

## **Lease accounting and CEO compensation**

Opportunistic maximization of executive compensation with operating leases? A study of U.S. listed airlines.

Master's Thesis  
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## Abstract

### RESEARCH OBJECTIVES

In IFRS (International Financial Accounting Standards) and U.S. GAAP (U.S. Generally Accepted Accounting Principles), leases are accounted for as either operating leases or finance leases leading to distinct and materially different effects on financial statements depending on the classification. Some of these effects are related to performance variables such as earnings or operating profit used widely in management compensation contracts. This study examines the relationship between operating lease intensities and levels of management compensation; whether higher relative levels of CEO bonuses have explanatory power over operating lease intensities implying that operating leases may have been historically used in order to maximize management compensation. Literature is reviewed regarding the topics of leasing and management compensation based on which a hypothesis is formed.

### DATA AND METHODOLOGY

A sample of U.S. airlines through years 2008-2018 is examined and an empirical model based on prior literature on determinants of operating leases constructed to test the hypothesis. Data is obtained from Compustat and ExecuComp databases resulting in a sample consisting of 155 observations. The analysis is performed using two OLS linear regression models incorporating different proxies for bonuses: one capturing the ratio of bonuses over total compensation while the other (a dummy variable) taking on a value of 1 if bonuses are paid. Significant theoretical determinants of leases are controlled for.

### FINDINGS

The study fails to find evidence supporting the hypothesis and instead finds that the level of CEO bonuses is negatively associated with operating-lease intensity within the sample. This finding is consistent with more recent research on the topic. Plausible explanations for this negative association within literature are presently scarce; only some speculation exists.

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**Keywords** operating leases, management compensation, airlines, SFAS 13

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## Tiivistelmä

### TUTKIMUSTAVOITTEET

Kansainvälisissä tilinpäätösstandardeissa (IFRS) ja Yhdysvaltojen tilinpäätösnormistossa (U.S. GAAP) vuokravastuu raportoidaan joko käyttöleasingina tai rahoitusleasingina. Ennen vuotta 2019 vuokravastuiden kirjanpitokäsittelyn luokittelulla oli olennaisia vaikutuksia tilinpäätökseen ja sen eriin. Osa näistä vaikutuksista koskee niitä tilinpäätöksen eriä, joita käytetään yleisesti johdon palkitsemissopimuksissa suorituksen mittareina, kuten nettotulosta ja operatiivista tulosta. Tämä tutkimus tarkastelee yhteyttä Yhdysvaltalaisien lentoyhtiöiden käyttöleasingintensiteettien ja johdon palkitsemisen välillä; selittävätkö korkeat johdon bonukset lentoyhtiöiden käyttöleasingintensiteettejä viitaten mahdolliseen käyttöleasingien opportunistiseen käyttöön, jonka tavoitteena on bonuksien maksimointi? Kirjallisuuskatsauksessa käsitellään leasingien ja johdon kompensaaation tutkimusta, jonka pohjalta tutkimushypoteesi muodostetaan.

### DATA JA TUTKIMUSMENETELMÄ

Tutkimuksessa tarkastellaan Yhdysvaltalaisia lentoyhtiöitä vuosina 2008-2018 ja hypoteesia testataan kirjallisuuskatsaukseen ja aikaisempaan tutkimukseen perustuvalla empiirisellä mallilla. Data tutkimusta varten ladattiin Compustat- ja ExecuComp-tietokannoista ja yhdistettynä ne muodostavat 155 havainnon otoksen. Analyysi suoritettiin kahdella PNS-mallilla (lineaarilla regressiolla), jotka eroavat toisistaan bonus-muuttujassa: ensimmäisessä mallissa bonus-muuttuja mittaa bonuksen suhdetta kokonaispalkkiioon ja toisessa mallissa bonus on ns. dummy-muuttuja, joka saa arvon 1, kun bonuksia on maksettu. Malli on kontrolloitu merkittävien leasingia selittävien teoreettisten tekijöiden osalta.

### TULOKSET

Tutkimustulosten perusteella hypoteesi hylättiin ja tulokset viittaavat päinvastaiseen yhteyteen: bonusten suhteellinen osuus kokonaispalkkiosta on negatiivisessa yhteydessä lentoyhtiöiden käyttöleasingintensiteetteihin. Tulokset ovat linjassa viimeisimpien samankaltaisia yhteyksiä tarkastelevien tutkimuksien kanssa. Kirjallisuudessa on niukasti selityksiä tällaiselle negatiiviselle yhteydellä ja tarjolla on vain spekulatiota.

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**Avainsanat** käyttöleasingit, johdon palkitseminen, lentoyhtiöt, SFAS 13

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# **1. Introduction**

## **1.1 Brief history of lease accounting**

In the U.S., leasing as a form of financing was relatively limited before the end of the 1950's, after which it steadily grew into an instrumental alternative to debt. The U.S. Securities and Exchange Commission (SEC) estimates that in 2015, U.S. companies had approximately 2 trillion dollars' worth of operating lease commitments (SEC, 2005). With this rise, leasing became a burning issue in accounting and has been extensively debated ever since (Troberg, 2013). Premises of the debate surrounding lease accounting concern fundamentals: for users of financial statements, information obtained must be relevant and reliable. Therefore, the underlying accounting rules must be up-to-date and reflect a true picture of companies' leasing activities. Time has shown that, in lease accounting, a consensus on how this can be achieved has been hard to reach. Indeed, Imhoff et al. (1997) speculate that the longest-running controversy concerning accounting standards falling short of representing underlying economic substance may lie in the area of operating leases. It is thus unsurprising then that lease accounting has been a topic of debate for decades among regulatory bodies, users and issuers of financial statements.

The most fundamental issue at debate has been about the extent to which leases should be recorded as assets and liabilities in the balance sheet and expensed as depreciation and interest expense rather than fully within the group of operating expenses. Leases accounted for in this manner are called finance leases (or capital leases). The justification for presenting leases this way lies in the transfer of substantial risks and rewards related to the asset from the lessor to the lessee making the situation directly comparable to owning the asset outright. In these cases, the accounting treatment is made to resemble that of purchasing the underlying asset with debt financing; the lessee records the asset in the balance sheet along with a corresponding liability. In the income statement, instead of recording a rental expense, the asset is depreciated and interest expense recorded as per the effective interest rate method. Operating leases on the other hand are defined negatively: all other leases save finance leases are defined as operating leases for which no balance sheet items are recorded. Thus, the popularity of operating leases can be, in part, explained by enabling management to keep financial obligations off the balance sheet (i.e. off-balance sheet financing). Duke et al. (2009) claim that firms engage in aggressive

accounting of operating leases in order to keep significant liabilities and assets off their balance sheet. Imhoff et al. (1991) find that while accounting textbooks describe operating leases as short-term rental agreements, many companies report non-cancellable operating lease commitments that are beyond short-term in nature. Goodacre (2003) finds that the average  $\frac{\text{operating lease}}{\text{debt}}$ -ratio (the long-term element of operating lease commitment over on-balance sheet long-term debt) is 3.3 for retailers in the UK implying that operating leases are materially important and often even more important than long-term debt. The same study finds that operating leases in the retail sector are on average 37 times the level of finance leases.

Before 1976, companies in the U.S. had significant discretion over whether to record leases as operating leases or finance leases. The first big shift came the same year along with The Financial Accounting Standards Board's (FASB) Statement of Financial Accounting Standards No. 13 (SFAS 13) which curbed much of this flexibility and required a much larger portion of leases to be capitalized (i.e. reported as finance leases). Arguments from proponents and opponents of lease capitalization concerned issues such as off-balance sheet financing, whether or not capitalization of leases adequately reflects the underlying flexibility inherent in leases, effects on debt covenants and so on. Although both SFAS 13 and the comparable IASB's (International Accounting Standards Board) IAS 17 standard (International Accounting Standard 17, which took effect the 1<sup>st</sup> of January 1984) required a larger portion of leases to be classified as financial leases, both standards nevertheless left room for discretion and the possibility of structuring lease contracts in order to achieve the desired accounting treatment (Duke et al., 2009). FASB together with IASB, in their discussion paper *Leases: preliminary views* (2009) note that both IAS 17 and SFAS 13 have been criticized for not meeting the needs of financial statement users. The discussion paper claims that many find the standards to give rise to assets and liabilities which remain off balance sheets even when unwarranted by their economic nature. Such amounts, disclosed but not accounted for by any generally accepted method, are often adjusted (capitalized) by users to reflect the effects of lease contracts on income statements (profit/loss) and balance sheets. The problem is, however, that notes accompanying operating lease disclosures are often seen to be an insufficient basis for reliable adjustments. According to the paper, users of financial statements also claim that the existence of two accounting models for leases hampers comparability of financial statements due to the possibility of similar transactions being recorded asymmetrically as well as allowing the

structuring of lease contracts to achieve desired classifications. The discussion paper also notes that preparers of financial statements and auditors have criticized the standard for being too complex and not being able to distinguish clearly enough between finance and operating leases.

Based on these discussions, FASB and IASB recently took another step towards enhancing the quality of both lease accounting and subsequent reporting and reducing the ability of companies to engage in off-balance sheet financing. From the beginning of 2019, new standards for lease accounting from both standard setters (IFRS 16 and SFAS 13 ASC 842 to be precise) came into effect affecting all companies engaged in lease financing operating under these accounting regimes. The new standards were jointly prepared and have a significant amount in common: both require lessees to more or less eliminate off-balance sheet (OBS) leases from their financial statements altogether by reclassifying leases previously accounted for as operating leases into finance leases (with the exception of leases with a duration of 12 months or less which shall remain as operating leases). Thus, the controversial benefits of operating lease accounting were significantly reduced. The impacts on lessees' financial statements are potentially significant: capitalization of operating leases will increase the amount of both assets and liabilities in firms' balance sheets, potentially alter levels of reported profits and other income statement items, and by extension, affect all ratios derived from impacted financial statement items. Aside impacts purely in the domain of financial reporting, whether the new standards have any economic consequences, will remain to be seen.

## **1.2 Lease accounting and management bonuses**

The history of leasing paints a portrait of a domain in which accounting is challenged to meet the underlying economic realities it is meant to describe. For that reason, the history of operating leases in their form prior to 2019 has come to an end; almost all leases from now on, under U.S. GAAP (U.S. Generally Accepted Accounting Principles) and IFRS (International Financial Reporting Standards), that is, are to be accounted for as finance leases. From now on, material operating leases are rendered visible in balance sheets on both the asset and liability side, as well as recorded as depreciation and interest expense in the income statement. It can be argued that academia played a significant role as an agent of this change. Several motives for



off-balance sheet financing have been proposed and identified in studies, and most appear to be related in some way to managing figures in financial statements. Evidence of opportunism exists. For instance, Imhoff & Thomas (1988) and Imhoff et al. (1991) show that managers have been able to present material amounts of leases as operating leases instead of capitalizing them. When SFAS 13 was implemented, most leases that are henceforth required to be capitalized, were at the time restructured in ways as to avoid recognizing the associated assets and liabilities. This way leverage ratios and performance measures were artificially improved. Indeed, a body of study exists documenting the effects of operating lease capitalization on financial statement items and accounting ratios (see section 2.2 of this thesis on capitalizations effects on financial statements). Effects of capitalization of operating leases (and logically, the omission of capitalization) on both balance sheets and income statements have been reported as being of significant magnitude by researchers and practitioners. These effects include non-reported assets and liabilities, overstated earnings (and other measures of profitability) etc.

This thesis is motivated by the interest to better understand both the amount of discretion management truly has in determining items reported in financial statements and the extent to which an opportunistic element is present in this domain. It is without a doubt that topics such as this, addressing whether accounting has a behavioral aspect to it, have interested accounting researchers for a long time and have prompted many studies with different takes and viewpoints on the subject. Logically financial statement items which are a) most material, b) tend to have high impact when tinkered with, and c) have a significant judgmental element to them, are most interesting to study. Such items include goodwill, financial instruments and, as we have seen, leases. Although leasing has been widely studied, fewer studies document evidence of the relationship between CEO bonuses and lease accounting. This seems at least partly due to mixed results in previous studies attempting it (Morais, 2014). The relationship is interesting because, according to Murphy (1999, 2013), management bonuses are driven to a significant degree by the same financial statement items other researchers have shown to be affected by lease capitalization. This notion then raises the question of whether the choices related to lease accounting have perhaps been partly driven by design of managerial incentive contracts and managers aiming to maximize their compensation. One can't help but being suspicious: have managers historically been inclined towards favoring operating leases in order to maximize their personal compensation as dictated by compensation contracts. For instance, imagine the

following: if a managers' compensation is partly based on a figure such as return on investment (ROI) implying higher compensation when calculated returns on assets are high, he or she may be inclined towards using operating leases thereby effectively hiding them from the balance sheet and subsequently maximizing ROI by minimizing its denominator. The logic follows that as operating and finance leases are treated differently in financial statements, this treatment may have real world behavioral consequences not intended by regulators – perhaps management bonus manipulation is one of them?

Thus, this thesis attempts to answer the question of whether or not operating leases in their prior form have been used to influence accounting figures in such a way as to maximize compensation via mechanisms related to bonus contracts. As regulation has recently changed, it must be highlighted that this study is fundamentally backward looking in nature as it focuses on companies' financial statements before the implementation of ASC 842 (Accounting Standards Codification 842). Although the significance of operating leases has severely diminished, it is interesting to attempt to clarify whether managerial compensation has historically been a determinant of decisions surrounding leases. Also, regarding companies reporting mainly under national accounting standards (other than U.S. GAAP and accounting regimes with similar lease standards), permitting long-term non-cancellable operating leases, this question may still be relevant. Statistical inquiry into the matter could, for its part, contribute to both the body of studies underlying regulators' rationale for the recent changes in legislation and accounting research covering management compensation and behavior. The focus in this thesis is exclusively on the U.S. market and companies reporting under U.S. GAAP as data on U.S. publicly listed companies is extensive - also, these companies operate under lease reporting standards similar to IFRS.

### **1.3 Structure of the thesis**

Structure of this thesis is as follows. Chapter two discusses research on lease accounting relevant to this study covering the technical definitions of both operating and finance leases, the mechanics of lease capitalization on a general level as well as studies addressing the effects of lease capitalization on financial statement items and accounting ratios. Chapter three looks

at management compensation initially on a general level discussing its components and drivers and subsequently advancing to a focus on factors generally driving the level of CEO bonuses. In chapter four, a framework synthesizing the previous two chapters is built from which a hypothesis for the empirical portion of the study derived. Chapter five discusses the data, sample, and methods including the empirical models for testing the hypothesis. Chapter six presents subsequent results and findings while chapter seven discusses them. Chapter eight concludes the thesis.

## **2. Research on lease accounting**

This section covers research and theories of lease accounting relevant to this study. The first part introduces the dichotomy of operating and finance leases under SFAS 13 (prior to the jointly prepared new lease accounting standards by IAS and FASB issued in January 2019), their conceptual characteristics/differences and criteria of classification laid out by the standard. After this, the impacts of capitalization vs. non-capitalization of leases on financial statements is discussed on both a theoretical and empirical level after which research on the subject is introduced.

### **2.1 Accounting for leases**

On the 1<sup>st</sup> of January 2019, new lease standards from both IASB and FASB came into effect materially eliminating the use of operating leases altogether in financial statements of companies reporting under them. These standards from the two accounting bodies were jointly prepared with convergence in mind – as a consequence, they now resemble one another closely. Effectively, the shared goal was to issue standards eliminating operating-lease driven off-balance sheet financing altogether as this is believed to increase the usefulness, transparency and completeness of financial statements while making them incrementally informative for users (FASB, 2006). Compared to previous standards, which allowed a lease to be classified as an operating lease under certain conditions, the new standards eliminate the classification of leases as either operating and financial leases almost completely. Currently, under both standards there now stands a single lease accounting model that requires lessees to “recognize assets and liabilities for all leases with a term of more than 12 months, unless the underlying asset is of low value”.

