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Anastasiou, Thomas

European Scientific Institute, ESI.

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# AN ENQUIRY INTO THE LEASE VS BORROW DECISION OF FIRMS

*Thomas Anastassiou, PhD*

Athens University of Economics and Business, Greece

*Angelos Tsaklanganos, PhD*

Neapolis University, Cyprus

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## Abstract

Greece has started to employ a new measure of financing with quite important success, especially over the last years, and this is the option of financial leasing. The measure has been decreed and put into effect quite earlier, in year 1986, (while it has been used widely long time ago in the United States and elsewhere) but only lately it has started in Greece to be considered seriously as an alternative source of investment financing.

Three main issues are addressed in this paper. First, an attempt is made to answer the question whether the lease decision and the borrow decision of firms are substitutes or compliments. Assumptions about complementarity run the risk of deciding in favour of leasing. Especially in Greece, where at the moment all leases are treated as operating, lessee firms are candidates for making the wrong assumptions about the impact of leasing in their financial position.

Also in this paper another question is asked, as long as a firm has decided on the lease option, as to how many units of capital equipment of a certain type the company is optimal to employ through leasing. A decision rule is employed and an illustration of this decision rule is made.

The final question which is posed is whether leasing is viewed as a financing or as an investment decision. We believe that trading leasing as a financing decision is a fundamental assumption. Firms though that decide in favour of investment projects based on favourable lease terms only, run the risk of accepting otherwise unacceptable projects and vice versa. What is suggested at present is to view at the combined result of both the investment and financing analysis in order to decide about the acceptability of an investment project.

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**Keywords:** Financing Policy, capital and ownership structure

## Introduction

Financial leasing has been introduced in Greece in 1986, when the legal framework for leasing was set by the Greek authorities. While leasing was already widely used for many years in the United States and elsewhere only during the last years it started being seriously considered as a financing alternative by Greek businesses. Although new as a financial option, the investments made through leasing during the last years, from 1997 to 2002, grew by approximately 25% - 35% per annum<sup>1</sup>. The Association of Greek Leasing Companies projected an even greater rate of growth for investments financed through leasing for the next years.

With interest rates falling dramatically and with the basic economic indicators improving, the Greek economic environment encourages more investments in every industry sector. With an additional financing mechanism available, except for the conventional

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<sup>1</sup> Source: Association of Greek Leasing Companies.

financing alternatives, Greek companies may be able to employ assets for investments easier than before.

In this paper an attempt is made to answer certain questions related to the leasing activity of firms. The first question is taken up in Section Two which tries to compare the lease vs borrow decision of companies. Section Three discusses the optimality decision, regarding the amount of capital equipment the firm should employ, as long as the lease option has been decided. Section Four poses the question as to whether leasing should be treated as a financing or as an investment decision, while conclusions are drawn in the last Section.

### **The Debt – Lease Relationship**

The lease vs borrow decision is a complicated decision for the firm that decides to lease. Leasing vs borrowing or buying is neither a matter of indifference for the firm nor it can be said that leasing is superior to other financing alternatives per se. The use of the term lease vs borrow instead of lease vs buy does not imply that the alternative to leasing is borrowing the asset's acquisition cost. It only recognizes that leasing reduces the borrowing capacity of the firm. Leasing displaces debt on a dollar for dollar basis. A firm signing a lease contract promises to make future payments. These payments are similar to the interest payments of a loan. Therefore, the firm acquiring assets through leasing assumes similar obligations to those firms that obtain their assets through borrowing. Likewise, lessee firms operate at no less risk than indebted firms. It seems reasonable to assume then that since leasing commits firms to similar obligations with those implicit in debt, the total borrowing power of a firm is reduced by an amount exactly equal to the funds which are provided for leasing.

As the early theoretical works of Miller and Upton (1976), Lewellen, Long and McConnell (1976) and finally Myers, Dill and Bautista (1976) have shown, leasing and debt are substitutes. More specifically, the smaller the lease liability the more the firm will borrow through conventional channels. On the other hand the larger the lease liability, the less conventional borrowing. Leasing has an impact on the borrowing capacity of a firm. Based on his empirical findings, Bowman (1980) also concluded that both leasing and debt financing affect the systematic risk of a firm. Same as with debt financing, firms that use lease financing tend to return to their target capital structures almost immediately. In more technical terms the debt ratio and the lease ratio of a firm are inversely related: lease ratio = capitalized assets/total assets $\uparrow$ , debt ratio = total debt/total assets $\downarrow$ . This inverse relationship confirms that lease and debt are substitutes.

