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Determinants of Corporate Leasing Policy

CLIFFORD W. SMITH, JR. and L. MACDONALD WAKEMAN*

ABSTRACT

The existing finance literature assumes the real operating cash flows from leasing or owning are invariant to the ownership of the asset and focuses on tax-related incentives for corporate leasing policy. Our analysis suggests that taxes are important in identifying potential lessees and lessors, but are less important in identifying the specific assets leased. We provide a unified analysis of the various incentives affecting the lease-versus-purchase decision. We then show how these incentives explain the use of contractual provisions such as maintenance clauses, deposits, options to purchase the asset, and metering.

WHEN A FIRM BUYS AN ASSET, it obtains both the right to the services of that asset over the period it is owned plus the right to sell the asset at any future date. With a lease, the firm acquires only the right to the asset's services for a period specified in the contract.

The existing finance literature analyzing corporate leasing policy concentrates on the tax-related incentives to lease or buy (e.g., see Miller and Upton [19], Myers et al. [21], Lewellen et al. [13], Franks and Hodges [11], and Brealey and Young [4]). We believe that taxes play an important role in explaining certain dimensions of leasing policy, for example, the choice between manufacturer and third-party leasing. However, taxes provide only a limited explanation of why specific assets are leased rather than owned, and for the choice of provisions in lease contracts.

In this paper, we want to accomplish two things: (1) to provide a unified analysis of the various incentives affecting the lease-versus-buy decision and (2) to employ that analysis to explain observed variation in corporate leasing policy. In deriving testable hypotheses about the characteristics of lessees, lessors, the assets leased, and provisions in lease contracts, we extend the standard lease-versus-buy analysis found in corporate finance textbooks (e.g., Brealey and Myers [5]).

I. Tax Determinants of the Lease-Versus-Buy Decision

A. An Irrelevance Proposition

In Table I, we categorize the different cash-flow implications of leasing and purchasing. If the asset is purchased, the inflows are cash flows from the asset's

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Table I

Comparison of the Present Values of the Component Cash Flows from
Purchasing an Asset with Those from Leasing the Asset

Description of Cash Flow	Asset Purchased	Asset Leased	
	Buyer/User (b) (1)	Owner/Lessor (o) (2)	User/Lessor (u) (3)
Nontax Cash Flows:^a			
Initial investment in the asset	$-INV_b^b$	$-INV_o^b$	
Lease payments		$+LEASE_o^c$	$-LEASE_u^c$
Salvage value of asset	$+SALV_b^{d,e}$	$+SALV_o^{d,e}$	
Maintenance expenses	$-MAINT_b^{d,f}$	$-MAINT_o^{d,f}$	$-MAINT_u^{d,f}$
Cash flow from asset's operation	$+CFLOW_b^d$		$+CFLOW_u^d$
Out-of-pocket contracting costs	$-COSTS_b^g$	$-COSTS_o^g$	$-COSTS_u^g$
Tax-Related Cash Flows:^{a,h}			
Investment tax credit	$+ITC_b$	$+ITC_o^i$	$+ITC_u^i$
Depreciation tax shield generated by asset	$+\tau_b(DEP_b)$	$+\tau_o(DEP_o)$	
Tax implications of lease payments		$-\tau_o(LEASE_o)$	$+\tau_u(LEASE_u)$
Tax on capital gains from disposal of asset	$-\tau_b(GAIN_b)$	$-\tau_o(GAIN_o)$	
Tax shield from maintenance	$+\tau_b(MAINT_b)$	$+\tau_o(MAINT_o)$	$+\tau_u(MAINT_u)$
Tax on cash flow from operations	$-\tau_b(CFLOW_b)$		$-\tau_u(CFLOW_u)$
Additional debt interest tax shield generated by asset	$+\tau_b(DEBT_b)^j$	$+\tau_o(DEBT_o)^j$	$+\tau_u(DEBT_u)^j$

^a The entries in the table represent the present values of the cash flows associated with each component. Thus $\tau_b(DEP_b)$ is the present value of the tax shield provided to the buyer by depreciation over the asset's life.

^b In a competitive market, $INV_b - INV_o$ (see Section II.B).

^c If the lessor has market power, $LEASE_u$ may differ across different lessees (see Section II.B).

