

# ACCOUNTING DISCRETION IN PURCHASE PRICE ALLOCATION

## Finnish evidence

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**Objectives:**

The objective of this thesis is to examine whether discretion is used in the purchase price allocation decisions in companies listed in OMX Helsinki in 2007.

**Data:**

The sample consists of companies listed in OMX Helsinki reporting acquisitions in their 2007 financial statements. Companies operating in the financial services industry are excluded due to their different financial characteristics. Thus, the sample consists of 54 observations. The data is extracted from the financial statements of the sample companies and Bloomberg database.

**Results:**

No evidence was found that discretion in the allocation decision is used in order to manage earnings. Instead, a negative association between the size of the acquirer and proportionate allocation to goodwill was documented implying that scarcity of accounting resources or political costs impact the allocation decision. Moreover, evidence was found that companies in technology, media and telecom sector allocate proportionately more to other intangible assets than companies operating in other sectors. Also, a positive association between the R&D activity of the acquirer and allocation to intangible assets was documented. These further consolidate the findings implicating that the reported allocations do not deviate from the underlying economics as a result of earnings management.

**Keywords:**

Purchase price allocation, IFRS 3, earnings management, mergers and acquisitions

## HARKINNANVARAISUUDEN HYVÄSIKÄYTTÖ KAUPPAHINNAN ALLOKOINNISSA

Tutkimus suomalaisella aineistolla

### **Tutkimuksen tarkoitus:**

Tutkielman tarkoituksena on selvittää käytetäänkö kauppahinnan allokointipäätökseen liittyvää harkinnanvaraisuutta hyväksi Helsingin pörssissä listatuissa yrityksissä vuonna 2007.

### **Aineisto:**

Tutkimusaineisto muodostuu Helsingin pörssissä listatuista yrityksistä, jotka raportoivat yritysjärjestelyjä vuoden 2007 tilinpäätöksissään. Rahoituslalla toimivat yhtiöt on suljettu pois aineistosta niiden erilaisten taloudellisten ominaisuuksien takia. Aineisto koostuu 54 havainnosta. Aineisto on kerätty yritysten tilinpäätöksistä ja Bloomberg-tietokannasta.

### **Tulokset:**

Todisteita allokointipäätöksen käytöstä tuloksenohjailukeinona ei löytynyt. Sen sijaan tutkimustulokset osoittavat, että ostajayhtiön koolla ja allokoinnilla liikearvolle on negatiivinen yhteys. Tämä voi merkitä sitä, että resurssien puutteella tai poliittisilla kustannuksilla on vaikutusta allokointipäätökseen. Tulokset osoittavat myös, että teknologia-, media- ja tietoliikennetoimialalla toimivat ostajayhtiöt allokoivat suuremman osan kauppahinnasta muille aineettomille hyödykkeille kuin muilla toimialoilla toimivat yhtiöt. Lisäksi havaittiin, että ostajayhtiön T&K- kulujen ja muille aineettomille hyödykkeille allokoinnin välillä on positiivinen yhteys. Nämä löydökset tukevat havaintoa, etteivät raportoidut allokoinnit poikkeaa todellisesta tilanteesta johtuen tuloksenohjailusta.

### **Avainsanat:**

Kauppahinnan allokointi, IFRS 3, tuloksenohjailu, yritysjärjestelyt

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amounts of the acquired identifiable assets and assumed liabilities on the acquisition date.

Purchase Price Allocation

The allocation of the cost of an acquisition to the fair values of the underlying assets and liabilities, both tangible and intangible.

Cost of combination/Purchase price

The fair values, at the date of exchange, of assets given, liabilities incurred or assumed, and equity instruments issued by the acquirer, in exchange for control of the acquiree; plus any costs directly attributable to the business combination.



# 1. Introduction

## 1.1 Background

IFRS became effective in Finland in the beginning of 2005. It was based on the European Union decision dating back to 2002 to require European companies listed in an EU securities market to prepare their consolidated financial statements according to IFRS from financial year 2005 onwards. IFRS 3 – Business Combinations (hereafter IFRS 3) was originally issued in 2004 with effect on business combinations completed after 31 March 2004.

Prior to adopting IFRS, Finnish listed companies accounted for business combinations (and possible subsequent goodwill) under Finnish Accounting Act. According to Finnish Accounting Act, the acquirer is obligated to amortize goodwill during its economic useful life (20 years at maximum). Under IFRS, companies are no longer allowed to amortize goodwill, but instead, goodwill must be subjected to annual impairment testing based on the expected future cash flows.

Goodwill impairment testing has been criticized for being too subjective. Impairment testing has been argued to allow management to use discretion in the timing of the impairments and e.g. avoid recording impairment charges in years when earnings look bad and vice versa.

Similarly, there is a high level of discretion related to purchase price allocation in recognition between goodwill and intangible assets. The more goodwill is recorded in connection with the allocation, the more room there is for discretion in terms of the impairment charges in the future. The allocation decision does not have to be made on the day the transaction is completed so it can be done simultaneously with earnings follow-up. The discretion related to purchase price allocation is further discussed in section 2.3.

If the reported allocation does not fully correspond to the actual underlying economics, the capital markets' valuations are based on incorrect information, which is likely to lead to disturbance in price formation.

Acquisitions often constitute a notable share of companies' growth and, therefore, it is crucial to have accurate information on acquisitions, on which the estimates of the future value of the company are based. Deviation of the reported purchase price allocation from the actual underlying economics dilutes the accuracy of the acquisition information and may result in drastic errors in valuations.

## **1.2 Purpose**

The purpose of this paper is to examine whether discretion is used in the purchase price allocation decision that makes the reported allocation deviate from the underlying economics. Also neglecting the allocation process due to e.g. a lack of resources is regarded as use of discretion in this paper as an external appraiser could be hired to conduct the allocation.

In this paper, purchase price is defined similarly to PwC (2005) and FFSA (2006, 2007), i.e. as the difference between the enterprise value and net debt and is divided into three components:

- 1) Goodwill. Goodwill is the amount that is reported on the financial statements in connection with the purchase price allocation disclosures.
- 2) Other intangible assets. Other intangible assets are defined as all intangible assets deducted by goodwill.
- 3) Other net assets. Other net assets are defined as the purchase price deducted by goodwill and other intangible assets.

Thus, non-controlling interests and translation differences are included in other net assets. However, the overall impact of these items is very minor and other net assets consist almost entirely of tangible assets.

Even though the discretion in purchase price allocation is mainly related to goodwill, the impact of company-specific characteristics on allocations to other intangible assets and other net assets are also tested.

Testing the allocation to other intangible assets can be seen as a reversed examination. E.g., certain industries are considered more intangible asset intensive than others (e.g. information technology versus banking) (Collins et al., 1997, Lev and Zarowin, 1999). Therefore, it can be argued that in acquisitions taking place within intangible asset intensive industries the relative allocation to other intangible assets should be larger than in other industries. Similarly, an extensive R&D activity can be argued to lead to a higher level of intangible assets.

If, however, this is not the case, it would give a reason to suspect that the allocation does not correspond to the underlying economics. Since the excess purchase price, and how it is structured, varies case by case, there is no straight trade-off between allocation to goodwill and other intangible assets. Therefore, allocation to other intangible assets must also be examined.

As there is a lot of subjectivity related to the allocation of the purchase price, the underlying accounting procedures are not verifiable. In order to illustrate the role verifiability plays in the purchase price allocation, an analysis to explain allocation to other net assets is also conducted. This is done because the valuation of other net assets is likely to involve less discretion as tangible assets are always recorded, either purchased or internally constructed. Barth et al. (1998) and Wyatt (2005) argue that reliability is the main reason why intangible assets are not always recorded.

These arguments imply that valuation of tangible asset, in general, involves less discretion and is more reliable. Therefore, allocation to other net assets is tested by using the same set of variables as for goodwill with the expectation that the same variables that explain allocation to goodwill do not explain allocation to other net assets because of the high level of discretion related to recognition of goodwill compared to recognition of other net assets.

However, allocation to goodwill and other intangible assets are the main focus area of this paper as they are not previously recorded in the acquiree's balance sheet, and, therefore, have no "reference values". According to Vuorela (2008), fair value adjustments to net tangible assets are often minor compared to goodwill and other intangible assets. Consequently, the fair value of net tangible assets is often close to the book value of net tangible assets in the acquiree's balance sheet.

The fair value of the acquiree can be verified at the time of the acquisition, but the fair values of individual assets cannot. Moreover, the allocation decision has a direct impact on the acquirer's accounting earnings. Thus, there is a remarkable component of discretion related to identification and valuation of intangible assets.

### **1.3 Contribution**

Earnings management, value-relevance of goodwill and the use of goodwill as an earnings management tool have been widely studied. However, research on goodwill as an earnings management tool focuses mainly on the timing of the impairments, not on the initial recognition of goodwill. Therefore, research on whether discretion is used in the recognition decision is very limited. The limited amount of research conducted on this topic is understandable because accounting standards prohibiting amortization of goodwill and requiring impairments instead are fairly new. In Finland, companies listed in OMX Helsinki have applied these new accounting rules only in three sets of financial statements and the practice is still findings its shape.

This paper contributes to the very limited amount of research conducted on the initial recognition of intangible assets and goodwill and whether there are factors that make the allocation decision deviate from the actual underlying economics. Zhang and Zhang (2007) found evidence that the allocation decision is used as an earnings management tool in the United States, which makes it necessary to examine whether similar findings can be made using Finnish data. In addition, Rantsi (2007), in his master's thesis, studied the application of IFRS 3 in OMX Helsinki and whether the acquiring companies' characteristics in general have an impact on the allocation of the purchase price. However, Rantsi (2007) did not place a lot of weight on the possibility of use of discretion but focused more on the impact of factors that are not related to use of discretion.

Furthermore, research on this topic is evolving rapidly and recent publications are discussed in this paper. In addition, in the light of prior research, this paper discusses the possible consequences of manipulating the purchase price allocation.

## **1.4 Research outline**

The second chapter provides an insight on purchase price allocation in general, discusses how it is prone to discretion and further motivates the research. The third chapter discusses the institutional settings of the research to provide an understanding of the theoretical framework of this paper. The institutional settings of the research in this paper means discussion of the accounting standards under which business combinations, goodwill and intangible assets are accounted for.

The fourth chapter discusses relevant literature and prior research. Moreover, the fourth chapter binds the prior research and literature together with the research problem of this paper to provide a passageway into and further motivation for the research conducted in this paper. The fifth chapter further discusses prior research and literature, based on which the hypotheses can be built.

The sixth chapter provides a description of the data used in the empirical research and discusses the research methods employed in analyzing the data. The seventh chapter presents the results of the empirical research, discusses and reflects them with theories and findings of previous studies. In the eighth chapter, the findings are summarized. In addition, implications and possibilities for further research are discussed.

## 2. Purchase price allocation

### 2.1 Definition of purchase price allocation

Purchase price allocation is necessary when a lump-sum purchase price is paid for a bundle of assets and liabilities. The paid purchase price must, for accounting purposes, be divided among the acquired assets and liabilities by the acquirer. IFRS 3 requires the purchase price to be allocated at the date of the acquisition to all identifiable assets and liabilities that meet the applicable recognition criteria. The acquired assets must be reported in the acquirer's balance sheet at their fair values (considering minority interest, if applicable). This is done to transform the book-value balance sheet of the acquired company into a fair value balance sheet (KPMG, 2007). The remaining value (after taking into consideration any deferred taxes) is recognized as goodwill. Figure 1 illustrates the determination of goodwill to be recognized.



Acquisition cost

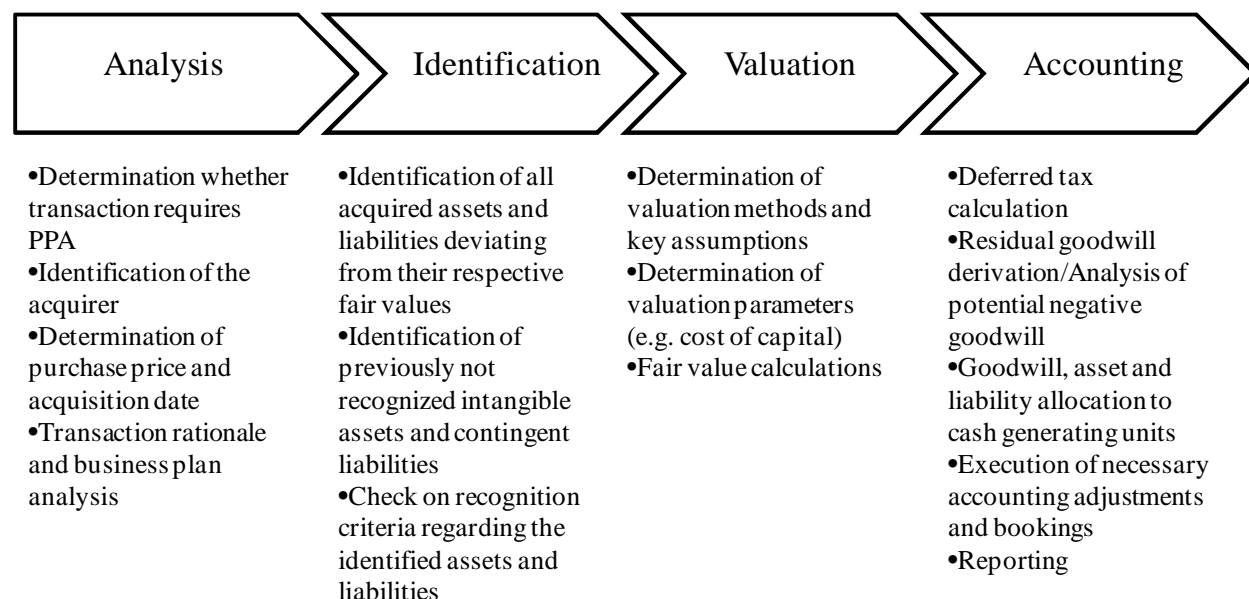
- fair value of tangible assets
- fair value of intangible assets
- + fair value of liabilities
- + fair value of contingent liabilities
- +/- deferred taxes

= Goodwill as residual value

**Figure 1. Determination of goodwill to be recognized. Source: KPMG (2007). Modified.**

The key driver behind purchase price allocation is to make the acquisition process more transparent, i.e. to identify and value the acquired assets thus arriving at the residual amount that represents goodwill (Deloitte, 2007). In a business combination the acquirer must measure (i.e. allocate) the purchased assets at their acquisition-date fair values. For accounting purposes, this represents “a complex challenge” for the acquirer. The process of allocating the purchase price, as required by IFRS 3, involves defining the purchase price, identifying the “hidden reserves and charges” embedded in the assets recognized in the acquiree's balance sheet, as well as

identifying and measuring the assets previously not recognized in the acquiree's balance sheet (KPMG 2007). Figure 2 illustrates the elements of purchase price allocation.



**Figure 2. Elements of purchase price allocation. Source: KPMG (2007).**

Allocation of the paid consideration added with additional costs (e.g. professional service fees) incurred from the transaction can be regarded as an indicator of expectations and motives that are associated with the acquisition. In addition, the outcome of the allocation compared to similar transactions can be used as a basis for analyzing the benefits of the transaction. Moreover, the amount of the residual goodwill may provide signals of the reasonableness of the paid contribution. (KPMG, 2007)

Allocating the purchase price is a complex, technical and organizationally challenging process, the consequences of which are regularly underestimated when the process is initiated. (KPMG, 2007)

## **2.2 Importance of purchase price allocation**

According to Deloitte (2007), the company value that is derived from intangible assets has increased substantially in today's knowledge based economy. The market value of many publicly

traded companies significantly exceeds the book value and Deloitte (2007) attributes this, to a large extent, to assets that are not presented on the balance sheet. This clearly highlights the ever increasing significance of intangible assets and their importance in acquisitions (Deloitte, 2007).