Another reason which may also explain the substitutability between lease and debt, is that in practice, banks, lenders and analysts in order to determine a firm's borrowing capacity, examine its ability to cover fixed charges including the contractual minimum lease payments. The debt – lease substitutability is an important assumption that firms have to make in evaluating lease vs borrow. As it can be further shown, this assumption is also built into the lease valuation formula. Firms that assume a complimentary relationship between lease and debt financing, run the risk of deciding in favour of leasing, assuming that leasing has no bearing on their leverage position. Indeed, the cross sectional analysis made by Mukherjee (1991) in a survey of 500 largest US industrial corporations, revealed that a significant 22% of them assumed a complimentary relationship between lease and debt financing. However, the majority of those firms had been engaged only in operating leases while the rest of them had an insignificant leasing activity. The off-balance sheet financing that operating leases provide, it may become misleading regarding the true debt – lease relationship. In Greece, where at this moment all leases are treated as operating, lessee firms are candidates for making wrong assumptions about the impact of leasing on their financial position.

There is only one exception to the substitute relationship between lease and debt. Empirical analysis conducted by Krishnan, Sivarama and Moyer (1994), revealed a

complimentary relationship between lease and debt financing for firms having very high debt ratios. The sample surveyed, consisted of firms having various levels of leasing activity. The firms with very high leasing activity were found to possess different financial characteristics than the firms having a normal leasing activity or used only debt financing. Firms with significantly higher leasing activity, had lower retained earnings relative to total assets, lower coverage ratios, significantly higher debt ratios and higher operating risk. In other words, they had a higher potential for financial distress. The only reasonable explanation for this anomaly can be attributed to the lower bankruptcy costs associated with leasing. Lessors have a superior claim over lenders prior to and after bankruptcy. Consequently, in such circumstances, for firms having already an increased potential for bankruptcy due to high operating risk and high debt ratio, lease financing is available either at a lower cost than debt or it is the only available form of long term financing. Nevertheless, we believe that the above finding can only verify the original assumption that firms should evaluate lease financing as a substitute for debt financing.

Under certain strict assumptions, there is a financial equivalence between leasing and borrowing. When, however, these assumptions are relaxed to reflect more realistic conditions prevailing in the marketplace, then they can explain differences between one form of financing and another. Revealing and understanding the right assumptions which make up the decision framework for the lease vs borrow issue, is of the greatest value to managers, because they can evaluate right what is best for their firms.

To complete the analysis, lessee firms have to decide on two related issues. The first one has to do with the core of the problem which is the lease vs borrow. Having done this first fundamental stage of the analysis and assuming that the firm finally decides to lease, the next thing to determine is how many units of capital equipment of type  $i$  is it optimal to employ through leasing. This is the next issue addressed.

### **Optimality Decision**

Assuming that the lessee firm has decided to lease capital equipment the next step is to determine the number of capital equipment units of the same type  $i$  that is optimal to acquire with this method. The decision rule to be used can be derived from the production theory. Production theory states that a firm can keep adding to its production process additional units of a variable input until the marginal revenue product (MRP) of that type of input is equal to the marginal expenditure (ME) for that input. Miller and Upton (1976) have suggested the use of the same decision rule by lessee firms. The amount of capital equipment of the same type  $i$  can increase up to a point where its marginal revenue product becomes equal to its marginal expenditure which in this case is the minimum lease rental payment.

To illustrate with an example the use of this decision rule, we may assume that lessee X has decided to lease capital equipment of type  $i$  and wants to determine the optimal number of units of equipment of type  $i$  to lease. Additionally we assume that this type of equipment is the only variable input to the firm's production process. To simplify things we may also assume that the lease term is only one period, one year in this case, and the lease agreement calls for a one period rental payment  $L$ . The lease at the end of the period becomes cancellable without any penalty provision for the lessee. The marginal revenue (MR) realized from selling each unit produced by capital equipment of type  $i$  is

$$MR_i = \text{€}10.$$

The periodic lease payment or else the marginal expenditure for  $i$  is

$$L = ME_i = \text{€}1,200.$$

If the production function for lessee firm, that has capital equipment of type  $i$  as the only variable input, is<sup>1</sup>

$$Q = 600i - 40i^2 \quad \text{where } Q \text{ is output,}$$

the optimal number of units of capital equipment of type  $i$  to lease is found as follows

$$MRP_i = ME_i \rightarrow MRP_i = 1,200. \quad (1)$$

Since

$$MRP_i = MR_i \times MP_i = 10 \times MP_i \quad (2)$$

we find first  $MP_i$  by differentiating  $Q = 600i - 40i^2$  with respect to  $i$ ,

$$MP_i = dQ/di \rightarrow MP_i = d(600i - 40i^2)/di \rightarrow MP_i = 600 - 80i.$$

Substituting  $MP_i$  to (2) we get

$$MRP_i = 10 \times (600 - 80i) = 6,000 - 800i$$

and substituting  $MRP_i$  to (1) and solving for  $i$  we finally get

$$MRP_i = 1,200 = 6,000 - 800i \rightarrow i = 6 \text{ units.}$$

The optimal number to lease in this case is 6 units of capital equipment of type  $i$ .

In reality this computation can be more complicated since the number of variable inputs required in the production process of a firm can be very large. Nevertheless, no matter how complicated such a computation may be, this decision should be viewed not as separate but as part of the general lease vs borrow or buy problem.