^d If the value of the asset is sensitive to use or maintenance decisions, then $SALV_b > SALV_o$, $MAINT_b \neq MAINT_o + MAINT_u$, and $CFLOW_b \neq CFLOW_u$ (see Section II.A).

^e If the lessor has a comparative advantage in asset disposal, $SALV_b < SALV_o$ (see Section II.B).

^f Maintenance can be provided by the lessor as part of the contract (with a correspondingly higher lease rate) or by the lessee.

^g For firm-specific assets or assets with short expected periods of use, $COSTS_b \neq COSTS_o + COSTS_u$ (see Section II.A).

^h We assume that tax rates remain constant over time and income. See Mayers/Smith [15] or Smith/Stulz [22] for an analysis of variation in tax rates.

ⁱ The lessor can either take the tax credit or pass it through to the lessee and charge a higher lease price (see Section I.B).

^j Incremental personal tax liabilities should be capitalized into the price of the debt when sold, and thus the net tax advantage of debt is related to the difference in effective marginal tax rates facing the corporation and the marginal individual in the bond market (see Miller [18] and DeAngelo/Masulis [8]).

operation ($CFLOW_b$) plus the asset's salvage value ($SALV_b$); the outflows are the initial investment (INV_b), maintenance expenditures ($MAINT_b$), out-of-pocket contracting costs ($COSTS_b$), plus incremental tax liabilities. When an asset is leased, the lessor (owner) receives the lease payments ($LEASE_o$) plus the asset's

salvage value ($SALV_o$). The lessee (user) receives the cash flows from the asset's operations ($CFLOW_u$) in return for the lease payments ($LEASE_u$). Each party also incurs specific tax liabilities, maintenance expenditures, and out-of-pocket contracting costs.

Three conditions must be met for an asset to be leased: (1) for a lessor to offer to lease an asset, the net present value of the leasing operation must be nonnegative (the sum of the present values listed in column 2 of Table I must be greater than or equal to zero); for the user to lease the asset, the net present value of leasing must be (2) nonnegative (the sum in column 3 must be greater than or equal to zero); and (3) no less than that of purchasing (i.e., the sum in column 3 must be at least as large as the sum in column 1).

Given competitive markets (from Table I, $INV_b = INV_o$), no taxes (components in the lower panel of Table I = 0), no out-of-pocket contracting costs ($COSTS = 0$), and fixed real activity choices [$-INV_b + SALV_b - MAINT_b + CFLOW_b = -INV_o + SALV_o - (MAINT_o + MAINT_u) + CFLOW_u$], then the distribution of net cash flows from the use of an asset is independent of the set of financial contracts specifying the allocation of rights to the asset. Under these assumptions, the firm will be indifferent between owning and leasing it. This is simply a special case of the Modigliani and Miller [20] theorem. Conversely, the decision between leasing and buying will not be irrelevant if the lessor has market power or if taxes, contracting costs or production/investment incentives, are affected by the choice between buying and leasing.

B. Effective Marginal Tax Rates

If the lessor and lessee face different effective marginal tax rates, leasing can reduce the total tax bill. The lower panel of Table I sets out the present values of the tax-related cash flows from leasing and purchasing. To concentrate on these tax-related cash flows, we assume that the sum of the nontax items for owning and leasing in Table I are equal, and that the debt capacity of the asset is independent of its ownership (i.e., $DEBT_b = DEBT_o + DEBT_u$). The difference in total taxes paid between purchase and lease is the difference between the sum of the items in column (1) and the sum of the items in columns (2) and (3): $(\tau_o - \tau_b)[(DEP + DEBT_o + MAINT) - (LEASE + GAIN)]$. Note that for a given potential user, the tax rate for the potential buyer/user (τ_b) is equal to the tax rate for the potential lessee/user (τ_u). If the lessor and lessee face the same effective marginal tax rates, then the total tax liability is independent of the ownership structure. There is then no tax advantage to leasing.

C. Manufacturer Versus Third-Party Leasing

For some assets, leases are offered both by manufacturers and by third-party lessors. We believe that provisions in the tax code are important in explaining this variation. The tax-code provisions affecting the choice between manufacturer and third-party lessors are: (1) the basis for calculating both the investment tax credit and depreciation for manufacturer lessors is manufacturing cost, C , while for third-party lessors it is the sale price of the asset, S ; and (2) for manufacturer

lessors, the manufacturing profit, $S - C$, need not be immediately recognized for tax purposes. Since neither provision always dominates, tax-related incentives can flavor either manufacturer or third-party lessors, and generally the decision is affected by all the parameters in column 2 of Table I.

