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Automobile Leasing Versus Installment Loan Credit:
A Comparative Analysis

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The Shortino family of Lodi, New Jersey may never buy another car. Joe, a construction worker, and Johanna, a part-time clerk, decided three years ago to dump their aging Datsun and lease a new Cadillac Eldorado for \$550 a month. When their lease expires in May, the couple, who earn about \$40,000 a year, will likely turn in the Eldorado for a new Caddy. Daughter Samantha, meanwhile, recently graduated from college and leased a Geo Storm subcompact for \$240 a month. "We're pleased," says Johanna. "We'll probably lease more cars--mostly to save on the down payment." (Woodruff, 1994, p. 92)

I. INTRODUCTION

The Shortino family has done what many other consumers are doing--leasing an automobile. As a result, leasing is becoming an increasingly popular method of automobile financing. But why is leasing advantageous for the Shortino family? Johanna Shortino stated that the principle advantage of leasing was the savings on the down payment. While this may be true, there are also other factors to consider. For example, consider the contrast in the Shortinos' vehicles: an "aging" Datsun versus a new Cadillac. This shift is a significant trade upward among automobile classes and suggests another advantage to leasing: leasing can make expensive cars affordable. In addition, the Shortino's daughter, Samantha, a recent college graduate, chose to lease a new vehicle. Unquestionably, Samantha's choice came under circumstances different from those of her parents. Given the different circumstances, what influenced Samantha's decision to lease?

This paper aims to determine the factors--preferences and budget conditions--which may lead consumers such as the Shortino family to lease a vehicle as opposed to purchasing the vehicle on traditional installment loan credit. First, Section II provides background on leasing. Next, Section III develops the underlying theoretical framework of the paper, and Section IV presents predictions for situations in which leasing would be more advantageous

than purchasing. Section V then provides a sensitivity analysis of changes in variables which can influence the lease/purchase decision. Finally, the conclusion summarizes the findings.

II. BACKGROUND

James J. Larkin addresses automobile leasing in his book, Vehicle Leasing. Larkin defines leasing as "the renting of automotive equipment by a lessor, who owns the equipment, to a lessee, who uses it for a specified period of time, for a specified fee." (Larkin, 1985, p. 7) The lessor is usually a leasing company or an automobile dealership while the lessee may be either a firm or an individual. The vehicle may be leased for either business use or for personal use.

IIA. HISTORY OF LEASING

Is leasing a relatively new trend? Although recently the popularity of leasing has increased, there was activity as early as the 1920's in long-term leasing. (Larkin, 1985, p. 12) However, after WWII, the popularity of automotive equipment leasing increased dramatically. (Larkin, 1985, p. 12) At this time major players in leasing included fleet operators (those who required a number of vehicles for business purposes) ranging in size from very small to very large and located across the country in rural and urban areas alike. For the fleet operators, leasing was the best method for meeting the transportation needs of their respective operations. (Larkin, 1985, p. 44) In addition to fleet operators, traditional lessees have included doctors, lawyers, and small-business owners. These professional groups leased their vehicles because part of the cost was tax deductible and thus was

advantageous to purchasing a vehicle on installment loan credit.

Over time, typical lessees have changed from fleet operators fulfilling transportation needs in a cost-effective way, and professionals capitalizing on tax benefits, to consumers desiring practical transportation for themselves and their families. This recent trend in leasing is evidenced by data from the National Vehicle Leasing Association (NVLA) which indicate that between 1982 and 1987, private new car leasing volume accelerated at an average annual rate of 24 percent, reaching 750,000 leased vehicles in 1987. This is equivalent to seven percent of the retail new car sales market. (Nunnally, 1989, p. 383) It is predicted that by the end of the decade one-half of all cars and trucks will be leased. (Woodruff, 1994, p. 93) The leasing trend has been especially noteworthy in the luxury car segment. For example, nearly 90% of the Jaguar XJ models are leased. (Consumer Reports, 1993, p. 204) In Vehicle Leasing, Larkin commented on the leasing trend as follows: "Leasing of automotive equipment is not new, nor is it a 'gimmick' due to disappear from the automotive scene--it has become a recognized way of merchandising cars and trucks." (Larkin, 1985, p. 7)

