A 1982 Survey of Corporate Leasing Analysis

Thomas J. O'Brien and Bennie H. Nunnally, Jr.

Both authors are Assistant Professors of Business Administration at the University of North Carolina at Charlotte.

■ Over the years the difficulty in resolving the issues in lease-buy analysis has given rise to textbook expositions that vary widely in form, if not in content. This situation may have resulted in some confusion among practitioners and some erroneous decisions. Indeed practitioner errors were apparently uncovered by Anderson and Martin [1] in a 1975 survey. Since the time of their survey, progress has been made in clarifying the issues in lease-buy analysis. This article addresses how this progress has influenced corporate procedures.

Fundamental Issues

Around the time of the Anderson-Martin survey the principal issue in the lease *versus* purchase literature was whether or not to treat a lease proposal as an

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alternative capital budgeting investment project. This simple approach is alluring, but is logically flawed for the following reason. In the "capital budgeting approach" lease payments are considered operating cash-outflows. However, lease payments contain a finance cost component, and finance costs should not be treated as a cash-flow in the traditional capital budgeting procedure. Instead, finance costs are "accounted for" in the discounting operation. Thus the treatment of a lease proposal as a capital budgeting alternative is inappropriate.

The suggested solution to the lease-buy problem is to determine whether leasing provides a better financing alternative to that which would be employed if the asset were purchased. This procedure, referred to as a "net advantage to leasing" analysis, or NAL, is conducted independently of the primary capital budgeting evaluation of the asset.

Given that the NAL method is a more satisfactory approach to lease analysis than the capital budgeting approach, another important issue at the time of the Anderson-Martin survey was the choice of the appro-

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was advocated was the corporation's cost of capital. However, a strong case also was made for the use of the cost of debt. This latter position was recommended on grounds that the primary cash-flow in the analysis, the lease payment, had approximately the same degree of certainty as the corporation's debt service payments. Since the idea of discounting different cash-flow components at different rates was only beginning to emerge at the time, the controversy seemingly arose from a need by analysts to employ only one discount rate.

priate discount rate to use in the NAL. One rate that

In the midst of the controversy another problem arose. While the focus was upon the previously mentioned issues, recommendations for how to tie NAL analyses back into the main capital budgeting function were often neglected. The problem that resulted was that many readers drew the conclusion that an NAL analysis should be conducted if and only if an asset had previously been accepted by capital budgeting criteria on a purchase basis. This conclusion was incorrect, since it did not provide a means for an attractive lease arrangement to "salvage" an otherwise unprofitable project. Nevertheless, specific procedures for relating NAL results to the overall capital budgeting process were very often omitted from textbooks. Perhaps this omission created "refugees" from the NAL method back to the capital budgeting approach. At least the latter approach did not appear to suggest that the analyst ignore the favorable implications of an attractive lease on a project's overall acceptability.

Another problem for practitioners in 1975 was that the academic literature had narrowed its focus primarily upon noncancellable (financial) leases. This situation resulted from a need to clarify the basic issues. But practitioners were left without a great deal of guidance on how to evaluate many *other* kinds of "real world" lease contracts.

The Anderson-Martin Survey

It was in this atmosphere that the Anderson-Martin survey was conducted. Their survey form was sent to the Fortune 200 firms. The form consisted of a lease versus purchase problem to solve and several questions to answer.

The problem was adapted from Johnson and Lewel-

The problem was adapted from Johnson and Lewellen [28]. The Johnson-Lewellen problem did not provide the project's revenue and cost information necessary for a capital budgeting approach. Thus the respondents were "forced" into the NAL method. While sixty-three of the 200 corporations responded, a

number chose not to do the problem.