D. Allocation of the Investment Tax Credit

As noted in Table I, if a firm buys an asset, it receives the investment tax credit, but if it leases the asset either the lessor or the lessee can take the investment tax credit. Thus, the option to allocate the investment tax credit to the higher valued party provides a tax advantage to leasing. For the lessor to be indifferent on an after-tax basis between keeping the investment tax credit and giving it to the lessee, the net present value of the lease payments for a lease in which the credit is passed to the lessee must exceed the net present value of the lease payments for a lease in which the lessor retains it by $ITC/(1 - \tau_o)$. This difference is a function both of the net present value of the investment tax credit and the lessor's tax bracket, τ_o . Similarly, for a lessee to be indifferent, the difference in the present value of the lease payments must equal $ITC/(1 - \tau_u)$. Thus allocating the investment tax credit to the party in the higher tax bracket lowers the total tax bill. Furthermore, since it only applies to a subset of all assets, the investment tax credit provides a partial explanation for which assets will be leased, i.e., assets which generate investment tax credits are more likely to be leased.

II. Nontax Determinants of the Lease-Versus-Buy Decision

Examination of the tax code reveals that there are identifiable tax-related incentives for leasing. Yet most of the incentives only identify potential lessors and lessees. There is little guidance to which assets will be leased. The primary provisions which differ across assets are depreciation and the investment tax credit. Yet we observe systematically different leasing decisions within the same firm for assets with the same tax treatment. For example, office buildings appear to be leased with greater frequency than research-and-development or manufacturing facilities. Taxes alone do not appear to explain these aspects of corporate leasing policy. We now turn to nontax incentives affecting leasing policy. Our objective is to provide a managerial analysis of the observed variation in leasing practices. Thus, our analysis is organized to emphasize observable asset and firm characteristics which are important to the lease-or-buy decision.

A. User Characteristics Affecting the Leasing Decision

We first examine incentives established through financial contracts, compensation contracts, and ownership structure. While these three nontax incentives are not asset specific, and thus cannot explain which of the firm's assets will be leased, they do help identify firms that have special incentives to lease or buy. We then examine three nontax incentives for corporate leasing policy which do vary across different assets and thus help identify which of the firm's assets will be leased.

Financial Incentives of Leases. Smith and Warner [22] identify sources of conflict of interest between corporations' fixed and residual claimholders. They argue that a long-term, noncancellable lease commits the firm to use a particular set of assets over the life of the lease and thus controls the asset-substitution problem. However, the senior legal standing of leases implies that their use reduces the coverage on other, already outstanding, fixed claims. This induces corporations to limit leasing activities through provisions in corporate bond contracts. Stulz and Johnson (25) argue that the option to enter long-term, noncancellable leases also affects these incentive problems. They suggest that this option controls the underinvestment problem by allowing the firm to acquire a new project and segregate the claim on the project's cash flows. Thus, some new positive net present value projects will be undertaken if the use of the assets is acquired through long-term leases or if the project is financed with secured debt, but not with unsecured debt where the project's payoffs would accrue as a windfall to owners of previously issued fixed claims.

While a long-term lease is similar to secured debt in a number of dimensions, it differs in others. If the value of a pledged asset in bankruptcy is less than the face value of the associated secured debt claim, the secured creditor also has an unsecured claim on the firm's other assets for the remainder. The lessor's claim on the firm's other assets is limited to one year's lease payments (see Brealey and Myers [5, p. 544]). In a lease, the lessor retains title to the asset, and the lessee uses the asset only as long as there is no default on the lease payments. Should the lessee default on the lease payment, it is simpler for a lessor to regain physical possession of a leased asset either prior to or after the declaration of bankruptcy than for a secured debtholder to acquire the pledged asset.

Compensation-Related Incentives to Lease. Management compensation plans can create incentives to lease. For example, a manager whose bonus depends on the return on invested capital will argue strongly to lease rather than purchase office space. With a purchase, the denominator of the performance measure increases, perhaps dramatically. This incentive can be controlled by including the capitalized value of lease payments in the calculation of invested capital. (See Smith and Watts [23] for more detailed discussions of incentive effects of compensation plans.)

