Corporate Risk Management

VIDEO LECTURE VL12

VALUATION FOR FINANCIAL ENGINEERS

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What would Modigliani & Miller say?

In perfect markets…

Shareholders can alter the risk profile of corporate shareholdings themselves

Shareholders have different preferences which the firm cannot simultaneously satisfy

Therefore the firm should not hedge

- All shareholders should choose their own risk profiles

Furthermore, there may be costs of hedging, such as bid/offer and transaction costs

Corporate Risk Overview

Business-Related Risks (Basic Operating Risks)

- Risks generated from the basic business operations
- Selection of technology platform, marketing strategy, cost management
- Ex: Homebuilder's exposure to injury, contract enforcement or delivery delays

External Risks

- Risks not directly related to business operations & out of control of management
- Political events, natural disasters/weather, prolonged recessions
- Ex: Shipper's exposure to weather events, Oil company's exposure to nationalization

Financial Risks

- Risks related to movements in global financial markets
- Sub-categories include market risks (rates, equities, FX), credit risk, liquidity risk
- For banks, financial risks are business-related risks
- Ex: Toy Company's exposure to FX risks (with countries they export to)

Can also divide this into income statement and balance sheet risks

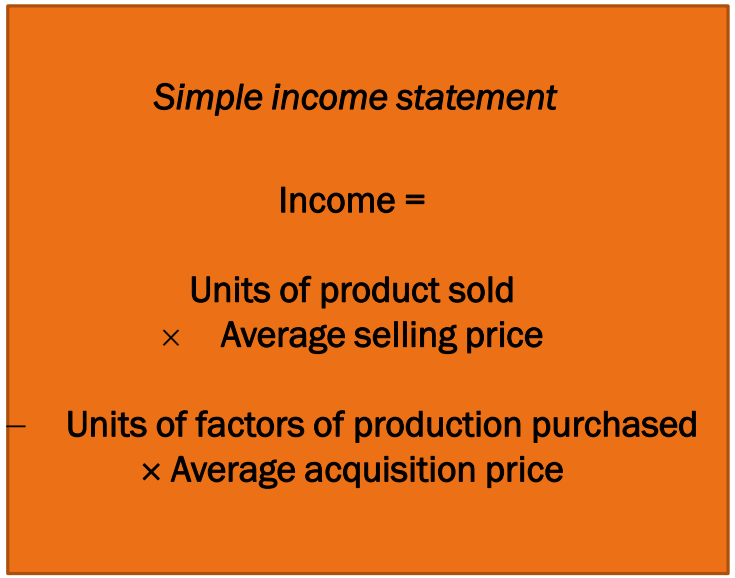
Income statement risks

Risks to number of units sold

- Overall economic conditions
- Demand for substitutes
- Reputation for product quality and customer service
- Ability of the company to produce the good

Risks to average selling price

- Foreign exchange rate
- Inflation
- Market power of the company
- Effectiveness of the marketing and sales organization



Risk to number of units purchased

- Technological developments in the industry
- Company's own production efficiency.

Risk to acquisition costs

- Commodity prices
- Prices of intermediate goods
- Interest rates
- Market wages

Balance sheet risks

Risk examples

- Market risk – The pension fund
- Credit risk – Accounts receivable
- Operational risk – Product warranties

Simple Balance Sheet

ASSETS	LIABILITIES
Property, Plant and Equipment	Product warranty obligations
Raw materials inventory	Short-term debt (working capital/ payables)
Finished goods inventory	Long-term debt
Cash on hand	Tax obligations
Accounts receivable	Equity
Financial assets (including insurance policies and pension fund surplus)	
Brand value/growth opportunities	

Corp finance view of risk management

Creating Value with Risk Management

Better Decision Making

- Risk Management provides a framework for looking at strategic decisions in the context of how risky they are
- Example
  - not just NPV, but what is the risk/return payoff?