Anderson and Martin reported two disturbing impli-

cations. First, the cost of capital was often utilized as the discount rate in instances where the cost of debt would apparently have been the more logical choice. This situation could have resulted from two combined factors: a) the bias of analysts toward "one rate," and b) the desire to correctly discount for the perceived uncertainties in the operating costs (if the asset were not leased) and in salvage value. On the other hand, the situation could have also resulted, at least in some cases, from attempts by practitioners to superimpose a

capital budgeting approach onto the problem.¹

The second disturbing implication of the Anderson-Martin results was that many practitioners did believe that a NAL analysis should be conducted only for projects that had previously been accepted as a purchase by the usual DCF capital budgeting criteria. Apparently, books that neglected to demonstrate how a lease proposal with a positive NAL could salvage an otherwise unacceptable project had indeed been either misleading or misinterpreted.

The state of affairs in corporate leasing analysis

The state of affairs in corporate leasing analysis reported by Anderson and Martin is not too surprising in light of the controversies and biases of the time. Contributions to the area were made by Beechy [3, 4], Bower, Herringer, and Williamson [6], Doenges, [16], Findlay [18], Johnson and Lewellen [28], Mitchell [41], Roenfeldt and Osteryoung [50], Vancil [57], Wyman [60], Bower [5], Nantell [44], Gordon [22], Sartoris and Paul [51], Schall [52], Ofer [45], Cooper and Strawser [13], Honig and Coley [25], Henderson [24], and Moyer [42]. Furthermore, despite the many contributions that were made in the above works, other significant issues were still in the process of being clarified.

Additional Significant Issues

After the Anderson and Martin survey, attention was focused on two separate but critically interrelated issues. The first was how to properly adjust for taxes. The second was how to correctly determine the "equivalent loan" in a lease financing plan. The prin-

"equivalent loan" in a lease financing plan. The principal breakthroughs made in these areas were by Myers, Dill and Bautista [43] and Lewellen, Long, and McConnell [35]. In addition, significant clarifications and extensions were contributed by Franks and Hodges [20], Levy and Sarnat [33], and Idol [27]. This litera-

ture continued to focus on the problems of evaluating

Indeed, Olsen [46] would later report his conclusion that some practitioners may favor the capital budgeting approach.

noncancellable leases.

The NAL procedure exposited by Myers, Dill, and Bautista [43] and Lewellen, Long, and McConnell [35] is as follows (ignoring salvage value): One should begin with the asset purchase price and subtract from this amount the discounted values of a) the after-tax lease payments; b) the foregone depreciation tax shield when leasing; and c) the foregone interest tax shield when leasing. The discount rate should be the beforetax cost of debt. The resulting amount is the NAL. If the NAL is positive, then leasing is preferable to purchasing. This general approach is particularly difficult to apply however. Since the interest tax shield depends upon the amount of "displaced" debt, and since the amount of displaced debt depends upon the differential cash-flows between the leasing and purchasing alternatives, including the interest tax shield, the "equivalent loan" amount and the interest tax shield depend upon each other. Thus a solution to the problem must be found iteratively.2

rates are equal (constant term structure), an equivalent but easier solution to the above problem is available. The easier approach is to find the NAL by omitting the interest tax shield from the differential cash-flows and by using the after tax cost of debt as the discount rate. This procedure is discussed by Brealey and Myers [8] and Levy and Sarnat [32].

What may be counter-intuitive about either the gen-

If one is willing to assume that all forward interest

eral approach of the simplified one is that no foregone interest tax shield is calculated on the actual loan amount (the price of the asset) under the purchase alternative. An alternative simplified approach which compensates for this problem is the one by Brigham [11]. Brigham first finds the "after-tax" cost of borrowing by adjusting the purchase outlay for the interest tax shield on the actual amount that would be borrowed. He then includes the same adjustments into leasing costs as a foregone interest tax shield. Since he is discounting at the after-tax rate, and since the two adjustments cancel each other out, Brigham's approach is exactly equivalent to the simplified NAL approach discussed above and is therefore also consistent with the general approach.

The correct solution to the NAL problem becomes more complicated, however, when uncertain salvage value is introduced. There exists an intuitive tendency to simply discount salvage value at the firm's cost of capital. However, Long [37] has indicated that more complicated adjustments should be made. The adjustments relate to the need to consider the impact of the salvage value on the displaced debt.