As this study focuses on U.S. companies with high operating lease intensities, it is backward-looking in nature - an ex-post-take on a period prior to the current lease accounting standards. The regulation under which data for the empirical part of the study (financial statement information and 10-k form compensation information) has been recorded is U.S. GAAP, specifically SFAS 13 (ASC 840). It is important to note that the lease standards of the U.S. and

that of IAS/IFRS are in many ways very alike. Accounting for leases and the subsequent effects on financial statements prepared under these two standards is therefore comparable.

SFAS 13 and its prescribed accounting is discussed below from the perspective of a lessee as the empirical part of the study only looks at lessees' financials. The concepts of operating leases and financial leases are but briefly explained focusing on their core defining properties.

### **2.1.1 Classification of leases (SFAS 13, ASC 840)**

In practice, generally speaking, leases in which the ownership of the leased asset is transferred to the lessee at the end of the lease term following lease payments that represent the full value of the asset, are called finance leases – all other leases are operating leases (Gavazza, 2010). In accounting, the classification is based on set specific properties. Broadly speaking, the classification of a lease as a finance lease depends on it meeting at least one of four criteria set by SFAS 13 - all other leases are thereby operating leases. These criteria are:

- 1) The lease transfers the ownership of the property to the lessee by the end of the lease term,
- 2) The lease contains a bargain purchase option,
- 3) The lease term is equal to 75 percent or more of the estimated economic life of the leased asset (with some exceptions),
- 4) The present value at the beginning of the lease term of the minimum lease payments, excluding payments representing executory cost, equals or exceeds 90 percent of the fair value of the leased asset to the lessor at the inception of the lease (again, with some exceptions).

As one can imagine, the criteria leave room for companies' management to structure leases in order to avoid capitalization. For instance, if all other criteria are unfulfilled, the lease term (#3) can be negotiated to equal 74 percent of the economic life of the leased asset thus avoiding capitalization altogether (Troberg, 2013). As Troberg (2013) points out, this was, among other issues, pointed out by the G4+1 group (Anglo-Saxon accounting standard setters and IASC) already in year 2000.

Finance leases in accounting refer to long-term non-cancellable lease contracts transferring all risks and rewards related to the asset from the lessor to the lessee (Troberg, 2013). The accounting for a finance lease is significantly more complicated than for an operating lease and materially resembles the debt financed purchase of an asset. The basic premise is that at the beginning of the lease term, the lessee shall record an asset and a liability equal to the present value of the minimum lease payments during the lease term. Some executory cost such as maintenance, insurances and taxes are excluded. If this present value of lease payments exceeds the fair value of the asset in question, the amount recorded as asset and liability in the balance sheet shall be the fair value of the leased asset. The present value of the minimum lease payments is calculated with the interest rate implicit in the lease agreement or, if not available, the lessee's incremental borrowing rate is used. The recorded asset in the balance sheet shall then be depreciated accordingly while the lease payment is allocated between the lease obligation (i.e. capital repayment) and interest expense so as to produce a constant periodic interest rate on the obligation in question (i.e. via the effective interest rate method).

On the other hand, the defining characteristics of operating leases are: 1) they are usually short-term in nature, and 2) the lessor carries the substantial risks and rewards incidental to ownership of the asset. When approaching the end of the lease term, an operating lease can be renewed but there is no obligation to do so. Rent paid to the lessor is recorded as an operating expense in the lessee's income statement as it becomes payable - at no point in the lease term is any asset or liability associated to the lease recorded in the balance sheet.

With neither finance nor operating leases is the legal ownership of the leased asset transferred as in the case of a normal sell/buy transaction.

### **2.1.2 Effects of lease classification**

Subsequent to the unequal accounting treatment of finance leases and operating leases, the classification of a lease will affect both the income statement and balance sheet of a lessee in varying ways. The differences between operating leases and finance leases are neatly described by so called "constructive capitalization", a method of lease capitalization by Imhoff et al.

(1991, 1997) (also called the ILW method) designed to replicate the recognition of finance leases as closely as possible. Constructive capitalization yields an estimate of assets and liabilities that would be recognized if operating leases were accounted for as finance leases. This method introduces six adjustments (Imhoff et al. 1993):

- 1) Liabilities increase by an estimate of the present value of future operating lease commitments (abbreviated in literature as PVOL),
- 2) Assets increase by the unamortized value of the lease asset in most cases equal to the PVOL at  $t = 0$  (abbreviated in literature as PVA),
- 3) A deferred tax effect,
- 4) An equity effect,
- 5) Effect on current period (before tax) net income which equals adding the current period's reported rent expense back to income and subtracting the depreciation and interest charge recognized via capitalization,
- 6) Effect on operating income equal to the reported rent expense less the constructively recognized amortization expense.

For companies with large operating lease portfolios, estimating impacts of lease capitalization means adding something to the financial statement we think is missing – it is indirect in the sense that while we cannot directly observe what their financial statements would look like if operating lease commitments were accounted for as finance leases, we can at least see with some accuracy what they have likely avoided from presenting. The analysis of financial statement impacts is complex in the sense that effects on the income statement are not independent of the effects on the balance sheet - nor is shareholder's equity from assets or liabilities etc. This makes a comprehensive description complex in the sense that for reasons of interconnectedness, balance sheet effects cannot be described separately from income statement effects.

The first and second effect listed by Imhoff et al. (1993) are the most apparent. Operating leases entail no recorded asset or liability and therefore have no direct effect with the balance sheet and subsequently derived accounting ratios. Finance leases on the other hand are accounted for by recognizing a lease asset and a lease liability in the balance sheet the amount of which equals the present value of the minimum lease payments (in most cases – although fair value is also a

possibility as stated above). This increases the total amount of assets and liabilities on the balance sheet causing changes in several common asset-based accounting ratios such as e.g. return on assets (ROA) and leverage ratios (e.g. D/E) as presented in equations 1 and 2 below:

$$(1) ROA = \frac{\text{Net income (NI)}}{\text{Total assets (TA)}}$$

$$(2) \text{Leverage ratio } \left(\frac{D}{E}\right) = \frac{\text{Total liabilities}}{\text{Shareholders' equity}}$$

For accounting ratios measuring profitability involving balance sheet assets (denominator) and income statement items such as net sales, EBIT(DA), NI etc. (numerator), any capitalization of leases will cause dilution – weaker ratios so to speak – unless effects on income statement items outweigh the change. The same applies to leverage ratios for which the increase in debt causes degradation, asset-based efficiency ratios and etc.

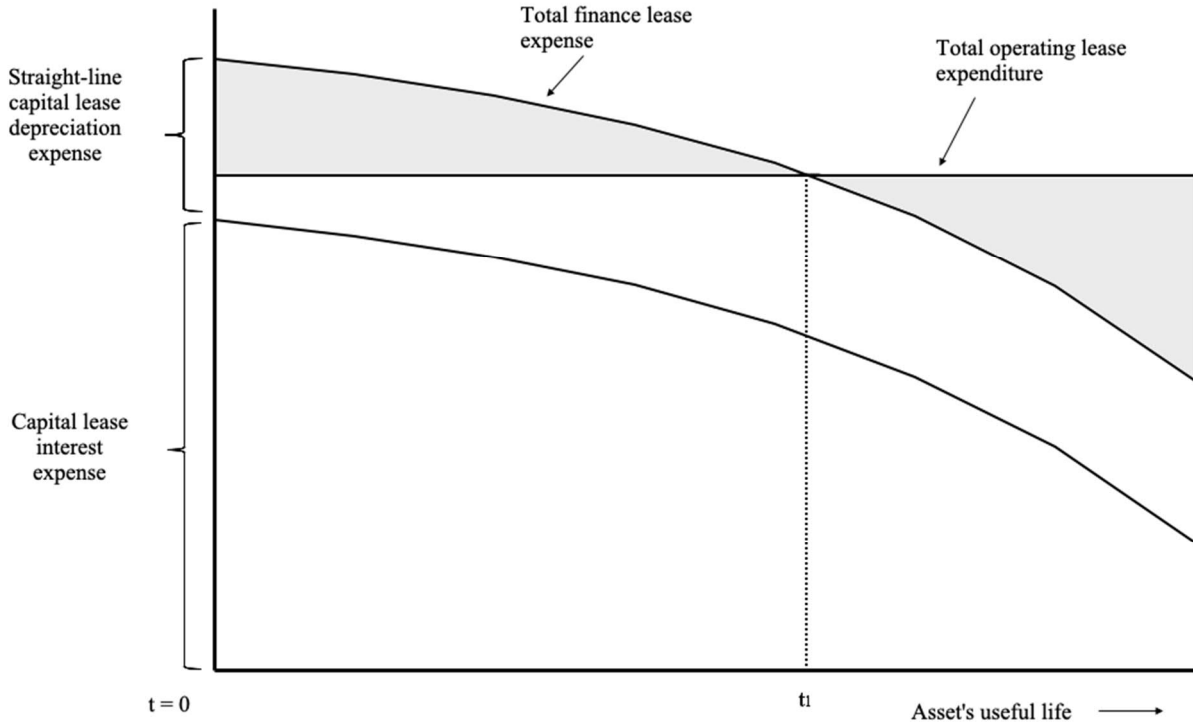
The more nuanced, but nevertheless important, effects of capitalization on the balance sheet are more easily understood after capitalization from the income statement's perspective is discussed. Finance and operating leases impact also the income statement unequally. First, the general mechanics cause a categorical difference in expense recognition: costs are presented under different income statement items. Costs incurred from operating leases are treated as expenses in income statements of lessees, typically in the larger group of operating expenses (OPEX). Examination quickly reveals that operating lease expenses enter into common profit figures such as EBITDA and EBIT which are subsequently less the recorded OPEX expense. Both profitability figures are impacted equally in absolute terms. This is not the case with finance leases for which the lessee records depreciation according to a predefined plan (e.g. straight-line depreciation) as well as interest charge based on the interest rate implicit in the lease (or the companies' incremental borrowing) rate and the outstanding lease liability (according to the effective interest rate method). These allocated costs are shown within their respective income statement items. As a consequence, with finance leases, EBITDA will not include the allocated depreciation and interest charges of the lease while EBIT won't include allocated interest charges of the lease (but will include depreciation).



The above examination, however, only presents the categorical differences in income statement cost allocation and does not account for the temporal aspect of costs incurred. As such it is insufficient in determining the differences between finance and operating lease accounting on income statement items (and subsequently accounting ratios). The temporal aspect of costs incurred refers to differences in period specific total lease expenses and their allocation compared to the linear expenses enjoyed with operating leases. In practical terms, this results in the “front-loading of costs”, i.e. costs are higher in the initial years of the lease for finance leases compared to operating leases. In the later years, the effect is reversed (Imhoff et al. 1991). The fundamental reason why costs are front-loaded in the case of finance leases compared to operating leases is the relationship between the way assets are depreciated and liabilities repaid with interest. Assets are depreciated (usually using the straight-line method - the default if a pattern reflecting the consumption of economic benefits cannot be reliably determined), while liabilities are reduced using the effective interest rate method. Unless assets are depreciated using a present value amortization method, which according to Jennings and Marques (2013) and Imhoff et al. (1993), would eliminate the effect of front-loading of costs on net income as the total (finance) lease expense would equal the actual lease payment (cash flow equal to the expense recorded with operating leases), the combination of interest paid to the liability and depreciation causes net income to be less than with operating leases in the initial year of the lease (Imhoff, 1991). The paper published by Imhoff et al. (1991) illustrates the front-loading of costs, which is shown below in Figure 1: the grey area between the curve “total finance lease expense” and “total operating lease expenditure” represents the total amount of “front-loaded costs” before  $t_1$ , after which the effect is reversed.

It can generally be stated that when the lease term equals the useful life of the asset, the asset is depreciated according to a method other than present value amortization, and the interest rate used in lease accounting  $r > 0$ , profits (net income) are greater in the initial periods of the lease term and lower in the second period when operating leases are used over finance leases. This notion is argued by multiple studies (Nelson, 1963; Ashton, 1985; Imhoff et al., 1991, 1993, 1997; El-Gazzar et al., 1986; Jennings & Marques 2013) and can easily be observed through constructive capitalization.

**Figure 1. Relationship between operating lease expenses vs. finance lease expenses (Imhoff et al. 1991, p. 59)**



This also directly effects deferred taxes via before-tax net income from which taxes are calculated; the magnitude of impact on deferred taxes is thus determined by the change in before-tax net income and therefore also affects balance sheet liabilities (Imhoff et al, 1997). Over the useful life of the lease, the sum of interest and depreciation will equal the operating lease rental expense (Bennett & Bradbury, 2003).

What's more is that the capitalization of leases also reflects on operating income measures (EBIT and EBITDA) in an unexpected way. Above, the general categorical difference in expense recognition in the income statement was discussed - namely that the rent expense associated with operating leases enters into operating income measures equally in every period, while with finance leases, its divided into depreciation and interest thus effecting cost allocation between EBIT and EBITDA. This is a cost classification difference and does not take into account the differences in total amount of costs incurred each year under operating leases and finance leases. "Front-loading of costs" tells us that the sum of interest expense and depreciation for early years of the lease is larger than the equivalent rental expense associated with the same

lease if it is accounted for as an operating lease. Thus, the unobvious consequence of capitalization is that both EBIT and EBITDA will improve (under the general assumptions) in absolute terms under not only because of cost classification (Imhoff et al., 1997; Nelson, 1963). This follows from the present value technique used to estimate the PVOL and PVA from the minimum lease payments of operating leases. In the absence of interest charges, the discounting of these cash flows to their present value and allocation using straight-line depreciation causes the depreciation charge reducing EBIT to be less than the rent expense associated with operating lease accounting. Thus, EBIT improves by  $rent\ expense_{operating\ lease} - depreciation_{finance\ lease}$ , while EBITDA improves by the total amount of rent expense as no charges are recorded in EBITDA with finance leases (as per the discussed classification effect). The situation is however more ambiguous if another method of depreciation is used, say a diminishing balance method with a high (aggressive) depreciation rate. Such a method can, hypothetically, reverse the effect on operating income as early year depreciation can be higher than the annual rent expense associated with an operating lease. There is, however, no economic reason in favoring finance leases to operating leases in order to maximize operating profits if one decides to eliminate the advantage by maintaining a high depreciation rate for assets (note that straight-line is the default in GAAP). In fact, the only advantage that suffering the “front-loading of costs” can bring in the early years of the lease on the income statement side is the tax shield resulting in tax savings (which is a cash-flow related benefits). Duke et al. (2009) however report of synthetic leases (in the U.S. context) which allow the accounting of leases as operating leases while retaining the tax benefits of finance leases (i.e. retaining the status of a finance lease in U.S. tax code).

After comprehending the general effects of capitalization on income statements, the more nuanced effects of capitalization on balance sheets can be discussed. Another way of stating the above is that the effect on equity through net income follows from the asset-liability ratio (ALR); the ratio of the capitalized operating lease asset to the capitalized operating lease liability at time  $t$  of the life of the asset’s useful life. Depreciation and effective interest rate method, both reducing their respective sides of the balance sheet, occur at different rates causing an impact on the income statement and finally net income. This in turn affects shareholder’s equity which, in a way, “collects” the annual disparity in reduction of lease assets and lease liabilities ultimately balancing out both sides of the balance sheet. As Imhoff et al.

(1997) note, income statement effects flow through to shareholder's equity, and therefore, the after-tax income statement effects may be directly calculated through the change in shareholder's equity from one year to the next. According to the authors, this implies that income statement details are not required to calculate the impacts that constructive capitalization has on net income. Therefore, through annual net income transferring into shareholders equity, shareholder's equity will in early years of lease capitalization due to front-loading of costs, *ceteris paribus*, stand in lesser amount compared to a situation in which leases are accounted as operating leases. In later years, it will eventually begin to recover until a state of identical effects is reached compared to operating leases at the end of the leased assets useful life (note that the effect is therefore cumulative and shareholders' equity will *throughout the asset useful life* be less than in the case of operating lease accounting).

