3**: Don't overestimate your return from bearing risk.
- **Hazard #4**: Don't take on too much risk.
- **Strategy #2**: Speculate on market movements.
  - Caveat... it's tough to predict market movements!
  - You'll need to explain convincingly why you're speculating in a certain direction.
- **Big Picture**: Understand the trade-offs your making and think about them with some care.

# Brief Overview of the Case

- Hired to manage Quest of Toys' defined-benefits pension plan and re-evaluate its strategy.
- Current fixed-income portfolio worth about \$84M.
- Want this portfolio to cover liabilities due to current retired employees.
- How does the value of assets compare to the current value of those liabilities?
- Want to avoid excessive risk and speculation.
  - Because Quest would need to make additional contributions to make up for any shortfalls in the portfolios ability to cover the pension liabilities.
  - But is undertaking some risk be *necessary*? More to come on this...

# First Step: Analyzing Your Assets and Liabilities

- Analyzing your *liabilities*:
  - Need to determine the value of these liabilities.
  - **Method 1**: Find the value of a matched portfolio (e.g. using a variety of strips). This is equivalent to pinning down the relevant parts of the term structure.
  - **Method 2**: Use a smaller number of bonds to get a couple of parts of the term structure. Interpolate and extrapolate rest of term structure.
  - Method 1 is *more precise* than method 2, but both are *acceptable* for this assignment.
  - What are the risks regarding the value of these liabilities?
  - Interest rate risk must be understood.

# First Step: Analyzing Your Assets and Liabilities

- Analyzing your *assets*:
  - Should find that the value of assets is lower than the value of liabilities.
  - What risks are undertaken in the current portfolio?
  - Interest rate risks and credit risks.
  - Have you taken on too little or too much?
- Nature of the *investment problem*:
  - Pension plan's assets are trailing its liabilities... need to make up some of this financial distance to avoid a shortfall in covering pension liabilities later on.
  - Need some financial fuel to win the race... by taking on some risk, you expect to make up some of the shortfall by capturing the premium paid on financial assets.
  - If you know more than the market does about future market movements, you can also profit from speculation. But this is difficult.

# Hazard #1: Equating Durations

- To maintain a conservative strategy, shouldn't you set the duration of your assets equal to the duration of your liabilities?
- NO!!!
- Two points:
  - Value of assets isn't equal to the value of your liabilities... so this policy doesn't even duration hedge.
  - There are benefits to undertaking some interest rate risk. We'll talk about this in 2 slides.

# Hazard #2: Matching CFs

- One way to insure that you'll be able to meet your pension liabilities is to perfectly match your asset cashflows with your liability cashflows. Can you do this?
- NO!!!
- Two problems:
  - First is practical and specific to this case... you can't match the cashflows with the securities we allow you to trade.
  - Second is fundamental... the value of your assets isn't high enough to actually accomplish this matching. You could in principal match quite a bit of the earlier cashflows, but you would be left with some completely uncovered liabilities later on.

# Strategy #1: Undertaking Some Risks

- Taking on some *interest rate risk*:
  - Remember the liquidity preference hypothesis.
  - Even if you don't expect interest rates to change, the term structure will be upward sloping because of risk premium.
  - What does this mean? How can you profit from this?
  - Called *riding the yield curve*.
  - What are the risks involved in this strategy?
- Taking on some *credit risk*:
  - Some bonds in the list aren't guaranteed to make their promised payments.
  - Corporate bonds... credit risk reflected by their credit rating.
  - Link between credit rating and default rates illustrated in lecture notes (3-43 and 3-44).
  - Again, credit risk gives you risk premium... this also helps you catch up to your liabilities.

# Hazard #3: Return From Risk

- Be careful not to *overestimate* the return you get from risk.
- For instance, in the case of credit risk... don't use the *promised yield* as your forecast of *actual yield*.
- Need to take actual *expected* payment level into account (which is less than promised payment).
- Can get this expectation from information on *default probabilities* of bonds in different credit rating categories.
- What are the problems with this approach to determining actual yeild?

# Hazard #4: Too Much Risk

- If I get a premium from bearing extra risk, why don't I just load up on the bonds with the most interest rate risk (i.e. longest maturities) and the most credit risk (i.e. worst credit rating)?
- Because...
- Quest of Toys still targets a conservative strategy.
- Though, on average, there is an upside to this approach, at some point you begin to increase the probability of being unable to cover the liabilities when you undertake too much risk.

# Strategy #2: Speculation

- Can use interest rate risk exposure and credit risk exposure to make bets on market movements.
- For instance, if you think interest rates will fall, this means you think bond prices will increase. Which bonds will have the largest increases?
- In this case, can catch up to your liabilities by purchasing long maturity bonds.
- However, speculation is risky because you may turn out to be wrong.
- Need a really good reason or insight to justify speculation.
- If you do this in the case, we expect a good explanation regarding your prediction in the write-up. This isn't easy.

# Big Picture: Important Trade-off

- Mainly, your strategy involves a trade-off between two things...
  - Getting *more return* which allows you to make up the difference between the value of your assets and your liabilities.
  - *Reducing your risk* which lowers the likelihood that bad luck or poor performance makes Quest's portfolio fall way short of meeting its liabilities.
- How should you balance these two? Certain amount of subjectivity. We just want you to think about this trade-off intuitively and use any insights you have to produce a sensible investment strategy that you can explain and defend.

# Useful Resources

- WSJ and Bloomberg to get prices.
- WSJ, Yahoo! Finance, etc. to get market news.
- TA office hours to go over ideas and get advice.
- Mainly want you to use the basics that we've covered in class...

# Main Point of the Case

- To build familiarity with the topics discussed in class.
- Only necessary to work at the *intuitive* level... *don't* need to overquantify things.
- Of course, if you enjoy coming up with quantitative techniques, you can do this too.
- **POINT**: This case should be fun and instructive. Don't feel the need to start doing crazy stuff just because another group has. Work on this until you get bored or too frustrated...