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# Why companies choose to lease instead of buy? Insights from academic literature

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## Abstract

**Purpose** – The purpose of this paper is to review empirical research on the determinants of leasing.  
**Design/methodology/approach** – The paper reviews previous literature that has focused on studying the determinants of leasing decisions. It also discusses the determinants of the lease-buy decision and the determinants of the choice between finance leases and operating leases.

**Findings** – Previous empirical studies show that there is no consensus as to whether debt and leases are complements or substitutes. However, there are some factors that affect the choice between leases and debt, such as size, taxes, nature of assets, financial constraints and management compensation. Leases tend to be more prevalent in some industries (such as air transport, retailing and services and utilities) than in others, and companies tend to lease assets that are less specific, of general usage and more liquid. Previous studies also show that higher leverage companies tend to use leases rather than other forms of financing.

**Research limitations/implications** – The paper only addresses the determinants of leasing. Previous studies about leases address other areas such as the lease accounting standards and the economic consequences and valuation of leases, which are not discussed in this paper.

**Originality/value** – The paper presents an exhaustive review of previous literature on the determinants of leasing. Evidence from research on this topic is likely to be helpful in capital market investment decisions, accounting standard setting and decisions on corporate financial disclosure.

**Keywords** Determinants, Debt, Finance leases, Leasing, Operating leases

**Paper type** Literature review

## 1. Introduction

In July 2006 and as part of the 2006 Memorandum of Understanding, the International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) began a project to develop a new approach to lease accounting. In March 2009, the IASB and FASB published a discussion paper (International Accounting Standards Board (IASB), 2009) and, in August 2010, an Exposure Draft (ED) that summarised the proposed approach to a new lease accounting standard. More precisely, the IASB decided that, in future, lessees will have to recognise an asset representing his right to use the leased item for the lease term and a liability for his obligation to pay rentals. Thus, the planned revision of the standard will abolish the distinction between finance and operating leases. The IASB and FASB announced their decision to issue a second ED in the second quarter of 2013.

Many companies use leases to finance their activities. Although the volume of leases slowed in 2008, European leasing was still responsible for financing, on average,



approximately 28 per cent of European investment, excluding real estate (Leaseurope). However, the objective of companies when they decide to lease may not be the same as their objective when they decide to buy. To require a similar accounting procedure for buying and leasing may lead to the unfaithful presentation of financial position and performance in the financial statements. In fact, one of the arguments against the new approach presented in the 302 comment letters received by IASB during the comment period of the first ED is that the financial statements will not accurately reflect how management runs a business, given that the companies may opt for leases as they want to benefit from a degree of flexibility without bearing the risks related to the asset or because they may want to manage their exposure to residual value risk. For several authors such as Grenadier (1995, 1996), leases are transactions that contain an embedded option allowing greater flexibility for the lessee.

Empirical research on the determinants of leases has focused on two interrelated issues: the determinants of buying vs leasing and the determinants of operating and finance leases. I will describe how research in these two areas has evolved and discuss the main results. Evidence from research on these topics is likely to be helpful in capital markets investment decisions, accounting standard setting and decisions on corporate financial disclosure.

The paper is structured as follows. Section 2 describes the empirical research on the determinants of leases and Section 3 provides the main conclusions.

## 2. Determinants of leasing

Previous literature has focused on studying the determinants of leasing decisions, on the whole, using two different approaches: first, the determinants of the lease-buy decision; second, the determinants of the finance leases vs operating leases choice.

### 2.1 *Determinants of buying vs leasing*

There is a large body of empirical literature investigating the determinants of the lease-buy decision. Many authors examined how leases are used as an alternative form of financing (Bayliss and Diltz, 1986; Beattie *et al.*, 2000; Lasfer and Levis, 1998; Marston and Harris, 1988; Mukherjee, 1991; Myers *et al.*, 1976; Yan, 2006). However, the overall empirical evidence is mixed, since some authors (Adams and Hardwick, 1998; Ang and Peterson, 1984; Bathala and Mukherjee, 1995; Krishnan and Moyer, 1994; Lewis and Schallheim, 1992) found that leases are a complement, not a substitute, to debt financing. Therefore, the true nature of the relationship between debt and leases remains an empirical issue and the “leasing puzzle” defined by Ang and Peterson (1984) has not yet been solved.