## **2.2 Research on effects of lease capitalization**

Accounting ratios are widely used as tools for decision making by companies' management, loan officers, investors, tax authorities etc. – the primary users of financial statements so to speak. The effects of capitalization of operating leases on financial statements has been studied over the decades with mostly consistent results. These inquiries show a number of general and repetitive results confirming the above description of lease capitalization mechanics. From the perspective of this study, the focus is essentially on what is avoided by choosing to finance assets with operating leases instead of purchasing the assets outright or using finance leases. The perspective also shifts to some extent from the absolute impact of capitalization on financial statement items to accounting-based measures and ratios used to evaluate company performance – their derivatives.

The earliest studies on the effects of capitalization trace back to Nelson's (1963) study which answers two different questions: firstly, what are the effects of operating lease capitalization on financial accounting ratios and secondly, are ratios more meaningful after capitalization (leading to improved decision usefulness). A sample containing 11 companies that undergo capitalization of operating lease commitments reported in their financial statements is studied. Nelson finds significant changes in the sample companies' financial ratios and highlights

especially how companies in the same industries are able to report highly variable ratios as a result of lease accounting choices only. For instance, leverage measured as debt to equity (D/E) increased significantly with a high of 164.7 percent for company A and a low of 6.3 percent for company K. The increases in the ratio were fairly linear within the sample and the average increase was 69 percent. Change in profitability measured by return on total assets averaged zero within the sample involving both improvements and deteriorations for individual companies. The methodology of this early investigation is somewhat different from later studies using the ILW-method – income statement effects are not accounted for comprehensively as the study presumes that the annual depreciation plus interest expense for financial leases equal the annual lease rentals for operating leases. Therefore, in light of later studies, only balance sheet effects noted by the study warrant attention. Out of 15 ratios tested, only 2 improved by means of capitalization – the rest deteriorated.

Ashton (1985) studied the effects of operating lease capitalization on financial statements in the UK context and noted effects to be reflected in such financial statement items as interest charges, depreciation, fixed assets, accumulated depreciation and outstanding debt. The study looks at whether capitalization of operating leases has a statistically significant impact on main indicators of companies' financial performance, and whether the choice of companies in the sample to voluntarily capitalize leases was driven by economic consequences. The effects of capitalization on various performance measures was mixed: Ashton finds that while performance measures improved on average, the asset turnover ratio and gearing deteriorated (which is expected due to liabilities and assets generally increasing). However, the paired t-tests showed that out of the impacts, only one concerning leverage ratio (gearing) was statistically significant. Indeed, Ashton notes that while the mean changes in performance measures were relatively small, the variations were rather high implying that, to the extent that the sample is representative, there will be considerable variation in the effect capitalization will have on different companies. Thus, Ashton draws two conclusions: first that companies on average can expect only their gearing ratio to be affected by capitalization and more importantly, second, that capitalization has little impact on performance measures.

Presenting the constructive capitalization method, which would later become a standard technique of lease capitalization in accounting literature, Imhoff et al. (1991) studied the

restaurant chain McDonald's and found that by capitalizing their rent commitments in 1998, the restaurant's ROA declined by 9 percent and D/E ratio increased by 30 percent. Their evidence also suggests that capitalizing leases has significant effects on accounting figures and ratios with significant cross- and within-industry variation. By applying constructive capitalization on 7 pairs of companies, they noted an average decrease in ROA for leasing-inclined companies (high lessees) of 34 percent compared to 10 percent for the less leasing-inclined kind (low lessees). The average increase in D/E ratio for high lessees was 191 percent compared to 47 percent for low lessees. It is worth noting that their 1991 study assumes that the impact of capitalization on net income is negligible when assessing effects on performance measures – an assumption they later withdrew in their 1997 study.

Imhoff et al. (1993, 1997) show that in addition to their 1991 study, which found material balance sheet effects (also noted in 1993 and 1997) caused by capitalization of operating leases, capitalization in addition causes material income statement effects on net income (bottom line) and operating profit (income before interest expenses and unusual items). The 1993 study finds that the median leverage ratio within their sample consisting of airlines and groceries (measured as debt/asset) experienced an increase of 12 percent. The median percentage adjustments to net income for airlines was -22 percent and -6 percent for groceries. Interestingly, the study notes that even considering the reversed effect of front-loading of costs at the later years for capitalized leases, the capitalization of leases tends to have a negative effect on reported net income because the typical operating lease for the sample companies is less than halfway through its useful life. Their 1997 study performs a similar capitalization of operating leases as 1991 (this time on Southwest Airlines through years 1990-1994) and finds net income (earnings) to generally decline. They also note that ROA and ROE are systematically overstated through the years when operating leases remain uncapitalized – for ROE the annual percentage overstatement ranges from 4 to 86 percent, while for ROA 27 to 51 percent. The potential materiality of adjusting the income statement along with the balance sheet in capitalization is confirmed; with Southwest Airlines, ROE is in fact *higher* through the years when only the balance sheet is adjusted compared to operating leases remaining uncapitalized. The impacts of only adjusting the balance sheet on ROA were not as severe, as the change in the ratio is dominated by the growth in average total assets.

Beattie et al. (1998) study the effects of capitalization on common profitability and gearing ratios on a sample of 232 UK companies. Along the now common notion that assets and liabilities of companies grow significantly from capitalization of operating leases (operating leases classified as long-term liabilities represented 39 percent of long-term debt on sample company balance sheets, while capitalized operating lease assets represented 6 percent of pre-capitalization total assets – both, however, with wide variation between high and low companies), Beattie et al. find statistically significant changes in most of the sample companies' profitability and gearing ratios at the 1 and 5 percent level. The study notes a profit margin (EBIT/sales) increase of 12 percent, return on equity (ROE) increase of 5 percent, return on assets (ROA) decrease of 11 percent, asset-turnover decrease of 13 percent, and an increase of 260 percent in gearing. These findings are consistent with previous studies (mentioned above) of Ashton and Imhoff et al., with the distinction that Beattie et al. found changes in financial ratios statistically significant, whereas Ashton did not (he concluded the effects of capitalization thus immaterial).

Goodacre (2003) along the lines of Beattie et al. (1998) studies 102 UK general retail companies and assesses the effects of operating lease capitalization on nine performance ratios. The study finds that the ratio of operating lease liabilities to long-term debt is on average 3.3, operating leases are on average 37 times the level of finance leases, and operating lease assets represent 28 percent of balance sheet assets. This noted importance of the PVOL and PVA highlight the possibility of subsequent distortions in financial statements caused by non-capitalization of leases. As for income statement profitability measures, EBIT was found to increase by 23 percent within the retail sector, while importantly, the effects on net income depended on the maturity of the lease portfolio. Capitalization is found to affect operating profitability measures significantly and the study notes that this may have important economic consequences in decision contexts where performance is judged against a benchmark, such as executive compensation schemes. For companies with growing operating lease portfolios (i.e. increasing avoidance of “front-loading of costs”), the reduction in mean net profit was found to be 7 percent on average. The authors note that due to variance in the sample companies' operating lease intensity and levels of reported profits, some companies, especially the ones with high levels of operating leases or low levels of reported profit, would feel effects more drastic than the average might imply.

Bennet & Bradbury (2003) examine the impacts of constructive capitalization of operating leases on 38 public companies listed on the New Zealand Stock Exchange (accounting for leases in the same fashion as per IAS and Anglo-American standards). They report an 8.8 percent mean increase in assets, 22.9 percent mean increase in assets and a 3 percent mean decrease in equity. The average leverage ratio (total debt/total assets) increases from 46.9 to 51.9 percent and ROA (net income/total assets) falls from 12.6 to 11.5 percent. The authors conclude that in addition to having deteriorating effect on leverage ratios, capitalization of operating leases also decreases liquidity and profitability ratios.

Lückerath-Rovers (2007) studies 278 Dutch companies through financial years 2000-2004 and finds similar effects of capitalization on financial ratios as previous studies. On performance measures, capitalization caused the mean ROE to increase by 3.6 percent and ROA decrease by 7.8 percent. Importantly, Lückerath-Rovers finds that capitalization driven balance sheet effects are slightly stronger than income statement effects. Fülbier et al. (2008) performed a similar study on 90 German listed companies through years 2003-2004. In their sample, on the balance sheet, mean assets increased by 20.4 percent and mean liabilities by 77.3 percent. On the income side they noted a significant increase in the mean EBIT, 8.1 percent, while mean net income only increased by 0.9 percent. However, interestingly, the minimum net income in the sample dropped 2.4 percent while the maximum increase by 9.6 percent implying the existence of asymmetric effects. The authors note that generally low EBIT and NI effects imply that average operating lease expenses are only slightly higher than depreciation (causing a slight improvement in EBIT), while almost on par with the sum of depreciation and interest (causing very little change in NI). In general, they noted only minor effects were observed for profitability ratios and performance metrics ranging from -2.0 percent for ROE to 2.9 percent for profit margin (EBIT/revenue). P/E ratios and EPSs are also studied: mean P/E falls by 1.4 percent while mean EPS increases by 1.6 percent - it must also be noted that these figures are driven by high variation in the sample as the median corresponding figures are -0.2 percent and 0.2 percent. The authors find the results to be in line with prior studies, however, reporting generally weaker effects – they attribute the difference to higher discount rates used in early papers. Moreover, industry-specific results are highlighted; the impact of capitalization is stronger in fashion and retail whereas many industries remain unaffected.



Durocher (2008) intentionally takes a somewhat different approach and selects sample companies not from industries with high lease-intensities but rather large companies irrespective of industry. He ends up with Canada's 100 largest companies (by revenue) and studies their financial years 2002-2003. He finds the typical increases in assets and liabilities as other studies but fails to find statistically significant (at 5 percent level) impacts on ROA, ROE and EPS. This result is interpreted to mean that simply replacing operating lease expenses (with depreciation and interest) does not significantly affect these ratios. However, as with other studies, the author notes that even with the median results being what they are, there still exists high intra-firm variability with some companies affected drastically while other face barely any effects. The weak results on performance measures is also, as in Goodacre (2003), according to the authors, explained by the maturity of the average lease portfolio (the average expired life of the portfolio is seven years while total life was 17 – i.e. closing in on 50 percent expired). The effect of model assumptions is also highlighted.

Duke et al. (2009) find that capitalization impacts their S&P 500 based sample by increasing the amount of liabilities on average by 11.3 percent while assets 3.97 percent. High variance occurs in this sample too: for the top 91 firms the respective figures are 34.2 percent and 11.0 percent. Average retained earnings, net of tax impact, were reduced by 7.14 percent (the effect on retained earnings is cumulative as it is a sum of all annual effects on net income). For the 91 major users of operating leases, the equivalent effect on retained earnings is a 12.99 percent decline. The study divides the sample into two groups based on whether or not the sample companies' lease portfolio maturities have passed the midpoint after which capitalization effects on NI turn positive compared to operating leases (depreciation + interest < operating lease rental). The group for which lease capitalization had a positive income effect showed an average 5.12 percent increase in net income while for the other group with negative income effects the average decline was 3.59 percent. The study highlights the possibility that lease capitalization offers large U.S. companies an opportunity to hide debt, assets and manipulate income. Indeed, the tone is rather explicit, unlike in many other studies, in suggesting that companies engage opportunistically in such action and regulators should take action to deter it.

Also, Grossman & Grossman (2010) studying the top 200 Fortune 500 companies as well as Branswijck et al. (2011) studying the impacts of a lease standards treating all material leases as finance leases (i.e. capitalizing leases) on companies in Belgium and Netherlands (128

companies listed on Euronext Brussels and 116 companies listed on Euronext Amsterdam at April 2010) saw similar effects as described above in previous studies.

The results of the studies indicate that capitalization of operating leases can have a material impact on financial statements and subsequent accounting ratios and performance measures. The literature also points out that there is clearly ambiguity in lease capitalization and its effects on financial statements (especially in income effects). Imhoff et al. (1997) state this point explicitly: the effects of off-balance sheet operating leases are both significant and unpredictable in direction (i.e. both positive and negative effects on NI, differences between EBIT/EBITDA etc.). Thus, it may not be surprising that balance sheet effects are explicitly found to be stronger than income statement effects in at least Lückerath-Rovers (2007), Goodacre (2003), Beattie et al. (2008) and Durocher (2008). Also, most studies note that there is high variance among the sample companies' profitability measures – this implies effects are different for some companies than others due to operating lease intensity. Further, while several studies noted that income effects ranged between negative and positive for sample companies, an asymmetry was present skewing the average income effect to the positive side for non-capitalizers. More importantly, with some companies the results can be extreme. What seems to be evident as well, is that these studies point that lease structuring is indeed a potent tool for earnings management. To stir the pot even further, Fülbier et al. (2008) find that within their sample, the average NI change is very small implying an average lease portfolio halfway through its useful life (when the sum of annual depreciation and interest payments equal annual operating lease expenses). Duke et al. (2009) report similar findings; the general effects of lease capitalization on sample companies' average income depends heavily on whether or not the proportion of operating leases to their investment assets (lease intensity) is growing or declining. Fülbier et al. (2008) note that all studies operate under model assumptions (discount rates, assumptions of lease portfolio maturity etc.) hampering comparability. They also find that effects on performance measures are limited.

Both the theoretical examination of capitalizations effects on financial statements as well as literature review of the subject show that both the implications and evidence on the effects of lease capitalization are to some extent mixed. Unequivocal determination of the effects of capitalization and thus, associated affectivity to a financial agent, is hampered by layers and factors adding to ambiguity - operating leases and finance leases do not exist in a vacuum and

are intrinsically thoroughly neither positive nor negative. These factors include the above discussed temporality (front-loading of costs), the maturity of the lease portfolio, which income statement item is under focus (EBITDA, EBIT, NI etc.). Also, as the level of analysis shifts from a more clear-cut view of financial statement items to their derivative counterparts (accounting-based performance measures), the additional complexity brings with it another layer of ambiguity. When ratios are calculated (i.e. ROI, ROA etc.) both the numerators and denominators are affected by capitalization - and not necessarily in any linear fashion. Whether such ratios improve or deteriorate depend on multiple factors. However, some things are clear: firstly, effects do exist and secondly, under the right setting (regardless whether facilitated by chance or intention) elements encouraging opportunistic behavior are present. This is not surprising as theoretical examination implies that effects of capitalization on performance measures varies widely depending on the inputs used in lease accounting (providing significant flexibility for managers).

### **3. Management incentives and compensation**

Executive compensation remains a widely discussed topic in academia and especially in the field of financial economics, where, according to Murphy (1999), before 1980, there were no more than barely 1-2 papers published per year. Nowadays, the publishing rate is much higher and executive compensation is seemingly one of the more covered and controversial topics emanating from the corporate world. Indeed, it is no exaggeration to state that the surrounding political debate especially in the U.S. has from time to time reached substantial proportions (Occupy Wall Street -protests, Enron etc.). For the purposes of this study, a look at executive compensation is in order to establish the current academic findings linking executive compensation to financial statement items and accounting ratios. However, no attempt at a comprehensive take on the literature is attempted as it would not serve the purpose of this study. The primary interest is to examine literature concerning the composition of executive total pay and which of its components may be typically determined by accounting-based performance measures and to what extent. An understanding of the nature and mechanics of executive compensation is crucial in examining whether operating leases (and lease structuring) act as a tool for self-interested executives to artificially increase their compensation – phenomena called rent-seeking behavior.

This chapter looks first at the theoretical backgrounds of executive compensation and moves on to describe the level and components of CEO compensation in the U.S. on a general level. Secondly, as this study focuses largely on CEO's cash bonuses instead of other components, the relationship between cash bonuses and their underlying performance measures are discussed.

