

PROJECT FINANCING: AN ECONOMIC OVERVIEW

Project financing is a method of organizing and funding large capital-investment projects. Although it is not an invention of modern finance, its application increased, and it reached new heights of innovation in the 1980s and 1990s as it was used to fund numerous large projects including mines, supertankers, roads, bridges, and even a theme park. The novelty, power, and complexity of this method of financing often obscures its economic simplicity:

Project financing is a way of distributing risks and returns more efficiently than under conventional financing strategies. Those who have specialized ability to bear specific kinds of project risk are paid to do so. The result is a lower overall cost of financing, the elimination of deadweight losses to consumers and investors, and, simply, the successful completion of projects that might not otherwise be undertaken.

The larger lesson of project financing illustrates the virtue of thinking about capital investments not as "black boxes" (which invite a simple go/no-go decision) but rather as aggregations of cash inflows and outflows that may be unbundled and rebundled to exploit attractive profit opportunities in capital markets and product markets. This lesson is similar to the insights one gains from studying the foreign-exchange hedging strategies, portfolio planning techniques, and the design of derivative financial instruments. *In essence, financial tailoring can yield substantial gains in value, if done correctly and under the right circumstances.* The purpose of this note is to explore these assertions in more detail.

Some Definitions

A project financing may be characterized by some or all of the following attributes:

- A separate legal entity is created (i.e., separate from the parent organization eager to see the investment undertaken). This entity may be organized as a partnership or a corporation.

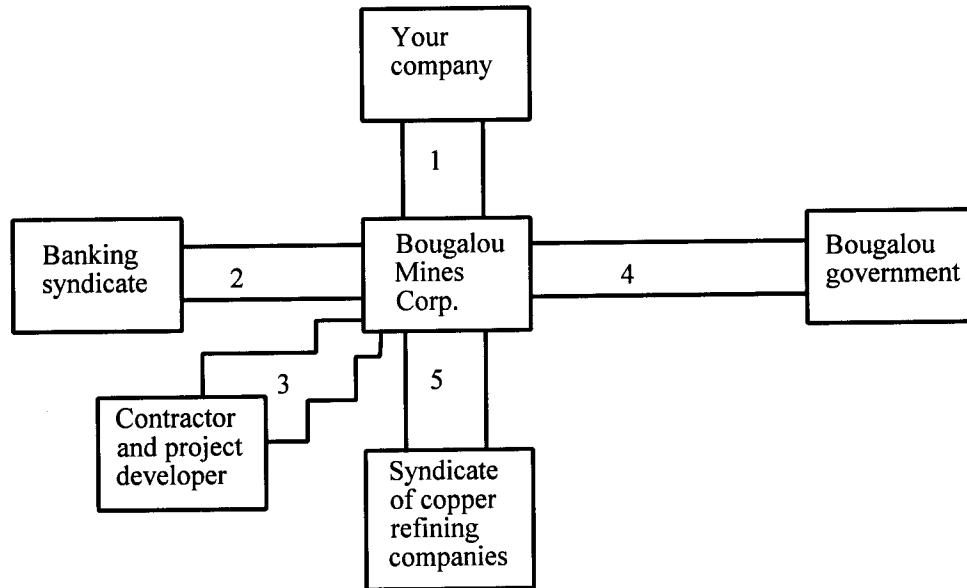
- The entity is organized around a specific business or asset. The business or asset is separable from the sponsor or parent and probably has a finite life. Indeed, the project facilities may be physically removed (or even remote) from those of the parent. The project will have clearly stated objectives and a likely conclusion.
- Project financings will be relatively expensive to set up. Contracts will describe in detail the responsibilities, contributions, and rewards of various participants in the project. Accounting and monitoring systems will be tailored to accommodate the unusual features of the project.
- Because of the large contracting and transaction costs necessary to set up a project financing, the project must be big, and will involve large sums of money.
- This entity is financed without recourse to the parent organization.