(i) *Leases as substitute for debt financing.* Myers *et al.* (1976) developed a theoretical lease-buy decision model and defined the debt-to-lease displacement ratio ( $\lambda$ ) that represents the substitution between debt and leases. For Myers *et al.* (1976),  $\lambda$  ranges between 0 and 1 (lease as a substitute to debt); however, they did not consider the possibility that  $\lambda$  could be  $< 0$  (lease as a complement of debt). The most frequently advanced view is that leases and debt are perfect substitutes ( $\lambda = 1$ ). That is, an increase in leasing activity reduces borrowing on a same amount.

Other papers (Beattie *et al.*, 2000; Marston and Harris, 1988; Yan, 2006) proposed that although there is a substitution effect, its magnitude is less than a full trade-off because some risk-sharing occurs between the lessee and the lessor ( $\lambda$  between 0 and 1).

Marston and Harris (1988) used financial statement data and OLS regression approach to examine the changes in debt and lease obligations (finance and operating leases).

They found that the estimated coefficient of substitution between leases and debt was significantly positive and between 0 and 1, showing that companies reduced non-lease debt when leases increased, but did so on a less than dollar-for-dollar basis. Beattie *et al.* (2000) investigated the degree of substitutability between lease and non-lease debt financing using comprehensive measures of leases (finance and operating lease) and debt. To estimate total operating lease liabilities, they used the method of “constructive capitalisation” suggested by Imhoff *et al.* (1991). They found that lease and debt are partial substitutes, consistent with the argument that lessors bear some risks which are not inherent in debt contracts.

The results found by Yan (2006) and Deloof *et al.* (2007) yielded evidence that leases and debt substitute each other empirically rather than act as complements. Yan (2006) took the cost of debt into consideration and interpreted rising interest rates paid on outstanding debt with rising leases as evidence of the substitution-theory and argued that this interpretation is in line with the trade-off theory of capital structure. He found that the degree of substitutability is greater for companies that pay no dividends (more asymmetric information), companies that have more investment opportunities (higher agency costs from underinvestment), or companies with higher marginal tax rates (transferring tax shields is less valuable).

Deloof *et al.* (2007) investigated the lease-debt relationship for Belgian small and medium-sized companies and their results provided support for the substitution hypothesis. However, some of these studies (Bayliss and Diltz, 1986; Beattie *et al.*, 2000; Marston and Harris, 1988; Yan, 2006) are subject to the difficulty of controlling for different asset bases related to leases in cross-sectional tests.

Finally, Klein *et al.* (1978) argued that leased assets are riskier than other assets, exposing the lessee to additional liquidity and bankruptcy costs and causing the value of the debt-to-lease displacement ratio to exceed one.

(ii) *Leases as a complement to debt financing.* Although the above studies proved that leases may serve as a substitute for debt financing, the overall empirical evidence is mixed, given that some authors (Adams and Hardwick, 1998; Ang and Peterson, 1984; Bathala and Mukherjee, 1995; Branson, 1995; Finucane, 1988; Kang and Long, 2001; Krishnan and Moyer, 1994; Lewis and Schallheim, 1992) found that leases are a complement to and not a substitute for debt ( $\lambda < 0$ ).

Using Standard & Poor's Compustat data on approximately 600 US companies and several different econometric models, Ang and Peterson (1984) demonstrated a positive correlation between leases and debt that led them to conclude that debt and leases appear to be complements, i.e. greater debt is associated with greater leases, even after controlling for the differences in debt capacity. The data used included companies from a number of industries, obviously, with different debt capacities. The addition of the non-debt explanatory variables may not adequately control for diverse debt capacities, which may explain the complementary relation between debt and leases. A second criticism is that Ang and Peterson (1984) failed to include operating leases, focusing exclusively on finance leases. Graham *et al.* (1998) indicated that this may be a serious omission.

A major critique that can be attributed to these studies is that only a cross-sectional relation was tested. Thus, the findings are consistent with the result that companies with high external financing requirements use debt and leases indifferently and it is not possible to reject the hypothesis that debt and leases are substitutes.

