RISK MANAGEMENT
(Maritime & Logistics)

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If you don’t invest in risk management, it doesn't matter what business you are in, it’s a risky business.

Gary David Cohn

"Success is 99 percent failure."
-Soichiro Honda

In 1948, he established Honda and oversaw its expansion from a wooden shack manufacturing bicycle motors to a multinational automobile and motorcycle manufacturer.

What is a Risk?

A probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through some preemptive action.

Risk: Finance Defn.

- The probability that an actual return on an investment will be lower than the expected return. Types of financial risk include: Basic risk, Capital risk, Country risk, Default risk, Delivery risk, Economic risk, Exchange rate risk, Interest rate risk, Liquidity risk, Operations risk, Payment system risk, Political risk, Refinancing risk, Reinvestment risk, Settlement risk, Sovereign risk, and Underwriting risk.

Risk: Securities Trading

The probability of a loss or drop in value. Trading risk is divided into two general categories: (1) Systemic risk affects all securities in the same class and is linked to the overall capital-market system and therefore cannot be eliminated by diversification. Also called market risk. (2) Nonsystematic risk is any risk that isn't market-related or is not systemic. Also called nonmarket risk, extra-market risk, or unsystemic risk.

Risk: Law Definition

- Peril, danger, the chance of loss or injury.

  ....e.g. Liability for injury, loss, or damage, by statute placed upon the manufacturer rather than the consumer, should it happen from normal use of a product.

Examples of Risks

- Make an investment, hang by a thread, play with fire, carry too much, sail, go out of one's depth, beard the lion in his den, go through fire, Enter the only available faulty matatu at midnight, take a leap in the dark, throw caution to the wind, live in a glass house, etc

Therefore…

- The term risk is used to describe negative deviations from the planned outcome.
- However, Risk is also any uncertain event that, if it occurs, has a positive or negative effect on goals or objectives

About Risk Management

Defining Risk

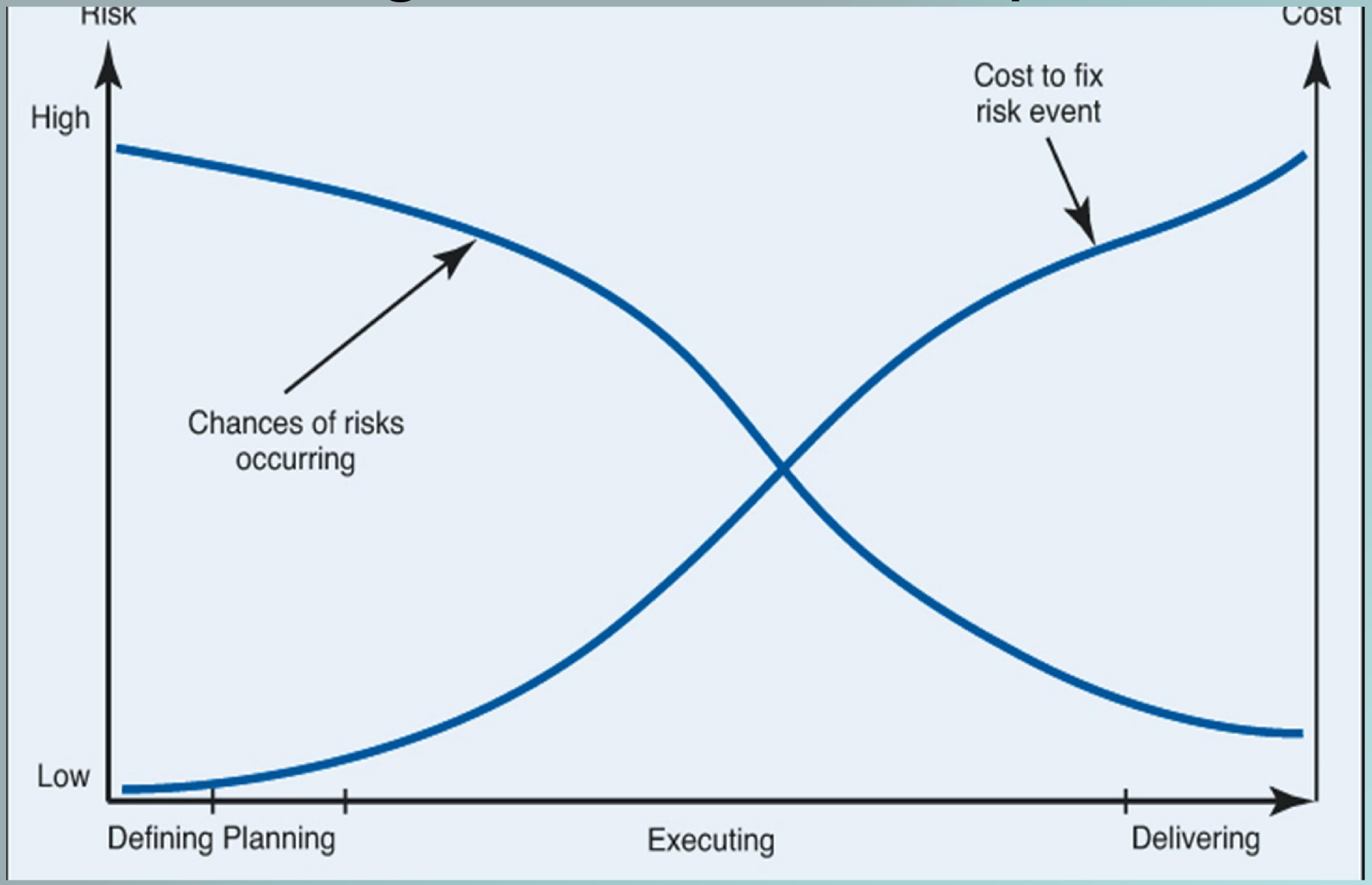
- **Definition of Risk**
  - We define (financial) risk as the prospect of financial loss due to unforeseen changes in underlying "risk factors". These risk factors are the key drivers affecting portfolio value and financial results. Such risk factors are equity prices, interest rates, exchange rates, commodity prices, freight rates, etc.