### Leasing as a Financial Decision

A firm usually has to decide on a number of investment projects. Applying the relevant capital budgeting techniques, the firm undertakes those investment projects that seem to yield positive returns to it. If the firm uses the net present value (NPV) analysis for example, it chooses among those projects that have a positive NPV. According to its capital budgeting restrictions, the firm selects the projects in terms of the highest positive NPV. The next thing to do then is to decide on how to finance these projects. The lease vs borrow is a financing decision and therefore it should be made immediately after any investment decision. Evidence provided from research on corporate leasing analysis conducted by Mukherjee (1991) revealed that an approximate 92% of firms that have been engaged in leasing arrangements, viewed leasing as a financing decision. The remaining 8% of firms treated leasing as an investment decision without further explanation of their choice. We believe that treating leasing as a financing decision is a fundamental assumption. Firms that decide in favor of investment projects based on favourable lease terms only, run the risk of accepting otherwise unacceptable projects and vice versa. What is advisable, is that firms, before accepting or rejecting projects, based on results of the capital budgeting analysis or the investment evaluation stage, proceed to the next stage which is the lease financing evaluation. The combined result of both, the investment and financing analysis, may give different results from those obtained by treating each analysis stage as completely independent from each other. In order for firms to avoid losing positive investment opportunities or avoid accepting projects whose net effect after financing is negative, it is suggested to employ a pattern (see Table 1 below) which uses the net effect of net present value (NPV) analysis and the net

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<sup>1</sup> In case that we had more than one variable inputs, the output function would be more complicated but it would still be a relationship between various combinations of inputs. It is interesting to name at least two cases that can be met more often. One is the case of having at least one variable input that is obtained with leasing and other variable inputs obtained with any other method, and the other case is having more than one variable inputs, all obtained with leasing. Generally in cases having more than one variable input, optimal amounts can be found with the use of partial differentiation. The marginal product of each input is found by differentiating the production function with respect to that input while holding the other inputs constant.

advantage to leasing (NAL) analysis<sup>1</sup>, as the decision rule for accepting or rejecting investment projects.

Table1. Investment Net Effect Decision Rule Pattern

NPV Condition	NAL Condition	Net Effect	Decision
1. NPV > 0	NAL > 0	NPV + NAL > 0	Project Accept
2. NPV > 0	NAL < 0	NPV + NAL > 0	Project Accept
3. NPV > 0	NAL < 0	NPV + NAL < 0	Project Reject
4. NPV < 0	NAL < 0	NPV + NAL < 0	Project Reject
5. NPV < 0	NAL > 0	NPV + NAL > 0	Project Accept
6. NPV < 0	NAL > 0	NPV + NAL < 0	Project Reject
7. NPV = 0	NAL = 0	NPV + NAL = 0	Indifferent
8. NPV = 0	NAL > 0	NPV + NAL > 0	Project Accept
9. NPV = 0	NAL < 0	NPV + NAL < 0	Project Reject
10. NPV > 0	NAL = 0	NPV + NAL > 0	Project Accept
11. NPV < 0	NAL = 0	NPV + NAL < 0	Project Reject

The pattern can be used consistently for any capital asset investment evaluation. Implicit in the pattern, is the assumption that the NPV analysis should be conducted before any financing decision is made. As pointed out previously, a lease or borrow decision can not determine by itself the attractiveness of any capital investment project. This is clearly a financing decision and should follow the investment capital budgeting analysis. Since every capital project needs to be financed, its financing creates side effects on the company's overall position. Sometimes those side effects are stronger than the main effect created by the investment itself on the firm's net position. Investment alternatives should be examined under the light of both the capital budgeting and the financing evaluation analysis. Their combined net effect better determines the consequences of each alternative capital project on a company's future net position. For example, in case 3 from Table 1, though the capital asset project has been deemed worthwhile, its NPV being greater than zero, the firm should be better off if it does not undertake the project. Its financing side effects are such that the overall net effect,  $NPV + NAL < 0$ , is negative to the firm. If the firm undertakes the project, its total market value will decrease.

The pattern can be extended to include the advantage of borrowing to the firm. It does not limit itself to the leasing alternative. Whatever the financing decision of the firm may be, lease or borrow, it still has its impact on the final decision. After all, if the firm can secure a loan with extremely favourable terms for a capital project with negative NPV, the overall effect can be such that it rescues the capital project.

## Conclusion

In this paper an attempt was made to answer certain questions related to a new means of financing investment projects, that of financial leasing. It was indicated that leasing should not be considered as better or superior to other sources of funds per se, other things being equal. And when an investor chooses the lease option, an answer as to the optimal amount of units that should be employed is given. Finally a pattern is provided by which the investment and financing analysis are both combined to give for the investor the best decision rule for accepting or rejecting investment projects.

<sup>1</sup> See Myers, Dill and Bautista (1976) who have developed the famous lease valuation formula by which the lessee can evaluate the attractiveness of a lease. If the net advantage of leasing over borrowing is positive, it means that the lessee is better off with lease financing than borrowing and owning the asset.

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