IIB. TYPES OF LEASES & LEASE TERMINOLOGY

It is important to understand the different types of leases. There are two general categories of leases: financial leases and operating leases. Financial leases predominate in equipment leases for business use and have three principal characteristics: (1) the payments cover the entire cost of the leased equipment and are made on a long-term basis (greater than five years), (2) the lessee is usually responsible for taxes, insurance, and maintenance, and

(3) the lease cannot be cancelled without a substantial penalty. (Ross, 1995, p. L-4)

Consumer lease agreements are more typically operating leases. (Nunnally, 1989, p. 384) In contrast to long-term financial leases, operating leases are usually relatively short term (less than five years), and the payments made by the lessee usually do not cover the full cost of the leased asset. (Ross, 1995, p. L-3) That is, in an operating lease the lessee pays only for the depreciation of the asset, whereas in a financial lease the lessee pays the entire cost of the asset. In addition, an operating lease ordinarily requires the lessor to pay for maintenance of the asset, and the lessee has the option to terminate the lease prior to the expiration date. Upon cancellation, the lessee ceases payments and returns the equipment to the lessor without penalty. (Ross, 1995, p. L-3)

Typical automobile leases are hybrids of financial leases and operating leases. Like operating leases, automobile leases are usually short-term and the payments cover only the cost of depreciation. As in financial leases, though, maintenance is ordinarily the responsibility of the lessee. For an automobile, maintenance would include taxes, insurance, fuel, and routine up-keep such as oil changes. Moreover, as in financial leases, the lease can be terminated, but there usually is a substantial penalty. The characteristics of a typical automobile lease are summarized in Figure 1.

Figure 1.

Characteristics of an Automobile Lease

Term:	Short Term	(Operating Lease)
Payments:	Based on Depreciation	(Operating Lease)
Maintenance:	Lessee Assumes Maintenance Costs	(Financial Lease)
Cancellation:	Lease Can Be Cancelled, But Generally With Substantial Penalty	(Financial Lease)

Leases can be further divided into open-end leases and closed-end leases. In open-ended leases, the lease agreement contains an option that allows the lessee to purchase the asset at the end of the lease. (Nunnally, 1989, p. 384) Also, in the open-end lease when the automobile is returned to the lessor at lease maturity, the lessee may be required to make an end-of-contract payment. This payment is used as compensation to the lessor when the market value of the asset is below the estimated value reported in the lease contract. (Nunnally, 1989, p. 385) Thus, the lessee assumes the risk that the asset will not be worth the estimated residual value.

In a closed-end lease, on the other hand, at the end of the term the lessee returns the asset to the lessor without an end-of-contract payment. At the termination of the lease the lessee has no financial obligation to the lessor, provided the asset is returned undamaged and without excess wear. In the closed-end lease, the lessor assumes the risk that the returned asset is not worth the residual value estimated at the beginning of the lease. (Consumers' Research, 1987, p. 18) Often, even in closed-end leases, the lessor will offer to the lessee

the option to purchase the asset at the end of the lease although this option was not a component of the initial lease contract. Automobile leases are available in both open- and closed-end forms. For consumers, closed-end leases are desirable because the lessor assumes the risk that the vehicle will not be worth the predicted value at the end of the lease.