Project financings can involve many different kinds of assets and operations. It is useful to categorize these into two broad types:

- *Stock-type projects.* These projects depend on the existence of a sufficient stock of some good to be exploited, the proceeds from which service the creditors and provide a return to investors. Examples of this would be mines of all types, and oil and gas fields (i.e., exploiting a particular reserve). This type of project terminates when the stock runs out.
- *Flow-type projects.* These projects depend on a particular flow of business or traffic through the project in order to service the creditors and provide a return to investors. Examples would be pipelines, toll bridges, toll highways, tunnels, supertankers, hydroelectric plants, hotels, and theme parks. This type of project terminates when the facility wears out.

A project financing is, in essence, a *nexus of contracts* among various interested participants. To illustrate this concept, consider the following example: you wish to extract copper ore from Bougalou, an island 3,000 kilometers north of New Zealand. The rest of your operations are located in Bullhead, Louisiana, in the United States. You know a great deal about mining, but Bougalou is riskier than your sulphur mines in Bullhead. Your financial adviser suggests the following project financing scheme:

Figure 1
Diagram of Structure
Bougalou Mines Project Financing



In this scheme Bougalou Mines Corp. is "the project." The financing of this project involves numerous agreements, signed simultaneously:

1. Your company invests equity funds and know-how (mining expertise) in return for dividends and other forms of remuneration.
2. The banking syndicate provides debt financing in return for principal and interest payments.
3. The contractor provides services in supervising the initial development of the project and possibly some guarantees about timely completion and operating efficiency, in return for fees.¹
4. The government makes a small equity investment, grants some tax relief, gives assurances against expropriation, and supports the project with civil services in return for dividends, employment guarantees, and tax revenues (in the distant future).

¹The contractor or parent may even lay off some of the completion risk through completion bonds, i.e., insurance policies issued by outsiders to the deal. This illustrates how risk radiates away from the project through concentric circles of participants.

5. The copper refiners sign a "take-or-pay" agreement under which they promise to take the copper ore at a steady price and pay for it no matter what is the open market price.

Also, note that if you adopt this scheme, you have *shifted the focus* of attention away from your company and onto the project directly.

The point of this illustration is to show that in legal and financial terms the project is nothing more than a web of complementary agreements (a "nexus of contracts") among different participants in the project. All this contracting makes lawyers, accountants, and financial advisors wealthy. But it is safe to speculate that contracting through a shell company, like Bougalou Mines, is cheaper than writing many different bilateral contracts. *More importantly, it is through this web of agreements that the (re)distribution of risks and returns occurs.*

Internal Financing versus Project Financing

What the illustration does not answer is why some large capital projects are financed by firms as part of their *internal capital budget*, and others are financed on a project basis? Each approach has different advantages and disadvantages. A choice of project financing over internal financing essentially entails making tradeoffs among many different attributes. The following table summarizes what some of these tradeoffs might be:

Criterion	Internal Financing	Project Financing
Flexibility	<ul style="list-style-type: none"> > Flows of funds are commingled with the business. > Management discretion is high. > Low investor monitoring. 	<ul style="list-style-type: none"> > All flows are separated and earmarked. > Management discretion is low. > Full payout to investors through dividends or contractual stock repurchase. > Obtains capital while preserving control. > Permits redeployment of corporate capital. > Since project debt is nonrecourse to the parent, project financing helps preserve the parent's unused debt capacity.