Specialization in Risk-bearing. For certain production processes (generally small and noncomplex operations), the gains from specialization in risk-bearing and management associated with the corporate form of organization are less than the concomitant agency costs caused by the separation of ownership and control. In these circumstances, as Fama and Jensen [9] note, the individual proprietorship is a more efficient form of organization than the corporation. However, ownership of the capital assets makes it more difficult for the proprietor to reduce risk through diversification. The proprietor can mitigate this problem by leasing the assets required. Leasing thus reduces the concentration of wealth in the one activity, and can facilitate a more efficient allocation of riskbearing.

Sensitivity to Use and Maintenance Decisions. Generally, an asset's value is affected by its history of use and maintenance. If an asset is owned and used by the same agent, then use and maintenance incentives are internalized—there are direct private incentives to maximize value since the owner/user bears the full

cost of abuse. But a lessee does not have the right to an asset's residual value and hence has less incentive to care for the asset (see also Alchian/Demsetz [1]).

If the contractual provisions of a lease contract do not internalize effectively the incentive to provide maintenance, abuse of the asset by the lessee will be anticipated by the owner/lessor (in Table I, $SALV_b > SALV_o$) and reflected in the schedule of lease payments. That is, the lease payments must be set to offer the lessor a normal return given the expected salvage value which results from the forecasted use and maintenance decisions, conditional on the contractual provisions of the lease. Thus, the more sensitive the value of an asset to use and maintenance decisions, the higher the probability that the asset will be purchased rather than leased.

High forecasted abuse and the resulting high lease rates lead to the further problem of adverse selection by lessees. Specifically, if the lease payment is high relative to the purchase price, a lessee anticipating moderate use of the asset will tend to purchase the asset, and thus the fraction of lessees abusing the asset will increase. We therefore expect to observe a tendency to offer assets for lease whose value is less sensitive to abuse. For example, the furnishings in a rental unit are generally more durable than furnishings in an owner-occupied dwelling but rental units also make more extensive use of disposable cups, etc. In both cases, the forecasted value of the asset at the end of the lease is less sensitive to use decisions.

Within a corporation there is already a separation of the use rights to an asset from the claim to the asset's residual value. Thus, assets owned by corporations should be abused more and less well maintained than similar assets owned by individuals. However, we still expect a difference in use and maintenance decisions between leased and owned corporate assets because of the differential incentives of corporate managers to monitor the use and maintenance of the asset services acquired through lease versus purchase.

Firm-specific Assets. An asset highly specialized to a particular user is more highly valued by that organization than in its best alternative use. The lease of organization-specific assets generates agency costs in the form of significant additional negotiation, administration, and enforcement costs due to conflicts between lessor and lessee. These conflicts arise over the division of the value in excess of the alternative use value of the asset. Specifically, a bilateral monopoly is created between lessor and lessee when the lease on such an asset is negotiated (in Table I, $COSTS_b > COSTS_o + COSTS_u$). Klein et al. [12] note that this bilateral monopoly creates incentives to internalize these contracting problems by purchasing assets highly specialized to the firm. For example, we expect to observe corporations leasing office facilities with greater frequency than production or research facilities. Moreover, differential consequences of a production delay lead most newspaper publishers, but few book publishers, to own their presses.

Expected Period of Asset Use. The demand for firm-specific assets typically extends to most of the asset's useful life; however the demand for many general (nonfirm-specific) assets is relatively short. If the useful life of an asset is

significantly longer than the period over which a particular firm expects to use the asset, and the costs of ownership transfer are significant, then there can be advantages to leasing rather than buying the asset (in Table I, $COSTS_b > COSTS_o + COSTS_u$). Miller and Upton [19] note that search costs can be reduced by selling the asset with a repurchase agreement. Yet legal fees and taxes are frequently higher to transfer ownership rather than lease an asset. Enforcement costs differ as well. Failure to return a rented asset is a criminal offense, while failure to honor a repurchase agreement is a civil offense.

Flath [10] notes that short-term leases reduce expenditures on information about quality. For example, a lessee of an automobile is less concerned about the condition of the motor, transmission, or cooling system than a potential purchaser of the vehicle. (Note, however, that the greater the certainty regarding quality and the lower the costs of transferring ownership in an asset, the less significant is the frequency of such transactions. For example, repurchase agreements between banks for bonds are transacted daily and exist in competition with overnight loans from the federal funds market.)

