

# THE LONG-RUN UNDERPERFORMANCE OF INITIAL PUBLIC OFFERINGS

## -A CASE STUDY OF DEUTSCHE TELEKOM

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### Abstract

This thesis surveys the literature on IPO's, in particular, its primary underlying reasons on long-run underperformance. The aim is to review theories regarding the long-run underperformance, and evaluate whether or not these theories can explain this phenomenon. A case study of Deutsche Telekom serves to assess the explanatory supremacy of the existing theories regarding the long-run underperformance of IPO's. We find that one could not argue separately that the theories stated are the only explanation of the IPO characteristics; one has to take into consideration the potential affection of the measurement problem highlighted by Fama among others. However, the theories we conclude to be best applicable are the ones based on heterogeneous expectations, as illustrated with the case. We argue that the reality regarding the long-run underperformance of IPO's is somewhere in between these two points of views and that it is important to have both of them in mind when examining any case.

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# 1 Introduction

## 1.1 Overview

Year 2005 was a record year for European Initial Public Offerings (IPO's) with regard to international offerings, the number of IPO's as well as the sum of offering value.<sup>1,2</sup> The strong development during 2005 continued through the first quarter of 2006 and 126 IPO's were settled during this period. Given that no negative macroeconomic factors emerge, there are no motives why the IPO markets should not continue to flourish. With the persistent call for capital from up-and-coming market economies such as Russia, China and India, Europe should maintain to be a well-liked objective for worldwide IPO's.<sup>3</sup>

With the IPO's being a hot topic in these days, the issue regarding IPO underperformance has become an exciting topic. It is a well known fact that newly floated companies often tends to underperform their peers during a period following the IPO.<sup>4</sup> Another IPO characteristic is the evidence of companies choosing to go public in periods when they think they will receive the highest valuation in the market and that companies going public during such periods will perform exceptionally bad in the aftermarket.<sup>5</sup> In context of the current IPO popularity these evidences make it interesting to study the theoretical explanations to the long-run underperformance of newly issued companies.

There has been substantial evidence of long-run underperformance in IPO markets all over the world, although of varying degree and span. Both in the US and the European marketplaces has evidence of underperformance for as long as five years after the floatation been exposed.<sup>6</sup> The theories trying to explain the presence of long-run underperformance of IPO's can be divided into two subgroups, one based on asymmetric information and the other based on behavioural explanations. However, there is a discrepancy about the underlying reasons for the long-run underperformance of IPO's. Along with the hypotheses which try to explain this phenomenon there is also theorists that argue that the long-run underperformance is not an IPO effect but rather a measurement problem.<sup>7</sup>

The divergence in opinion raises the question of what the underlying reasons for long-run underperformance of IPO's really are. This thesis presents an overview of the IPO phenomenon, significant stress is placed on the underlying reasons of the underperformance of IPO's.

## 1.2 Purpose

This thesis surveys the literature on IPO's, in particular, its primary motives on long-run underperformance.

The aim is to review theories regarding the long-run underperformance, and evaluate whether or not these theories can explain this phenomenon.

## 1.3 Delimitations

This thesis is of academic delimitation as contrasting to empirical statistical surveys. The range of the academic structure is thus broadened and should be seen as the keystone of this survey.

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<sup>1</sup> The number of European IPO's increased by 39% from 433 in 2004 to 603 in 2005. New money raised in 2005 of 51 billion Euro represents almost double the amount raised in 2004 (28 billion Euro)

<sup>2</sup> Troubridge et al (2005)

<sup>3</sup> Troubridge et al (2005)

<sup>4</sup> Ritter (1991)

<sup>5</sup> *ibid*

<sup>6</sup> Miller (1999)

<sup>7</sup> Fama (1998) and Brav and Gompers (1997)

We will in this thesis not take into consideration the financial structure of the firms. We are aware of the fact that this might affect the performance of the IPO. However, we do not consider it to be of high significance in the long run. This belief is based on the assumption that the asymmetric information between investors and owners to be most evident in the short-run performance of an IPO. Hence, this includes the asymmetric information regarding financial structure and its risk.

The prime focus of the thesis lies in analysing the underlying reasons of the underperformance of IPO's. The particular interest in underperformance of IPO's is in the long-run performance. The short run performance will only be mentioned briefly.

### *1.4 Method*

Two main paradigms, deductive and inductive methods, can be distinguished when conducting social science studies. The deductive method starts from theory and the inductive method starts out from the empirical framework. We have in this master thesis determined to accomplish a qualitative deductive study, which means that we start out with theory to which data is matched. In order to find out which underlying reasons that perhaps can explain the long-run underperformance of IPO's we have started out by going through related literature on the area under discussion. The theories are thereafter applied to a case study: Deutsche Telekom, which by it's IPO in 1996 was the largest made in Europe and is still number three worldwide.<sup>8</sup> This case serves to assess the descriptive supremacy of the existing hypothesises of IPO's on the whole, the purpose is to consider the scope and worth of the academic construction on the underlying reasons of IPO's. Further more, the case study will also be provided with a numerical approach to determine the size of the underperformance in the particular case. The models used to establish this underperformance will be a Capital Asset Pricing Model (CAPM) regression and Cumulative Adjusted Return (CAR).

### *1.5 Outline*

The survey continues as follows. In section 2, the IPO is presented. An overview of the structure, the history and a description of the current (European) IPO market is given. Section 3, sketches out the theoretical framework of IPO's, and hence the underlying theoretical reasons for long-run underperformance are put forth. In section 4, we present the IPO of Deutsche Telekom and use the present theories to analyse the case. Section 5 winds up.

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<sup>8</sup> [www.ipohome.com](http://www.ipohome.com)

## 2 Initial Public Offerings

The time a company sell their common shares to the public is referred to as an IPO. The shares offered in the IPO can be either already existing or newly issued shares. The primary motive behind an IPO is for the firm to raise capital. The IPO is to be confused with later issuances of share. In these cases the term IPO is not applicable to later issuance of shares; these issuances are called to as secondary market offerings (SEO's).<sup>9</sup>

### 2.1 The IPO process

The IPO process starts by the company going public choosing in which marketplace they will offer their stock. The general case is that companies choose to have their shares traded on their domestic stock exchange. To assist the company in the process at least one investment bank is contracted to serve as the underwriter of the floatation. The process then continues with putting together all relevant information and creating the prospectus. When the prospectus is produced the issuer and the underwriter starts to market the shares to potential investors. The marketing can be carried out in numerous ways, often dependent on whom the offer is intended to and how the pricing and allocation will be carried out. During the marketing phase, when the offer is presented to potential investors, it is often the case that these investors are encouraged to reveal their interest in the shares. The information gathered during this book-building will later help the issuer and the underwriter in pricing and allocating the share among investors.<sup>10</sup>

The pricing and allocation take various forms and is often dependent on local regulations in the area. When the price is fixed the allocation depends on the interest in the share. Problems arise when the issue is oversubscribed and some discretionary allocation rules need to be implemented. Some regulations require the allocation of shares to be "fair" which limits the ability for the issuer to choose investor.<sup>11</sup>

When the price is fixed from start a more intimate connection between the issuer and the investor is built up during an information gathering book-building phase. The underwriter is especially important when investors are of institutional kind since they could be assumed to have more outspread contacts among such investors. The price and allocation of shares is then determined after the consideration of the information revealed by the investors. The book-building method gives the issuer the possibility to get a sense of the market before selling the shares and also the ability to reward investors for revealing information. An alternative to book-building and fixed price offers is the conduct of a formal auction to set the price and allocation. The special feature of an auction is that it can be carried out without intermediate and is therefore interesting in a futuristic context where the issue of coming in contact with investors is diminishing.<sup>12</sup>

### 2.2 The development of IPO's

The IPO markets have recently experienced an increase in the number of companies going public. The increase is most significant in Europe where new regulations have decreased the number of requirements on IPO's. In Finland, for example, the number of listed domestic companies has increased by over 200% since early 1980's.<sup>13</sup> The European development in

<sup>9</sup> Jenkinson and Ljungqvist (2001) s.4

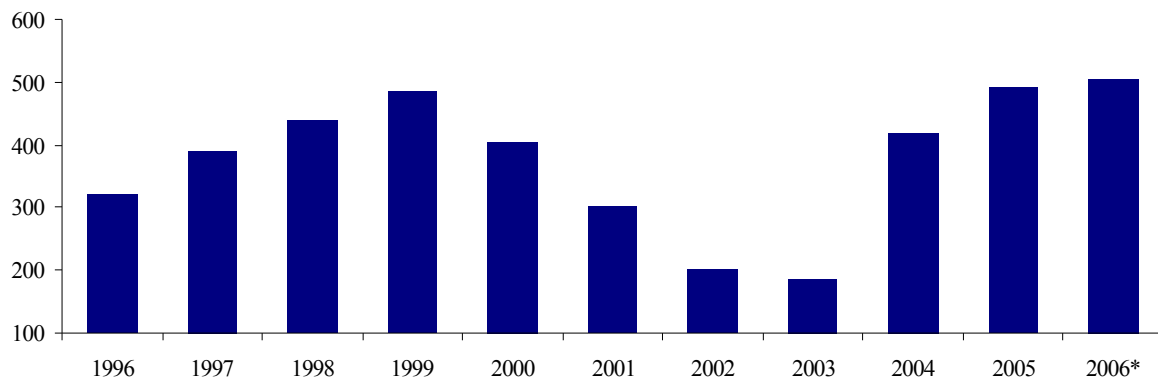
<sup>10</sup> Jenkinson and Ljungqvist (2001) s.13

<sup>11</sup> Jenkinson and Ljungqvist (2001) s.15

<sup>12</sup> Jenkinson and Ljungqvist (2001) s.20

<sup>13</sup> Jenkinson and Ljungqvist (2001) s.30

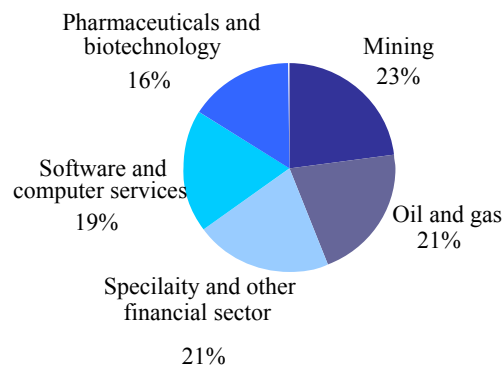
the number of companies going public each year is presented in *Graph 1* below.



