Definition of Enterprise Financial Risk Management

- Lower financial risks to the firm by
  - Capital structuring
  - Capital budgeting
  - Hedging
- Risks include
  - Business disruption (up to and including bankruptcy)
  - Failure to meet regulatory capital adequacy requirements
  - Suboptimal investment (under- or over-)
Outline

- The evolution of corporate policy
  - Eminem (indifference)
  - Frictions
  - Modern era
- Goals
- Buy side risk management
- A model of the firm
- Techniques
- Conclusions
The evolution of corporate policy
Businesses have two kinds of risks:
- Core (uncertainty inherent in business)
- Noncore (risk from external factors)

E.g. airline:
- Core includes flying planes safely and on time, selling seats, keeping customers satisfied...
- Noncore includes jet fuel prices
- Core risk is good; Noncore risk bad

Frank Knight, *Risk, Uncertainty and Profit*, 1921
Eminem (the classical literature)

• “The average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class.”

• Taxes indicate should take advantage of tax shield as much as possible.

• Extension to projects of different risk through CAPM works linearly. Extension to risky debt doesn’t change anything.

• No point to changing risk profile of the firm.

Investor/Employee agency (the classical literature)

- Investor can decide how to use firm’s risk
  - Offset in a portfolio
  - Hedge
- Similarly for an employee
  - Firm need not worry about difficulty in attracting employees because employees can hedge risks
The modern era: taking into account friction & agency costs

- “For capital allocation decisions to involve more than a straightforward application of the Capital Asset Pricing Model, frictions must exist between the firm and the capital markets and/or in the internal management of the firm… Absent imperfections, the Modigliani Miller (1958) theorem applies and the price of risk is determined by the capital market equilibrium.” (Perold, 2001)
Some frictions & agency costs

- Bankruptcy (Baxter, 1967)
  - Mini-bankruptcy (disruption of business lines)
- Agency effects of equity holders vs. debt holders – pecking order (Jensen & Meckling, 1976)
- Loss of business due to credit downgrades (Merton and Perold, 1993)
- Costs of raising new external funds – going to capital markets in distress (many, including Froot & Stein, 1996)
- Deadweight cost of risk capital (Perold 2001)
Behavioral corporate finance

- Executive herd mentality
- Career risk of going against current tide greater than most can bear
- Rare to see recognition of cycles and lead/lag behavior
- Result: this quarter’s bottom line has unreasonable influence on capital budgeting
Goals of Enterprise Financial Risk Management (EFRM)
Goals of EFRM

- Avoid frictional and agency costs
- Counter behavioral limitations with a disciplined program
- Cushion downside to avoid business disruption
- Preserve sufficient upside to compete in strong markets
- Provide sufficiently predictable cash flows so firm can take advantage of weakened competitors in negative environment

See also Strongin & Petsch, Goldman Sachs, 1998
Common EFRM programs

- Lower variability of cost of goods or of sales
  - Airlines: energy
  - Agribusiness: commodities (e.g. wheat)
  - Commodity producers
    - American Barrick, Metallgesellschaft
- Minimize foreign exchange risks
  - Merck (F/X options)
- Asset/liability management
  - Banks, insurance companies, GSE’s
- Capital adequacy
  - Banks, investment banks, brokerages
Buy side risk management
Investment management firms

- No capital adequacy requirements (VaR irrelevant)
- Little ALM (not a bank or insurance company)
- Credit downgrades not directly tied to loss of business
- Why bother?
“Stalling equity markets add up to bad news for most investors, but for many fund management companies *it means they also have to rethink their business models as profits slump*, according to analysts.” – GARP, 9/16/2002

What investment management firm has a business model that does not take into account the possibility of stalling equity markets?
quot;One of the oldest fund management names in London's famed banking heartland, Schroders, recently posted first half profits down 45 percent year on year, hit by lower revenues from investment funds and the short-term costs of refocusing its business. Schroders... fell to its first ever loss last year...quot;
Simple revenue model for an investment management firm

- \( \frac{\text{Revenues}_t}{\text{Revenues}_{t-1}} = \)
  - Non-market function\(_t\) +
  - \((\text{Coefficient1} \times \text{Equity Index}_t)\) +
  - \((\text{Coefficient2} \times \text{Interest Rate Level}_t)\)

- For our company:
  - Non-market function is a large positive number (!)
  - OOS R-squared of this regression is high
Implications of revenue model

- Equity markets go down, we lose equity fund management fee revenues
- Interest rates go up, we lose fixed income fund management fee revenues
- Therefore our business plan is that equity markets will always go up and interest rates will always stay low (?)
- Business plan is not a plan unless it plans for movements in capital markets
A model of the firm
Capacity, demand, and revenue

- Firm has capacity to meet demand for goods or services
  - Building capacity entails investment costs
  - Maintaining capacity entails operating costs
  - Divesting of capacity recovers a salvage cost that is less than investment
- Demand for goods or services is partially dependent on an external factor
- Revenue is the lesser of demand and capacity
## Changes in capacity

<table>
<thead>
<tr>
<th>Recent Financial Health</th>
<th>Demand &gt; Capacity</th>
<th>Demand &lt; Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Add Capacity</td>
<td>Level dependent</td>
</tr>
<tr>
<td>Low</td>
<td>Level dependent</td>
<td>Subtract Capacity</td>
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</tbody>
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The table shows the decision-making process for changes in capacity based on recent financial health. If demand is greater than capacity, the action is to add capacity. If demand is less than capacity, the action is level dependent or subtract capacity based on financial health.
Hedging criteria

- Round trip (invest/divest) is costly
- Need to maintain profits and net assets
- Sharpe ratio of demand is not too high (i.e. volatility dominates trend)
- Hedging external factors smooths profits and net assets, leading to fewer invest/divest cycles.
Hedging techniques
Diversification is the primary hedge

- A diversified portfolio of businesses with different external exposures is the best natural hedge
  - (But don’t diversify only for that reason)
- Risk mitigation is always done best at the highest possible level
  - Example: don’t hedge equity fund income without taking into account fixed income fund income, vice versa
  - Don’t silo – use entire firm
  - Employee agency problem
Types of hedging

- Complete offset
- Purchase put protection
- Collar
Complete offset

- Turn combination of revenues/investment and hedge into a risk-free position
- Purest example: invest in an index fund, sell index futures. Negative cost of carry (T-bill rate).
- Cost is loss of upside – if fund goes up, hedge goes down. Can have a proportional hedge.
- Basis risk – usually not possible to hedge perfectly
- Behavioral risk
How not to hedge

Hire risk manager, start hedging program

Fire risk manager, end hedging program

Bankrupt
Mitigate behavioral risk: 50% hedge
Put protection

- Buy insurance – protect downside with a put option. Like insurance, involves an upfront cash cost.
- Also like insurance, can completely hedge downside (zero-deductible insurance) or can take some loss before protection starts.
- Involves basis risk or counterparty risk
- Typical costs: 12%/year, 21%/five years
Collar

- Buy puts on the downside, pay for them with upside call sales
- Asianing generally saves money
- Volatility skew works against buyer
- Depending on volatility surface, can get more on the upside than give up on the downside when going long
- Downside: long runs. Mitigate by buying out of the money calls
Collar + far upside payoff
Conclusions

• Hedging net income effective depending on:
  • Frictional costs
  • Agency costs
  • Behavioral factors
• Hedging technique used depends on desired shape of outcome distribution
• Ultimate goal: maximize firm’s efficiency and competitive position