Intangible assets, such as technologies or patents, are often seen as value drivers of the target of the acquisition and, therefore, they present a strong interest for the acquiring company (even acting as a motivator for the transaction). Internally generated intangible assets are usually not recognized in the balance sheet of the target and, according to KPMG (2007), these assets generally account for the majority of the surplus value of the consideration. Identifying and recognizing these assets require a thorough and precise analysis of the whole business model of the target company (KPMG, 2007).

Therefore, it is crucial to conduct a thorough process of allocating the purchase price in order to provide the capital markets information that enables the markets to properly evaluate acquisitions. Moreover, the allocation has a direct impact on the future operating results, which enables the allocation decision to be used as an earnings management tool.

### **2.3 Accounting discretion in purchase price allocation**

Impairment testing of goodwill has been argued to be overly subjective and to open an opportunity to earnings management because management is able to use discretion in the timing of the impairment charges. Postponing the goodwill impairment charges into the future would make accounting earnings of the current reporting period look better. The impairment could be recorded when pre-impairment earnings look better and there is “more room” for impairments.

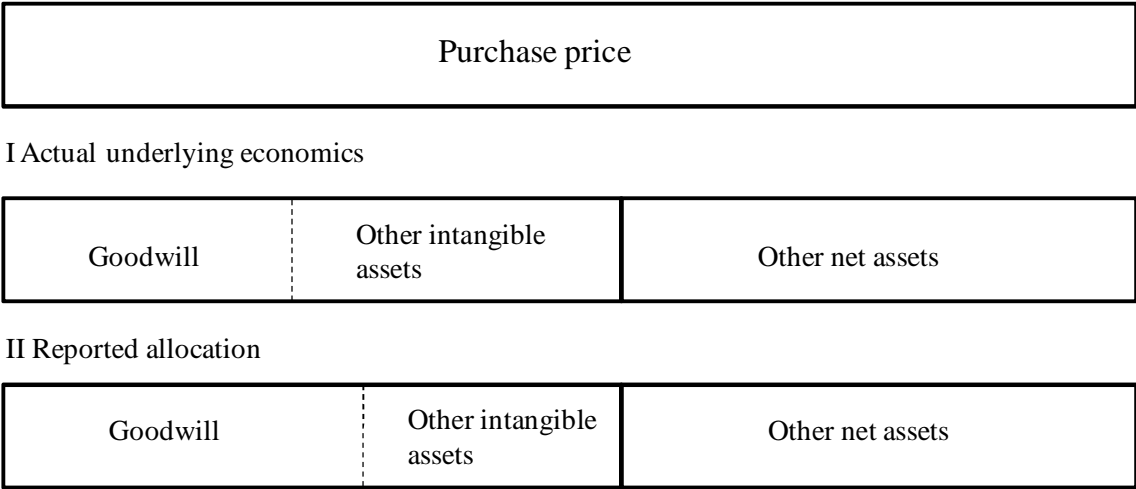
Evidence of the use of goodwill as an earnings management tool has been found. Sevin and Schroeder (2005) found that using discretion in the timing of the goodwill impairments allow companies to manage earnings. Further research supports these findings (e.g. Haman and Jubb, 2008, Van de Poel et. al, 2008). These findings are further discussed in section 4.1.



Despite the consistent findings that goodwill is used as an earnings management tool, the initial recognition of goodwill has not received much attention. Based on prior research and the fact that postponing goodwill impairments makes the current period look better, it can be argued that discretion in the initial recognition of goodwill can be used.

The excess purchase price over the book value of the acquiree’s net assets consists either of goodwill, intangible assets previously not recognized in the acquiree’s balance sheet or both. IFRS 3 requires the acquirer to identify and recognize as many intangible assets apart from goodwill as possible and minimize the amount of recorded goodwill.

According to IAS 38, intangible assets must be amortized during their economic useful lives. Amortization charges would instantly depress reported earnings but instead of recognizing intangible assets, management may use its discretion and record goodwill instead of duly recognizing intangible assets. This would enable management to use discretion in the timing of the impairment charges instead of immediate amortization of intangible assets. Figure 3 illustrates the discretion related to the allocation decision.



**Figure 3. Discretion related to purchase price allocation.**

Figure 3 represents a case where the reported allocation does not correspond to the underlying economics because an amount in excess of the actual value of goodwill is recorded to goodwill instead of duly recognizing all the identifiable intangible assets that the acquirer has paid for.

It can be argued that also factors that are not driven by incentives to boost earnings can lead to use of discretion in the allocation decision. For example, FFSA (2006, 2007) found that the purchase price allocation decision is influenced by scarcity of accounting resources in companies. A lack of resources would, according to FFSA (2007), compel companies to allocate a larger proportion of the excess price to goodwill instead of intangible assets as allocation to intangible assets is time consuming and requires special skills.

## **3. Institutional settings of the research**

### **3.1 IFRS 3**

#### **3.1.1 Objective of IFRS 3**

The objective of IFRS 3 is to improve the relevance, reliability and comparability of the information that a reporting entity provides in its financial statement about a business combination and its effects. To accomplish that, IFRS 3 establishes principles and requirements for how the acquirer:

- (a) Recognizes and measures in its financial statement the identifiable assets acquired, the liabilities assumed and any non-controlling interest in the acquiree;
- (b) Recognizes and measures the goodwill acquired in the business combination or a gain from a bargain purchase; and
- (c) Determines the information to be disclosed to enable users of the financial statement to evaluate the nature and financial effects of the business combination (IFRS 3.1)

#### **3.1.2 Acquisition method**

Under IFRS 3 the acquirer is obligated to account for a business combination using the *acquisition method* (IFRS 3.4) with the exception of

- a) Combinations involving related entities, i.e. entities under common control
- b) Formation of a joint venture
- c) Acquisition of an asset or a group of assets that does not constitute a business.

Accounting for such entities falls out of the scope of IFRS 3 even though it can be considered as merger accounting. For such cases, pooling (historical cost) method is recommended under IFRS 3 (if there is substance to the transaction) (IFRS 3.2).

Applying the acquisition method consists of the four following steps:

1. Identifying “the acquirer” – the entity that obtains control of the acquiree
2. Determining “the acquisition date”, i.e. the date on which the acquirer obtains control of the acquiree
3. Recognizing and measuring the identifiable assets acquired, liabilities assumed and any non-controlling interest (NCI) in the target (NCI is measured as a minority’s percentage of the fair value under IFRS 3) (IFRS3.5)
4. Recognizing and measuring goodwill or a gain from a bargain purchase.  
(IFRS3.5)

If an intangible asset is acquired as a part of a business combination, it must be recognized separately if the asset meets the criteria defined in IAS 38 (Intangible assets) (IFRS 3.13). These criteria and accounting for intangible assets under IAS 38 are discussed in section 3.2. IFRS 3 includes a list of intangible assets that satisfy the criteria of being recognized apart from goodwill. Examples of such intangible assets can be found in table 5.

The acquirer’s application of the recognition principle and conditions may result in recognition of some assets and liabilities that the acquiree had not previously recognized as assets and liabilities in its financial statement. For example, the acquirer recognizes the acquired identifiable intangible assets, such as brand names, patents or customer relationships, that the acquiree did not recognize as assets in its financial statement because it developed them internally and charged the related costs to expense (IFRS 3.13).

Goodwill is calculated as the residual value between the purchase price of the acquired business and the sum of fair values of acquired assets and assumed liabilities taking into account any deferred tax charges or credits. In case of a negative residual (the total fair value of acquired assets exceeds the consideration paid, far less common than emergence of goodwill), companies accounting under IFRS 3 are first required to conduct a thorough review of the allocation process to check the accuracy. If the residual remains negative even on validation, it must be charged to the profit and loss account (IFRS 3.36). Under IFRS 3 (the actual guiding standard being IAS 36)

goodwill amortization is not permitted. Instead, goodwill must be tested for impairment annually (IAS 36.96).

### **3.1.3 Determining fair values and valuation approaches**

Under IFRS 3, the acquirer must recognize the acquired tangible and intangible assets as well as the assumed liabilities on their acquisition-date fair values (IFRS 3.18). Even though the acquirer on a frequent basis encounters difficulties in determining the fair values of the acquired assets and assumed liabilities already recognized in the acquiree's balance sheet, according to KPMG (2007), identification and valuation of intangible assets previously not presented in the acquiree's balance sheet pose the greatest challenge in purchase price allocation. These represent the cases where the criteria for recognition were not previously met.

Determination of the fair values is essential for a proper application of the acquisition method. Still, guidance on the fair value determination is rather limited. The standard itself does not contain guidance on determining the fair value of an asset. However, it is important to understand where the fair value of intangible assets is derived from. The following paragraphs provide an insight on how the fair values of intangible assets can be determined.

Valuation (and the subsequent amortization) of intangible assets is not a purely scientific process and subjectivity is involved in both the interpretation and application of the standards (Cranford and Moore, 2004). According to Deloitte (2007), differences in opinion may emerge in company management concerning the key intangible assets acquired. The identification of such assets is likely to lead to much debate.

Valuating the acquired intangible assets can be carried out using either a market, income or cost approach. The following briefly clarifies the main methods used in valuation of the acquired intangible assets. The methods are introduced to illustrate the challenges related to the valuation process.

a) Market approach is widely regarded as the most reliable estimate of the fair value since the value is derived from the prices in an actively-functioning market using multiples. However,

there can be a major downside to this, which prevents this method from being used. Intangible assets acquired are often unique in nature and there is a lack of information about similar prior transactions.

b) Income approach is the most widely used valuation method. It is based on the present value of the future economic benefits expected to be generated by the asset. The difficulty of this method lies in attributing and projecting the future cash flows generated by the asset, defining the appropriate discount rate and estimating the remaining useful life of the asset. The determination of appropriate assumptions requires experience and judgment due to the subjectivity inherent to the process.

c) Cost approach is founded on the supposition that the acquirer would not pay for an intangible asset more than it would cost to reproduce a similar asset that could be used to replace the acquired asset. To arrive at the fair value, all costs including the opportunity cost involved in reproducing the assets and deductions for obsolescence must be taken into account. (Deloitte, 2007)

Determining the cost of capital poses a challenge in performing the valuation based on the income approach. The cost of capital should reflect the risks and rewards related to the asset that is being valued. Similarly, when drawing up projections on the future economic benefits, they should be duly reviewed as they will have an impact on the value and thus a bearing to the impairment reviews conducted in the future.

According to Deloitte (2007), when performing the valuation, possible double counting must be avoided. I.e. it must be taken into account that the same intangible assets may make a contribution on the same stream of earnings. An example of such case could be a well-known trademark and technology that the trademark is (at least partly) based on. However, it is often difficult to separate intangible assets due to their interconnectivity.

Due to the variety of challenges related to determining the fair value of an intangible asset and the required skills, it would most likely be the easiest way for companies to just allocate the

excess price entirely to goodwill, even if there were recognizable intangible assets transferred in the business combination. Employing external appraisers is often seen as costly and unnecessary as excessive allocation to goodwill has not induced sanction procedures by the Financial Supervision of Finland. Therefore, it can be assumed that the adequacy of resources may have an impact on the reported allocation.

#### **3.1.4 Required disclosures**

IFRS 3(.64) lists a rather comprehensive selection of required disclosures on a business combination. According to IASB (International Accounting Standards Board), the purpose of the disclosure requirements is to increase the relevance, reliability and comparability of the disclosed information on business combinations (IFRS 3.1). The disclosure requirements include information on e.g. the target (name, description), acquisition date, percentage of voting equity interest acquired, acquisition date fair value of the total consideration transferred and primary reasons behind the acquisition. These disclosures have been rather limited in financial statements of companies listed in OMX Helsinki (FFSA, 2006, 2007), which hinders the assessment of the acquisitions.

#### **3.1.5 Pros and cons of IFRS 3**

There are certain limitations in IFRS 3, due to which the standard has been criticized by both practitioners and academicians.

Goodwill that has been brought forward at the date of adoption of IFRS 3 (which is often significant) has been “frozen” at the value it was brought forward at. The “frozen” goodwill represents the historic goodwill capitalized less pre-IFRS 3 amortization. This added with post-IFRS 3 goodwill recognized less impairment charges under IFRS 3 sums up to the total goodwill in reports and accounts. Even though the reported goodwill in post-IFRS 3 accounts is significant, it is difficult to comprehend such a complicated combination of concepts. As a result, goodwill is not often readily understood. (Forbes, 2007)

IFRS 3 has been widely criticized for no longer allowing the amortization of goodwill. Ojala (2007) in his dissertation studied the informativeness of goodwill amortization and concluded that the goodwill amortization practice provides investors with useful information in cases where amortization periods are sufficiently short, i.e. where they better reflect the economic useful life of the underlying asset.

Bugeja and Gallery (2006) found recently purchased goodwill to have information content, whereas “older” goodwill was not perceived as having future economic benefits. This seems to be in line with Ojala’s (2007) findings about sufficiently short amortization periods. Li and Meeks (2006) confirmed prior evidence of value-relevance of purchased goodwill on the year of acquisition but, in contrast to Ojala’s (2007) findings, found the value-relevance to fade thereafter and the amortization to be value-irrelevant. No uniform evidence of value-relevance of goodwill amortization has been presented and it may have been one of the drivers behind IASB’s decision to reject amortization of goodwill and replace it with goodwill impairment testing.

Moreover, goodwill treatment under IFRS 3 has received criticism also for the impairment procedure being too discretionary and allowing it to be used for managing earnings. Van de Poel et al. (2008) studied the role of goodwill as an earnings management tool using a sample consisting of listed companies in 15 EU countries in 2005-2006. Van de Poel et al. (2008) found that occurrence of goodwill impairments was highly influenced by financial reporting incentives and was thus used as a tool for earnings management. However, Van de Poel et al. (2008) inferred that a Big 4 company as an auditor constrains the use of goodwill as an earnings management tool but does not remove it entirely. Despite Big 4 auditors, goodwill accounting is used to manage earnings and therefore, it is important to examine also the initial recognition of goodwill and whether it is used as an earnings management tool.

Despite the critique, according to numerous studies, IFRS 3 does, in theory, increase the informativeness and transparency in merger accounting by prohibiting the use of the pooling method (where the assets and liabilities of the acquirer and acquiree are added together at historical book values). Prior to adopting IFRS, Finnish listed companies have accounted for business combinations under Finnish GAAP, which allows the acquirer to use either the pooling



method or the purchase (acquisition) method. The use of the pooling method was allowed if the acquirer, acquiree and the transaction met certain criteria. Otherwise, the acquirer was to use the purchase method (KPL 6§9).

For instance, Hong et al. (1978) reported significant abnormal returns in the period surrounding the merger date for companies using the purchase method instead of the pooling method. Davis (1990) replicated and extended the study of Hong et al. (1978) using a different time period and sample. Davis (1990) reported significant stock market responses for companies using the purchase method, whereas using the pooling method did not yield significant abnormal returns. This suggests that the purchase method does provide the investors with more useful information about the completed transactions.