While there are different types of leases, the terminology used within the lease contracts is usually very similar and is described below. First is the vehicle's **capitalized cost**. The capitalized cost is the amount for which the dealer is "selling" the vehicle. (Levy, 1992, p. 35) This cost can be negotiated and should be equal to the price if the vehicle were to be purchased. Next is the vehicle's **residual value**, or the monetary value of the vehicle at the termination of the lease. (Levy, 1992, p. 35) The residual value is usually expressed as a percentage of the vehicle's original price. The residual value is a key element in the lease; it allows monthly lease payments to be less than monthly payments for a vehicle purchased on installment credit. (Levy, 1992, p. 35) An additional leasing term is the **capitalized cost reduction**, similar to a down payment. The capitalized cost reduction is a nonrefundable initial payment which lowers the capitalized cost. The interest rate considered in the lease is the **money factor**. It is equivalent to the finance charge on an installment loan. In addition, a **security deposit** is often required at the beginning of the lease. The security deposit is usually refundable and will be applied to any additional charges such as wear and tear which may accrue over the lease period.

III. THEORY

A consumer's decision to lease or purchase an automobile is derived from two

components: preferences and budget conditions. Each consumer has individual preferences. Due to these preferences, different individuals will make different choices even in the face of the same budget conditions. However, in decision-making, the budget constraint--or its determinants, income and relative prices--must also be considered. The same individual with the same preferences will make different choices if income and/or relative prices change. Section IIIA addresses preferences, regarding leasing and purchasing, that would lead some consumers to prefer one in lieu of the other. Subsequently, Section IIIB examines the relative prices of a leased car versus a purchased car. This section will illustrate how changes in relative prices can affect a consumer's decision to lease or purchase.

IIIA. PREFERENCES: Why do consumers do different things given the same budget?

A consumer's preferences are mostly intangible, and often there is no way to quantify them. However, there are characteristics of leasing which make some consumers prefer it. For example, with leasing it is often possible to obtain a more luxurious car. Thus, all other factors constant, a consumer with a greater preference for luxury would be more likely to lease. This preference is illustrated in the introduction as the Shortino family's situation is presented and leasing allows them to obtain a substantially more luxurious vehicle.

In addition, some consumers prefer to change vehicles quite frequently. Leasing can make this practice relatively easy. Leases typically have relatively short terms--ranging from 2 years to 5 years. At the end of the term, the consumer can return the vehicle with the freedom to obtain a different vehicle--either through lease or purchase. If the consumer had purchased the car, he would have been forced to find an outlet for his current automobile

before he could have obtained another. The ease of returning the leased vehicle illustrates another characteristic of leasing--convenience. The lessee is only required to return the car along with any required end-of-contract payments to the dealership at the end of the lease. Thus, for a consumer who prefers new vehicles on a frequent basis, all other variables constant, leasing would be advantageous.

It is also important to consider the consumer's liquidity preference. Liquidity preference refers to one's preference for cash outflows having the least adverse effect on the cash situation. (Isom, 1982, p. 155) Important considerations when evaluating liquidity are the amount of the down payment, the security deposit (if required), the amount of the monthly payment, and the length of the payments. Evaluating liquidity involves examining the present cash position and cash flow of the consumer--short term and long term, as well as the credit rating. In general, the down payment, the monthly payment, and the length of the payments are less in leasing as opposed to purchasing. For the purchaser, however, there is considerable residual value involved in the vehicle which, in effect, "ties up" assets. As a result, an individual with a high liquidity preference, all other variables constant, would benefit from leasing because: (1) the lower payments involve relatively lower cash outflows than loan purchase payments, and (2) the "tying up" of assets in the residual value of the vehicle is avoided. Thus, leasing a vehicle would have the least adverse effect on the cash situation. However, those with a high liquidity preference should also beware of leasing. Leasing customers build no equity and may be lured into owing monthly payments for life. (Woodruff, 1994, p. 93) An additional consideration for the liquidity preference is the security deposit which may be required. Even if the deposit is refundable at the termination

of the lease, the fee is nonetheless "tied up" until expiration.

While the above characteristics of leasing can make it favorable for some consumers, there are other characteristics of leasing which would make it less desirable. Thus, in some circumstances, purchasing a vehicle would be advantageous. For example, some individuals have a strong desire to be "owners." That is, they prefer to own as opposed to rent, and often they take great pride in and derive satisfaction from ownership. For a consumer with a strong desire to be an "owner," purchasing would be preferable. Secondly, some consumers want the finality associated with the last car payment. This is similar to ownership preference because at the final payment the consumer officially becomes the owner. However, in leasing, monthly payments end at termination of the lease, but the consumer is left without a vehicle. For those who have a strong desire for finality, all other variables held constant, purchasing an automobile would be the preferred option.

