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Modeling Determinants of First-Day Returns from  
IPOs; Evidence from the Stockholm Stock Exchange  
1996-2004

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Key words: Initial Public Offerings, First day returns, Determinants, Regression analysis, Underpricing.

Purpose: The purpose of this paper is to model determinants affecting the magnitude of first-day returns from IPOs on the Stockholm Stock Exchange. Our research will cover the 1996 – 2004 periods.

Methodology: We have chosen a deductive attempt with a quantitative procedure through which we can draw general results. More specifically, we use multiple regression models to attain our purpose.

Theoretical perspectives: IPO literature has generally done a good job in covering the theoretical perspective on why first-day returns exist. Within this area, Ritter is the foremost authority.

Empirical foundation: The method of predicting first-day returns is derived from the assumption that first-day returns are explained as a function of company characteristics, stock market cycle and how the IPO is conducted. Our empirical foundation is built upon 258 firms, of which 124 were identified as clean IPOs. From this sample we were able to collect data, supplied by FI, in the form of company listing prospectuses, on 107 firms.

Conclusions: Although our findings can be deemed successful, we have failed to find a model that determines first-day returns. This revelation is hardly surprising since doing so is virtually impossible. Instead, our findings show, with a high degree of certainty, which behavioural characteristics can be expected during the first-day of trading, given the input variables we have chosen.

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## **Abstract**

When a company performs an IPO it is valued by the market for the first time. An overpriced IPO will lead to negative first-day returns and thus bad publicity. On the other hand, a heavily underpriced IPO is equivalent to leaving money on the table. Hence, it is in the best interest of every company considering an IPO to set a fair offer price. However, previous studies find that underwriters appear to make systematic errors in using historic accounting data when setting the offer prices of IPOs. Further, the underpricing and cyclicity phenomenon as well as other trends associated with IPOs are of utmost importance to investors and companies considering an IPO. In this paper we focus on the relation between the magnitude of first-day returns and a number of broad factors, including; accounting information, ownership information, underlying IPO motives, the market conditions at the time of the IPO and IPO procedure. Our purpose is to model determinants affecting the magnitude of first-day returns, using a sample that covers 107 IPOs on the Stockholm stock exchange, between 1996 and 2004. Although our findings can be deemed successful, we have failed to find a model that determines first-day returns. However, we hope our results will contribute to shed more light on the factors most important in determining the magnitude of first-day returns from IPOs.

# 1. Introduction

## 1.1 Background

Stock exchanges function as a market for companies to raise capital. They are thereby essential in channelling savings into productive enterprises that can no longer finance further growth without external funds. The first prerequisite for a company to become listed on a stock exchange is an Initial Public Offering, hereafter IPO. Empirical evidence on IPOs clearly document three distinct patterns, all of which have been comprehensively covered in academic literature.<sup>1</sup>

First, IPOs tend to be underpriced resulting in spectacular first-day returns. Underpricing and large first day returns are some of the most well recognized characteristics of the new-issue market and there has been extensive research on the area. For an example, Ritter finds that the average first day return on the Stockholm Stock Exchange was 34.1 percent (1980-1994). The same evidence holds true globally with average first day returns ranging from 12.1 percent in Israel (1990-1994) and 104.1 percent in Malaysia (1980-1998).<sup>2</sup> Second, when compared to the stock market as a whole or to the performance of industry benchmarks, newly issued stocks tend to under-perform in the long-run.<sup>3</sup> Third, there is a pronounced cyclicity both in the number and size of IPOs and the degree of underpricing. The implication of this phenomenon is that companies tend to go public during bull-markets creating huge fluctuations, year over year, on the amount of new listings. The number of IPO's on the Stockholm Stock Exchange peaked in 1999 with thirty one companies going public, attracting SEK 4.7 Billion to the IT sector alone.<sup>4</sup> As we are writing this paper, IPOs have once again re-emerged as a "hot" topic following the burst of the equity bubble in early 2000, with three IPOs performed on the Stockholm Stock Exchanges in 2004.

Now that IPOs have come back in vogue again we feel that a renewed interest in profitable IPO trading should take place and through this paper we hope to contribute to the existing knowledge about IPO valuation. In doing this we have chosen to focus on the role of information available prior to the IPO, in relation to first-day returns from IPOs on the Stockholm stock exchange between 1996 and 2004. In particular, we focus on the relation between the level of first-day returns and a number of broad

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<sup>1</sup> Ritter, J., "Investment Banking and Securities Issuance" (2003) p.p 254-304

<sup>2</sup> Ibid p. 280-281

<sup>3</sup> Ritter, J., "The long-run performance of initial public offerings" (1991) p.p 3-27.

<sup>4</sup> Hammar, "IT-bolag hetast bland nyintroduktionerna" (2000)



factors, including; accounting information, ownership information, underlying IPO motives, the market conditions at the time of the IPO and IPO procedure.

## **1.2 Presentation of Problem**

When a company performs an IPO it is valued by the market for the first time. For that reason, it is in the best interest of every company considering an IPO to set a fair offer price. An overpriced IPO will lead to negative first-day returns and thus bad publicity. On the other hand, a heavily underpriced IPO is equivalent to leaving money on the table. First-day returns can be explained by the difference between the offer price of the company's shares and the markets expectations and valuation during the first day of trading. It is up to the underwriters involved to set a fair offer price that fully reflects all public information about the company going public. However, previous studies find that underwriters appear to make systematic errors in using historic accounting data when setting the offer prices of IPOs.<sup>5</sup>

We are interested in examining whether IPO prices are informative, in the sense that they reflect basic firm characteristics and accounting data such as firm age, ownership structure and size of revenue. Further, the firms' motives for going public is also of great interest as well as the way in which the IPO is conducted, for an example which investment bank that is employed and whether the offering price is fixed or set by an auction procedure. If we find significant relationships between these variables and the magnitude of first-day returns our results can be used as a proxy for future IPO valuations. Previous findings also show that the volume of new issues vary dramatically across time. This means that private firms have to take both life-cycle as well as market-timing aspects into consideration, when facing the decision of when to go public. This as well as other trends related to IPOs are of utmost importance to investors as well as companies considering an IPO. Therefore, through our study we hope to shed more light on the factors most important in determining the magnitude of first-day returns from IPOs.