Improvement of Risk/Reward profile

- Leading to higher valuations
- Example
  - Elimination of FX risk for an Import/Export company

Lower Funding Costs

- Increasing the stability of cash-flows reduced the risk premium (spread) demanded by lenders

Improved Marketing Ability

- A strong risk discipline gives confidence to customers to buy the company's products.
- Example:
  - Auto manufacturers lost substantial business when their future outlook turned very bleak

Academic arguments

Risk management irrelevance proposition
- If shareholders can manage risk on their own account, there is no reason for the company to do it

Costs of financial distress and bankruptcy
- Risk reduction reduces the expected losses of financial distress

Capital structure
- Risk reduction can increase tax-deductible debt capacity

Taxes
- Risk reduction reduces expected taxes in a progressive tax environment

Large shareholder incentives
- Risk reduction may benefit large shareholders who add value by their presence

Management incentives
- Contracts that link compensation to risk can improve performance

The Sage of Omaha

Well, when we buy the Burlington Northern, they're hedging diesel fuel. Now what I tell them is I wouldn't do it if I were them but it's entirely up to them. I mean, diesel fuel's a big cost for them and they've got pass-through costs to [customers] and [customers] don't have pass-throughs so they're [the] exposed partly. ...I tell them if they really don't want diesel fuel on the market we'll just close up the railroad and then all trade diesel fuel all day... And if they don't know it, they're going to be out the frictional costs over time. The reason many of them do it is that they want, the public companies, they want to smooth earnings. And I'm not saying there's anything wrong with that...[T]hey're going to lose as much on the diesel fuel contracts over time as they make but they can protect themselves just like Coca-Cola does on foreign exchange and they make a big thing of this... Anheuser-Busch was just talking about it in Business Week... It's a common practice. It's overdone in my view, but it is the response to the fact that the market doesn't like...that diesel fuel could affect the earnings of Burlington...up and down in some quarter when really over time they're not going to...save any money by doing it...

transaction costs,
bid-offer, trading staff

Risk management in nonfinancial corporations

Usually no regulatory requirement to manage risk

Capital may not be as constrained as in a financial firm

Shareholders may have explicit objectives at odds with risk management

ex. "gold bugs" don't want the company to hedge (give up upside)

Risk may be highly concentrated in a small number of factors, some of which could be illiquid

Risk management strategy may interact significantly with debt strategy

Risks may be embedded (hidden) in sales & procurement contracts, and management contracts

More concerned with accounting issues than banks

Hedge accounting - allows you to accrue the asset and the hedge together - allows smoothing of earnings

ex. refinery sells gasoline and buys crude; hedge gasoline purchases only

Risk Policy Elements

Risk policy is secondary to financial policy (not minimizing risk)

Consistency with the financial policy is required

Governance must be specialized for each company

ex. senior management (large trades) - position company
traders (small trades) - speculative profit

Corporate Finance & Risk

Most corporate finance texts do not include a section on risk management

For some, it is difficult to understand how risk management can add to shareholder value

However, risk management can make cash flows less risky, which means that a company can issue more debt

If equity capital is scarce or expensive, this can add to shareholder value

How hedging may add value

- Hedging reduces the expected costs of financial distress
- Hedging helps firms avoid underinvestment losses
- Hedging can increase debt capacity and reduce taxes
- Hedging allows firms to allocate their risk capital more efficiently 

Example #1: A Gold Company

What are shareholder objectives?

Value-based S/H.... income-based ... gold bugs

How do you set a risk policy to make sure management is aligned to these objectives?

Zero-risk policy: DO NOT HEDGE. Shareholders define your zero risk position as being long.

How do you set compensation policy to provide management incentives?

American Barrick - great case study
Write compensaton contracts with embedded "hedges"

Key takeaways?

Design risk structure of company to achieve the overall objectives

"Contingent capital structure" analogous to capital structure decision

Example #2: A Case Study

A refinery with substantial storage capacity was owned by a wealthy family, with no need for borrowing. The family was comfortable being long oil and products, so the risk policy defined the benchmark of "long 25 MM barrels" as their natural position, and the policy set limits as to how far the refinery could stray from the natural position.

After some time, the family decided they needed to get cash out of the refinery, which they would accomplish by getting a loan for $200 MM, requiring a consortium of banks.

The banks insisted on a new risk management policy that allowed for speculative trading, customer transactions, and risk management overlays for the company.

Consultant's mandate

Review refinery's financing documents, business objectives and hedging requirements

Integrate agreed lender requirements with corporate objectives

Draft a consistent risk management policy framework

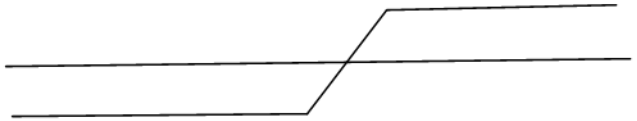
Determine a methodology for comparing hedging strategies

Suggest a reporting framework to facilitate execution of the risk policy

Lender workshop

Review hedging motivation

Summarize risk policy recommendations



Study liquidity requirements of “Zero Cost Structures”

e.g. forwards, swaps and sold call options (zero cost collars)