- **Types of Risks**
  - **Business**: The risk of loss due to unforeseen changes in demand, technology, competition, etc., affecting the fundamentals of a business activity.
  - **Market**: The risk of loss arising from unexpected changes in market prices or market rates.
  - **Credit**: The risk of loss arising from the failure of a counterparty to make a promised payment.
  - **Operational**: The risk of loss arising from the failures of internal systems or the people who operate in them.
  - **Other types**: Legal, Liquidity, etc.

Risk Also...

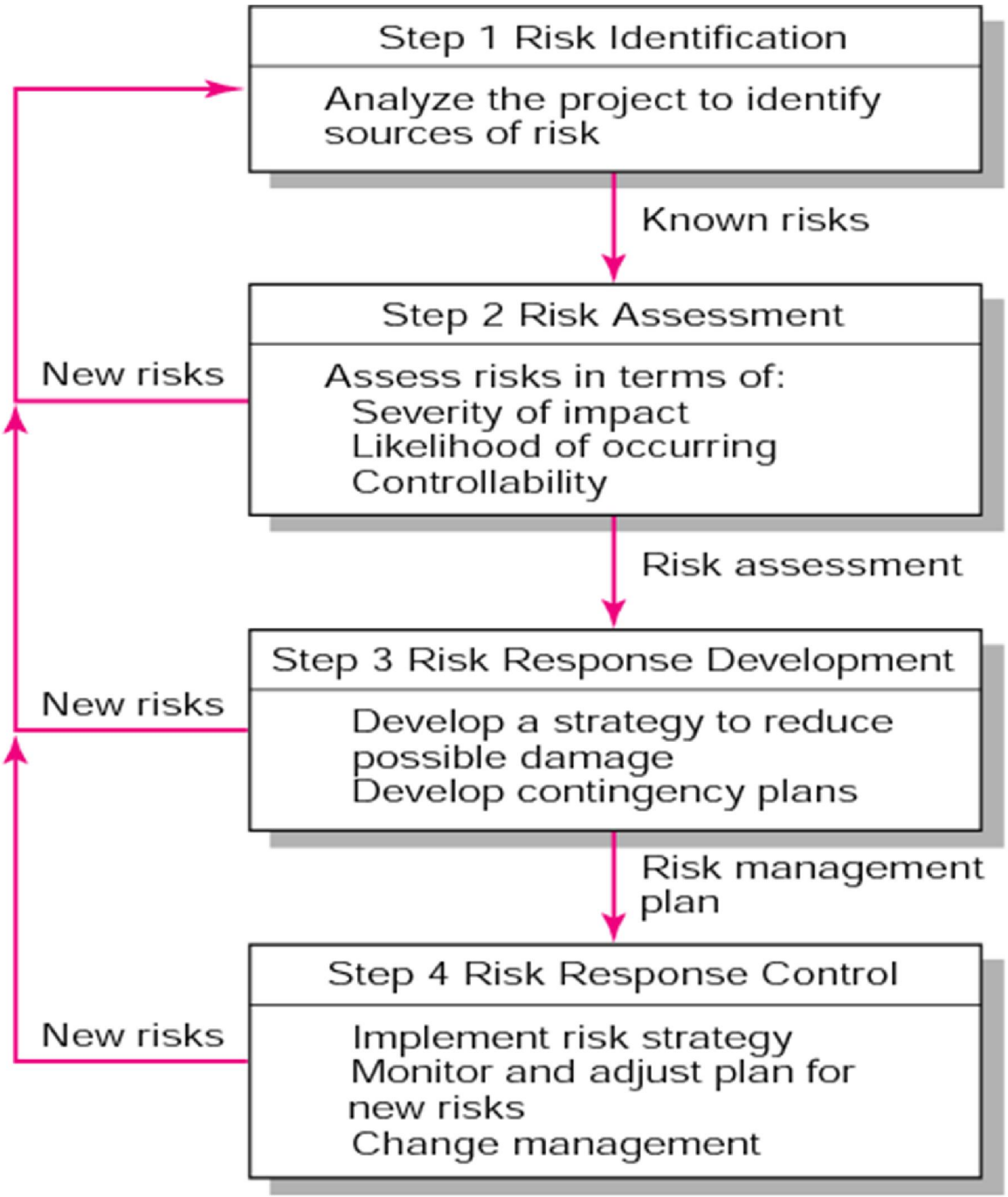
- Risk Management
  - A proactive attempt to recognize and manage internal events and external threats that affect the likelihood of a project's success
    - What can go wrong (risk event)
    - How to minimize the risk event's impact (consequences)
    - What can be done before an event occurs (anticipation)
    - What to do when an event occurs (contingency plans)

e.g Risk Event Graph



Risk Management's Benefits

- A proactive rather than reactive approach
- Reduces surprises and negative consequences
- Prepares the firm to take advantage of appropriate risks
- Provides better control over the future
- Improves chances of reaching the desired org. performance within cost.