*Graph 1: 2006 figures are estimated based on the first quarter figures.*

*Source: PWC Watch Survey Q1 2006*

As seen in *Graph 1* the number of IPO's varies from year to year and seems to follow some kind of trend. The reason behind this cyclical pattern can to some extent be explained by the macro economical factors and the overall state of the economy. The academic research on the area does not totally agree with this explanation and suggests other motives behind companies' decision to go public.<sup>14</sup> The variety in the number of companies going public can also be traced to the industry belonging of the company. There seem to be industry clusters where companies of the same industry tend to go public during certain periods.<sup>15</sup> During the IT-boom of the late 1990's internet companies represented, due to natural reasons, the majority of companies going public. *Graph 2* shows the industry allocation of companies going public in 2005.



*Graph 2. Source: PWC IPO Watch Survey, Troubridge (2006)*

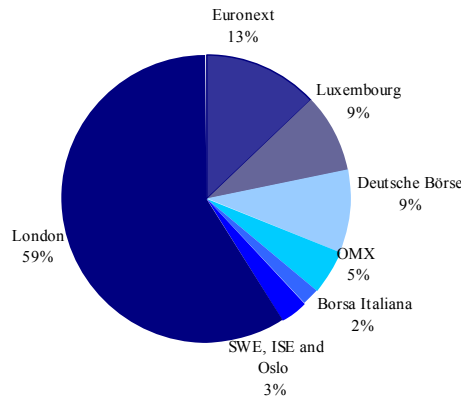
Prior to the IPO popularity in the late 1990's European companies were characterized as large and mature companies in contrast to the typical US IPO company who were smaller and younger. As listing requirements have been reduced the average age and size of the general European IPO have decreased and an international convergence of newly floated companies can be distinguished. Despite this convergence the average European IPO company is still

<sup>14</sup> Ritter (1991)

<sup>15</sup> Jenkinson and Ljungqvist (2001) s.151

both large and more mature than its US counterpart.<sup>16</sup> However, the evidence of decreasing European deals is evident on the Deutsche Börse where the average deal size in 2004 was €180 million and the same number for 2005 was €83 million.<sup>17</sup>

The London Stock Exchange (LSE) is the leading financial exchange in Europe, also when it comes to the numbers of IPO's. In 2005 354 IPO's was registered at the LSE, which represents 59% of the total number of European IPO's in the same year. The distribution is displayed in *Graph 3* below:



*Graph 3. Source: PWC IPO Watch Survey, Troubridge (2006)*

As shown in *Graph 3* Deutsche Börse was the third most active exchange in terms of volume.

### 2.3 IPO Characteristics

Extensive research has been carried out on the IPO area for decades and the empirical findings confirm three stylized facts of the new issue market. Initially these characteristics were mainly evident in the US but as research has been extended across the globe it can be concluded that IPO generally are associated with certain anomalies.<sup>18</sup>

The first and most extensively documented irregularity is the initial underpricing, the short-run overperformance, which imply that the first day trading prices usually exceed the initial offering price. Studies on this subject have been carried out in countries all over the world and in virtually every country examined has a pattern of positive first-day premium been identified.<sup>19</sup> The Swedish evidence, for example, is based on Rydqvist's findings of an average initial return of 39% in a sample of 213 Swedish IPO's between 1970 and 1990.<sup>20</sup>

The second IPO characteristic is the evidence of cyclical patterns in the extent of underpricing and the numbers of companies going public during certain time periods. There seem to be clusters of companies that choose to go public in periods following periods of substantial underpricing. These finding would suggest the presence of timing even though an IPO transaction is assumed to have zero net present values in an efficient market place.<sup>21</sup> In a

<sup>16</sup> Jenkinson and Ljungqvist (2001) s.36

<sup>17</sup> Troubridge et al (2006)

<sup>18</sup> Jenkinson and Ljungqvist (2001) s.37

<sup>19</sup> ibid

<sup>20</sup> Rydqvist (1993)

<sup>21</sup> Jenkinson and Ljungqvist (2001), s.43



study of the German IPO market Ljungqvist finds that the IPO activity tends to be higher after periods of extensive underpricing.<sup>22</sup>

The third anomaly, the long-run underperformance of newly floated shares, suggests that IPO's tend to underperform their peer during a period of up to 10 years following the IPO. The long-run underperformance is the least explored of the three IPO characteristics and there is no total consensus among researcher in the field. As this is the anomaly that we have chosen to study under the scope of this thesis the theoretical framework in the field will be examined throughout in section 3.

We consider the theoretical explanations for the first two anomalies to be outside the scope of this thesis, but since most of these theories are based on the assumption of asymmetric information we will give a quick overview of the phenomenon.

## *2.4 Asymmetric information*

Information asymmetry models assume that at least one party to a transaction has relevant information whereas the other(s) does not.<sup>23</sup> Many of the theories regarding IPO characteristics are based upon asymmetric information. A common asymmetric model used when evaluating IPO underpricing is Rock's (1986) winner's curve. This model predicts that the issuing firm as well as its underwriting bank are not informed about the real value of the shares which are offered. On the other hand, it is assumed that some investors are perfectly informed. This is reflected in a "winners curse": in unattractive offerings, the uninformed investor will receive all the shares she bids for, while in attractive offerings she will face competition from informed investors. Rock puts forth that since informed investors are insufficient to take up all shares on offer even in attractive offerings, something needs to be done to at least hold the uninformed to break even. The solution is to underprice all offerings.<sup>24</sup>

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<sup>22</sup> Ljungqvist (1997)

<sup>23</sup> Perloff (2004)

<sup>24</sup> Jenkinson and Ljungqvist (2001)

### 3 Theories: Underperformance of IPO's

The three parts of this section will review the existing conjectures and hypotheses and assess the available evidence in this field of study in order to try to explore the tendency of new issues to underperform in the long-run.

#### 3.1 Long-run underperformance in theories of underpricing

As mentioned in section 2.3 one of the characteristics of IPO's is the tendency of initial underpricing. We will now review how these theories explain the existence of long-run underperformance.

##### 3.1.1 Signalling

Of the asymmetric-information based underpricing models, only the signalling and book-building theories have anything to say about long-run underperformance. Rather than predicting that newly floated companies will underperform in the long-run signalling theories seem to require positive after-market returns, given that firms underprice in order subsequently to be able to sell further shares at a higher price than in the absence of signal. For the average IPO firm signalling seems to make no sense.<sup>25</sup> However, what is true on average may not be true across the quality distribution of issuers. In particular if firms underprice to signal their quality and if a separating equilibrium is obtained in this game, high-quality firms should – perhaps by virtue of this signal – perform better than low-quality ones. Empirical evidences show little support of the predictions made by signalling models.<sup>26</sup> It can be argued that the long-run performance results are inconsistent with implications of signalling, leading to the conclusion that signalling through underpricing retains little credibility as an explanation of long-run underperformance.<sup>27</sup>

Although signalling through underpricing does not seem to solve the puzzle of long-run underperformance of IPO's other types of signalling models potentially could. Carter and Manaster (1990) present a model based on asymmetric information where quality is signalled through the use of a prestigious underwriter. They find that prestigious underwriters are associated with lower risk offerings which would imply lower returns. To determine whether an underwriter is prestigious or not a ranking system is constructed in the article. Carter, Dark and Singh (1998) continue on this theme and find that long-run performance is less severe when the floatation is handled by a prestigious underwriter. Barry et al (1990) propose a similar model but instead of the use of underwriters quality is signalled through the presence of a venture capitalist. Unlike entrepreneurs venture capitalists might have to face the market again and therefore have the incentive to treat the investor fairly since they do not want to create a bad reputation for the future.

In line with Leland and Pyle's (1977) model owners can signal quality of their company by retaining a large equity stake at the floatation. By doing this the owners show that they are comfortable about the future prospect of the company and that they therefore are willing to take on risk to get a piece of these prospects. The model predict that the more capital that is retained the better is the quality of the firm and one could therefore expect it to have superior return than its IPO peers in the long-run. The empirical testing of this theory finds weak support in Singapore but is contradicted in Germany.<sup>28</sup>

<sup>25</sup> For example, the average German IPO firm traded below its first-day price after three years (after adjusting for stock splits, etc.) and managed a positive raw three year return (of 5%) only as a result of dividend payments.

Jenkinson and Ljungqvist (2001), s. 141

<sup>26</sup> Jenkinson and Ljungqvist (2001), s. 144

<sup>27</sup> *ibid*

<sup>28</sup> Koh et al. (1992) and Ljungqvist (1996)

### 3.1.2 Theories of book-building

In the Benveniste and Spindt (1989) model of book building it is the investors that have the informational advantage. They model underpricing as a reward to better informed investors for truthfully revealing their information during the book-building phase. The information these investors reveal will help the issuer (and the underwriter) to revise the initial offering price and to set a price as close to the fair price as possible. Investors who reveal more positive information will see the offer prices revise upwards. Hence, there is an incentive among investors to reveal negative information to get as low price as possible. The price revision can therefore not be complete as some money must be left on the table to reward investors for truthful information revelation. Benveniste and Spindt argue that the subsequent performance will be positively correlated with the initial price revision which could potentially explain the existence of long-run underperformance. If there are more disclosures of negative information than of positive information the long-run performance may be negative on average. However, the only available evidence is unresponsive. Hanley (1993) does not find any support in his US sample that companies priced above the initial range would fare any better off than those priced below it.

### 3.1.3 Legal liability

Hughes and Thakor (1992) argue that their legal insurance model of underpricing could explain the long-run underperformance phenomenon. According to them IPO investors are in fact investing in a package consisting of a share and a “litigation put”. That assumption requires the issuer, along with the underwriter, to be liable for future damages to investors. The “litigation put” gives the investors the opportunity to recover parts of subsequent losses from the issuer. Huges and Thakor think of these damages as extra dividends paid out to the investors and that long-run underperformance could be explained as the failure to initially include the value of these dividends.

