



**Università degli Studi di Roma "La Sapienza"**  
**Centro di ricerca in studi europei ed internazionali**  
**"EuroSapienza"**

# **Risk management (overview) and Project finance**

Prof. Vincenzo Sanguigni

[studio.sanguigni@tiscali.it](mailto:studio.sanguigni@tiscali.it)

*Rome – May 29, 2006*



# Agenda

---

## 1) Introduction to Risk Management for outsourcing projects.

## 2) Project Finance

- The MM Proposition
- What is a Project?
- What is Project Finance?
- Project Structure
- Financing choices
- Real World Cases
- Project Finance: Valuation Issues
- The MM Proposition



# 1) Introduction to Risk Management for outsourcing projects.

---

## Purpose:

- To provide an overview of the risk management process
- To describe specific risks and what it's meant with Risk Management

# Objectives of RM

---

Improve the predictability of a project!

By:

- Raise awareness and visibility of risk
- Managing risk by mitigations actions to prevent major disasters
- Preparing for contingency

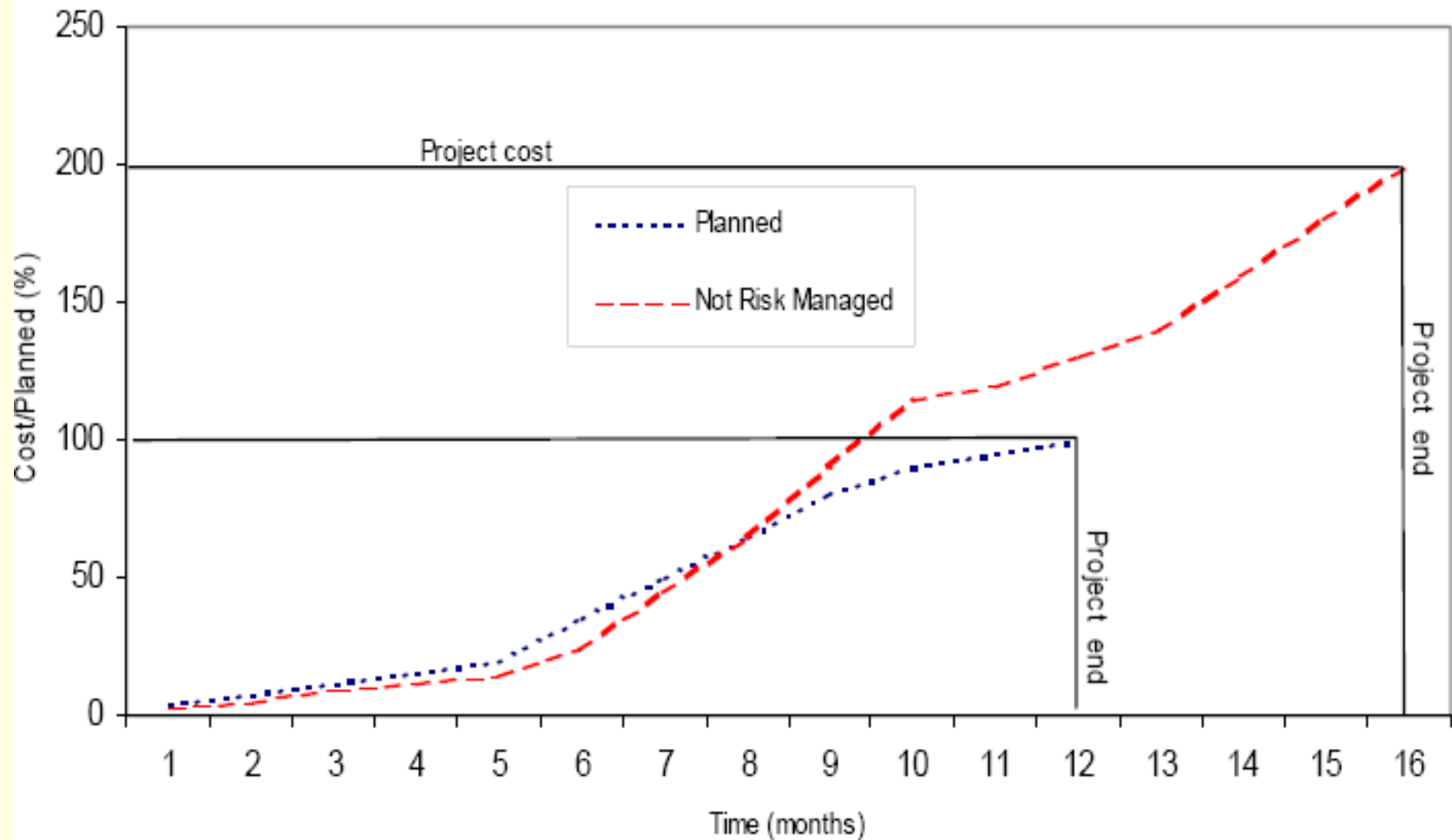
# What is a Risk?

---

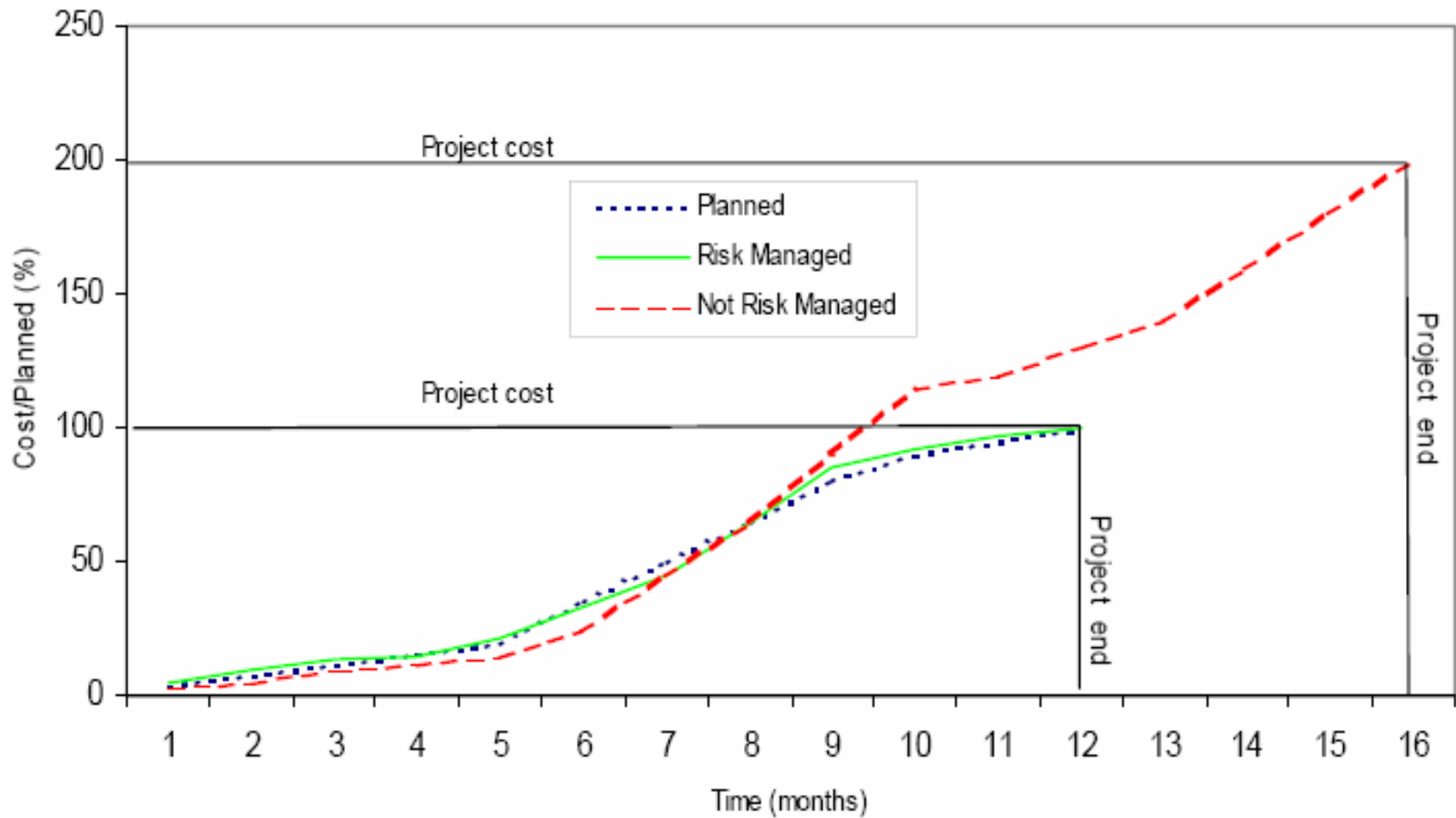
- A risk is a potential event with Negative consequences that as not happened yet
- A possibility of loss - Not the loss itself
  - A source of problem during a project
  - Avoid labeling the cost of a risk as a risk
  - Strike at the root of the problem, not the leaves