Criterion	Internal Financing	Project Financing
Risk	<ul style="list-style-type: none"> > The risk of different projects contaminate each other. > Full recourse to parent, but this creates moral hazard (risk shifting, debt shifting, refusal to finance in future). > Diversifies asset portfolio of firm. 	<ul style="list-style-type: none"> > Spins off project risk to separate company. > Creditors have no recourse to parent, but creditors' exposure is confined to the project alone (i.e., no risk contamination from other projects). > Shareholders see types of risk allocated to those most able to bear those types.²
Income	<ul style="list-style-type: none"> > Inflows are fully fungible. Disposed by common policy. > Investors exposed to agency costs. 	<ul style="list-style-type: none"> > Lower agency costs. > Possibly higher information, transaction, and contracting costs. > Improved efficiency of valuation. > Improved risk control. > Reduced bankruptcy costs (quicker, simpler).³ > Possibly higher leverage gives higher debt tax shields, and higher equity NPVs.
Control	<ul style="list-style-type: none"> > Management stands between project and investor. 	<ul style="list-style-type: none"> > Disintegration permits increased accountability to investors: <ul style="list-style-type: none"> - assets and cash flows are separated; - initial structuring receives great scrutiny; - project-based management is visible and clearly accountable; - capital to be returned to investors, by contract. > Management remains in control (unless bankruptcy or some other battle for control forces management out).
Timing	<ul style="list-style-type: none"> > Relatively quick. > Project life may be easily rolled over or extended indefinitely. 	<ul style="list-style-type: none"> > Slow to put together. > Financing lifetime is finite and highly structured. Project is refinanced and/or financing lifetime is extended with greater difficulty.

²To clarify what we mean by risk allocation, note that *the total risk of the project itself has not changed*. The risk has simply been packaged into various different agreements and shifted around—this may result in a redistribution in risk from some stakeholders in the project to others. In looking for risk shifting, a good place to start is with the shareholders' perspective, where one is bound to observe significant reductions in risk from project financing.

³Because of the carefully defined asset base of the firm, lenders may view a bankruptcy proceeding as more straightforward than a situation in which a debtor has many different kinds of projects. Also, the narrow boundaries around the project limit some of the classic adverse forms of behavior often witnessed by lenders: risk shifting by managers (i.e., taking big gambles in hopes of recouping past losses), refusal to make additional equity investment, etc. However, a counterargument could be made that the chances of asset recovery by the lender are more limited in bankruptcy, since the lender cannot be repaid with the proceeds from other unrelated projects.

Criterion	Internal Financing	Project Financing
Other	<ul style="list-style-type: none"> > Through fungibility of cash, each project benefits from the internal liquidity of the firm. > Conversely, if the parent has liquidity problems, the parent could bleed the project of its cash, possibly endangering the life of the project. 	<ul style="list-style-type: none"> > Limited transferrability of investment interests, and thus low liquidity of securities. > Incentives for key people may be more easily structured. > New conflicts of interest may be created. > Because the project is insulated from the parent, failure of the parent may pose less danger to the project.

The table reveals significant differences between internal financing and project financing. Based on this comparison, one can hypothesize that project financing will occur when:

- The capital project is large, complex and "stand-alone." The costs of financial tailoring and monitoring are significant in project financings. Only the larger projects will throw off sufficient project financing gains to cover these costs.
- The parent (i.e., main residual owner in the project) is sensitive to the use of debt capacity on its balance sheet and relatively less interested in the fungibility of project funds.
- The parent (i.e., main residual owner in the project) is concerned about bearing the total risk of the project.
- The parent cares to maintain operating control over the project, but is willing to accept inflexibility in the structure of the project.

The main point, then, is that the choice of project financing is the result of tradeoffs managers accept. Also, there will be classes of projects and managerial situations where the use of project financing will be unattractive.

The Many Faces of Project "Risk"

Ultimately, to appreciate what is meant by "risk sharing" in a project-financing context, one needs to think carefully about the risks the project confronts and how the *structure* of the project mitigates those risks to the parent, by sharing them out to others who are better able to bear them. The following table defines nine classic forms of project risk and illustrates how the structuring of a typical natural resources project might share those risks to others.