#### **3.1 Brief view of executive compensation theory**

The separation of ownership and control lies at the heart of executive compensation and has been studied extensively. Its (modern) roots can be traced arguably to Jensen & Meckling's (1976) seminal "*Theory of the firm: Managerial behavior, agency costs and ownership structure*". (For context, the article has been cited 87 524 times according to Google Scholar at the time of writing this in April 2020.) Agency theory, as it is called, describes the fundamental

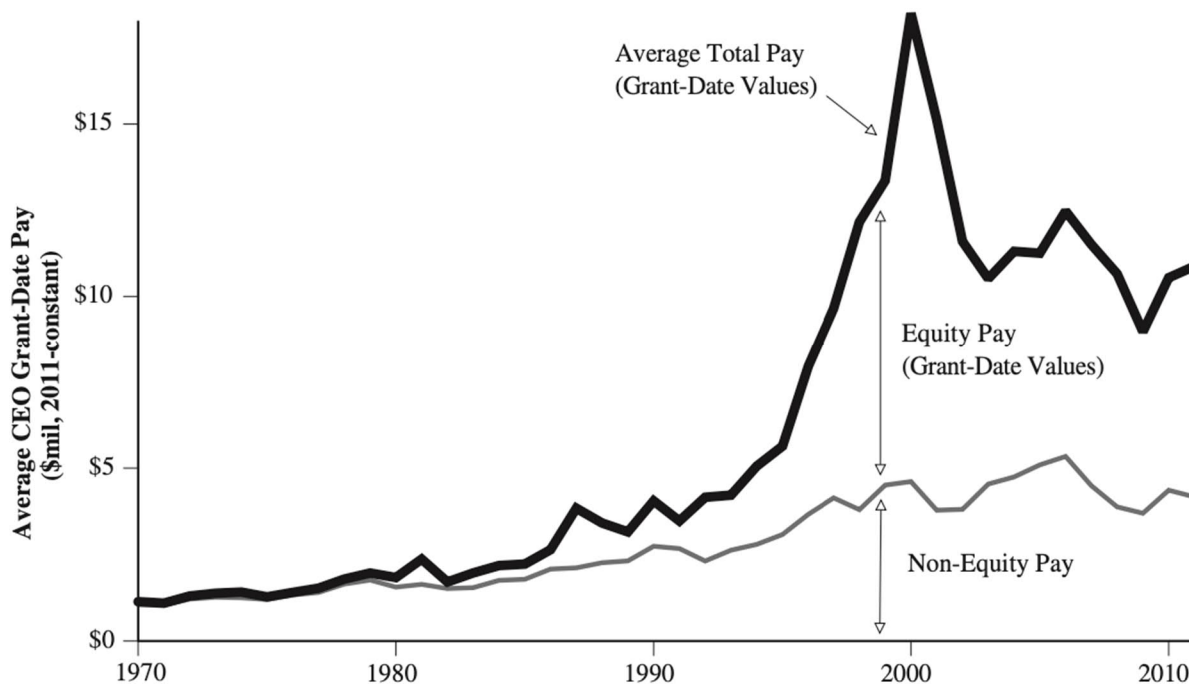
conflict between owners of firms and self-interested managers acting on their behalf; owners are interested in maximizing firm value while managers are concerned with maximization of their individual well-being (a fundamental assumption). Thus, executive compensation plans act in order to align the interests of risk-averse self-interested CEOs with those of shareholders. It's hardly surprising then, as Murphy (2013) notes, that much of the research on CEO incentives has its theoretical roots in agency theory. A closer look reveals that academic literature is divided roughly into two camps with regards to the theoretical grounds explaining trends and structures of executive compensation: the "*efficient contracting*" camp and the "*managerial power*" camp (Frydman and Jenter, 2010; Murphy, 2013). The efficient contracting camp holds that the composition and level of executive compensation is determined by competitive markets for managerial talent with incentives structured to optimize firm value, whereas the managerial power group finds that these factors are determined by captive board members catering to rent-seeking, entrenched CEOs (CEOs holding power over their pay setting process) (Murphy, 2013). Both Frydman and Jenter (2010) and Murphy (1999, 2013) in their comprehensive reviews on executive compensation literature maintain that neither camp alone explain these phenomena; both are important but neither fully consistent alone and in relation to the available evidence. Indeed, according to Frydman and Jensen (2010), there is no consensus of the relative importance of these two camps in explaining the determinants of the typical CEO pay.

### **3.2 Structure and level of CEO compensation**

Executive compensation literature has mainly focused on CEO pay (Aggarwal & Samwick, 2003). It also appears that at least a somewhat significant proportion of the literature uses the words "executive" and "CEO" virtually interchangeably which can quickly be inferred from e.g. Murphy (1991, 2013) - two comprehensive takes on the executive compensation literature. The following literature review relies on Murphy's work (1991, 2013) extensively as they are comprehensive, written to guide research in executive compensation, and authored by a leading researcher in the field of executive compensation.

Frydman and Jensen (2010) point out that the evolution of CEO compensation can be divided broadly into two time periods – the period prior to 1970 and the period following it. Prior to 1970, pay of CEOs was relatively low with little dispersion across top managers. After the 1970s, on the other hand, levels of pay grew significantly with widening dispersion across top managers and firms. The largest surge in levels of CEO pay was observed during the years 1990 and 2000 (Frydman & Jensen, 2010; Murphy, 2013). Figure 2 below from Murphy (2013, p. 225) shows the average equity and non-equity pay for CEOs in S&P 500 firms during the years 1970-2011.

**Figure 2. Average CEO grant-date pay over time (Murphy 2013, p. 225)**

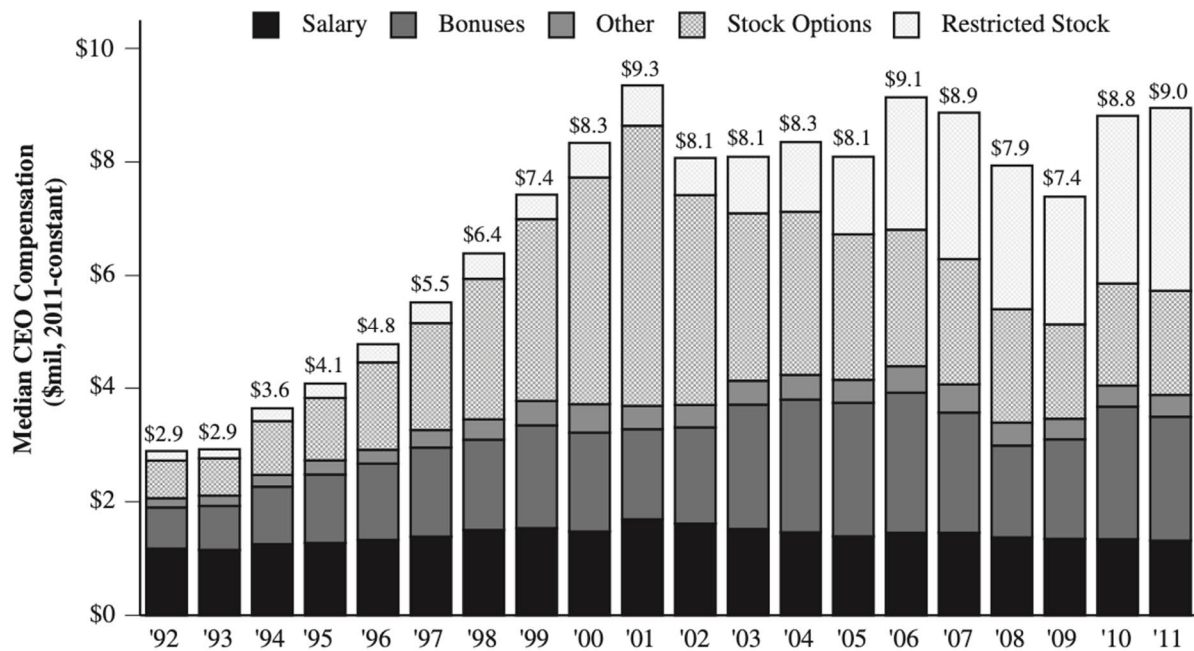


The figure shows the evolution of average grant-date pay (i.e. not the ultimate realized payout after stocks vest and options are exercised but rather the ex-ante grant-date value) for CEOs during 1970-2011 based on Forbes surveys (years 1970-1991) adjusted for inflation and Standards & Poors Compustat database (years 1992-2011). A recent report from Economic Policy Institute (Mishel & Wolfe, 2019) suggests that the (realized) pay for CEOs in top 350 S&P 500 firms in 2017 (ranked by sales) was roughly level to the average during 2010-2017 (although there appears to be significant volatility involved with realized pay as opposed to grant-date pay as per Murphy). It is worth mentioning, however, that the above average annual CEO pay over time is amplified to some extent due to the use of averages instead of medians.

This is caused by the distribution of annual average compensation becoming more skewed over time as a small number of CEOs on the top have enjoyed accelerated growth in total compensation compared to most (Frydman and Jensen, 2010; Murphy, 2013). Therefore, a look at the “typical CEO” (the median) is more representative of the population as a whole.

To better understand the rise in CEO-pay in the recent decades, a look at the composition of pay packages is warranted. The division of total pay into its components and sub-components is described with more or less resolution depending on the author, but for clarity sake, the deconstruction of Murphy (1999) is used (the differences are immaterial and rather of the semantic kind). Murphy (1999) notes that even though there is substantial heterogeneity in pay practices across firms and industries, most pay packages of CEOs (“executives” in the original text) are the sum of the base salary, an annual bonus tied to accounting performance, stock options, long-term incentive plans (including restricted stock plans and multi-year accounting performance plans). Executives also receive “broad-based” employee benefit-plans and receive special benefits including life insurances and supplemental executive retirement plans (SERPs). The distribution of total pay into its sub-components and their evolution during the period between 1992-2011 is elegantly presented in Figure 3 from Murphy below (2013, p. 226). The figure shows median grant-date total compensation for CEOs in S&P 500 firms during 1992-2011. The differences of annual total pay compared to the average pay in Figure 2 highlight the skewness in the pay distribution. Murphy’s analysis clearly shows how CEO median pay has evolved during the period of analysis: the role of base pay has reduced significantly in overall compensation but nevertheless remained roughly level in absolute terms. At the same time, bonus payouts have roughly doubled, while the role of stock options and restricted stock has skyrocketed. Indeed, this rise in the level of compensation has been studied and a number of explanations have been offered ranging from weak corporate governance to greater demand for managers with a more general skillset as documented in Shue & Townsend (2017). From the point of view of this study, fundamental reasons for the upward trend in CEO pay is not the issue at hand and therefore merits no further examination. What is nevertheless important is to understand the composition and relative roles of the different components in overall CEO pay - these are described below.

*Figure 3. Median CEO compensation over time (Murphy 2013, p. 226)*



**Base pay** or salary of a CEO is the amount of the overall compensation which does not vary with performance (although good performance can lead to a higher base salary) (Balsam, 2002). According to Murphy (1999) base pay of CEOs is typically determined by an industry-specific benchmark based on industry salary surveys adjusted for company size through size groupings or log-linear regressions with size being typically measured using company revenues or market capitalization. The salary-determination process gets substantial attention from executives considering it only comprises a relatively small portion of executive total pay and according to Murphy (1999), this is explained by salary being the key component in executive employment contracts and representing the “fixed component” of total pay for risk-averse executives. Additionally, most other components of compensation exist in some specified relation to base salary (percentage of base salary etc.).

**Bonuses** are a component of executive pay that can be conditioned upon individual, group or corporate performance. For most executives, the bonus plan is dependent mainly on group performance and is a part of a plan covering a larger group of employees (Balsam, 2002). According to Murphy (1999), annual bonus plans are offered by virtually every profit-seeking company to its top executives and are based on a single year’s performance. They consist of three building blocks: performance measures, performance standards and the pay-performance



relation. The typical bonus plan described by Murphy (1999) has a threshold performance above which bonuses are paid (the minimum bonus), a “target bonus” paid for achieving the performance standard, and typically a cap on bonuses (the maximum). Balsam (2002) also notes that some executive compensation contracts guarantee a bonus regardless of performance, but in light of Murphy (1991) this seems untypical of firms. Conyon et al. (2011), Murphy (1999), Murphy (2013), Ittner (1997) and others note that bonuses in the U.S. are mainly based on measures of accounting performance – it is safe to say, apparently a generally accepted observation in literature. According to Murphy (1999), however, bonuses are not based only on performance measures but rather on performance measures relative to a standard. Such a standard can be, for instance, a profitability measure compared to 1) the budgeted profitability measure, 2) last year’s profitability, 3) peer-group performance or etc.

**Stock options** are contracts giving the holder the right to buy the underlying asset for a pre-specified and fixed “exercise” (or “strike”) price for a prespecified term or a certain date. Murphy (1999) notes that executive options typically vest over time (e.g. 25 percent become exercisable in each of the four years following the grant). Such options will have value to the executive when the firm’s stock is valued higher than the strike price. The strike price for the option is typically set level with the stocks’ share price on the grant date and, therefore, the value of the option for the executive lies in the performance of the stock price and its final value upon becoming exercisable (Balsam, 2002). If the firm’s share price is below the fixed strike price upon the date of exercising, the option is worthless.

**Restricted stock** refers to grants of shares that are forfeited under certain conditions (usually related to employment longevity) (Murphy, 1999). Unlike stock options, they have no derivative properties such as strike prices etc. and are valuable as long as the stock price is over zero. Shares can and are also granted unrestricted (Balsam, 2002).

While this description of executive compensation components is far from comprehensive and leaves out smaller components and other categories such as pension, it suffices in facilitating a basis for understanding CEO compensation and covers material elements for the purposes of this study.

### **3.3 Underlying performance measures of cash bonuses**

The focus is now turned to cash bonuses. As noted above, cash bonus payouts are mainly based on financial metrics, i.e. performance measures derived from accounting figures in financial statements whereas the drivers for other components of executive pay (notwithstanding base pay) are more complex (or even ambiguous). The most common up-to-date financial metrics used in compensation contracts are hard to find from academic literature – this domain appears to be one of industry consultants rather than scholars. However, research documenting relevant accounting performance measures does exist. Within the context of this thesis, the interest is identifying whether cash bonuses rely on measures affected by capitalization of operating leases.

The popularity of accounting-based performance measures in compensation contracts can be argued to be largely due to the relative ease of obtaining necessary information. Financial statements offer a fairly reliable way of tracking firm performance as they are both regulated in line with public interest as well as audited by independent accounting professionals. Other subsidiary reasons may exist as well, e.g., as per the academia has argued, fair value accounting and subsequent earnings measures should track firm value with some positive correlation, and thus, theoretically act as a mechanism of aligning the interest of managers with that firms' shareholders.

It is no surprise then that traditionally firms have used mostly financial metrics such as net earnings and return on investment (ROI) in bonus contracts (Ittner et al.,1997). Ittner et al. (1997) found that in their sample of 317 firms, the mean weight placed on non-financial measures when evaluating CEO performance was 13.4 percent rendering it overall much less significant than financial measures. Also, interestingly, fewer than 2 percent of companies included in their sample used non-financial performance measures in their long-term compensation plans. However, Perry & Zettner (2001) find that 69 percent of their random sample of companies (S&P 500 and Midcap 400) use some form of non-financial performance measure in determining total compensation of CEOs (not bonuses in particular). Also, a consequential temporal aspect exists as Ittner et al. (1997) note: most companies use short-term or annual bonus measures in their executive compensation contracts. This implies that as the relationship between short-term bonuses and actions taken by managers (ultimately recorded in

the general ledgers of companies during a particular financial year) is easier to understand than if the time-frame were longer, managers, provided they are inclined to such action, have a clear incentive for managing accounting figures related to their personal compensation.

Ittner et al. (1997) found that in their sample of 312 firms using financial measures in the bonus contracts, companies used on average 1.7 financial performance measures of which net income, operating income and earnings per share were the most popular. Net income was used by 27.2 percent, operating income by 25.3 percent and EPS 28.5 percent of firms in the sample.

Perry & Zenner (2001) selected a random sample of 100 S&P 500 and 100 Midcap 400 firms and documented the performance measures in compensation contracts by executive compensation committees to determine CEO compensation (including bonuses). Within this sample of companies, 97 percent used some type of financial performance measure to determine CEO compensation. The results are interesting: 60 percent of companies' compensation committees mention using some form of net income (with or without non-recurring events), 38 percent mention EPS, 32 percent sales and 31 percent ROE. Less frequently used measures include shareholder returns as used by 20 percent, ROA with 15 percent, and profit margins with 13 percent.