Alexander (1993), on the other hand, disagrees with this explanation of underperformance. According to him litigation puts and dividends could not explain the phenomenon as they are not practically available during the first couple of years, i.e. the period when underperformance is usually observed. Further, under the assumption that the market is fairly efficient share prices would include the value of the dividends and such market failure could not exist. It could also be discussed whether the threat of litigation has any economical relevance in different countries. Underperformance is experienced in both European and Asian markets where the legal environment is such that it could probably not explain the long-run underperformance of IPO's.<sup>29</sup>

### 3.1.4 Price support

The presence of initial price support by underwriters could serve as an explanation for the long-run underperformance of IPO's. However, due to legislation reducing underwriters' obligation to reveal such information the supply of such data is limited. By examine distributions of initial returns Ruud (1993) argues for evidence of initial price support. Ruud's findings gain further support in a study by Ellis et al (2000) where considerable evidence of underwriters' market activity during the first days of trading was found and that this activity was especially intense around small IPO's. They also found evidence of supportive activities being carried out as long as 60 trading days after the IPO.

If first day trading prices are kept artificially high by supportive underwriters, they are the wrong starting point for a long-run performance evaluation. Once support is withdrawn, prices will adjust down towards to the true market equilibrium. Starting the clock

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<sup>29</sup> Jenkinson and Ljungqvist (2001), s. 145

on the first trading day thus wrongly leads to an observation of negative returns. Stocks that received the most support will experience worse long-run performance as the stock price is kept further from its true value than stock supported slightly or not at all. If many IPO's receive such price support, it is conceivable that the resulting estimation bias is sufficiently large to lead to a spurious finding of abnormal underperformance.<sup>30</sup> It might seem irrational for underwriters to support badly performing stocks. Ellis et al (2000) argues that the reason behind such trade is that the underwriters are considerate about their future reputation on the IPO market.

### 3.1.5 Agency costs: separation of ownership and control

The operating performance literature has proposed an explanation for long-run underperformance based on Jensen and Meckling's (1976) model of conflict of interest between managers and shareholders. The model suggests that the long-run underperformance is a consequence of increased agency costs in connection to the IPO. When the company, during the floatation, distribute the shares to a large number of investors it might be the case that management's stake in the firm decreases. As their share of equity decreases the incentive to maximize the value of private benefits, rather the value of the company, increases and hence the increased agency costs. The cost escalation, and hence the long-run underperformance, could be counteracted if managements' equity stake is held constant throughout the IPO process.<sup>31</sup>

Empirically the support for this hypothesis has been slightly positive in US samples and negative in, for example, Japanese samples.<sup>32</sup> It has also been argued that the agency cost model is more applicable in explaining the poor operating performance post-IPO, mainly because the assumption of an efficient after market would require the increased agency costs to be incorporated into the share price.<sup>33</sup>

## 3.2 Behavioural Explanations of long-run underperformance

We now turn to the behavioural explanations of long-run underperformance phenomenon.

### 3.2.1 Heterogeneous expectations

Miller (1977) relaxes the assumptions about homogeneous expectations in the marketplace and explores the effect on assets pricing. By introducing an element of realism to the marketplace Miller's model could potentially explain both the initial underpricing and the following long-run underperformance of IPO's. In the model investors are allowed to have different opinions about the future prospects of the company without for that matters assume that any part is being irrational. The divergence in opinion is assumed to be largest initially and is then expected to decrease on the arrival of new information. Unlike the efficient-market theories the model of heterogeneous expectations suggests that the market-clearing price will be set by the marginal investor that is just optimistic enough to buy the share. At the arrival of new information the marginal investor will reevaluate their expectations and the share price will decline. As heterogeneity is assumed to be greatest at floatation the new information would only need to make a few overly optimistic investors to adjust their expectations for the price to go down, although the average belief about the value of the company remains the same. It should be noted that the new information does not even have to be particularly negative because any type of information that decreases the spread of opinion will lower the

<sup>30</sup> Jenkinson and Ljungqvist (2001), s. 145

<sup>31</sup> Jenkinson and Ljungqvist (2001), s.146

<sup>32</sup> Mikkelsen et al (1997) and Cai and Wei (1997)

<sup>33</sup> Jenkinson and Ljungqvist (2001), s 148

price. Applying Miller's model to long-run performance would suggest that the long-run performance is negatively related to the initial extent of divergence of opinion, meaning that the larger the uncertainty is about the true value initially the poorer will the performance be in the long-run.

Ljungqvist et al (2001) examine the empirical evidence of Miller's model and find that long-run performance is negatively correlated with the divergence in opinion using the opening ask-bid spread as a proxy for the initial uncertainty. The findings are perfectly in line with what Miller's model would predict.

### 3.2.2 Fads and learning

In his renowned study Ritter (1991) argues that there are periods in which investors tend to be overoptimistic about the earnings potential of companies and he calls these period *fads*. Aggarwal and Rivoli (1990) take this one step further and argue that investors are being irrationally overoptimistic when trading starts. According to Ritter companies are able to distinguish periods when investors are optimistic from others and chose to go public when the market is giving them a more favourable valuation i.e. capturing a window of opportunity. A similar observation is also made by Rajan and Servaes (1994) who examine the market conditions on IPO's and show that more companies go public when other companies in the same industry are trading at high multiples. The logic behind these findings is not hard to understand as the owner wants to get as high compensation as possible. When the temporary overoptimism eventually fades the newly floated companies will not be able to meet expectations and underperform in the long-run. In their study Rajan and Servaes show that the long-run performance is especially poor for companies going public when the market is overly optimistic about future prospects, reinforcing Ritter's theory of companies being able to capture "windows of opportunities". In a later study Rajan and Servaes (1997) examine the analyst coverage of IPO's. They discover that analysts are generally more optimistic about the long-run than the short-run and that companies that are assigned the highest growth projections initially perform the worst in the aftermarket. The fact that the market in certain periods seem to be overoptimistic about the future prospects of the IPO's could potentially explain of the underperformance of IPO's.

Bossaerts and Hillion (1998) question the irrationality in the IPO market. They argue that one could not expect the market to have correct beliefs about all relevant future events, and especially not in the case of IPO's. One could, on the other hand, expect rational investors to update their expectations as new information arrives i.e. learn from subsequent events. Bossaerts and Hillion test whether long-run underperformance is a reflection of initial overoptimism or failure among investors in the after market to learn. They come to the conclusion that new information is generally incorporated into market prices accurately and that the reason for underperformance is rather that the initial expectations are overly optimistic than the inability among investors to learn. The authors also find evidence of different behavioural patterns among investors in low priced offer. One possible explanation to this anomaly is that low-priced offers often tend to be small and aimed at retail investors who might have different learning patterns than institutional investors.

### 3.2.3 Window dressing

When companies are about to go public they have the incentive to project a favourable picture of their future performance. In addition, the owners have an information advantage in comparison with the investor since they have more or less control over the distribution of information prior to the IPO. In this context the existence of earnings management, or window dressing, could easily be understood. DeGeorge and Zeckhouser (1993) present evidence of strong incentives for managers to make the company look as good as possible

before taking it to the market. Through the use of accounting accruals and cash flow improvement efforts managers have the opportunity to boost reported pre-IPO figures. The presence of earnings management could, according to Teoh, Welch and Wong (1998), explain the apparent overoptimism among investors in the pre-IPO market and the subsequent long-run underperformance. They argue that if the investors are not able to detect whether the companies engage in window dressing they will translate high reported earnings directly into a higher offering price. The prospect investors will then incorporate these boosted numbers into their future expectations with consequence of overrated valuations. In the aftermarket the IPO companies will no longer have the incentive to manipulate their earnings and perhaps not the continued possibility to do so. As the information requirements on the IPO companies will increase post-floatation investors will get access to more accurate information and will thereafter incorporate the new information into their future expectation. The future projections will then be adjusted downwards and this will cause the long-run underperformance.

The findings presented in the Teoh, Welch and Wong article could be interpreted as evidence of earnings management pre-IPO. The authors find that accounting accruals tend to be especially high in the year of the IPO and those companies with the highest accruals are those who perform the worst during the three consequent years. In an earlier study Teoh, Wong and Rao (1993) examine how cash flow and net income varies in the years surrounding the IPO. They found that both cash flow and net income tend to increase the years prior to the IPO and that the levels could not be sustained the years after floatation. As argued by the authors these findings could be interpreted as either evidence of window dressing or that issuers time the IPO after a couple of years of growing cash flows and earnings.

### *3.3 Measurement problems*

Fama (1998), along with others, criticize the methodology used in many studies of long-run underperformance of IPO's and argue that the findings are results of mis-measurements of risk, return and significance. It is further argued that if adjustments are made for these factors the long-run underperformance of IPO's would no longer exist, meaning that newly floated companies do not generally underperform because they are IPO's but because of other factors.<sup>34</sup> Examples of such factors could be the small size and high risk, which are general features of North American IPO's but is necessarily not true for IPO's in the rest of the world where companies tend to be larger and more mature when they go public. Much of the critique is aimed at the benchmark models used in these kinds of studies. Fama argues that the problem is unavoidable since any test of long-run performance is a combined test of the validity of the chosen benchmark and the sample performance relative to the benchmark.

New studies of underperformance has been made using the more sophisticated techniques suggested by the critics and yet findings of long-run underperformance have been made. Especially outside of USA the phenomenon is still evident, which could be explained by the different feature of non-US IPO's.<sup>35</sup>

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<sup>34</sup> Brav and Gompers (1997)

<sup>35</sup> Jenkinson and Ljungqvist (2001), s.166

## 4. Case study – Deutsche Telekom

We have selected Deutsche Telekom as focus for our case study. Deutsche Telekom was chosen due to several factors; first, as shown in Appendix 2, it is the third largest IPO ever made, with regard to funds raised. Hence, we believe that the theories could be seen as valid given the size of illustrative example. Second, the IPO was made in 1996; therefore the time aspect works well in order to evaluate the underperformance. The period used when assessing the long time underperformance is normally 3-5 years, although three years is most common.<sup>36</sup> We have therefore also chosen to examine the performance of Deutsche Telekom during a period of three years following the IPO. This is also suitable since the effect of the internet bubble probably could be seen as extremely in 1999-2001.

### 4.1 Case outline

As mentioned above, we have chosen to study Deutsche Telekom for the purpose of examining the theoretical framework on the area. To give a more comprehensive picture of the company and the floatation we will start off by briefly presenting the history and the current status of the company and also the specific circumstances around the IPO. In part 4.3 we will go through our numerical findings from the CAR and CAPM regression model. Finally, we will examine how the theories presented above can help us in explaining the long-run performance of Deutsche Telekom. We will go through the different theories in the same order as they are presented in section three.