The study by Ang and Peterson (1984) was updated by Branson (1995) using Compustat data and reached the same conclusion. Other studies also reached the same conclusion: Finucane (1988) found that leases are positively related to the company's

debt ratio, number of bond issues and bond rating, although he also found that leases are negatively related to the company's ratio of subordinated debt to assets; Kang and Long (2001) found that companies with high levels of regular debt also have higher levels of leases; Mehran *et al.* (1999) found that the Tobit model estimation suggested that debt and finance leases are complementary, but they did not find evidence of a significant interaction between debt and operating leases.

Lewis and Schallheim (1992) framed the lease choice within the optimal capital structure choice. They showed that lease can actually increase a company's debt capacity by selling excess non-debt tax deductions, and that leases and debt can be complementary within an optimal capital structure. Eisfeldt and Rampini (2008) presented another justification for increased debt capacity due to lease. They argued that leases provide the lessors with a benefit that consists in the ability to repossess the leased assets. They concluded that it is easier for a lessor to acquire a leased asset than it is to assure the collateral of a secured loan. This means that leases proportionate higher debt capacity than secured lending. However, leases can give rise to agency costs because of the separation of ownership and control of the leased assets. For these reasons, they concluded that leases tend to be more frequently used by companies that are more financially constrained.

Lasfer and Levis (1998), based on a large number of British companies, classified by size, concluded that leases and debt are complements for large companies. Tsay (2003) investigated how the tax liability and the residual value risk affect the lease-buy decision. He found that when there is a negative correlation between earnings and residual value, companies should buy the assets instead of leasing them. On the other hand, if the correlation between earnings and residual value is positive, companies should lease and, in this case, debt complements lease.

Despite all these studies, the available databases and the various models used in the studies are not comparable, therefore, the substitute/complement of leases vs debt controversy continues and it is a relevant area for investigation (Table I).

## 2.2 Determinants of leases

One area that has been researched intensively relates to the determinants of leasing. Previous research has investigated the determinants of finance leases (Ang and Peterson, 1984; Deloof and Verschueren, 1999; Lasfer and Levis, 1998) or the determinants of operating leases (Duke *et al.*, 2002; Graham *et al.*, 1998; Sharpe and Nguyen, 1995) separately. Other studies did not distinguish between operating and finance leases (Adams and Hardwick, 1998; Graham *et al.*, 1998; Mehran *et al.*, 1999). However, the determinants may not be the same for operating and finance leases, because the accounting treatment of each type of lease is different.

Lease vs debt	Debt-to-lease displacement ratio	Studies
Leasing as a substitute for debt financing	$0 < \lambda < 1$ $\lambda > 1$	Marston and Harris (1988), Beattie <i>et al.</i> (2000), Yan (2006), Deloof <i>et al.</i> (2007) Klein <i>et al.</i> (1978), Bayliss and Diltz (1986)
Leasing as a complement of debt financing	$\lambda < 0$	Ang and Peterson (1984), Finucane (1988), Lewis and Schallheim (1992), Branson (1995), Lasfer and Levis (1998), Mehran <i>et al.</i> (1999), Kang and Long (2001), Tsay (2003), Eisfeldt and Rampini (2008)

**Table I.**  
Summary of extant  
literature – determinants  
of buying vs leasing

Smith and Wakeman's (1985) study is one of the most relevant studies about the determinants of leasing. They identified eight reasons for leasing besides tax motivation: asset values not tied to use and maintenance; assets not specialised for the company; the useful life of the asset exceeds the lessee's expected period of use of the asset; the lessee's bonds contain specific financial policy covenants; management compensation is a function of return on invested capital; the company is closely held; the lessor has market power; and the lessor has a comparative advantage in disposing of the asset.

Other studies investigated the relation between leases and the characteristics of lessee companies. The main characteristics investigated were: size, industry, nature of assets, leverage and financial constraints, taxes, management compensation and ownership structure.

(i) *Size*. Most of the studies on lease determinants included size as an independent variable. However, the results are mixed since most of the studies found a significant relationship between size and lease, whereas others showed a negative relationship (Adams and Hardwick, 1998; Graham *et al.*, 1998; Sharpe and Nguyen, 1995), and others still found a positive relationship (Deloof and Verschueren, 1999; Lasfer and Levis, 1998; Mehran *et al.*, 1999). Few studies found a non-significant relationship between size and leases (Ang and Peterson, 1984; El-Gazzar *et al.*, 1986).

Size is generally considered an important variable to explain the use of leases for several reasons.