Explain bias towards purchased put options

Management discussion of proposed risk policy

Company hedging analysis

BENEFITS

Stable income or guaranteed minimum income

Stable or minimum asset value

Reduced likelihood of financial distress

Increased likelihood of reaching financial goals

Improved borrowing terms

COSTS

Bid-offer spread
- Market availability and liquidity

Incremental risks
- Basis instability
- Liquidity requirements
- Operational risk
  - Model risk
  - Execution risk
- Accounting considerations
- Competitive issues
- Communications

The risks of hedging…

SemGroup declared bankruptcy within a month

"The downgrades and Watch Negative status reflect liquidity pressures related to the sustained elevated level of crude oil prices and SemGroup's ability to continue its marketing and storage businesses in the current price environment. Spot prices for WTI crude at Cushing, OK have increased by as much as 43% since April 1, 2008. SemGroup hedges a large percentage of its inventories and would be required to post additional margin to increase the collateral support for its hedging program. Specifically, Fitch is concerned that the company may not have sufficient available capacity from its bank facilities to meet requests for additional margin. SemGroup is a privately held midstream energy partnership focused primarily on providing gathering, transportation, processing, and marketing services for crude oil and refined products in the U.S. Midcontinent region and Canada."

- Fitch release on SemGroup Energy Partners LP, dated 7/17/2008

Draft policy highlights

First objective: Preserve liquidity Management directive

- Accomplished by simulating liquidity requirements and prohibiting derivative activities with >1% chance of reducing liquidity to < USD $200 MM.

Second objective: Control risk of covenant breaches

- Focus on net equity covenant, i.e. inventory hedging
- Balance budgetary limits and liquidity requirements
- Establish “Level I” book and analysis to verify these requirements are met

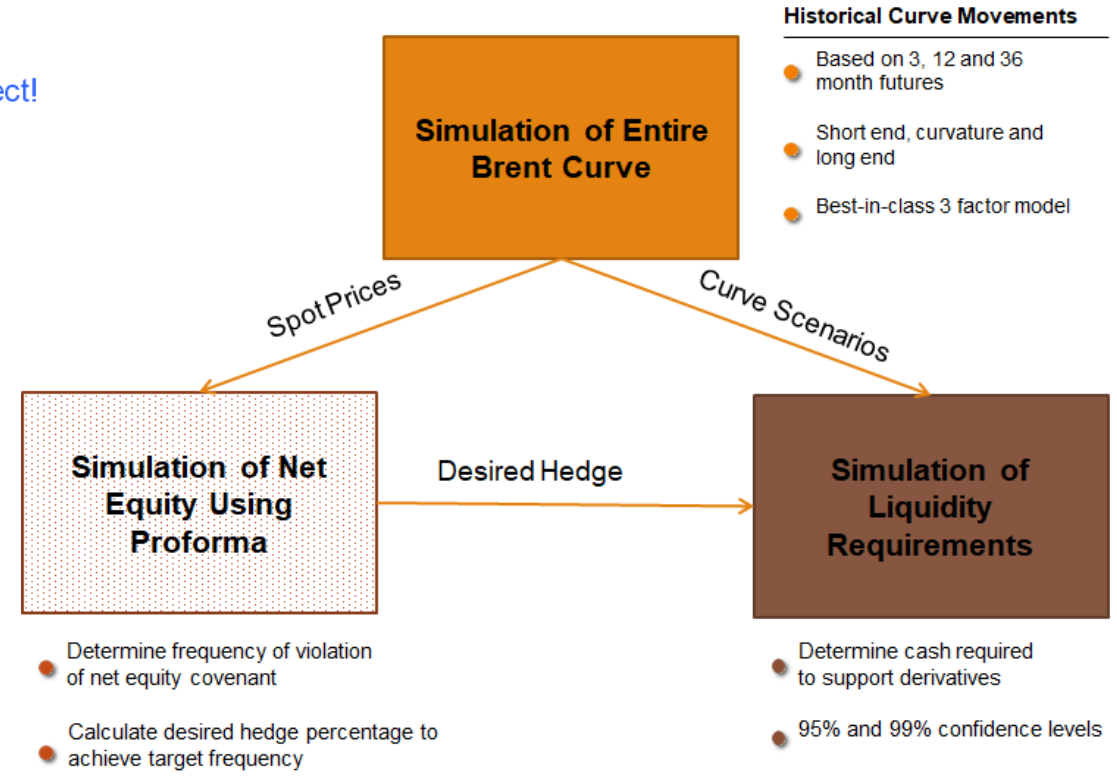
Third objective: Provide mechanisms for additional discretionary hedging and commercially-motivated trading Traders

- “Level II” additional hedging book subject to comparable restrictions
- “Level III”, i.e. other trading limits, are put in place subject to noninterference with Level I and Level II objectives

keep this small

Risk analytics

Miniproject!