An additional variable is uncertainty. There may be varying degrees of uncertainty inherent in certain aspects of the lease alternative. For example, there are often stiff penalties for ending a lease early. If the lessee were forced to do so, the cost of leasing would increase. As a result, leasing would become relatively more expensive than purchasing. In addition, some uncertainty emerges in the lessee's place of residence. Some lessors place restrictions on their lessees. One such example is a dealership in California which requires all leased automobiles to remain within the state of California. As a result, lessees would not be permitted to take their vehicles out-of-state. Also, if the lessee were forced to relocate to a different state, termination of the lease would be required. If this termination occurred prior to the end of the lease, the lessee would also be subject to early termination fees which

would once again increase the relative price of leasing as discussed above. Consequently, for consumers who have a very low degree of certainty concerning their future situational needs, all other variables constant, purchasing a vehicle on installment loan credit would be advantageous to leasing.

IIIB. BUDGET: Why do consumers do different things given the same preferences?

The previous discussion involves the preferences of consumers and whether leasing or purchasing on installment loan credit is favored given those preferences. The following discussion will focus on relative prices. Relative prices can be evaluated using traditional consumer finance theory. The financial framework, drawn from the work of Bennie H. Nunnally, Jr. and D. Anthony Plath, considers the cash flows associated with the financing alternatives (leasing and purchasing), the period of time in which the cash flows occur, and the opportunity cost of capital. From these variables, the least costly alternative can be identified. In the analysis, it is assumed that preferences remain constant. It is also assumed that consumers possess enough income to purchase the given vehicle. If this is true, the consumer can weigh the relative cost of leasing the vehicle against the relative cost of purchasing the given vehicle.

As stated previously, consumers often choose leasing over the installment loan purchase alternative because of the lower down payment and lower monthly payment. This is reaffirmed by Johanna Shortino's testimony in the introduction. Mrs. Shortino chose leasing in part because of the smaller down payment required. Even when initial charges such as the security deposit are included, the up-front costs associated with leasing are usually less than

those incurred in an installment loan purchase. As a result of these lower costs, there is an initial cost savings associated with leasing. Secondly, since the monthly lease payments are usually less than monthly installment loan payments, there is also a periodic savings associated with leasing.

While there is an initial and periodic advantage to leasing, this is often diminished by differences in the lessee/purchaser wealth positions at the end of the lease. That is, installment loan purchasers acquire ownership of the vehicle following the final loan payment. The assets which are "tied up" in that vehicle are valuable. In contrast, lessees surrender the leased assets without compensation at the expiration of the lease contract and do not have a vehicle to represent the value of their payments. The value has been exhausted; the lessee paid to use the *service* of the vehicle. On the other hand, the purchaser's payments covered the cost of the vehicle with the *benefit* of the use of the vehicle.

Using financial analysis, it is possible to calculate the required rate of return necessary to transform the cash advantage, initial and periodic, realized from leasing into the market value of the purchaser's vehicle at the expiration of the lease. (Nunnally, 1989, p. 386) Nunnally and Plath call this required rate of return the "effective annual lease hurdle rate (K)." By investing the cash differential from leasing at a rate of return greater than the hurdle rate, the lessee can achieve total wealth equal to that of the purchaser at lease maturity. In essence, the hurdle rate is the opportunity cost of purchasing. If the return on investment is greater than the hurdle rate, the opportunity cost of leasing is less than that of purchasing. The greater the (positive) differential between the market rate of return and the hurdle rate, the greater the opportunity cost of purchasing. On the other hand, in choosing to

purchase, the consumer "gives up" any return on savings realized from leasing. The calculation of the hurdle rate requires: (1) a set of lease contract conditions, and (2) a set of installment loan conditions. It can be calculated as follows:

First, the initial cash outlay differential must be calculated. Let **C** be defined as the initial cost savings provided by leasing where **D** is the down payment in installment loan purchases, and **Z** is the capitalized cost reduction.

$$\mathbf{C = D - Z} \qquad \mathbf{Eq. 1}$$

Next, let P_t and L_t represent the periodic purchase and lease payments in period t , respectively. ("t" indicates the period, from 1 to "n".) M_t is defined as the periodic cash savings derived from leasing:

$$\mathbf{M_t = P_t - L_t} \qquad \mathbf{Eq. 2}$$

Finally, R_n signifies the net residual value of the leased vehicle at the expiration of the lease (minus the security deposit returned to the lessee in period n , where n is the number of payments). It is assumed that the residual value of the vehicle stated in the lease contract is the actual residual value at the end of the lease. The periodic lease hurdle rate, k , is calculated by solving Eq. 3 for k . The equation has three components.

$$\mathbf{R_n = C(1+k)^n + \sum_{t=1}^n M_t(1+k)^t} \qquad \mathbf{Eq. 3}$$

" k " is a monthly rate which can be expressed as an effective annual lease hurdle rate, K :

$$\mathbf{K = [1+k]^{12} - 1} \qquad \mathbf{Eq. 4}$$

An important assumption which must be made regarding the hurdle rate analysis is that the consumer can invest savings at some market interest rate. To control for volatility in

market interest rates, and thus rates of return over time, the market interest rate used to evaluate the lease hurdle rate should represent the *average* annual after-tax return that consumers expect to earn on invested cash over the life of the lease. (Nunnally, 1989, p. 390)

If this after-tax rate of return is greater than the hurdle rate, k , then leasing provides a greater total wealth. (Nunnally, 1989, p. 386) The lessee can invest the net cash differential realized from leasing at market interest rates, and this investment will grow over the term of the lease to exceed the expected value of the purchased asset. Hence, in this situation, one would expect a consumer to lease. However, if the hurdle rate exceeds this after-tax rate of return, the purchasing alternative is more favorable. Here, the future value of the invested net cash differential from leasing is less than the vehicle's market value at lease maturity. That is, the money would be more valuable if spent on the vehicle and later reflected in the vehicle's residual value than if invested at market interest rates. In this case, the wealth of the vehicle owner will exceed the value of the lessee's investment at the termination of the lease. (Nunnally, 1989, p. 387) As a result, in this instance it is expected that the consumer would purchase.

Consider the effect of the residual value, R_n , on the hurdle rate. A consumer who leases a vehicle pays only the depreciation--the difference between the capitalized cost and the residual value--plus an interest equivalent. As the residual value of the vehicle increases, the hurdle rate will also increase. Thus, the greater the percentage residual value of the vehicle, the greater is the consumer's financial incentive to purchase as opposed to lease. For a vehicle with a relatively high percentage residual value, it is expected that the consumer would purchase.

Also consider the consumer's automobile use patterns and their relationship to the hurdle rate analysis. Most lease agreements charge a fee for any mileage in excess of a given number, usually 15,000 miles per year. The charge ranges from \$.10 to \$.15 cents per mile. Therefore, for every 1,000 miles in excess of 15,000 miles, the cost of leasing can be increased by \$100-\$150. For high mileage drivers, the added cost can be considerable. An additional factor in automobile use patterns is the "wear and tear" on the automobile during the lease. Lessors often impose hefty charges for excess wear and tear. While lessors may require a deposit for excess wear and tear, the overall cost of wear and tear will not be determined until the lease expires. The final determination is subjective as it results from a lessor inspection. At the end of the lease, the lessee will be refunded the deposit, in total or in part, if resulting excess wear and tear is determined to be less than the value of the deposit. Alternatively, the lessee will face additional charges for wear and tear.