# Project Predictability



# Project Predictability



# Who is involved in RM?

---

- Customer
- End-user
- Project team
- Management
- Product management
- Related Projects
- Suppliers



# When?

---

- Business case analysis for Outsourcing
- Preparation for Outsourcing
- Status and briefing of requirements
- Detailed contracts and project planning
- Milestone in project execution
- Transfer and maintenance

**RM is a continuous process**



# Generic RM process

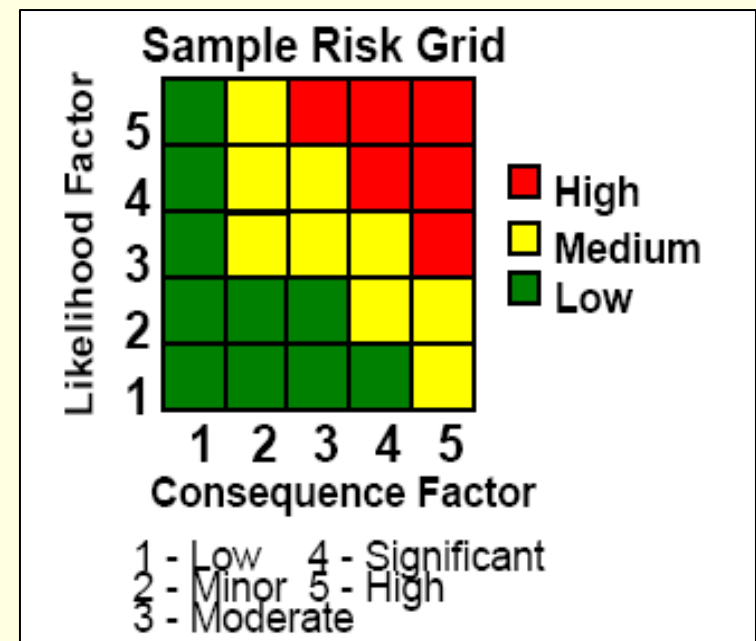


Based on  
 • SEI,  
 • Riskit  
 • Boehm



# Risk analysis method

- Describe the risks
  - Brainstorming potential risks
  - Walkthrough the risk identification checklist
- Analyze and prioritise risks
  - Walkthrough risk sheet and estimate the probability and cost of each risk
  - Calculate risk rating of each risk (e.g. likelihood consequence)
  - Priorise in risk classes concentrate on class high



# Likelihood

What Is the Likelihood the Risk Will Happen?		
Level		Your Approach and Processes...
1	Not Likely:	...Will effectively avoid or mitigate this risk based on standard practices
2	Low Likelihood:	...Have usually mitigated this type of risk with minimal oversight in similar cases
3	Likely:	...May mitigate this risk, but workarounds will be required
4	Highly Likely:	...Cannot mitigate this risk, but a different approach might
5	Near Certainty:	...Cannot mitigate this type of risk; no known processes or workarounds are available



# Consequence

Given the risk is realized, what would be the magnitude of the impact?			
Level	Technical	Schedule	Cost
1	Minimal or no impact	Minimal or no impact	Minimal or no impact
2	Minor perf shortfall, same approach retained	Additional activities required; able to meet key dates	Budget increase of less than 1%
3	Mod perf shortfall, but workarounds available	Minor schedule slip; will miss need date	Budget increase of less than 5%
4	Unacceptable, but workarounds available	Program critical path affected	Budget increase of less than 10%
5	Unacceptable; no alternatives exist	Cannot achieve key program milestone	Budget increase of more than 10%



# Agenda

---

1) Introduction to Risk Management for outsourcing projects.

## 2) Project Finance

- **The MM Proposition**
- What is a Project?
- What is Project Finance?
- Project Structure
- Financing choices
- Real World Cases



# The MM Proposition

---

“The Capital Structure is irrelevant as long as the firm’s investment decisions are taken as given”

Then why do corporations:

- Set up independent companies to undertake mega projects and incur substantial transaction costs, e.g. Motorola-Iridium.
- Finance these companies with over 70% debt inspite of the projects typically having substantial risks and minimal tax shields, e.g. Iridium: very high technology risk and 15% marginal tax rate.



# Agenda

---

- The MM Proposition
- **What is a Project?**
- What is Project Finance?
- Project Structure
- Operating aspects
- Financing choices
- Real World Cases



# What is a project?

---

- High operating margins.
- Low to medium return on capital.
- Limited Life.
- Significant free cash flows.
- Few diversification opportunities. Asset specificity.



# What is a project?

---

- Projects have unique risks:
  - Symmetric risks:
    - Demand, price.
    - Input/supply.
    - Currency, interest rate, inflation.
    - Reserve (stock) or throughput (flow).
  - Asymmetric downside risks:
    - Environmental.
    - Creeping expropriation.
  - Binary risks
    - Technology failure.
    - Direct expropriation.
    - Counterparty failure
    - Force majeure
    - Regulatory risk



# What does a Project need?

---

Customized capital structure/asset specific governance systems to minimize cash flow volatility and maximize firm value.



# Agenda

---

- The MM Proposition
- What is a Project?
- **What is Project Finance?**
- Project Structure
- Financing choices
- Real World Cases
- Project Finance: Valuation Issues



# What is Project Finance?

---

Project Finance involves a corporate sponsor investing in and owning a single purpose, industrial asset through a legally independent entity financed with non-recourse debt.