The most comprehensive research on cash bonuses and performance measures appear to be in Murphy's (1999) study presenting interesting findings. In this study (or rather summary of studies), Murphy asserts that most descriptions of executive bonus contracts in 1999 were non-representative, anecdotal, or gathered non-randomly from voluntary disclosures in companies proxy statements, and thus instead, Murphy studied the usage of performance measures based on "Annual Incentive Plan Design Survey" in 1996-1997 by Towers Perrin (nowadays Willis Towers Watson) which documents performance measures used in top executive bonus plans by 177 publicly traded U.S. firms. Although both financial and non-financial performance measures were in use, almost all companies rely on at least one measure of accounting performance (including revenues, net income, pre-tax income, operating profits (EBIT), economic value added) or accounting based ratios (such as ROA or EPS). Of the survey sample, less than half (38 percent) used only a single performance measure while the rest used two or more measures. Of the companies using only a single performance measure, 96 percent use an

accounting measure as described above, while for the rest (using two or more measures) 62 percent of the used measures were accounting-based measures. Murphy states: “Overall, 161 of the 177 sample firms (91 %) explicitly use at least one measure of accounting profits in their bonus plans.” It is worth noting that in the case of the 16 remaining firms, while bonuses were largely discretionary, they may be tied to accounting performance through the board’s subjective assessment of performance. Also, typically annual bonus contracts are largely explicit with limited room for discretion (Murphy, 1999).

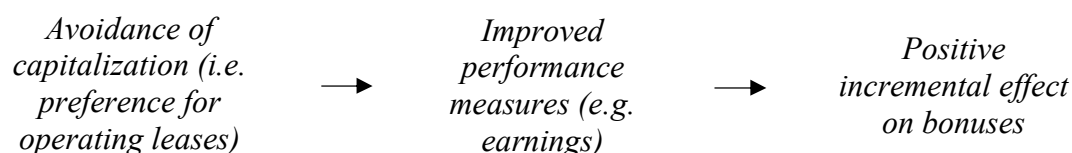
Based on Murphy (1999) (and Perry & Zenner, 2001), earnings stand out as the single most important group of performance measures used by companies relying on a single performance measure in bonus contracts. Earnings in Towers Perrin survey’s context refer not only to net income, but also pre-tax income and returns on assets equity and capital. All in all, out of the 68 firms using a single performance measure, 67 percent turned to earnings, the second most important measure was EBIT (13 percent) (referring in this context also to operating income, EBITDA, and other cash flow measures) while third place went to EVA (9 percent) (defined to generally equal operating income less a charge for capital). Firms with two or more performance measures also list earnings and EBIT as the most used measures of performance. Taking secondary performance measures into account introduces a large number of non-financial measures into the mix. Notwithstanding the measure “individual performance”, which stands out as relatively popular (although its ambiguity implies that it may contain a variety of measures both financial and non-financial itself) the popularity of non-financial measures is distributed fairly evenly with no single measure standing out. This implies that non-financial measures are mainly used in addition to accounting-based performance measures, and regardless of whether a firm’s bonus contract uses one or more performance measures, accounting based measures of either operating profits or bottom-line earnings such as net income take precedent. Indeed, Murphy (1999) finds that the primary determinant of executive bonuses is accounting profits.

## 4. Hypothesis development

### 4.1 Synthesis

So far, topics of lease accounting covering both the technical accounting framework of SFAS 13 and capitalizations' effects on financial statements as well as management compensation (with a focus on the structure and drivers of different components of executive pay) have been separately discussed. As noted in the introduction, the topic of this study is to examine whether operating lease intensity is partly explained by management compensation and thus, the above topics require synthesis.

Whether or not managers are incentivized to choose operating leases over finance leases in order to maximize their compensation is dependent on both the effects of (non-) capitalization of leases and the design of CEO bonus contracts. For such a relationship to exist between them, firstly, for a CEO, the avoidance of lease capitalization must have positive effects on accounting statement items and subsequently derived accounting ratios, and secondly, these very same financial statement items and ratios must be used as performance measures in his/her compensation contract. The literature review above confirms not only that leases can be accounted for opportunistically but also that performance measures commonly used in compensation contracts are likely affected by such actions. Summa summarum, the literature supports the existence of a plausible positive relationship between operating lease intensity and level of CEO bonuses. Further, as we have seen, bonus contracts are fundamentally designed to align the interests of employees with those of the company and provide incentives especially for managers to act with the company's best interest in mind (Petersen & Plenborg, 2008). The only premise left necessary to establish is that compensation contract design matters in influencing management behavior. This has been extensively documented in literature as noted by Ittner et al. (1997): the choice of financial and non-financial measures within contracts, their weights and mix are relevant in guiding management's actions. The relationship between operating lease intensity and CEO bonuses is, therefore, as follow:



This relationship is direct and easy to imagine as operating leases coupled with competent executives can have a positive effect on accounting-based performance measures while, on the other hand, a direct link between these measures and bonuses are stipulated in bonus contracts. Indeed, opportunistically choosing operating leases with the intent of improving accounting-based performance measures can increase bonuses incrementally in the right setting.

The reason for focusing on bonuses instead of other components of executive pay warrants explanation especially, as we have seen, as they only account for a fraction of CEO total pay. As seen above, the composition of CEO pay is multifaceted, and each component is affected by varying drivers. There are some specific reasons why cash bonuses receive special attention instead of other components of CEO pay in this thesis. The first one being that a clear relationship exists between cash bonuses and accounting-based performance measures: bonuses are mainly determined by ratios and figures derived from the financial statement. Indeed, bonuses are more highly correlated with accounting-based performance measures than other components of executive pay (Core et al., 2003). Also, a positive association exists between the relative importance of bonuses as a component of total pay and the extent of earnings management (Larcker et al., 2007). As to the directness of the relationship between management bonuses and effects of lease capitalization, Murphy (1999) showed that earnings are the most commonly used accounting-based measure determining the level of bonuses. Thus, it can be expected that the relative importance of bonuses in executives' compensation plans bear significance over the likelihood of engaging in earnings manipulation. Also, as we have seen, significant earnings effects have been noted as a result of operating lease capitalization.

Another reason is that other forms of compensation, such as options and restricted stock, are more ambiguous. Even though bonuses are not the most important components of executive bonuses, they offer a "cleaner" way of studying compensation-based incentives' effects on operating lease intensity (proxying the preference for operating leases) than another component of executive total pay would (say the relationship between stock price and operating lease intensity). A study involving options and restricted stock would most likely require incorporation of more sophisticated methodologies such as option valuation, pay-performance sensitivities or event studies – all of which increase complexity and variance (i.e. noise).

Although, Murphy (1999) and Hall & Liebman (1998) show that changes in CEO wealth are mostly explained by changes in company stock price leaving little room for other components of compensation, Murphy (2013) speculates interestingly that from a behavioral perspective, annual and multi-year bonuses based on accounting measures may be as important as equity-based compensation in directing the activities of CEOs and other executives. Firstly, incentive plans are only effective if participants know how to reach the targets and affect the payoff. How to increase accounting income is likely better understood than how to increase company stock price (although one could argue that they are highly interconnected). Secondly, payoffs based on bonus contracts are paid out after year-end financials have been audited – the rewards from bonus plans are more immediate than distant and uncertain gains in unvested equity plans. Incentives based on short-term accounting profits are likely to increase measures taken to maximize short-term profits - a phenomenon largely documented in financial economics literature. As Murphy (2013) points out, the short-term nature of bonus plans incentivizes taking measures to manipulate earnings and increase short-term profits at the expense of the long-term. And last but not least, using cash bonuses in similar settings has been successful in earlier research: for instance, Shalev et al. (2013) argue that earnings-based bonus plans compared to other forms of compensation provide stronger incentives for executives to overstate goodwill (in order to maximize accounting-based bonuses) and thus, bonuses as a component of total pay, are more likely to encourage earnings inflation. The study found that CEOs whose compensation rely more heavily on earnings-based bonuses are more likely to overstate goodwill in order to maximize their bonuses.

## **4.2 Evidence from previous studies**

Although several studies on the determinants of leases have hypothesized and treated management compensation as a plausible determinant of accounting policy choice and finance vs. operating lease decisions, there is no comprehensive body of literature on the topic and the evidence so far is mixed (Morais, 2014).

The hypothesized relationship between leasing and management compensation goes back to at least 1985. Smith and Wakeman (1985) identify management compensation as a potential

incentive for leasing in cases where management compensation is based on accounting figures such as return on invested capital (ROIC). The general mechanism underlying the relationship between management compensation and operating leases is attributable to the ratio itself: with every asset purchased or capitalized as a finance lease in the balance sheet, the growth in assets will dilute the denominator of the ratio for invested capital and thus weaken the premises for management compensation. Theoretically, in such a case, a manager with such an incentive would prefer to have the asset obtained through an operating lease and have it off the balance sheet. The authors note that a potential control for this on a contractual level is to design the ratio of return on invested capital to include the capitalized value of the operating lease. No empirical research testing this hypothesis is undertaken in the study and it therefore remains as purely speculative.

El-Gazzar et al. (1986) examine factors affecting choices of managers regarding lease accounting using “political costs” (size, effective tax rate), leverage effect, and management compensation variables. The study focuses on U.S. companies’ financial statements prior to the implementation of SFAS 13, adopted in 1976, which forced many companies in the U.S. to capitalize a significant portion of their operating leases. This sample period preference allows for data on companies’ leasing choices at a time when significantly more discretion in lease accounting was allowed. The author’s note that the theoretical underpinning of the study is based on prior accounting literature proposing that management influenced by bonus incentives is more likely to undertake accounting procedures that maximize reported earnings in the current period at the expense of future periods. Secondly, they note that the type of income used (defined) in incentive contracts will largely determine whether or not management can increase its compensation through lease accounting choices – something Murphy (1999) later shed light on. The authors hypothesized that if income in incentive contracts is calculated after deducting interest expense, for companies that are growing, operating leases will maximize incentive income as high depreciation and interest expenses typical for finance leases are deferred to future periods. The authors remained unsure at the time about how the choice between capital and operating lease affects compensation of managers whose contracts specify compensation income as earnings before interest. Thus, the study arrives at the incentive plan hypothesis as:



*“Those firms with incentive plans based on income after interest are more likely to use the operating approach for lease accounting. Those firms with income-based incentive plans or incentive plans based on income before interest expense are more likely to capitalize leases. This implies a positive correlation between the operating method and the income-based compensation plans.”*

The empirical models in the study used to test the above hypothesis all have dummy variables for incentive compensation taking on the value of 1 for companies that have managerial compensation contracts using after-interest income. The study reports a positive statistically significant correlation between use of operating leases and management compensation implying that companies with managerial incentive plans relying on performance measures based on income after interest expense are more likely to prefer using operating leases. Again, what is important to remember about this study is that it focuses on financial statements before the adoption of SFAS No. 13 in 1976 - when managers could exercise significant discretion between choosing operating or finance leases.

Duke et al. (2002) test predictions (the set of hypotheses) laid out in Smith and Wakeman's (1985) study on determinants of leases suggested by literature and the authors themselves. The hypothesis of operating-lease use being more likely if management compensation is based on return on invested capital is tested with the same measure used in El-Gazzar et al. (1986): a dummy variable set to one if managements' compensation is based on income after interest and set to zero if not. Duke et al. used several models to test Smith and Wakeman's predictions: two ordered logit models, a multinomial logit model and OLS regression. None of the empirical models used found any evidence for the Smith-Wakeman hypothesis of management compensation being a determinant of operating lease usage. Interestingly, the management compensation hypothesis was the only one tested which wasn't supported by findings. The authors themselves did not find this surprising; indeed, a) they noted a general continuity of poor performance of management compensation variables in accounting choice studies, and b) they reasoned that a multitude of other more important factors are likely to affect management compensation. The reasoning remained on the level of speculation, however, as no supporting literature was discussed. Also, discussion of reasons of why the management compensation variable was not found to be statistically significant is somewhat sparse. The author suspect

that as El-Gazzar et al. (1986) (they shared the same methodology) studied financial statement data prior to SFAS No. 13, the relationship may have existed prior to the standard's implementation but perhaps not after it.

Imhoff et al. (1993) assessed whether compensation committees adjusted management compensation for the effects of operating leases when such footnote disclosures are made in financial statements. The effects of operating lease capitalization on compensation decisions was studied by relating the percentage change in CEO salary and bonus ( $\% \Delta \text{COMP}$ ) to the change in both return on assets and return on equity ( $\Delta \text{ROA}$  and  $\Delta \text{ROE}$ ). They consider CEO compensation to be significantly related to accounting performance measures. The authors report that effects of operating leases are not considered by compensation committees determining executive compensation and are therefore not incorporated into executive compensation contracts. This inference is reached because capitalization of operating leases did not provide incremental explanatory power in determining management compensation levels. The study is somewhat hard to interpret but it appears to suggest the following: if executive compensation committees actively adjust compensation granted to management by the effects operating leases potentially have on performance measures (used in compensation), then capitalizing operating leases should result in a regression variable with incremental explanatory power over the level of compensation. This, however, was not found to be the case implying firstly that management compensation does not differ with high and low leasing companies and secondly, as the authors propose, that managers are free to tinker with operating leases to increase their compensation. Therefore, this study does not provide direct evidence per se on whether or not such acts are actively taken by managers, but rather simply note that 'presumably, managers are free to engage in compensation-increasing leasing behavior without the fear that compensation committees will undo their efforts on payday'.

Lückerath-Rovers (2007) in her dissertation tests whether change in management compensation can be explained by changes in operating lease intensity and whether a difference exist in the level of compensation for high and low leasing companies. The study tests two hypotheses: 1) a positive relationship is expected between increases in management compensation and increases in operating lease intensity, and 2) a positive relationship is expected between total management compensation and operating lease intensity. The hypotheses are tested first with a univariate regression model with a sample consisting of Dutch listed companies. Results

indicate a significant positive relationship between changes in management compensation levels and operating lease intensities. Also, and more interestingly, the results show that management compensation is significantly higher in high-leasing companies as well as the relative amount of bonuses to base pay being higher in high-leasing companies (38 percent for low-leasing companies and 47 percent for high-leasing companies). Although both hypotheses are initially tested with a univariate regression model with no control variables or other considerations, Lückerath-Rovers (2007) asserts explicitly based on the results that management of Dutch companies succeed in increasing their compensation by high use of operating leases. The individually tested variables are then tested in a multivariate regression model taking into consideration all identified determinants of leases in literature. This time however, the absolute amount of management compensation in the four regression models show a negative relationship with operating lease intensity three times and a positive relationship once. Thus, Lückerath-Rovers rejects both hypotheses.

The studies on management compensation as a determinant for leases reveal a few things. Firstly, they are not many in numbers – relevant studies on the topics are somewhat scarce and secondly, the findings seem to agree with Duke et al. (2002) on the poor performance of management compensation variables. However, because of the lack of conclusiveness in studies so far and the fact that many do not test the described association explicitly, more evidence is needed. Also, as the literature review in this thesis has shown, the setting in which avoidance of operating lease capitalization may increase CEO compensation does not necessarily always exist presenting its own difficulties.

### **4.3 Hypothesis**

Based on the literature review on both the effects of lease capitalization, management compensation and management compensation as a determinant of leasing, the following hypothesis is formed:

**H0:** *“There is a positive association between lease intensity and level of CEO bonus compensation.”*

As discussed above, the hypothesis is motivated by the possibility of artificially improving performance measures used in determining CEO bonus levels through use of operating leases. Therefore, a positive association is expected between lease intensity and level of CEO bonus compensation. Compared to previous studies, this hypothesis takes on similar form as in Lückerath-Rovers (2007) by examining the overall association between these components while being looser than hypotheses in Duke et al. (2002) and El-Gazzar et al. (1986). This generality is useful considering that more detailed information on both company-specific effects of lease capitalization and performance measures used in management compensation is harder to obtain for the purposes of a broader statistical analysis. Thus, the hypothesis is formed in order to obtain results of a more preliminary kind.

