



14 JUN 2004 RESEARCH & IDEAS

# The Big Money for Big Projects

by Ann Cullen

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This isn't your father's venture capital. Amusement parks, satellite networks, oil fields, toll roads: HBS Professor **Benjamin Esty** studies financing of large projects. **Q&A**

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There is nothing small about the research practiced by Harvard Business School professor Benjamin Esty. He studies the financing of some of the largest projects in the world: the Eurotunnel, Hong Kong Disneyland, and the Airbus A380, to name three. Not only are the projects big, but so are the financing requirements—typically north of \$500 million.

Why study large projects? Because they offer clear examples into the process used by managers to make important financing and structuring decisions, he says. Another reason: Large projects can deliver significant financial, developmental, and social returns when they succeed. The problem, says Esty, is that many of the largest products have hit financial turbulence.

Esty, whose new book *Modern Project Finance: A Casebook*, was published recently, teaches the "Large-Scale Investment" course on project finance, which analyzes how firms structure, value, and finance large, "Greenfield" projects. He also has created the Project Finance Portal.

Perhaps fittingly, his HBS office is just a few miles down the road from one of the most expensive public works project undertaken in the United States, Boston's "Big Dig" road improvement project built through the heart of the city.

**Ann Cullen:** The Big Dig in Boston is coming to completion. In terms of project financing, what are your thoughts on this project? Was there a better way to finance the project to avoid the tremendous cost overruns?

**Benjamin Esty:** Boston's "Big Dig" is the largest public works project in American history (the official name is the "Central Artery/Tunnel Project"). Technically, however, the project was municipally financed, not project financed. The difference is that project-financed transactions have nonrecourse debt, which means the loan repayments must come from project cash flows only. In municipally financed or public financed projects, a government entity is the borrower or the debt is backed by a government guarantee. In the case of the Big Dig, the state and federal governments have provided the bulk of the funds—at the state level the Massachusetts Transportation Authority will issue revenue bonds to finance construction. While it is true the cost of the project has risen from \$2.2 billion in 1983 (not indexed for inflation) to \$14.6 billion today, it is very difficult to allocate blame for the cost and schedule overruns.

In general, I think the project would have benefited from more "for-profit" incentives—if there's not clear incentives to be efficient and make profits, people won't. To address this concern in developing infrastructure projects, many countries, including the U.K., have adopted a hybrid approach known as the Private Finance Initiative (PFI), also known as "public-private partnerships" (PPP). Under this approach, private firms build and operate the infrastructure while the host government bears many of the residual risks such as market demand.



Very interesting facts about large projects is that so many of them get into financial trouble. Enron and Globalstar (two global telecommunications firms), Global Crossing, Eurotunnel, EuroDisney, and many others have all defaulted. The challenge of building and managing these projects is the focus of my ongoing research.

**Q:** One of the key themes in your book is that structure matters in the investment decisions made in financing a project. Could you explain this further?

**A:** Modigliani and Miller's (M&M) "irrelevance" proposition is one of the foundations of modern finance. It states that corporate financing decisions do not affect firm value under certain conditions. One of the key assumptions underlying this proposition is that financing and investment decisions are separable and independent. When this assumption holds, various financing decisions such as the firm's capital structure, its ownership structure, and its board structure do not affect firm values or investment decisions. In other words, financing structure does *not* matter. Yet much of the empirical research in the field of corporate finance over the last twenty-five years has attempted to show that financing structures do, indeed, matter.

## **CREATION OF A NEW PROJECT COMPANY AFFECTS NOT ONLY THE DECISION TO INVEST BUT ALSO THE SUBSEQUENT VALUE OF THE INVESTMENT.**

Research on project finance turns out to provide some of the best examples of how and why financing structures matter (or why structure affects firm value). When a firm decides to use project finance for a new capital asset, it creates a legally independent project company and finances that company with nonrecourse debt (i.e., the debt must be repaid by cash flows from the project company only.)

The relevant question is: Why would a firm choose to finance its assets separately in different companies rather than financing them jointly on a single balance sheet, especially when it is costly to set up project companies? The answer is that the creation of a new project company affects not only the decision to invest but also the subsequent value of the investment.