### 4.2 Company profile

#### 4.2.1 Historical Overview

The history of Deutsche Telekom goes back to the early days of telecommunication although it was not until 1949 official supervision of the German communications networks was placed under the jurisdiction of the postal ministry. In the same year Deutsche Bundespost (former Deutsche Reichspost) was established. Deutsche Bundespost was a state-owned company providing their customers with postal, telecommunication and banking services. The telecommunication side was initially paying most attention to fixed-network communication, but the first mobile network was launched already in 1958.

During 1990 a first wave of reformation was running across Germany and Deutsche Bundespost was split into three independent, although still state-owned, entities; postal services, telecommunications and Post-Bank. The telecommunication entity was named Deutsche Bundespost Telekom. In the same year the company started its internationalization process by opening up its first foreign office in Tokyo, Japan. During the 1990's the communication over the Internet became an increasingly important part of the company's operations and in 1995 Deutsche Bundespost Telekom launched its first official website. The same year, during a second wave of reformation, the company was transformed into a stock company owned by the German government. During this transformation the name Deutsche Telekom was adopted. In line with the transformation process the company went public in November 1996 in the largest IPO seen in Europe.

#### 4.2.2 Deutsche Telekom today

Through several mergers and acquisitions Deutsche Telekom has been able to grow into Europe's largest, and the world's third largest, telecommunication company.<sup>37</sup> As of 2005 the

<sup>36</sup> Jenkinson and Ljungqvist (2001) s.140

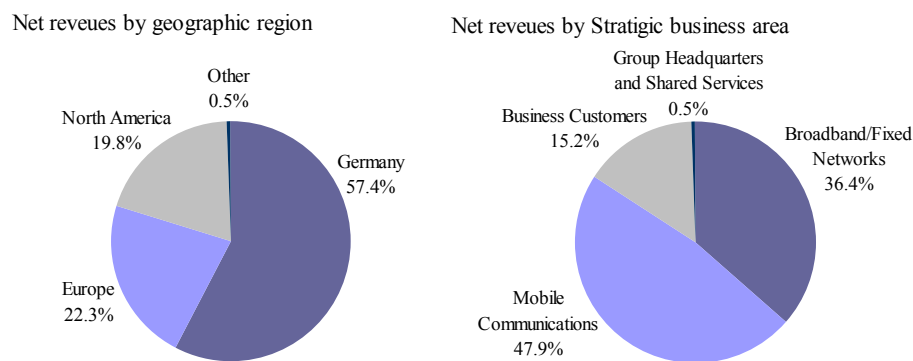
<sup>37</sup> The Forbes 2000, [www.forbes.com](http://www.forbes.com) 2006-10-25

company had revenues of € 59.6 billion and was the employer of approximately 244,000 people. Deutsche Telekom is currently represented in 50 countries with more than 40% of revenues generated outside the German market.<sup>38</sup>

The company is organized around four strategic business areas:

- **Broadband and Fixed networks:** Offers consumers and small companies with fixed-network infrastructures, broadband Internet access and multimedia services
- **Mobile communications:** In terms of revenues the largest business area providing customers with mobile communication services and applications
- **Business customers:** Provides Deutsche Telekom's business customers with customized solutions to combine information technology and telecommunications.
- **Group Headquarters and Shared Services:** Facilitates cooperation between groups of integrated companies.

In *Graph 4 and 5* the contributions to net revenues in 2005 by each of the geographic regions and business areas respectively are presented.



*Graph 4 and 5. Source: Deutsche Telekom Annual report 2005*

#### 4.2.3 The T-share

As mentioned earlier, Deutsche Telekom went public in November 1996. At an initial share price of DM 28.5, DM 20.1 billion was raised in the largest IPO in Europe at the time. The offering consisted of a new issue of 720 million shares. The IPO was divided into two separate offerings; one aimed at global investors and one at the employees of Deutsche Telekom and its German subsidiaries. 600 million, out of the 720 million new shares, were allocated to the global offering, 90 million to the underwriters over allotment options and the remaining 30 million to the employee offering.<sup>39</sup> The 600 million shares allocated to the global offering were in turn divided between five different regions as follows;

- 402 million shares offered in Germany
- 85 million shares offered in the Americas
- 50 million shares offered in the UK

<sup>38</sup> The Deutsche Telekom website 2006-11-12

<sup>39</sup> Prospectus 1996



- 33 million share offered in rest of Europe
- 30 million shares offered in Japan, Asia/Pacific and the rest of the world

In markets outside of Germany the offers were primarily aimed at institutional investors. In Germany however, a discount program was put in place to encourage retail investors buy the share. As a consequence the Deutsche Telekom share, known as the T-share (T-aktie), became the first widely spread “peoples share”.<sup>40</sup> Many of the retail investors were first time buyers and in general the interest for the floatation was enormous and the offering was oversubscribed five times.<sup>41</sup>

Out of the 30 millions new shares allocated to the employee offering, 23.7 million was finally exercised. Deutsche Telekom was, at the time, Germany’s largest employer and the employee offering was a part of program encouraging employee ownership. In addition to a discount program similar to the one offered to the retail investors the employees were also offered a financing program where a special purpose entity would hold the shares on behalf of the participants during five years.<sup>42</sup>

### *4.3 Numerical approach of the Deutsche Telekom share*

We will in this section present the numerical findings from the CAR and Regression models. The mathematical model specifics are found in Appendix 1. In both calculations we used two different peer groups to get a less biased picture of the long-run performance of the Deutsche Telekom share. The two groups we used were the Frankfurt general index, CDAX, and the index of the 30 largest public companies in Germany, DAX30.<sup>43</sup> The time period applied to both calculations was November 18 1996 to November 17 1999, the day of the floatation and the following three years of trading.

#### **4.3.1 Cumulative Abnormal Return**

The CAR calculations returned a cumulative abnormal return of 52.6% when DAX30 was used as benchmark and 64.1% when CDAX was the benchmark. The relatively large positive abnormal return is primarily due to exceptional performance of the T-share in the last year of the testing period. As seen in *Graph 6* below it is not until toward the end of 1998 that the Deutsche Telekom share starts to outperform its peers which probably is affected by the strong influence of the Telecom bubble.

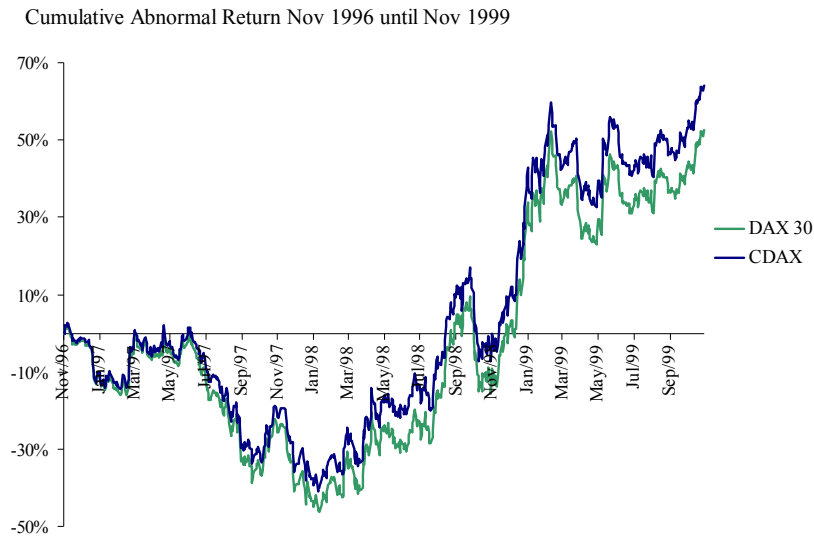
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<sup>40</sup> The Deutsche Telekom website 2006-11-12

<sup>41</sup> Annual Report 1996

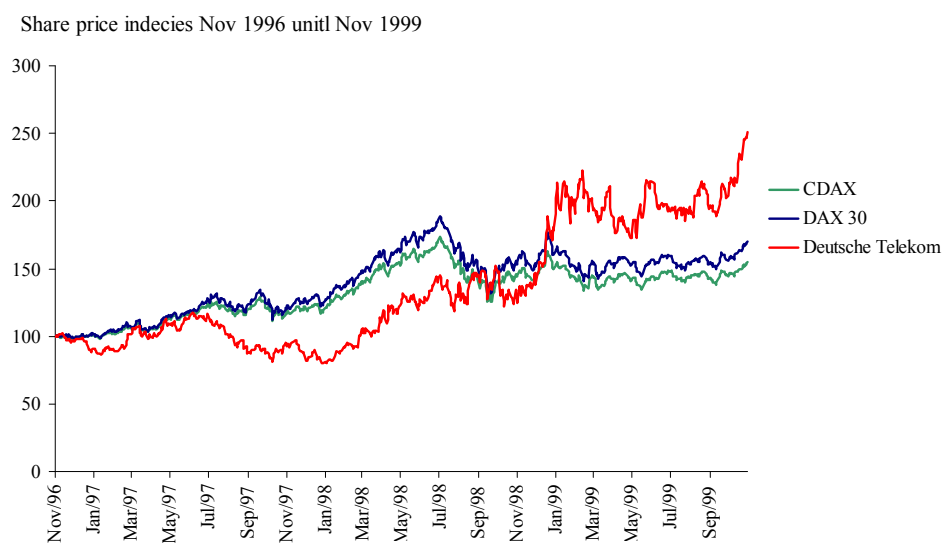
<sup>42</sup> Prospectus 1996

<sup>43</sup> Presented in Appendix 1



Graph 6. Source: Thomson Datastream

Moreover, when looking further into the CAR for the first and second years after the IPO the T-share performance is -24.5% and -12.0% for the DAX30 benchmark and -20.9% and -7.2% when CDAX was used as a benchmark. The findings are also clearly visible in *Graph 7* where the indexed development of two benchmarks and the T-share is shown.