# Project Finance – An Overview

---

## ■ Outstanding Statistics

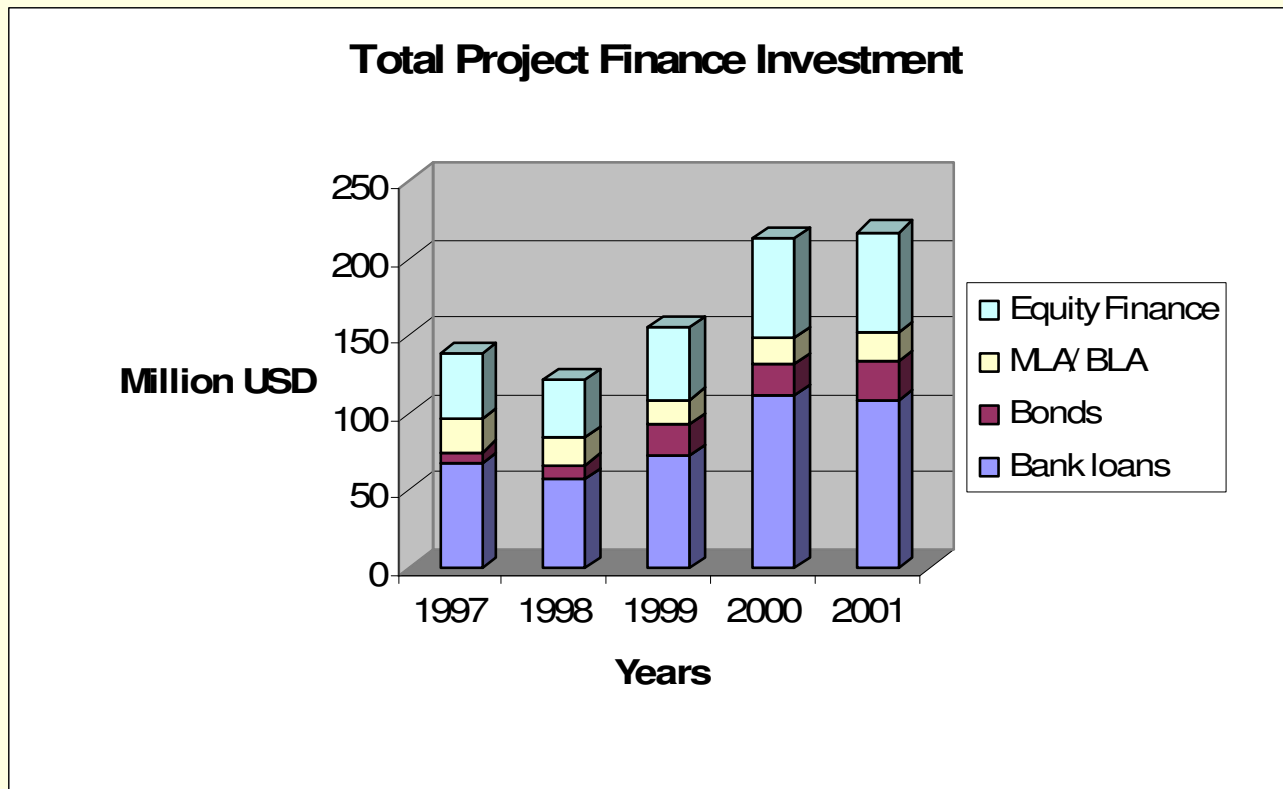
- Over \$220bn of capital expenditure using project finance in 2001
- \$68bn in US capital expenditure
- Smaller than the \$434bn corporate bonds market, \$354bn asset backed securities market and \$242bn leasing market, but larger than the \$38bn IPO and \$38bn Venture capital market

## ■ Some major deals:

- \$4bn Chad-Cameroon pipeline project
- \$6bn Iridium global satellite project
- \$1.4bn aluminum smelter in Mozambique
- €900m A2 Road project in Poland