Type of Risk	Typical Solution in Natural-Resources Projects	Who Bears the Risk?
<u>Resource Risk</u> Uncertainty that the exploitable resource is there in required quality or quantity.	<ul style="list-style-type: none"> > Investment in geological surveys and logging services to reduce uncertainty. > Financing contract designed so that funds are released as resource size is determined. 	<ul style="list-style-type: none"> > Equity holders in the project company. > Sponsor or parent of the project.
<u>Input or Throughput Risk</u> Risk that basic raw materials of production or extraction will be unavailable under the original terms.	<ul style="list-style-type: none"> > Investment in fixed-price supply contracts. 	<ul style="list-style-type: none"> > Supplier.
<u>Technical Risk</u> Risk that technical complexity may result in significant cost overruns or delays.	<ul style="list-style-type: none"> > Specialized contracting: turnkey, percentage-of-completion payments, etc., that create incentives to control costs and time. 	<ul style="list-style-type: none"> > Project manager/main contractor.
<u>Timing Risk</u> Possibility that delays will stretch out the period of construction before the cash flows begin. Can lead to higher interest charges and escalation of construction costs (e.g., liquified natural-gas projects only become operational once the last piece of equipment from the offshore production and collection facilities and transportation network is in place).	<ul style="list-style-type: none"> > Attempt to begin partial production before total project is complete. > Contract design with project developer: use of incentives and penalties. 	<ul style="list-style-type: none"> > Project manager/main contractor. > Equity holder/sponsor of project.
<u>Completion Risk</u> Combines timing and technical risks: errors in delivery and design; construction delays due to strikes; late delivery of equipment and supplies; unanticipated topological problems; new and untested construction techniques.	<ul style="list-style-type: none"> > Share completion risks with lenders: tailor loan agreements to permit release of funds across phases of project completion. > Contract design with project developer. > Developer may shed some of the completion risk onto a bonding agency through a completion bond agreement (e.g., an insurance policy.) 	<ul style="list-style-type: none"> > Lenders. > Project manager/main contractor. > Equity holder/sponsor of project.

Type of Risk	Typical Solution in Natural-Resources Projects	Who Bears the Risk?
<u>Market Risk</u> Future prices and volumes demanded of product are uncertain. Variations attributable to recession, changes in competition, exchange rates, availability of substitutes, politics, environmentalism.	> The use of long-term, take-or-pay contracts in natural resources production.	> Customer.
<u>Operating Risk</u> Potential adverse change in costs or other critical elements over the long life of the project (e.g., unexpectedly high corrosion or wear, uncertain quality, and stability of local labor pool).	> Training. > The use of imported or transitional labor. > Government support in maintaining an efficient and liquid labor market. > Careful monitoring of physical assets.	> Lenders. > Equity holders/sponsor of project. > Local government.
<u>Force Majeure Risk</u> Acts of God: earthquakes, adverse weather, war, and other uncontrollable events.	> Some lenders accept force majeure risk for a limited duration.	> Lenders. > Equity holders/sponsor of project. > Indirectly, all project participants.
<u>Political Risk</u> Terrorism, expropriation, civil unrest.	> Tailoring explicit tax and dividend agreements with local government. > Gaining moral and diplomatic support of customer country and sponsor's country.	> Government. > Indirectly, all project participants.

Financial Evaluation of Project Financings

So far, this discussion has focused on the structuring and risk-shifting aspects of project financings. But in the introduction, we also asserted that project financings also redistribute returns or wealth. Two techniques of financial analysis permit one to detect shifts in combinations of risk and return: *credit analysis* and *valuation analysis*.

Credit analysis looks at the risk/return combination from the standpoint of lenders only, and asks the basic question, "How probable is it that the project will repay interest and amortize the loan in timely fashion, and without unexpected monitoring costs?" In the usual corporate lending situation, answers may be obtained with the aid of industry averages, extensive ratio analyses, and peer comparisons. Unfortunately, the very uniqueness of most projects prevents this comparative approach. Instead, lenders are forced to rely on careful financial modeling and the opportunities for breakeven analysis, scenario analysis, and general sensitivity analysis that

computer modeling affords. The objective of these analyses is to determine the conditions and probability of future default. Artful project lenders then take these insights into account in structuring their loan agreements with the project.⁴ In addition to default, lenders are concerned with the return on their loan assets committed to the project. Ultimately, the lender must decide whether the prospective return on assets adequately compensates the bank for the project risks it assumes.