Graph 7. Source: Thomson Datastream

#### 4.3.2 The regression model

As shown with the CAR above, it is clear that Deutsche Telekom underperformed its peers in 1997 and 1998. However, the T-share performed well in comparison during 1999. In order to evaluate whether or not the average performance during these years can be classified as underperformance we have performed a Capital Asset Pricing Model (CAPM)<sup>44</sup> regression. It will be difficult to make any statistical conclusions with help from the CAR, since it is cumulative. Hence, we performed a regression analysis in order to incorporate the daily version. With help of the regression we want to get a sense of the size of alpha. Alpha is the

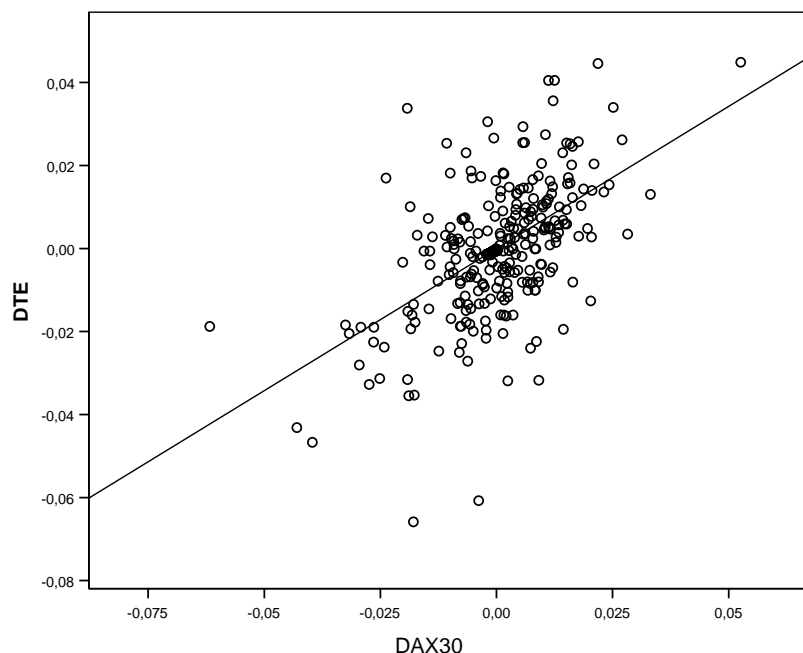
<sup>44</sup> See Appendix 1 for formula

undetermined factor, which could not be explained mathematically by the model. Alpha would consequently reflect the level of the questionable IPO characteristics. If the amount of alpha we are given from the regression is negative this can be interpreted as the T-share on the whole underperformed during the entire testing period.

When running the regressions for the excess return of the Deutsche Telekom share and the two peers the daily risk free rate from the European Central bank is used as a proxy for the risk free interest rate.<sup>45</sup>

As shown in Appendix 4, a significance level of 5% is implying a critical value of  $t = 1,96$  for an infinite amount of numbers. In our sample we have 781 observations which would imply a critical t-value of circa 2.0<sup>46</sup>. The calculated t-values from the regression amounts to -1.181 for CDAX and -1.367 for DAX30. The regression with peer CDAX as well as DAX30 generates an alpha close to zero (-0,000387 for DAX30 and -0,000341 for CDAX). However, as the statistical t-values are within the critical limits we cannot reject the hypothesis that the share did not underperform in either of the cases. Further, we can therefore not reject the hypothesis that alpha is zero and therefore not prove any numerical underperformance of the T-share over the whole period. The reason to absence of numerical underperformance could presumably be motivated by the strong abnormal return achieved in 1999, as a probable consequence of the telecom bubble.

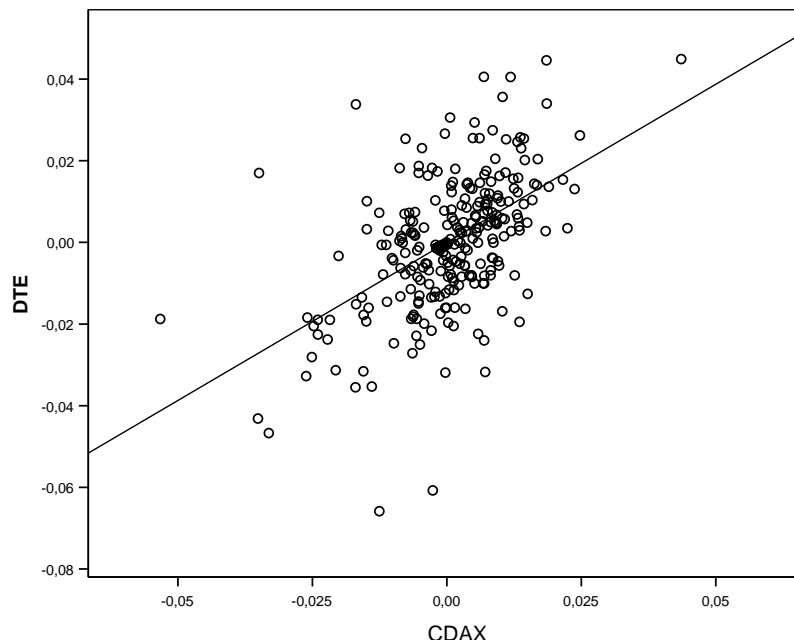
The beta for CDAX is 0,529 and amounts to 0,551 for DAX30 indicating that we find evidence of systematic risk being positively related to expected return, all in accordance with CAPM. It can be noted that the  $R^2$  levels of 0,280 and 0,304 for CDAX and DAX30 respectively are rather low, which indicate that there might be other more accurate explanatory variables not captured by this model. *Graph 8* and *9* below show the plotted observations and the estimated regression line for the DAX30 and CDAX respectively.



*Graph 8. Regression output DAX30*

<sup>45</sup> Since data on German T-bills are not available

<sup>46</sup> With a t-test with 781 observations with the significance level of 5% the critical t-value will be circa 2.0 on a significance double-sided test.



Graph 9. Regression output CDAX

#### 4.3.3 Short summary of numerical approach

Referring to the CAR approach it can be stated that Deutsche Telekom's T-share underperformed during the first two years following the IPO, i.e. 1997 and 1998. However, we could not find any evidence of underperformance in 1999. Moreover, when using the CAPM regression model, we could not get a numerical confirmation that the T-share on the whole underperformed during these three years. However, we will in the case analysis put emphasis on the fact that we did find evidence of underperformance during the 1997 and 1998 and analyse the case accordingly.

Having presented the numerical characteristics of the post-IPO performance of the T-share we will examine how the theoretical framework presented above can explain these mathematical findings.

### 4.4 The long-run underperformance of Deutsche Telekom

#### 4.4.1 Signaling

As mentioned above signaling can be made through a variety of ways. In this case we will focus on signaling through the use of underwriters, venture capitalists and retained equity since we feel that these theories will help us the most in explaining the long-run performance of Deutsche Telekom.

Since the Deutsche Telekom floatation was the largest IPO in Europe at the time and aimed at investors all over the world there were over 50 underwriters involved in the deal. In lead of the underwriters were the global coordinators Goldman Sachs & Co, Deutsche Bank and Dresdner Bank. We will focus on these three as they were the lead underwriters and also in charge of the German offering which accounted for more the half of the total amount offered. To determine whether or not these underwriters could be classified as prestigious we have used the ranking systems constructed by Cooney Jr et al and Carter, Dark and Singh. In these rankings both Goldman Sachs & Co and Deutsche Telekom receive the highest score possible in all periods. Dresdner Bank receives the highest score in all periods but one.<sup>47</sup>

<sup>47</sup> Cooney Jr et al. (2004)

These finding makes us conclude that the underwriters contracted in the Deutsche Telekom floatation could be classified as a prestigious. The theories would then predict that the long-run performance of Deutsche Telekom would not be as poor as if the underwriter would have been less prestigious. We can of course only speculate in whether the performance of Deutsche Telekom can be considered as especially poor or not. Earlier empirical studies of the German IPO market found that the average long-run performance of newly floated companies was -7.6% in the period of 1978-1992.<sup>48</sup> Depending on the choice of benchmark Deutsche Telekom performs both worse and better than the -7.6% during the first two years which makes it hard to tell whether this theory could give a credible explanation to the long-run underperformance of Deutsche Telekom. When taking all three years into account Deutsche Telekom is not outperformed by its peers and is well above the empirical findings of -7.6% which could be interpreted as an effect of the use of prestigious underwriters. Although, as we will comment on later, this is probably not the only explanation to the long-run performance of Deutsche Telekom

Deutsche Telekom was 100% state-owned prior to IPO and a venture capitalist could therefore not have been present. By modifying the theory slightly it could be applied on state-owned companies. We would like to argue that the government has similar incentives as a venture capitalist in the IPO process. Just like the venture capitalist, the government might have to interact with the market again which creates an incentive for it to treat the market fairly and project a good reputation for the future. In line with the modified model this would suggest that the long-run performance of Deutsche Telekom would have been less severe than if it had not been a state-owner company. Since it is hard to find a suitable benchmark for such large telecom companies it is difficult to say whether state-owned companies perform better or worse than their peers. What could be said is that state-owned companies that go public are generally large and old companies that are associated with lower risk and therefore generate a less negative return than other companies in the same industry.<sup>49</sup> However, we do not consider the explanatory power of this theory especially large in this case. If all three years are accounted for this theory could to some extent explain the inability of find numerical proof of underperformance throughout the whole period due to the fact that Deutsche Telekom was a state-owned company and that the government had the incentive to give the market a fair offer. The fact that Deutsche Telekom was a relatively large and experienced company when it was offered to the market would also envisage less severe underperformance which in turn could explain the deficiency of numerical proof of underperformance over three years.

As mentioned earlier, the German government was the sole owner of Deutsche Telekom prior to the IPO. During the floatation 26% of the company was sold to outside investors and employees and the government share was decreased to 74%.<sup>50</sup> Applying the Leland and Pyle model to this setting would imply that the T-share would not be expected to perform as bad in the long-run as it would have done if a larger share of the company had been sold out, this of course hinges on whether or not 76% could be considered to be a large share of retained ownership. We would argue that 76% retained ownership is large enough to signal confidence about the future prospects of the company. The theoretical implications of these findings would then be in line with the numerical long-run performance of the T-share over all of the three years. However, earlier empirical findings suggest that the share of retained ownership has little explanatory power in the German IPO market,<sup>51</sup> which would

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<sup>48</sup> Ljungqvist (1997)

<sup>49</sup> Ritter (1991)

<sup>50</sup> Annual Report 1996

<sup>51</sup> Ljungqvist (1996)

imply that these theories are not credible in this setting. We therefore conclude that the theories have little credibility explaining the underperformance of Deutsche Telekom.