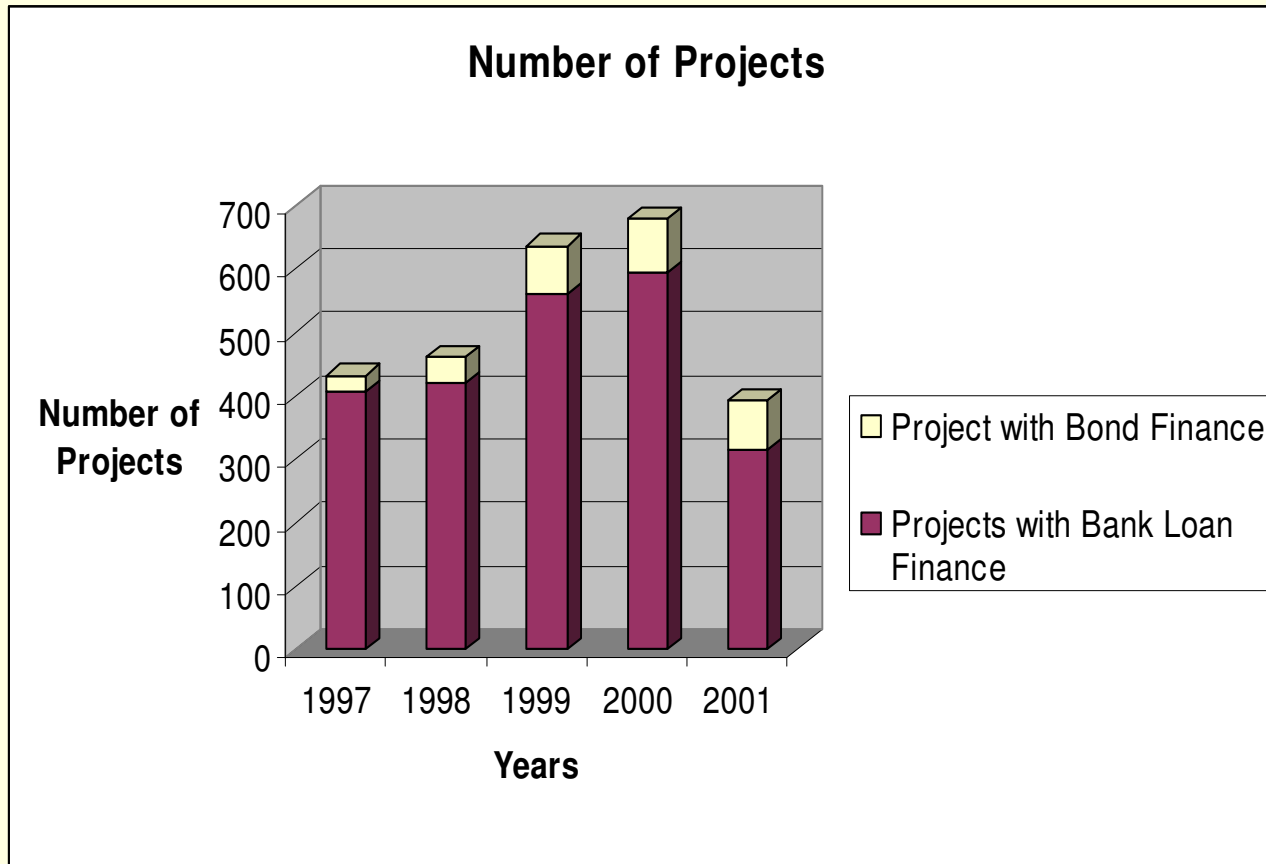


# Total Project Finance Investment

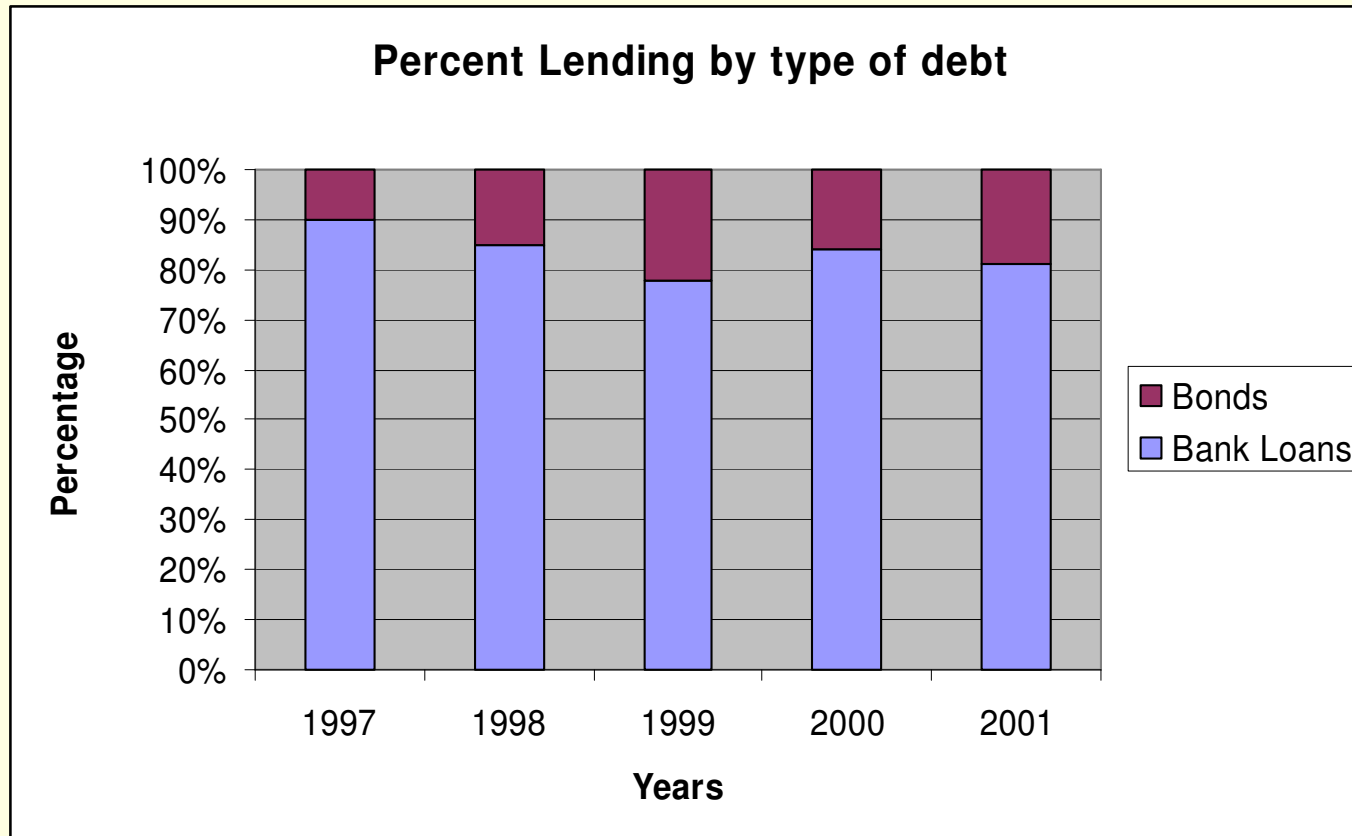


- Overall 5-Year CAGR of 18% for private sector investment.
- Project Lending 5-Year CAGR of 23%.

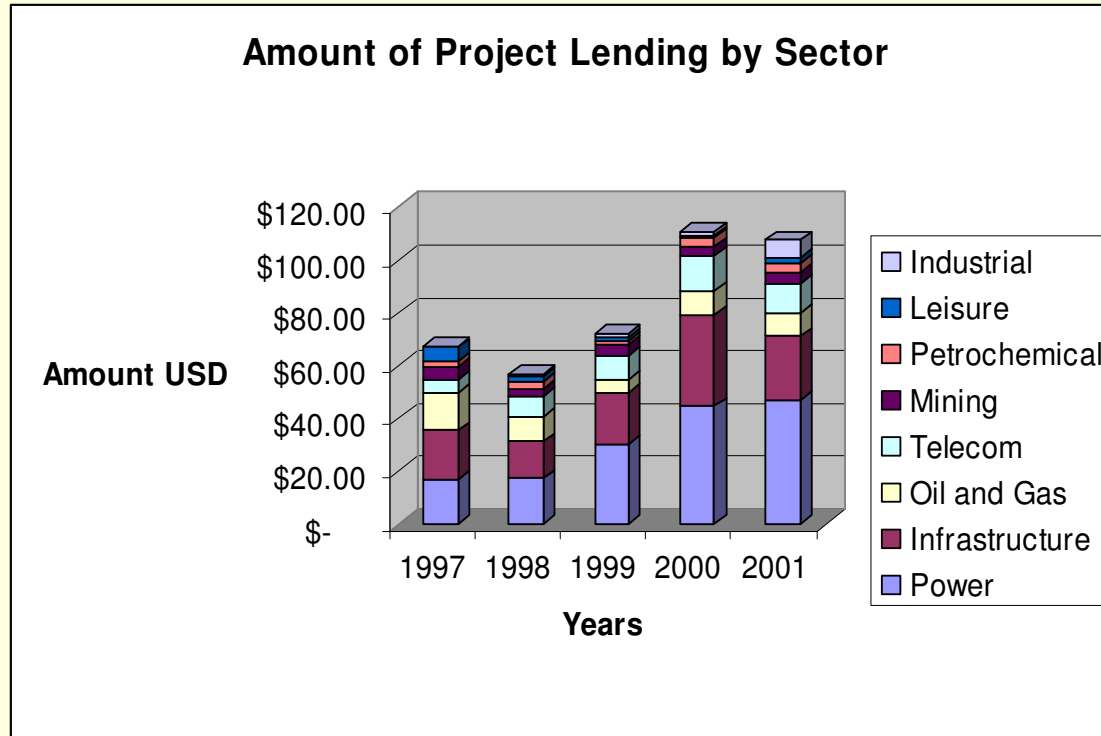
# Number of Projects



# Lending by Type of Debt



# Project Finance Lending by Sector



- 37% of overall lending in Power Projects, 27% in telecom.
- 5-Year CAGR for Power Projects: 25%, Oil & Gas:21% and Infrastructure: 22%.

# Agenda

---

- The MM Proposition
- What is a Project?
- What is Project Finance?
- **Project Structure**
- Operating aspects
- Real World Cases
- Project Finance: Valuation Issues



# Project Structure

---

- Structure highlights
- Comparison with other Financing Vehicles
- Disadvantages
- Motivations
- Alternative approach to Risk Mitigation



# Structure Highlights

---

- Independent, single purpose company formed to build and operate the project.
- Extensive contracting
  - As many as 15 parties in upto 1000 contracts.
  - Contracts govern inputs, off take, construction and operation.
  - Government contracts/concessions: one off or operate-transfer.
  - Ancillary contracts include financial hedges, insurance for Force Majeure, etc.



# Structure Highlights

- Highly concentrated equity and debt ownership
  - One to three equity sponsors.
  - Syndicate of banks and/or financial institutions provide credit.
  - Governing Board comprised of mainly affiliated directors from sponsoring firms.
- Extremely high debt levels
  - Mean debt of 70% and as high as nearly 100%.
  - Balance capital provided by sponsors in the form of equity or quasi equity (subordinated debt).
  - Debt is non-recourse to the sponsors.
  - Debt service depends exclusively on project revenues.
  - Has higher spreads than corporate debt.



# Comparison with Other Vehicles

## Financing vehicle

## Similarity

## Dis-similarity

Secured debt

Collateralized with a specific asset

Recourse to corporate assets

Subsidiary debt

Possible recourse to corporate balance sheet

Asset backed securities

Collateralized and non-recourse

Hold financial, not single purpose industrial asset

LBO / MBO

High debt levels

No corporate sponsor

Venture backed companies

Concentrated equity ownership

Lower debt levels; managers are equity holders



# Disadvantages of Project Financing

---

- Takes longer to structure than equivalent size corporate finance.
- Higher transaction costs due to creation of an independent entity. Can be up to 60bp
- Project debt is substantially more expensive (50-400 basis points) due to its non-recourse nature.
- Extensive contracting restricts managerial decision making.
- Project finance requires greater disclosure of proprietary information and strategic deals.



# Motivations: Agency Costs

## Problems:

- High levels of **free cash flow** due to few investment opportunities. Possible managerial mismanagement through wasteful expenditures and sub optimal investments.

## Structural solutions:

- Traditional monitoring mechanisms such as takeover markets, staged financing, product markets absent.
- Reduce free cash flow through high debt service.
- Contracting reduces discretion.
- “Cash Flow Waterfall”: Pre existing mechanism for allocation of cash flows. Covers capex, maintenance expenditures, debt service, reserve accounts, shareholder distribution.

# Motivations: Agency Costs

## Problems:

- High levels of **free cash flow** due to few investment opportunities. Possible managerial mismanagement through wasteful expenditures and sub optimal investments.

## Structural solutions:

- Concentrated equity ownership provides critical monitoring.
- Bank loans provide credit monitoring.
- Separate ownership: single cash flow stream, easier monitoring.
- Senior bank debt disgorges cash in early years. They also act as “trip wires” for managers.



# Motivations: Agency Costs

## Problems:

- Opportunistic behavior by trading partners: **hold up**. Ex-ante reduction in expected returns.

## Structural Solutions:

- Vertical integration is effective in precluding opportunistic behavior but not at sharing risk (discussed later). Also, opportunities for vertical integration may be absent.
- Long term contracts such as supply and off take contracts: these are more effective mechanisms than spot market transactions and long term relationships.

# Motivations: Agency Costs

## Problems:

- Opportunistic behavior by trading partners: **hold up**. Ex-ante reduction in expected returns.

## Structural Solutions:

- Joint ownership with related parties to share asset control and cash flow rights. This way counterparty incentives are aligned.
- Due to high debt level, appropriation of firm value by a partner results in costly default and transfer of ownership.