The effect of automobile use patterns can be integrated into the hurdle rate analysis by including variable F which represents any additional charges which may be due at the end of the lease. Components of F include excess wear and tear charges as well as excess mileage charges. The incorporation of F into the hurdle rate analysis alters Eq. 3 as shown below.

$$R_n = C(1+k)^n + \sum_{t=1}^n M_t(1+k)^t - F \quad \text{Eq. 3a}$$

As F increases, either by excess mileage accumulation or excess wear and tear charges, the hurdle rate will also increase. As a result, for the lessee's total wealth position to be equal to that of the purchaser, he must achieve a higher rate of return on the invested cash differential.

Additional factors such as income, market interest rates, tax laws, and consumer

information may have also contributed to the trend in leasing. One factor which can be evaluated within the hurdle rate analysis is the change in tax laws. In the past, a major benefit of purchasing on installment loan credit was the tax deduction for interest. The Tax Reform Act of 1987 (TRA) phased out the personal interest deduction for vehicle installment purchases. (Nunnally, 1989, p. 384) In 1987, 65 percent of the interest was tax deductible, forty percent in 1988, twenty percent in 1989, ten percent in 1990, and none thereafter. (Nunnally, 1989, p. 384) The change in tax laws caused the alternative methods of financing automobiles, including leasing, to be relatively less expensive for consumers.

The hurdle rate analysis can be adapted to consider the tax deductibility of interest payments. Let I_t represent the periodic portion of the loan payment devoted to interest. The percentage of tax deductible interest is denoted as Y , while Z represents the consumer's marginal tax rate. Accounting for the tax deductibility of installment loan interest changes Eq. 2 as follows:

$$M_t = [P_t - (I_t)(Y)(Z)] - L_t \qquad \text{Eq. 2a}$$

It is predicted that as the percentage of interest that is tax deductible decreases the hurdle rate will also decrease. As a result, the required rate of return that the lessee must obtain to achieve wealth equal to that of the purchaser at the end of the lease also decreases. Thus, as the tax deductibility of interest was phased out, it is likely that more consumers would choose to lease.

IV. PREDICTIONS OF MODEL

The theory outlined above suggests that the increased popularity of leasing may be

attributed to changes in consumer preferences or relative prices. Section IIIA presents consumer preferences which affect the lease/purchase decision. Individual preferences explain why certain individuals lease while others purchase. In general, though, the trend in leasing is more likely to have resulted from changes in budget conditions as presented in Section IIIB. The following predictions are derived from the discussion concerning budget conditions.

- 1a. A direct relationship exists between the residual value of the vehicle and the hurdle rate.
- 1b. Given a percentage residual value, the hurdle rate for a luxury car will be less than the hurdle rate for an "average" car.
2. A direct relationship exists between excess mileage and the hurdle rate.
3. A direct relationship exists between excess wear and tear charges and the hurdle rate.
4. A direct relationship exists between the percentage tax deductibility of installment loan payments and the hurdle rate.

Section V presents a sensitivity analysis to evaluate the predictions listed above. The data for the hurdle rate analysis include a set of lease contract conditions and a set of installment loan conditions for two different vehicles. Two vehicles were evaluated to demonstrate that effects may be different for "average" and luxury vehicles. Data for the first vehicle, an unnamed GM product (purchase price-\$12,000), is obtained from, "Leasing and Borrowing: Evaluating Alternative Forms of Consumer Credit," The Journal of Consumer Finance. Data for the second vehicle, an Acura NSX-T (purchase price-\$74,723.43), is obtained from, "Lease Your Dream," Automobile. The unnamed GM vehicle was chosen to represent an "average" vehicle. The Acura NSX-T was chosen to represent a

luxury vehicle.

The sensitivity analysis was conducted for each prediction. Analyses were run both for the “average” vehicle and for the luxury vehicle. In evaluating Prediction 2, the total excess mileage charge is calculated using a rate of \$.15 per mile. This rate was used because of its acceptance in the automobile leasing industry. In evaluating Prediction 4, .28 was used as the marginal tax rate. This rate was used because it is a typical rate that is characteristic of a substantial portion of the population.