Valuation analysis directly assesses the risk/return tradeoffs in the project. Quantitative modeling is again the tool of choice. But unlike the banker who compares the project risk and return against internal bank credit standards, the valuation analyst must start with standards offered by the capital markets. This means estimated required rates of returns, relying to the extent possible on the returns to companies comparable to the project. Again, the unique qualities of the project will frustrate this effort to some extent, but it is essential that the risk-adjusted required rate of return is drawn from the capital markets, rather than from vague guesses. Sensitivity analyses of project cash flows will yield insights into the robustness of project net present values (NPVs).

Perhaps some of the most important insights about the *distribution of value* emerge from valuation analyses of the different participants' interests in the project. Consider the possibilities:

Project Participant	Possible Cash Flows for Valuation
Lender	Interest payments Principal payments Fees (commitment, closing, etc.) Prepayment penalties Administrative expenses Depreciation tax shields (lessors only)
Project parent (main equityholder and project operating manager)	Dividends or partners' return on capital Capital gains or residual value upon sale Management fees Royalties on technology, brands, trademarks Performance incentive payments Refinancing proceeds Administrative or head-office expense reimbursement

⁴For example, suppose that modeling analysis revealed the probability of default to be extremely sensitive to labor wage rates in the first five years of the project. A lender could require that before the draw-down of the loan a collective bargaining agreement be signed with the workers that commits them to a fixed (and feasible) rate of pay over the five years.

Project Participant	Possible Cash Flows for Valuation
Other equityholders	Dividends, cash Dividends, in-kind Capital gains or residual value upon sale Refinancing proceeds Return of capital
Suppliers	Payments under fixed supply contracts Performance incentive payments Penalties for late or poor-quality deliveries
Customers	Payments under take-or-pay sales contracts
Workers	Salaries and wages Benefits (medical, retirement, housing) Performance incentive payments Costs of negotiation
Government	Tax and social-security revenues to government Dividend payments to government (if equityholder) Import duties paid to government Costs of civil services (schools, public sanitation, transportation) borne by project Equity investment by government in project Infrastructure investment borne by government Investment incentives provided by government

The philosophy of using this *distributional analysis* to understand the attractiveness of a project-financing proposal is similar to that of a bridge or poker player attempting to deduce the cards (i.e., risks and opportunities) in the hands of the other players. This distributional analysis becomes extremely important in settings where the returns to participants are determined by negotiation rather than by competitive bidding (as in a stock exchange). Only by understanding the potential risks and returns of all the participants can the executive arrive at some final judgment about the fairness of the project-financing proposal.

Conclusion: Some Key Questions to Ask

The purpose of this note has been to define project financing, describe its strengths and weaknesses relative to internal financing, explore how project structures distribute risks and returns, and lay a conceptual foundation for the quantitative analysis of project financing proposals. The implications of this discussion for executives seeking to evaluate project financing proposals may be summed up in the following questions:

1. What is the resource that this project is intended to exploit? How uncertain is that resource?
2. What are the essential raw materials of production, and who can most effectively guarantee their availability?
3. How exposed is my firm to the various types of risk in this project, and can we shed those risks by contracting?
4. As a result of the proposed project financing, who shoulders the various kinds of risks? Do these parties have any special capacity to bear these risks? What are the financial returns (or wealth) allocated to these various players? Does this allocation seem appropriate?
5. Is this project truly separable from the other activities of my firm?
6. How significant is my firm's need for the full cash flow from the project? How sensitive is my firm's need to preserve its unused debt capacity?
7. Can the management of my firm tolerate the structural inflexibility of a project?
8. Does my firm *need* to control the project?
9. Is this project financing more, or less, costly than internal financing? Once the project is set up, does my firm truly bear less risk than it would have under internal financing?

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