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The EPS Measure in the Context of Mergers and Acquisitions

Investor's ability to decode true cash flow effects

Abstract

The purpose of this paper is to investigate whether investors are able to see through pure accounting treatment having an artificial effect on earnings per share in the context of mergers and acquisitions. In theory two schools of thought, being behavioural finance and the efficient market hypothesis, have conflicting views. The latter advocates that investors are not misled and able to decode true cash flow effects. Prior studies, however, concludes that the market values form over substance finding a positive, statistically significant, relationship between accounting accretion and abnormal returns. This study, looking at European transactions between 2005 and 2014, concludes that the hypothesis of accretive deals having the same abnormal returns, on average, as dilutive deals cannot be rejected.

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1. Introduction

1.1 Background

Between corporate finance theory and practice there is a clear dissent with regards to earnings and its importance when evaluating investment decisions such as mergers and acquisitions. According to theory, a company's valuation is dependent on future cash flows rather than accounting earnings although assumed to converge in steady state. Any artificial earnings differences not affecting the underlying economics are therefore irrelevant in terms of value creation and in extension decision making. Thus, pure accounting treatment and its subsequent effect on earnings per share (EPS), whether increasing or decreasing, following a merger or acquisition is also irrelevant. Related examples from mergers and acquisitions where EPS may change without a conclusive value relevance are whether the transaction is accounted for by the pooling or purchase method, if the target trades at a different price to earnings multiple and the amount of asset step-ups. The researchers Koller, Goedheart & Wessels (2010, p. 345) argue that capital markets are efficient and fully understand the link between short term accounting earnings and value:

"Stock markets are perfectly capable of seeing the economic reality behind different forms of accounting information. Therefore, managers should not be overly concerned with how their share prices might be affected by new accounting rules, since these does not affect their underlying economics."

Among practitioners, however, short term EPS is often at the centre of attention as concluded by Arnold (2011). Rappaport (2005) argues that analysts put a lot of emphasis on earnings when forecasting performance and managers can go to great lengths to meet earnings expectations. The same holds true when evaluating mergers and acquisitions. Common practise, according to Arzac (2005), is to analyse if a transaction has an accretive or dilutive effect on EPS and accretive transactions are often preferred by decision makers. In discussions with corporate managers and bankers the consensus was that EPS is irrelevant as a measure for evaluating mergers and acquisition, but easy to interpret as well as to communicate and therefore used (Koeller, Goedhart & Wessels, 2010). *Table 1: Transaction examples* illustrates the emphasis acquirers often put on the impact on EPS in acquisition announcements.

This paper aims to examine whether transactions which are dilutive on the basis of the method they are accounted for generates negative abnormal stock returns around their announcements. That means excluding any value relevant effects on EPS, such as synergies, and studying only the EPS effects deriving from the application of accounting standards.

Table 1: Transaction examples: European acquisition announcements

I	When the communications provider BT Group agreed definite terms to acquire EE for £ 12.5 billion the press release on February 5th 2015 emphasised the expected EPS effect of the acquisition: " As a result of EE's high depreciation charge, reflecting historical network investment, the Transaction is expected to be accretive to Adjusted EPS one year later"
II	In November 17th 2014 Actavis announced in a press release that they were to acquire Allergan, a transaction within health technology valued at $66 billion, with one of the highlighted bullets in the press release stating: "Double-Digit Accretion to Non-GAAP EPS within First 12 Months"
III	In July 14th 2008 InBev and Anheuser-Bush agreed to combine, creating a global leader in beer with Budweiser as a flagship brand. One of the selling points in the press release stated: "The transaction is expected to be neutral to normalized earnings per-share in 2009 and accretive beginning in 2010..."

1.2 Research purpose and contribution

The purpose of this paper is to investigate investors' ability to decode true cash flow effects of accounting data in the context of mergers and acquisitions. This paper will leverage on previous research evaluating drivers of long term acquirer performance and combine these accepted explaining variables with a constructed EPS dilution measure to see whether the latter is relevant to explain the short term announcement reactions. Andrade (1999) did a similar study on U.S transactions and concluded that EPS accretion has a positive and statistically significant effect on abnormal returns around announcement. Further Lynagh (2014), only looking at all equity financed transactions, confirms Andrade's discovery but finds no support post 2000. This paper is based on European data, which distinguishes it from previous studies.

Research question: *Does the market penalize transactions where the application of accounting standards will have a dilutive effect on EPS?*

2. Theoretical framework

2.1 Fundamental value creation

Value, defined as the sum of discounted future cash flows, is a central aspect of measuring performance for an investor in an equity securities market place. Investments are made based on anticipations that when sold, the asset will generate returns compensating investors for the risk held, at or above the cost of capital. Essentially, value is created when capital is invested at rates higher than the cost of capital according to Damodaran (2007). The fundamental value drivers are return on invested capital and growth combined with the cost of capital, as shown in equation 1 below.

$$Intrinsic\ value = \frac{EBIT \times (1-\tau)_{t=1} \times (1-\frac{g}{ROIC})}{WACC-g} = \frac{Invested\ Capital\ x\ ROIC \times (1-\frac{g}{WACC})}{WACC-g} = \frac{Free\ cash\ flow}{WACC-g} \quad (1)$$

Ultimately market values are determined by the aggregated market's expectations about growth and return on invested capital, partially formed by accounting information provided by the company. Hence communication with capital markets is crucial. The IFRS conceptual framework for financial reporting, in turn, decides what IFRS compliant businesses should disclose. IFRS (2010, p. 9) states that financial reporting should aid investors in making decisions regarding investments in equity securities.

"The objective of general purpose financial reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity. Those decisions involve buying, selling or holding equity and debt instruments, and providing or settling loans and other forms of credit."

However, Rappaport (2005) among others express concerns that managers, analysts and investors focus too much on short term earnings and fail to properly evaluate events with negative short term impacts which pay off in the long run. In other words, if investors fail to think in terms of the present value of all future cash flows, and rather focus on current earnings as a comprehensive measure of value, they may miss out on strategic opportunities. There are two sets of theories on how investors evaluate corporate events - the first being the rational efficient market view under which information is always correctly interpreted, and the second the theory of behavioural finance.

2.1.1 The rational view

According to Eugene & Fama (1970) investors are rational mean-variance optimizers, have homogenous expectations and all available information is reflected in stock prices. The valuation implication, hence, is that market values do not deviate from intrinsic values. Any new, value relevant, information is immediately incorporated eliminating potential arbitrages as rational investors always strive to have the highest possible reward-to-volatility ratio. Further, this suggests that investors focus solely on economic fundamentals, being return on invested capital and growth. Thus prices are not affected by earnings management or earnings volatility, as shown in recent research provided by Rountree, Weston and Allayannis (2008). In line with the rational view, accounting driven accretion in mergers and acquisitions should not have any impact on cumulative abnormal returns.

2.1.2 The irrational view

Behavioural finance has two building blocks. The first, limits to arbitrage, argues that it can be problematic for rational investors to undo mispricing caused by less rational investors due to costs and risk associated with exploiting the arbitrage. Secondly, psychology catalogues irrational behaviour causing deviations from intrinsic values. Possible explanations to this financial phenomenon provided by behavioural finance scholars are noise trader risk, investor sentiment and functional fixation – which are all discussed below.

Bardford De long, Shleifer, Summers and Waldmann (1990, p. 703) concludes that *"the unpredictability of noise traders' beliefs creates a risk in the price of the asset that deters rational arbitrageurs from aggressively betting against them. As a result, prices can diverge significantly from fundamental values even in the absence of fundamental risk."*. Assuming that some investors have difficulties decoding the cash flow implications of accounting data, it is plausible that noise traders react to accounting accretion or dilution and drive the price up or down respectively. If their price impact is risky or costly to undo the effect may be a sustained impact on the acquirer's abnormal returns.

Baker & Wurgler (2006) provides evidence that investor sentiment may affect returns. They argue that mispricing is the result of uninformed demand shocks in presence of an arbitrage constraint, thus predicts that sentiment has an effect on returns. Referring to these two cornerstone theories of behavioural finance, they argue that stocks with highly subjective valuations, such as those of companies involved in mergers and acquisitions, are likely to be more affected by investor sentiment. This because those stocks are the most risky and costly to arbitrage.

Finally, functional fixation supports the theory that uninformed investors, not able to properly decode cash flow effect of accounting data, affects stock prices. Functional fixation suggests that stock prices are decided in an interaction between informed and uninformed investors. The traditional hypothesis presumes that prices are always decided by uninformed, unsophisticated investors, in a way that accounting differences are fully ignored implying that the market is misled. In later days Hand (1990) developed the theory suggesting that prices are decided by both informed and uninformed investors to a degree that pure accounting differences affect prices are reflected by the proportion of informed and uninformed investors.