B. Lessor Characteristics Affecting the Leasing Decisions

We next examine two additional nontax incentives for corporate leasing policy. Since these incentives vary both across potential lessors and across assets, they also help identify which assets will be leased.

Price Discrimination Opportunities. If a manufacturer has some degree of market power in the market for a specific asset, then becoming a lessor can provide additional opportunities to extract rents by circumventing those provisions of the Robinson-Patman Act which prohibit differential pricing of the same good (see also, Burstein [6] and Liebowitz [14]). Specifically, if purchasers have less elastic demands and lessees have more elastic demands, then the firm can increase profits by setting the implicit purchase price to the lessee below the explicit price to the purchaser (in Table 1, $INV_b > INV_o$). Note that if the demand elasticities are reversed, the manufacturer's ability to price-discriminate is reduced by potential third-party lessors. A second method of price discrimination entails charging different prices to different leasing customers whose demands are correlated with one or more of the characteristics of the lease (for example, the term of the lease, the provision of maintenance services, or the intensity of use of the asset). In such cases the manufacturer/lessor may be able to use these characteristics to segment the relevant market by demand elasticity and thus to increase profits. In each of these cases, the effectiveness of the resulting second degree price discrimination is limited by the availability of close substitutes. Note also that because of the required market power, this argument only applies to manufacturer lessors. There is no obvious way for third-party lessors to exclude potential competitors.

If a manufacturer has a monopoly and thus can control the total supply of a durable asset, his ability to extract price above a marginal cost can still be restricted by customers' expectations. If the monopolist can only sell the asset, he will produce as long as price exceeds marginal cost. But potential customers,

forecasting this behavior, have no incentive to pay more than marginal cost. Coase [7] argues that by leasing, the monopolist bears the cost of expanding the supply, and can thus more effectively exploit his monopoly position. Flath [10] argues similarly that leasing allows a manufacturer/lessor more effectively to bond quality.

Brealey and Myers [5] argue that if a manufacturer can affect the rate of technological obsolescence, that manufacturer has an incentive to offer to lease. By leasing some of its machines, the manufacturer signals to potential buyers that since it will suffer when obsolescent-leased equipment is returned, it has a reduced incentive to innovate quickly and thereby reduce the value of its current output. The value of this signal should be reflected in higher selling prices for the manufacturer's current generation of products. However, we doubt that this is an important incentive to lease because of both the value foregone by delaying innovation and the signal provided to potential competitors of the opportunities available to entrants.

Comparative Advantage in Disposing of the Asset. If the lessor has a comparative advantage in disposing of the asset, this provides an incentive to lease (in Table I, $SALV_o > SALV_b$). For example, Lewellen et al. [13] state: "The lessor may be more active or skillful in dealing in the associated second-hand asset market; his specialized knowledge may give him an edge." Three potential sources of this comparative advantage are: (1) the reduction in search, information, and transaction costs associated with the lessor's provision of a centralized marketplace for the asset (see Benston and Smith [3], p. 216); (2) the reduction in service costs from reusing components of previously leased machines in the repair and maintenance of current machines; and (3) the reduction in production costs from reusing components of previously leased machines in the manufacture of new machines. (Note that the tax code limits the fraction of used parts that can be used in this manner if the new machine is to qualify for the Investment Tax Credit.) Yet we believe that this comparative advantage of lessor over user is, by itself, insufficient to provide an incentive to lease. In order to favor leasing, the cost reduction must not be available to buyers on similar terms. But manufacturers who take used assets in trade, offer purchasers access to this comparative advantage, thus eliminating a differential advantage to leasing.

III. Provisions in Lease Contracts

A. Bonding Use and Maintenance

Deposits and Penalty Clauses. Deposits and penalty clauses are frequently employed in lease contracts. The primary role of these provisions is to bond the lessee to compensate the lessor if the leased asset is either not returned on time or returned in an abused condition. If it is relatively inexpensive to detect undermaintenance or abuse which affects the value of the leased asset, we expect to observe bonding provisions in lease contracts. Conversely, if it is relatively expensive to detect undermaintenance or abuse, increased use of alternative methods for controlling this agency problem should be observed. For a particular asset, the more expensive the control of this agency problem, the more likely is

the asset to be purchased. And if the asset is leased, the higher the fraction of the purchase price will be the lease rate (e.g., chain saw or ski rentals).