## **3.2 IAS 38**

### **3.2.1 Definition of intangible asset and recognition criteria**

Under IAS 38, an intangible asset is defined as an identifiable, non-monetary asset with no physical substance. An intangible asset is required to be identifiable and separable, which distinguishes it from goodwill. An asset is a resource that is controlled by the enterprise as a result of past events (purchase or self-creation) and from which future economic benefits (inflows of cash or other assets) are expected. Thus, *definition of intangible asset* has three critical attributes:

- identifiability
- control (power to obtain benefits from the asset)
- future economic benefits (IAS 38.8)

A company must recognize an intangible asset, whether purchased or self-created, if and only if, it satisfies the following *recognition criteria*:

- it is probable that the future economic benefits, that are attributable to the asset, will flow to the enterprise;
- the cost of the asset can be measured reliably. (IAS 38.21)

### **3.2.2 Intangible assets in business combinations**

An intangible asset is initially recognized at cost. If an intangible asset does not meet both the definition of and the criteria for recognition as an intangible asset, the related expenditure must be recognized as an expense when it is incurred (IAS 38.68). Based on these criteria, many self-created intangible assets are expensed (e.g. advertising, which may result in a valuable brand) and, therefore, cannot be seen in the acquiree's balance sheet.

On the other hand, according to IAS 38 (and IFRS 3), in a business combination the acquirer recognizes an intangible asset of the acquiree at the acquisition date, separately from goodwill, regardless of whether the asset had been recognized by the acquiree before the business combination (if it meets the definition of and satisfies the criteria for recognizing an intangible asset). (IAS 38.34)

For example, according to IAS 38.54, all research costs should be expensed as they are incurred and development costs are capitalized only after the technical feasibility of the asset for sale or use has been established (IAS 38.57). On the contrary, an R&D project acquired in a business combination is recognized as an asset at cost even if the project has a research component. Subsequent expenditure on the project is accounted for as any other R&D cost (IAS 38.34).

Due to the general rule of expensing internally generated intangible assets under IAS 38, intangible assets internally generated by the acquiree may form a remarkable part of the purchase price in a business combination as those assets are measured and recognized at their fair values in the acquirer's balance sheet.

In IAS 38, there is an assumption that the fair value of an intangible asset acquired in a business combination can be measured reliably (IAS 38.35). An expenditure on an intangible item included in the cost of acquisition that does not meet both the definition of and recognition criteria for an intangible asset should form a part of the amount attributed to the goodwill recognized at the acquisition date.

Nevertheless, according to IAS 38, non-recognition due to measurement reliability should be rare:

The only circumstances in which it might not be possible to measure reliably the fair value of an intangible asset acquired in a business combination are when the intangible asset arises from legal or other contractual rights and either:

- (a) is not separable; or
- (b) is separable, but there is no history or evidence of exchange transactions for the same or similar asset, and otherwise estimating the fair value would be dependent on immeasurable variables. (IAS 38.38)

### **3.2.3 Impact of intangible asset amortization**

Intangible assets are classified into two categories. Intangible assets with:

- **Indefinite life:** No foreseeable limit to the period, over which the asset is expected to generate net cash inflows for the entity.
- **Finite life:** A limited period of benefit to the entity.

Intangible assets with a finite useful life are amortized using either a straight-line, diminishing balance or units-of-production method. The amortization method should reflect the pattern of economic benefits derived from the asset. Intangible assets with an indefinite useful life are not amortized but tested for impairment on annual basis according to IAS 36. Under IFRS, intangible assets other than goodwill are allowed to be revaluated to fair value. However, because revaluation requires reference to an active market for the specific type of intangible, this is a relatively uncommon practice (IAS 38.97). Assets with indefinite economic lives are not subjected to amortization.

One of the greatest challenges posed by accounting for intangible assets is defining the appropriate economic life for each item or category of acquired assets. Some assets, such as

brand names, may be considered to have a long or indefinite life but others (e.g. customer relationships or databases) may be amortized over a shorter period. (Deloitte, 2007)

However, IFRS does not allow the amortization of goodwill. Instead, the goodwill must be reviewed for impairment on annual basis. The reduced amortization charge will initially have a positive effect on earnings. Nonetheless, the impairment reviews conducted annually may result in volatility in reported earnings. If a projection for a certain intangible asset, a brand, for instance, overstates the revenues derived from that asset, a significant write-down on the asset may become necessary thus increasing the volatility in reported earnings. Also post-acquisition changes in recognized brand names could lead to significant write-downs. (Deloitte, 2007)

Such volatility is likely to unnerve the capital markets. Hence, it is vital to perform an adequate process of allocating the purchase price for an acquisition so as to avoid undue volatility in reported earnings. Also, according to Deloitte (2007), it is in the best interest of companies to ensure that the acquired intangible assets are properly identified and separated from goodwill. This is supported also by findings of prior research papers (e.g. Kimbrough, 2007) discussed later in this paper.

## **4. Prior research and literature**

### **4.1 Goodwill**

Research on earnings management related to goodwill accounting is still rather limited. However, research on the use of discretion in goodwill accounting has been conducted. E.g. Sevin and Schroeder (2005) found that recording goodwill impairments instead of amortization allows companies to manage earnings. Further research suggests that companies do utilize that possibility. Haman and Jubb (2008) found that managers tend to use discretion in the timing of goodwill impairments to manage the accounting earnings of certain years upwards by postponing impairment charges. Moreover, Van de Poel et al. (2008) found that goodwill impairments are highly associated with financial reporting incentives and are not uniform across auditors and European countries. According to Van de Poel et al. (2008), these findings show that opportunities for earnings management under IFRS still exist and they seem to have found their way in the implementation of the standard. These findings suggest that the purchase price allocation decision could also be used as an earnings management tool.

If the allocation decision is used as an earnings management tool, instead of duly identifying and recognizing intangible assets, an excess amount of the purchase price is recorded to goodwill. Based on the research on value-relevance of goodwill, it can be argued that excessive allocation to goodwill may lead to distortion in valuations.

For example, Chauvin and Hirschey (1994) identified consistently positive market value influences of accounting goodwill numbers in the manufacturing sector. Chauvin and Hirschey (1994) inferred that goodwill data offers a useful perspective on the ongoing hard-to-measure concern value component of the economic value of the company. Furthermore, McCarthy and Schneider (1995) made findings that support Chauvin and Hirschey's (1994) contention that the markets regard accounting goodwill numbers as a useful indicator of goodwill assets. In their study, Jennings et al. (1996) presented corroborating strong evidence that investors value the purchased goodwill as an economic resource. If, however, the initial recognition of goodwill deviates from the underlying economics, the investors base their valuations on incorrect information.

According to Johnson and Petrone (1998), components that do not represent the real, 'true' goodwill can, however, be a part of goodwill. Johnson and Petrone (1998) divided goodwill into six components. Two of the components, fair values of 1) the going concern element of the acquiree's existing business and 2) synergies from combining the acquirer's and acquiree's businesses and net assets from the 'true goodwill'. The other four components that do not qualify for 'true goodwill' but still form a part of it are in Johnson's and Petrone's classification as follows: 1) excess of the fair values over the book values of the acquiree's recognized net assets 2) the fair values of other net assets not recognized by the acquiree (e.g. know-how) 3) overvaluation of the consideration paid by the acquirer 4) overpayment by the acquirer.

Henning et al. (2000) examined whether the markets make distinction between identifiable components of goodwill for valuation purposes. Henning et al. (2000) partitioned the target firm's value as a going concern, the synergy gains of the acquisition and overvaluation of the consideration paid. The study suggested that the markets response both negatively and positively to these three components. The first two components were significantly positively valued by the investors (with the going concern valued similarly to non-goodwill assets), whereas the investors placed a significantly negative value on the residual goodwill component, which captures the amount excess of the market value of the transaction. This implies companies should strive to allocate as many components apart from goodwill as possible instead of just assigning the excess consideration to goodwill.

If a company does not disclose sufficient information on the residual component of goodwill, which, according to FFSA (2006, 2007), has been the case in Finland, the investors are likely to regard the excess price as an overpayment and react negatively. Allocating a larger amount to goodwill than the actual underlying economics suggest leads to a large amount of "unexplained" goodwill, which may in the light of the findings of Henning et al. (2000) offset the benefits originating from discretionary treatment of goodwill.

Hirschey and Richardson (2002) studied the information effects "narrowly tied" to goodwill write-off announcements. Hirschey and Richardson (2002) found that the effects are typically negative and material, on the order of 2-3% of the company's share price. Moreover, in the

period of one year prior to the announcement they noted negative information effects of around 40%. During the post-announcement period the effects were on the order of 11%, which according to Hirschey and Richardson (2002), suggests that much, if not all, of the negative valuation effects stemming from goodwill write-off announcements are realized by the end of the announcement period. These results together with findings of Pender (2001), suggesting that goodwill write-offs are likely to result in dismissal of management, support the finding of Zhang and Zhang (2007) that older CEOs are more likely to record excess goodwill having less to lose in case of large impairment charges.

As Henning et al. (2000) concluded, goodwill and the basis of its recognition may have a significant impact on earnings and further on the share price. A large amount of evidence has been presented that content of goodwill, impairment and amortization (with certain preconditions) of goodwill act as an informative signal for the investors. However, if goodwill is wrongfully recorded against the underlying economics, investors base their valuations of incorrect information, which is likely to lead to distortion in price formation.

## **4.2 Intangible assets**

According to traditional accounting definition of intangible assets, intangible assets lack physical existency and have a high uncertainty about value (Kieso and Weygandt, 1998). Lev and Zarowin (1999) found that there was a weakening association between market values and accounting information (earnings, cash flows and book values). They hypothesized that “business change” (globalization, emergence and growth of high-tech companies and thus intangible assets) has been the driver behind the declining usefulness of financial reports.

Thus, Lev (2001), in contrast to the traditional accounting definition, takes a more modern approach and defines intangible assets as “non-physical resources of value generated by innovation and discovery, unique organizational design and human resources”. The supporters of the modern approach have argued that the value-relevance of traditional accounting measures has declined over time and the value-relevance of intangible assets is increasing along with advancing technology.

A large proportion of the surplus value paid in acquisitions consists, according to KPMG (2007), of intangible assets previously not recorded on the acquiree's balance sheet. As acquisitions often account for a notable share of companies' growth, this growth is, to a large extent, based on intangible assets. This is why it is important to examine whether the markets have correct information on intangible assets in order for them to perform more accurate valuations. If valuations of one of the biggest growth drivers (intangible assets) are based on false information, it is likely to lead to inefficiencies in stock pricing.

Ely and Waymire (1999) found that the investors identify the existence of economically relevant intangible assets based on reported earnings rather than carrying values of intangible assets in the balance sheet, which implies that the intangible assets previously not recorded in the acquiree's balance sheet are of significance to the investors. Boone and Raman (2001), in turn, documented a significant association between market liquidity and off-balance sheet assets using R&D expenditure as a proxy, which supports the finding of Ely and Waymire (1999) and further highlights the importance of intangible assets in the investors' valuations.

Similarly, Ritter and Wells (2006) provided evidence of a positive association between voluntarily recognized and disclosed intangible assets and stock prices. Moreover, Ritter and Wells (2006) found there to be a positive association between identifiable intangible assets and realized future period income.

Sriram (2008) tested whether intangible assets are relevant in assessing company's financial health. Sriram (2008) found that it is crucial to include intangible assets in the model when evaluating companies with high proportions of intangibles. Even though Sriram (2008) found that the traditional financial variables still play a major role in assessing the financial health of a company (regardless of the asset composition and business model), excluding intangibles from the assessment may lead to false results. Technology companies, for example, take longer to develop intangible assets and even longer to earn revenues, profits and ultimately provide the shareholders with adequate returns.



These findings imply that if an excess amount of goodwill is recorded, for example to reach a certain level of profitability, all the existing intangible assets are not identified and recognized in an appropriate manner. In the light of Sriram's (2008) findings, this would impede and distort the assessment of company's financial health. Errors in such assessment (often conducted by e.g. creditors or credit rating agencies) could result in differences between the actual risks and risk premiums.

There are several categories of intangible assets as presented in table 5. To make a distinction in the value-relevance between different categories of intangible assets, Eccher (1998) examined the value-relevance of intangible assets specializing on computer software. Eccher (1998) documented a positive association between stock price and the annual amount of software capitalizations, the value of software assets and the subsequent amortization. Similarly, Eccher (1998) reported a positive association between the capitalization related variables and future earnings. Kallapur and Kwan (2000) tested whether brand values bear useful information to the investors and found brand values recognized in financial statements to be positively associated with values capitalized in stock prices and with future net income.

Moehler et al. (2001) compared the informativeness of net income after taxes but before extraordinary items and net income after taxes but before extraordinary items excluding amortization of intangible assets. By regressing the market-adjusted returns on these two alternatives performance measures, Moehler et al. (2001) found that traditional accounting earnings before extraordinary items and earnings before extraordinary items excluding amortization were equally informative. This implies that investors value the information on the initial recognition of intangible assets more than the subsequent amortization.

Despite the large amount of evidence presented of the value-relevance of intangible assets, research on the initial recognition of intangible assets in business combinations could still be described as exiguous. Intangible assets may play a major role in company valuations and assessing the financial health of companies. If they are not properly reported, it may lead to distortion in price formation and risk assessment, as discussed earlier in this section.

## **4.3 Purchase price allocation**

The concept of purchase price allocation is relatively new and it seems that it per se is not such a widely studied topic and a limited number of papers have been written on it. Especially, research under IFRS 3 is rather limited, most likely due to the young age of the guiding standard. However, academics, consultancies, accountancy companies and public sector supervisory boards have conducted a certain amount of research on purchase price allocation. The following paragraphs discuss prior research on purchase price allocation.

### **4.3.1 Academic papers**

Allocating an excess amount of the purchase price to goodwill gives management a more comprehensive option to exercise discretionary goodwill accounting but it can also be argued that it is not in the best interest of the company. Kimbrough (2007) examined the stock market responses to the amount of assets allocated apart from goodwill in economically significant business combinations. Kimbrough documented a positive association between cumulative abnormal returns surrounding the release of 10-Q or 10-K containing the first disclosures of the purchase price allocation and the value of the consideration paid by the acquirer. Moreover, Kimbrough found that the investors respond positively to the increase in the percent of the total assets allocated apart from goodwill as well as in the percent of the intangible assets allocated apart from the goodwill.

Under IFRS goodwill amortization is no longer allowed. Similarly, under SFAS 142 (U.S. GAAP equivalent for IAS 38) goodwill impairments have to be carried out instead of goodwill amortization while most identifiable intangible assets are still amortized over their finite useful lives. Zhang and Zhang (2007) found evidence that managers allocate more to goodwill post-SFAS 142 to reduce amortization expenses when they anticipate greater discretion in future goodwill assessments in order to avoid reporting impairment.

Moreover, Zhang and Zhang (2007) found that older CEOs, who are likely to care more about short-term accounting earnings and bonuses, record more goodwill to avoid amortization

expenses. Zhang and Zhang (2007) were not able to explain the purchase price allocation prior to SFAS 142 using the same variables. This finding implies that the unverifiable accounting measures are likely to deviate from the underlying economics as a result of management exploiting their accounting discretion. In addition, Zhang and Zhang (2007) found that using external appraisers can constraint the management's reporting opportunism to an extent but not eliminate it. Therefore, the possibility of use of discretion in the allocation decision driven by incentives to manage earnings must also be examined using Finnish data.

Rantsi (2007), in his master's thesis, studied the effect of characteristics of the acquiring company on purchase price allocation in Helsinki Stock Exchange using 2005 financial statements. He found evidence that the acquirer's growth prospects correlate positively with proportionate allocation to goodwill. This finding seems to contradict with theory of nature of growth firms' goodwill (e.g. Ojala, 2001) suggesting that growth firms carry less goodwill than others. He also found a positive association between R&D activity and proportionate allocation to intangible assets and a negative association between leverage and proportionate allocation to goodwill.