The Risk Management Process

The Risk Management Process

- The Risk Management process
  - In fact, risk management is a process that involves three separate steps:

1. **Risk Modeling:** Before any attempt to take decisions on risk considerations, we must identify the underlying risk factors, understand their behavior, and try to model their dynamics. This is the basic foundation on which the other phases of the risk management cycle are built.

2. **Risk Measurement:** After identifying and modeling the underlying risk factors, we must determine their significance and quantify their influence on portfolio value and financial results.

3. **Risk Management :** Having identified and measured our risks, we are then able to take informed decisions on whether to reduce our exposure or alter our risk profile based on our risk preferences – hedging is one such alternative course of action

Scope of Risk Management

- Risk Management
  - Moreover, risk management does not necessarily imply risk reduction. In fact, the objective of risk management is NOT to reduce risk, but – more importantly –
    to quantify and control risk.
  - Most of the times, the objective is not to eliminate risk, but rather to alter our risk profile according to the prevailing market conditions, our risk preferences, and potential regulatory or contractual requirements.
  - Risks are embedded in any business activity. For a shipowner, the decision to invest in a vessel signifies his belief that freight rates will go up, earning him a return on his investment that is higher than the "risk-free" interest rate. However, there is no "free lunch" in the economy; his decision to invest creates at the same time a natural exposure to freight rates, accepting the risk that freight rates may in fact go down. Risks are simply unavoidable in any profit-taking activity.

Scope of Risk Management

- **Uncertainty vs. Variability** [1]

  "*Variability is a phenomenon in the physical world to be measured, analysed and where appropriate explained. By contrast, uncertainty is an aspect of knowledge.*"

  Sir David Cox

  - Risk management is only useful for the mere fact that we cannot predict the future. There are two components of our inability to be able to precisely predict what the future holds: these are **variability** and **uncertainty**.

- Variability is the effect of chance and is a function of the system. It is not reducible through either study or further measurement, but may be reduced through changing the physical system.
- Uncertainty is the assessor's lack of knowledge (level of ignorance) about the parameters that characterize the physical system that is being modeled. It is sometimes reducible through further study, or through consulting more experts.
- Risk management can do very little to reduce variability (markets will continue to fluctuate no matter how advanced risk management gets), but can be very effective in reducing uncertainty for those involved in risk-taking decisions.

Modern Applications of Risk Management

- **Modern applications of Risk Management**
  - Exposure measurement and reporting
    - Market risk (since early 90s)
    - Credit risk (since late 90s)
    - Operational risk (new area)
  - Economic capital estimation
  - Allocation of capital
  - Risk-based pricing
  - Risk limits
  - Risk-adjusted performance evaluation

Modern Applications of Risk Management

- Example: Risk-Adjusted Performance Evaluation
  - Consider two traders who are evaluated on the basis of their realized profits at some future date. Trader B ended up with higher profits compared to Trader A. Does this mean he is more skilled than Trader A? Does he deserve a higher bonus? What about the risk incurred by each trader through their trading strategy?

The Traditional Approach to Risk Measurement

- The Mean-Variance framework
  - Under the Mean-Variance framework, we model financial risk in terms of the mean and variance (or standard deviation, the square root of variance) of the Profit/Loss (P&L) or the returns of our portfolio.
  - The Mean-Variance framework often makes the assumption that returns obey a normal distribution (strictly speaking, the mean-variance framework does not require normality, but it is easier to understand its statistics).

- Portfolio Theory
  - The origin of portfolio theory can be traced back to the work of Markowitz (1952) which earned him the Nobel prize.
  - Portfolio theory starts with the premise that investors choose between portfolios on the basis of maximizing expected return for any given portfolio standard deviation or minimizing standard deviation for any given expected return.
  - One of the key insights of portfolio theory is that the risk of any individual asset is measured by the extent to which that asset contributes to overall portfolio risk which depends on the correlation of its return with the returns to the other assets in the portfolio (a result known as diversification effect).
  - Portfolio theory typically makes the assumption of normally distributed returns.