We do not expect the size of the deposit to be related to the market value of the asset, but rather to the forecasted distribution of damages to the asset over the period of the lease. If the damage can exceed this deposit amount, and if the lessor has no other recourse, the lease payment will implicitly include an insurance premium for a policy with a deductible equal to the amount of deposit.

Deposits appear to be used in conjunction with, rather than as alternatives to, penalty clauses in lease contracts. Deposits are, in fact, at one end of the spectrum of mechanisms that can bond the lessee to the liability established by a penalty clause. If it is relatively costly to obtain information about the lessee, and relatively expensive to enforce the penalty clause, we expect a bond to be posted when the asset is leased. Conversely, if it is relatively inexpensive to obtain information about the lessee and also relatively inexpensive to enforce the penalty clause, bonding through explicit deposits will be less frequently employed.

Restrictions on Subleasing and Use. A restriction on subleasing limits the ability of the lessee to transfer the right to use the asset to a third party. We expect to observe such restrictions in either of two situations: first, if the lessor has market power and uses leases to price-discriminate among customers; second, if the salvage value of the asset is sensitive to use and maintenance decisions, forecasted abuse differs among classes of potential lessees, and the characteristics of the actual lessee do not signal high abuse. Clauses can be included that limit the range of applications in which the asset can be employed. We expect to observe these restrictions when the salvage value of the asset depends on the activity in which the asset is used, and such differential use can either be monitored during the period of the lease or detected at its termination. These restrictions allow more effective bonding of a higher forecasted terminal value, resulting in a lower lease payment.

Service Versus Net Leases. In a net lease the lessee has the responsibility to maintain the asset. However, if the terminal value of an asset is affected by maintenance during the lease, the lessee has an incentive to undermaintain the asset. In a service lease, the lessor provides the maintenance. By bundling a maintenance contract and a lease contract, a service lease provides an effective bond that maintenance will be performed on an asset in a predictable manner. Thus, when an asset's value at the end of the lease is sensitive to maintenance decisions over the life of the lease, a service lease can reduce the costs of the conflict over maintenance policy. If deviations from an optimal maintenance program are easy to detect, other contractual provisions such as monitoring of user-provided maintenance and deposits can provide effective controls of the problem. But in the case of assets for which it is costly to monitor the provision of maintenance or costly to detect undermaintenance, service leases are especially valuable.

One cost associated with a service lease results from the fact that since maintenance expenditures are fixed in advance, the problem of asset abuse by the lessee is exacerbated. However, if the abuse is inexpensive to detect, service leases will be used which include penalty clauses controlling abuse.

If the lessor has a comparative advantage in disposing of the asset, then there

is an additional incentive to negotiate a service lease: it lowers the information costs to the secondary market. A related but different argument is that service leases are observed because the lessor has a comparative advantage in maintaining the asset. However, since a maintenance contract can be provided separately, we do not believe such a comparative advantage is sufficient to explain service leases. As long as the demands for the two components are perfectly complimentary, the lessor cannot increase profits by bundling (see McGee and Bassett [17]). However, a small potential benefit would exist if out-of-pocket contracting costs were lower for a service lease than a separate net lease and maintenance contract.

As noted in Table I, lessor and lessee tax liabilities are affected by the allocation of maintenance expenditures. Yet as long as nontax cash flows are equal, there is no advantage to the allocation of maintenance expenditures even if the lessor and lessee face different effective marginal tax rates. Shifting maintenance responsibility from lessee (net lease) to lessor (service lease) will be accompanied by an increase in the present value of lease payments by the expected maintenance expenses. Since lease payments and maintenance expenditures by the lessee receive the same tax treatment, there is no tax incentive in the allocation. Thus taxes cannot explain the choice between service and net leases.

B. Capital Versus Operating Leases

For accounting purposes the definitions of operating and capital leases are set out in paragraphs 6 and 7 of the Financial Accounting Standards Board Standard No. 13. "Accounting for Leases," November 1976. Since 1976, only operating leases are accounted for as true leases; capital leases must be capitalized into the lessor's and lessee's balance sheets. Since capital leases are accounted for as if they were sales, incentives associated with bond contracts and executive compensation contracts discussed in Section II. A. cannot explain the choice of capital leases.