# Motivations: Agency Costs

## Problems:

- Opportunistic behavior by host governments: ***expropriation***. Either direct through asset seizure or creeping through increased tax/royalty. Ex-ante increase in risk and required return.

## Structural Solutions:

- Since company is stand alone, acts of expropriation against it are highly visible to the world which detracts future investors.
- High leverage forces disgorging of excess cash leaving less on the table to be expropriated.

# Motivations: Agency Costs

## Problems:

- Opportunistic behavior by host governments: ***expropriation***. Either direct through asset seizure or creeping through increased tax/royalty. Ex-ante increase in risk and required return.

## Structural Solutions:

- High leverage also reduces accounting profits thereby reducing local opposition to the company.
- Multilateral lenders' involvement detracts governments from expropriating since these agencies are development lenders and lenders of last resort. However these agencies only lend to stand alone projects.



# Motivations: Agency Costs

## Problems:

- **Debt/Equity holder conflict** in distribution of cash flows, re-investment and restructuring during distress.

## Structural Solutions:

- “Cash flow waterfall” reduces managerial discretion and thus potential conflicts in distribution and re-investment.
- Given the nature of projects, investment opportunities are few and thus investment distortions/conflicts are negligible.
- Strong debt covenants allow both equity/debt holders to better monitor management.

# Motivations: Agency Costs

---

## Problems:

- ***Debt/Equity holder conflict*** in distribution of cash flows, re-investment and restructuring during distress.

## Structural Solutions:

- To facilitate restructuring, concentrated debt ownership is preferred, i.e. bank loans vs. bonds. Also less classes of debtors are preferred for speedy resolution. Usually subordinated debt is provided by sponsors: quasi equity.



# Why Corporate Finance cannot Deter Opportunistic Behavior ?

---

- Do not allow joint ownership.
- Direct expropriation can occur without triggering default.
- Creeping expropriation is difficult to detect and highlight.
- Multi lateral lenders which help mitigate sovereign risk lend only to project companies.
- Non-recourse debt had tougher covenants than corporate debt and therefore enforces greater discipline.
- In the absence of a corporate safety net, the incentive to generate free cash is higher.



# Motivations: Debt Overhang

---

## Problems:

- ***Under investment*** in Positive NPV projects at the sponsor firm due to limited corporate debt capacity. Equity is not a valid option due to agency or tax reasons. Fresh debt is limited by pre-existing debt covenants.

## Structural Solutions:

- Non recourse debt in an independent entity allocates returns to new capital providers without any claims on the sponsor's balance sheet. Preserves corporate debt capacity.



# Motivations: Risk Contamination

## Problems:

- A high risk project can potentially drag a healthy corporation into ***distress***. Short of actual failure, the risky project can increase cash flow volatility and reduce firm value. Conversely, a failing corporation can drag a healthy project along with it.

## Structural Solutions:

- Project financed investment exposes the corporation to losses only to the extent of its equity commitment, thereby reducing its distress costs.
- Through project financing, sponsors can share project risk with other sponsors. Pooling of capital reduces each provider's distress cost due to the relatively smaller size of the investment and therefore the overall distress costs are reduced. This is an illustration of how structuring can enhance overall firm value. Re: MM Proposition.



# Motivations: Risk Contamination

## Problems:

- A high risk project can potentially drag a healthy corporation into ***distress***. Short of actual failure, the risky project can increase cash flow volatility and reduce firm value. Conversely, a failing corporation can drag a healthy project along with it.

## Structural Solutions:

- Co-insurance benefits are negative (increase in risk) when sponsor and project cash flows are strongly positively correlated. Separate incorporation eliminates increase in risk.

# Motivations: Risk Mitigation

---

- Completion and operational risk can be mitigated through extensive contracting. This will reduce cash flow volatility, increase firm value and increase debt capacity.
- Project size: very large projects can potentially destroy the company and thus induce managerial risk aversion. Project Finance can cure this (similar to the risk contamination motivation).



# Motivations: Other

- Tax: An independent company can avail of tax holidays.
- Location: Large projects in emerging markets cannot be financed by local equity due to supply constraints. Investment specific equity from foreign investors is either hard to get or expensive. Debt is the only option and project finance is the optimal structure.
- Heterogeneous partners:
  - Financially weak partner needs project finance to participate.
  - It bears the cost of providing the project with the benefits of project finance.
  - The bigger partner if using corporate finance can be seen as free-riding.
  - The bigger partner is better equipped to negotiate terms with banks than the smaller partner and hence has to participate in project finance.



# Alternative Approach to Risk Mitigation

<b>Risk</b>	<b>Solution</b>
Completion Risk	Contractual guarantees from manufacturer, selecting vendors of repute.
Price Risk	hedging
Resource Risk	Keeping adequate cushion in assessment.
Operating Risk	Making provisions, insurance.
Environmental Risk	Insurance
Technology Risk	Expert evaluation and retention accounts.



# Alternative Approach to Risk Mitigation

Political and Sovereign Risk	<ul style="list-style-type: none"> <li>■ Externalizing the project company by forming it abroad or using external law or jurisdiction</li> <li>■ External accounts for proceeds</li> <li>■ Political risk insurance (Expensive)</li> <li>■ Export Credit Guarantees</li> <li>■ Contractual sharing of political risk between lenders and external project sponsors</li> <li>■ Government or regulatory undertaking to cover policies on taxes, royalties, prices, monopolies, etc</li> <li>■ External guarantees or quasi guarantees</li> </ul>
Interest Rate Risk	Swaps and Hedging
Insolvency Risk	Credit Strength of Sponsor, Competence of management, good corporate governance
Currency Risk	Hedging



# Agenda

---

- The MM Proposition
- What is a Project?
- What is Project Finance?
- Project Structure
- **Operating aspects**
- Real World Cases
- Project Finance: Valuation Issues



# PF: typical items\_1

---

It is possible to distinguish two different types of PF:

- ↓ *no recourse o without recourse* operations  
(without compensation on *sponsors*)
- ↓ *limited recourse* operations  
(with compensation only on *sponsors*)

## PF: typical items\_2

---

- ↓ Capability of the project in terms of *cash flow*
- ↓ different requirements
- ↓ *Ring Fence* rule
- ↓ Participation of various subjects in different functions
- ↓ Analysis and risk's managing/sharing



# Applicability fields

---

- ↓ High socio-economic relevance works (networks, satellites, subways, bridges, highways, industrial plants, *shopping centers, harbours, etc...*)
- ↓ Small and medium constructions (parking areas, theaters, hotels, etc..)