## **5. Data and methods**

### **5.1 Sample selection**

As this study does not address the classical lease-or-buy decision per se, it is not interested in companies which do not lease. The main interest is whether there is a positive link between management compensation and use of operating leases. Sample data should therefore consist of companies which operate in lease-intensive industries and are more likely to lease assets compared to other industries. With this in mind, the airline industry was chosen for examination as the choice is backed by past accounting research. For instance, Grossman & Grossman (2010) and Imhoff et al. (1993) noted airlines as one of the industries most affected by lease capitalization. Imhoff et al. (1991) find that airlines and groceries are two of the seven industries with large amounts of operating leases. According to Gavazza (2010), the commercial airline market is ideal for research on leasing issues due to more than half of all commercial airlines being leased. At the time of the study (2010), within the entire population of commercial aircrafts, roughly one third of were under operating leases and one sixth under finance leases. Also, a focus on a single industry instead of a cross-sectional analysis will mitigate effects industry specific properties of companies such as differences in leverage etc.

The sample for the empirical part of the study was obtained from Compustat Capital IQ Fundamentals Annual database. Relevant data was extracted using Standard Industrial Classification (SIC) codes related to transportation by air services SIC major group 45 (4500 – 4599). This group consists of establishments providing services primarily involved in transportation by air, operating airports and flying fields, and furnishing terminal services. Focusing on companies providing transportation-by-air services, data was extracted from the database for individual SIC codes 4512, 4513 and 4522. Thus, the data contains companies providing both scheduled and non-scheduled air transportation as well as air courier services. This dataset contained financial statement information for the sample companies. The second dataset contains executive compensation data extracted from Compustat Execucomp database. The nature of this database determines the sample period: internally comparable data available from Execucomp is available from 2006 onwards. Data prior to 2006 has been recorded under a different regulatory framework (standard prior to the current FAS 123: Accounting for Stock

Based Compensation) than subsequent data. For this reason, the sample initially covers financial years 2006 to 2019 but is narrowed down to 2008-2018 due to variable design (lagged variables) discussed below.

The combining of the two datasets renders observations from either dataset obsolete if the matching information is not found in the other. The final sample size for the combined dataset is thus  $N = 155$ .

## 5.2 Methods

### 5.2.1 Empirical model

The hypothesis is tested using the following OLS regression models. Two models are used in order to test two different proxies for management bonuses and control for some potential pitfalls explained below.

$$(1) \quad LEASEINT = \beta_0 + \beta_1 BONUS + \beta_2 SIZE + \beta_3 LEVERAGE + \beta_4 GROWTH + \beta_5 PERFORMANCE + \varepsilon$$

$$(2) \quad LEASEINT = \beta_0 + \beta_1 D\_BONUS + \beta_2 SIZE + \beta_3 LEVERAGE + \beta_4 GROWTH + \beta_5 PERFORMANCE + \varepsilon$$

In which,

$$LEASEINT = \frac{\text{capitalized operating lease asset}}{\text{PP\&E} + \text{capitalized operating lease asset}}$$

$$BONUS = \frac{\text{Lagged two-year average of bonuses}}{\text{CEO total pay}}$$

*D\_BONUS* = dummy variable taking on the value of 1 if bonuses are paid two years sequentially

*SIZE* = the natural logarithm of sales

*LEVERAGE* = ratio of debt to equity (D/E)

*GROWTH* = no-dividend dummy taking on the value of 1 when cash dividend is paid during the financial year

$$PERFORMANCE = \frac{EBITDA + \text{rent expenses}}{Sales}$$

### 5.2.2 Dependent variable

The dependent variable in the empirical model is *LEASEINT*, which captures a company's operating lease intensity referring to the proportional amount of the capitalized (operating) lease asset over the totality of revenue generating property, plant and equipment (including all finance leases within this group).

The variable captures the relative amount of a company's revenue generating assets that are not found as fixed assets on the balance sheet but are rather accounted for as operating leases and expensed in the income statement. A relative rather than absolute variable removes any direct effects of company size (in balance sheet terms), although it obviously does not control for the possibility that company size may be an explanatory factor in the eagerness of a company to increase leasing intensity.

Compustat database incorporates operating lease expenditure figures as presented in the notes to companies' financial statements: the minimum rental commitments (MRC) due in first, second, third, fourth, and fifth years from the balance sheet date under all existing noncancelable leases (Compustat #96, #164-167). The cumulative total of all future rental

commitments after year five (TA, referring to thereafter portion) are also captured separately (Compustat #95).

As these cash flows are undiscounted and as such theoretically incomparable with one another, the figures are via capitalization discounted for additivity in order to generate an estimate of the lease asset and liability. There are generally two classes of methods used in capitalizing operating leases: present value methods and multiple methods (Lückerath-Rovers, 2007). Multiple methods are based on multiplying next year's annual operating lease payment with a constant factor (such as 8 or 6) and are as such more akin to a heuristic rather than a theoretically sound method backed by economic literature. The advantage of using such a heuristic lies in its simplicity and easy applicability while its weakness in disregarding fundamentals (interest rates, total and remaining life of lease assets). More sophisticated multiple methods aim to correct these shortcomings by taking these fundamentals into account on some level while retaining applicability. Nevertheless, none reach the rigor of present value methods which make up the second class of capitalization methods.

Along the present value method, we arrive at the capitalized operating lease liability by discounting future lease obligations (minimum rental commitments):

$$i) \quad PVOL = \frac{MRC_1}{(1+r)} + \frac{MRC_2}{(1+r)^2} + \frac{MRC_3}{(1+r)^3} + \frac{MRC_4}{(1+r)^4} + \frac{MRC_5}{(1+r)^5} + \frac{TA}{(1+r)^6},$$

where

*PVOL* = Present value of lease obligation,

*MRC<sub>t</sub>* = minimum rental commitment at year *t*,

*TA* = thereafter portion of leases

*r* = interest rate.

The capitalized lease liability (PVOL) used to calculate lease intensities of sample companies in this study is constructed as per Imhoff et al. (1991). As minimum rental commitments for years 1-5 in the future are disclosed explicitly, discounting them is simple and straightforward – only the relevant discount (interest) rate is required. Commitments after 5 years (TA),



however, also depend on assumptions regarding the distribution and duration of lease payments making up the disclosed lump sum. Therefore, the discounting of present value of operating leases relies on four critical assumptions:

- 1) The interest rate used in discounting cash flows,
- 2) Remaining life of lease assets and obligations,
- 3) As financial statements present all operating lease cash flows after five years as a lump sum, a pattern of these cash flows along the estimated duration, and
- 4) All cash flows are assumed to occur at year-end (not throughout the year).

By discounting operating lease cash flows we will arrive at their present values - in order to do this, we need a generalized discount rate. Lückérath-Rovers (2007) notes in her study that generally a 10 percent discount rate has been applied in studies attempting to constructively capitalize operating lease cash flows – these studies include Imhoff et al. (1991), Imhoff et al. (1997), Beattie et al. (1998) and Ely (1995). Goodacre (2003) used 8.5 percent when studying the effects of capitalization of operating leases for UK retail sector. Imhoff et al. (1991) argue that the theoretically correct interest rate for capitalization is the weighted average of the historical borrowing rates of the entity at the times of inception of operating leases. These are, however, not known and therefore can't be used. The study therefore adopts the average historical secured long-term debt as a proxy (the study only looks at a single company). In their 1997 study, Imhoff et al. argue that the implicit interest rate in companies' financial statements (either explicit or implicit but calculable) should be the basis for discounting. Beattie et al. (1998) use the three-month London deposit rate for their whole sample while Ely (1995) sees the footnotes in the sample companies' financial statements regarding long-term debt representative of a suitable discount rate. Further, Beattie et al. (1998) perform a sensitivity test on their assumption of a uniform 10 percent interest rate by introducing variance of  $\pm 2$  percent and noted "very little change" in the results (profitability ratios and gearing). As these ratios use the same post-capitalization balance sheet figures as the *LEASEINT* -variable, it can be expected that a similar "error" in the applied sample-wide uniform interest rate should not deteriorate the quality of the this study.

It is worth pointing out that interest rates have declined significantly since the abovementioned studies were published. This is also briefly pointed out in a footnote by Lückérath-Rovers

(2007) stating a 10 percent discount rate as inappropriate in an environment of low interest rates. The danger of using a discount rate close to 10 percent lies in producing too conservative present values ultimately leading to possibly biased data in the model. If a company is incentivized towards operating leases for the purposes of avoiding impacts of capitalization on financial statement items, it is only logical that the larger the present value of the lease, the higher the incentive not to capitalize. By extension, estimating the present values of lease payments too conservatively may partially obscure the hypothetical relationship between operating lease intensity and executive compensation. Therefore, a uniform 4 percent interest rate is used in estimating the capitalized lease asset and liability for the whole sample; this way, the low interest rate environment of the past decade is incorporated into analysis.

Financial statements do not generally disclose information on the total or remaining life of operating leases both of which are required in order to arrive at the PVOL and PVA (the present value of lease asset). In order to estimate the total lease life, this study uses the method adopted in Imhoff et al. (1997) where the minimum rental commitment beyond year five (TA) is divided by the  $MRC_5$  resulting in an approximation of how many years the payments will continue at the rate of the fifth year's payment. A constant of five is then added to this figure to add the effect of the first five years of lease life. The estimate is rounded up to the next whole year.

$$\text{ii) Lease total life (TL)} = 5 + \frac{TA}{MRC_5}, \text{ rounded to the next full year}$$

Unlike Imhoff et al., however, this study follows Jennings & Marques (2013) in which the output of the above formula is not regarded as the remaining life of the lease but rather the total life. This assumption is discussed in more depth below.

This principle is simple and effective albeit somewhat ambiguous as noted by the authors of the method. For the purposes of discounting these minimum rental commitments, a pattern of payments across the remaining life of the lease obligation must also be determined (division of the lease payments beyond five years). It is assumed that the annual payments remain equal throughout the remaining life of the lease obligation – an assumption also present in Imhoff et al. (1991, 1997).

$$\text{iii) } MRC_{t>5} = \frac{TA}{TL - 5},$$

where

$MRC_{t>5}$  = annual minimum rental commitment for years beyond  $t = 5$

With these assumptions and premises in place, the disclosed operating lease payments for each company can be discounted into a theoretically grounded estimate of capitalized operating lease liability, PVOL. Discounting of lease payments through 1-5 is straightforward. Payments after  $t + 5$ , however, require assuming the equal annual payment to take place from  $t = 1$ , calculating the present value of equal payments for the whole  $TL$  and subtracting from it the present value of payments through years 1-5. Expressed formally, this takes the form of

$$\text{iv) } PVOL_{t>5} = MRC_{t>5} * \left( \frac{1 - \left(\frac{1}{1+r}\right)^{TL}}{r} - \frac{1 - \left(\frac{1}{1+r}\right)^5}{r} \right)$$

where

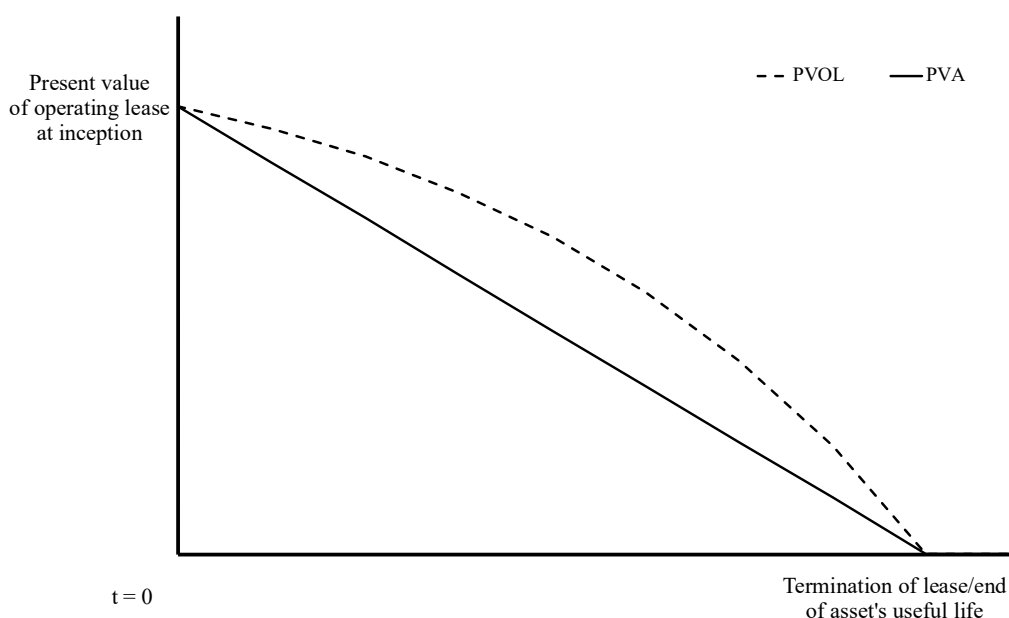
$PVOL_{t>5}$  = present value of lease obligations after five years

Summing up the discounted lease payments through years 1 to 5 and the present value of lease payments after year 5 yields us with the total present value of lease obligations i.e. the capitalized lease liability, PVOL. This estimate represents the portion of liability unrecorded in the balance sheet compared to a situation in which all leases are required by regulation to be accounted as finance leases.

From the PVOL we are able to estimate the unrecorded capitalized lease asset (PVA), which the empirical model's dependent variable *LEASEINT* incorporates both in its nominator and denominator. The unrecorded lease asset has to be estimated from the capitalized lease liability separately as they do not equal each other throughout the life of a lease. The reason for this is that the lease asset is depreciated using a suitable method, e.g. straight-line depreciation, while the lease liability is reduced through interest payment and repayment of principal. As the principal is the largest in the start of the lease life, so are the interest payments. The proportion

of the principal repayment of the total lease payment (in accounting, that is) is smallest in the start of the lease, but gradually grows as the interest-portion of the payment declines with time. This leads to the following relationship between the PVA and PVOL through time illustrated in Figure 4 – the magnitude of this relationship depends on the interest rate used as well as the following assumptions. This mechanism of accounting leads to the fact that the unrecorded lease liability is always equal or larger than the unrecorded lease asset.

**Figure 4. The relationship between the (unrecorded) lease asset and liability (Imhoff 1991, figure 1)**



In order to estimate the PVA from PVOL, a set of assumptions need to be made (Imhoff et al., 1991).

- 1) Straight-line depreciation is used for all lease assets,
- 2) The unrecorded lease asset and liability at  $t = 0$  equal a 100 percent of the present value of the future lease payments,
- 3) The unrecorded lease asset and liability are both zero in value after the last lease payment has been made for each lease (end of useful life).

The assumptions are not unrealistic per se and as Lückcrath-Rovers (2007) notes concerning Imhoff et al. (1991), the assumptions are comparable with 100 percent debt financing of an

asset based on annuities and a related depreciation of the mentioned asset with the straight-line method.