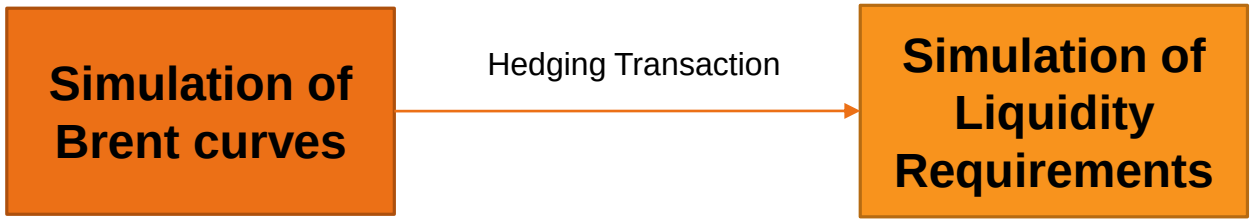


Simulate liquidity requirements

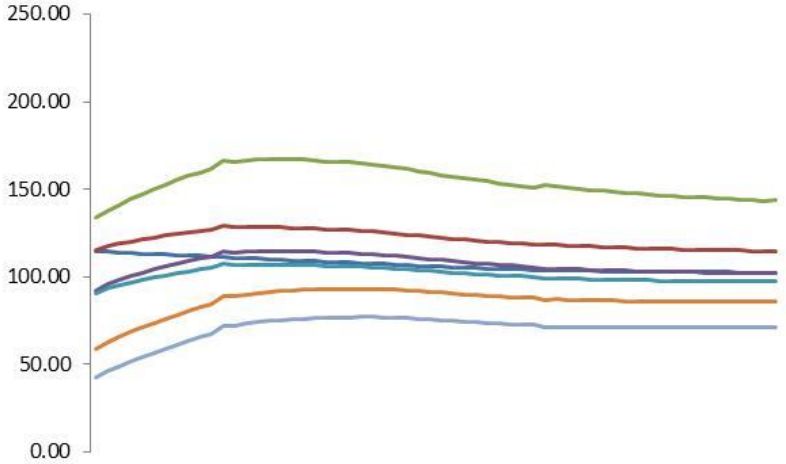
1000 paths of futures price curves

Revalue futures position

Determine liquidity requirements with 99% confidence



Sample forward curves



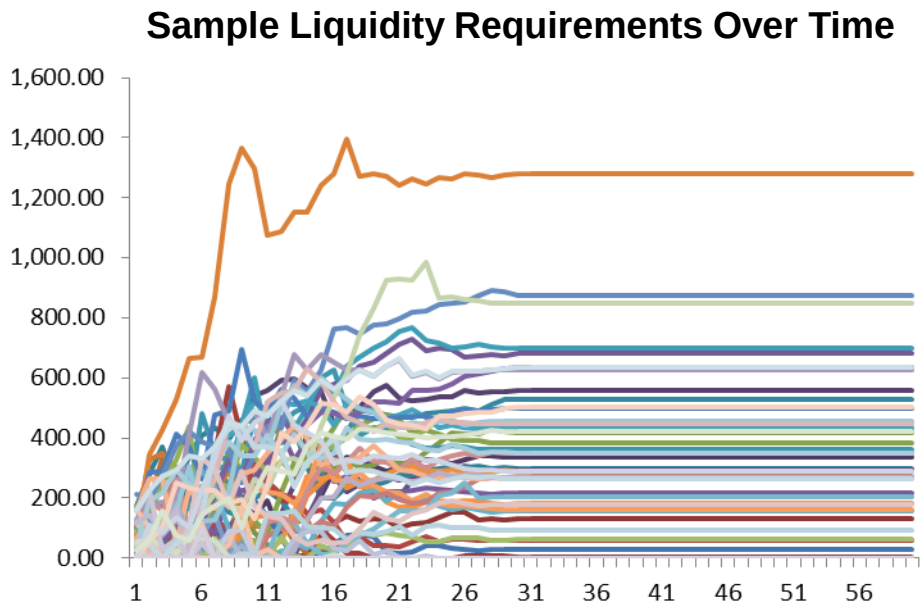
Liquidity summary

Assumptions for 100% Hedge

- Only hedge after Feb 2012
- Hedge 700,000 BBL/mo for one yr
- Hedge 350,000 BBL/mo for 2nd yr
- Total 12.6 MM BBL