However, Rantsi (2007) omitted the possibility that management's personal incentives may directly affect the allocation decision as evidenced by Zhang and Zhang (2007). This paper caters for the possible impact of the characteristics of the management. Moreover, Rantsi (2007) concentrated more on the general company attributes impacting the allocation decision (i.e. deal characteristics) instead of examining the possibility of discretionary accounting.

Rantsi (2007) also carried out a survey mapping out the CEOs'/CFOs' views on IFRS 3 in companies listed in OMX Helsinki. Most of the respondents of the survey thought that intangible assets cannot be reliably measured and found brands and trademarks to be the most difficult to value. 40 % of the respondents disagreed that intangible assets are valued only for accounting purposes, which means that many companies believe that intangible asset valuation affects the purchase price and thus bear useful information to investors. This is in line with findings of Kimbrough (2007) suggesting that there is a positive association between abnormal returns and the percentage of intangible assets allocated apart from goodwill.

### **4.3.2 Historical quality of purchase price allocation**

In 2006, Financial Supervision of Finland (FFSA) released a study on IFRS Financial Statements of Finnish listed companies for financial year 2005. As a part of that study, FFSA (2006) dealt with purchase price allocation. The sample consisted of 39 listed companies that made acquisitions in 2005. FFSA (2006) found that the proportion of goodwill of the purchase price was significant in most business combinations. The proportional share of goodwill (totaling nearly €2 billion) of the total cost of combinations (€4.5 billion) was also significant, totaling 44%.

The pre-acquisition book value of all business combination covered 36% of the total cost of combinations. 43 % of the cost of combinations exceeding the pre-acquisition carrying amounts (book values) was allocated to intangible assets and the total share of fair value allocations was 25%. However, according to FFSA (2006), the proportion of intangible assets cannot be regarded as large; in almost 50% of the combinations the share of intangible assets was less than 10% or intangible assets were not recognized at all. FFSA (2006) found this information surprising, as according to them, for example customer relationships, trademarks and technology are often the main drivers for acquisitions and they are usually not recognized in the acquiree's balance sheet.

FFSA (2006) also found the notes disclosed on the business combinations insufficient. FFSA (2006) found the disclosures on acquiree, acquisition date, percentage of acquired control and assets and liabilities recognized fairly comprehensive. On the contrary, barely any factors affecting the cost of combination were disclosed. Over half of the companies generally referred to "future synergy benefits" or did not refer to any factors that had an impact on the measurement of goodwill. A general reference to "synergy benefits" does not meet the requirements of IFRS 3 unless more detailed information on the subject is disclosed. Only one of the companies disclosed information on monetary value of the future synergy benefits (FFSA, 2006).

In 2007, FFSA studied the Finnish listed companies IFRS financial statements for fiscal year 2006 to find out, if any improvements in the application of IFRS could be detected. The total value of cost of combinations in Finnish listed companies increased from €4.5 billion in 2005 to €4.7 billion in 2006. The amount of goodwill in proportion to the total value of business combinations had declined from 41% in 2005 to 25% in 2006. In 2006, the pre-acquisition carrying value of the acquirees' assets of the total cost of combination was 42% (36% in 2005). Only 17% of the cost exceeding the carrying amounts was allocated to intangible assets, but it was in line with FFSA (2006) finding of 2005 that in individual cases the percentage of the allocation was no more than 10%. On the other hand, the total fair value allocations had increased from 25% to 33%. According to FFSA (2007), the quality of reporting had improved from 2005 to 2006 as companies had familiarized themselves with the requirements of IFRS. Thus, it can be argued that companies have become more aware of the (discretionary accounting) possibilities related to purchase price allocation and that the awareness has increased further in 2007 financial statements.

Intangible Business (2007), a brand valuation consultancy, conducted a research on purchase price allocation under IFRS 3 for the first year of reporting (2005 or 2006) for major FTSE 100 companies. They examined total 88 companies reporting under IFRS 3. The total reported deal value for those companies for the selected periods was £40 billion.

Intangible Business (2007) noted that the "spirit of IFRS 3" was not being followed and nor were the specific rules of IFRS 3. Intangible Business found the shortcomings so significant that they concluded that the adoption of IFRS 3 had not remarkably improved the transparency of business combinations. They found that intangible assets had been reported at undervalues, whereas goodwill had correspondingly been reported at overvalues. The share of the acquisition value allocated to intangible assets was only 30%, which the authors found too low based on their experience in purchase price allocation. Goodwill, again, constituted over a half (53%) of the deal values, which Intangible Business (2007) found to be too high considering that the key purpose of IFRS 3 is to identify and value all the purchased assets. (Intangible Business, 2007)

IFRS 3 states the following about goodwill disclosures:

*“ A description of the factors that contributed to a cost that results in the recognition of goodwill – a description of each intangible asset that was not recognized separately from goodwill and an explanation of why the intangible asset’s fair value could not be measured reliably – or a description of the nature of the excess recognized in profit or loss.”. IFRS 3 66(h)*

In spite of this, the entities did not report notes describing the factors making up goodwill even though, according to Intangible Business (2007), this should be possible to accomplish. Intangible Business (2007) reckons that the above-mentioned results in an “accounting black hole” of £21 billion that is wrongly reported as goodwill. Intangible Business (2007) found the non-compliance rather notable considering the remarkable pile of cash that was spent on acquisitions.

In addition, the study revealed that the level of disclosures about acquired intangible assets was patchy and inconsistent. Many of the companies did not describe the acquired intangible assets as suggested by IFRS 3. The majority of the reported intangible assets fell into “mixed” category, which was either a combination of other classifications or was described on a general level (for instance, “other intangibles”). According to the authors, this “mixed” category offers very little transparency in the accounts. These findings are in line with the findings of FFSA (2006, 2007). Possible implications of these findings for this paper are discussed later on.

The lack of disclosures hamper the investors’ analysis and assessment if the acquisition has generated any value for the company and makes it difficult, if not possible, to see if the acquisition is performing well (Intangible Business, 2007). Similarly, even if the disclosures were extensive but the actual allocations did not correspond to the underlying economics, investors’ analysis and assessment regarding the value added by the acquisitions are seriously impeded.

The low quality of the disclosures Intangible Business (2007) attributes to the following:

- a) Companies can increase reported profits through reduced amortization. Intangible assets need to be amortized and the respective charges made to profits, if the assets have a finite useful life. As goodwill cannot be amortized, minimizing the values of intangible assets and maximizing the goodwill means that the amortization charges are likely to be reduced.
- b) Acquired intangible assets need to be valued and tested for impairment individually. Goodwill only needs to be tested for impairment together with the goodwill for the rest of the associated cash generating unit. As such goodwill is not revalued it might be recorded at much less than its current value. This results in headroom for impairment test, reducing the risk of having to recognize impairment charges.

According to PricewaterhouseCoopers, (PwC 2004) prior to application of the purchase method, in majority of business combinations the purchase price exceeding the fair value of tangible assets of the acquiree has been fully recorded as goodwill instead of valuing the acquired assets and assumed liabilities at the fair value. As a reason for this, according to PwC (2004), many companies present that measuring and controlling the intangible assets is rather difficult.

- c) Lack of specialist skills to implement IFRS 3. Lack of knowledge or confidence might have led to such a low level of disclosures. The valuation of intangible assets for business combinations requires specialist skills which can be difficult to find.
- d) It is possible that the detailed processes and regulations have resulted in an insufficient standing back from the detail to assess overall what the acquisition was about, what were the justifications and what the reporting standard is trying to achieve.

The historical low quality of IFRS 3 reporting and purchase price allocation has practical implications also for this paper. Even though the acquired entity has identifiable intangible assets previously not recognized in the acquiree's balance sheet, they may not be identified and recognized in the process of business combination accounting. This might lead to a larger

proportion of the purchase price allocated to goodwill than the underlying situation would actually require. However, in the absence of additional goodwill disclosures, it cannot be confirmed whether a large proportion of the purchase price allocated to goodwill is a consequence of neglecting the allocation process or using the allocation decision to manage earnings. It might also be that there are no intangible assets to be identified and the excess purchase price consists in full of genuine goodwill. This implies that allocation to goodwill and intangible assets does not represent a straight trade-off. Therefore, a reversed inspection discussed in section 1.1 is also necessary.



## **5. Hypotheses development**

### **5.1 Hypotheses background**

Accounting for business combinations under IFRS 3 is not voluntary for companies required to apply IFRS. However, transition from Finnish GAAP has, according to FFSA (2006), proven problematic and time-consuming. For practical reasons, FFSA has, to an extent, overlooked the deficient IFRS-reporting during the transition period. Therefore, allocation of the purchase price for the sample companies in 2007 can be perceived in a sense as subtly discretionary as FFSA has not imposed sanctions (only guiding critique) on companies not following the guidance of IFRS 3 to the fullest and allocating all identifiable assets apart from goodwill. This implicates that discretion may be used in the allocation decision as an excessive allocation to goodwill has not induced punitive measures by FFSA. Consequently, companies that lack accounting resources for duly conducting a time-consuming and resource binding process of identifying and valuing the purchased intangible assets may just against the spirit of IFRS 3 allocate the excess price in full to goodwill.

The first three hypotheses aim to find evidence that the discretion related to the allocation decision is used driven by incentives to manage earnings, i.e. evidence that certain acquirer characteristics make the allocation deviate from the underlying economics as a result of earnings management. The fourth hypothesis acts as a reversed inspection for such discretionary accounting. The purpose of the fifth hypothesis, in turn, is to find evidence of impact of discretionary accounting, driven by factors other than earnings management, on the allocation decision.

### **5.2 Use of the allocation decision as an earnings management tool**

Zhang and Zhang (2007) found evidence that managers use the allocation decision as an earnings management tool. Assuming that allocating the purchase price is the management's decision, they found that older CEOs, who are likely to care more about short-term accounting earnings and bonuses bound to those earnings, record more goodwill to avoid amortization expenses.

According to Zhang and Zhang (2007), older CEOs are likely have stronger incentives to boost up short-term earnings due to their weakened career concerns. Older CEOs are likely to lose less if the misallocation of the purchase price is discovered or the misallocation leads to goodwill impairment in the future. Prior research argues that CEOs close to the end of their tenure focus more on short-term earnings rather than long-term performance to maximize their compensation prior to retiring. Evidence of such behavior has been presented e.g. by Dechow and Sloan (1991) and Brickley et al. (1999).

The study of Zhang and Zhang (2007) was carried out under US GAAP but it can be assumed that there are no institutional factors that would prevent the allocation decision from being similarly used as an earnings management tool also in Finland. Thus,

### **H1. There is a positive association between the age of the CEO and allocation to goodwill.**

According to earnings smoothing theory, management strives to increase earnings in years of bad performance and, in turn, decrease earnings in years of good performance. Gaver et al. (1995) and Burgstahler and Dichev (1997) found evidence of earnings management consistent with income smoothing. Such behavior would make sense for managers, whose bonus incentives depend on meeting certain targets for earnings. Burgstahler and Dichev (1997), especially, report that companies avoid negative earnings. They present evidence that distribution of earnings is “bunched” just above zero. Degeorge et al. (1999) presented evidence that the distribution of earnings is “bunched” also at other levels, not just above zero. According to Degeorge et al. (1999) earnings are bunched also above the level of earnings to have stable or growing earnings and above analyst’ forecasts.

Allocating a larger proportion to goodwill requires more goodwill impairments in the future (to “deflate” the recorded goodwill) but the absence of tangible assets depreciations and intangible asset amortizations would make the current reporting period look better. Thus, the second hypothesis:

## **H2. There is a negative association between the acquirer's profitability and allocation to goodwill.**

According to Ojala (2001), there is a limited period of time during which a growth company can utilize the purchased goodwill due to the rapidly changing business environment. Ojala (2001) argues that if the goodwill is not exploited without delay it will lose its value. This implies that either the goodwill is more rapidly impaired or less goodwill is initially recognized.

Signaling theory suggests that management strives to decrease the information asymmetry between agent and principal (e.g. Cheng and Coulombe, 1996). According to signaling, investors are assumed to respond to the change from initial reporting strategy to more aggressive expensing positively and, consequently, value the company upwards, which may result in management bonuses. More rapid expensing in connection with the initial goodwill recognition means that the amount allocated to goodwill is minimized.

According to the theories presented above, it would be in a growth company's (and its management's) best interest to record as little goodwill as possible (e.g. by overvaluation of intangible assets). Thus,

## **H3. There is a negative association between the acquirer's growth prospects and allocation to goodwill.**

The industry, in which a company operates, is argued to have an impact on the vulnerability of the company. Also, proprietary costs vary by industry. Companies operating in different industries face different characteristics of market competition, the type of private information and also the threat of new companies entering into the market (Watts and Zimmerman, 1986). Companies that operate in technology, media and telecom industries are likely to have more sensitive private information due to the high level of intangible assets utilized in their operations (Collins et al., 1997). This suggests that the disclosures on the acquired intangible assets would make the acquirer more vulnerable to competition. Therefore, in order to keep their sensitive

information a secret, these companies may minimize the amount of intangible assets recognized apart from goodwill.

On the other hand, signaling suggests that deviating from corporate reporting practice that has been established may be regarded as bad news by the markets (Giner, 1997), which implies that withholding information from investors could have a negative impact on the share price. Therefore, it would be in the company's best interest not to withhold information. Furthermore, allocation to intangible assets per se does not itself reveal sensitive information in the absence of detailed verbal disclosures.

According to Collins et al. (1997) and Lev and Zarowin (1999) more investments in intangible assets are made in high-tech industries. Because acquisitions often take place within an industry, it can be assumed that companies operating in high-tech industries allocate a larger proportion of the purchase price to other intangible assets than companies operating in other industries (even though the acquired intangible assets may not always be recognized as assets, e.g. employees' competence can be regarded as an asset but must be recognized as goodwill).

Therefore, the fourth hypothesis:

**H4. Companies operating in Technology, Media and Telecom sector allocate a larger proportion of the purchase price to intangible assets than companies operating in other sectors.**

### **5.3 Impact of resources and political costs on the allocation decision**

As discussed in section 3.1.3, there are many challenges related to determination of the fair values of intangible assets that require special skills and knowledge. Buzby (1975) and Lang and Lundholm (1993) found that the cost of accumulating and disseminating detailed financial information is relatively higher for smaller companies than for bigger ones. Also, according to Depoers (2000), large companies tend to employ highly skilled individuals and management reporting systems that are capable of providing more comprehensive corporate information,

which suggest that it is more lucrative for larger companies to conduct a thorough allocation of the purchase price and identify and recognize more intangible assets apart from goodwill.

Moreover, larger firms are under closer scrutiny by government agencies and thus more exposed to political costs (Watts and Zimmerman, 1978, Holthausen and Leftwich, 1983). These companies believe that the pressure of the unwelcome scrutiny will ease along with better reporting (Buzby, 1975). Therefore, the fifth hypothesis:

**H5. There is a negative association between the acquirer's size and allocation to goodwill.**

Zhang and Zhang (2007) assumed the length of the CEO's tenure to be positively correlated with the age of the CEO and included it to their study to better capture the explanatory power of CEO's characteristics on goodwill allocation. Zhang and Zhang (2007) found the length of the CEO's tenure to be negatively correlated with allocation to goodwill. Therefore, the length of the CEO's tenure is used as a control variable in this paper. Furthermore, Rantsi (2007) found there to be a positive association between company's R&D activity and proportionate allocation to intangible assets and a negative association between leverage and proportionate allocation to goodwill and a positive association between leverage and allocation to other net assets. Therefore, these variables are also included as control variables.