First, size is related to the costs of obtaining external funds. Smaller companies tend to bear higher costs for getting external financing, due to information asymmetry (Graham *et al.*, 1998). Lessors may choose to reduce the uncertainty surrounding their claims by leasing rather than lending to small companies. Leases are preferred because the lessor's security is tied to the asset itself rather than his general credit. Thus, other elements held constant, smaller companies are predicted to lease relatively more, suggesting a negative relationship between size and leases.

Second, size is related to diversification and the ability to redeploy assets internally, and larger companies tend to be more diversified than smaller ones. Mehran *et al.* (1999) investigated the relationship between total leases and size, measured as total sales. Their results showed that size is positively related to leases, which means that larger companies with more diversification possibilities tend to lease more. Lasfer and Levis (1998) used total assets, market value of equity and sales as proxies for size and they included these variables as an explanatory element and as a measure to differentiate types of companies (UK quoted and unquoted). Their results showed that the determinants of the financial leasing decisions, such as tax reasons and growth opportunities, depend on the size of the companies. In large companies, profitability, leverage and taxation were found to be positively correlated with leases, whereas in small companies the leasing decision did not appear to be driven by profitability or taxation reasons, but by growth opportunities. Deloof and Verschueren (1999) also investigated the determinants of the financial leasing decision and they used total assets as a measure of size. Their results showed that the coefficient of size is significant and positive for the entire sample, but also when the sample is split between small and large companies.

Third, size can be used as a measure of political costs. Efficient contracting theory assumes that managers choose accounting policies so as to minimise political exposure and agency costs. The political costs view states that larger companies are more likely to face political exposure penalties than smaller companies (Holthausen and Leftwich, 1983; Watts and Zimmerman, 1978), as they have greater available wealth to be taxed

by the government or appropriated by special interest parties (Hand and Skantz, 2006). In general, these studies showed that large companies have greater incentives to adopt income decreasing methods, so as to reduce the expected costs of political visibility. Applied to leases, this suggests that larger companies tend to avoid operating leases.

Fourth, annual turnover can be used as a measure of size. Adams and Hardwick (1998) investigated the relation between a change in company size and the total lease share, for companies of different sizes. The results showed that the coefficient of the size variable (sales) was significantly less than zero meaning that small companies tend to lease more than large companies. They also showed that the lease share tends to fall as company size increases.

Finally, Sharpe and Nguyen (1995) used size as a proxy for the flexibility of companies' investments and they found that small companies lease more than large companies, showing a statistical negative relationship between size and lease intensity. In order to control for endogeneity, they used the log of the number of employees as a proxy for the size of the company. The results showed that large companies had better conditions to find alternatives for assets that are no longer used. In contrast, for smaller companies, it is more difficult to predict the future need for assets. They also found that companies with higher external capital costs tend to lease more. Similarly, Graham *et al.* (1998) hypothesised that larger companies tend to prefer to use debt rather than operating leases. They presented three main reasons: larger companies are more diversified and therefore cash flows have a greater stability; larger companies have more economies of scale when they issue securities; and because of information asymmetry, smaller companies have to bear higher costs for obtaining external funds. They used the natural log of market value of equity as a proxy for company size, finding a significant negative relationship between size and operation.

Studies by Ang and Peterson (1984) and El-Gazzar *et al.* (1986) did not find a significant relationship between leases and size. Ang and Peterson (1984) did not find concrete results, since results changed each year during the 1976-1981 period: the sign of the relationship between size (measured by total assets at the year end) and lease intensity changed and only in 1976 and 1981 was the relationship negatively significant. El-Gazzar *et al.* (1986) also found an insignificant positive relation between company size – measured as total sales – and leases.

(ii) *Industry.* The “industry” determinant is related to the investment opportunity set and the type of assets used by the company. Several studies showed that leases tend to be more prevalent in some industries than in others, although Ang and Peterson (1984) showed that companies that used leases were not concentrated in a few industries, and that leasing occurred in every industry group considered in the sample. Their results also showed that non-leasing companies were found in all industries except the amusements industries. However, Ang and Peterson (1984) investigated only the existence of lease contracts in those industries and not the possibility of different levels of leasing (lease intensity).