2.2 Accounting accretion

2.2.1 Acquiring targets with different P/E-multiples

Acquiring companies with higher or lower price-to-earnings multiples is one example of how to artificially alter EPS. Given that a company engage in a transaction financed with equity, where the target trades at a lower price-to-earnings multiple, the EPS effect will always be accretive. This since the acquirer pays more for each unit of earnings than the market values its own earnings, thus the acquirer has to issue proportionately more shares in the transaction. If instead targeting a company with a higher price-to-earnings multiple the effect on EPS will be dilutive for the opposite reason, as illustrated in *Table 2: Accretion or dilution depending the target's P/E multiple* below. In terms of valuation the artificial increase or decrease in EPS should not matter according to theory since future discounted cash flows are priced. Moreover, the sum of the standalone entities market capitalization equals the combined entity's market capitalization. Thus no additional value is created and the artificial change in EPS is value irrelevant.

Table 2: Accretion or dilution depending the target's P/E multiple

Accretive deal	**Acquirer**	**Target**	**Combined**	**Dilutive deal**	**Acquirer**	**Target**	**Combined**
Earnings	200	100	300	Earnings	200	40	240
# shares	20	10	25	# shares	20	4	25
Price per share	200	100	200	Price per share	200	250	200
P/E multiple	20.00	10.00	16.67	P/E multiple	20.00	25.00	20.83
Market cap	4,000	1,000	5,000	Market cap	4,000	1,000	5,000
New shares			5	New shares			5
EPS	**10.0**	**10.0**	**12.0**	**EPS**	**10.0**	**10.0**	**9.6**

2.2.2 Asset step-ups

IFRS 3 Business combinations (2014) states that acquisitions shall be accounted for with the purchase method. This means that the assets of the acquired entity will be recognized at their fair values in the acquirer's consolidated accounts rather than at their previous book values. Further, IFRS generally does not allow for internally generated intangible assets such as brands and customer relations to be recognized as assets. In the event of a business combination however acquired assets of this kind should be recognized if they are expected to provide economic benefits to the new group. The revalued and newly recognized assets form a source of accounting accretion that the market will need to take into account when comparing firms.

An example to illustrate the effects of step-ups would be if a company, whose market value of assets is three times its book value, engage in two different equity financed transactions – one where the target is a biotech firm trading at a high multiple of its book value, and a second where the target is valued at its book value. Assuming that the additional market value reflects development costs, brands or any other kind of asset that may be recognized in the consolidated accounts, the former acquisition will lead to a revaluation of the acquired assets and with it additional charges for depreciation and/or amortization at the group level. Originally, assuming that no premium is paid and that the targets and acquirer all trade at the same price to earnings ratio, there would be no change in EPS. But with the additional accounting charges the high step-up acquisition will have a dilutive accounting effect.

The depreciation and amortization charges are not value relevant as such since they are accounted for at the group level, and not in the accounts of the legal entities. In most jurisdictions they are therefore not deductible for tax purposes, thus they have no impact on cash flows and valuation.

The pharmaceuticals company Valeant serves as a real world example of the potential EPS effects of acquisitions. In Valeant's (2015) Q1 earnings release it presented a GAAP EPS of $0.21, but after mainly adjusting for amortization expenses from previous acquisitions the figure soared to $2.36.

Table 3: Dilution as a result of asset step-ups

	Acquirer	High step-up Target	Combined	No step-up Target	Combined
Book value	1,000	100	2,000	1000	2,000
Tobin's Q	3.0	10.0	2.0	1.0	2.0
Market value	**3,000**	**1,000**	**4,000**	**1,000**	**4,000**
Earnings	300	100	400	100	400
New group D&A			-90		0
Reported earnings	**300**	**100**	**310**	**100**	**400**
# shares	300	100	400	100	400
EPS excl. group D&A	1.00	1.00	1.00	1.00	1.00
EPS reported			**0.78**		**1.00**

2.3 Controlling variables

Even though growth and return on invested capital are the main drivers of value other factors have also been proved by research to affect the performance of acquiring companies. These factors, comprised by deal characteristics, firm characteristic and corporate governance are vital to consider when evaluating announcement reactions to see whether taken into account or not by investors when forming a view of the transaction.

2.3.1 Deal characteristics

Type of payment

Research within the topic comes to the conclusion, regarding which type of financing is best in terms of returns, that equity issuance tends to go along with lower returns. Travlos (1987) argues that using equity financing when acquiring public firms is accompanied by lower returns at announcement. Further, the theory of equity issuance signalling suggests an adverse selection problem since management is better informed than investors and will want to issue equity when their stocks are highly valued. Mayers and Majluf (1984, p. 217) supports this conclusion and states *"When managers have superior information, and stock is issued to finance investment, stock price will fall, other things equal"*. Applying the same logic to mergers and acquisition it makes sense that managers wants to pay with stock, if the stock is highly valued. Donaldson (1961) introduced the pecking order theory, saying that cost of financing increases with the presence of asymmetric information. This causes managers to prefer to finance new projects primarily with existing funds, secondly debt and only as a last resort to issue equity since the

market will assume that equity is issued only when it is highly valued and therefore require a discount.

Premium paid

According to Sirower (1997) an acquirer should not pay a higher premium than the potential realization of value as a consequence of the transaction. Roll's (1986) hubris hypothesis suggests that the acquiring management team may overestimate its capability to capture synergies. Thus, a higher premium may not match the true value of synergies implying a negative impact on abnormal returns. On the other hand, if the market for corporate control is efficient the premium should always reflect the present value of synergies.

Relative deal size

Moeller, Schlingemann and Stultz (2004) finds empirical evidence that acquirer abnormal returns increase at announcement when the relative size, defined as deal value over acquirer's market capitalization, is higher. Asquith, Bruner and Mullins (1983) finds, in an earlier research, empirical support for the same conclusion when looking at transactions taking place in 1955 to 1979. Although they document a more substantial impact before 1969 than after.

2.3.2 Firm characteristics

Acquirer's Tobin's Q

Previous studies examining the effect of acquirer's Tobin's Q on performance find an ambiguous effect on cumulative abnormal returns. Lang, Stulz, and Walking (1991) finds a positive relation for successful tender offer transactions and public firm transactions, respectively. Servaes (1991) supports the same conclusion in his study. Moeller, Schlingemann, and Stulz (2004), on the other hand, concludes a negative relationship in a broad sample of acquisitions.

2.3.3 Corporate governance

Researchers within finance and accounting emphasise that corporate governance parameters are important when explaining value creation in mergers and acquisitions. Two different types of governance are relevant when evaluating corporate performance – internal and external governance. Internal mechanisms monitor the progress of an organisation and takes corrective actions when required. In contrary, external mechanisms are implemented and monitored by governments, financial institutions and regulators outside of an organisation. Cremers and Nair (2005) finds evidence supporting that external governance is effective only when internal governance is robust. Further, Masulis et al. (2007) argues that companies protected by

antitakeover provisions are not as affected by the disciplinary influence of external governance and therefore are more probable to engage in value destroying transactions.

Acquirer's leverage

According to Jensen (1986) leverage is an important factor to control for since higher levels of debt constraint managers ability to excessively spend future cash flows. Leverage also incentivizes managers to improve the firms' performance since they will give up control to creditors and risk losing their jobs if ending up financially distressed. Thus, it is reasonable to believe that firms with high leverage taking on a merger or acquisition is more likely to perform better and generate abnormal returns than those with a low leverage. Conversely, firms with low leverage are more likely to excessively empire build and spend cash. This lays the foundation for the hypothesis that firms with low leverage, implying high free cash flows, who engage in a merger or acquisition will generate lower abnormal returns.

Institutional ownership

Early behavioural finance theory, deviating from the efficient market view, known as "functional fixation" suggests that stock prices are decided by an interaction between informed and uninformed investors. The traditional hypothesis presumes that prices are always decided by uninformed, unsophisticated investors, in a way that accounting differences are fully ignored implying that the market is misled. In later days Hand (1990) developed the theory suggesting that prices are decided by both informed and uninformed investors to a degree that pure accounting differences affect prices are reflected by the proportion of informed and uninformed investors. On the basis of this extended theory, a relevant measure of external governance is the aggregate percentage owned by institutional investors. The hypothesis suggests that firms with a higher total level of institutional ownership generate abnormal returns.

Another take on institutional ownership is the monitoring of management aspect. Cremers & Nair (2005) finds evidence that companies with a higher degree of pension fund ownership has a positive impact on returns. McConnell and Servaes (1990) finds a statistically significant, positive, curvilinear relationship between corporate performance and institutional ownership. The empirical evidence presented supports that institutional ownership has an impact on corporate value, thus an impact on mergers and acquisitions.

Absolute bidder size

Moeller, Schlingemann and Stultz (2004) examines a large sample of public firms from 1980 to 2001 and finds robust evidence that bidder size is negatively correlated with cumulative

abnormal returns at announcement. They debate the results in terms of support for Roll's (1986) hubris hypothesis. The hypothesis states that hubris is the idealistic idea that managers in the acquiring firm can handle the assets of a target more efficiently than the existing management team. Managerial hubris is an explanation of why firms may decide to invest in targets that, on average, does not generate profits. Another, alternative explanation, discussed by Masulis, Wang and Xie (2007) is that a large firm size is an effective takeover defence since more capital is required to acquire large targets. Hence, they argue that management in larger firms are more entrenched and probable to engage in value-destroying transactions.