A good example of the former is the managerial decision to invest in a very large and very risky project. If done as part of the corporate balance sheet, there is a possibility that the project could drag the parent or "sponsoring" company into default if the project gets into trouble. The potential for a failing project to drag down an otherwise healthy parent corporation can deter a manager from making the investment in the first place even if it is likely to have a positive net present value in expectation. As a result, the firm will suffer an opportunity cost of under-investment if the only option is to finance the project using corporate finance. A good example is Iridium, the \$6 billion global satellite telecommunications firm that went bankrupt in August 1999. Had Motorola financed this investment on balance sheet or guaranteed all the debt, it might have dragged Motorola into bankruptcy, as well.

In addition to affecting investment decisions, the use of project finance can also affect asset values. By using project finance, companies get the opportunity to create a project-specific governance system designed to optimize the value of the project. Thus, rather than using the corporation's existing governance system—its capital structure, board of directors, compensation schemes, etc.—which may or may not be appropriate for any particular asset, the firm can create an entirely different governance system that is ideally suited for the asset in question. Much the same way leveraged buyouts (LBOs) change the governance of companies in value-enhancing ways, the decision to use project finance changes the management of projects in value-enhancing ways.

The dramatic increase in the use of project finance over the last ten years, from less than \$30 billion in the early 1990s to over \$200 billion in recent years, provides strong prima facie evidence that firms have recognized the value of financing capital assets through project companies. Even though it is very costly and time consuming to use project finance, the potential benefits far outweigh the costs for certain kinds of assets such as power plants, pipelines, toll roads, and mines. The key is to understand for which assets and in which settings the benefits are likely to be realized.

**Q:** I found your point interesting: Given the high debt-to-total capitalization ratios (typically 70 percent!), leverage plays an important disciplinary role in preventing managers from wasting or misallocating free cash flow and deters related parties, including host governments, from trying to appropriate it. But is this always effective in preventing the big money from big projects?



Other important benefits, these benefits come at a cost. First, high leverage provides managerial discipline on the use of free cash flow. Most projects involve large upfront capital costs, have very low operating (marginal) costs, and have few investment opportunities. As a result, projects generate large amounts of "free cash flow" (cash flow in excess of what is needed to finance all positive NPV investment opportunities). Large debt service requirements force managers to distribute these cash flows to capital providers, both debt and equity holders, rather than reinvesting it in the firm. As I mentioned before, project finance resembles LBOs in this respect.

Second, the use of high leverage can also be a source of discipline on related parties such as key suppliers or host governments. High leverage prevents cash from accumulating inside project companies, thereby eliminating the temptation for related parties to seize the cash. It also helps enforce contracts by, somewhat paradoxically, increasing the risk of bankruptcy. With low leverage, a related party can expropriate a large fraction of the profits before default becomes likely; with high leverage, even small acts of expropriate can cause the project to default and, at least temporarily, cease operations. Because most projects have going concern value only, a shutdown can be very costly particularly a very public one.

But high leverage does its disadvantages. Obviously, it can increase the probability of bankruptcy. It can also create incentive problems. When equity holders have too little "skin in the game," moral hazard (the idea that people drive rental cars more recklessly than they drive their own cars) becomes a real danger. Project sponsors may take excessive amounts of risk knowing the debt holders will bear most of the downside, yet will share almost none of the upside. Infrastructure projects such as toll roads, telecommunications systems, and water projects are particularly prone to this problem because host governments are reluctant to let them fail. Knowing the host government is more likely to restructure the project (e.g., to allow unscheduled increases tariffs or tolls), sponsors of infrastructure projects have an incentive to minimize equity contributions knowing they are likely to get bailed out. For regulators and politicians, the challenge is to structure contracts that deter reckless behavior prior to default and ensure efficient operations after default.

**Q:** Not much academic research has been done in the area of project finance. Why is that?

**A:** You're right. There has been very little academic research done on project finance to date. In fact, there have been only a couple of articles directly on project finance published in the leading finance journals, and not more than fifteen articles in all finance journals over the past twenty years. Similarly, there is little coverage or discussion of project finance in the leading corporate finance textbooks. Only three of the five leading corporate finance textbooks even mention project finance in their latest editions, and they do so in a total of only six pages. In contrast, all of these textbooks discuss initial public offerings (IPOs), leasing, and venture capital for an average of 15, 10, and 4 pages each, respectively.

This limited coverage is unfortunate from a research perspective given the potential for new insights on the relationships among financial structure, managerial incentives, and asset values. It is also unfortunate from a pedagogical perspective given the potential to teach advanced principles of corporate finance.