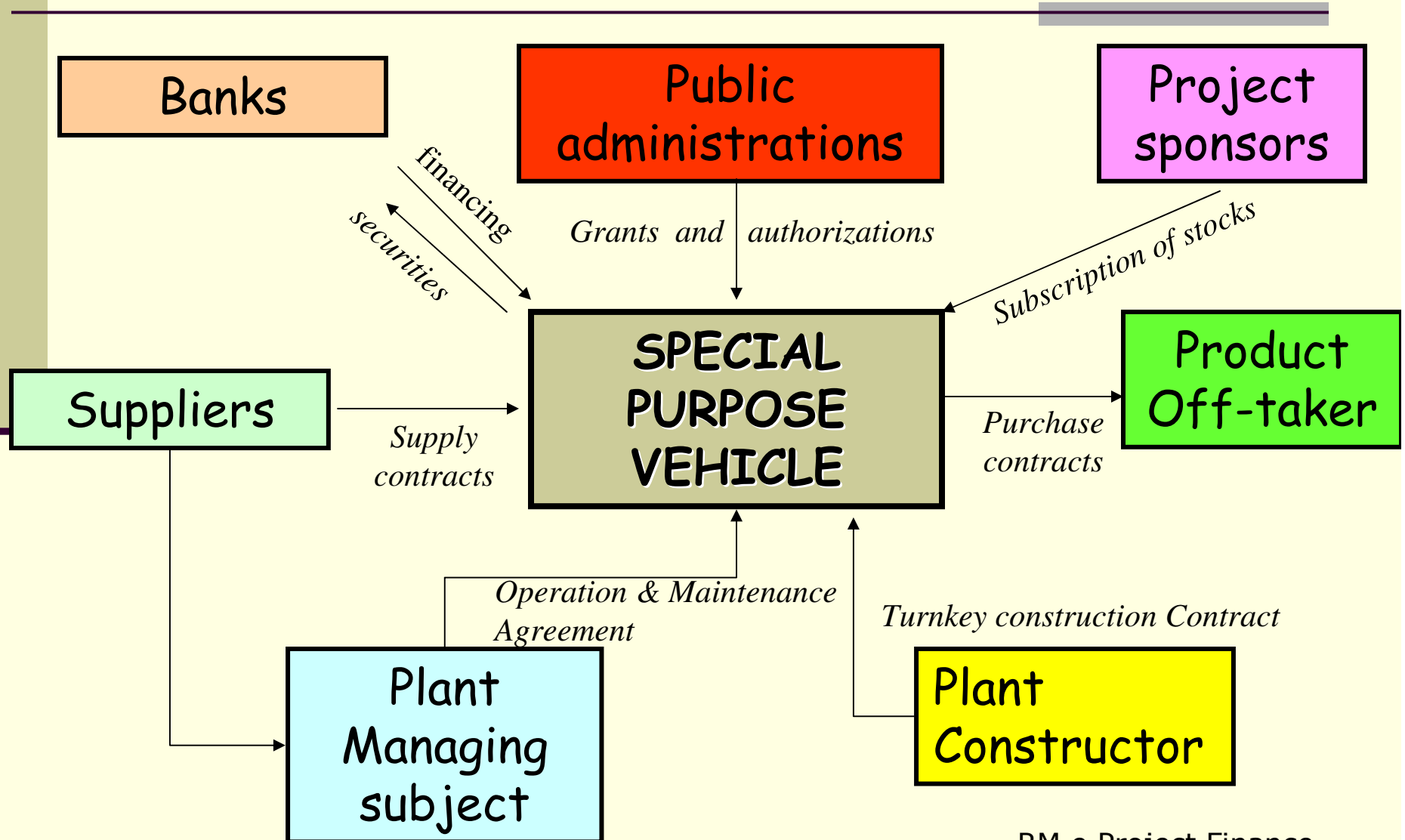
# Players

---

- ↓ Proposers or *sponsors*
- ↓ Public granter
- ↓ *Project Company* o *Special Purpose Vehicle*)
- ↓ Institutional investors and financiers
- ↓ Project managers
- ↓ *Contractors*
- ↓ Suppliers
- ↓ Consumers or output project's users
- ↓ Guarantors
- ↓ Consultants



# Involved parties



# Steps:

## A) Project focusing and feasibility analysis

---

### ☆ Proposal

#### 🕒 Feasibility studies

- a) technical feasibility
- b) financial feasibility

---

🕒 Financial and juridical structure.

Financial structure to present to financiers

- a) Financing: financiers/investors
- b) risk management proposal
- c) financiers involvement in order to define the financial structure
- d) define the juridical and corporate structure

## B) Operating phase

### ☆ **Creation of a *project company***

🕒 Planning

🕒 Grant's allotment

🕒 General contract,  
supply contract,

🕒 Permissions,  
environmental impact  
test

🕒 Starting financial supply

🕒 Security package:  
hedging agreements

🕒 Starting date

🕒 Monitoring

🕒 Completion

## C) Managing phase

---

☆ **Start-p**

🕒 Workability

🕒 Grant's end

# Risks

---

- ⊠ project's risks detecting and analysis
- ⊠ detected risks management

---

## A) General risks

## B) Specific risks:

⊠ planning risks, project testing risks

⊠ Workability risks (risks of the operational phase)

## A) *General risks*

---

### ☆ **Subjective risks**

#### 🕒 Financial risks

→ interest rate fluctuations

→ currency rate fluctuations

→ inflation

#### 🕒 *Refinancing risk*

(General or structural risks: follows)

---

🕒 Country risk

- currency unconvertibility
- transfer risk
- market deregulation
- restrictions, law limitations

🕒 Legal risk

- certainty of the law system
- difficulties in conciliate different foreign law techniques

(General or structural risks: follows)

⌚ Environmental risk

→ Related costs to: *Environmental Due – Diligence*; taxes; sustainable technologies; insurances; legal costs; reimbursements; assets value decreasing; etc..

⌚ Technological risk

⌚ *Force majeure risk*

⌚ *Equity resale risk*

## *B) Planning and testing phase risks*

---

☆ Fulfillment risk

🕒 *Cost overrun risk*

🕒 Supply risk

🕒 Unfunctioning

## C) Workability phase risks

---

★ Market risk

🕒 Risks related to the operating costs of the project

🕒 Supply risk

🕒 Unexpected capital disbursement

# Risk Management Process

---

- ↓ Is a complex process of negotiation that brings overall risk to a sharing process between all the players involved, by means of:
  - A set of contracts that take in engagements and specific agreements in order to protect the project from the uncalculated risks.



---

## ↓ 2 main strategies

⊠ stipulating insurance contracts

⊠ take on risks by the subjects involved

# The Security Package

---

RMP results in a *Security Package*: “a set of agreements, contracts and guaranties that ensure, referring to a Project Financing, the risk mitigation and the risk sharing as well”.

(G. Imperatori)



# Guaranties

---

↓ *In the Security package* it is possible to distinguish between two classes of agreements:

↓ to do, not to do

→ to give, not to give

**in order to remove a specific risk**

---

↓ Issues:

⊠ fulfillment (costs, quantity, quality)

⊠ commercial management (debt, profit)

# Foreign Country

---

↓ Country choice

↓ *Local counsel*

↓ Local government involvement

→ financial resources

→ guaranties on the future political stability



---

↓ *Letter of Intent o Comfort Letter* (first step)

→ provisional agreement; partially binding;  
general intents

↓ *Master Agreement* (second step)