Measuring Market Risk

The Value-at-Risk (VaR) Approach

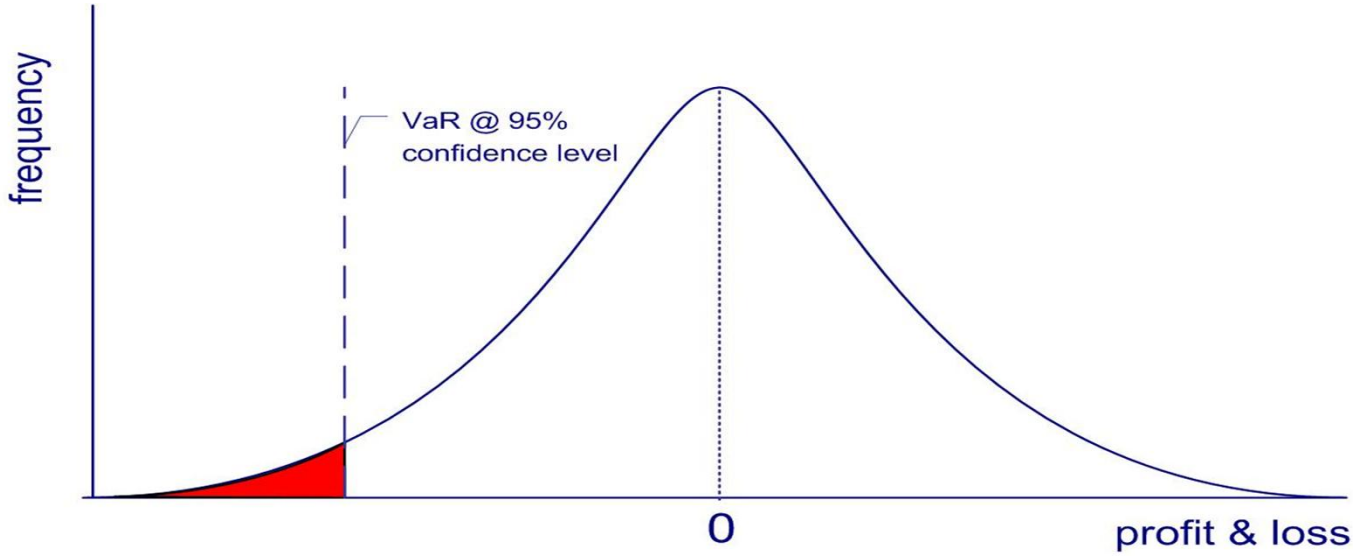
- **The origin and development of VaR**
  - In the late 70s and 80s, a number of major financial institutions started working on internal models to measure and aggregate risks across the institution as a whole.
  - The best known of these models is the RiskMetrics model developed by JP Morgan. According to industry legend, this model is said to have originated when the chairman of JP Morgan, Dennis Weatherstone, asked his staff to give him a daily one-page report – the famous "4:15 report" – indicating risk and potential losses over the next 24 hours, across the bank's entire trading portfolio.
  - The report was ready by around 1990 and the measure used was Value-at-Risk (VaR), or the maximum likely loss over the next trading day. VaR was estimated from a system based on standard portfolio theory, using estimates of the standard deviations and correlations between the returns of different traded instruments.
  - In early 1994, JP Morgan set up the RiskMetrics unit to make its data and basic methodology available to outside parties. This bold move attracted a lot of attention and raised awareness of VaR techniques and risk management systems.
  - The subsequent adoption of VaR systems was very rapid, first among securities houses and investment banks, and then among commercial banks, other financial institutions and non-financial corporates.
  - Today, VaR is widely used in almost every market-sensitive industry (with the exception perhaps of shipping!) and has even gained recognition from regulatory authorities.

The Value-at-Risk (VaR) Approach

- VaR in practice

➢ VaR Basics:

- VaR on a portfolio is the maximum loss we might expect over a given holding or horizon period, at a given level of confidence (probability).
- VaR is less restrictive on the choice of the distribution of returns and the focus is on the tail of that distribution – the worst *p* percent of outcomes.