Analysis

- Revalue entire position
- Use 2X BBL/mo for 1 yr
- Use X BBL/mo for 2 yrs



Every 10% hedge (1.26 MM BBL) implies 99%ile liquidity requirements of USD $117 MM

Case conclusions

Sound risk policy requires that liquidity provisions accompany hedging requirements

Current working capital facility size did not contemplate liquidity requirement for hedging

Most firms fail for lack of liquidity, not drop in asset value

Recommend probability of liquidity failure to be set at 1%

- Conservatism
- Allowance for hedging ineffectiveness
  - Basis risk, model risk and other risks

Because of liquidity concerns, focus on purchased put options

Exact program to be recommended by management

Corporate Risk Policy Guidelines

Risk definition:
- Corporate risk is any threat to financial objectives, measured in financial terms.

Benchmarking:
- Risk is not necessarily defined as an absolute risk, but may be a relative risk.

Risk pricing:
- If risk is free, corporate departments will squander it. By putting a price on risk, it is managed when it should be

Corporate risk pockets:
- Treasuries typically seek to minimize risk or minimize costs
- Procurement problems often arise due to fixed price contracts
- Marketing risk problems typically relate to unknowingly giving away options

Decision-making
- An integrated corporate risk management policy defines how risk should be measured, priced, and rewarded, leading to better decisions in all departments

Focus on treasury

The treasury department is usually responsible for FX, interest rate and commodity hedges in a corporation. They also handle cash management functions, including ARAP.

The word “hedging” is challenging to interpret

ex. hedge production with bank, accept credit risk of counterpart
ex. hedge production with futures, accept margining risk

- Financial hedging: Often the exchange of one risk for another that is more acceptable
- Hedge accounting: A method by which trades receive accrual accounting rather than mark-to-market

smoothing earnings

Many companies also struggle with the definition of treasury as a cost center or a profit center.

What is the treasury really doing?

Corporate risk quotes

"Our risk management committee can't agree whether the dollar is strengthening or weakening."

"Go ahead and hedge, but don't do anything stupid!"

"Our hedging program has consistently made money for us."

"We're not hedging this year because we lost money doing it last year."

"Our management is in favor of hedging but not at these levels."

"We never speculate."

"We hedge opportunistically."

"Sometimes we hedge 0%, sometimes we hedge 100%. Other times, we go back and forth."

"We only hedge when we have strong views."

Focus on derivatives (A Checklist)

- Verify consistency with risk policy and corporate objectives.
- Has the risk policy been updated to reflect current business strategy?
- Consider the impact of potentially offsetting risks on the balance sheet.
- Examine legal and regulatory requirements to assure compliance.
- Anticipate possible future legal and regulatory changes.
- Simulate possible outcomes of the derivative transaction under many scenarios.
- Establish the correct accounting treatment.
- Ensure the accounting treatment has the desired result in all scenarios.
- Understand when the desired accounting treatment cannot be attained.
- Make sure the firm has the personnel and systems to trade, monitor, and report derivatives activity.
- Communicate objectives to all stakeholders.
- Plan communication strategies for alternative future outcomes.
- Anticipate reputational risk due to possible adverse outcomes.
- Predetermine performance measurement criteria.
- Undertake review by audit committee (some firms will have a risk management committee).
- In the absence of sufficient internal expertise, seek outside evaluation.
- Determine in advance how ongoing valuations and risk assessments will be performed.
- Provide updated performance reports referencing communicated objectives.
- Study exit strategies in the event that conditions change materially.
- Consider personal political risk to managers under different outcome scenarios.