Other studies have shown the industries in which leases are more dominant, when compared to other industries. Finucane (1988) showed, by using the mean ratio of financial leases to total assets over a five-year period for each industry (52 industries), that companies in certain industries, including air transport and retailing, used more lease financing than others. He identified several reasons for this: certain industries have more specific assets, industry-wide differences in investment tax credits, the availability of assets as collateral, the rate of obsolescence of company-specific assets, the characteristics of secondary asset markets, marginal tax rates and debt capacity.

Adams and Hardwick (1998) showed that service and utilities companies used more leases, and construction companies tend to lease less. Gosman and Hanson (2000) also found that leases were prevalent in airlines and in retail stores.

Finally, other studies investigated the intensity of the use of leases, not by industry but based on whether the company is regulated and whether the company belongs to a monopolist sector. Coase (1972) and Bulow (1986) argued that a durable goods monopolist may lease in order to avoid time inconsistency, and Hendel and Lizzari (1999, 2002) showed that it may lease to reduce competition or adverse selection in secondary (used goods) markets.

(iii) *Nature of assets.* The nature of the asset is another variable that can determine the use and intensity of leases. Previous research found that companies tend to lease assets that are less specific and whose purpose is more general. General fixed assets are readily transferable and as a result have greater availability on the leasing market. With few alternative uses, the economics of specialised assets suggest conventional debt (or equity) financing. Consistent with these predictions, Graham *et al.* (1998) and Sharpe and Nguyen (1995) reported a negative relation between leases and proxies for asset specificity. Klein *et al.* (1978) argued that more specific assets are more likely to be owned (vertical integration) and more general purpose assets are more likely to be leased. Krishnan and Moyer (1994) also found that manufacturing companies employ lower levels of leasing than the retail, transportation and mining industries, whose assets are less company specific.

Smith and Wakeman (1985) also suggested that companies are unlikely to lease assets highly specific to the organisation, because the resulting bilateral monopoly problem would create conflicts and agency costs between lessor and lessee. They predicted that companies are more likely to lease generic office assets than company-specific production or research assets. Williamson (1988) similarly argued that more easily redeployable assets are better suited both for leases and for use as collateral in debt contracts. Erickson (1993) found that asset-specific factors, as proxy by industry, may be the single most important determinant of lease use. Gavazza (2010), using data from commercial aircrafts, found that the liquidity of assets affects the lease decision; i.e. more liquid assets make leases more likely, in particular operating leases.

(iv) *Leverage and financial constraints.* Several studies included leverage as an independent variable for the use or intensity of leverage. In general, most of the studies (Eisfeldt and Rampini, 2008; Sharpe and Nguyen, 1995) found that given that higher leverage companies have less debt capacity, they are more likely to use leases rather than other forms of financing.

Eisfeldt and Rampini (2008) and Sharpe and Nguyen (1995) found that companies facing greater financing constraints, due to information asymmetries, have a higher propensity to make off-balance sheet lease investments (operating leases). They argued that leases provide creditors with more security, higher priority in bankruptcy and an effective way of reducing adverse selection and moral hazard problems that arise from information asymmetries.

Companies have been found to lease as a means to avoid debt financing (Ang and Peterson, 1984; Marston and Harris, 1988; Myers *et al.*, 1976); to obtain a lower cost of financing by passing the tax allowances the company cannot claim when buying the asset from the lessor (Barclay and Smith, 1995; Graham *et al.*, 1998; Sharpe and Nguyen, 1995); and to mitigate agency conflicts, especially the asset substitution problem (Smith and Wakeman, 1985; Stulz and Johnson, 1985). Bathala and Mukherjee (1995) found that lease covenants appeared to be less restrictive than those imposed by



other creditors. Abdel-Khalik (1981) also tried to explain why some companies opt to use operating leases and they found three explanations: first the violations of restrictive debt covenants in lending agreements may incentivise the use of lease contracts; second, the managers' beliefs about the perceptions of analysts and users in terms of the effects of finance leases; and finally, the existence of management compensation plans based on accounting numbers.

El-Gazzar *et al.* (1986) also investigated the relation between leverage (measured by debt-equity ratio, the change in debt-equity ratio, and the industry adjusted debt-equity ratio) and leases, finding that companies with financial ratios that are nearer the limits of covenants tend to choose operating leases instead of finance leases.