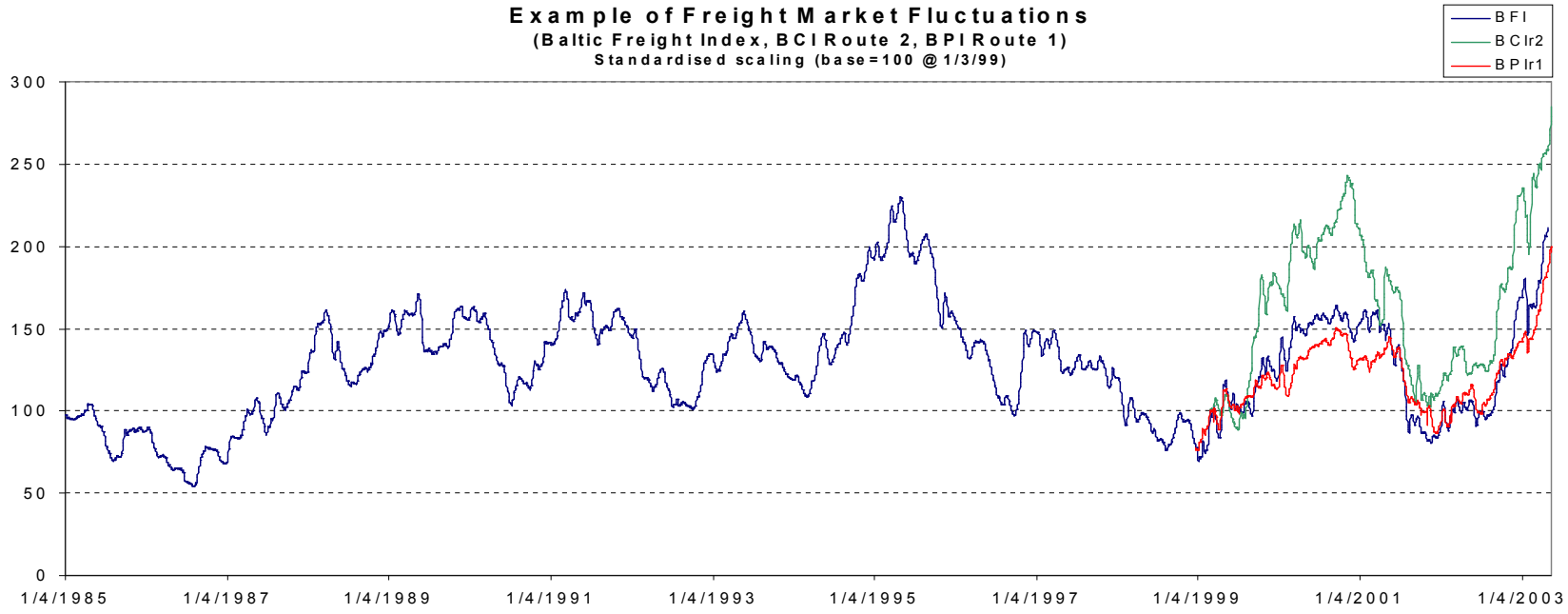


The Value-at-Risk (VaR) Approach

- VaR in practice
  - **Estimating VaR**: The various methodologies for estimating VaR actually differ on their particular technique for constructing the distribution of possible portfolio values from which VaR is inferred. The most common methodologies are:
    - Analytical methods (Variance/Covariance)
    - Historical simulation
    - Monte-Carlo simulation
  - **Attractions of VaR**:
    - VaR is a single, summary, statistical measure of possible portfolio losses, providing a common and consistent measure of risk across different positions and risk factors.
    - It takes account of the correlations between different risk factors.
    - It is fairly straightforward to understand, even for non-technical people.
  - **VaR variants**: Following the same logic, other "at risk" measures have been proposed to quantify risk in various settings: Cash Flow at Risk (CaR), Earnings at Risk (EaR), etc.

Justification for Risk Management in Shipping and Logistics

- **High market volatility**
  - Freight rates have historically been very volatile. The impact of unforeseen geo-political events and the slow speed of adjusting supply to demand have often resulted in dramatic fluctuations in the level of freight rates.



Justification for Risk Management in Shipping & Logistics

- Industry inefficiencies
  - Capital needs vs. sources of funds:
    - Shipping & Logistics is a capital intensive industry with significant funding needs for fleet expansion and replacement purposes. Yet, it has very limited opportunities to diversify its sources of funding, as most of its financing comes in the form of bank debt.
  - Asset – Liability (mis)matching
    - Asset economic life >> term of debt financing
    - Variable (uncertain) revenues to meet fixed debt claims
  - Pro-cyclical lending practices
    - Many banks tend to be influenced by the general sentiment of the market and ignore the cyclical nature of the business. Thus, they appear more willing to lend when the market (and vessel prices) is high, despite the fact that the market will eventually revert back to lower levels. In contrast, they appear rather hesitant to extend credit at a period of low freight rates, although they are likely to rise to more sustainable levels.

Impact of Freight Rate Volatility on Cash Flow

- **Identifying the impact of freight rate volatility on fleet cash flow**
  - Fluctuations in freight rates directly affect fleet cash flow.
  - Cash flow performance is the topmost concern in shipping and logistics.
  - So, what really matters in measuring freight market risk is the impact of freight rate variability on cash flow performance.

Back to the Risk Management Process…

Managing Risk...

- Step 4: Risk Response Control
  - Risk control
    - Execution of the risk response strategy
    - Monitoring of triggering events
    - Initiating contingency plans
    - Watching for new risks
  - Establishing a Change Management System
    - Monitoring, tracking, and reporting risk
    - Fostering an open organization environment
    - Repeating risk identification/assessment exercises
    - Assigning and documenting responsibility for managing risk

Risk Assessment Form

Risk Event	Likelihood	Impact	Detection Difficulty	When
Interface problems	4	4	4	Conversion
System freezing	2	5	5	Start-up
User backlash	4	3	3	Postinstallation
Hardware malfunctioning	1	5	5	Installation