## **6. Research methodology**

### **6.1 Data description**

The data for the dependent variables was extracted from 2007 financial statements of companies listed in OMX Helsinki reporting acquisitions. The data for the explanatory variables was gathered from Bloomberg database and supplemented by manually extracting the missing data from the financial statements. The cases where no acquisitions were reported for fiscal year 2007 were double-checked in Mergermarket database.

61 of 129 (47%) of companies listed in OMX Helsinki as at 31 December 2007 reported at least one acquisition, i.e. disclosed information on the allocation of the purchase price. The overall number of deals disclosed by the 61 companies was over 200 (the exact number is not known since many companies presented aggregate information on smaller deals without disclosing the number of deals included in the aggregate figures). However, the number of aggregated deals was not significant.

The overall purchase price of the acquisitions of the 61 companies in 2007 was €10.16 billion. The average individual purchase price was €118.11 million and median 10.70 million. The mean value lies far above the median value, which shows that even though some large scale deals were included in the sample, the overall deal value was small. The value of the smallest deal included in the sample is unknown due to the aggregation of information and absence of the related additional disclosures that would include specifications of the deal values. The value of the smallest individually reported deal was €320 thousand. In contrast, the largest deal included in the sample was the transaction between Nokia and Siemens to form Nokia Siemens Networks, the acquisition cost of which reported by Nokia was €5.5 billion.

The overall purchase price, €10.16 billion, comprised of goodwill arising from the acquisitions € 3.54 (34.8%) billion, intangible assets not previously recorded in the acquiree's balance sheet € 3.09 (30.4%) billion and other net assets €3.53 billion (34.8%). Both goodwill and intangible assets form a remarkable part of the purchase price, which highlights the importance of proper goodwill and intangible asset accounting in baring the drivers behind the acquisition. Of the

companies reporting at least one acquisition, 54 (89%) companies reported goodwill and 43 (71%) intangible assets, which shows that goodwill and intangible assets were present in the majority of the deals.

**Table 1. Classification of sample companies by industry.**

This table presents the distribution of the sample companies by industry as well as the number of companies reporting intangible assets and goodwill. The classification is based on Global Industry Classification Standard (GICS) on the sector level. However, sectors have been combined into five categories.

Industry	Number of companies in the industry	%	Number of companies reporting intangible assets	%	Number of companies reporting goodwill	%
Other consumer or industrial products	34	56 %	25	74 %	31	91 %
Technology, media & telecom	17	28 %	13	76 %	17	100 %
Financial	7	11 %	3	43 %	4	57 %
Healthcare	2	3 %	2	100 %	2	100 %
Utilities	1	2 %	0	0 %	0	0 %
<b>Total</b>	<b>61</b>	<b>100 %</b>	<b>43</b>	<b>70 %</b>	<b>54</b>	<b>89 %</b>

Table 1 describes the classification of the sample companies and proportions of the companies reporting intangible assets and goodwill. 76 % of the companies operating in the technology, media and telecom (TMT) industry reported intangible assets in their purchase price allocation disclosures. This is not surprising as TMT is an intangible asset intensive industry (Collins et al., 1997, Lev and Zarowin, 1999). The respective figure for companies operating in other consumer or products (CIP) industry is almost as high (74%). The high percentage in CIP is interesting and implies that intangible assets are not important only to TMT companies.

Only 43% of the companies in the financial services industry (FIN) reported intangible assets. This is also logical since the financial services industry is not regarded as an intangible asset intensive industry. However, the sample includes only seven companies operating in FIN and does not necessarily give an accurate enough picture of the actual state of affairs. Neither healthcare nor utilities companies are extensively represented in the sample, and, therefore, conclusions should be drawn with caution.

Purchase price allocation by industry is discussed in more detail in section 7.

## **6.2 Variable measurement and research design**

### **6.2.1 Dependent variables**

The dependent variables used in this paper are calculated similarly to Zhang and Zhang (2007) and are as follows:

1) GOODWILL = Allocation to goodwill.

To capture the discretion related to allocation of goodwill, allocation to goodwill is calculated as the amount allocated to goodwill as a percentage of the combined amount allocated to all intangible assets, including both goodwill and other intangible assets.

2) OTHERINTANGIBLES = Allocation to other intangible assets.

Allocation to other intangible assets is calculated as the percentage of the purchase price allocated to other intangible assets.

3) OTHERNETASSETS = Allocation to other net assets.

Allocation to other net assets is calculated as the percentage of the purchase price allocated to other net assets (purchase price deducted by goodwill and other intangible assets).

### **6.2.2 Explanatory variables**

The explanatory variables employed are as follows:

4) CEOAGE = The end of the fiscal period 2007 – CEO date of birth

CEO age is the age of the CEO of the acquiring company at the end of the fiscal period.



5) CEOTENURE = The end of fiscal period 2007 – the date the CEO took office

$$6) \text{ LEVERAGE} = 2006 - 2007 \text{ year-end average of } 1 - \frac{\text{Equity}}{\text{Total assets}}$$

Leverage is calculated as the average leverage of 2007, i.e. the average of leverage in the beginning and at the end of the fiscal period 2007. The average is used in order to better reflect the average situation during the fiscal period.

$$7) \text{ PROFITABILITY} = \text{Return on assets (ROA)} = \frac{\text{Earnings before interests and taxes (2007)}}{\text{Total assets (2007)}}$$

$$8) \text{ RDTONETSALES} = \text{average of 2005 - 2007 } \frac{\text{R \& D expenses}}{\text{Net sales}}$$

Intangible assets resulting from research and development activity often take longer than a year to develop. Therefore, to proxy for R&D activity the average of 2005-2007 R&D costs divided by net sales is used.

$$9) \text{ PRICETOBOOK} = \frac{\text{Market capitalization (2007)}}{\text{Equity (2007)}}$$

To proxy the acquirer's growth prospects, price-to-book ratio is used.

$$10) \text{ LNMCAP} = \ln(\text{Market capitalization (2007)})$$

To proxy the company's size, either market capitalization, total assets, net sales or number of employees are often used. Total assets and net sales are, however, used to build other proxies and could create multicollinearity. Therefore, to proxy the acquirer's size, the natural logarithm of market capitalization is employed.

11) CIP – Equals 1 if the company operates in other consumer or industrial product industry. Otherwise, equals 0.

12) TMT - Equals 1 if the company operates in technology, media and telecom industry. Otherwise, equals 0.

The sample of Zhang and Zhang (2007) included data only in one industry. Zhang and Zhang (2007) argued that purchase price allocations are likely to be affected by the underlying economics of the target companies and having a homogeneous sample in terms of the industry reduces the possibility that the results are driven by differences in operating environments. Due to the limited number of companies listed in OMX Helsinki it would not be sensible to examine allocations in only one industry as it would result in a rather small sample size.

Therefore, two dummy variables are employed as a proxy for the two biggest industry groups represented in OMX Helsinki. Rantsi (2007) found companies operating in TMT to allocate proportionately more to goodwill than companies operating in other industries. Moreover, CIP can be argued to be less intangible asset intensive and thus a dummy variable for CIP is employed in order to find out whether a reversed effect compared to TMT can be documented.

Companies operating in the financial services industry have significantly different financial characteristics (e.g. leverage ratio and profitability) than other companies and, therefore, financial service companies are not included in the multivariate analysis since financial characteristics are used as explanatory variables. The sample includes only a few companies operating in other industries and, therefore, separate dummy variables are not employed for them.

### 6.2.3 Multivariate regression analysis

Hypotheses 1-3 and 5 are tested by estimating the coefficients in the four multivariate models presented below. The estimations are conducted by employing ordinary least squares (OLS) regression. Hypothesis 4 is tested by employing Student's two-tailed t-test.

The first model includes variables that, based on theory and prior research, bear strong expectations related to their explanatory power regarding goodwill. Therefore, the first model as whole bears the highest expectations regarding the explanatory power in allocation to goodwill.

In the second model, all the explanatory variables are included, in the third model RDTONETSALES is removed, in the fourth model RDTONETSALES is added back and PROFITABILITY is removed. The switch between PROFITABILITY and RDTONETSALES is conducted due to strong correlation between the two variables. Multicollinearity is further discussed in section 7.1.3.

Research on factors impacting allocation to goodwill can be described as rather limited. Therefore, regressions using all four models are run in order to elaborate the examination and to see if any peculiar or interesting findings can be made. However, there are no strong expectations related to models 2-4.

Model 1,

$$GOODWILL = \beta_0 + \beta_1 LNM CAP + \beta_2 PRICETOBOOK + \beta_3 PROFITABILITY + \beta_4 CEOAGE + \beta_5 CEOTENURE + \varepsilon$$

Model 2,

$$\begin{aligned} \text{GOODWILL} = & \beta_0 + \beta_1 \text{LNM CAP} + \beta_2 \text{PRICETOBOOK} + \beta_3 \text{PROFITABILITY} + \\ & \beta_4 \text{CEOAGE} + \beta_5 \text{CEOTENURE} + \beta_6 \text{LEVERAGE} + \beta_7 \text{RDTONETSALES} + \\ & \beta_8 \text{TMT} + \beta_9 \text{CIP} + \varepsilon \end{aligned}$$

Model 3,

$$\begin{aligned} \text{GOODWILL} = & \beta_0 + \beta_1 \text{LNM CAP} + \beta_2 \text{PRICETOBOOK} + \beta_3 \text{PROFITABILITY} + \\ & \beta_4 \text{CEOAGE} + \beta_5 \text{CEOTENURE} + \beta_6 \text{LEVERAGE} + \beta_8 \text{TMT} + \beta_9 \text{CIP} + \varepsilon \end{aligned}$$

Model 4,

$$\begin{aligned} \text{GOODWILL} = & \beta_0 + \beta_1 \text{LNM CAP} + \beta_2 \text{PRICETOBOOK} + \beta_4 \text{CEOAGE} + \\ & \beta_5 \text{CEOTENURE} + \beta_6 \text{LEVERAGE} + \beta_7 \text{RDTONETSALES} + \beta_8 \text{TMT} + \beta_9 \text{CIP} + \varepsilon \end{aligned}$$

To test the impact of acquirer's characteristics on purchase price allocation to other intangible assets, i.e. to conduct a reversed inspection as discussed in 1.1, the models presented above are employed with the exception of replacing GOODWILL with OTHERINTANGIBLES (models 5-8).

Similarly, to test the impact of acquirer's characteristics on purchase price allocation to other net assets, i.e. to illustrate the role of the verifiability of the assets in purchase price allocation, allocation to OTHERNETASSETS is examined by employing the same four models as in examination of allocation to GOODWILL. Thus, GOODWILL is replaced with OTHERNETASSETS (models 9-12). The predicted signs of the coefficients in models 1-4, 5-8 and 9-12 are presented in tables 8, 10 and 11, respectively.

## **7. Results**

### **7.1 Examination of violation of OLS assumptions**

#### **7.1.1 Normality of residuals**

One of the main assumptions of the OLS regression is that the residuals follow a normal distribution. Normality of residuals is required for statistical tests to be valid (p, t and F). Therefore, the normality of residuals of one model in each of the model groups (allocation to goodwill, other intangible assets and other net assets) is tested by employing a graphical test, where normal probability plots for the residuals are produced and plotted against a theoretical normal distribution. The output of the test can be found in appendix 1.

The visual examination does not show significant departures from the line (i.e. normality) and gives no reason to assume that the residuals are not normally distributed. According to Mellin (2006), even though mild deviation from the normality emerges, the results of the regression are still fairly reliable in terms of p, t and F-values. It can also be assumed that the distributions of residuals of other models in the group do not significantly differ from the residual distributions of the test models presented in appendix 1 (models 1, 5, and 9).

#### **7.1.2 Homoskedasticity of residuals**

Another main assumption of the OLS regression is the homogeneity of variance of the residuals. When the variance of the residuals varies across observations, residuals are said to be heteroskedastic. If the residuals are heteroskedastic, the OLS estimator remains unbiased but becomes inefficient. According to Long and Ervin (2000), when heteroskedasticity is mild, OLS standard errors behave quite well. However, when severe heteroskedasticity is present, it may bias standard errors. This in turn leads to bias in test statistics and confidence intervals.

Therefore, an initial test for heteroskedasticity is conducted by performing a visual inspection of residuals plotted against fitted values for each model group to determine, whether further tests for heteroskedasticity are needed. The output of the test can be found in appendix 2. None of the visual

tests showed a distinct pattern that would indicate presence of severe heteroskedasticity. However, a slight indication of heteroskedasticity can be detected in GOODWILL and OTHERNETASSETS. To further examine the possible presence of heteroskedasticity, White's test was employed. The p-values ranged from 0.22 to 0.52, which gives no evidence to reject the null hypothesis of White's test stating that the variances are homogenous in all of the models.

### 7.1.3 Examination of multicollinearity

In multicollinearity, two or more dependent variables are highly correlated. Even though it does not affect the reliability or predictive power of the model as a whole, multicollinearity could result in defective calculations regarding individual variables. To examine whether multicollinearity between the explanatory variables exists, pairwise Pearson's correlations are calculated for the variables. The outcome of the calculations is presented in table 2.

**Table 2. Pairwise Pearson's correlations between dependent and continuous explanatory variables.**

This table presents pairwise Pearson's correlations between dependent and continuous explanatory variables employed in the OLS regression. Statistically significant correlation at 1 % and 5% significance level is indicated by \*\*\* and \*\*, respectively. (N=54)

Variable	GW	OTINT	OTNET	LNMCAP	PRICE	PROF	CEOAGE	CEOTEN	LEVER	RD
GOODWILL	1.00									
OTHERINTANGIBLES	<b>-0.57***</b>	1.00								
OTHERNETASSETS	-0.15	<b>-0.64***</b>	1.00							
LNMCAP	-0.21	0.00	0.14	1.00						
PRICETOBOK	-0.03	0.07	-0.06	<b>0.41***</b>	1.00					
PROFITABILITY	<b>0.30**</b>	<b>-0.50***</b>	<b>0.33***</b>	0.21	0.25	1.00				
CEOAGE	-0.02	-0.10	0.11	<b>0.38***</b>	0.21	0.10	1.00			
CEOTENURE	-0.02	-0.25	<b>0.28**</b>	-0.10	0.04	0.13	<b>0.28**</b>	1.00		
LEVERAGE	-0.05	-0.23	0.23	0.13	0.16	0.15	0.17	<b>0.38***</b>	1.00	
RDTONETSALES	-0.22	<b>0.54***</b>	<b>-0.38***</b>	-0.17	-0.08	<b>-0.76***</b>	-0.21	-0.16	<b>-0.38***</b>	1.00

The table shows that 11 pairs of variables have statistically significant correlation at 1 % level. Two of the pairs are formed by two dependent variables. OTHERINTANGIBLES and GOODWILL are negatively correlated, which is logical since more allocation to OTHERINTANGIBLES often means less allocation to goodwill. Even though there is no straight trade-off between allocation to goodwill and other intangible assets, based on the negative correlation it can be assumed that the models explaining allocation to goodwill can also

be used to explain allocation to other intangible assets with expectations of somewhat reversed results and additional findings related to the variables not included in model 1.

Moreover, OTHERNETASSETS correlates negatively with OTHERINTANGIBLES, which is also logical since the more of the purchase price consists of other net assets, the less is left for intangible assets.