Under these assumptions an asset-to-liability ratio (ALR) can be calculated (also called *asset proportion* in some studies) by establishing a factor with which the unrecorded lease liability is multiplied to achieve the unrecorded lease asset. Again, the methodology is as in Imhoff et al. (1991, 1997) – note, however, that formula (v) is presented as in Jennings & Marques (2013) for the virtue of its clarity. The ALR-factor operates as follows

$$\text{v)} \quad PVA = ALR * PVOL$$

of which

$$\text{vi)} \quad ALR = \frac{\frac{1-(1+r)^{-N} \left(\frac{RL}{TL}\right)}{r}}{\frac{1-(1+r)^{-RL}}{r}}$$

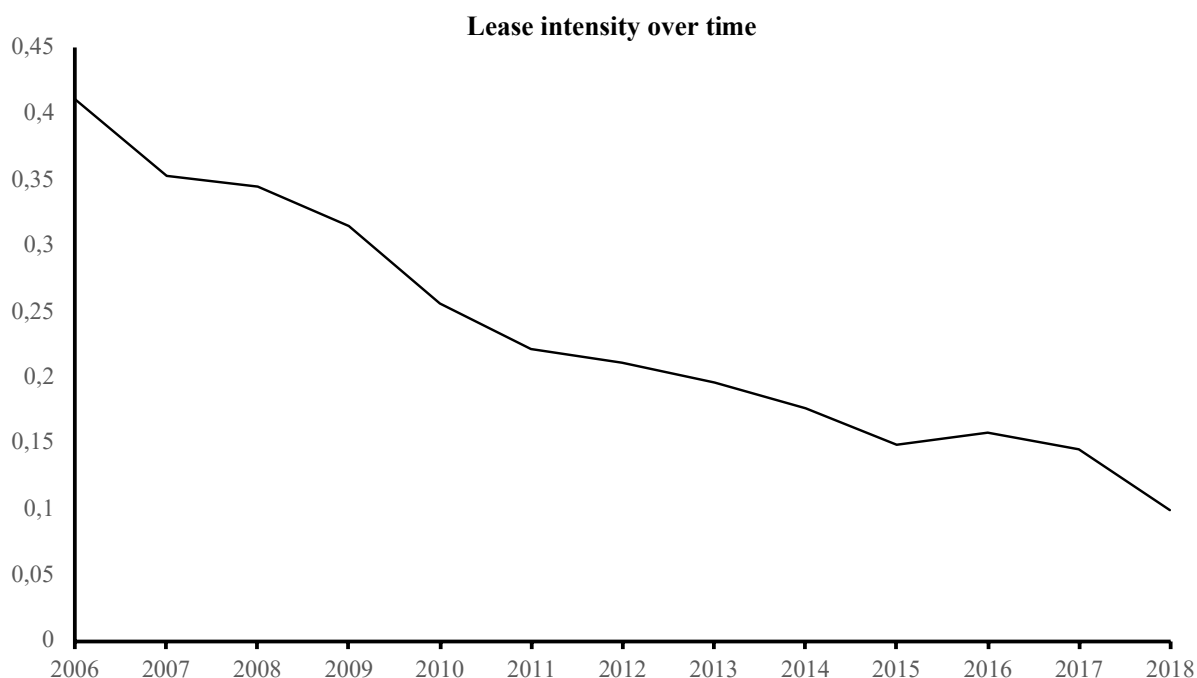
Formula (vi) represents the ALR factor for converting PVOL into PVA. The nominator represents the asset value equal to a one-dollar annuity for the total life (TL) times the ratio of the remaining years (RL) to the total life of the lease (TL). The denominator represents the liability value equal to the present value of a one-dollar annuity for the remaining years of the lease.

Financial statements do not disclose the total or remaining lives of leases nor do they generally inform the reader on the average maturity of the lease portfolio. This presents further difficulty as the magnitude of the ALR-factor for a single lease, and thus the unrecorded lease asset, depends on which point in time of its life the lease is presently in. As Figure 4 shows, under the previously stated assumptions, the ALR-factor is smallest in the mid-point of its life and largest either in the start of or when approaching the end of its useful life. Imhoff et al. used a 70 percent factor in 1991 and a 75 percent factor in 1997 as a general rule on thumb. Their 1991 study argues that most of the time the ratio of lease asset to lease liability is between 60 to 80 percent and therefore using 70 percent as a general factor is not unreasonable. Note that these

percentages are influenced by high discount rates in the study compared to present standards. This study adopts the method used in Jennings & Marques (2013); the total life of the lease is assumed to match the years for which cash flows are expected (i.e. formula (ii) does not represent the remaining life as in Imhoff et al. (1997) but rather the total life). The remaining life on the other hand is assumed to be  $TL/2$  implying that the average lease is in the midpoint of its expected useful life.

Following this methodology, the proportional amount of the capitalized (operating) lease asset over the totality of revenue generating fixed assets (including all finance leases) for a given company is calculated for each financial year – i.e. the proxy for operating lease intensity. Below, in Figure 5, the yearly average lease intensity for all companies through the sample period is shown.

**Figure 5. Average yearly lease intensity of sample companies through the sample period**

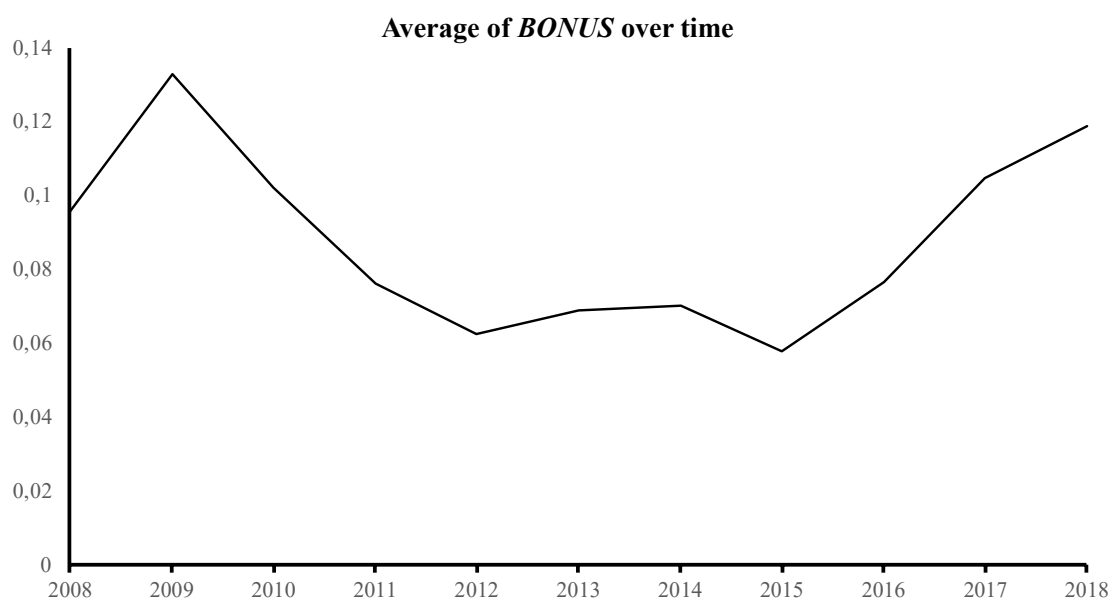


### 5.2.3 Main explanatory variable

In order to test the hypothesis, two proxies for management bonuses are constructed and tested separately against the dependent variable: *BONUS* and *D\_BONUS*. To mitigate problems

caused by possible multicollinearity of a bonus proxy in relation to control variables such as profitability (accounting-based bonuses are driven by performance such as earnings etc.), as per Shalev et al. (2013), *BONUS* is constructed as a two-year lagged average of the ratio between CEO's bonus over total pay. Note that this design causes changes to the period for which observations are found as described in 5.1 Sample selection. As such, this variable measures the relative importance of cash bonus in a CEO's total pay package. As Lückerath-Rovers (2007) found, operating lease intensities were found to be higher for companies with CEOs receiving higher levels of bonuses in relation to total compensation. Figure 6 below shows the average level of *BONUS* over time. The plotted line takes on a u-shape; bonuses have peaked both in 2009 and 2018 whereas the years in between show roughly a decline until 2012 and a rise back to previous levels beginning in 2015. *D\_BONUS* on the other hand is simply a dummy variable taking on the value of 1 if a bonus is paid both during the financial year for which lease intensities are calculated and the previous financial year. Further, the lag for this variable is also relaxed to one year (although it is also qualitatively different from the lag associated with *BONUS*). This variable is constructed as a dummy in order to relax the assumption of linearity imposed by the model between operating lease intensity and bonuses (as with *BONUS*) and to simply observe whether a categorical relationship between *LEASEINT* and *D\_BONUS* is present. Thus, the coefficient for *D\_BONUS* simply picks up the average change in lease intensity if management bonuses are paid during the year.

***Figure 6. Average ratio of bonuses over total compensation through the sample period***



#### 5.2.4 Control variables

*LEVERAGE* was identified by most of the abovementioned lease capitalization studies as the variable which was the most affected by lease capitalization (highest impact on financial ratios). Indeed, literature has shown that the off-balance sheet financing aspect of operating leases is one of the fundamental reasons for managers to choose not to capitalize operating leases, i.e. to avoid presenting debt on the balance sheet (Ang & Petersen, 1981) or breaking leverage-based covenants (EL-Gazzar et al., 1986; Duke, 2002). This implies that the greater the ratio of debt to equity for a given company, the more likely it is to prefer operating leases over finance leases. The variable is expected to exhibit a positive relationship between leverage (D/E) and operating lease intensity.

*SIZE* is shown by Lückérath-Rovers (2007) to have at best been an ambiguous determinant of leasing in literature and valid arguments have been made for both a positive and negative relationship between size and operating lease intensity. The suggested reasons vary from arguing for a negative relationship based on larger companies' ability to redeploy assets internally (less need to avoid long-term commitments – the flexibility argument) to the positive relationship by political cost and financial constraint theory in which the former states that larger companies are more watched and have more pressure to report better financials and the latter arguing that larger companies have better access to financial markets (allowing to choose financial contracts that are in their best interest). Based on empirical findings, however, within the airline context Gavazza (2010) finds that, measured by carrier fleet size, smaller carriers are more likely to lease in accordance with the flexibility argument. To avoid the potential endogeneity of using total assets as the variable for size (as they are affected by lease intensity), the natural logarithm of sales is chosen. *SIZE* is expected to have a negative relationship with lease intensity as smaller airlines are expected to finance a larger portion of their fleet through operating leases.

*GROWTH* (proxy for the investment opportunity set) has been a traditional theoretical explanatory variable for leasing intensity. Lückérath-Rovers (2007) identifies that generally a positive relationship between growth (investment opportunity) and leasing has been expected: companies that have been growing in the past and face more uncertainty are inclined to use financing such as leasing which allows for more flexibility than owning assets does. This implies that high-leasing companies are expected to have grown more in the past than low-



leasing companies as well as the notion that high-leasing companies are expected to grow more *in the future*. Also, research on management compensation has in general found that firms with greater growth opportunities (and size – a note towards the previous control variable) require more talent and highly paid managers (Conyon, 2011). Sharpe & Nguyen (1995) use a no-dividend dummy variable as a proxy to identify growth companies (they are less likely to pay out dividends when facing a large set of investment opportunities). Also, Lückerath-Rovers (2007) points out that no-dividend has been one of the few statistically significant variables proxying growth in literature. Based on the above, this variable (taking a value of 1 when dividend is paid) is expected to have a negative relationship with operating lease intensity.

*PERFORMANCE* is selected as a control variable due to its popularity in literature – there are two ways profitability is expected to have an effect on operating lease intensity (Lückerath-Rovers, 2007). First, it is expected that lower levels of earnings (low profitability) may cause managers to prefer operating leases over finance leases due to the enhancing effect non-capitalization of leases has on earnings. Second, firms with low profitability may face higher external financing costs because they are closer to exhausting their debt capacity and have to rely on leasing. Thus, both hypothesize a negative relationship between (operating) lease intensity and profitability. The proxy for profitability on the other hand is a more challenging matter to address. It could be argued that the most straightforward way to measure profitability is to choose earnings as a proxy. In this case, however, earnings (NI) is influenced, as shown above, by the choice of financing through operating leases and, therefore, the relationship between NI and lease intensity is endogenous. Also, measures like ROA which have total assets or other balance sheet items in their denominator, are also affected by non-capitalization of operating leases, and again, are by nature endogenous in relation to leasing intensity. To get around this matter, as proxy for profitability (performance), the ratio of operating income to sales is chosen as per Sharpe & Nguyen (1995) (their definition of cash flow). In order to avoid creating a measure influenced by either the choice between leasing and buying, or by lease-intensity itself (amount of operating lease rent expenses in EBITDA), operating income is defined as EBITDA with rent expenses added back divided by total sales. As this measure does not take into consideration any effects of capitalization (or interest expenses, depreciation, rent expenses for that matter), it should offer a more robust way to measure profitability. For instance, the temporal effects of the front-loading are not included in this proxy – this way the

potential endogeneity is mitigated. On the same note, the control variable LEVERAGE should, on the other hand, proxy the level of financial cost effecting profitability as companies with higher debt are expected to suffer higher interest expenses.

## 6. Results and findings

This chapter discusses the results and findings of the empirical analysis. First the descriptive statistics for the sample are presented while the second part focuses on the regression results for the empirical model. Thirdly, outliers are discussed and multicollinearity test results presented.

### 6.1 Descriptive statistics

Table 1 below shows the sample's descriptive statistics excluding dummy variables *D\_BONUS* and *GROWTH*.

Table 1					
<i>Variable</i>	<i>LEASEINT</i>	<i>BONUS</i>	<i>SIZE</i>	<i>LEVERAGE</i>	<i>PERFORMANCE</i>
Mean	0.25	0.09	8.47	4.89	0.23
Median	0.24	0.00	8.10	2.19	0.23
St. Dev.	0.16	0.17	1.52	9.01	0.07
Minimum	0.00	0.00	5.40	0.64	0.00
Maximum	0.70	0.83	11.15	77.23	0.40

Table 2 shows the mean, median, standard deviation, minimum and maximum value for all observations and variables. Each of the figures should be interpreted with their nature in mind. The variables *LEASEINT*, *BONUS*, *LEVERAGE* and *PERFORMANCE* are relative figures and express an abstract ratio, whereas *SIZE* is the natural logarithm of sales.

For *LEASEINT* the distance between the median and mean is small indicating little but some skewness with the maximum value of 0.70 confirming the observation. The bulk of observations for this variable fall between 0.2 – 0.6 (83 percent). Thus, within listed U.S. airlines, an average of 25 percent of the means of production through the years 2008 to 2018 have been financed by use of operating leases. The standard deviation shows that there is substantial variation in lease intensities in this cross-sectional sample. The median for *BONUS* exhibits the fact that most observations in the sample show no paid bonuses (63 percent) and therefore take on the value of zero. 61 observations of 155 show the lagged two-year average

bonuses larger than zero with 24 (15 percent) of these in the range of larger than zero and less or equal to 10 percent of total compensation, 31 (20 percent) in the range of larger than 10 and less or equal to 50 percent of total compensation. Only six observations exhibit ratios larger than this. The maximum value and mean indicate (with the median value in mind) that observations for this variable are strongly positively skewed – thus, the median value and standard deviation tell little of the variable’s distribution alone. The mean and median values for *SIZE* are relatively close to each other with a fairly small standard deviation for observations. The minimum and maximum values exhibit no large single deviations. For *LEVERAGE*, the mean observation is 2.2 while the median 4.9 exhibiting some skewness. The standard deviation for the variable is fairly large (9.01). 144 out of 155 observations fall within the range of 0-10 percent (91 percent) and the rest are values larger than 10 – this is to be expected as balance sheet debt 10 times or more the amount of shareholder’s equity is undesirable for companies for reasons of increased fragility to volatility both in the operating and financial domains. The maximum shows that a small number of observations take on a large value – these are cases in which shareholders equity is relatively close to zero inflating the ratio. 116 out of 155 (75 percent) observations fall within the range of 0-4 times debt to equity. *PERFORMANCE* exhibits the least skewness and appears to be closest to a normal distribution out of all the variables: the mean and median are both 0.23 with a standard deviation of 0.07 and observations are evenly distributed around the median. Observations for *PERFORMANCE* involve no outliers. This can be expected due to the nature of the variable; operating profit with rent expenses added back is certain to operate within a certain range due to economic realities. Observations for dummy variables *D\_BONUS* and *GROWTH*, not addressed in the above table, are as follows: for *GROWTH*, 58 percent of the time this dummy variable takes on a value of 1 (indicating that cash dividends larger than zero were paid by a sample company in a given financial year), while for *D\_BONUS*, 20 percent of the observations took on the value of 1 indicating payment of cash bonuses for two years in a row.

## **6.2 Regression results**

Two multivariate regression models were used to predict the level of operating lease intensity within the sample. The total sample consisted of 155 observations between the years 2008 -

2018. In model (1), the main variable of interest is a two-year lagged average of bonuses over CEO total compensation, and in model (2), a dummy bonus variable is used which takes on the value of 1 if bonuses were paid out during both the financial year (for which lease intensities were estimated) and the year previous to that. Control variables include proxies for company size, leverage, growth and performance. Overall, model (1) was found to have statistically significant explanatory power: with five variables and 149 degrees of freedom,  $F = 6.54, p < 0.000$ . The adjusted  $R^2$  for the model was 0.1524 indicating that the model is able to explain roughly 15 percent of variation in operating lease intensity. Results for model (1) are presented below in Table 2.