Board size

Most available studies scrutinizing the relationship between board size and corporate performance finds a correlation implying that larger boards tend to have a negative impact on performance. One example is Yermack (1996) concluding that companies with smaller boards are more effective and thus have a higher market valuation. Recent empirical evidence from large European countries have, however, arrived at diverse conclusions with regards to the impact of a board's size on corporate performance. In a study by Guest (2009) covering public UK companies in 1981 to 2002 a negative relationship between board size and performance was found. The relationship was most robust for large firms, tending to have larger boards. The evidence supports the view that poor communication and decision-making undermine the effectiveness of large boards. In contrary, a similar study by Bermig & Frick (2010) covering public German companies in 1998-2007 did not find a consistent effect of board size on corporate performance.

3. Method

To examine if there is a significant difference in returns between accretive and dilutive transactions a dataset will be formed based on mergers and acquisitions that meet the criteria described below. For each transaction an accretion measure will be formed based on available forecasts and estimates, and the controlling variables will be compiled. Thereafter two statistical tests will be employed. Firstly a hypothesis test applied to the mean differences between the two types of deals, and secondly a linear regression model which control for the other variables will be used.

3.1 Deal selection criteria

The dataset is extracted from the M&A module of Bloomberg and consists of transactions where both parties are publicly listed entities to ensure access to analyst forecasts needed to construct the EPS variable. The minimum deal size was set to $20m and to confirm consistent accounting treatment of goodwill only deals closing from 2005 and onwards, when impairment tests rather than systematic amortization was prescribed by the IFRS, have been included. Further, only deals where both parties have adopted IFRS are included to make certain that the pooling of forecasted earnings suffers from as few differences in accounting policies as possible. Additionally, financial companies were excluded due to their vastly different business models. With these selection criteria 1469 transactions were available.

To ensure that a transaction would have a meaningful impact on the acquiring entity a further condition was that the previously held stake was relatively low, less than 30%, and that the acquired stake at least would lead to a full consolidation of the acquired entity (>50%). This reduced the sample to 989 firms, and after excluding acquirers who engaged in multiple transactions during the time window, club deals and complex mergers 389 remained.

As described further under the methodology section, it is necessary to construct an accretion measure ex ante rather than ex post the announcement to only capture the earnings estimates available at the time of the deal announcement and to exclude synergies. Of the 389 firms there were 63 instances in which earnings forecasts for the two subsequent fiscal years were available for both the acquirer and target at the date of announcement and 68 with full availability only for the first year, which thus forms the final sample.

3.2 Construction of the EPS dilution measure

By applying an adjusted definition of changes in EPS as Andrade (1999) it is possible to create a measure excluding value relevant transaction effects such as synergies. This is crucial since

the paper aims to explain whether accounting accretion has a statically significant impact on abnormal returns. At the same time the measure allows for combinations of equity, cash and debt financing as it includes incremental interest expenses and new shares issued. Equation 2 below states that if the combined entity's forecasted EPS exceeds the standalone acquirer's forecasted EPS at given point in time, the transaction is accretive. That is, the left hand side of the equation, $\Delta E_0(EPS_t)$ is positive. If the opposite is true, the transaction is dilutive.

$$\Delta E_0(EPS_t) = E_0\left(\frac{(Comb.\ Earnings)_t - (\Delta D\&A + GW\ Imp.)_t - (Incr.\ Interest)_t * (1 - Tax\ rate)}{Number\ of\ Shares\ Acquirer + New\ shares\ issued}\right) - E_0(\ Acq.EPS_t) \quad (2)$$

The two most important factors affecting valuation is growth and return on invested capital, thus it is important to include those in the main explanatory variable. Using analyst's earnings forecasts implies that the markets view on future growth and return on invested capital is already incorporated on a standalone basis for target and acquirer. Any additional value creation, or destruction, arising from the acquisition is therefore excluded from the measure.

The combined earnings component consists of the standalone median forecasts, among all analysts covering the security, for both the target's and acquirer's earnings. The median earnings forecast is used as the consensus to eliminate outliers. Moreover, analysts' forecasts before the announcement date does not take synergies into account thus excluding the value relevant effect on EPS. Hence, to an as large extent as possible, the measure takes only pure accounting accretion into account. Additionally, a proportionate amount of the target's earnings are included in the combined earnings measure to only consider the EPS accruing to target shareholders. If the acquirer, for example, acquirers 70 percent of the target, the corresponding share of its forecasted earnings are included. The consensus forecasts are collected using Bloomberg.

Changes in depreciation and amortization for the combined entity derive from the statutory revaluation of the assets of the acquired firm to their fair values prescribed under IFRS purchase accounting rules. The step-up amounts will be allocated over their useful lives as depreciation or amortization charges in the consolidated financial statements. For the purpose of constructing the EPS measure filings, press releases and analyst calls have been studied to estimate the fair value adjustments per asset class. Where the acquirer discusses the useful lifetimes of acquired assets it has been used to compute the incremental depreciation and amortization charge. For the remaining cases the acquired assets are assumed to have the same lifetime as the average of the assets already in place.

The incremental interest rate charge related to debt financing is estimated using professor Aswath Damodaran's database on industry after-tax cost of debt for those transactions not disclosing interest costs related to financing of a transaction. Before-tax cost of debt is computed based on the standard deviation of return on debt for each sector. Given a standard deviation range, a basis spread is assigned - a higher standard deviation implies a higher spread. Added to the spread is a risk free rate. For all transactions the Euro area 10-year government benchmark bond yield is used provided by ECB. The default premium is then added to the risk free rate applicable at the time to determine the pre-tax cost of debt. Finally the cost of debt is scaled by the effective tax rate of the acquiring entity. As a conservative base case all cash considerations are assumed to be debt financed. In a sensitivity analysis adjustments will be made to account for eventual internal funds financing and its impact on EPS. The tested scenarios will be a 30, 20 and 10 percent lower as well as a 10 percent higher interest expense.

Goodwill includes two potential effects on EPS that must be taken into account, impairment charges and accounting treatment of negative goodwill. To simplify the analysis impairment charges are assumed not to occur during the EPS measurement time, the two first years following consolidation. Negative goodwill is accounted for by proportionally writing down non-current acquired assets which implies a one-time gain for the acquiring company. Thus, the negative goodwill amount is included, as a gain, in the EPS measure for the first year.

The denominator, number of new shares issued, is collected from the initial press release or the business combination note in the first consolidated report. Number of shares already outstanding for the acquirer is collected via the Bloomberg database.

Finally, the different components are consolidated to create an EPS variable, typically for the two subsequent years. In five cases forecasts were only available for the first subsequent year. In order to make the constructed absolute EPS measure comparable across firms and transactions it is necessary to scale it with a proper deflator. Equation 3 illustrates the choice of deflator, EPS at the beginning of the estimation period. That is EPS for the standalone acquirer at time zero, the announcement date.

$$EPS\ Measure = \frac{E_0(Comb.\ Earnings)_t - E_0(\ Acq.EPS_t)}{E_0(\ Acq.EPS_t)} = \frac{\Delta E_0(EPS_t)}{E_0(\ Acq.EPS_t)} - 1 \quad (3)$$

3.3 Controlling variables

Type of payment

Information about financing of the transaction, whether cash, equity or a mix is collected via filings, offer documents or press releases available at announcement date. One variables is created for the regression analysis, *All_Cash*, assigned values 1 and 0. 1 implies that the transaction is all cash financed and 0 implies that the transaction is either a mix of cash and equity or all equity financed.

Premium paid

The acquisition premium variable, *Premium*, is defined as deal value over the target's market value of equity computed 30 trading days before announcement. The target's market value of equity is proportionally scaled by the percentage share acquired. Market value of equity is extracted through Bloomberg's database while deal values are collected via filings, offer documents or press releases available at announcement date.

Relative deal size

Relative deal size, *RelSize*, is defined as deal value over acquirer's market value of equity computed 30 trading days before announcement. Market value of equity is extracted through Bloomberg's database while deal values are collected via filings, offer documents or press releases available at announcement date.

Acquirer's Tobin's Q

In the paper Tobin's Q, *Tobin*, is defined as market value of assets over book value of assets. Book values are collected from the latest available financial report before announcement date. The market value of equity is added to the book value of liabilities, which is used as a proxy for its market value, to get the market value of assets.

Acquirer's leverage

Leverage is measured as book value of interest bearing liabilities, debt, over book value of assets. To achieve a more normally distributed sample the variable is computed as a logarithm. Since some acquirers are unlevered an adjustment to the leverage formula is made as ln (0) is a missing value. Hence leverage is defined as ln (D/A + 1). Figures are collected from the latest available financial report before announcement date. The variable is named *Leverage*.