#### 4.4.2 Book-building

The theories of book-building suggest that the long-run performance of IPO's could be explained by the extent of pre-floatation price reversion. To get a sense of whether or not the price of the T-share was revised during a book-building phase we have studied different publications for evidence of such reversion. The activities prior to the IPO started off by an information forum in March 1996. During the spring and summer Deutsche Telekom and the underwriters went on a road show and presented the offer to institutional investors. We would like to argue that it is likely that some kind of book-building could have been carried out during the road show and that it probably was. There was an enormous interest for the T-share and it was oversubscribed five times.<sup>52</sup> Although this could indicate that book-building was conducted it is hard to tell whether this interest in the T-share was among retail or institutional investors primarily. If the interest was among the institutional investor it is a fair assumption to say that a positive price reversion was made to mitigate the enormous interest. If, the interest, on the other hand, was primarily among the retail investors, who are not that influential in the book-building process, the presence of any price reversion is hard to determine. Assuming that the interest shared equally by the retail investors and the institutional investors could suggest that a positive price reversion was made, given the oversubscription of the share. The theories would then predict that the long-run performance of the Deutsche Telekom share would not be as poor as it would have been if there would have been a negative price reversion or no reversion at all. Again it goes back to whether the long-run performance of the T-share could be considered as less severe than the normal, and as mentioned earlier this is dependent on the choice of benchmark. We therefore consider the book-building theories to have little explanatory power when it comes to interpreting the long-run underperformance of Deutsche Telekom.

#### 4.4.3 Legal liability

The model of legal liability is probably not likely to explain the underperformance of Deutsche Telekom because of the European context. As mentioned earlier the legal climate in Europe is such that the economical significance of a litigation dividend is diminishing. On the other hand, it could of course be argued that the likelihood of litigation is larger because of the fact that the government is offering the shares. The argument builds on the fact that people generally require their governments to take more responsibility than ordinary companies, and this might as well include the government actions on the capital market. In this case it would be especially applicable since the T-share was aimed at the public and was the first "peoples share". The governments' presence in the process might make the retail investors feel more secure and therefore make them more willing to sue if the returns do not turn out to be what they were expecting them to. Analogous observations could be made from the flotation of the Deutsche Telekom's Swedish counterpart, Telia.

The implication of this would be that the long-run performance of Deutsche Telekom could to some extent be explained by the threat of litigation, given that the market was not able to incorporate the cost of such treat in the initial stock price. The theoretical explanation of the underperformance would according to theses theories then be the initial threat of litigation that was later incorporated into the share price. Although we do not consider this theory as the sole explanation to the underperformance we do think that it has some explanatory power in this setting.

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<sup>52</sup> Annual Report 1996

#### 4.4.4 Price support

As mentioned earlier the principal problem when it comes to identify whether price support has been conducted is the limitations on available data. We can therefore only speculate in whether Deutsche Telekom was supported by underwriters initially and whether the removal of such support could explain the long-run performance of the share. According to Ellis et al (2000) supportive trade is particularly common in cases where the stock is initially traded below the offering price. The T-share was in fact traded slightly below the initial offering price about two months after the floatation. One interpretation of this could be that supportive activities were carried out by Deutsche Telekom's underwriters, although two months might be considered to be a too long period of time to be identified as initial. Another interpretation could be that the price support was removed about two months after the floatation and that the share price therefore declined in the absence of support. Both these observations suggest the presence of initial price support. The theoretical implication of this would then suggest that the long-run underperformance of the T-share could be explained by the removal of initial price support by the underwriters.

On the other hand, Ellis et al (2000) find that initial price support is particularly common in cases of small IPO's where the underwriters have to serve as market makers. The size of the Deutsche Telekom floatation and five time oversubscription would rather imply that the need for supporting activities was limited. Despite the size and the interest of the T-share it could be argued that there was a need for supporting activities since Deutsche Telekom was a state-owned company and many of the subscribers were first-time buyers and that the share price therefore needed to be upheld for legitimacy reasons. Overlooking the governments need to legitimize the floatation there are few indications of any need for initial price support of the T-share which would suggest that the price supporting theory has little explanatory power of the long-run underperformance of Deutsche Telekom.

#### 4.4.5 Agency costs

In connection to the IPO we have not been able to identify any decrease in management ownership, but rather an increase since a part of the offering was aimed at the employees. The transformation into a stock company took place the year before the IPO,<sup>53</sup> and the opportunity for management ownership was probably limited before this change. In lack of more detailed information we therefore conclude that the management ownership was zero or close to zero in the year of the IPO and that the floatation opened up for an increase in managers' stake of the company. The theory about increased agency cost after the IPO would in this context therefore have limited explanatory power of the long-run performance of Deutsche Telekom. In this case an increase, rather than a decrease, in management ownership could be recognized which would imply that the T-share was expected to perform better than the market post-floatation because of the lower agency costs.

Taking these arguments one step further one can also argue that the large retention of equity post-floatation would also counteract the increasing agency costs. As the ownership can be assumed to have continued to be strong even after the IPO the cost of control would still be manageable for the majority owners which would mitigate the ability for the managers to consume private benefits. These observations would not predict the long-run underperformance of the T-share and we therefore consider the explanatory power in this context to be limited.

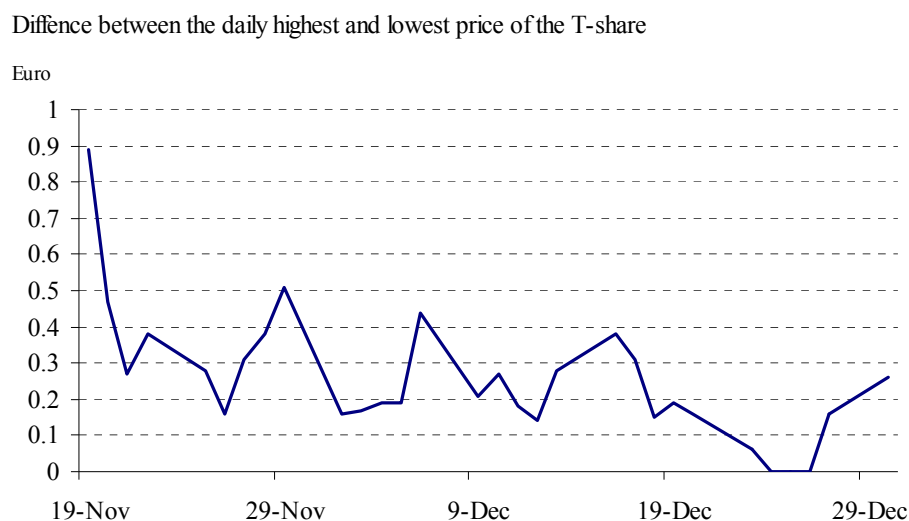
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<sup>53</sup> Annual report 1996

#### 4.4.6 Heterogeneous expectations

Deutsche Telekom was one of the first state-owned telecom companies to go public in Europe. In this context Miller's model about heterogeneous expectations seems particularly applicable since the experience of similar floatations was limited among everyone involved and the divergence in expectations could therefore be assumed to have been especially large. Miller's model could in this case serve as an explanation for the long-run performance given that there was a substantial divergence in expectation among investors since they did not know what to expect from this kind of IPO. The arrival of new information post-IPO would then explain the change in investors expectation and hence the long-run underperformance of Deutsche Telekom even though the information was not negative. The fact that the company was not even a stock company until a year before the floatation probably made it harder for the market to create a fair view of Deutsche Telekom and the divergence in opinion was therefore large. This would suggest that the arrival of new information had especially large impact on the differences in expectations since the information pre-IPO can be assumed to have been limited. The arrival of new information decreased the gap in opinion as the most optimistic investors might have changed their expectation although the average opinion never changed. The divergence in opinion pre-IPO could in this case explain the long-run underperformance of the T-share, both because of the limited access of information prior to floatation and the fact that a company like Deutsche Telekom had never gone public before. We consider the explanatory power of these theories to be especially large in this case for the same reasons as just mentioned.

To determine whether the uncertainty about the true value of the T-share actually decrease after the floatation an assessment of the ask-bid spread at the time of the floatation could be carried out, in line with the framework presented by Ljungqvist et al. In absence of information about the ask-bid spread of the T-share during its initial trading days we used difference between the highest and lowest prices of the day during the first 30 trading days as a proxy for the uncertainty about the true value of the share. The results of the comparison are presented in *Graph 10* below:



*Graph 10. Source: Thomson Datastream*

As shown in the graph the difference was greatest during the second day of trading and then declined over the period of time. One interpretation of this, using Miller's framework, could be that the uncertainty about the true value of the share was greater initially because of heterogeneous expectations among investors. In the following days and weeks new



information arrived and the divergence in expectations, and hence the differences between daily high and low price, therefore declined. These findings further strengthen the explanatory power of the heterogeneous expectation theory in explaining the long-run underperformance of the T-share.

#### 4.4.7 Fads, timing and learning

According to Ritter companies are able to identify when the market is giving them a favorable valuation and therefore chose to go public in these periods. He also present evidences showing that companies going public during such periods will experience worse long-run performance than others. For several reasons this might not be very applicable to the Deutsche Telekom case. First, the fact that Deutsche Telekom was one of the first in a line of many state-owned telecom companies go public makes it hard to see the link between a high peer group valuation and the floatation as there were no compatible peer group at the time of the IPO. On the other hand, it could very well be the case that telecoms in general were highly valued in 1996 and that Deutsche Telekom therefore saw an opportunity in going public at that moment. One could only speculate in whether Deutsche Telekom actually considered the stock market as especially favorable at that time and therefore decided to go public. Assuming that this was the case, Ritters' theory about *fads* could to some extent explain the long-run performance of the T-share. Taking the, at that time, impending IT-bubble into account make this explanation less probable since the hot market for telecoms did not occur until three years later. Looking back, Ritters' theory would predict the IPO to have been carried out about around the millennium rather than in 1996. One can of course argue that Deutsche Telekom could not have predicted the stock market boom and that they were in fact catching a window of opportunity by going public in 1996.