Leasing theory predicts that financially distressed firms obtain more favourable financing terms from lessors than from traditional creditors because of the priority of lessors' claims in bankruptcy proceedings. In the USA, Kare and Herbst (1990) found financial gearing to be higher for leasing companies. Krishnan and Moyer (1994) also found leasing companies to have higher levels of long-term debt, as well as higher growth rates, lower retained earnings, lower interest coverage and higher operating risk. They concluded that as bankruptcy potential increases, lease finance becomes more attractive.

Krishnan and Moyer (1994) empirically investigated the relation between finance leases and the costs of bankruptcy and found a positive relation. Graham *et al.* (1998) found that this positive relationship extends to operating leases. Leasing theory also predicts that companies with higher costs of external funds reduce investment costs by leasing assets. Finance theory and empirical evidence further suggest that the cost of external funds is higher when information asymmetry, agency problems and underinvestment problems are more severe (Graham *et al.*, 1998; Myers and Majluf, 1984; Sharpe and Nguyen, 1995).

Fawthrop and Terry (1975) investigated how the UK corporate financial managers perceived and used leases. They found that the relevance of factors in determining the use of leases varied across companies and concluded that leasing policies are a product of individual financial circumstances. Sykes (1976) found leases to be used mainly because of cash flow advantages, although large companies attached some importance to tax allowances. Tomkins *et al.* (1979) found that only a minority of small companies engaged in leasing mainly to avoid capital outlay, or because no other sources of finance were available. Hull and Hubbard (1980) concluded that non-tax paying reasons for leasing are important and that incorrect lease evaluation affects leasing use.

Mayes and Nicholas (1988) found that the UK-based small companies tend to use leases to avoid large capital outlays. These results were confirmed by Drury and Braund (1990) who also concluded that the relative cost of leases, as well as tax motives, seemed to be a determinant of the decision to lease for large companies. Smaller companies tend to give more importance to other factors such as cash flow. Thomson (2005), based on a survey on the lease decision across the UK listed companies, found that avoiding large capital outlay and cash flow considerations are important for companies in terms of their decision to lease all asset types.

(v) *Taxes.* Taxes are generally pointed out as an important factor in the lease-buy decision, especially in the literature that focused this decision on tax incentives (Lasfer and Levis, 1998; Miller and Upton, 1976). The argument is that if a company is not in a full tax paying position, buying and depreciating the asset allows it a lower rate of tax deduction than leasing because, in this case, the company can deduct both the depreciation and the finance costs.

Miller and Upton (1976) showed that companies are indifferent to leasing or buying, except when they face different tax rates.

El-Gazzar *et al.* (1986) used the effective tax rate as a measure of political costs and as a proxy for tax incentives. They found that low tax rate companies are more likely to use operating leases instead of finance leases, which is consistent with the hypothesis that companies with high effective tax rates are more likely to adopt income decreasing strategies, such as finance leases.

Sharpe and Nguyen (1995) also focused on the advantages of operating leases in shifting tax advantages from lessee to lessor. They found a significant positive relation between high tax-loss carry-forward and leases. They also found that capital leases are used more in companies for which the tax benefits of buying appear low, and that low tax rate companies tend to have more operating leases.

Later, Graham *et al.* (1998) questioned the findings by Sharpe and Nguyen (1995) arguing that their tax results were caused by the endogeneity of corporate tax status given that using leases can lower a company's observed tax rate. Therefore, as a better proxy they used a dummy variable that indicates the presence of high or low tax-loss carry-forward, defined as tax-loss carry-forward above or under EBITDA. Companies with significant tax-loss carry-forward will be tax-exhausted for a period of years, and thus able to take full advantage of the tax benefits of ownership, including accelerated depreciation and investment tax credits. With respect to the tax rate, no significant relationship with leasing was found.

Lasfer and Levis (1998) showed that leasing is driven by taxes for large companies only. Their main conclusion was that companies that use leases are more likely to suffer tax losses, although this is not the major determinant for small companies. The major critique that can be pointed out is that tax differences for lessee and lessor relate mainly to operating leases and Lasfer and Levis (1998) focused on finance leases.

Graham *et al.* (1998) investigated whether low tax rate companies lease more than high tax rate companies. They argued that the use of operating leases should be negatively related to a company's tax rate. To avoid the problem of endogeneity, they simulated the before-financing decision marginal tax rate, based on a simulation, assuming that the company's taxable income follows a random walk. They found a significant negative relation with the operating-lease intensity.