Another technique that is sometimes correct is to find the implicit interest rate that equates the cost of leasing to the purchase cost. As long as the annual cost of leasing is determined by adding the lease payment to the foregone depreciation tax shield (and not any interest tax shield), then the resulting implied interest rate should be compared with the after-tax cost of debt. If the latter is larger, then NAL is positive, and vice versa. However, this method runs into serious difficulty when the cash-flows have different risks, such as when uncertain salvage value is considered.

Status of Lease/Buy Expositions in 1982 In addition to the advancements that have been made

In addition to the advancements that have been made in clerifying the correct procedures for NAL analyses, some effort has been aimed at identifying the appropriate manner for tying the NAL technique to the overall capital budgeting effort. Martin *et al.* [38] give an explicit formula for connecting the NAL analysis with the capital budgeting one. In addition, Brealey and Myers [8] point out verbally that an advantageous lease proposal could make attractive a project that was otherwise unacceptable.

Despite all of the advances that have been made, the intricacies of the problem are still not easily understood. At the time the 1982 survey, reported below, was conducted, some texts still advocated the capital budgeting approach. Furthermore, other texts recommended NAL methods that do not clarify how the equivalent loan (displaced debt) is determined. Moreover, Martin et al. [38] and Brealey and Myers [8] appear to be unique in suggesting how to tie the NAL analysis into the capital budgeting decision. Unfortunately, the Martin et al. [38] NAL exposition is one of those that does not confront the equivalent loan calculation.

Thus while Levy and Sarnat [32] and Brigham [11] do give useful guidance (under the constant term structure and no salvage value assumptions), those texts still do not show how the NAL analysis should be connected with the capital budgeting effort. And while Martin et al. [38] do correctly demonstrate how to tie the NAL analysis to capital budgeting, their NAL exposition is too general. Brealey and Myers [8] appear to be correct in both areas, but still do not offer an

²Many analysts will recognize this situation as being similar in spirit to determining debt levels in "proforma" financial statements, where the debt level affects the interest pard, which affects retained earnings and equity level, and thereby reflects back again on debt level. An iterative solution procedure solves the problem. A similar situation is the case in the NAL problem here.

advocated lease analysis procedures of other texts, and 500-699 700-\$1.499 3) the previous findings of Anderson and Martin [1] 7 over \$1.500 63 and Olsen [46], the 1982 survey was undertaken. The 1982 Survey and Findings been recommended on a purchase basis. This finding The survey was mailed to the first 195 of the Forcorroborates the earlier findings of Anderson and Martune 500 firms; 78 of that number responded. Of the tin. It appears that the incorrect impression on this

Total

Assets

(\$000,000)

\$200-499

budgeting.

ly 37%). Thus the response rate was a bit higher than that of Anderson and Martin. Every effort was made in the construction of the survey questionnaire to keep the time involved for the participants at a minimum, fol-

firms that replied, six indicated a desire not to partici-

pate, and 72 completed the survey form (approximate-

explicit formula for connecting the NAL to capital

Given 1) the state of the expositions in the four

leading financial management texts listed in the pre-

ceding paragraph, 2) the potential deficiencies in the

lowing Singhvi [53]. The questions attempted to discover whether in 1982 changes had been made by practitioners relating to the three potential problems perceived by Anderson and Martin [1] and Olsen [46]: 1) the use of the cost of

capital instead of cost of debt in certain portions of the NAL analyses; 2) the failure to permit a positive NAL to salvage a project on a lease basis that was rejected on a purchase basis, if the NAL was greater than the absolute value of the negative NPV; and 3) the carrying out of the analysis as though the lease and purchase decisions were two investment alternatives (the capital

budgeting approach).

annual lease payments. Exhibit 1 summarizes the responses to that query. The first analytical question of the survey attempted

The first question on the survey sought to determine

the size of the firms in question and the amount of their

to determine whether companies would consider analyzing a project under lease when it was not economical on a purchase basis. The question was: In making leasing decisions, our company (Check

one) (a) Analyzes the potential of leasing an asset even if the purchase of the asset would not be consid-

ered profitable. (b) Analyzes a leasing alternative

only if the asset would have been

profitable on a purchase basis. The response to this question was overwhelmingly "b" (54 out of 72). Thus many decision-makers incorrectly omit lease analyses if projects have not already In making leasing decisions, our company (Check one) (a) Performs a net advantage to leas-

matter continued to be prevalent at least through 1982.

the capital budgeting approach or the NAL approach

The next question attempted to determine whether

.500-.999

1.0-3.0

over \$3.00

Exhibit 1. Annual Lease Payment

.\$100-.499

was taken. The question was:

ing (NAL) analysis. (b) Finds the net present value of the project under both leasing and purchase alternatives and then selects the one with the higher net present value. (c) Other. Please explain.