Institutional ownership

Institutional ownership, *Inst_Owner*, is the aggregate percentage ownership of institutional investors. Institutional ownership is defined as the ownership by an organization investing on behalf of the organization's members. Data is gathered via Bloomberg's database.

Absolute bidder size

Absolute bidder size, titled *LnAbsSize*, is the absolute market value of the acquirer's equity 30 trading days before announcement date. To achieve a more normally distributed sample the variable is computed as a logarithm. Data is gathered via Bloomberg's database.

Board size

The number of members of the board is counted at announcement. Due to a significant positive skewness the variable is computed as a logarithm to achieve a more normally distributed sample. The variable in the regression analysis is titled *LnBoard* and is the logarithm of the absolute number of board members.

3.4 Calculation of abnormal returns

The left hand side of the regression is constituted by the total short term abnormal return of the stock. Oler, Harrison and Allen (2007) finds that 76 percent of all event studies uses a time window for summing abnormal returns of +/-5 trading days, therefore it will be the main period used. Additionally a +/- 15 days' time window will be tested for sensitivity purposes.

Sharpe (1964) suggests that required stock returns can be seen as the sum of a risk free component and a compensation for the correlation with a market portfolio consisting of all risky assets. Fama and French (1992) argue that extending the model with two additional priced risk factors, one being size and the second the price to book ratio, improves the explanatory power of the model. Further, incorporating the work of Titman (1993) who shows that stocks with a positive momentum keep rendering abnormal returns, Carhart (1997) presents an extended Fama French model with a fourth momentum factor.

This essay use expected returns calculated with both a one and four factor model to examine if accretive transactions yield greater returns than dilutive ones. The index chosen to calculate the stock's correlation with the overall market is the MSCI Europe index[1] and the risk free rate of return is defined as an average of 10 year yields on sovereign Euro denominated debt. The Fama French and momentum portfolios, against which the remaining betas were regressed, have been retrieved from the WRDS research database and are constructed by professor French. All factor betas have been calculated over five years' time up to a period ending 180 days before the transaction announcement.

[1] The MSCI Index includes large and mid-cap companies across 15 developed countries in Europe and covers roughly 85% of the free-float adjusted market capitalization for those countries.

The cumulative abnormal return (CAR) of a stock is the daily differences between the actual and expected return of the stock summed over the observation window. Stock returns have been calculated on prices adjusted for dividends and splits.

$$CAR_T = \sum_{n=-T}^{T} \left(r_t - E_t(r_e)\right) \quad (4)$$

Where $r_t = P_t/P_{t-1}$ is the actual return of the stock, and $E_t(r_e)$ is the expected return of the stock according to either the one or four factor model where SMB is a benchmark portfolio for small minus big stocks, HML represents the high minus low portfolio and MOM the momentum factor.

$$E(r_e)_{1\,factor} = \alpha + \beta * (r_m - r_f)$$

$$E(r_e)_{4\,factor} = \alpha + \beta_I * \left(r_m - r_f\right) + \beta_{II} * SMB + \beta_{III} * HML + \beta_{IV} * MOM$$

3.5 Statistical Tests

In order to investigate the research question two statistical approaches are used. The first method is a hypothesis test comparing abnormal return means of two independent groups, accretive and dilutive transactions. Secondly a regression model is constructed including relevant control variables attempting to reduce the effect of confounding variables.

3.5.1 Hypothesis test

As a direct and first answer of the research question the hypothesis that accretive transactions have the same cumulative abnormal returns, on average, as dilutive transactions is tested. Each of the cumulative abnormal return intervals are tested. That implies, +/- 5 trading days and +/- 15 trading days from announcement. Below, the two-tailed null and alternative hypothesis are formulated. H_0 is rejected given that t_{crit} is in the critical area, defined as $C_\alpha = \{t: |t| > \lambda_{\alpha/2}\}$. That is, H_0 is rejected if $\left|\frac{\bar{d}}{s_d/\sqrt{n}}\right| > t_{n-1,\propto/2}$. The normal t-test assumes that variances of the two samples are fairly equal. To tell whether the assumption holds true Levene's test for equal variances is done. Under the circumstance that the p-value is equal to or less than the chosen $\propto$ level, equal variances cannot be assumed.

H_0: $\mu_{CAR\ Acrretive\ Transactions} = \mu_{CAR\ Dilutive\ Transactions}$

H_1: $\mu_{CAR\ Acrretive\ Transactions} \neq \mu_{CAR\ Dilutive\ Transactions}$

3.5.2 Regression model

To further analyse the impact of EPS on abnormal returns a multivariate linear regression model is built including all of the already mentioned control variables. In the model none of the related variables has an identified high correlation between each other, increasing the robustness, as shown in *Table 20: Correlation matrix*. The left hand side of the regression model is cumulative abnormal returns, the right hand side includes the constructed EPS measures and the controlling variables as well as an error term.

Table 4: Regression variables

Variable	**Name**	**Definition**
Dependent	*CAR*	$r_t - E_t(r_e)$
Main explanatory	*EPSY1*	$\Delta E_0(EPS_{t=1})/E_0(\text{Acq. EPS}_{t=1}) - 1$
Main explanatory	*EPSY2*	$\Delta E_0(EPS_{t=2})/E_0(\text{Acq. EPS}_{t=2}) - 1$
Controlling	*All_Cash*	Dummy variable (1,0)
Controlling	*Premium*	$\text{Deal Value}/\ \text{MV Equity}_{\text{Target}}$
Controlling	*RelSize*	$\text{Deal Value}/\ \text{MV Equity}_{\text{Acquirer}}$
Controlling	*Tobin*	MV Assets / BV Assets
Controlling	*Leverage*	ln (Debt / BV Assets + 1)
Controlling	*Inst_Owner*	Aggregate % sum of inst. ownership
Controlling	*LnAbsSize*	$\ln(\text{MV Equity}_{\text{Acquirer}})$
Controlling	*LnBoard*	$\ln(\text{Board Size}_{\text{Acquirer}})$

4. Results

4.1 Descriptive statistics

Table 5: Descriptive statistics below shows the distribution of the dependent and explaining variables. Firstly, with regards to the cumulative abnormal returns, the one and four factor models yield very similar results with only a few tens of basis points difference. Secondly, as expected, the return distributions have wider tails for three rather than one trading week – both the maximum and minimum values are around three times those for one week. In line with Andrade et al. (2001) both the average and median acquirer return was found to be positive at one to two percent.

There were as shown by *Table 6: Transaction information* 31 deals that were expected to be accretive from year one, and 37 from year two. The average deal had an expected accretion of 3 percent the first year and 13 percent the following year, whereas there for both years were a few acquisitions burdened by large step-ups or financing charges causing an expected dilution of up to 65 and 55 percent respectively. Equally, a mixture of high earnings growth expected by analysts and few M&A related accounting entries led the highest level of EPS accretion to reach 61 percent for the first year and 253 for the second. Further, among the 37 transactions that had an expected dilutive effect the first year 10 shifted direction the year after.

In terms of deal value the absolute and relative sizes of the transactions vary a great deal, from small bolt-on acquisitions to full scale mega mergers. As indicated by the maximum relative size of 1.4 there are three transactions were the market capitalization of the targeted entity exceeds that of the buying. The typical deal in terms of average relative size is 39 percent. The premium paid is defined as the deal value over the market value of the acquired stake 30 days before the first announcement. Although a few transactions, mainly the mergers of equals, offered almost zero premiums the average stood at 33.9 percent which is a fairly typical value and similar to what Bruner (2002) found.

The absolute bidder size is relevant in the field of corporate governance to explain management entrenchment. All market values have been expressed in USD to facilitate comparisons and is retrieved 30 days before the announcement. The average bidder value is $6.75bn which when compared to the median value of $1.7bn indicates that it does not follow a normal distribution – which has been compensated for by using the logarithm of size.

There were seven firms in the sample who did not employ any financial leverage, and the average debt to asset ratio stood at 22 percent. As expected industrial and utilities companies

had higher debt levels than retailers, pharmaceutical companies and other more cyclical businesses.

The lowest Tobin's Q of 0.82 indicates that the sample contains firms trading at slight discounts as well as a few biotech firms on the other end of the spectrum which trade at up to 8.98 times their book value. The average board size is 8.8 people, but Volkswagen stands out with its 20 members and there are a few companies with 3 members too. The fraction of shares outstanding controlled by institutional investors do also vary a great deal, from 1 to 100 percent.