While most leases are written to avoid the IRS "constructive sale" rule, certain leases have been structured to take advantage of this ruling. The removal of exchange controls by Britain in the early 1980's led to substantially increased lease activity by British banks to American companies. These leases are structured so that, under British tax law, the transaction is a lease and therefore the British bank can depreciate the asset, while under American tax law, the transaction is a constructive sale and therefore the American company can also depreciate the asset.

C. Metering and Tie-In Sales

Metering is a contractual provision that ties lease payments to some measure of the intensity of the asset's use. For example, automobile lease payments can be linked to elapsed mileage, computers to CPU cycles, copy machines to copies, and shopping center space to sales. A tie-in sale is the contractual requirement to use a specified nondurable input in the operation of the leased asset. For example, IBM required IBM cards to be used with IBM tabulating machines.

Metering and Price Discrimination. Burstein [6] argues that metering provi-

sions and tie-in sales in leases provide opportunities for price discrimination. If lessees with different use intensities also have different demand elasticities, metering allows the firm to extract more rents. For example, American Can Company only leased their can-closing machines and required lessees to use their tin cans. The Court ruled that this practice was an illegal tying arrangement, and that the refusal to sell their products precluded competition by third-party lessors.

Metering and Asset Abuse. If it is relatively inexpensive to measure the intensity of use of the asset, metering can be effective in controlling use intensity. Without metering, the lessor must forecast the intensity of asset usage and charge accordingly. This leads to moral hazard and adverse selection problems. With metering, the lessor need only set a schedule of lease payments as a function of measured usage. This should more closely approximate marginal cost pricing of the leased asset. Thus, in a net lease, metering links lease payments more closely to changes in terminal value.

If alternate supplier's inputs are of lower quality and impose more rapid depreciation on the leased machine, a tie-in sale can control asset abuse. Without the tied sale, the lessor would forecast use of the less expensive input, lower salvage value, and set a higher lease rate. In this case, the tie-in sale allows the lessee to bond input quality.

Metering and Bonding. We expect to observe greater use of metering in service leases than in net leases, because metering also links lease payments more closely to expected maintenance expenditures. (Note that metering provisions are frequently used in pure maintenance contracts offered by manufacturers.) Moreover, this payment structure in service leases also allows the lessor to bond his obligation to provide timely maintenance services. For example, the lease payment on a copier is a function of the number of copies made, and thus the lessor's revenue is automatically lower if the machine is inoperative. Thus, we expect to observe service leases with metering provisions for assets impounding new technologies, a case where this incentive is especially important because of significant user uncertainty as to whether or not the asset will function.

A related incentive for metering occurs if the lessor owns and maintains common property such as malls parking facilities in the case of a shopping center. In this case, metering allows the lessor to bond the quality of the common property. Shopping center leases typically specify lease payments as a function of total revenues. Thus the lessor's receipts are reduced if the quality of maintenance of the common property (e.g., snow and litter removal or lighting in parking areas) is reduced. Moreover, since the demands facing specific shops tend to be interrelated, lease payments dependent on total revenues provide the lessor/developer with stronger incentives to coordinate the range of shops over the life of a shopping center to maximize joint profitability.

Metering and Risk Reduction. Liebowitz [14] argues that metering and tie-in sales reduce the volatility of the lessee's net cash flows by charging more when asset use is high and less when it is low. This hedging explanation is more forceful when the lessee is an individual, a partnership or a small, closely held corporation. Also, concavities in the tax function imply that the after-tax value

of the firm is concave, and reduction in cash-flow volatility increases the expected after-tax value of the firm (see Smith/Stulz [24]). The hedging explanation seems more credible the higher the fraction of the lessee's total cash flows related to the use of the leased asset.

D. Options

Options to Extend and Options to Purchase. If the term of a noncancellable (financial) lease could be written to match the expected useful life of the asset, then the problem of undermaintenance and abuse would be largely controlled. While this approach has been disallowed by the Internal Revenue Service (which considers such a contract to be a "constructive sale"), we observe several provisions in leases which appear to be consistent with this principle. One approach is to set the term of the lease as long as possible under IRS guidelines (i.e., not exceeding 75 percent of the asset's estimated economic life).