Procter & Gamble - 1994

Leading global Consumer Products company

- Crest toothpaste, Tide detergent, Ivory soap, Pampers diapers, Bounty, etc.
- FY1994: Global sales of $33.4BN, profit of $2.65BN

Legitimate reasons for hedging

- P&G exposed to market risks such as currency exchange rates, interest rates, and commodity prices
  - Hedge currency exposure on international profits (half of sales are non-U.S.)
  - Hedge foreign net investments and cash balances through interest rate swaps
- Manage debt interest costs through swaps
- $2.4bn of derivative contracts in 1994 annual report

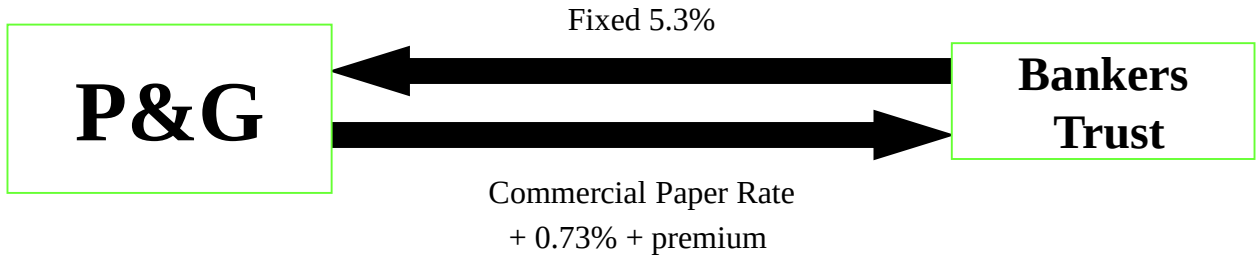
Treasury began to transact as a profit center, making leveraged bets that interest rates would continue to decline

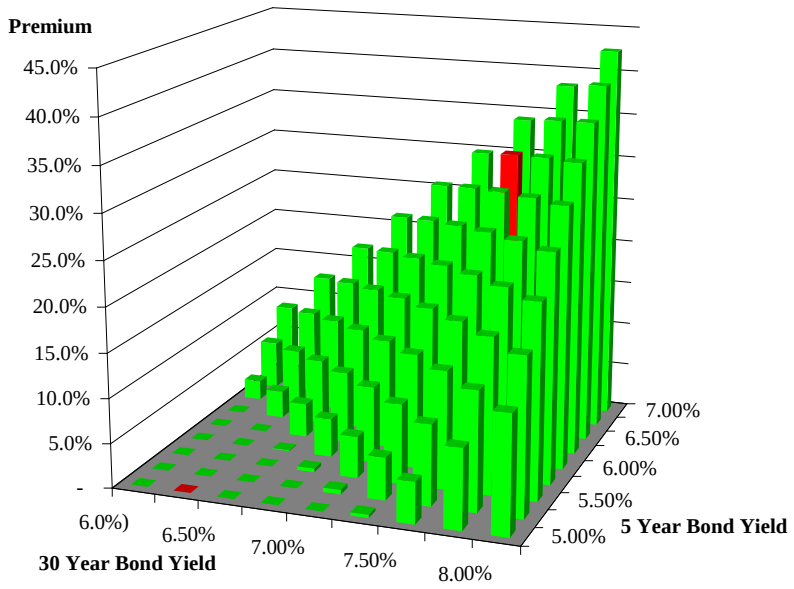
- Entered into two exotic interest rate swaps with Bankers Trust:
  - U.S. “5s/30s Treasuries” Swap
  - German “Wedding Band” Swap
- Interest rates rose dramatically, causing swap fixed payments to balloon ($200MM loss)
- P&G’s derivative debacle was the largest reported by a U.S. industrial company on swaps

“Unlike the other swaps the company has historically used, it turned out that the two leveraged swaps in question were based on highly complex formulas that multiplied the effect of interest rate increases”

Edwin L. Artzt, P&G's chairman and CEO

U.S. “5s/30s Treasuries” Swap





$$\text{Premium} = \text{Max}\left\{\frac{\frac{98.5 \times 5\text{ Year T Yield}}{0.0578} - 30\text{ Year T Price}}{100}, 0\right\}$$

What happened?

- 5 Year Yields Increased from 5.06% to 6.78%
- 30 Year Prices Decreased from $104 to $89
- Premium Increased from 0% to 26.3%
- P&G charged $157m loss to pre-tax earnings ($102 after-tax) in 1994 due to 5s/30s swap

Are derivatives in decline?

- The gross market value of derivatives fell to $11 trillion at the end of 2017, down from a crisis-level peak of $35 trillion, according to the Bank for International Settlements.
- Warren Buffett once called the instruments "financial weapons of mass destruction."
- Derivatives had a major role in the financial crisis after instruments used to play the subprime mortgage market collapsed.

Why is risk management a corporate finance topic?

Risk management provides a kind of dynamic capital structure management.