<b>Table 2</b>					
<b>Variable</b>	<b>Predicted</b>	<b>Coefficients</b>	<b>t-stat</b>	<b>P-value</b>	<b>Significance</b>
<i>Intercept</i>		0.30	2.77	0.01	***
<i>BONUS</i>	+	-0.18	-2.24	0.03	**
<i>SIZE</i>	-	0.01	0.54	0.59	
<i>LEVERAGE</i>	+	0.00	1.37	0.17	
<i>GROWTH</i>	-	0.05	1.90	0.06	*
<i>PERFORMANCE</i>	-	-0.48	-2.45	0.02	**

\*\*\* Significant at 1%

\*\* Significant at 5%

\* Significant at 10%

Results were very similar for model (2). With five variables and 149 degrees of freedom,  $F = 6.52, p < 0.000$ . Adjusted  $R^2$  was also very close to model (1) with 0.1521. Results for model (2) are presented below in Table 3.

In model (1), out of all the variables, two are statistically significant at the 5 percent level: *BONUS* and *PERFORMANCE*. *GROWTH* is statistically significant at the 10 percent level with  $p = 0.06$ . For *LEVERAGE* and *SIZE* however, the p-values are 0.17 and 0.89 respectively indicating that changes in these variables have weaker correlations with the dependent variable. For these two variables, the signal-to-noise ratio is interpreted as too large for valid positive interpretations to be made – therefore, contrary to predictions based on literature, within the sample companies and sample period, company size and capital structure as proxied by the

variables *SIZE* and *LEVERAGE*, do not appear to explain airline's operating lease intensity. Model two shows similar results with one difference: in this model, *GROWTH* is statistically significant at the 5 percent level (compared to the 10 percent level as with the first model). *SIZE* and *LEVERAGE*, however, remain statistically insignificant.

Table 3					
Variable	Predicted	Coefficients	t- stat	P-value	Significance
<i>Intercept</i>		0.25	2.45	0.02	**
<i>D_BONUS</i>	+	-0.07	-2.23	0.03	**
<i>SIZE</i>	-	0.01	1.15	0.25	
<i>LEVERAGE</i>	+	0.00	1.15	0.25	
<i>GROWTH</i>	-	0.05	2.08	0.04	**
<i>PERFORMANCE</i>	-	-0.44	-2.29	0.02	**

\*\*\* Significant at 1%

\*\* Significant at 5%

\* Significant at 10%

In both models, the control variable *PERFORMANCE* has a coefficient in line with its predicted direction consistent with literature on determinants of leases. Within the sample companies, low financial performance (high performance) indicates higher (lower) operating lease intensity. Both models predict the percentage point change in companies' operating lease intensity given a one percentage point change in the company's financial performance. For model (1), the quantitative relationship in the sample between *PERFORMANCE* and *LEASEINT* is -0.48 indicating that a one percentage point increase in  $\frac{EBITDA \text{ less rent expenses}}{Sales}$  results in 0.48 percentage point decrease in operating lease intensity. For model (2), the same interpretation applies but with a slightly weaker relationship (a decrease of 0.44 percentage points). Airlines' operating lease intensities appear to be most sensitive to changes in this variable compared to other specified model variables. In both models, the variable *GROWTH* has a positive coefficient unlike what was predicted based on literature. This is somewhat of a surprise; *GROWTH* was expected to have a negative relationship with operating lease intensity as growing companies have an increased need for flexibility in their operations (implying preference for operating leases), and paying dividends implies low growth (low investment opportunities). However, within the sample companies, the relationship between *GROWTH* and *LEASEINT* is 0.05 implying that paying out cash dividends increases the average operating

lease intensity by 0.05 percentage points – a relationship of the opposite direction than predicted. It is clear that this variable has little, although statistically significant, explanatory power over operating lease intensity.

The variables of interest in this study are *BONUS* in model (1) (measuring a two-year lagged average of bonus over total pay of CEOs) and *D\_BONUS* in model (2) (a dummy variable indicating payment of cash bonuses two years in a row). Inconsistent with  $H_0$ , the coefficients on bonus variables are significantly negative. This implies that as the proportion of bonus compensation increases, the level of lease intensity decreases. Findings are statistically significant in both models at the five percent level. The coefficient for *BONUS* (model (1)) indicates that a one percentage point increase in the ratio of bonuses over CEO total pay results in a decrease of 0.18 percent in lease intensity. In the case of *D\_BONUS* model (2), the strength of the relationship (in terms of effects) is less notable: if bonuses are paid both in the year of observation  $t_i$  and the previous year  $t_{i-1}$ , then on average, operating lease intensities are 0.07 percentage points lower. Therefore, within the airline industry, higher operating lease intensities are associated with lower bonuses for CEOs.

### **6.3 Outliers and multicollinearity**

Trustworthiness of the model is addressed in two ways: firstly, non-informational outliers were deleted and secondly, a VIF analysis is conducted to evaluate possible multicollinearity.

Outliers were deleted from the sample if they represented very large single yearly observations. Two observations were deleted for the variable *LEVERAGE* as the fall of shareholder's equity to close to zero (single yearly observations) for two companies caused D/E ratios on two occasions to grow with a factor of 100 times compared to the rest of the observations for the same company. This was warranted as such a number is not particularly descriptive of reality but is rather a consequence of the nature of the variable (a ratio) and increases bias in the model.

VIF (variance inflation factor) is a method of quantifying the severity of multicollinearity in an OLS regression by calculation of an index measuring how much the variation of a regression coefficient is increased by correlations between variables, and thus, leading to model instability.

Essentially, each independent variable is regressed against other independent variables to see how much of the variation of variable  $X_{1i}$  is explained by  $X_{2i}, X_{3i} \dots X_{pi}$  (expressed by the obtained  $R^2$ 's for each regression) and inflated by the formula  $\frac{1}{1-R_i^2}$ . The results can be interpreted by a rule-of-thumb method: if the resulting variance inflation factor for each independent variable is below 5, no severe multicollinearity is present. Another measure of multicollinearity is Tolerance which is simply the reciprocal of VIF. Tables 4 below present both the VIFs and Tolerances for the independent variables of model (1) and model (2) respectively.

<b>Table 4</b>				
	<b>Model (1)</b>		<b>Model (2)</b>	
<b>Independent variable</b>	<b>Tolerance</b>	<b>VIF</b>	<b>Tolerance</b>	<b>VIF</b>
<i>BONUS</i>	0.81	1.23	n/a	n/a
<i>D_BONUS</i>	n/a	n/a	0.95	1.06
<i>SIZE</i>	0.65	1.54	0.75	1.34
<i>LEVERAGE</i>	0.85	1.18	0.84	1.19
<i>GROWTH</i>	0.89	1.12	0.89	1.12
<i>PERFORMANCE</i>	0.83	1.21	0.84	1.20

The calculated VIFs for both models are low indicating little presence of multicollinearity between explanatory variables. Based on these tests which show hardly any linear relationship between independent variables in model (1) and model (2), both empirical models appear stable in this respect. Inferences made based on these results are not jeopardized by multicollinearity.



## 7. Discussion

Based on the results of the empirical model, the hypothesis is rejected. A positive association was expected between high levels of operating lease intensities and CEO bonuses relative to total compensation implying that operating leases have been used by airline CEOs to opportunistically increase their compensation. The relationship between the variables *BONUS* and *D\_BONUS* turned out to be of the opposite direction expected and, surprisingly, with this negative association in mind, the results show that these bonus variables have some explanatory power when compared to the best performing (theoretically grounded) control variable of the models (with statistical significance). The CEOs of airlines with higher operating lease intensities had a) on average lower ratios of bonuses to total compensation as per model (1) and b) had more often not been paid cash bonuses in both the year of the observation and the year before that than companies with lower levels of operating lease intensities as per model (2). The models showed overall little explanatory power and many of the selected control variables fared worse than expected. In hindsight, the overall performance of lease-determinant variables as documented by Lückerrath-Rovers (2007) appear to be rather mixed which appears to explain this to some extent. Many determinants which fared well in some studies failed to show statistical significance in others. Indeed, based on this, the performance of theoretical determinants of operating leases do not appear to have performed very well in research.

The theoretical framework, empirical model, and results raise some interesting thoughts and questions when reflected against theories and findings by previous studies. Most notably, what explains the negative association between both *BONUS* and *D\_BONUS* with operating-leases intensity? Is this a case of spurious correlation or do the results bare some meaning? The most tempting intuitive explanation might be related to company financial performance: if less profitable companies use more operating leases, it is logical that bonuses may be smaller. Such an interpretation is backed by the theoretical relationship between effects of operating lease capitalization and performance measures used in compensation contracts: i.e. when net income (earnings) is used to measure performance, bonuses are paid (to some extent) based on earnings, and if this measure turns out low for the financial year, one can intuitively expect low bonus payout. However, the control variable *PERFORMANCE* should in theory adjust for the effects of financial performance preventing it from confounding the main variables of interest, *BONUS*

and  $D\_BONUS$ . Therefore, this explanation is insufficient when considering the design of the empirical model. Also, interestingly, no multicollinearity was detected between  $PERFORMANCE$  and  $BONUS$  implying that they are not driven by the same mechanisms supporting this inference.

If this is the case, and the model is specified as intended (proxies etc.), it remains an open question as of why such a negative relationship exists; the results suggest that management bonuses may serve as inhibiting factor of operating lease usage. Little logical explanation for this can be found apart from a study by Devos & Li (2016), which however appears not to be peer-reviewed (it has not been published in any academic journal), claims to find a negative association between risk-taking incentives and firms' operating-lease intensity driven by the real option embedded in operating leases allowing for hedging of firms' asset risk (e.g. the risk of owning an obsolete asset). The article argues that 1) *real leases* (i.e. operating leases) in which the lessor carries such risk while receiving rental payments are comparable to a real option, and 2) because incentive compensation has a substantial influence on CEOs hedging activities while greater risk-taking incentives discourage hedging, a negative relationship is expected between operating-lease intensity and management compensation. This hypothesis is confirmed by the study and reported as robust. However, no other studies with any take on the matter apart from this were identified.

It might be suspected, based on the literature review, that the design of the variable  $BONUS$  could explain the negative relationship between operating lease intensities and  $\frac{CEO\ cash\ bonus}{CEO\ total\ compensation}$  as it was noted that the total level of CEO compensation has increased dramatically in the U.S. during the past 20 years. Indeed, if inflation adjusted absolute levels of bonuses have remained stagnant over this timeline while total compensation has increased as a result of the rise of equity-based compensation, then the denominator of  $BONUS$  has grown causing the ratio to decrease. However, the coefficient of  $D\_BONUS$ , which does not take in absolute levels of CEO total compensation, is also negative. As such, the growth of CEO equity-based compensation and its relation to the design of  $BONUS$  is not a plausible explanation.

Other considerations of causes are far more speculative. For instance, one reason for a negative association between operating-lease intensity and the bonus variables may be that management

bonuses are not paid linearly in relation to improvements in whatever performance measure they may be based on, but rather, they operate within a set of thresholds as noted by Murphy (2013). In the case of most bonuses, there exists a threshold related to a performance measure after which a minimum bonus amount is paid, if a company is making a loss (or generally scores lower on performance measures than expected) these thresholds may not be breached. In such cases, speculatively, when little or no bonuses are paid, the bonus variable may exhibit a negative relationship to the average operating-lease intensities even as profitability is controlled for.

Other possibilities are less clear: for instance, whether temporal effects of lease capitalization and the fact that operating-lease intensities have been steadily declining with airlines in the sample period have an effect on the empirical results. Indeed, we have seen with lease capitalization studies that lease capitalization is a double-edged sword with respect to its temporal effects. In the initial years of leases, capitalization will decrease net income (i.e. recording operating leases will increase income in comparison) as the sum of depreciation and interest exceed the rent expense associated with operating leases. For later years of the assets' useful life, this effect will reverse, and capitalized leases will impact NI positively (compared to the same leases being accounted for as operating leases). Duke (2009) states it eloquently: firms need to lease assets regularly to keep the average lease life below the point in which net income is negatively affected. Thus, the general effects of lease capitalization on sample companies' average income depends heavily on whether the maturity of the lease portfolio is increasing or decreasing. This would imply that were earnings in the center of bonus schemes, on average, a growing portfolio of operating leases would be needed to sustain high bonuses. This does not seem to be the case with airlines: as Figure 5 shows, the average operating lease intensity has fallen dramatically from 40 percent in 2006 to about 12 percent in 2018. Basically, less and less of revenue generating assets appear to have been financed by operating leases. If CEOs have been adjusting operating lease intensities downwards in anticipation of, for instance, a new lease accounting standard, then it is also appropriate to assume that any attempts to maximize compensation with such a mechanism have also been discarded.

Regarding control variables in the model and their poor performance, it would be interesting to learn whether this is due to poor proxies or the validity of theoretical determinants in general.

It can be assumed that plausible reasons (i.e. determinants) for operating lease financing for airlines are related to business and economic reasons. For airlines, operating leases may provide the greatly needed flexibility and mitigation of assets risk; assets such as aircrafts involve massive costs which, if by design or management decision (financing) end up being fixed, will increase the fragility of an airline to outside volatility substantially and thus weaken it. On that note, with fragility in mind, it can also be speculated that CEOs are more interested in securing their compensation by keeping the airlines they run alive in times of turmoil than focusing on accounting-gimmicks (indeed, this note is made at a time when a global pandemic is shaking the airline business).

## **8. Conclusions**

### **8.1 Research summary**

By studying data on U.S. airlines between years 2008 – 2018, this thesis examined whether two proxies of CEO bonuses have explanatory power over operating lease intensities. Two empirical models used in analysis incorporated five explanatory variables based on academic literature outlining determinants of leases. It was hypothesized that operating lease intensity is partly driven by CEOs opportunistically aiming to maximize their compensation by avoiding operating lease capitalization to artificially improve performance measures used in bonus contracts.

Based on the empirical model's results, the hypothesis was rejected. The variables measuring bonuses were assumed to have statistically significant positive relationships with operating lease intensity, but as it turned out, within the sample, the opposite appears to be true; both variables are associated negatively with the dependent variable. Based on academic literature on both leasing and management compensation, no compelling reasons were identified for the existence of such a relationship. The result seems to be broadly in line with prior literature in the sense that research documenting similar relationships between management compensation and leases have so far yielded mixed results and management compensation variables have been described to have performed poorly in general.

### **8.2 Limitations and suggestions for further research**

Limitations to this study include at least 1) an absence of sensitivity analysis with respect to discount rates used and assumptions related to variable construction, 2) testing whether certain favorable and non-favorable conditions related to effects of lease capitalization (e.g. conditions for positive net income effects of non-capitalization mentioned in the discussion of lease-capitalization-effect ambiguities), are systematically prevalent in subsamples of companies paying out varying levels of bonuses (i.e. controlling for these ambiguities), and 3) a limited sample (single industry, fairly few observation of paid-out cash bonuses).

In light of these results, it would be interesting to see a study, perhaps one which combines several industries thus yielding a larger sample size bringing out industry-specific characteristics hidden by lack of such comparison in this sample. The sample could be divided into two groups based on the estimated maturities of sample companies lease portfolios, one consisting of companies with short average time to lease maturity, and one with similarly high average time. As temporal effects of lease capitalization cause lower comparative earnings for non-capitalizers of leases after the midpoint of portfolio lease life (whereas the opposite is true for finance leases), one could examine whether a CEO bonus-variable yields a positive relationship with operating lease intensity in the divided sample of companies with high lease-portfolio maturities (implying growing lease portfolios). On this note, it is likely crucial to study industries with growing lease portfolios for literature does not support the existence of a positive relationship between management compensation levels and operating lease intensities outside of them.

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