Generally the answer was "a" (or "c," where the provided explanations were really equivalent to the NAL; most often if "c" were answered the implicit interest cost was found in IRR fashion). Thus it appears that Olsen's concern is unfounded, at least in 1982, that practitioners are biased toward analyzing leases as investments. Instead, many practitioners appear quite up-to-date in that they view leasing as a pure financing decision.

If NAL were used, was the cost of debt or the cost of capital being employed? Thus the questionnaire read: The discount rate used in our net advantage to leasing analysis is (excluding the one used for salvage value) (Check one)

| (a) The after-tax weighted average |
|--|
| cost of capital |
| (b) The after-tax cost of debt |
| (c) The before-tax cost of debt |
| (d) Other. Please explain. |

(This question was only to be answered by the firms that indicated they performed a NAL).

In general the cost of debt was used instead of the cost of capital. Of the 22 respondents who indicated they used NAL and answered this question only 4

answered weighted average cost of capital and one

the use of the cost of debt. Many of the respondents reworked our questions

and gave detailed explanations of their procedures that indicated they understood very well indeed how to go about a correct (simplified) NAL analysis, i.e., use the

answered "a range of rates." The other 17 indicated

after-tax cost of debt and omit the interest tax shield from the cash-flows. The survey's final question, "Please discuss any

other considerations in your leasing decision," provided responses of possible general interest. Among those other considerations were: the investment tax

credit; the duration of the lease; treatment of the salvage value; inflation; technological forecasting; and the rate of obsolescense. Those items were offered by the respondents without further comment or explana-

Conclusion The 1982 survey revealed that many practitioners

appear to have switched from favoring the cost of capital to favoring the cost of debt in NAL analyses. This switch appears to follow academic preference in cases where salvage value and differential operating costs are not significant issues. However, many practitioners still incorrectly believe that a lease analysis should be conducted if and only if a project has been approved on a purchase basis.

Perhaps further progress will be made in the future.

Other explorations and applications in lease versus buy

analysis will build upon already existing efforts on a) the determination of leasing rates in perfect capital markets by Miller and Upton [40], Upton [56], Brealey and Young [9], and Brennan and Kraus [10]; b) leveraged leasing by Athanasopoulos and Bacon [2], Perg [48], Dyl and Martin [17], Grimlund and Capettini [23], Capettini and Toole [12], Smith [54], and Wiar [58]; c) lease versus sell by Gaumnitz and Ford [21]; d) sale and leaseback by Kim, Lewellen, and McConnell [30]; e) the application of option pricing theory to lease valuation by McConnell and Schallheim [39], Copeland and Weston [14], and Lee, Martin, and Senchack

[31]; f) bargaining by parties in the lease by Hull [26]; g) perceptions of the leverage in lease commitments by investors by Long [36], Bowman [7], and Finnerty, Fitzsimmons, and Oliver [19]; and h) empirical studies of leasing costs incurred by firms by Sorensen and Johnson [55], Roberts and Gudikunst [49], Crawford, Harper, and McConnell [15], Osteryoung, McCarty, and Coats [47], and Johnson, Lease, McConnell, and Schallheim [29].

employed to "sell" their tax credits under the safe harbor liberalized leasing rule of Economic Recovery Tax Act (ERTA) of 1981 is presented in Willis [59]. We hope analysts will find that the future study of leasing analysis will yield useful additional insights into more general financial issues in the manner sug-

gested by Lewellen and Emery [34].

Finally, a discussion of the model that firms have

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