Table 5: Descriptive statistics

Variable	Min	Quart. 1	Median	Quart. 3	Max	Mean
1 factor: CAR +/- 5 days	-12,4%	-2,4%	1,2%	5,8%	16,1%	1,5%
4 factors: CAR +/- 5 days	-12,5%	-2,5%	1,3%	5,9%	15,4%	1,6%
1 factor: CAR +/- 15 days	-36,0%	-6,9%	2,0%	8,4%	37,7%	1,1%
4 factor: CAR +/- 15 days	-36,9%	-6,4%	1,8%	8,1%	41,6%	1,2%
EPS Y1	-65%	-4%	-1%	8%	61%	3%
EPS Y2	-55%	-1%	2%	16%	253%	13%
Deal statistics						
Deal Value (tUSD)	23 165	103 085	308 968	993 672	41 000 000	1 539 115
Relative Size	0,4%	9,7%	21,3%	66,6%	141,6%	38,7%
Premium	-0,5%	17,5%	34,0%	46,5%	99,5%	33,9%
Acquirer characteristics						
Absolute Bidder Size (tUSD)	71 195	403 298	1 704 380	5 232 506	79 638 777	6 919 433
Debt to assets	0,0%	5,7%	20,8%	30,6%	66,0%	21,7%
Tobins Q	82%	125%	161%	241%	898%	208%
Board Size	3,0	6,0	8,5	10,0	20,0	8,8
% Institutional owners	1,2%	43,8%	63,4%	92,6%	100,0%	64,4%

The distribution of the remaining dummy variables can be seen in *Table 6: Transaction information*. Of the CEOs who engages in accretive transactions 67 percent were members of their boards, versus 48 percent for the dilutive ones. It was more common to finance the transaction entirely by cash (38 transactions) than only with equity (12 transactions), but the method of payment was highly correlated with relative size implying that smaller bolt-on acquisitions were cash financed whilst larger mergers to some extent involved equity issuances.

Table 6: Transaction information

Transaction information:	CEO on board	All cash financed	All equity financed	Accretive Y1	Accretive Y2	Dilutive Y1 -> accretive Y2
Yes	38	38	12	31	37	10
No	30	30	56	37	26	25

The time distribution of the transactions can be seen in Table 7: Deal distribution per year. Overall the activity is fairly even between the years, although it picks up in the two years preceding the crisis.

Table 7: Deal distribution per year

Announced year:	2005	2006	2007	2008	2009	2010	2011	2012	Total
# Deals	4	14	12	6	7	9	8	8	**68**

4.2 Hypothesis tests

+/- 5 trading days

The average return for an accretive transaction was 1.85 and 1.87 percent for the one and four factor models respectively. The same values for the dilutive samples were 1.55 and 1.77 percent. Although different, the tested hypothesis, that cumulative abnormal returns are equal for dilutive and accretive deals, cannot be rejected on a 10% $\propto$ level for any of the capital asset pricing models. In all cases, Levine's test for equality of variances shows that equal variances can be assumed. This since the p-values all are above the $\propto$ level at 10%. More precise the one factor and four factor model is significant at 0.277 and 0.295 respectively. Furthermore the observed t-values in all cases implies that the null hypothesis cannot be rejected. The two-sided test requires Sig. (2-tailed) to be lower than the chosen level of $\propto$ in order to be rejected. For all models the significance is well above the threshold at 10% with values at 0.830 and 0.932. The mean differences between the two groups are not substantial, which together with the high variances explain the test outcome and makes it impossible to reject the null hypothesis. This holds true for both of the capital asset pricing models. Additionally, with 95% confidence the interval of the mean difference covers zero making it difficult to draw any further conclusions.

Table 8: Hypothesis tests +/- 5 days

+/- 5 trading days	Levene's test for equal variances		t-test for equality of mean					
Model	**F**	**Sig.**	**t**	**Sig. (2-tailed)**	**Mean Diff.**	**Std. Error Diff.**	**95% Confidence Interval**	
1 Factor	1.202	0.277	0.215	0.830	0.003	0.016	(0.029)	0.036
4 Factor	1.113	0.295	0.086	0.932	0.001	0.016	(0.031)	0.034

Statistical power and sample size

Overall the statistical power and sample size test indicates that the sample size is too small to consider the hypothesis test a good statistical method over the +/- 5 trading day window. As shown in *Table 9: Statistical power +/- 5 days*, the required sample size to reach statistical power of 0.80 is 1507 and 3050 for each of the accretive and dilutive deals. Compared with the current sample of 31 accretive and 38 dilutive there is substantial difference. Moreover, the current power of the test says there is a 93 and 94 percent probability for the one and four factor test to reject H_0 when H_1 is true.

Table 9: Statistical power +/- 5 days

Power	0.07	0.06
Required Sample	1507	3050

+/- 15 trading days

For the 15 days window the differences are larger. The average return for accretive deals has risen to 2.48 and 3.02 percent for the one and four factor models respectively. The corresponding values for dilutive transactions are -0.22 and -0.38 percent. The test shows that variances can be assumed equal, but the null hypothesis regarding the mean difference cannot be rejected. However the significance levels for both the f-test and t-test is much closer to the $\propto$ level which is of interest. Mean differences are more substantial over the longer horizon among dilutive and accretive deals. Even though the 95% confidence interval still covers a mean difference of zero it is more skewed to above than below zero. This indicates that means are higher for accretive transactions than dilutive ones although not supported by statistical significance. Sig. (2-tailed) values for the 1 and 4 factor model are 0.393 and 0.313 respectively.

Table 10: Hypothesis tests +/- 15 days

+/- 15 trading days	Levene's test for equal variances		t-test for equality of mean					
Model	**F**	**Sig.**	**t**	**Sig. (2-tailed)**	**Mean Diff.**	**Std. Error Diff.**	**95% Confidence Interval**	
1 Factor	0.890	0.349	0.859	0.393	0.027	0.031	(0.035)	0.089
4 Factor	0.795	0.376	1.016	0.313	0.034	0.034	(0.033)	0.102

Statistical power and sample size

The power of the 15 days test is higher, and the required sample size to reach a 0.80 level of power substantially lower than for five days. However, it is still too far off to consider the statistical method appropriate. The main reason behind the improved results is the increase in mean difference between accretive and dilutive deals compared to the shorter time window test. *Table 11: Statistical power +/- 15 days* shows that the required sample size to achieve statistical power of 0.80 is 392 and 273 for each of the samples in the one and four factor test. The actual statistical power is 0.13 and 0.17 respectively.

Table 11: Statistical power +/- 15 days

Power	0.13	0.17
Required Sample	392	273

4.3 Regression model

Over the +/- 5 and +/- 15 trading days' time window the results in terms of significant variables and adjusted R square remain fairly consistent using the two different cumulative abnormal return calculations, one factor and four factors. In short, the adjusted R square ranges from 0.286 to 0.348 including all combinations of abnormal return calculations and time windows. Further, the number of significant variables varies between 3 and 5 in count for the different models. The variables which are statistically significant in both of the tested regression models are *EPSY1*, *Premium*, *Tobin*, *Leverage*, *RelSize*, *Inst_Owner* and *All_Cash*.

Table 12: Regression Models

	+/- 5 trading days				+/- 15 trading days			
	1 factor		4 factors		1 factor		4 factors	
Variable	**Std. Beta**	**Sig.**	**Std. Beta**	**Sig.**	**Std. Beta**	**Sig.**	**Std. Beta**	**Sig.**
(Constant)		0.907		0.996		0.605		0.404
EPSY1	-0.077	0.571	-0.119	0.365	0.208	0.112	0.218	0.099*
EPSY2	-0.112	0.396	-0.098	0.445	-0.152	0.232	-0.040	0.751
Premium	0.355	0.005**	0.346	0.005**	0.232	0.051*	0.173	0.145
Tobin	-0.186	0.180	-0.229	0.090*	0.082	0.533	0.006	0.966
RelSize	0.538	0.002**	0.553	0.001**	0.560	0.001**	0.528	0.002**
Leverage	0.172	0.159	0.172	0.144	0.238	0.043**	0.247	0.038**
Inst_Owner	0.052	0.669	0.042	0.716	-0.177	0.128	-0.232	0.050**
LnBoard	-0.105	0.462	-0.112	0.416	-0.064	0.639	-0.087	0.525
LnAbsSize	-0.119	0.443	-0.120	0.424	-0.117	0.430	0.002	0.990
All_Cash	0.508	0.004**	0.511	0.003**	0.736	0.000**	0.622	0.000**
Adjusted R2	**0.286**		**0.334**		**0.348**		**0.338**	
*Sig. 10%	**Sig. 5%							

In the longer time window, the main explanatory variable, *EPSY1*, is statistically significant at the 10% level for the four factor model. However, this does not apply for the one factor regression model although just above the 10% level. With a standardized beta coefficient at 0.218 the four factor model suggest that expected accretive EPS transactions are rewarded by the market and in a +/- 15 trading days' time window. The one factor model is statistically significant at 0.112. A 90% confidence interval for the EPS coefficient, shown in *Table 18: 1 factor 15 days regression*, range from -0.004 to 0.257 for the one factor model. Even though not statistically certain it is likely that the direction of the coefficient is positive indicating that the market does reward expected accretive transactions. *EPSY1* is however not statistically significant in any of the models analysing the shorter time window, +/- 5 trading days. A 90% confidence interval for the unstandardized beta value of *EPSY1* is centred on zero with a slightly more positive skew for the four factor model. Moreover, the standardized beta coefficient is negative in all of the shorter window regressions, although not statistically significant, indicating that the market does not reward accretive deals.