- A company that incurs a loss due to a hedgeable but unhedged risk becomes more levered (Why?)
- A hedge stabilizes asset value, preventing the leverage from changing much.
- Therefore, hedging is a substitute for dynamic capital structure management

Risk management can increase debt capacity.

- This may make it possible to get a better tax benefit/distress cost tradeoff from debt.
- This many make it possible to use less equity, since equity is not needed to cover hedgeable risks.

Risk management can increase the likelihood that internal funds are available for investment.

- Banks lend less in industry downturns.
- A firm that is hedged may be able to generate more capital from its hedge positions and better weather the storm.

Some investment bankers believe that earnings stabilization maximizes shareholder value.

- This makes the equity currency more valuable for acquisitions.

Risk management can lead to better management incentives, making sure managers are rewarded for performance, not just because they were lucky.

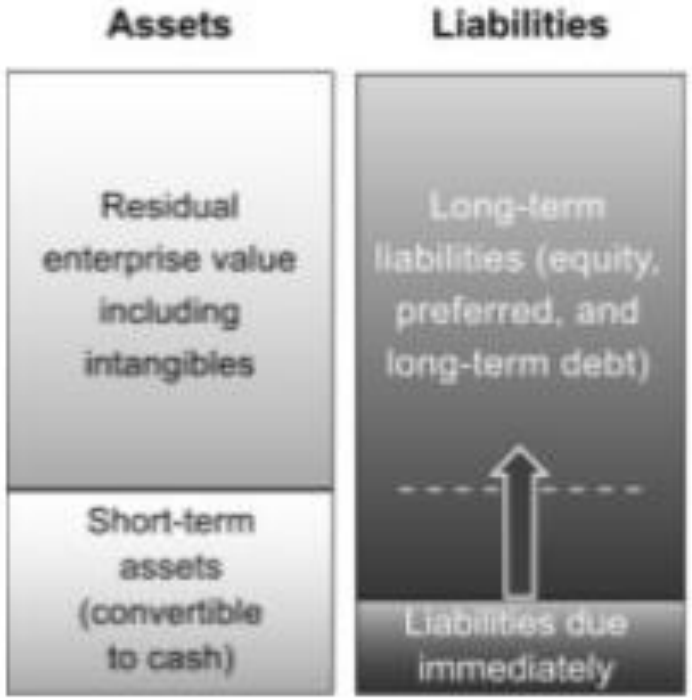
What type of risk is the most important?

(from the point of view of avoiding bankruptcy)

- Market risk
  - Risk of fluctuations in prices and rates
- Credit risk
  - Risk of non-performance by counterparties
- Operational risk
  - Losses caused by failed processes, people or systems
- Liquidity risk
  - Increases in short term liabilities
- Model risk
  - Consequences of using a misspecified pricing or risk model or applying the model incorrectly

Liquidity risk overview

- Organizations fail if they do not have access to sufficient cash to meet their short-term liabilities as they fall due.
- As long as short-term assets exceed short-term liabilities, companies face minimal liquidity problems.
- Fluctuations in margining requirements from lenders and trading counterparties can cause short-term liabilities to rise sharply, precisely when assets fall, leading to costly and sudden liquidations.
- Collateral haircuts, discretionary interest rates, and material adverse change clauses exacerbate liquidity risk.
- Ironically, lenders make "bank runs" on liquidity-stressed funds and corporations, each lender securing its own interest while collectively destroying value.
- Enron's demise was triggered by fraud, but caused by inability to manage liquidity risk.
- Financial institution bankruptcies and restructurings in 2008 were accelerated by the inability or failure to manage liquidity risk.
- Corporations must manage these risks through better contracting and precommitted contingency plans.



What are these?

- Margin loan
- Repurchase agreements
- OTC collateral calls

What tools help reduce liquidity risk?

Credit lines, contingent capital, special purpose transaction (e.g. catastrope contract)

Focus on marketing

Customer giveaways: Warranty, return policy, option to increase or decrease order on the same terms, pricing features, extensions/accelerations

Example: Industrial company purchases electric power in a block contract per MWH, i.e. a certain number of megawatts over a given time period. They cannot exceed that amount, and any power that is not drawn is lost. Client threatens to change electric companies unless they get a “full requirements contract,” where they pay only for the power they use.

Issues

- Marketers give away options that the company does not price
- Not only does this affect the values of the contracts, but it affects risk exposures
- Most marketing personnel are not risk-savvy

How should risk policy deal with these risks?

Identify risks in marketing function, document risks, policy for managing those risks

Focus on procurement

Incentive problems: Fixed price contracting, performance measurement.