Based on the approach taken by Graham *et al.* (1998), Mehran *et al.* (1999) estimated a before-financing marginal tax rate, so as to explain the relationship between all leases and the tax rate. They argued that companies with little or no tax liabilities are less likely to use debt financing, but more likely to lease assets. Their results were opposite to those found by Graham *et al.* (1998), and they justified them as being due to the larger sample size used by Graham *et al.* (1998). However, Graham *et al.* (1998) used operating leases and Mehran *et al.* (1999) used operating and finance leases indistinctively.

Yan's (2006) empirical result showed that the degree of substitutability between debt and operating leases increases for companies facing more agency problems, or for companies having more redundant tax shields.

Duke *et al.* (2002) included the effective tax rate of a company in their model based on the theoretical prediction of Smith and Wakeman (1985), and on the previous empirical results found in the studies by El-Gazzar *et al.* (1986) and Sharpe and Nguyen (1995). Their results showed a significant negative relationship between the effective tax rate and operating lease intensity.

O'Brien and Nunnally (1983), based on a sample made up by the US companies, found that tax and the risk of residual values and obsolescence were determinants in

the leasing decision. Mukherjee (1991) also found that avoiding the risk of obsolescence appeared to be the most important advantage to leases, followed by a lower cost compared to borrowing. The tax and “off-balance sheet” advantages to operating leases seemed to be insignificant.

(vi) *Management compensation.* In several companies, management compensation is based on accounting measures which motivate company management to choose accounting policies that best fulfil their interests (El-Gazzar *et al.*, 1986; Imhoff and Thomas, 1988; Smith and Wakeman, 1985).

The preference for operating leases has generally been associated with management compensation schemes. Smith and Wakeman (1985) hypothesised that companies tend to use leases more frequently when management compensation is based on accounting numbers, in particular, on return on invested capital. If managers’ rewards are based on the return on invested capital and no adjustment is made to reflect operating leases, managers will prefer operating leases to capital leases or to buying, because operating leases can produce the same operating results without increasing the total assets.

Imhoff *et al.* (1993) investigated whether the management compensation committee adjusted income for operating leases, considering the footnote disclosure of operating leases. They found that management compensation committees did not take operating leases into account when determining management compensation, since the capitalisation of operating leases did not provide incremental explanatory power in determining management reward.

El-Gazzar *et al.* (1986) also included management compensation in their study and they predicted that companies whose incentive plans are based on income after interest were likely to choose operating leases over finance leases. They used a bonus dummy and they found a positive and significant relationship between management compensation plans and the use of operating leases.

Contrary to their predictions and the results obtained by Smith and Wakeman (1985), Duke *et al.* (2002) found that the existence of management compensation plans that are based on return on capital did not seem to be related with the use of operating leases. They used the same dependent variable used by El-Gazzar *et al.* (1986) and their results seem to suggest that markets take into account the unrecognised assets and liabilities of operating leases.

Following Imhoff *et al.* (1993), Lückerath-Rovers (2007) tested whether the change in management compensation was explained by a change in operating lease intensity and whether this differed between companies that lease more or less. The results did not show a significant relationship.

Finally, Robicheaux and Fu (2008) hypothesised and found that companies that have more incentive compensation and more outside directors are more likely to use leases in order to reduce agency costs.

(vii) *Ownership structure.* Prior research showed that higher levels of managerial ownership tend to be associated with higher levels of debt and finance lease (Alchian and Demsetz, 1972; Flath, 1980; Smith and Wakeman, 1985) and operating leases (Duke *et al.*, 2002). Leases involve agency costs due to the separation of ownership and control of capital; a lessee may not have the same incentive as an owner to properly use or maintain the capital.

Flath (1980) and Smith and Wakeman (1985) investigated the role of ownership structure in the decision to lease assets. Flath (1980) found that companies that are more closely held tend to have more lease contracts. The main argument is that debt and leases expose the company owners to financial risk. However, when an asset is

leased for a period shorter than its useful life, the lessor bears most of the obsolescence risk or the other changes in asset value. On the other hand, a lessor company with both a diversified asset portfolio and widely dispersed ownership may be able to bear such risks in a way that incurs less expense. Smith and Wakeman (1985) pointed out that the potential benefits are enhanced if the lessor has any comparative advantage in disposing of assets in the second-hand market.