V. SENSITIVITY ANALYSIS

The sensitivity analysis of Prediction 1a. is presented in Figure 2.

Figure 2.

Sensitivity of the Lease Hurdle Rate, K, to Changes in Vehicle Residual Value

Residual Value as a Percentage of Initial Cost	Lease Hurdle Rate (%)	
	GM	Acura
10%	-32.41	-82.99
20%	-13.33	-55.65
30%	.89	-36.45
40%	11.12	-21.68
50%	19.28	-9.53
60%	26.12	.88
70%	32.06	10.05
80%	37.33	18.28
90%	42.09	25.77

The analysis was performed for residual values as a percentage of initial vehicle cost ranging from 10% to 90% in increments of 10%. Separate analyses were conducted for the "average" vehicle and the luxury vehicle. The results are as expected: as the percentage residual value increases, the hurdle rate also increases. As expected, negative values appear, and in these instances leasing is significantly less expensive than purchasing. In fact, even if the lessor does not invest the cash differential, he will still achieve total wealth equal to that of the purchaser upon termination of the lease. For the GM vehicle, the hurdle rate increased from -32.41 to 42.09%. For the Acura, the hurdle rate increased from -82.99% to 25.77%. In this instance, the differential is greater for the Acura. This is due to the fact that a 10% increase in the residual value of the Acura is much greater than that of the GM. As a result, the Acura hurdle rate increases more dramatically than the GM hurdle rate.

In addition, Prediction 1b. can be analyzed by choosing a percentage residual value and then comparing the resulting hurdle rates for the GM and the Acura. As can be seen in Figure 2, at every percentage residual value the hurdle rate is less for the Acura than the GM. For example, at a residual value of 60%, the hurdle rate for the GM vehicle is 26.12% while the hurdle rate for the Acura is 0.88%. Concerning the GM vehicle, one would expect the consumer to purchase because it would be difficult to obtain a 26.12% rate of return on his investment. On the other hand, in considering the Acura, one would expect the consumer to lease because it would be relatively easy to obtain a 0.88% rate of return on his investment. This confirms that leasing is relatively less expensive for luxury cars and explains its prevalence in the luxury car market.

The results for the analysis of Prediction 2 are presented in Figure 3.

Figure 3.

Sensitivity of the Lease Hurdle Rate, K, to Changes in Excess Mileage

Excess Mileage (Miles)	Charge (\$)	Lease Hurdle Rate (%)	
		GM	Acura
0	\$0	11.75	1.38
1000	\$150	12.85	1.58
3000	\$450	14.95	1.97
5000	\$750	16.95	2.35
10000	\$1500	21.59	3.31

The results are as predicted: as excess mileage charges increase, the hurdle rate increases. For the GM vehicle, as excess mileage increases from 0 to 10,000 miles, the lease hurdle rate increases from 11.75% to 21.59%. For the Acura, the hurdle rate increases from 1.38% to 3.31%. The differential in the hurdle rate (9.84 percentage points) for the GM vehicle is much greater than the differential for the Acura (1.93 percentage points). This differential is the result of the variance in the residual value of each vehicle. A \$2,000 charge on the GM vehicle which has a residual value of \$4,659 is much more substantial than the same charge on the Acura with a residual value of \$44,048.75. For both vehicles, as excess mileage increases, leasing becomes relatively more expensive. Thus, a consumer who expects to accumulate many excess miles would probably purchase instead of lease. However, this effect is more dramatic for the "average" GM vehicle than for the luxury Acura. As a result, excess mileage considerations are probably a more important factor for those who lease "average" vehicles as opposed to luxury vehicles.

The results for the analysis of Prediction 3 are presented in Figure 4.

Figure 4.