One could argue back and forth about whether Ritters' theory helps in explaining the circumstances around the Deutsche Telekom IPO. We would argue that the most probable explanation to the floatation is found in the history of the company. As a state-owned company Deutsche Telekom was, and is, much more closely affected by government reformations than their private counterparts. It was during one of those reformation periods that Deutsche Telekom was transformed into a stock company and partly sold out to outside investors and employees. Taking this into account makes it more reasonable to say that Deutsche Telekom went public because of political reasons rather than the contemporary market valuation of similar companies. This would imply that Ritter's model of *fads* may not be able to explain the long-run performance of the company, and we do think that this is the most reasonable explanation although it does not help us in understanding the underperformance of the T-share.

Whether or not the investors were overly optimistic about the future prospects of Deutsche Telekom in 1996 is of course hard to say. Going back to the discussion about heterogeneous expectations it is likely to say that the divergence in opinion was large due to the novelty of the IPO. One could therefore argue that there probably were a number of investors that where overly optimistic about the T-share and that these investors pushed up the initial price and then revised their opinions and cause then long-run underperformance of the share. The question still remains whether or not Deutsche Telekom chose this period because of overly optimistic investors or because of other reasons. As concluded above we do not think that the reason behind the Deutsche Telekom IPO was the current market and these theories are therefore of little help in explaining the long-run performance of the T-share.

#### 4.4.8 Window-dressing

In their article Teoh, Wong and Rao (1994) use the change in cash flows and net incomes as proxies for the presence of earnings management prior to the IPO. Applying the same

approach on Deutsche Telekom shows that the net income increased the years prior to the IPO but decreased in the year of the floatation.<sup>54</sup> The cash flow pattern is quite the opposite with decreases in the years prior to the floatation and an increase in 1996,<sup>55</sup> which is a quite natural consequence considering the substantial amounts raised through the IPO. Using the framework presented by Teoh, Wong and Rao solely on the income figure could provide some help in explaining the long-run performance of Deutsche Telekom. The increased net income prior to the IPO would in this context be interpreted as earnings manipulations and that in turn could have caused the T-share to perform worse than the benchmarks at the arrival of new, more accurate, information.

On the other hand, it could as well be evidence of a profitable company in need of fresh capital to continue to grow. Adding cash flows into the analysis would enforce this picture since the decrease in cash flow could be interpreted as an increased capital expenditure. Going through Deutsche Telekom's financial reports the years prior to the IPO shows that several cost cutting programs were put in place in the early 90's to cope with escalating costs. Depending on the point of view adopted this could serve as evidence of both an attempt to boost earnings prior to the IPO or just rational business sense among Deutsche Telekom's executives. The poor evidence of window-dressing prior to the floatation implies that the explanatory power of the theory in this case is limited.

#### 4.4.9 Measurement problems

The fact that neither the CAR or the CAPM regression model was able to prove any numerical evidence of long-run underperformance during all of the three years could definitely be seen in favor of the view of the phenomenon of measurement error. We did, on the other hand, find numerical evidence of underperformance during the first two years and there is no law saying that the underperformance has to last for at least three years to be accounted for as long-run underperformance. It could therefore be argued that the T-share did underperform its peer although it "only" lasted for two years.

The fact that our measurements of the long-run underperformance of the T-share seem to be so dependent on the choice of peer group would also support the view of long-run performance as a measurement error. The issue of choosing the appropriate benchmark could potentially determine the outcome of the numerical tests. Our choice of the DAX30 index is based on the assumption the companies underlying the index would at least match Deutsche Telekom in size. To counteract that this peer group would for some reason be biased because of their size we have also chosen the Frankfurt general index CDAX as our second peer. The performances of the indexes are shown in Appendix 3. The Frankfurt Telecom index is also included in order to get a further understanding of how Deutsche Telekom performed with regard to its branch on the Deutsche Börse. Although the companies underlying this index do not individually match Deutsche Telekom the aggregate could be assumed not to be biased. The reason why we did not choose to create a peer group of companies with same size and in the same industry, in line with Ritter, is because we felt that such a group would probably be more biased than any of the peers we chose for the following reasons. First, due to the size of Deutsche Telekom it is hard to find comparables in the same industry. Secondly, the unusual history of the company further complicates the choice of peer group. Although it could be argued that we should have created a peer group of other state-owned telecom companies going public such a group would have been especially biased as Deutsche Telekom was one of the first of its kind to go public and the sample would then have been biased throughout the testing period.

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<sup>54</sup> Annual Report 1996

<sup>55</sup> Annual Report 1996

#### *4.5 Concluding Remarks on Case*

Summarizing the case of the long-run performance of the Deutsche Telekom share it could be concluded that a majority of the theories predict that the share would not perform as poor in the after market as it would have done if the firm characteristics would have been different. The fact that we were able to find long-run underperformance in our numerical tests during the two first years following the IPO gives raise question to whether these theories are applicable in this case. On the other hand, it can be argued that the inability to find numerical proof of underperformance throughout the whole period would give some validity to these theories as they predict the underperformance to be less severe in the case of Deutsche Telekom.

All of the signalling theories, based on asymmetric information, predict the underperformance to be less severe than it would have been if the company characteristics would have been different. They therefore are of little help in explaining the underperformance of the T-share. However they could potentially help in explaining the absence of underperformance during the last year of the period and in this context we feel that the hypothesis based on retained ownership is especially applicable due to the nature of Deutsche Telekom ownership structure. Due to the lack of empirical evidence of book-building we found it hard to say whether these theories have any credibility in explaining the long-run performance. The legal liability theories on the other hand may have more explanatory power in this case than in other European cases due to the fact that Deutsche Telekom was a state-owned company. The presence of supportive activities by the underwriters in the after market does not seem likely in this case and the theories in this area therefore are of little help in explaining the long-run underperformance of the T-share. The same goes for the theories based on increased agency costs post-IPO since this case implies a decrease, rather than an increase.

The theories based on heterogeneous expectations seem especially applicable in this case since the IPO was the first of its kind and that it is therefore fair to assume that the investors initially had different opinions about the future prospect of the share. We therefore argue that the explanatory power of these theories is large in this case and that it could serve as a likely explanation to the long-run underperformance of the Deutsche Telekom. The theories on market fads, on the other hand, probably have little explanatory power in this case since it does not seem likely that Deutsche Telekom chose to go public in 1996 because of the current market conditions. We feel that it was rather political motives that were the reason behind the IPO. We also feel that the window-dressing theories is of little help in explaining the performance of the T-share both because of the difficulties in finding evidence of such manipulation and also since the management of the company seemed to have little to win on raising the price of the share.

The inability to numerically prove the presence of underperformance during all of the three years following the Deutsche Telekom IPO could be seen as an evidence of the long-run underperformance in this case as a measurement error. Although this could very well be the case we would like to argue that the stock market bubble at the end of the millennium could be an explanation to why the T-share outperformed its peers during the last year of the period that is usually characterized by underperformance. Since Deutsche Telekom is in the telecom industry it could be argued that they were probably more likely to be dragged with the optimism in the end of the 1990's and therefore outperformed the general index and the DAX30 during the end of our time series. On the other hand, one could of course argue that the peer should have experienced the same escalation in stock prices as the overall economies at that point in time were particularly positive.

Although none of the theories alone seem to be able to explain all of the features surrounding the IPO and its following performance we feel that all of them have something to

give to the overall explanation. A mixture of the theoretical predictions gives a more faceted view of the reality of the case and probably has the highest explanatory power in this case.

## 5 Conclusion

The amounts of IPO's have steadily been increasing annually since the telecom bubble burst, and with regard to the prospects for 2006, the trend seems to continue. The increased IPO activity consequently builds an enlarged interest and the existing theories behind the IPO's have become even more relevant. Hence the phenomenon concerning underperformance, a company underperforming its peer during a period following the IPO, has become an even more applicable topic nowadays.<sup>56</sup>

Our case study of Deutsch Telekom serves to assess the explanatory supremacy of the existing theories regarding the long-run underperformance of IPO's. We found evidence of underperformance in 1997 and 1998 and we find that one could not separately state that the theories presented are the sole explanation of the IPO characteristics. However, we find that it could be argued that theories based on heterogeneous expectation are the most applicable in this particular case. These theories give the most consistent explanation to the long-run underperformance of the T-share that was mathematically exposed in the numerical approach of the study. Even though we feel that this theory has most explanatory power in this case we do not rule out the potential explanations of the other theories. We feel that they all contribute to a more throughout understanding of the circumstances around the Deutsche Telekom IPO and the subsequent performance. It can of course be argued that the theories predicting less severe underperformance, and especially the signalling theories, have explanatory power as well since the underperformance during all of the three tested years is not as severe as would be predicted by earlier made empirical studies of Germany. However, one has to take into consideration that the non-existing total underperformance during the years 1996-1999 is eliminated by the extremely high abnormal returns achieved in 1999 and that the reasons behind these findings might lay outside the explanatory ability of any of the theories. General conclusions regarding the explanatory power of the theories concerning long-run underperformance are hard to establish, since we not have been doing a quantitative analysis. However, the case study serves as an illustrative example of the applicability of the presented theories.

It is debatable whether or not the theories stated can be considered to be reliable and indisputable. Opponents raise the question whether or not long-run underperformance really could be explained by certain theories, or if it in fact is a measurement problem. Moreover, we find it hard to say whether the Deutsche Telekom long-run underperformance in fact can be explained by the theoretical framework or whether it should be fired off as measurement error. We think that the truth is somewhere in between these two points of views and that it is important to have both of them in mind when examining any case.

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<sup>56</sup> Ritter (1991)

## 6 Reliance and Reliability

As most hypothesis and studies are derived from the US and have an US focus, it is not fully established if these are directly applicable to a European market perspective, which is the spotlight of much IPO debate today as well as our case study. Due to the differences between European and US IPO's the findings made in the US marketplace might give false implications to a European case study. However, as mentioned earlier there is a trend of convergence between the two IPO markets and we therefore believe that the explanatory power of these theories is increasing in a European setting. It is also our belief that the theoretical frame of most hypotheses makes their applicability to the European economy likely.

The case study of Deutsche Telekom cannot be regarded as a universal proof on the essential motivations. We are also aware of the fact that the development of this IPO might have been affected by the internet bubble. Though, our opinion is that it is for sure representative of an IPO today, with regard to its size and registration on one of Europe's largest stock exchanges (by value and number of IPO's). Hence, it should be thought of as a symbolic exemplar of different illustrative characteristics.