→ specific agreements legally binding

# Build, Own - Operate and Transfer (BOT o BOOT) pattern

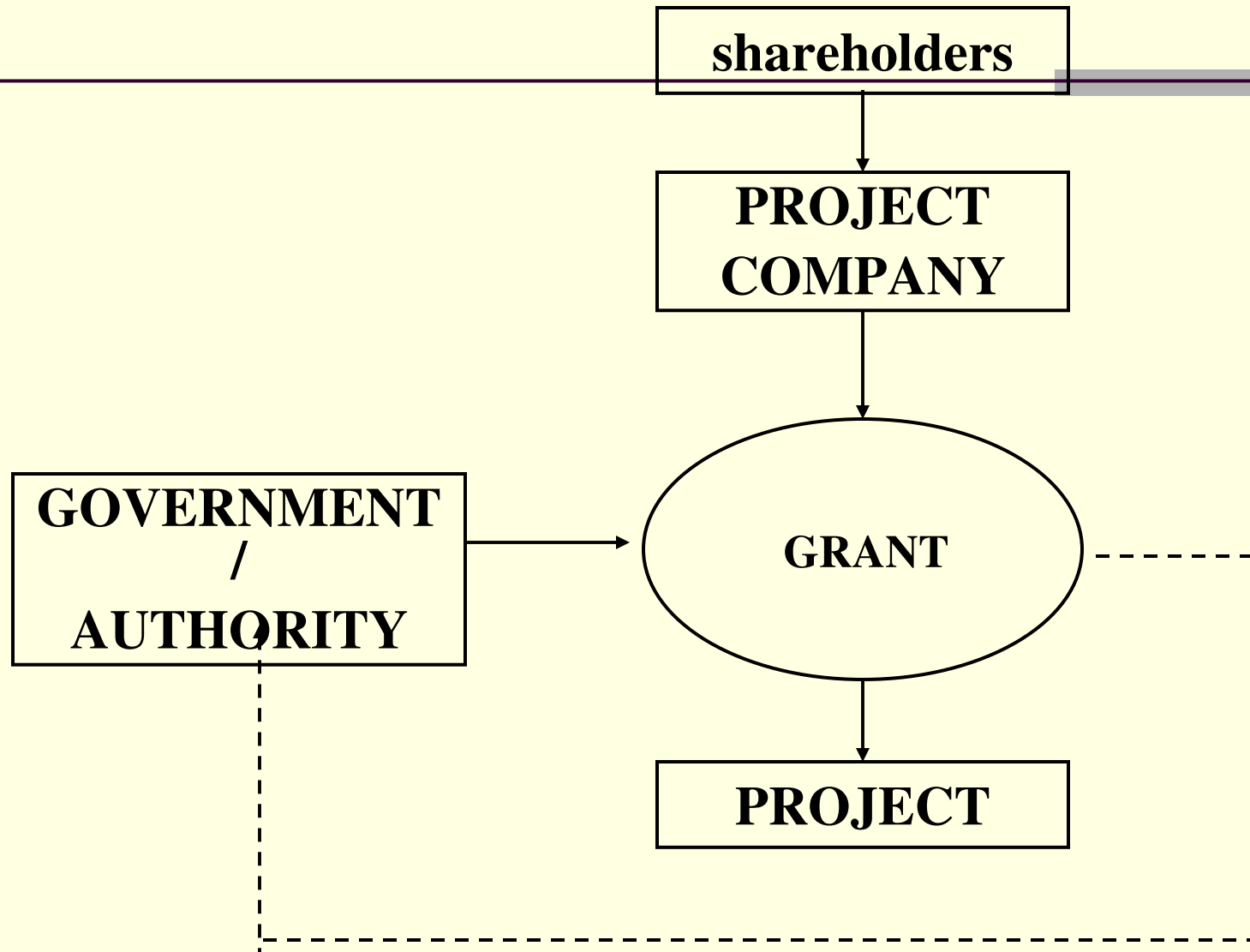
---

The grant (for a public building and after for the commercial exploitation) is farmed out.

The exploitation right is time limited, and at the end of the agreed period the user is obliged to transfer the building to the public granter.



# Pattern



# Building contract

---

- ↓ The building contract represent the main part of the overall project cost.
- ↓ *Cost Plus Fee Contract*
- ↓ *Lump Sum – Turn Key Contract* →  
*Liquidated Damages clause*

## *Completion Guarantee (required by banks)*

---

- ↓ if the building cost exceeds the budgeted value, *sponsors* have to supply needed capital in order to face the increased overall cost (*stand – by equity; subordinated debt*)
- ↓ if the building is not ready on time, the promoters are obliged alternatively (by banks choice) to complete the building within a further deadline or to refund the project company's debt.

# *Product Offtake Agreements*

---

↓ *Take Or Pay (TOP)*

→ *Exclusion of Defences or Hell or High Water clause*

→ *Assignment Agreement*

↓ *Through – put Agreement*

↓ *Take And Pay (TAP)*

# *Feedstock Supply Agreements*

---

- ↓ *Put Or Pay Contract (POP) or Supply Or Pay Contract (SOP)*
- ↓ *Put And Pay Contract (PAP) or Supply And Pay Contract (SAP)*



# Contents

---

- The MM Proposition
- What is a Project?
- What is Project Finance?
- Project Structure
- Operating aspects
- **Real World Cases**



# Real World Cases

---

**BP Amoco:** Classic project finance

**Australia Japan cable:** Classic project finance

**Poland's A2 Motorway:** Risk allocation

**Petrolera Zuata:** Risk management

**Chad Cameroon:** Multiple structures

**Calpine Corporation:** Hybrid structure

**Iridium LLC:** Structure and Financing choices

**Bulong Nickel Mine:** Bad execution

# Case : BP Amoco

---

**Background:** In 1999, BP-Amoco, the largest shareholder in AIOC, the 11 firm consortium formed to develop the Caspian oilfields in Azerbaijan had to decide the mode of financing for its share of the \$8bn 2<sup>nd</sup> phase of the project. The first phase cost \$1.9bn.

## Issues:

- Size of the project: \$10bn.
- Political risk of investing in Azerbaijan, a new country.
- Risk of transporting the oil through unstable and hostile countries.
- Industry risks: price of oil and estimation of reserves.
- Financial risk: Asian crisis and Russian default.



# Case: BP Amoco

---

## Structural highlights:

- Risk sharing: Increase the number of participants to 11 and decrease the relative exposure for each participant. Since partners are heterogeneous in financial size/capacity, use project finance.
- Sponsor profile: Get sponsors from major superpowers to detract hostile neighbors from acting opportunistically. Get IFC and EBRD (multilateral agencies) to participate in loan syndicate and reduce expropriation risk.
- Staged investment: 2<sup>nd</sup> phase (\$8bn) depends on the outcome of the 1<sup>st</sup> phase investment. Improves information availability for the creditors and decreases cost of debt in the 2<sup>nd</sup> phase.

# Case : Australia Japan Cable

**Background:** 12,500km cable from Sydney, Australia to Japan via Guam at a cost of \$520m. Key sponsors: Japan Telecom, Telstra and Teleglobe. Asset life of 15 years.

## Key Issues:

- limited growth potential
- Market risk from fast changing telecom market
- Risk from project delay
- Specialized use asset: Need to get buy in from landing stations and pre-sell capacity to address issue of “Hold Up”
- Significant Free Cash Flow

# Case : Australia Japan Cable

---

## Structural highlights:

- Avoid Hold up Problem through governance structure:
  - Long term contracts with landing stations.
  - Joint equity ownership of asset with Telstra and landing station owners both as sponsors.
- High project leverage of 85%
  - Concentrates ownership and reduces equity investment.
  - Shares project risk with debt holders.
  - Enforces contractual agreement by pre-allocating the revenue waterfall. Enforces Management discipline.
  - Short term debt allow for early disgorging of cash.

# Case : Poland's A2 Motorway

**Background:** AWSA is an 18 firm consortium with concession to build and operate toll road as part of Paris-Berlin-Warsaw-Moscow transit system. Seeking financing for the € 1bn deal (25% equity). Is being asked to put in additional € 60-90m in equity. Concession due to expire in 6 weeks.

## Key Issues:

- Assessment of project risk and allocation of risks.
- How can project risk best be managed?
- Developing a structuring solution given the time pressure.



# Case : Poland's A2 Motorway

## Structure for allocation of Risk

- Construction Risk:
  - Best controlled by builder and government.
  - Fixed priced turnkey contract with reputed builder.
  - Government responsible for procedural delay and support infrastructure.
  - Insurance against Force Majeure, adequate surplus for contingencies.
- Operating Risk:
  - Best controlled by AWSA and the operating company.
  - Multiple analyses by reputable entities for traffic volume and revenue projections.
  - Comprehensive insurance against Force Majeure.
  - Experienced operators, road layout deters misuse.



# Case : Poland's A2 Motorway

## Structure for allocation of Risk

- Political Risk:
  - Best controlled by Polish Government and AWSA.
  - Assignment of revenue waterfall to government: Taxes, lease and profit sharing.
  - Use of UK law, enforceable through Polish courts.
  - Counter guarantees by government against building competing systems, ending concession.
- Financial Risk:
  - Best controlled by Sponsor and lenders.
  - Contracts in € to mitigate exchange rate risk.
  - Low senior debt, adequate reserves and debt coverage, flexible principle repayment.
  - Control of waterfall by lenders gives better cash control.
  - Limited floating rate debt with interest rate swaps for risk mitigation.



# Case : Petrolera Zuata, Petrozuata C.A.

---

**Background:** \$2.4bn oil field development project in Venezuela consisting of oil wells, two pipelines and a refinery. It is sponsored by Conoco and Marvan who intend to raise a portion of the \$1.5bn debt using project bonds.

## Key Issues:

- What should be the final capital structure to keep the project viable?
- What is the optimum debt instrument and will the debt remain investment grade?
- How can the project structure best address the associated risk?



# Case : Petrolera Zuata, Petrozuata C.A.

## Operational Risk Management

- Pre Completion Risk
  - Includes resource, technological and completion risk.
  - Resource and technology not a major factor ( 7.1% of resources consumed and proven technology).
  - Sponsor's guarantee to mitigate completion risk.
- Post Completion Risk
  - Market risk and *force majeure*.
  - Quantity risk is mitigated by off-take agreement with CONOCO. However price risk not addressed due to secure deal fundamentals.
- Sovereign Risk
  - Key risk is of expropriation. Exchange rate volatility is a minor consideration.
  - Fear of retaliatory action on expropriation. Government ownership of PDVSA.