EPSY2, the second main explanatory variable, is not statistically significant in any of the tested models and time windows. The level of significance varies from 0.232 to 0.445, with the 15 days four factor model being an outlier at 0.751.

Two statistically significant control variables in all of the regressions, with the longer time window four factor model as an exception, are *Premium* and *All_Cash*. In the shorter time window, +/- 5 trading days, the significance is below an ∝ level of 1% for both variables. Compared with the longer time window the significance is below 1% level for the *All_Cash* variable in all models and the Premium is at a 0.051 and 0.145 level of significance for the one and four factor model. Interpreting the impact of the premium variable each percentage of premium paid generates 0.355% and 0.346% additional cumulative abnormal return in the shorter time window for the one factor and four factor model correspondingly. In the longer time window the impact of paying a premium is less substantial with each percentage increase in premium paid generating 0.232% and 0.173% additional abnormal return. Given that the deal is all cash financed an extra boost in abnormal returns appears as well. The effect is an additional 0.508% to 0.511% cumulative abnormal return over the +/- 5 trading days' window and 0.622% to 0.736% for the longer +/- 15 trading days' window.

Further, relative deal size turns out to be statistically significant in all of the tested models for both the longer and shorter trading days' window at a 1% level. Each percentage point increase in relative deal size can be interpreted as a percentage increase in cumulative abnormal return by 0.560% and 0.528% in the +/- 15 trading days window for the one and four factor model. The same figures for the +/- 5 trading days window is 0.538% and 0.553%. The direction of the unstandardized beta coefficient is likely positive as the 90% interval is above zero for all of the models and time windows tested.

Leverage is statistically significant in the +/- 15 trading days' window at a 5% level for all of the regression models examined. Thus a higher leverage ratio for the acquirer before announcement implies better returns on a risk adjusted basis. In the one and four factor model the level of significance is at 0.043 and 0.038. More precise a one percentage increase in the logarithm version of leverage increases cumulative abnormal returns by 0.238% and 0.247% for the one and four factor regressions. In the +/- 5 trading days window leverage is not statistically significant for any of the tested regression models.

Institutional ownership is significant at 0.128 and 0.050 in the one and four factor model over the +/- 15 trading day window. The significant result in the four factor model has a negative direction implying that an increase in aggregate institutional ownership as a percentage measure decreases the cumulative abnormal returns. Each percentage increase in institutional ownership have a -0.232% impact on returns. In +/- 5 trading day time window the one and four factor

model are however significant at 0.669 and 0.716 respectively, which makes it difficult the draw any further conclusions regarding institutional ownership.

Tobin's Q is statistically significant in the shorter window regression for the four factor at 10% level. In terms of direction the standardized beta value is -0.229 which corresponds to a decrease in cumulative abnormal return for an increase in acquirer's Tobin's Q. Every percentage increase in the acquirers Tobin's Q yields a decrease by 0.229% for the four factor model. The one factor model result has a significance level of 0.180. In the longer time window, +/- 15 trading days, Tobin's Q is not statistically significance.

Finally, *LnBoard* and *EPSY2* are the only controlling variables which are not statistically significant in any of the model setups.

Regression model robustness and validation

Correlation between independent variables is not an issue in any of the regression models. The VIF value tables in the Appendix shows that none of the VIF values are above 4, which can be considered low. *RelSize* and *All_Cash* have the highest VIF values at 2.243 and 2.330 respectively.

Potential issues with heteroscedasticity have to some extent been mitigated by using logarithm version of some of variables in order to achieve error terms as constant as possible. *Table 13: Breusch-Pagan results* shows that heteroscedasticity is not very big problem in any of the models. The results shows that the most robust model in the longer time window, +/- 15 trading days, is the four factor model which is 8.8 percent significantly heteroscedastic. In the shorter +/- 5 trading days window the four factor is most robust with 19.7 percent significance.

Table 13: Breusch-Pagan results

	+/- 5 trading days		**+/- 15 trading days**	
	1 factor	4 factor	1 factor	4 factor
Sum of Squares	0.457	0.125	0.496	0.024
Chi-square value	0.228	0.062	0.248	0.012
Significance	0.367	0.197	0.381	0.088

4.4 Sensitivity analysis

The first sensitivity analysis, testing the conservative assumption that all cash deals are fully financed with debt, does not yield any other statistical results than the ones already presented.

Table 14: Interest expense sensitivity: 1 factor clearly shows that the both the level of significance for the main explanatory variables and adjusted R square for the one factor model over the +/- 5 trading days window is consistent with minimal variation. The same holds true for all of the tested models with persistent results for the controlling variables as well. However, not affecting the statistical outcome, the number of accretive deals decreases as the interest expense component grow. This is show in *Table 15: Interest expense effect change on number of dilutive transactions* .

Table 14: Interest expense sensitivity: 1 factor

	Std. Beta	**Sig.**	**90.0% Confidence Interval for B**		**Adjusted R Square**
EPSY1					
-30%	-.077	.569	-.092	.045	.286
-20%	-.079	.561	-.093	.045	.287
-10%	-.077	.569	-.092	.045	.287
+10%	-.078	.565	-.093	.045	.287
EPS Y2					
-30%	-.113	.392	-.049	.016	.344
-20%	-.114	.390	-.049	.016	.346
-10%	-.115	.384	-.049	.015	.347
+10%	-.112	.396	-.050	.016	.346

Table 15: Interest expense effect change on number of dilutive transactions

Change:	**-30%**		**-20%**		**-10%**		**+10%**	
	Year 1	**Year 2**	**Year 1**	**Year 2**	**Year 1**	**Year 2**	**Year 1**	**Year 2**
Dilutive	33	19	33	23	35	24	35	27
Accretive	34	43	34	39	32	38	32	35
Total	67	62	67	62	67	62	67	62

The second sensitivity analysis, being a test of the persistence of significance for the *EPSY1* variable shows that it is not robust to stand small changes in time windows. Over a 13, 16 and 17 trading days window the main explanatory variable is far from significant, even though it is still significant over a +/- 14 trading days interval. In terms of control variables the results are persistent to changes in time windows.

5. Analysis

5.1 The EPS measure

The hypothesis which was to be examined in the statistical tests was if acquisitions which causes the expected EPS of the acquirer to fall only due to accounting effects rather than changes in the underlying cash flows suffer from worse returns around their announcements. The efficient market view argue that investors can distinguish between real and artificial changes in EPS and therefore reacts to an announcements based on the direction and scale of its net present value. The school of behavioural finance do however recognize that an investor sentiment can be formed on non-rational grounds, for example by the presence of uninformed "noise traders" who do not fully comprehend the link between accrual accounting profits and cash flows. As it may prove costly for informed investors to trade against the market mispricing may persist for some time.

The regression results indicates that the hypothesis that accretive and dilutive transactions receive the same short term price reaction cannot be dismissed when looking at one trading week. Extending the time window to three weeks do on the contrary provide evidence that transactions which are expected to be accretive in the first year are rewarded with superior returns. The significance of the EPS measure do however reverse when extending the observation window just a few days further.

This ambiguous result supports Baker & Wurgler (2006) claim that corporate acquisitions are complex events that the market initially may find difficult to evaluate. It seems fair to conclude that although EPS accretion is significant at 15 days, it is not a consistent nor useful predictor of short term stock performance of the acquirer. The reason for this may be a result of issues regarding the collection and interpretation of data facing an analyst who wants to predict the EPS impact of a transaction. There are four pieces of information needed to construct an accretion variable which excludes any material and valuation relevant effects:

1. Stand-alone earnings forecasts for each company.
2. The number of shares to be issued to finance the acquisition, either to target shareholders or the general market.
3. The change in net interest expense due to new borrowings or foregone interest income on cash.
4. The total amount of asset revaluations and their estimated useful life.

The issue facing the analyst would be that the items listed will, in falling order, prove more difficult to retrieve. Although there will likely exist a market consensus for the earnings forecasts no analyst can know for sure if the company is likely to reduce leverage by issuing shares in the future as a consequence of the transaction. Nor can they at the time of announcement be certain of the interest rate on any debt securities that are to be issued or lending facilities that are to be drawn, and equally, at the time of announcement there is usually only an estimate of the amount of step-ups available whilst the finalized purchase analysis may not be available until long after. Further, the estimated remaining lifetime of the revalued assets is subject to judgement. In order to estimate these components one can compile various official statements from the acquirer, but in the end the combined EPS accretion measure is subject to assumptions.

Therefore, there are two possible explanations to why the market does not react to the constructed EPS measure of this essay. Firstly the market participants may not view accounting accretion as relevant, which is in line with the efficient market hypothesis. Alternatively they are concerned with accretion but make other assumptions regarding the useful lives of assets, level of interest or share issuances implying a different view on the level of accretion.