Risk Severity Matrix

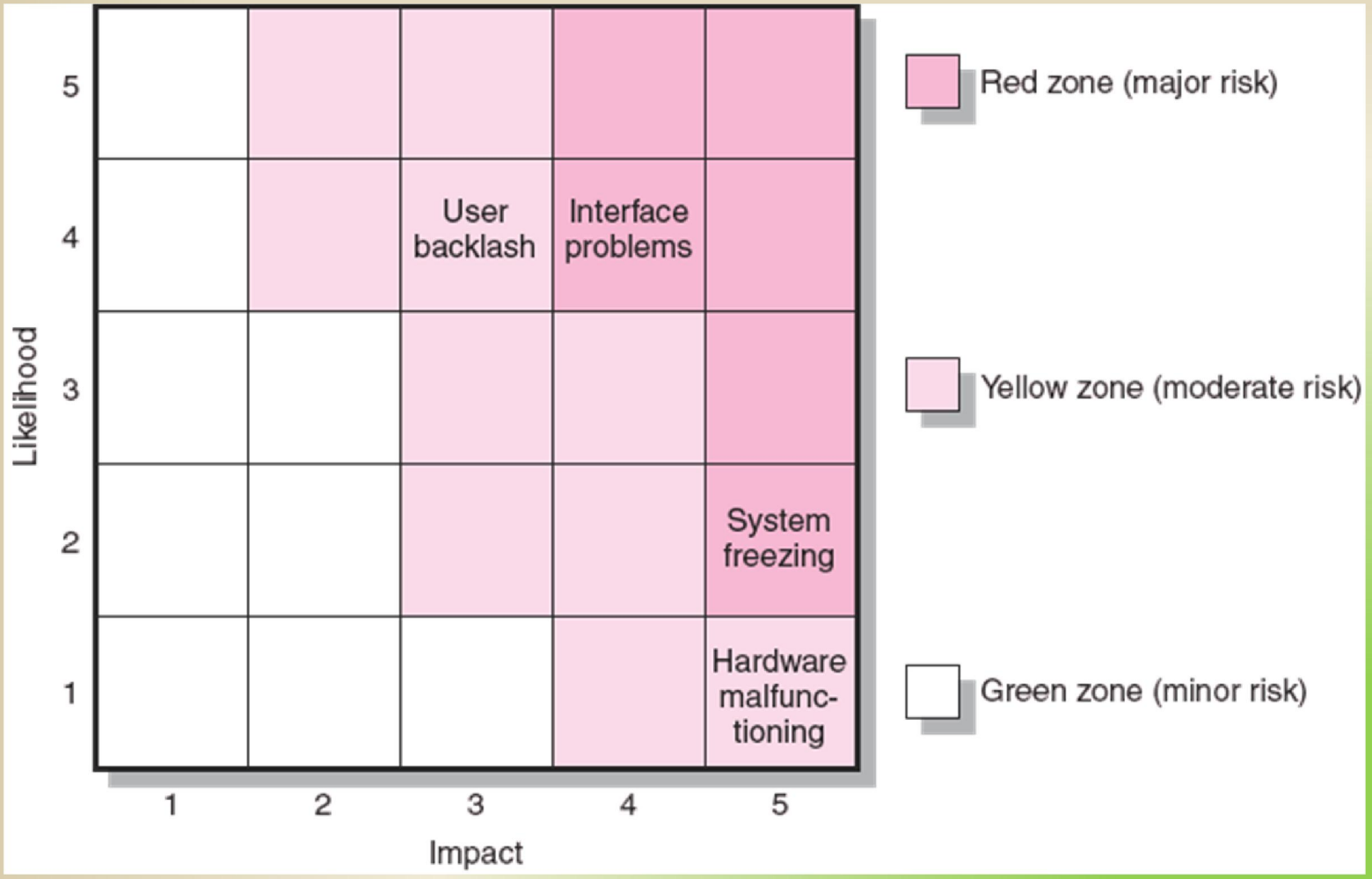


FIGURE 7.5

Risk Response Matrix

Risk Event	Response	Contingency Plan	Trigger	Who Is Responsible
Interface problems	Reduce	Work around until help comes	Not solved within 24 hours	Nils
System freezing	Reduce	Reinstall OS	Still frozen after one hour	Emmylou
User backlash	Reduce	Increase staff support	Call from top management	Eddie
Equipment malfunctions	Transfer	Order different brand	Replacement doesn't work	Jim

FIGURE 7.7

Risk and Contingency Planning

- Market Risks
- Operational Risks
- Business Risks
- Funding Risks

Contingency Funding

- Contingency Funds
  - Funds to cover risks—identified and unknown
    - Size of funds reflects overall risk of a project
  - Budget reserves
    - Are linked to the identified risks
  - Management reserves
    - Are large funds to be used to cover major unforeseen risks (e.g., change of scope)

Contingency Fund Estimate (000s)