We realize that one of the questionable points with our survey could be the choices of peer groups. One could most probably argue that a Telecom peer would be relevant. However we have in this survey chosen to focus on the Deutsche Börse, and hence have chosen DAX30 as well as CDAX. We consider our choice of peer to have less potential to be biased, than a pure Telecom peer.

Other factors affecting the long-run underperformance, except the focus regarding stated theories versus measurement problem, which might be relevant to be taken into consideration, are aspects such as the world economy and the life time of the firm. Moreover the performance of the Deutsche Börse relative to the European Stock Exchanges on whole might also be an applicable topic.

Finally, with regard to our regression analysis it can be mentioned that the level of  $R^2$  for both peers are rather low. This means that the regression might not be totally unfailing, and hence there might be indications for underperformance. Consequently, we may not have found all the explanatory variables. Although, this regression only serves as evaluating whether or not Deutsche Telekom underperformed during the three years and we have primarily focused on 1997 and 1998, in the analysis, where we found evidence for underperformance.

## 7 Suggestions for further studies

The question concerning the development of underperformance with venture backed companies versus those who are not venture backed, has been put forth by for example Brav and Gompers.<sup>57</sup> Hence in line with our thesis and also earlier researches, interesting topics for further studies could be to assess long-run underperformance of IPO's, when dividing the companies with regard to their financial structure.

Furthermore, a break up of the companies with reference to their life cycle and business could be an interesting area of study. Particularly with regard to Millers survey which assess that the firms with the greatest underperformance are those with a short operating history and low institutional ownership etc.<sup>58</sup>

A comparison of the US and the European development of IPO characteristics would also be relevant, in order to establish the reliance of using American models with a European perspective.

Another choice of peer group would also be attractive, for example a Telekom peer. Besides that, a quantitative study would certainly also be appealing, in order to be able to draw more general conclusions regarding the theories concerning long-run underperformance of IPO.

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<sup>57</sup> Brav and Gompers (1997)

<sup>58</sup> Miller (1999)

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## Appendix 1 – Models used

### Equation 1. Definition of CAR (Cumulative Adjusted Return)

$$CAR_{im} = \sum_{t=1}^m AR_{it}$$

$$AR_t = R_{it} - R_{mt}$$

### Equation 2. CAPM

$$R_{DeutscheTelecom} - R_f = \beta(R_m - R_f) + \alpha$$

### Peer group:

#### DAX30:

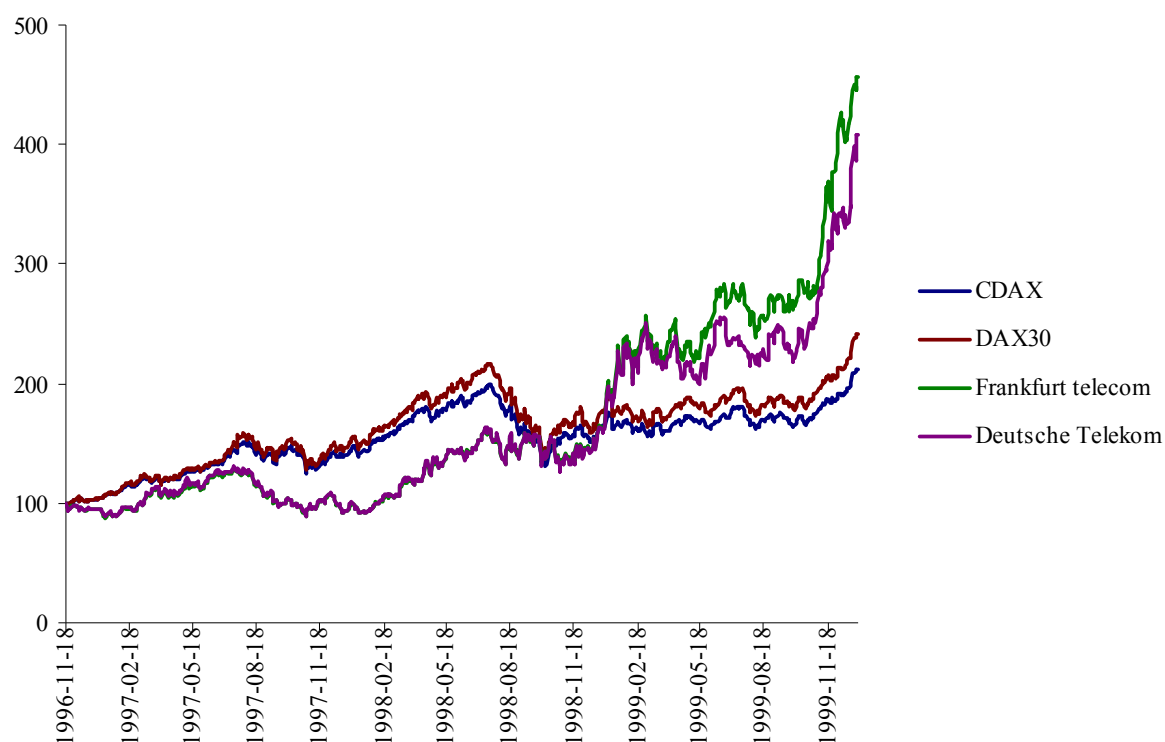
Adidas AG  
 Allianz SE  
 Atlanta AG  
 BASF AG  
 Bayer AG  
 BMW AG St  
 Commerzbank AG  
 Continental AG  
 Daimler Chrysler AG  
 Deutsche Bank AG  
 Deutsche Börse AG  
 Deutsche Lufthansa AG  
 Deutsche Post AG  
 Deutsche Postbank AG  
 E.ON AG  
 Fresenius Medical Care AG & Co, KGaA.St  
 Henkel KGaA Vz  
 Hypo Real Estate Holding AG  
 Infineon Technologies AG  
 Linde AG  
 MAN AG St  
 Metro AG St  
 Münchener Rück AG  
 RWE AG St  
 SAP AG  
 Siemens AG  
 ThyssenKrupp AG  
 TUI AG  
 Volkswagen AG St

#### CDAX: General Index of the Deutsche Börse

**Appendix 2 – Biggest IPO's, based on total proceeds raised**

Company	IPO Date	Underwriter	Industry	Location	Funds raised
1 Bank of China	2006-05-24	Bank of China	Banking-Foreign	Beijing	\$75.4
2 ENEL SpA	1999-11-01	Merrill Lynch	Utility-Electric	Rome, Italy	\$16.5
3 Deutsche Telekom	1996-11-17	Goldman Sachs	Telekomm-Svcs	Bonn, Germany	\$13.0
4 AT&T Wireless Group	2000-04-26	Goldman Sachs	Telekomm-Cellulr	US	\$10.6
5 Kraft Foods	2001-06-12	Credit Suisse	Food-Misc	US	\$8.7
6 France Telekom	1997-10-17	Merrill Lynch	Telekomm-Svcs	75505 Paris Cedex 15	\$7.3
7 Telstra Corporation	1997-11-17	Credit Suisse	Telekomm-Svcs	Victoria 3000	\$5.6
8 Swisscom	1998-10-04	Warburg Dillon Read	Telekomm-Svcs	Bern, Switzerland	\$5.6
9 United Parcel Service	1999-11-09	Morgan Stanley	Transpt-Shipping	US	\$5.5
10 Infineon	2000-03-12	Goldman Sachs	Elec-Semiconductors Mfg	Munich, Germany	\$5.2
11 China Unicom Ltd	2000-06-16	Morgan Stanley	Telekomm-Svcs	Beijing, China	\$4.9
12 CIT Group	2002-07-01	Goldman Sachs	Financi-Consumer Loans	US	\$4.6
13 Conoco	1998-10-21	Morgan Stanley	Oil/Gas-U S Integrated	US	\$4.4
14 China Mobile Limited	1997-10-15	Goldman Sachs	Telekomm-Cellulr	Hong Kong, China	\$4.0
15 Travelers Property Casualty	2002-03-21	Citigroup	Insurance-Prop/Casualty	US	\$3.9
16 Telekom Eireann	1999-07-07	Merrill Lynch	Telekomm-Svcs	Dublin, Ireland	\$3.8
17 Alstom	1998-06-19	Credit Suisse	Electrical-Equipment	Paris, France 75116	\$3.7
18 Goldman Sachs Group	1999-05-03	Goldman Sachs	Financi-Investment Bkrs	US	\$3.7
19 Agere Systems	2001-03-27	Morgan Stanley	Telekomm-Equip	US	\$3.6
20 China Petroleum (Sinopec)	2000-10-12	Morgan Stanley	Oil/Gas-Intl Integrated	Beijing, China	\$3.5
21 Charter Communications	1999-11-08	Goldman Sachs	Media-Cable TV	US	\$3.2
22 Lucent Technologies	1996-04-02	Morgan Stanley	Telekomm-Equip	US	\$3.0
23 Prudential Financial	2001-12-12	Goldman Sachs	Insurance-Life	US	\$3.0
24 China Life Insurance	2003-12-11	China International	Insurance-Life	Beijing	\$3.0
25 PetroChina	2000-03-30	Goldman Sachs	Oil/Gas-Intl Integrated	Beijing, China	\$2.9

*Source: Renaissance Capital and IPOhome.com*

**Appendix 3 – Frankfurt Telekom in relation to peer groups**

Source: Thomson/Datastream

## Appendix 4 – Regression

Since we choose to perform our test at a 5% significance level, we cannot reject the null hypotheses that the constants (alphas) in the two regressions are equal to zero. It could be mentioned that the null hypotheses could be rejected if the significance level is 23, 8% respectively 17, 2%. Although this is not reasonable. We have 781 observations. Hence our t-value will be ca. 2.0 at a 5 % significance level. Moreover, it can be mentioned that R<sup>2</sup> is low in our calculations. Furthermore, a positive statistically beta indicates that we find evidence that systematic risk is positive related to expected return, in accordance with CAPM. Finally, \*\*\* indicates that it is significant on 1%.

	<b>CDAX</b>	<b>DAX30</b>
<b>alpha</b>	0,000	0,000
<b>t-value</b>	(-1,181)	(-1,367)
<b>beta</b>	0,529	0,551
<b>t-value</b>	(17,418***)	(18,439***)
<b>R<sup>2</sup></b>	0,280	0,304
<b>significance</b>	0,238	0,172