An assumption underlying the constructed EPS measure is that the market for corporate control is efficient in the sense that an acquirer never values a target above its intrinsic value, and that bidder competition makes bargain purchases impossible. However, if the contrary is true, the goal of the EPS variable to only capture pure accounting effects would fail. That is because the interest expense included in the numerator for cash deals will deviate from the fair value, and for equity deals the number of shares issued can possibly be either too high or too low. These effects are both of value relevance, and if included they will make any outcome of the EPS measure coefficient ambiguous as one can never say whether for example a dilutive deal is so because of its accounting treatment or if it is because the target was acquired at a price above its fair value.

Ideally, if the intrinsic value of the target was known, a separate overpayment variable could be constructed, and the EPS measure adjusted by a deflator to only reflect the pure accounting effects. Such data is however impossible to retrieve, so it must be kept in mind that if it is assumed that the market for corporate control is inefficient then what has been mentioned above can pose as an error source.

5.2 Controlling variables

Cash as method of payment

For all regressions the dummy variable *All_Cash* has proved to have a statistically significant positive impact on acquirer returns. The outcome is also economically significant from a behavioural finance point of view. Firstly, the theory of adverse selection states that management will prefer to issue equity whenever it perceives its stock to be undervalued. The fact that internally generated funds are used, although it in some cases rather is a practical consequence of the transaction value, can be seen as an indication that the stock is trading cheaply and fits well with the pecking order theory stating that own funds, then debt and only as a last resort equity will be used to finance new endeavours.

Secondly, net debt is the amount of interest bearing obligations undertaken less the amount of cash and equivalents held by a firm. Thus, to use liquid funds to finance the purchase of equity securities will effectively act as an increase in leverage for the acquiring firm since net debt will rise. According to the free cash flow hypothesis, an increase in leverage will act as a constraint in management freedom as future cash flows will in part be earmarked for debt service rather than being at management's disposal for their pet projects. Also, Masulis et al. (2007) suggests that leverage is an inverse anti-takeover provision as it will be less costly to acquire a firm with lower solvency. Thus, if management fails in executing an M&A integration while being higher levered, they face a larger risk of being discharged through a hostile takeover. It is therefore reasonable, as the regression results show, that an acquisition paid for all in cash receives a more positive stock market reaction.

Further in line with this is that the leverage variable, defined as the amount of financial liabilities over total assets before the announcement has a positive significant impact on acquirer stock returns. This indicates that an acquisition made by a levered firm is perceived as being more likely to succeed than one done by a firm with lower leverage.

Premium

The premium paid by the acquirer in excess of the target's market capitalization one month before the announcement has a significant and positive correlation with abnormal returns in every model except for the 15 days four factor model. All else equal a lower premium would be of benefit for the acquirer, but a probable explanation is that the premium correlates with the amount of synergies - which should have a positive stock price impact as long as the acquirer does not overpay for them.

The dependent variable of the regression, *CAR*, reflects the total stock market reaction to an announcement and includes the reaction to every underlying aspect of a transaction – including expected synergies and integration costs. If it was possible to estimate the net present value of these two items it would have been ideal to include it to separate them from the premium paid. They are however not readily available because they are subject to assumptions made and can be found only in confidential management forecasts and strategic plans. However, the highly significant premium variable suggests that further research into whether the market actually decodes the present value of synergies or merely uses the premium as a proxy could be of interest.

Relative size

The controlling variable for relative deal size has a significant positive impact on acquirer returns of around 0.5 percent times the value ratio. This is intuitively reasonable since a relatively larger transaction, as long as it is not overpaid for, will have a greater impact on the market capitalization of the acquirer than a small one.

6. Conclusions and final discussion

6.1 Conclusions

The purpose of this thesis was to investigate whether investors react to pure accounting effects of a merger or acquisition in the sense that they do not adjust their valuation multiples for accounting entries deriving from group accounting standards. If so, transactions which are expected to be dilutive for the acquiring firm, on the basis of for example asset step ups or stock issuances, would suffer from worse stock returns than those which are accretive from the first years.

Although a difference in average acquirer returns to the favour of accretive deals has been identified it cannot be verified as statistically significant. Secondly a linear regression model was constructed where other factors, known for explaining acquirer returns, were controlled for. Two time windows and two capital pricing models were tested. In a five days window neither model provided any conclusive result regarding the importance of accounting effects on EPS, but extending the model to 15 days gave a positive significant relationship between first year accretion and CAR. For the four factor model was significant at 9.9 and the CAPM model at 11.2 percent. However, when extending the time frame just a few days further the observed relation did not persist. It is therefore not possible to reject the null hypothesis, being that there is no difference in returns between transactions that are accretive or dilutive because of the way they are accounted for.

6.2 Validity, reliability and generalizability

Validity

One of the aspects that questions the validity of the study aims at the CAPM model and whether it is flawed or not. The framework has suffered a lot of criticism over the past years with recurring proof that the underlying assumptions do not properly reflect a real world setting. For example, frictionless markets does not exist and markets are not complete implying limits to the amount of risk-free borrowing and lending for investors. Furthermore, the critique of Roll (1977) suggest there is no future opportunity to test the model unless the true market portfolio is identified. More specifically in this study, using the MSCI Europe as a proxy for the market portfolio creates two issues. First, the index may be mean-variance efficient while the market portfolio is not. Secondly, MSCI Europe may be inefficient, in turn, this does not tell if the market portfolio is efficient. This is valid critique and the CAPM framework is certainly not flawless. However, CAPM is still one of the most widely used methods to measure short-term

cumulative abnormal returns in event studies and other, better methods are absent. The Fama French factor model does nonetheless expand the original CAPM model by adding explanatory factors, why it has been used as a compliment throughout the study.

A second aspect is that the method of financing whether issuing new shares, raising debt or using internal funds does likewise play an important role in the accounting of transactions considering EPS. A concern generating difficulties to measure accounting accretion is that financing relates to the ultimate EPS effect including value relevant aspects. Assuming that an acquirer overpays, too many shares are issued or too much debt is raised with interest eradicating acquired earnings. Given that an acquirer pays too much, the net present value is negative as expected synergies does not compensate the overpayment. This eventuality has a material effect from a valuation perspective and overpayment can be expected to have a negative effect on cumulative abnormal returns and earnings. In the opposite case, where an acquirer pays too little, the net present value is expected to have a positive impact on cumulative abnormal returns as well as on earnings. As the value relevance of overpayment is not explicitly accounted for in the constructed EPS measure and the assumption of equal probability to overpay for dilutive and accretive deals fails, the validity of the study can be questioned.

Reliability

The reliability of the study can be consider as fairly high. Most of the data was manually collected from annual reports, press releases and offer documents. Potential sources of error is mainly the quality and reliability of the transaction data extracted from Bloomberg. In order to verify the data, selected outliers were checked and no deviations were detected. Although the sample size should preferably have been bigger which possibly could alter the level of significance and power of the statistical test. The mentioned sources of error are, in the end, not considered to put the reliability of the study at risk. Finally, the replicability of the study is judged to be good. It relies on earlier, similar, research and the assumptions as well as the methodology is clear and explicit in the paper.

Generalizability

The generalizability of the study is limited both in terms of time periods and other geographical areas than Europe. Primarily, the issue relates to differing accounting standards across the world generating problems when collecting earnings forecasts and handling asset step-ups. Also, major changes in accounting standards that has taken place historically makes it difficult to compare EPS measures over time. One example is the change in treatment of goodwill from

2005 and onwards. For the mentioned reasons it is problematic to generalize the results to any greater extent.

6.3 Future research

As no definite conclusions regarding the EPS measure can be drawn the topic is still of interest and room for improvement in future research reports exists. First and foremost one could consider how to expand the sample size. One option is to make a geographical expansion and include U.S transactions as well. It is also possible to use a longer time period and include transactions pre 2005. Another alternative is to include deals where acquirer and target use different accounting standards. However, this raises concerns regarding earnings adjustments on a standalone basis to have comparable group earnings. Further, including public companies acquiring private companies would open up the potential transaction count substantially. The methodology how to include those transactions is vague though as analyst coverage is absent. Potentially one could assume growth in reported earnings aligned with inflation growth to get forecasts.

Besides expanding the sample size including omitted control variables could raise the explanatory power of the model and, perhaps, contribute to another conclusion. More specifically one would like to capture the net present value of the transaction which would directly correlate with cumulative abnormal returns. In practise this seems to be difficult but a better proxy for synergies and hence the net present value might be attainable. In press releases and offer documents it is often stated how much management expects to achieve in synergies. Those figures might be a better proxy than the actual premium paid. This, in the extension, becomes a matter of how to manage expectations and whether analysts do believe in management's assessment of the transaction synergies. Value, ultimately, depends on expectations of growth and return on invested capital, why it could be of interest to include a variable controlling for how good management is at altering expectations.

Another possible approach to answer the research question is to make a qualitative study focusing on analysts and what they actually assess in merger and acquisition announcements.