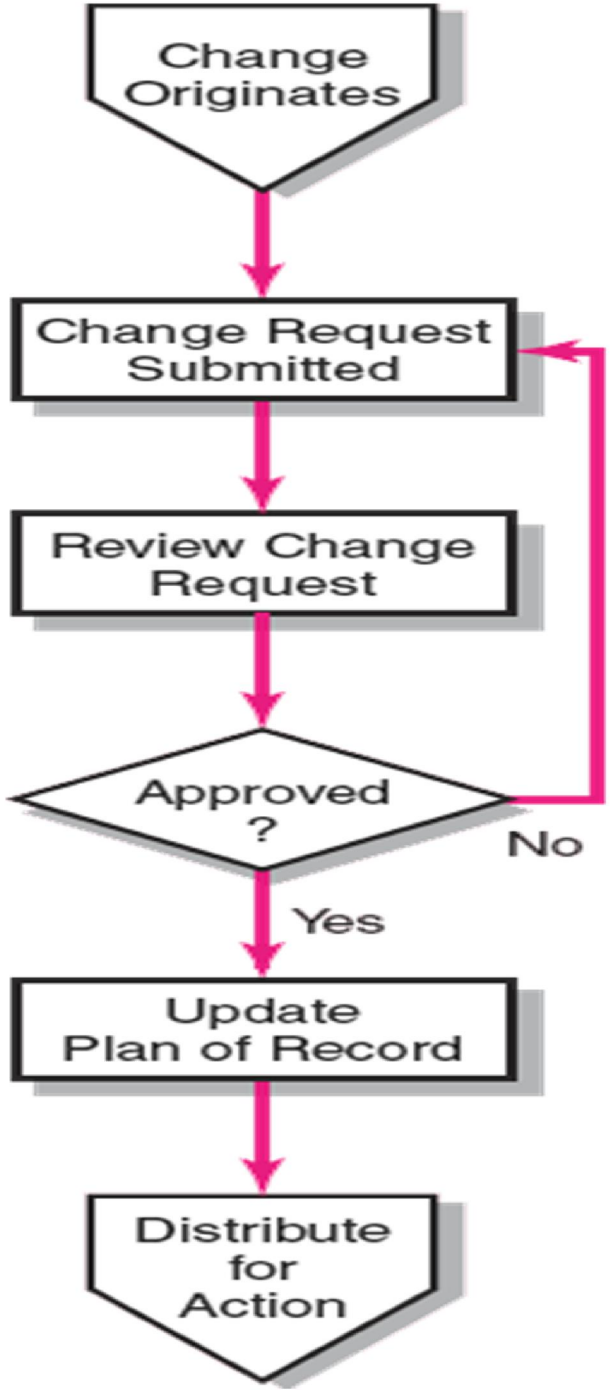
Activity	Budget Baseline	Budget Reserve	Project Budget
Design	$500	$15	$515
Code	900	80	980
Test	20	2	22
Subtotal	$1,420	$97	$1,517
Management reserve	—	—	50
Total	$1,420	$97	$1,567

TABLE 7.1

Change Management Control

Sources of Change

- Changes in the operating environment (Market, Operational, Business).
- Improvement changes/change management



The Change Control Process

Finally...

...Life is all Guess Work, The Only Difference Sometimes is, Those Who Guessed With Information...

(Anonymous)

And...

“Speed is irrelevant if you are going in the wrong direction.”

M. Gandhi

But Critically...

"Test fast, fail fast, adjust fast."

Tom Peters

Questions?


Ask
Answer
Who
Where
How
Question
Apply
Why
Understand
What
When
Answers
Query
Questions

Types of risk

Introduction:

Risk is a part of investing. You probably want to get the most from your investments without losing a good night's sleep worrying about your investments. Does this mean stocks are good for you? Or those bonds are the way to go? The thing that's important to remember is this: regardless of where you invest, there's always some kind of risk involved, and you need to be comfortable with your investment decisions.

1. Principal risk

The money invested is called “principal.” Unfortunately, investors don’t always make money on what they’ve invested. They may lose some or their entire principal. The chance that investors may lose money invested is principal risk.

2. Interest-rate risk

There is a risk that the price of a stock or bond will fluctuate because of changes in interest rates. If interest rates go up, bond prices usually go down. If rates go down, bond prices usually go up.

Stock prices can also go up or down depending on the situation and what kind of company is involved. Since stocks and bonds can react differently to the same events, diversifying your investments by investing in both can help reduce the volatility, or the swings, in your overall portfolio's value.

3. Market risk

Both stocks and bonds are vulnerable to changes in the economy and to general changes in the markets they trade in.

Market risk (Cont'd)

Although stocks and bonds issued by companies are tied to profits and losses of those companies, there are factors and cycles outside of the companies' control that may cause a rise or fall in prices.

4. Credit Risk

When you borrow money you have to make payments plus interest to pay off your debt. The same holds true for companies that issue bonds (or IOUs) to the public.

Credit risk (Cont'd)

There's a chance companies that issue bonds won't be able to make interest payments or return your entire principal. That's credit risk.

5. Price Risk/Volatility risk

The uncertainty associated with potential changes in the price of an asset caused by changes in interest rate levels and rates of return in the economy. The reverse is also true.

$$\uparrow \textit{Interest Rates} \Leftrightarrow \downarrow \textit{Present Value}$$

$$\downarrow \textit{Interest Rates} \Leftrightarrow \uparrow \textit{Present Value}$$

Since interest rates directly affect discount rates and present values of future cash flows represent underlying economic value, we have the following relationships.

$$\uparrow \textit{Discount Rates} \Leftrightarrow \downarrow \textit{Economic Value}$$

$$\downarrow \textit{Discount Rates} \Leftrightarrow \uparrow \textit{Economic Value}$$

Reinvestment Rate Risk:

The uncertainty associated with the impact that changing interest rates have on available rates of return when reinvesting cash flows received from an earlier investment. It is a direct or positive relationship.

$$\uparrow \textit{Interest Rates} \Leftrightarrow \uparrow \textit{Reinvestment Rate}$$

$$\downarrow \textit{Interest Rates} \Leftrightarrow \downarrow \textit{Reinvestment Rate}$$

6. Liquidity risk

This is the chance that one is unable to sell or redeem an investment quickly at a fair price to get the cash. It's an indication that the investment has low liquidity. A lack of liquidity can affect the price of stocks and bonds.