As regards to hypotheses 1, 3 and 5, no statistically significant pairwise correlation between any of the explanatory variables and allocation to goodwill is found at 1% or 5% level. CEOAGE is negatively correlated with GOODWILL, which is in contradiction with H1 and findings of Zhang and Zhang (2007). PROFITABILITY has a statistically significant correlation with GOODWILL at 5% level but the sign is in contradiction with the underlying hypothesis. PRICETOBOK, instead, has a negative sign as expected. In addition, LNMCAP is negatively correlated with GOODWILL as assumed in H5.

Six of the pairs with statistically significant correlation are formed by a dependent variable and an explanatory variable. OTHERINTANGIBLES correlates negatively with PROFITABILITY and positively with RDTONETSALES. Similarly, OTHERNETASSETS correlates negatively with RDTONETSALES and positively with PROFITABILITY and CEOTENURE. These findings give a reason to expect similar findings in the multivariate analysis.

Five pairs include two explanatory variables, which are the focus area in examination of multicollinearity. LNMCAP has statistically significant correlation with PRICETOBOK (0.41) and CEOAGE (0.38) at 1% significance level. RDTONETSALES has statistically significant correlation with PROFITABILITY (-0.76) and LEVERAGE (-0.38) at 1% significance level. In addition, LEVERAGE correlates with CEOTENURE (0.38) at 1% significance level and CEOAGE with CEOTENURE (0.28) at 5% significance level. Correlation between explanatory variables may deteriorate the overall model fit and lead to weakening of multivariate test results.

To further investigate if harmful multicollinearity is present, VIF (Variance Inflation Factor)-values are calculated for the continuous variables. Table 3 shows the outcome of VIF-calculations.

**Table 3. Variance Inflation Factors for continuous explanatory variables.**

	VIF	1/VIF
RDTONETSALES	3.31	0.302
PROFITABILITY	3.01	0.332
LEVERAGE	1.56	0.642
LNMCAP	1.49	0.673
CEOTENURE	1.39	0.717
CEOAGE	1.39	0.721
PRICETOBOOK	1.38	0.725
<b>Mean VIF</b>	<b>1.93</b>	

A VIF-factor of over 10 is usually considered a sign of presence of harmful multicollinearity. However, there is no one clear indicator of multicollinearity and it must be dealt with case by case. None of the variables gets a VIF-value over 10, the highest values being 3.31 (RDTONETSALES) and 3.01 (PROFITABILITY). The inverse of VIF indicates that 30% of variance in RDTONETSALES is not explained by other explanatory variables and 33% of variance in PROFITABILITY is not explained by other explanatory variables. Other variables get notably lower VIF-values and, consequently, higher 1/VIF-values.

The explanation for the (negative) correlation between PROFITABILITY and RDTONETSALES could be that companies that have already reached a certain level of profitability do not feel the need to engage in extensive R&D activities, whereas companies with lower level of profitability strive to reach a higher profitability level by means of investing in R&D, which could result in e.g. new technology that could be used to lower production costs.

To avoid the possible problems caused by the correlation between the explanatory variables, one of the variables could be left out of the regression at a time. This would remove the problem to an extent, but removing variables from the model could cause deterioration in the explanatory power of the model as a whole (correlated omitted variable problem). It would be justified to leave out one of the variables without further actions if the variables measured the same thing



(e.g. net sales vs. market capitalization as a measure of company size) or did not have underlying theories supporting their possible impact on the model but this is not the case. Therefore, separate regression are run with both variables included in the first run and one of the correlating variables excluded at a time in the next two runs.

## 7.2 Descriptive statistics

Descriptive statistics on the variables included in the multivariate regression analysis are presented in table 4.

**Table 4. Descriptive statistics.**

Variable	Observations = 54				
	Mean	Std. Dev.	Lower quartile	Median	Higher quartile
GOODWILL	0.61	0.32	0.33	0.69	0.89
OTHERINTANGIBLES	0.27	0.30	0.00	0.21	0.34
OTHERNETASSETS	0.27	0.38	0.06	0.23	0.50
LNMCAP	6.06	2.09	4.51	6.24	7.46
PRICETOBOOK	2.55	1.50	1.49	2.27	3.27
PROFITABILITY	0.08	0.19	0.05	0.09	0.15
CEOAGE	50.93	5.89	47.00	51.00	62.00
CEOTENURE	4.54	3.95	1.58	3.92	7.00
LEVERAGE	0.53	0.13	0.44	0.55	0.62
RDTONETSALES	2.80	7.20	0.00	0.64	2.12
CIP	0.63	0.49	0.00	1.00	1.00
TMT	0.31	0.47	0.00	0.00	1.00

Most of the variables' means are close to their medians, which indicates that most of the variables are not significantly skewed. However, it is notable that the mean value of RDTONETSALES is way above the median indicating that certain companies' research and development expenses in relation to their net sales are a lot higher than in most companies. Lower quartile value 0 indicates that at least 25% of the sample companies did not have any R&D expenses in 2007. The variation is not surprising, since the data includes companies operating in completely different industries.

The mean age of the CEO is 50.93 years and the median 51 years. It seems that it takes tens of years of experience to get a hold of a CEO position in a listed company in Finland. Moreover, in Finland, a common retirement age is between 60-65, which means that majority of the CEOs included in this paper are not close to retiring, which could vitiate the explanatory power of CEO age in earnings management since it was based on the closeness of retirement. On the other hand, the average CEO age in the study of Zhang and Zhang (2007) was 52.7 and the median 52, which are quite close to the values of this paper. Also, the retirement age in the United States is close to that of Finland's. Therefore, this gives no reason to believe that the age distribution of CEOs would undermine the results. On the other hand, the average tenure of a CEO is 4.54 years (Zhang and Zhang (2007) 6.3) and mean 3.92 (5) implying that CEO's in Finland have shorter tenures on average.

In addition, PRICETOBOK mean value is 2.55 (median 2.27), indicating that the market values of the majority of the sample companies significantly exceed their book values (lower quartile being 1.49). According to Deloitte (2007), the market value of a company exceeding its book value can be largely ascribed to intangible assets.

### **7.3 Descriptive results**

Table 5 presents the classification of intangible assets used in this paper. The classification has five categories and is very similar to that of Deloitte (2007).

**Table 5. Classification of intangible assets in this paper.**

<b>Intangible asset category</b>	<b>Examples include</b>
Customer related	Customer lists, order or production backlogs, customer contracts and customer relationships including non-contractual relationships.
Technology-based	Patented technology, computer software, unpatented technology (know-how), databases, trade secrets such as secret formulas, processes and recipes.
Marketing related	Trademarks, trade names, service marks, newspaper mastheads, internet domain names, non-competition agreements.
Contract-based	Licensing and royalty agreements, advertising, construction, service or supply agreements, lease agreements, franchise agreements, employment contracts.
Other or not classified	Intangible assets classified either as "intangible assets" or "other intangible assets".

Table 6 summarizes the amounts of intangible assets recognized by the sample companies as well as the number of companies reporting intangible assets belonging to each category.

**Table 6. Intangible assets by category.**

This table summarizes the amounts of intangible assets in the sample data by category. In addition, the table lists the number of companies that reported a certain category of intangible assets.

	Number of companies reporting intangible assets belonging to the category	Total value of intangible assets in the category (m€)
Intangible assets		
Customer related	28	1.45
Technology-based	8	0.73
Marketing related	13	0.52
Contract-based	7	0.09
Other or not classified	20	0.29
Total		3.08

Intangible assets were recognized by 43 companies, which represent 70% of the sample companies. Customer related intangible assets were the most recognized assets. Customer related intangible assets were recognized by 28 companies (65% of the companies reporting intangible assets). Marketing related, technology-based and contract-based intangible assets were reported by 13 (30%), 8 (19%) and 7 (16%) companies, respectively. Overall 20 (47%) companies

reported intangible assets classified as plain “intangible assets” or “other intangible assets”. It is likely, however, that those assets would actually fall into at least one of the categories presented above but the information is simply not disclosed.

**Table 7. Purchase price allocation by industry.**

This table presents the purchase price allocation of the sample companies in 2007 by the acquirer's industry. A statistical significance of difference between the industry's average and other industries' averages on 1%, 5% and 10% level is denoted by \*\*\*, \*\* and \*, respectively. The respective control group in a statistically significant difference between groups is bolded without the asterisks.

	TMT	CIP	FIN	Other	All less TMT	Total
Intangible assets						
Customer related	22 %	2 %	2 %	24 %	5 %	14 %
Technology-based	12 %	0 %	0 %	0 %	0 %	7 %
Marketing related	6 %	7 %	0 %	0 %	3 %	5 %
Contract-based	1 %	1 %	0 %	0 %	2 %	1 %
Other or not classified	0 %	12 %	0 %	1 %	10 %	3 %
Intangible assets total	<b>41%**</b>	21 %	2 %	24 %	<b>20 %</b>	30 %
Goodwill	20 %	60%	54 %	71 %	40 %	35 %
Other net assets	<b>39 %</b>	<b>18%</b>	<b>45%***</b>	5 %	40 %	35 %
Total purchase price (€bn)	6.15	2.28	1.57	0.15	4.01	10.16

The average purchase price allocation by industry is presented in table 7. Statistical significances of differences between average allocations in the five industry categories were tested by employing Student’s two-tailed t-test.

Overall, 30% of the total purchase price was allocated to intangible assets, 35% to goodwill and 35% to other net asset. Acquisitions totaling €6.15 billion were made in technology, media and telecom industry. These acquisitions covered over a half of the total purchase price of €10.16 billion. However, the transaction between Nokia and Siemens to form Nokia Siemens Networks constituted almost 90% of the total purchase price in TMT. In consumer and industrial products industry, the total purchase price was €2.28 billion and in the financial services industry €1.57 billion. However, there were 34 companies reporting acquisitions in CIP, whereas the number of companies reporting acquisitions in FIN was only 7, which implies that the average deal size in FIN was a lot bigger than in CIP (and also in TMT).

The highest average proportion of the purchase price allocated to intangible assets was in TMT (41% of total purchase price was allocated to intangible assets). Companies operating in TMT allocate proportionately more to other intangible assets than other companies combined. The finding is statistically significant at 5% level and thus supports H4 stating that companies operating in technology, media and telecom sector allocate a larger proportion of the purchase price to intangible assets than companies operating in other sectors. This finding is line with theories presented by (Collins et al., 1997, Lev and Zarowin, 1999) that more investments in intangible assets are made in high tech industries. In addition, companies in TMT allocate proportionately more to intangible assets than companies operating in CIP and FIN alone. However, these findings are statistically significant only at 10% significance level.

Average allocation to goodwill was the highest in CIP, where 60% of the total purchase price was allocated to goodwill on average. No statistically significant differences between industries were found.

The highest average proportion allocated to other net assets was in FIN, where 45% of the total purchase price was allocated to other net assets. Higher average allocation to other net assets in FIN than TMT and CIP is statistically significant at 1% significance level. The finding is logical since companies operating in FIN often acquire financial assets instead of intangible assets such as technology or software.

The most recognized intangible assets were customer related assets representing 14% of the total purchase price. In TMT customer related intangible assets constituted 22% of the total purchase price, whereas in CIP and FIN customer related assets covered only 2% of both industries' total purchase price. 12% of the total purchase price in CIP was allocated to other intangible assets (or the type of the intangible assets was not disclosed), which means that companies in CIP acquired almost €300 million worth of intangible assets they did not disclose specific information on.

## 7.4 Results of the multivariate tests

### 7.4.1 Allocation to goodwill

**Table 8. Multivariate OLS regression analysis of characteristics influencing allocation to goodwill.**

This table presents the results of multivariate OLS regression analysis. Dependent and explanatory variables are as defined in section 6.2. The sample consists of all companies listed in OMX Helsinki reporting acquisitions in 2007 less companies operating in the financial services industry (N=54). T-statistics are presented in the parentheses below the estimated coefficients. Statistical significance at 1%, 5% and 10% level is denoted by \*\*\*, \*\* and \*, respectively.

Explanatory variable	Expected sign	1	2	3	4
LNMCAP	-	<b>-0.05**</b> (-2.18)	<b>-0.06**</b> (-2.12)	<b>-0.06**</b> (-2.16)	<b>-0.05**</b> (-2.03)
PRICETOBOOK	-	0.00 (0.04)	0.01 (0.33)	0.01 (0.23)	0.03 (0.78)
PROFITABILITY	-	<b>0.63***</b> (2.75)	0.47 (1.11)	<b>0.59**</b> (2.41)	
CEOAGE	+	0.01 (0.68)	0.01 (0.58)	0.00 (0.69)	0.00 (0.37)
CEOTENURE	-	-0.01 (-0.93)	-0.01 (-0.77)	-0.01 (-0.84)	-0.01 (-0.57)
LEVERAGE	-		-0.20 (-0.45)	-0.13 (-0.33)	-0.39 (-0.92)
RDTONETSALES	?		-0.00 (-0.35)		<b>-0.02**</b> (-2.13)
TMT	+		0.20 (0.92)	0.17 (0.86)	0.29 (1.39)
CIP	?		0.24 (1.15)	0.22 (1.10)	0.31 (1.58)
Constant		0.63 (1.70)	0.56 (1.14)	0.50 (1.09)	0.68 (1.43)
R <sup>2</sup>		0.19	0.21	0.21	0.19
Adjusted R <sup>2</sup>		0.10	0.05	0.06	0.04
F-value		<b>2.19**</b>	1.27	1.45	1.27
N		54	54	54	54

Variable definitions:

GOODWILL	= Allocation to goodwill
CEOAGE	= The end of the fiscal period 2007 - CEO date of birth
CEOTENURE	= The end of the fiscal period 2007 - the date the CEO took office
LEVERAGE	= 2006 - 2007 year-end average of 1 - Equity/Total assets
PROFITABILITY	= Return on assets (ROA) = Earnings before interests and taxes (2007)/Total assets (2007)
RDTONETSALES	= Average of 2005 - 2007 R&D expenses/Net sales
PRICETOBOOK	= Market capitalization (2007)/Equity (2007)
LNMCAP	= ln(Market capitalization (2007))
CIP	= Dummy variable for consumer or industrial product industry
TMT	= Dummy variable for technology, media and telecom industry

To test the impact of the acquirer's characteristics on the proportionate amount of the total intangible assets allocated to goodwill, four regression runs are performed. The regressions include all OMX companies reporting acquisitions in 2007 less companies operating in the financial services industry. The first model includes variables that, based on theory and prior research, bear strong expectations related to their explanatory power regarding goodwill. The second model includes all explanatory variables. The third model includes the same sample and variables as the second one with the exception that in the third one RDTONETSALES is removed, since strong correlation between RDTONETSALES and PROFITABILITY was detected. In the fourth model, the same sample is included as in models 1-3, but RDTONETSALES is added back and PROFITABILITY is removed.

The results of all four regression runs are presented in table 8. The results are interesting. Only the first model returns a statistically significant F-value (at 5% significance level), which was expected as the first model includes only the variables that bear strong expectations regarding goodwill. Therefore, the discussion concentrates mainly on the results of the first regression model.

R<sup>2</sup>-values remain rather low in all four runs varying between 0.19-0.21 (adjusted R<sup>2</sup>-values between 0.04-0.10). As expected, the first model returned the highest adjusted R<sup>2</sup>-value (0.10) meaning that 10% of the variance in GOODWILL is explained by model 1.

To complement the analysis of allocation to goodwill, statistical significances of differences between average allocations in test variable sub-groups are examined by employing Student's two-tailed t-test. The results of the complementary analysis are presented in table 9.

**Table 9. Complementary analysis of allocation to goodwill.**

This table presents comparison of average allocations to goodwill between sub-groups of the test variables. Statistical significance between the averages at 10%, 5% and 1% level is denoted by \*, \*\* and \*\*\*, respectively.