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8. Appendix

Table 16 4 factor 15 days regression

4 factor model regression +/- 15 trading days

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.138	.164		-.842	.404	-.413	.137		
	EPSY1	.146	.087	.218	1.680	.099	.000	.293	.655	1.526
	EPSY2	-.013	.041	-.040	-.319	.751	-.082	.056	.693	1.443
	Premium	.115	.078	.173	1.479	.145	-.015	.246	.806	1.240
	Tobin	.001	.013	.006	.043	.966	-.021	.022	.635	1.574
	RelSize	.219	.065	.528	3.358	.002	.110	.328	.446	2.243
	Leverage	.276	.129	.247	2.134	.038	.059	.492	.824	1.214
	Inst_Own	-.104	.052	-.232	-2.007	.050	-.191	-.017	.824	1.213
	LnBoard	-.031	.049	-.087	-.640	.525	-.113	.051	.592	1.690
	LnAbsSize	.000	.012	.002	.012	.990	-.019	.020	.505	1.981
	All_cash	.179	.046	.622	3.878	.000	.101	.256	.429	2.330

a. Dependent Variable: F4_15_15_CAR

Table 17: 4 factor 5 days regression

4 factor model regression +/- 5 trading days

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.000	.075		.004	.996	-.126	.126		
	EPSY1	-.037	.040	-.119	-.915	.365	-.103	.030	.655	1.526
	EPSY2	-.015	.019	-.098	-.770	.445	-.046	.017	.693	1.443
	Premium	.106	.036	.346	2.950	.005	.046	.166	.806	1.240
	Tobin	-.010	.006	-.229	-1.730	.090	-.020	.000	.635	1.574
	RelSize	.105	.030	.553	3.505	.001	.055	.155	.446	2.243
	Leverage	.088	.059	.172	1.482	.144	-.011	.187	.824	1.214
	Inst_Own	.009	.024	.042	.365	.716	-.031	.048	.824	1.213
	LnBoard	-.018	.022	-.112	-.819	.416	-.056	.019	.592	1.690
	LnAbsSize	-.004	.005	-.120	-.806	.424	-.013	.005	.505	1.981
	All_cash	.067	.021	.511	3.175	.003	.032	.102	.429	2.330

a. Dependent Variable: F4_5_5_CAR

Table 18: 1 factor 15 days regression

1 factor model regression +/- 15 trading days

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.076	.147		-.520	.605	-.323	.170		
	EPSY1	.126	.078	.208	1.618	.112	-.004	.257	.655	1.526
	EPSY2	-.045	.037	-.152	-1.211	.232	-.107	.017	.693	1.443
	Premium	.140	.070	.232	1.996	.051	.022	.257	.806	1.240
	Tobin	.007	.012	.082	.627	.533	-.012	.027	.635	1.574
	RelSize	.210	.058	.560	3.588	.001	.112	.307	.446	2.243
	Leverage	.240	.116	.238	2.072	.043	.046	.434	.824	1.214
	Inst_Own	-.072	.046	-.177	-1.546	.128	-.149	.006	.824	1.213
	LnBoard	-.021	.044	-.064	-.472	.639	-.094	.053	.592	1.690
	LnAbsSize	-.008	.010	-.117	-.796	.430	-.026	.009	.505	1.981
	All_cash	.191	.041	.736	4.626	.000	.122	.260	.429	2.330

a. Dependent Variable: F1_15_15_CAR

Table 19: 1 factor 5 days regression

1 factor model regression +/- 5 trading days

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	90.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.009	.077		-.117	.907	-.139	.121		
	EPSY1	-.023	.041	-.077	-.571	.571	-.092	.045	.655	1.526
	EPSY2	-.017	.019	-.112	-.857	.396	-.049	.016	.693	1.443
	Premium	.108	.037	.355	2.923	.005	.046	.169	.806	1.240
	Tobin	-.008	.006	-.186	-1.361	.180	-.019	.002	.635	1.574
	RelSize	.101	.031	.538	3.291	.002	.050	.153	.446	2.243
	Leverage	.087	.061	.172	1.429	.159	-.015	.189	.824	1.214
	Inst_Own	.011	.024	.052	.431	.669	-.030	.051	.824	1.213
	LnBoard	-.017	.023	-.105	-.741	.462	-.056	.022	.592	1.690
	LnAbsSize	-.004	.005	-.119	-.773	.443	-.013	.005	.505	1.981
	All_cash	.066	.022	.508	3.051	.004	.030	.103	.429	2.330

a. Dependent Variable: F1_5_5_CAR

Model Summary – 4 Factor, +/- 15 trading days

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.670[a]	.449	.338	.11707

a. Predictors: (Constant), All_cash, Inst_Own, Leverage, Premium, EPSY1, LnBoard, Tobin, EPSY2, LnAbsSize, RelSize

Model Summary – 4 Factor, +/- 5 trading days

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.667[a]	.445	.334	.05365

a. Predictors: (Constant), All_cash, Inst_Own, Leverage, Premium, EPSY1, LnBoard, Tobin, EPSY2, LnAbsSize, RelSize

Model Summary – 1 Factor, +/- 15 trading days

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.676[a]	.457	.348	.10487

a. Predictors: (Constant), All_cash, Inst_Own, Leverage, Premium, EPSY1, LnBoard, Tobin, EPSY2, LnAbsSize, RelSize

Model Summary – 1 Factor, +/- 5 trading days

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.637[a]	.405	.286	.05523

a. Predictors: (Constant), All_cash, Inst_Own, Leverage, Premium, EPSY1, LnBoard, Tobin, EPSY2, LnAbsSize, RelSize

Table 20: Correlation matrix

Correlation table										
	Tobin	RelSize	Premium	Leverage	EPSY1	LnBoard	Inst_Own	LnAbsSize	EPSY2	All_cash
Tobin	1.000	.313	-.292	.287	.065	.165	.234	-.203	.025	.392
RelSize	.313	1.000	-.024	.168	-.133	-.161	.202	.184	-.093	.480
Premium	-.292	-.024	1.000	-.229	.097	-.038	-.235	-.004	-.220	.009
Leverage	.287	.168	-.229	1.000	-0.101	-.138	.142	.041	.090	.015
EPSY1	.065	-.133	.097	-.101	1.000	-.167	-.021	-.230	-.497	.141
LnBoard	.165	-.161	-.038	-.138	-.167	1.000	.012	-.362	.312	-.057
Inst_Own	.234	.202	-.235	.142	-.021	.012	1.000	.090	.120	.147
LnAbsSize	-.203	.184	-.004	.041	-.230	-.362	.090	1.000	.096	-.297
EPSY2	.025	-.093	-.220	.090	-.497	.312	.120	.096	1.000	-0.070
All_Cash	.392	.480	.009	.015	.141	-.057	.147	-.297	-.070	1.000

Table 21: 1 factor interest sensitivity 5 days

1 factor model interest sensitivity regression +/- 5 trading days

Model		Unstandardized Coefficients		Standardized Coefficients			90.0% Confidence Interval for B		Adjusted R Square
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	
1	(Constant)	-.008	.077		-.105	.917	-.137	.121	
	Y1_M30	-.023	.041	-.077	-.573	.569	-.092	.045	.286
	Y2_M30	-.016	.019	-.113	-.863	.392	-.049	.016	
	Y1_M20	-.024	.041	-.079	-0.586	.561	-.093	.045	.287
	Y2_M20	-.017	.019	-.114	-0.867	.390	-.049	.016	
	Y1_M10	-.024	.041	-.077	-.573	.569	-.092	.045	.287
	Y2_M10	-.017	.019	-.115	-.878	.384	-.049	.015	
	Y1_P10	-.024	.041	-.078	-.580	.565	-.093	.045	.287
	Y2_P10	-.017	.020	-.112	-0.856	.396	-.050	.016	

a. Dependent Variable: F1_5_5_CAR

Table 22: 1 factor interest sensitivity 15 days

1 factor model interest sensitivity regression +/- 15 trading days

Model		Unstandardized Coefficients		Standardized Coefficients			90.0% Confidence Interval for B		Adjusted R Square
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	
1	(Constant)	-.008	.077		-.105	.917	-.137	.121	
	Y1_M30	.117	.078	.193	1.503	.139	-.013	.248	.344
	Y2_M30	-.043	.036	-.149	-1.186	.241	-.104	.018	
	Y1_M20	.120	.078	.198	1.538	.130	-.011	.251	.346
	Y2_M20	-.044	.037	-.150	-1.192	.239	-.105	.018	
	Y1_M10	.124	.078	.204	1.586	.119	-.007	.254	.347
	Y2_M10	-.045	.037	-.153	-1.216	.230	-.106	.017	
	Y1_P10	.123	.078	.203	1.574	.122	-.008	.254	.346
	Y2_P10	-.044	.037	-.149	-1.187	.241	-.107	.018	

a. Dependent Variable: F1_15_15_CAR