Liquidity risk (Cont'd)

A highly liquid asset can be sold for fair value on short notice. This is because there are many interested buyers and sellers in the market. An illiquid asset is hard to sell because there few interested buyers.

7. Inflation Risk (Purchasing Power Risk)

Maybe you prefer putting your money in a savings account or a CD (certificate of deposit) because it feels safe. Both of these strategies could be pretty risky. There's a chance your money may not be able to keep up with inflation i.e your money may be worth less in future years.

Cont'd

The loss of purchasing power is due to the effects of inflation. When inflation is present, the currency loses it's value due to the rising price level in the economy. The higher the inflation rate, the faster the money loses its value.

8. Market risk

Within the context of the Capital Asset Pricing Model (CAPM), the economy wide uncertainty that all assets are exposed to and cannot be diversified away. Often referred to as systematic risk, beta risk, non-diversifiable risk, or the risk of the market portfolio. This type of risk is discussed extensively in Investment courses.

9. Systematic Risk

Systematic risk influences a large number of assets. A significant political event, for example, could affect several of the assets in your portfolio. It is virtually impossible to protect yourself against this type of risk.

10. Unsystematic Risk

Unsystematic risk is sometimes referred to as "specific risk". This kind of risk affects a very small number of assets. An example is news that affects a specific stock such as a sudden strike by employees. Diversification is the only way to protect yourself from unsystematic risk.

11. Firm specific risk

The uncertainty associated with the returns generated from investing in an individual firm's common stock. Within the context of the Capital Asset Pricing Model (CAPM), this is the investment risk that is eliminated through the holding of a well diversified portfolio. Often referred to as un-systematic risk or diversifiable risk. This type of risk is discussed extensively in Investment courses.

12. Project risk

In the advanced capital budgeting topics, the total risk associated with an investment project. Sometimes referred to as stand-alone project risk. In advanced capital budgeting, project risk is partitioned into systematic and un-systematic project risk using the same theoretical risk framework that the CAPM uses.

13. Financial risk

The uncertainty brought about by the choice of a firm's financing methods and reflected in the variability of earnings before taxes (EBT), a measure of earnings that has been adjusted for and is influenced by the cost of debt financing. This risk is often discussed within the context of the Capital Structure topics.

13. Business risk

The uncertainty associated with a business firm's operating environment and reflected in the variability of earnings before interest and taxes (EBIT). Since this earnings measure has not had financing expenses removed, it reflect the risk associated with business operations rather than methods of debt financing. This risk is often discussed in General Business Management courses.

14. Foreign Exchange Risks

Uncertainty that is associated with potential changes in the foreign exchange value of a currency. There are two major types: translation risk and transaction risks:-

15. Translation Risks

Uncertainty associated with the translation of foreign currency denominated accounting statements into the home currency.

16. Transactions Risks

Uncertainty associated with the home currency values of transactions that may be affected by changes in foreign currency values.

17. Total Risk

While there are many different types of specific risk, we said earlier that in the most general sense, risk is the possibility of experiencing an outcome that is different from what is expected. In financial terms, this total risk reflects the variability of returns from some type of financial investment.

18. Country Risk

Refers to the risk that a country won't be able to honor its financial commitments. When a country defaults on its obligations, this can harm the performance of all other financial instruments in that country as well as other countries it has relations with. Country risk applies to stocks, bonds, mutual funds, options and futures that are issued within a particular country. This type of risk is most often seen in emerging markets or countries that have a severe deficit.

19. Foreign-Exchange Risk

When investing in foreign countries you must consider the fact that currency exchange rates can change the price of the asset as well. Foreign-exchange risk applies to all financial instruments that are in a currency other than your domestic currency. As an example, if you are a resident of America and invest in some Canadian stock in Canadian dollars, even if the share value appreciates, you may lose money if the Canadian dollar depreciates in relation to the American dollar.

20. Political Risk

Represents the financial risk that a country's government will suddenly change its policies. This is a major reason why developing countries lack foreign investment.

Other Types of Risks

Strategic, for example a competitor coming on to the market

Compliance, for example the introduction of new health and safety legislation

Operational, for example the breakdown or theft of key equipment

Other Types of Risks (Cont'd)

Environmental risks, including natural disasters

Employee risk management, such as maintaining sufficient staff numbers and cover, employee safety and up-to-date skills

Health and safety risks

Finally...

"Test fast, fail fast, adjust fast."

Tom Peters

Remember...

- **"Test fast, fail fast, adjust fast."**
  Tom Peters

TAKING RISK

There's a fine line between taking a calculated risk and doing something dumb.

...Life is all Guess Work, The Only Difference you can make is, when you Guess With Information...

(Anonymous)