

# TOPIC 10 - RISK MANAGEMENT

## RISK MANAGEMENT

### RISK

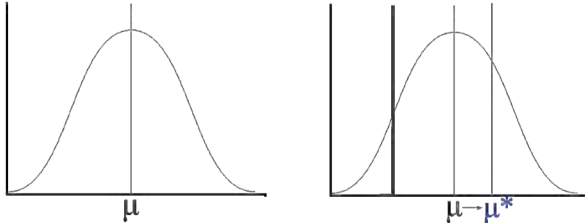
Risk = uncertainty = different from what is expected

#### MEASURED BY

- Standard deviation ( $\sigma$ )
- Variance ( $\sigma^2$ )

#### REMOVING TAIL RISK

- Removing tail risk increases our expected return
- NPV of risk management should be zero → gain from risk management perfectly offset by its cost



#### PROBABILITY OF DISTRESS

- Bankruptcy costs reduces firm value:
  - Direct costs: administration, reorganisation
  - Indirect costs: loss of sales, reputation loss, management time

$$V_{debt} = V_{no\ debt} + PV(Tax\ Shields) - PV(Financial\ distress\ costs)$$

- $PV(FDC) = Pr(distress) * Costs$
- Agency cost of debt – underinvestment problem
  - Passing up +ve NPV projects
  - Asset substitution problem
- Hedging narrows distribution of possible firm outcomes
  - Reduces expected bankruptcy costs
  - Reduces likelihood of underinvestment problem

#### MANAGERIAL SELF-INTEREST

- Generalists can work anywhere
- Specialist can work in specialised places BUT get paid more because of increased risk
- Hedging financial exposure can add value by:
  - Reducing manager's risk and hence required rates of return
    - lower compensation
    - enhances returns to s/h
  - Removing uncertainty helps monitor managers better

#### WHY RISK MANAGEMENT

- To mitigate:
  - Systematic risk e.g. market and credit
  - Operational risks e.g. fraud
  - Currency risk for multinationals
  - Political instability

#### RISK MANAGEMENT

- Risk management shouldn't create value
  - S/h and other investors can always manage risks of own portfolio
  - M&M PSM conditions, risk management does NOT affect firm value

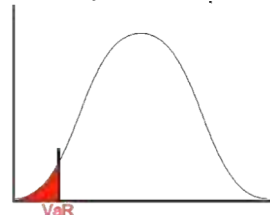
*Reality: imperfect market → risk management CAN create value*

#### NON-LINEAR TAXES

- Most tax codes in world are progressive i.e. convex
  - Tax rate is higher for higher pre-tax income
- Reduction in volatility of taxable income can lower expected taxes for firms with convex effective tax functions
- Reducing effective long-term average tax rate, any strategies that reduce volatility in reported earnings will enhance s/h value

#### VALUE AT RISK (VaR)

- VaR → attempt to quantify risk (what is the worst loss under NORMAL market conditions)
- For given p: What is a dollar amount VaR such that the probability of an outcome worse than VaR is no more than p?*
- Most useful for short-term positions (FX, derivatives)
- VaR is the dollar amount in the left tail
  - Set a probability of loss



- Commonly used by financial institutions
- Lots of subjectivity in VaR
  - relies on inputs that can be manipulated
  - what are normal market conditions?
  - Time period used (↑ time → ↑ VaR)

#### WHAT IS IT?

- Hedging – strategy designed to minimise exposure to unwanted business risks while allowing business to profit from an investment activity
- Complete hedging = elimination of risk
  - Expected return of risk-free asset →  $E(r) = r_f$

#### WHY?

- In market where imperfections exist:
  - Future financial distress imposes costs today
  - Can be costly to raise external finance
  - Managers might act in own interests
  - Companies pay taxes
- Hedging can diminish threat to shareholder wealth and add value

#### HOW?

- Buy/hold one asset and sell an offsetting amount of another asset (one asset is real, other is financial)
  - E.g. derivatives, natural hedges*

#### DERIVATIVES AS RISK MANAGEMENT

- Derivatives – financial security whose payoffs are derived from performance of underlying assets e.g. shares, commodities, bonds, interest rates, exchange rates or indices
- Options give ability to cut losses
  - Forwards, futures, options & swaps
- Risk management deals with how financial contracts may be used to reduce business risk
  - 95% use derivatives to control interest rate risk
  - 78% use derivatives to hedge currency risk
  - 24% use derivatives to manage commodity price risk
- Derivatives also used for speculation and executive pay

#### NATURAL HEDGES

- Hedging is costly → hedge net exposure rather than each individual exposure
- Natural hedges are common
  - E.g. Australian sells products to Germany → Currency risk. Borrow money from somewhere in EU, use German sales to help cover interest costs in same currency (reduced net exposure and need less hedging)
  - Value of asset and liability move in same direction

*MS reduced VaR drastically. Was it:  
 → Improved risk management  
 → Better positions  
 → Careful analysis  
 → Change in time period*