Sensitivity of the Lease Hurdle Rate (K) to Excess Wear and Tear Charges

Excess Wear & Tear Charge	Lease Hurdle Rate (%)	
	GM	Acura
\$0	11.75	1.38
\$500	15.29	2.03
\$1000	18.55	2.67
\$1500	21.59	3.31
\$2000	24.40	3.94

The results are as predicted. That is, as excess wear and tear charges increase, the hurdle rate increases. For the GM vehicle, as excess wear and tear charges increase from \$0 to \$2000, the lease hurdle rate increases from 11.75% to 24.42%. For the Acura, the lease hurdle rate increases from 1.38% to 3.94%. As in the analysis of Prediction 2, the differential in the lease hurdle rate (12.67 percentage points for the GM vehicle and 2.56 for the Acura) can be explained by the amount of the charge relative to the residual value of the vehicle. As a result of excess wear and tear, leasing becomes relatively more expensive. The effect of excess wear and tear charges is similar to that of excess mileage charges. The expectation of high excess wear and tear charges would probably cause a consumer to purchase. It is also likely that excess mileage charges are a more important consideration for those leasing "average" vehicles as opposed to luxury vehicles.

The results of the analysis for Prediction 4 are presented in Figure 5.

Figure 5.

**Sensitivity of the Lease Hurdle Rate, K,
To Changes in the Tax Deductibility of Interest**

Percentage Tax Deductibility of Installment Loan Interest	Lease Hurdle Rate(%)	
	GM	Acura
100%	18.52	5.67
65%	16.67	4.49
40%	15.36	3.65
20%	14.31	2.98
10%	13.78	2.65
0%	11.75	1.38

Analyses were conducted for percentage tax deductibility beginning with 100%. The percentages used were chosen to show the possible effect of the Tax Reform Act of 1987 on the trend in leasing. The results are as expected: as the percentage deductibility decreases, the hurdle rate decreases. This is because the tax deduction of interest makes loan payments relatively lower. Thus, the incremental savings from leasing is less, so the lower differential must be invested at a higher rate of return to equal the total wealth of the purchaser upon maturity of the lease. When interest on installment loan payments is tax deductible, it is more likely that the consumer will purchase. This analysis also suggests that the Tax Reform Act of 1987 may have perpetuated the trend in leasing. As can be seen in Figure 5, the effect is more dramatic for the "average" vehicle as opposed to the luxury vehicle.

VI. CONCLUSION & FURTHER RESEARCH

This paper has argued that the decision to lease or buy is a result of consumer

preferences and relative prices. With regard to preferences, in general, all other variables constant, a consumer would benefit from leasing if he has a high affinity for luxury/relatively expensive vehicles, he has a high rate of turnover in vehicles, and/or he has a high liquidity preference. In contrast, all other variables held constant, a consumer would benefit from purchasing if he has a high preference for "owning" a vehicle, he desires the finality of the last payment, he has a high degree of uncertainty regarding his short-term situation, or he is highly risk averse as to the vehicle being damaged or stolen. The effect of preferences on the lease/purchase decision is summarized in Figure 6.

Figure 6.

The Effect of Preferences on the Lease or Purchase Decision

All other variables constant, a consumer should consider leasing if he or she has...

- a high affinity for luxury or relatively expensive vehicles
- a high rate of turnover in vehicles
- a high liquidity preference

All other variables constant, a consumer should consider purchasing on installment loan credit if he or she has...

- a high preference for "owning" a vehicle
 - a high desire for the finality of the last loan payment
 - a high degree of uncertainty regarding his short-term situation
-

With regard to prices, several variables can influence a consumer's decision to buy or lease a vehicle. Leasing luxury vehicles is often relatively less expensive than leasing an "average" vehicle or purchasing the luxury vehicle. Excess mileage charges and excess wear and tear charges increase the relative cost of leasing. This effect is more dramatic for

"average" vehicles as opposed to luxury vehicles. Finally, the tax deductibility of interest on installment loan payments made leasing relatively less expensive. This suggests that the Tax Reform Act of 1987 has likely contributed to the trend in leasing. Any future tax policies concerning the deductibility of interest on installment loan credit could also affect the trend. In the future, data permitting, it would be interesting to determine if this is true.

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