One of the reasons why so little research has been done is that project finance, at least in its modern form, is a relatively new phenomenon—it did not really become popular until the early- to mid-1990s. A second reason is that it is difficult to uncover detailed information and conduct quantitative research. Because most project companies are private companies, very little information is available to the public. In terms of statistical analysis, there are relatively few projects (approximately 300 per year, but only 40 to 50 large ones costing more than \$500 million). These projects tend to have long lives and many idiosyncratic features. As a result, statistical tests are weak and the lessons are not always applicable to other projects. Third, studying projects requires significant up-front investment to understand the institutional details.

## **WHEN EQUITY HOLDERS HAVE TOO LITTLE "SKIN IN THE GAME," MORAL HAZARD BECOMES A REAL DANGER.**

This combination of private information, few observations, and complex institutional details necessarily implies that the primary research methodology will be in depth and field based rather than broader and large sample statistical analysis.



...monies, and related articles. I expect to see significantly more research in the coming years, particularly given the fact project companies provide fertile and relatively unused territory for testing existing financial theories and developing new ones.

**Q:** Professor Josh Lerner recently published an article ["Boom and Bust in the Venture Capital Industry and the Impact on Innovation," Josh Lerner, *Economic Review, Federal Reserve Bank of Atlanta*, October 2002, Volume 87, Issue 4] pointing to the cyclic nature of the use of venture capital investment. Do you think the use of project finance is affected by market cycles as well? And if so, what economic factors do you feel would influence a boost in interest in this sort of finance?

**A:** The field of project finance has clearly been affected by macroeconomic conditions over the past few years, but not nearly to the extent that other financing vehicles such as venture capital or other financial transactions such as mergers and acquisitions have been affected. From a peak of almost \$220 billion in 2001, total capital expenditures financed on a project basis fell by 38 percent to \$135 billion in 2002. Nevertheless, it rebounded in 2003 to \$172 billion. Based on mid-year statistics, volume in 2004 should be up again. In comparison, total IPO volume fell 85 percent from \$66 billion in 2000 to \$10 billion in 2003, while announced M&A acquisitions of U.S. targets fell 70 percent from \$1,789 billion in 2000 to \$539 billion in 2003.

The difference with project finance is that it is used to finance long-lived projects, many of which are in the infrastructure sector (power, water, telecom, and transportation). For many countries, these expenditures cannot be deferred for very many years; they need the infrastructure today. Moreover, it doesn't make sense to defer a project with a thirty- to fifty-year lifespan just because we are in a temporary economic downturn. The long-term demand is clear. For this reason, the decline in project finance has been about half as severe as in these other financing vehicles and transactions.

The strong long-term demand stems from three underlying trends. First, globalization is increasing the minimum efficient scale for many industries, thereby forcing firms to make larger and riskier capital commitments. Second, depletion of existing natural resources means firms will have to develop resources in increasingly remote locations subject to higher levels of sovereign risk such as Chad and Azerbaijan. And finally, the combination of privatization and deregulation of key industrial sectors (e.g., telecommunications, power, water, etc.) will create new investment opportunities, not to mention lessons on what kinds of businesses should and should not be managed by the private sector. Demand for infrastructure investment is especially high in developing countries. According to the World Bank, Asia alone needs \$2 trillion of infrastructure investment over the next ten years to maintain its current standard of living. Yet most developing countries lack the necessary capital and have little ability to borrow. The only way to fund much of this investment will be through project finance.

We are, however, still in the early stages of learning how to use project finance effectively. While the use of project finance exploded in the late 1990s, the excitement over this new tool led to project finance being used in places where it probably should not have been used. For example, ten years ago, most power plants were financed with long-term fixed price contracts for both inputs (gas supply) and outputs (and electricity purchase). More recently, "merchant plants" were financed without the benefit of long-term contracts, leaving them exposed to competitive threats, volatile prices, and fluctuating demand. As highly leveraged companies, they could not withstand the large fluctuations in revenue. In the end, we have seen many power companies default in recent years. Similarly, many telecommunications firms have also defaulted over the past four or five years. But these events just reinforce the need for additional research on project finance. We need to know more about how to use this new, and potentially very valuable, financing tool.



LEADERSHIP

ENTREPRENEURSHIP

GENDER

NEGOTIATION

