Optimality of Project Financing: Theory and Empirical Implications in Finance and Accounting

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Abstract. During the 1980s a fairly active market developed in the private placement of limited recourse project financing. Although this form of financing is gaining in importance, we know very little about it. This article presents a theoretical analysis of project financing. In the model of the firm presented, outstanding risky debt gives rise to agency costs of underinvestment that are offset by the benefit of debt-related tax shields. The tradeoff specifies the optimal leverage for a firm. Within this framework, we consider the optimality of financing a new project with a nonrecourse project financing arrangement. We derive implications for 1) the characteristics of a new venture that will be project financed, 2) the wealth gains from project financing over that of financing with straight debt, and 3) the optimal allocation of debt across the different assets (the sponsor firm vs. the new venture). It is shown that a project financing arrangement, where the debt is optimally allocated to the sponsor firm and the new venture, increases value by reducing agency costs and increasing the value of tax shields (compared to the case of straight debt financing). The optimal allocation of debt in project financing involves assigning to the sponsor firm and the new venture debt levels equal to their individual optimal capital structures. Several testable empirical implications in finance and accounting are developed.

Key words: limited recourse project financing, straight debt financing, optimal allocation of debt

1. Introduction

The main purpose of this study is to analyze project financing arrangements. Although the origins of such financing arrangements can be traced to medieval times, only recently have they become an important method of financing projects and facilities. Limited recourse project financing has been used to finance large-scale capital projects such as power plants, oil pipelines, integrated oil refineries, automated steel mills, and chemical fertilizer factories. Project financing can be defined as the financing of a project by a sponsoring firm where the cash flows of the specific project are earmarked as the source of funds from which the loan will be repaid and where the assets of the project serve as the collateral for the loan. The assets and the cash flows of the project are segregated from those of the sponsoring firm in order to obtain credit appraisal and the loan for the project. An essential aspect of the project financing is that the creditors of the project have limited or no recourse to the cash flows from the remaining assets of the sponsoring company. It is this feature of project financing arrangements and its optimality that will be the focus of our analysis.

In addition to the limited recourse nature of project financing, the following features are common. Project financing arrangements are often accompanied by fairly detailed and
complex contracts precommitting the output and cash flows to customers, suppliers, and creditors. The contracts also curtail managerial discretion to a large extent. The project is legally distinct from the sponsors, and the project debt does not appear on the balance sheet of the sponsoring firm. Thus, project financing provides an important category of off-balance-sheet financing for firms. Our analysis will provide insights into the nature of projects and activities that are suitable for project financing and will explain the characteristics of project financing contracts. Our results provide several testable empirical implications in finance and accounting.

During the 1980s, a fairly active market developed in the private placement of limited recourse project financing. The most common use of project financing by corporations has been in oil and gas production, refining, gas transmission, chemicals, food processing and textiles. Project financing has also become the dominant practice in the independent nonutility electric power production industry. Nearly 2000 facilities that were initiated during the 1980s have used project financing as a primary financing mode. Although this form of financing is gaining in importance, we know very little about it. For example, what are the characteristics of the activities that are optimally financed through a nonrecourse or limited recourse project financing arrangement? What explains the nature and complexity of the contracts that accompany such financing? How much debt should be allocated to the sponsor firm and how much to the new venture? Why are most project financing arrangements joint ventures? What are the accounting implications of project financing being an off-balance-sheet financing activity?

The model of this article provides a framework to answer some of these questions. We adopt an agency-theoretic approach, where we model the investment decisions taken by corporate insiders as private action. As argued in Myers (1977), outstanding risky debt distorts the investment choices made by corporate insiders such that they pass up positive net-present-value projects. The agency costs of these underinvestment incentives are offset by the benefits of debt-related tax shields. The tradeoff specifies the optimal leverage for firms. Within this framework, we will then consider whether the incentive problems and the resulting value loss is affected by the structure of the debt contract used. In particular, we will show that the flexibility for project-specific allocation of debt across both the assets-in-place and the new venture will be important and can lead to value gains from reduced agency costs and increased tax shields. The optimality of project financing is related to characteristics of the project technologies to derive empirically testable propositions. The optimal allocation of debt is specified in terms of measures of profitability and growth of the technologies that can be given empirical content.

Our model predicts a positive response for the stock price of the sponsor firm when it makes announcements of new project financing. Although, to our knowledge, no previous study has examined empirically such an announcement effect, it is a testable prediction of our model. Our model predicts the intensity of the announcement effect to be positively related to differences in growth measures between the sponsor firm and the new venture announced. Our results have important implications in accounting. They provide a unified rationale for off-balance-sheet financing activities.

The underinvestment incentives of risky debt analyzed by Myers (1977) form the starting point of our analysis. Myers (1977) does not address issues of financing a new venture or those of project financing versus straight debt. John (1987) and Minahan (1988) study issues