	>55	# of companies	55-50	# of companies	<50	# of companies
CEOAGE	0.65	16	0.56	16	0.60	22
	>10%	# of companies	10%-5%	# of companies	<5%	# of companies
PROFITABILITY (ROA)	0.61	25	0.69	15	0.50	14
	>2.5	# of companies	2.5-1.5	# of companies	<1.5	# of companies
PRICETOBOK	0.59	20	0.62	20	0.60	14
	Large cap (>1bn€)	# of companies	Mid-cap (1bn€-150m€)	# of companies	Small cap (<150m€)	# of companies
LNMCAP	0.58	21	0.52	13	0.69	20

The first hypothesis as presented in section 5.2 is as follows:

### **H1. There is a positive association between the age of the CEO and allocation to goodwill.**

CEOAGE gets a slightly positive value in all four runs, but the associations are not statistically significant. This contradicts with findings of Zhang and Zhang (2007) who found that the purchase price allocation decision is used as an earnings management tool by older CEOs.

There could be several explanations for this contradiction. First of all, social differences between Finland and the United States probably exist. CEO's may not want to engage in earnings management in Finland if it is not, for instance, approved by their colleagues. Secondly, bonus schemes between Finland and the United States may differ. In Finland, the bonus schemes may be bound to certain measures that cannot be affected by the purchase price allocation decision. Third, Van de Poel et al. (2008) found that Big 4 auditors constrain the use of goodwill treatment as an earning management tool. The majority of the companies listed in OMX Helsinki are audited by a Big 4 company, which could place the companies under closer scrutiny by auditors and remove the possibility of earnings management conducted by excess allocation to goodwill. According to Pender (2001), goodwill impairment charges are likely to lead to dismissal of management. Compared to the United States, Finland is a small country and being dismissed as a



result of impairment charges might damage one's reputation more in Finland than it does in the United States. Avoiding dismissal and keeping one's reputation may be a stronger incentive than straight monetary bonuses. Or it could be that CEOs are not responsible for the allocation of the purchase price and e.g. the CFO of the company may be entrusted to conduct the allocation of the purchase price.

Table 9 shows that the average allocation to goodwill is the highest in companies where the age of the CEO is above 55 years but it does not differ from other groups at a statistically significant level. It is notable that companies with CEOs at the age of 50-55 years allocate less to goodwill than companies with CEOs younger than 50 years. This implicates that the assumption that the older the CEO the larger the allocation to goodwill does not seem to apply when moved further away from the retirement age.

No evidence to support hypothesis H1 stating that there is a positive association between the age of the CEO and allocation to goodwill was found. Therefore, H1 is rejected.

The second hypothesis is as follows:

**H2. There is a negative association between the acquirer's profitability and allocation to goodwill.**

Contrary to the hypothesis, PROFITABILITY gets a positive value in the first regression at 1% significance level. The logic behind this could be that the more profitable the company, the more cash it is likely to have to spend on acquisitions. As acquisitions are often auctioned between several bidders, the higher the bid, the bigger is the probability of winning the auction. Cash rich companies may ensure the win by paying a large goodwill in excess of the value of other intangible assets. The positive sign of PROFITABILITY contradicts with the theory that the purchase price allocation decision is used to smooth earnings. PROFITABILITY gets positive values also in the second and third regressions, but neither of the models is statistically significant. The complementary analysis is in line with the multivariate results even though no statistical significances between the average allocations to goodwill in the three sub-groups exist.

The proportionate average allocation to goodwill is the lowest in companies with return on assets less than 5%.

The sign of PROFITABILITY is the opposite of the expected sign, which gives no support to hypothesis 2 stating that a negative association between the acquirer's profitability and allocation to goodwill exists. Thus, H2 is rejected.

The third hypothesis is as follows:

**H3. There is a negative association between the acquirer's growth prospects and allocation to goodwill.**

PRICETOBOK gets positive values in all four regressions. Even though any of the findings is not statistically significant, the signs contradict with theory of *nature of growth firms' goodwill* (Ojala, 2001). The theory suggests that growth companies have only a limited period of time to exploit their goodwill due to the rapidly changing business environment. Unless the goodwill is quickly exploited, it will become worthless. This would encourage growth companies to allocate as little to goodwill as possible. H3 is based on that assumption and signaling theory but no evidence to support H3 was found. The complementary analysis provides no statistically significant results, either. The contradictory signs of the coefficients in relation to the theory of *nature of growth firms' goodwill* may imply that companies with larger price-to-book ratios have more positive expectations as regards to the future cash flows and, therefore, more goodwill can be recorded as impairments of the excess goodwill are less likely, as suggested by Zhang and Zhang (2007).

As evidence of a negative association between the acquirer's growth prospects and allocation to goodwill is not found, H3 is rejected.

The fourth hypothesis is as follows:

**H4. Companies operating in Technology, Media and Telecom sector allocate a larger proportion of the purchase price to intangible assets than companies operating in other sectors.**

The fourth hypothesis was tested in section 7.3 by employing Student's two-tailed t-test. The average allocation of the purchase price to other intangible assets in TMT was 41%, whereas the respective figure in all other industries combined was 20%. The difference is statistically significant at 5% significance level and, therefore, support for H4 was found.

The fifth hypothesis is as follows:

**H5. There is a negative association between the acquirer's size and allocation to goodwill.**

LNMCAP gets a negative value in each of the regressions. The finding is significant at 5% significance level in the first regression and, therefore, in line with the underlying theories presented in connection with hypotheses development suggesting that larger companies have more accounting resources and/or are more exposed to political costs.

According to FFSA (2006, 2007) and Intangible Business (2007), many companies lack the resources to thoroughly conduct the process of purchase price allocation and, as a consequence, may be tempted to allocate the excess purchase price entirely to goodwill even if there are identifiable intangible assets.

Moreover, the political cost theory suggest that larger companies are under closer scrutiny by government agencies and thus more exposed to political costs and believe that the pressure of the unwelcome scrutiny will ease along with better reporting. Better reporting, in terms of purchase price allocation, means identifying and recognizing as many identifiable assets apart from goodwill as possible.

The complementary analysis shows that companies belonging to OMX Helsinki Small Cap allocate proportionately more to goodwill than companies in Mid-Cap and Large Cap, which supports the findings of the multivariate analysis. However, no statistically significant differences between the average allocations to goodwill in the different sub-groups are documented.

LNMCAP gets a negative value in the first model at 5% significance level and thus, support for H5 is found.

The rest of the explanatory variables' signs are as expected. Both TMT and CIP get positive (but not statistically significant) values in all four regressions.

All in all, evidence of the test variables' impact on goodwill implicating that discretion is used in the allocation decision is rather exiguous. The original purpose of the examination of allocation to other net assets was to illustrate the role that verifiability plays in the allocation process. The modesty of the findings related to use of discretion in the allocation decision somewhat diminishes the significance of that purpose. Nevertheless, LNMCAP gets a negative sign as expected at a 5% level and, therefore, allocation to other net assets is examined. In addition, it is interesting to see whether allocation to other net assets can be explained by regression models 9-12.

#### **7.4.2 Allocation to other intangible assets**

To test the impact of the acquirer's characteristics on the proportionate amount of the purchase price allocated to intangible assets, four regression runs are performed. The settings of all the four runs in terms of the sample and explanatory variables are the same as in section 7.4.1. The results of the regression analysis are presented in table 10.

**Table 10. Multivariate OLS regression analysis of characteristics influencing allocation to other intangible assets.**

This table presents the results of multivariate OLS regression analysis. Dependent and explanatory variables are as defined in section 6.2. The sample consists of all companies listed in OMX Helsinki reporting acquisitions in 2007 less companies operating in the financial services industry (N=54). T-statistics are presented in the parentheses below the estimated coefficients. Statistical significance at 1%, 5% and 10% level is denoted by \*\*\*, \*\* and \*, respectively.

Explanatory variable	Expected sign	5	6	7	8
LNMCAP	+	0.00 (0.18)	0.01 (0.29)	0.01 (0.33)	0.00 (0.16)
PRICETOBOK	+	0.04 (1.60)	0.04 (1.34)	<b>0.05*</b> (1.69)	0.02 (0.79)
PROFITABILITY	-	<b>-0.82***</b> (-4.22)	-0.56 (-1.63)	<b>-0.82***</b> (-4.06)	
CEOAGE	?	-0.00 (-0.39)	-0.00 (-0.15)	-0.00 (-0.38)	0.00 (0.18)
CEOTENURE	?	-0.01 (-1.29)	-0.01 (-0.93)	-0.01 (-0.81)	-0.01 (-1.21)
LEVERAGE	-		-0.18 (-0.50)	-0.34 (-1.04)	0.04 (0.10)
RDTONETSALES	+		0.01 (0.92)		<b>0.02***</b> (3.76)
TMT	+		0.14 (0.78)	0.21 (1.26)	0.04 (0.23)
CIP	?		0.12 (0.73)	0.17 (1.06)	0.03 (0.21)
Constant		0.40 (1.28)	0.23 (0.58)	0.36 (0.96)	0.07 (0.18)
R <sup>2</sup>		0.32	0.38	0.36	0.34
Adjusted R <sup>2</sup>		0.25	0.25	0.25	0.22
F-value		<b>4.59***</b>	<b>2.94***</b>	<b>3.22***</b>	<b>2.88***</b>
N		54	54	54	54

Variable definitions:

OTHERINTANGIBLES = Allocation to other intangible assets

CEOAGE = The end of the fiscal period 2007 - CEO date of birth

CEOTENURE = The end of the fiscal period 2007 - the date the CEO took office

LEVERAGE = 2006 - 2007 year-end average of 1 - Equity/Total assets

PROFITABILITY = Return on assets (ROA) = Earnings before interests and taxes (2007)/Total assets (2007)

RDTONETSALES = Average of 2005 - 2007 R&D expenses/Net sales

PRICETOBOK = Market capitalization (2007)/Equity (2007)

LNMCAP = ln(Market capitalization (2007))

CIP = Dummy variable for consumer or industrial product industry

TMT = Dummy variable for technology, media and telecom industry

All four models get F-values that indicate statistical significance of the model at 1% significance level. R<sup>2</sup>-values vary between 0.32 and 0.38 and adjusted R<sup>2</sup>-values between 0.22 and 0.25. Even though the second model as a whole is statistically significant, any of the individual explanatory variables does not get a value that is statistically significant. This implies that harmful multicollinearity is present as the analysis in section 7.1.3 suggests.

In first and third regressions, PROFITABILITY gets a statistically significant negative value at 1% significance level indicating that the more profitable the company, the smaller the proportionate allocation to other intangible assets. A possible explanation for this could be that companies that have already reached a high level of profitability do not acquire companies because of intangible assets such as brands or customer lists. Profitable companies are likely to already have a strong brand or a solid customer base and they may not feel the need to acquire such assets.

In the third regression, PRICETOBOK gets a positive value at 10% significance level, which suggests that companies with higher growth prospects allocate proportionately more to intangible assets. This finding is in line with the argument of Deloitte (2007) that the value of a company exceeding the book value of its assets can be, to a large extent, ascribed to intangible assets. However, 10% level is not generally considered sufficient evidence of a significant association.

In the fourth regression, RDTONETSALES get a positive value that is statistically significant at 1% significance level. This finding is logical for two reasons: Engaging in extensive R&D activity is likely to lead to intangible assets such as patents or software. Moreover, companies are likely to acquire companies within the same industry. Therefore, the acquired companies are also likely to have a larger proportion of intangible assets to be identified and recognized in connection with the purchase price allocation.

The signs of the other variables are as expected but none of the values the other explanatory variables get is statistically significant. TMT and CIP get positive values also when allocation to other intangible assets is used as a dependent variable.

In general, the results are logical and as expected (e.g. the statistically significant positive value of RDTONETSALES). The reversed inspection gives no evidence, based on which it could be argued that discretion is used in the allocation decision that would make the reported allocation deviate from the underlying economics.

### **7.4.3 Allocation to other net assets**

To test the impact of the acquirer's characteristics on the remaining component of the purchase price, other net assets, four regression runs are performed. The settings of all the four runs in terms of the sample and explanatory variables are the same as in sections 7.4.1 and 7.4.2. The results of the regression analysis are presented in table 11.

**Table 11. Multivariate OLS regression analysis of characteristics influencing allocation to other net assets.**

This table presents the results of multivariate OLS regression analysis. Dependent and explanatory variables are as defined in section 6.2. The sample consists of all companies listed in OMX Helsinki reporting acquisitions in 2007 less companies operating in the financial services industry (N=54). T-statistics are presented in the parentheses below the estimated coefficients. Statistical significance at 1%, 5% and 10% level is denoted by \*\*\*, \*\* and \*, respectively.

Explanatory variable	Expected sign	9	10	11	12
LNMCAP	?	0.04 (1.35)	0.03 (1.16)	0.03 (1.17)	0.04 (1.25)
PRICETOBOOK	-	-0.06 (-1.64)	-0.06 (-1.55)	-0.06 (-1.67)	-0.04 (-1.20)
PROFITABILITY	+	<b>0.61**</b> (2.29)	0.56 (1.19)	<b>0.59**</b> (2.17)	
CEOAGE	?	-0.00 (-0.18)	-0.00 (-0.19)	-0.00 (-0.18)	-0.00 (-0.45)
CEOTENURE	?	<b>0.27**</b> (2.01)	0.02 (1.58)	0.02 (1.60)	<b>0.03*</b> (1.81)
LEVERAGE	+		0.26 (0.52)	0.27 (0.63)	0.04 (0.09)
RDTONETSALES	-		-0.00 (-0.08)		<b>-0.01*</b> (-1.77)
TMT	-		-0.37 (-1.50)	<b>-0.37*</b> (-1.70)	-0.27 (-1.16)
CIP	-		-0.27 (-1.19)	-0.28 (-1.28)	-0.18 (-0.84)
Constant		0.11 (0.26)	0.32 (0.59)	0.31 (0.61)	0.48 (0.91)
R <sup>2</sup>		0.22	0.28	0.28	0.25
Adjusted R <sup>2</sup>		0.14	0.13	0.15	0.12
F-value		<b>2.68**</b>	<b>1.87*</b>	<b>2.15**</b>	<b>1.91*</b>
N		54	54	54	54

Variable definitions:

OTHERNETASSETS = Allocation to other net assets

CEOAGE = The end of the fiscal period 2007 - CEO date of birth

CEOTENURE = The end of the fiscal period 2007 - the date the CEO took office

LEVERAGE = 2006 - 2007 year-end average of 1 - Equity/Total assets

PROFITABILITY = Return on assets (ROA) = Earnings before interests and taxes (2007)/Total assets (2007)

RDTONETSALES = Average of 2005 - 2007 R&D expenses/Net sales

PRICETOBOOK = Market capitalization (2007)/Equity (2007)

LNMCAP = ln(Market capitalization (2007))

CIP = Dummy variable for consumer or industrial product industry

TMT = Dummy variable for technology, media and telecom industry



F-values indicate statistical significance of every model either at 5% or 10% significance level. R<sup>2</sup>-values for all four models fall between 0.22 and 0.28 (adjusted R<sup>2</sup>-values between 0.12 and 0.15).

PROFITABILITY did get a statistically significant negative value (at 1% level) in allocation to other intangible assets. As a possible reason for the negative correlation it was suggested that companies with a higher level of profitability do not acquire companies to acquire intangible assets. Profitable companies are likely to already have e.g. a strong brand or a solid customer base, which often form a part of the excess purchase price and act as drivers for acquisitions. In regression 2, PROFITABILITY gets a positive value at 5% significance level, which supports the reasoning presented above. It could be that companies with high profitability are likely to acquire companies to get in possession of the tangible assets of the acquiree.