# Case : Petrolera Zuata, Petrozuata C.A.

## Financial Risk and Capital Structure

- Financial Risk:
  - Optimum leverage at 60% for investment grade rating.
- Evaluation of Debt Alternatives
  - *BDA/ MDA*: Reduced political insurance, and loan guarantees at higher cost and time delay.
  - *Uncovered Bank Debt*: Greater withdrawal flexibility at a fee. Shorter maturity, size and structure restrictions, variable interest rate.
  - *144A bond market*: Longer term, fixed interest rates, fewer restrictions and larger size. Relatively new and negative carry.
- Equity returns:
  - Equity can be adjusted within reason to get better rating.

# Case : The Chad Cameroon Project

**Background:** An oil exploration project sponsored by Exxon-Mobil in Central Africa with two components:

- Field system: Oil wells in Chad, cost: \$1.5bn.
- Export System: Pipeline through Chad and Cameroon to the Atlantic, cost: \$2.2bn.

## Key Issues:

- Chad is a very poor country ruled by President De'by, a “warlord”. Expropriation risk.
- Possibility of hold up by Cameroon.
- Allocation of proceeds – World Bank’s role and Revenue Management Plan.



# Case : The Chad Cameroon Project

Possible financing Strategies for Exxon-Mobil			
Financing Options	Field System	Export System	Total Investment
Corporate Finance: 1 sponsor, EM 100% owner	\$1521m	\$322m+\$1881m=\$2203m	\$3723m
Corporate Finance: 3 Sponsors, EM 40% Owner	40%* \$1521m = \$608m	40%*(\$2203m) = \$881m	\$1489m
Hybrid structure: 3 Sponsors, EM 40% owner	Corp. Finance 40%* \$1521m = \$608m	Project Finance 40%*(123+680)= \$321m	\$929m
Project Finance: 3 sponsors D/V=60% EM 40% Owner	16%*\$1521m = \$243m	16% * (\$2203) =\$352m	\$596m



# Case : The Chad Cameroon Project

---

## Structural choice: Hybrid structure

- Brings in the World Bank to address the issue of Sovereign Risk.
- Exxon-Mobil chooses corporate finance for oil fields since investment size is small. Other means of managing sovereign risk.
- Exxon-Mobil chooses project finance for the pipeline to diversify and mitigate risk.
- Involves the two nations to prevent post opportunistic behavior with the export system.



# Case : Calpine Corporation

---

**Background:** \$1.7bn company with 79% leverage seeking over \$6bn in financing to construct 25 new power plants. Changing Regulatory Environment allows for selling of power at wholesale prices over existing transmission systems with no discrimination in price or access. Firm wants to change from IPP to Merchant power provider.

## Key Issues:

- Seizing the initiative and exploiting first mover's advantage.
- Possible alternative sources for finance.
- Limited corporate debt capacity.



# Case : Calpine Corporation

## Options for Project Structure:

- Corporate Finance:
  - Public Offering of senior notes.
- Project Finance :
  - Bank loans 100% construction costs to Calpine subsidiaries for each plant.
  - At completion 50% to be paid and rest is 3-year term loan.
- Revolving credit facility:
  - Creation of Calpine Construction Finance Co. (CCFC) which receives revolving credit.
  - Debt Non-recourse to Calpine Corp.
  - High degree of leverage (70%).
  - 4 year loan allowing construction of multiple plants.



# Case : Calpine Corporation

## Comparison of Financing Routes:

- Corporate Finance:
  - Higher leverage: violates debt covenant for key ratios.
  - Issuance of equity to sustain leverage would dilute equity.
  - Debt affected by the volatility in the high yield debt market.
- Project Finance:
  - Very high transaction costs given size of each plant.
  - Time of execution: potential loss of First Mover advantage.
- Hybrid Finance:
  - Best of Corporate and Project Finance.
  - Low transaction costs and shorter execution time.
  - New entity can sustain high debt levels: ability to finance.
  - Non-recourse debt reduces distress cost for Calpine Corp.



# Case : Iridium LLC

---

**Background:** A \$5.5bn satellite communications project backed by Motorola which went bankrupt in 1999 after just one year of operations. Had partners in over 100 countries.

## Issues:

- Scope of the project: 66 satellites, 12 ground stations around the world and presence in 240 countries.
- High technological risk: untested and complex technology.
- Construction risk: uncertainty in launch of satellites.
- Sovereign risk: presence in 240 countries.
- Revolving investment: replace satellites every 5 years.



# Case: Iridium LLC

## Structural highlights:

- Stand alone entity: Size, scope and risk of the project in comparison to Motorola. Allows for equity partnerships and risk sharing.
- Target D/V ratio of 60%:
  - Cannot be explained by trade off theory since tax rate is 15% only.
  - Pecking order theory and Signaling theory also do not explain the high D/V ratio.
  - Agency theory best explains the D/V: Management holds only 1% of equity and the project has projected EBITDA of \$5bn resulting in high agency cost of equity. Also, since Iridium has no other investment options, risk shifting and debt overhang do not increase agency costs of debt.
- Partners participating through equity and quasi equity to deter opportunistic behavior and align partner incentives.



# Case: Iridium LLC

## Financing choices:

- Presence of senior bank loans:
  - lower issue costs.
  - Act as trip wire.
  - Easier to restructure.
  - Avoids negative arbitrage (disbursed when required).
  - Duration aligned with life of satellites.
  - Provide external review of the project.
- Sequencing of financing:
  - Started with equity during the riskiest stage (research) since debt would be mispriced due to asymmetric information and risk.
  - In development, brought in more equity, convertible debt and high yield debt. This portfolio matches the risk profile then.
  - For commercial launch, got bank loans: agency motivations emerge.



# Case: Iridium LLC

---

**Contention:** The Structuring and financing of Iridium was faulty and partially responsible for its demise.

**Reality:** Since Iridium was incorporated as an independent entity and not corporate financed, its prime sponsor Motorola is still solvent in spite of Iridium's bankruptcy. Moreover, the Bank loan default which seemingly triggered the bankruptcy also avoided fresh capital from being ploughed into what was essentially a technologically doomed project.

# Case : Bulong Nickel Mine

---

**Background:** In July 1998 Preston Resources bought the Bulong Nickel Mine in the pre-completion phase and financed it with a bridge loan. The bridge loan was financed with a 10 year project bond in December 1998. Within one year, Bulong defaulted on the notes after operational problems.

## Issues:

- Concentrated and weak equity ownership: Preston Resources.
- Cash flows very close to debt service.
- Processing technology is unproven.
- The output faces severe market risk and currency risk.
- The company has exposure to currency risk through forward contracts.

# Case: Bulong Nickel Mine

## Structural / financing highlights:

- Project finance: the right choice given the nature of the project and its size relative to the sponsor.
- 72% D/V ratio: very high given the projected cash flows of the project. Severely limits flexibility.
- Optionality: financial structure resembles an out of the money call option from the sponsors perspective.
- Importance of completion guarantees: EPC agency guarantees commissioning of plant and not ramp up. This misinterpretation of completion guarantee results in project exposure to technology risk.
- Project Bonds instead of bank loans: Motivation is flexibility in future investment (Preston has a similar project on the cards which it wants to “facilitate” with Bulong cash flows). However bonds limit flexibility during restructuring and delays it by 2 years.



# Acknowledgements

---

The content of this presentation has been derived primarily from the:

- **Imperatori G**, *La finanza di progetto, Il Sole24Ore, 2003.*
- ***Project Finance*** course taught by **Benjamin Esty** at the Harvard Business School.
- ***Emerging markets Corporate Finance*** course taught by **Campbell Harvey** at the Fuqua School of Business.
- ***Advanced Corporate Finance*** course taught by **Gordon Phillips** at the Fuqua School of Business.

We acknowledge the usage of content from ***Project Finance International*** and ***Journal of Applied Corporate Finance***.