A provision often observed in lease contracts specifies the conditions under which a lessee may either extend the life of the lease or purchase the leased assets. (McConnell and Schallheim [16] employ a compound option framework to value these options, treating the asset's expected rate of economic depreciation as an exogenous variable.) We expect these options to be used when the asset's terminal value is affected by use or maintenance decisions. Since the value of the option is a positive function of this terminal value, these options reduce the perverse use and maintenance incentives for the lessee.

Options to purchase or to extend the lease can also be effective in reducing the costs of the bilateral monopoly created by leases of firm-specific assets. If the lease contract contains options for the lessee to extend the lease or purchase the asset, then the lease payment for the initial lease period can be set high enough for the lessor to recover the extra investment required to "specialize" the leased asset, and the lessee is protected by being given an option to renew the lease, or purchase the asset, at a favorable price.

Cancellation and Noncancellation Clauses. A cancellation provision in a lease contract allows the lessee to terminate the contract prematurely. Examples of situations where the lessee might exercise the option are where the lessee's demand for the asset declines if the specific asset leased is below expected quality or if the leased asset becomes technologically obsolete. Therefore, the value of the cancellation option to the lessee is a positive function of uncertainty of the use-value of the asset. If the lessor has a comparative advantage in bearing these risks, we would expect contracts to include a cancellation option. Conditions under which this comparative advantage is likely to exist are: when demands for the asset are not perfectly positively correlated across lessees, where for a manufacturer lessor the leased assets impound new technology, or where the manufacturer lessor can affect the rate of technological change.

While the cancellation options focused on thus far are provided to the lessee, some lease contracts provide cancellation options to the lessor. One example is the lease of accommodations to "essential farm workers" throughout Europe. Contracts on these "tied cottages" often contain a clause which cancels the lease if labor is withheld.

If the cash flows from the use of a leased asset decline significantly over the life of the lease and the contract specifies level lease payments, we expect to observe a financial (noncancellable) lease. This provision precludes the lessee from cancelling the lease as soon as the asset's cash flow falls below the contracted lease payment. An alternative solution to this problem involves a schedule in which the lease payments decline over time.

Noncancellation clauses can also be an effective answer to abuse and under-maintenance problems. In this context, Brealey and Myers [4] note that most noncancellable leases are net leases. Our analysis suggests that noncancellation clauses will often be used in long-term net leases of assets where cash flows (and terminal values) are affected by use and maintenance decisions.

IV. Conclusions

The coexistence of both leased and purchased assets suggests that the net benefits of leasing are uniformly neither positive nor negative. The concentration of leases in certain industries and for certain assets implies that there are predictable cross-sectional differences in the net benefits of leasing. Yet most of the finance literature on leasing assumes that the real operating cash flows associated with leasing or owning are invariant to the financial contract chosen and focuses primarily on tax-related incentives to lease or buy. Our analysis suggests that taxes are important in determining the identity of lessor and lessee, but are less important in identifying specific assets to be leased. Finally, tax provisions offer little explanation for the choice of specific provisions in lease contracts such as metering, service provisions, or limitations on use.

We identify eight nontax incentives to lease or buy. Our analysis implies that leasing is more likely: (1) if the value of the asset is less sensitive to use and maintenance decisions; (2) if the asset is not specialized to the firm; (3) if the expected period of use is short relative to the useful life of the asset; (4) if corporate bond contracts contain specific financial policy covenants; (5) if management compensation contracts contain provisions specifying payoffs as a function of the return on invested capital; (6) if the firm is closely held so that risk reduction is important; (7) if the lessor has market power; and (8) if the lessor has a comparative advantage in asset disposal. We also show how these incentives explain the use of standard contractual provisions such as maintenance clauses, deposits, penalty clauses, restrictions on use, options to extend, and metering.

We believe that our analysis also helps explain the results of studies such as Ang/Peterson [2] which examine trade-offs between leasing and debt. They find that the use of leases and debt are complimentary: firms which issue more debt tend to engage in more leasing. This result should not be surprising. Although leasing and debt are substitutes for a given firm, looking across firms, characteristics of firms' investment opportunity sets which provide high debt capacity also tend to provide more profitable leasing opportunities. In order to measure the extent of substitutability between leases and debt, the differences in the characteristics of the specific assets used by different firms must be controlled.

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