TMT gets a negative value in regression 3 at 10% significance level providing modest evidence that companies operating in TMT allocate less to other net assets. This finding is logical since TMT is an intangible assets intensive industry and does not usually involve e.g. heavy production machinery.

In regression 4, modest evidence of a negative association between RDTONETSALES and allocation to other net assets was found. The association is not surprising, since extensive R&D activity often results in intangible asset.

Regressions 1 and 4 show interesting results in terms of CEOTENURE. They show that there is a positive association between the length of the CEO's tenure and allocation to other net assets. The finding is statistically significant at 5 % level in regression 1 and at 10% level in regression 4.

A possible explanation for the positive association could be that the longer the CEO has been in the office, the better she/he knows the company and the industry. Based on the extensive knowledge in the industry the CEO can better evaluate the true value of the acquired company, which would result in a smaller amount of the excess purchase price over the book value of net

tangible assets. Zhang and Zhang (2007) found there to be a negative association between the length of the CEO's tenure and allocation to goodwill, which is in line with the reasoning presented above.

Evidence of a significant negative association between allocation to goodwill and the size of the acquirer was found in model 1 in section 7.4.1. Similar evidence of an association between allocation to other net assets and LNMCAP is not found, which somewhat supports the findings of Zhang and Zhang (2007) that the verifiability of assets plays an important role in the allocation process. However, statistically significant associations between allocation to other net assets and explanatory variables were found implicating that some consistencies in allocation to other net assets do exist, which contradicts with findings of Zhang and Zhang (2007).

## **8. Conclusions**

### **8.1 Summary and implications**

#### **8.1.1 Summary of the findings**

OLS regression analysis was conducted in order to test if discretion is used in the purchase price allocation that would make the reported allocation deviate from the underlying economics. The possible impact was tested separately on goodwill, other intangible assets and other net assets. In addition, a complementary Student's two-tailed t-test analysis on allocation to goodwill was performed in order to deepen the analysis on allocation to goodwill. Similarly, Student's two-tailed t-test was employed in order to test the differences in the average allocations between industries.

No evidence was found that discretion in the allocation decision is used in order to manage earnings. Instead, a negative association between the size of the acquirer and proportionate allocation to goodwill was documented implying that scarcity of accounting resources or political costs impact the allocation decision. The following summarizes the findings at a more detailed level.

#### **Allocation to goodwill**

H1 suggested that there is a positive association between the age of the CEO and allocation to goodwill. The hypothesis was based on the findings of Zhang and Zhang (2007) that older CEOs allocate more to goodwill in order to avoid intangible asset amortizations that would depress accounting earnings, to which CEOs' bonus incentives are often bound. Recording a proportionately larger amount to goodwill would enable the CEO to postpone the impairments of goodwill beyond her/his resignation and enable bigger bonuses before retiring.

No evidence of an association between the age of the CEO and allocation to goodwill was found. Therefore, the conclusion based on the statistical test is that in Finland older CEOs are not more likely to allocate more to goodwill than younger CEOs.

H2 suggested that the purchase price allocation decision is used to smooth earnings based on the same logic as presented in H1 but H2 suggested that the profitability of the acquirer is negatively associated with the amount allocated to goodwill. The less profitable the company, the more it allocates to goodwill in order to be able to postpone goodwill impairments into the future and conduct the impairments when the accounting earnings look better and such impairments do not depress the earnings below certain levels, e.g. below zero or below analysts' estimates.

However, evidence of a negative association between profitability of the acquirer and allocation to goodwill was not found. Instead, a positive association between PROFITABILITY and allocation to goodwill was documented. The logic behind this could be that as acquisitions are often auctioned between several bidders, the higher the bid, the bigger is the probability of winning the auction. Cash rich companies may ensure the win by paying a large goodwill in excess of the value of other intangible assets.

H3 suggested that there is a negative association between the acquirer's growth prospects and allocation to goodwill. The hypothesis was based on the nature of growth firms' goodwill and signaling theories.

No evidence to support H3 was found. It could imply that the nature of growth firms' goodwill is more lasting than assumed in the theory. As for signaling, the investors may not see allocating the purchase price to goodwill as a way to postpone expensing but instead see goodwill as a means for growth. Price-to-book ratio used as a proxy for growth prospects may not actually capture the growth prospects of the acquiring company to a sufficient extent as it represents the investor's estimations of the company's future cash flows. Asymmetry of information and subjectivity may lead in deterioration of those estimations. However, using other indicators e.g. PEG (price-to-earnings-to-growth) -ratio as a proxy for growth prospects would be prone to the same problems as P/B-ratio.

H5 argued that the bigger the acquiring company, the less it allocates to goodwill. As suggested in H5, evidence of a negative association between the acquirer's size and allocation to goodwill was found. It could implicate that scarcity of accounting resources may have an impact on the

allocation decision as FFSA (2006, 2007) and Intangible Business (2007) suggested. Based on the multivariate analysis results, it seems that larger companies may have more extensive accounting resources available for more thorough purchase price allocation procedures than smaller companies.

Another explanation could be the political cost theory suggesting that larger companies are under closer scrutiny than smaller companies and hope to ease the pressure of this unwelcome scrutiny by better reporting.

Nevertheless, a large proportion of the purchase price allocated to goodwill does not necessarily mean that the allocation is not conducted in an appropriate manner. The proportion allocated to goodwill may represent genuine goodwill and thus no intangible assets can be identified and recognized apart from it. Based on this, a larger proportion allocated to goodwill may not, however, be regarded as insufficient reporting by the markets and, therefore, the lack of resources is a more probable explanation.

### **Allocation to other intangible assets**

Evidence was found that the profitability level of the acquirer is negatively associated with allocation to other intangible assets. The finding implies that profitable companies may not acquire companies because of intangible assets (e.g. brands or customer lists) because they are likely to already have a strong brand or a solid customer base.

In addition, evidence of a positive association between the R&D activity of the acquirer and allocation to intangible assets was found. This finding is logical since engaging in extensive R&D activity is likely to lead to intangible assets such as patents or software and acquisition often take place within an industry.

As a conclusion, testing the allocation to intangible assets (a reversed inspection) does not give a reason to suspect that the reported allocation deviates from the underlying economics.

### **Allocation to other net assets**

Evidence of a positive association between profitability of the acquirer and allocation to other net assets was found, which is in line with the finding that profitable companies are not likely to acquire companies for intangible assets.

Moreover, evidence was found that there is a positive association between the length of the CEO's tenure and allocation to other net assets. This finding could implicate that the longer the CEO has been in the office, the better she/he knows the industry. As consequence she/he can better evaluate the true value of the acquired company, which would result in smaller excess price. This is in line with the findings of Zhang and Zhang (2007) that there is a negative association between the length of the CEO's tenure and allocation to goodwill.

Evidence of a negative association between the size of the acquirer and allocation to goodwill was found but evidence of a similar association between allocation to other net assets and the acquirer's size was not found, which somewhat supports the findings of Zhang and Zhang (2007) that the verifiability of assets plays an important role in the allocation process. However, certain associations between explanatory variables and allocation to other net assets were found implicating that some consistencies in allocation to other net assets exist, which contradicts with the findings of Zhang and Zhang (2007).

### **Allocation between industries**

In order to test H4 (companies operating in TMT allocate more to intangible assets than other companies operating in other industries), differences in the average allocations between industries were tested by employing Student's two-tailed t-test. The test returned evidence (at 5% significance level) that companies operating in TMT do allocate more to intangible assets than companies operating in other industries, which is in line with the assumption that TMT is an intangible asset intensive industry.

In addition, the t-test provided evidence at 1% level that companies in FIN allocate more to other net assets than companies in TMT and CIP. The finding is logical, since companies in the financial services industry often acquire financial assets instead of intangible assets such as technology or software.

### **8.1.2 Implications**

This paper has several implications. In general, it provides the investors with assurance that the variables included in this paper do not induce the use of the allocation decision as an earnings management tool in Finland. Moreover, it allows the investors to adjust their valuations based on the finding that larger companies are more likely to allocate the purchase price more thoroughly. In other words, the investors can take into account the possibility that smaller firms' goodwill may actually include intangible assets that have not been recognized due to a lack of resources. The following paragraphs discuss the implications of the paper in more detail.

First of all, the results show that older CEOs are not more likely to strive to allocate a larger proportion of the purchase price to goodwill in Finland, e.g. in hope for larger bonuses (which are often bound to accounting earnings). Evidence of the negative impact of the profitability level of the acquirer or growth prospects on allocation to goodwill was not found, either.

Based on these, it can be inferred that discretion is not used in the purchase price allocation by the CEO in order to claim bigger bonuses prior to retiring or to lift the accounting earnings up to a certain level (e.g. above analysts' estimates) in order to avoid a slump in the share price. Moreover, no evidence was found that companies with higher growth prospects would avoid recording goodwill (which might have resulted in misevaluation of other intangible assets).

Instead, a negative association between the size of the acquirer and allocation to goodwill was documented implying that smaller companies may neglect the allocation procedure due to scarcity of accounting resources and allocate excessively to goodwill. An alternative explanation may be the larger political costs that larger companies face.

Second, a few logical associations between certain company characteristics and allocation of purchase price between goodwill, other intangible assets and other net assets were found. These findings implicate that the purchase price allocation reporting corresponds to the underlying economics, at least to an extent. For example, companies operating in technology, media and telecom sector allocate more to intangible assets than companies operating other industries. Had such association not been found, it could have also been a sign that the reported allocations are not in line with the underlying economics, since TMT is an intangible asset intensive industry. A positive association between the R&D activity of the acquirer and allocation to intangible assets was found, from which similar conclusions can be drawn.

These findings provide the capital markets with more information to be taken into account when performing valuations on companies and aid the markets to adjust the valuations accordingly. A valuation model is only as good as its assumptions and the more solid information the markets have, the more accurate are the valuations. Mergers and acquisitions often constitute a remarkable part of companies' growth and, therefore, assessing the future performance of the acquired entities is of vital importance in assessing the future value of the company.

However, even though no evidence of earnings management driven use of discretion in the allocation decision was found, these findings do not exclude the possibility that discretion is used and that the reported allocations in fact do deviate more from the underlying economics. Therefore, further research is called for. The limitations of this paper and suggestions for further research are discussed in sections 8.2 and 8.3.

## **8.2 Limitations**

This paper has certain limitations. First of all, this paper concentrates on companies listed on OMX Helsinki and no generalization regarding other countries can be done. Moreover, the data covers only year 2007. In order to achieve more comprehensive results, a study including a larger sample should be conducted.

In addition, purchase price allocation is rapidly changing and the findings of this paper are not likely to be of good indication about the future state of purchase price allocation. Results of data



gathered from 2008 financial statements may differ significantly compared to the results presented in this paper. Also, there might be variables not used in this paper that could be used in explaining the allocation of the purchase price. Some of the possible variables that could be involved are discussed in the next section.

Lastly, this paper concentrates on the characteristics of the acquirer and does not take into account the characteristics of the acquiree, which could also have an impact on the allocation decision.

### **8.3 Further research**

The results of this paper call for further research on use of accounting discretion in purchase price allocation. This paper assumed the characteristics of the acquiree to be similar to those of the acquirer regarding certain variables, which may not always be the case. Therefore, it would be of interest to also examine the attributes of the acquiree and whether they have an impact on the allocation decision. However, gathering data on the acquiree could prove to be extremely troublesome, if not in certain cases impossible.

Even though no evidence of use of earnings management driven discretion in the allocation decision was found, the possibility cannot be ruled out completely. Goodwill impairment tests have to be carried out at a CGU (cash generating unit, a smallest unit that a cash flow can be attributed to) level. Profitability levels of CGUs may also have an impact on the allocation decision. If goodwill is allocated (even excessively) to a certain CGU with a high profitability, an impairment may not be necessary as the future cash flow predictions for that unit are likely to be positive and indicate no reason for an impairment. If none of the CGUs is profitable enough to “hide” the goodwill (a large impairment is likely to lead to dismissal of management, Pender, 2001), a larger proportion of intangible assets may be identified and recognized.

The role of external appraisers should also be further examined in the allocation process, since it is likely that external appraisers are more objective in the valuations as they are not a part of the bonus schemes bound to the acquirer’s earnings, for example.

R&D expenses were used as a control variable in this paper since they are likely to result in intangible assets such as technology or software. Similarly, it can be argued that more extensive advertising results in a stronger brand, which can also be identified and recognized in connection with the allocation.

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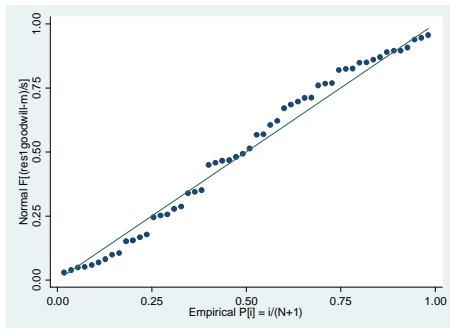
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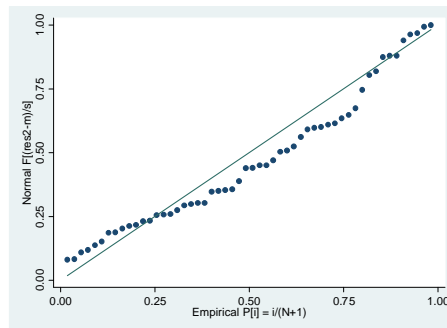


## Appendix 1. Normality of residuals.

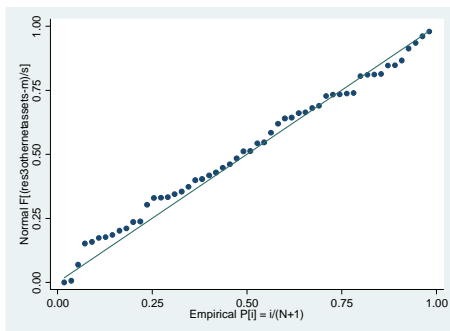
GOODWILL (model 1)



OTHERINTANGIBLES (model 5)

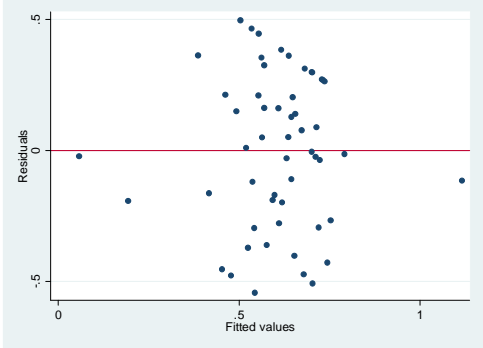


OTHERNETASSETS (model 9)

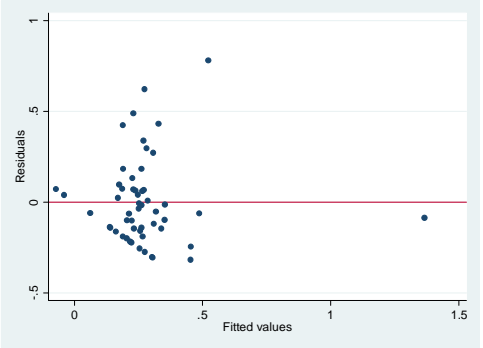


# Appendix 2. Homoskedasticity of residuals.

GOODWILL (model 1)



OTHERINTANGIBLES (model 5)



OTHERNETASSETS (model 9)