Example: Corporate purchasing department is given a budget every year for supplies. The department is rewarded proportionately to their savings. Suppose one of those supplies is copper. What happens?

- Timing of the purchase decision?
- Effect on incentives?

- How should risk policy deal with these risks?

Pharma procurement case

A large multinational pharmaceuticals firm has a “zero risk” risk policy.

(What are the pros and cons of a zero risk policy?)

Case: The company owns a fleet of trucks and delivery vehicles in Puerto Rico that consume diesel fuel. Since diesel fuel prices are volatile, they need to hedge their exposure.

Plan A: Force their fuel supplier to take a fixed price contract.

Issue: places risk on suppliers
if supplier goes bankrupt?
risks: performance, supply risk, price risk

Plan B: Hedge their risks using an OTC diesel swap.

Issues:
- Cost of setting up a desk and managing it
- Operational risk
- Liquidity risk, basis risk, margining

What should they do?

In light of this, how might you suggest they change the risk policy?

The State of Alaska

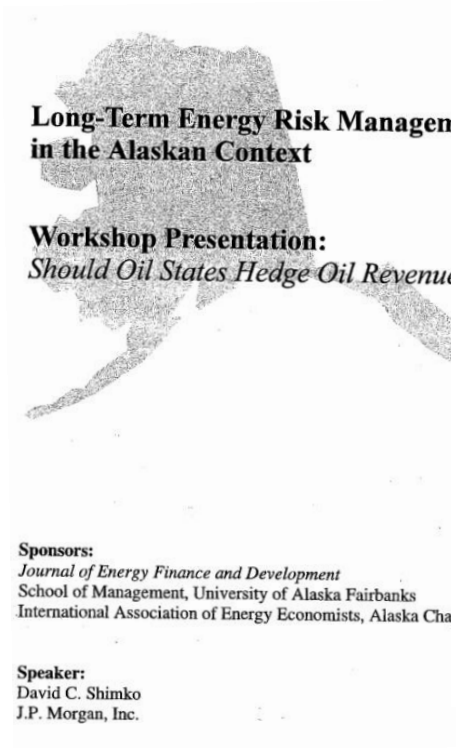
The U.S. State of Alaska

- Depends for most of their tax revenue on oil royalties
- Does not collect income tax from individuals
- Experiences swings in the state budget that affect education and hospitals
- What should they do?

  Alaska permanent fund

  AAA credit rating

  Position much too large for OTC markets



Recitation questions

How does hedging add value in the Modigliani-Miller framework?

It doesn't, because S/H can hedge themselves.

Provide two examples of income statement risk, and two examples of balance sheet risk. Which is more important for companies?

I/S: Revenues
B/S: Vulnerable debt

What are the benefits and costs of hedging?

Benefits: Reduce risk, smooth earnings, more & cheaper debt
Cost: Frictional costs

How is value created with risk management?

Orgs manage assets & risks better

Recitation questions B

What does Buffett say about risk management? Do you agree?

Smooth earnings
"Derivatives are the financial weapons of mass destruction"

What is the most important requirement for a corporate risk policy?

Consistent with financial policy

Give an example where risk policy might conflict with financial policy.

Financial policy: Max S/H value; Risk Policy: Min risk

What makes gold companies different from other companies, from a risk management perspective?

Goldbugs want company to keep upside

Recitation questions C

What is the role of lenders in the risk management process?

Lenders will provide more capital the more the company controls its risk

What is the corporate bias towards purchased put options?

What was the problem with Semgroup?

Potential for very large margin calls

Should companies be allowed to speculate with derivatives?

Yes: If they can make money with controlled risk, then ok.
No: Volatility can crowd out the ability to take risk elsewhere.

Recitation questions D

How does risk management affect marketing?

Promise obligations to company, similar to selling options and not being compensated for it.

How does risk management affect procurement?

Fixed budgets, cause risk management problems
Measuring performance is difficult

Should risk management be involved in M&A policy?

Yes: Risk is part of any acquisition. Material risks should be measured and managed,

What risk most often drives a company out of business?

Liquidity risk

Recitation questions E

What is the problem with “hedging” in the corporate treasury?

Often has a challenge interpreting "hedging", and it becomes trading

What happened at Procter & Gamble?

Betting interest rates would fall, by promising to pay more if interest rates rose (exponentially higher rates)

Why did Buffett call derivatives “financial weapons of mass destruction?”

What type of risk most often causes firms to go bankrupt?