Mehran *et al.* (1999) found that companies in which the CEOs have a larger ownership tend to use more leases in order to reduce their exposure to obsolescence and other asset-specific risks.

Table II summarises the determinants of leases investigated in previous research.

3. Summary

This paper reviews empirical research into the determinants of leases. A number of empirical studies investigate the decision between buying or leasing and the

Main determinants	Main conclusions and studies
Size	Prior studies found mixed evidence about the relationship between size and leases Some studies found a negative relationship between size and operating (Sharpe and Nguyen, 1995; Graham <i>et al.</i> , 1998) or total leases (Adams and Hardwick, 1998) Other studies found a positive relationship between size and finance leases (Lasfer and Levis, 1998; Deloof and Verschueren, 1999; Mehran <i>et al.</i> , 1999)
Industry	Leases tend to be more prevalent in some industries than in others (Coase, 1972; Bulow, 1986; Finucane, 1988; Adams and Hardwick, 1998; Gosman and Hanson, 2000; Hendel and Lizzari, 1999, 2002) Leases are more prevalent in air transport and retailing (Finucane, 1988; Gosman and Hanson, 2000), services and utilities (Adams and Hardwick, 1998), durable goods monopolists (Coase, 1972; Bulow, 1986; Hendel and Lizzari, 1999, 2002)
Nature of assets	Companies tend to lease assets that are less specific, of more general usage and more liquid (Smith and Wakeman, 1985; Williamson, 1988; Erickson, 1993; Krishnan and Moyer, 1994; Sharpe and Nguyen, 1995; Graham <i>et al.</i> , 1998; Gavazza, 2010)
Leverage and financial constraints	Higher leverage companies will tend to use leases rather than other forms of financing, since those companies have less debt capacity (Myers <i>et al.</i> , 1976; Ang and Peterson, 1984; Marston and Harris, 1988; El-Gazzar <i>et al.</i> , 1986; Sharpe and Nguyen, 1995; Eisfeldt and Rampini, 2008) Finance leases become more attractive when bankruptcy potential increases (Myers and Majluf, 1984; Krishnan and Moyer, 1994; Sharpe and Nguyen, 1995; Graham <i>et al.</i> , 1998)
Taxes	Prior research found that taxes are an important factor in the decision to lease (Miller and Upton, 1976; El-Gazzar <i>et al.</i> , 1986; Sharpe and Nguyen, 1995)
Management compensation	Prior studies found mixed evidence about the relationship between management compensation and leases Some studies found a positive and significant relationship between management compensation plans and the use of operating leases (Smith and Wakeman, 1985; El-Gazzar <i>et al.</i> , 1986) Other studies found that the existence of management compensation schemes based explicitly on return on capital did not appear to be related to the use of operating leases (Duke <i>et al.</i> , 2002; Lückérath-Rovers, 2007) Management compensation committees did not take operational leases into account when determining management compensation (Imhoff <i>et al.</i> , 1993)
Ownership structure	Higher levels of managerial ownership tend to be associated with higher levels of debt and finance lease (Flath, 1980; Smith and Wakeman, 1985; Mehran <i>et al.</i> , 1999)

Table II.  
Summary of extant literature – determinants of leasing

determinants of leases. Considered together, the results from this line of research indicate that there is no consensus as to whether debt and leases complement or substitute each other. This can be justified by the fact that these studies only document a cross-sectional relation and therefore the relation found between leases and debt can be attributed to the true relation, but also to the factors that simultaneously affect debt and leasing. Future research into leases and debt should control for endogeneity problems and companies' fixed effects.

Results related to the determinants show that there are a number of factors that affect the choice between leases and debt, such as size, taxes, nature of assets, financial constraints and management compensation. Leases tend to be more prevalent in some industries than in others and companies tend to lease assets that are less specific, of more general usage and more liquid. Previous studies also show that higher leverage companies will tend to use leases rather than other forms of financing, since those companies have less debt capacity and finance leases become more attractive when bankruptcy potential increases.

Previous literature on leasing is based on European or North American samples. Little is known regarding the determinants of leasing in Latin-American countries, although the leasing activity in Latin America is an important source of finance for companies. Future research should study the relationship between debt and leases in Latin-American countries and assess how these countries fit into the more general global picture.

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