## **1.3 Purpose**

The purpose of this paper is to model determinants affecting the magnitude of first-day returns from IPOs on the Stockholm Stock Exchange. Our research will cover the 1996 – 2004 periods.

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<sup>5</sup> Melnik, A & Thomas, D “ Value-Relevance of Accounting Information and the Predictability of IPO Underpricing” (2003) p. 2

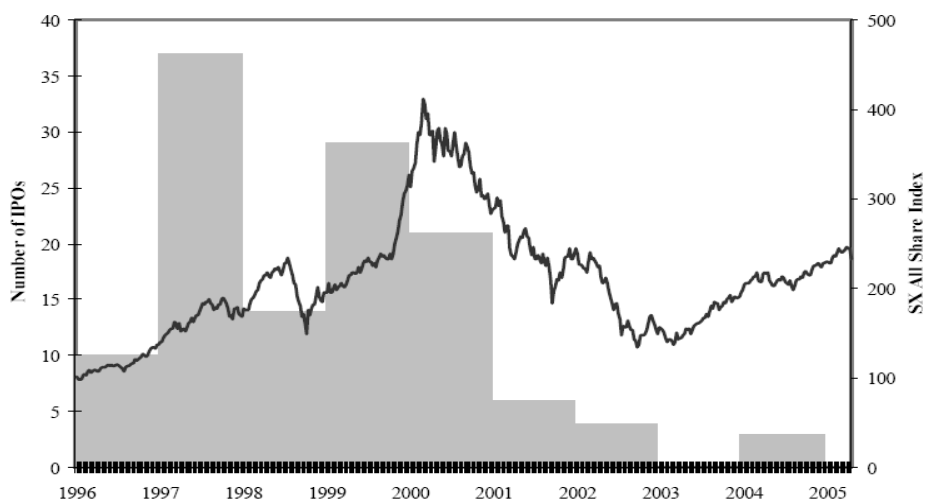
## 1.4 Target Audience

Our target audience consists of parties' interested in gaining a greater knowledge concerning the characteristics surrounding returns on IPO's. Our study is especially relevant to investment bankers, investors and companies planning to go public.

## 1.5 Context

As previously discussed, market timing, with regard to capturing cycle peaks, is an important factor in a firm's decision of whether, and when, to go public. This is why an understanding of the of the general market sentiments for our chosen time period is of great consequence to a study of the IPO process and its first-day returns. The frequency of IPOs is generally higher in a bullish market, than in a downward market climate.

**Figure 6.2. Annual frequency of IPOs plotted against SX All Share Index**



Notes. Graph consists of the entire sample of 124 companies. Data on the SX All Share index comes from <http://finance.yahoo.com/>.

During the first year in our sample, 1996, 10 IPOs occurred on the A-, O- and OTC-lists. Prices and trading volumes increased throughout 1996, continuing the bullish trend from 1995, resulting in the SX All Share Index gained 38 percent, closing the year at a new All Time High.<sup>6</sup> The largest IPO during that year was the sale of about half of the capital of the truck maker Scania by Investor, with a price tag of SEK 18,8 billion.<sup>7</sup>

<sup>6</sup> Stockholmsbörsen, "Factbook 1996" (Internet Source).

<sup>7</sup> Ibid

The three subsequent years, 1997 to 1999, the SSE continued its advance with a record amount of new issues coming to market. The seemingly large number of IPOs in 1997 is consistent with the before mentioned incentive to turn to the equity market in periods of over-valuation. Stock prices continued to rise during 1997 until October 8, when Alan Greenspan warned the American markets that they were overvalued.<sup>8</sup> This led to unrest in the markets, which also explains the lower frequency of IPOs in 1998.

The bullish trend in our sample period came to an abrupt halt in March 2000. Radiant growth projections in the beginning of 2000 led consumption to increase to unprecedented levels, while inflation remained in check, and The New Economy secured a footing in Sweden.<sup>9</sup> The advances on SSE culminated in the beginning of March, when the valuation of IT companies had reached astronomical heights. At this time several firms were lined up and ready for an IPO; the unlucky ones who missed timing the booming market, instead being introduced in a market collapsing at breakneck speed.

The following two years were a depressing period in SSE's history. Headlines from Swedish business papers sums it up; "Red numbers closed a lousy stock market year" and "Only 1931 was worse". During these two years the number of IPOs declined significantly and hit rock-bottom in 2003 with no IPOs at all.

In 2003 the climate shifted and the SX All Share index showed a positive trend. The bullish market continued in 2004, largely due to Ericsson's recovery which accounted for 6 % of the total market increase.<sup>10</sup> In spite of the stock market revitalization, the interest in IPOs continues to be weak. One explanation to this deviance from the trend is the series of unsuccessful IPOs that have drawn much attention during the last couple of years.

## **1.6 Disposition**

Chapter one covers the background of the subject, problems we intend to shed light on and the purpose of doing so. Chapter two explains the methodology and clarifies the procedure of our study. Chapter three contains theories covering and relating to IPOs which we use for our study and conclusions. Chapter four contains the empirical study background material. Chapter five consists of our empirical study. Chapter six analyzes our findings based on the theories in chapter three. Chapter seven

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<sup>8</sup> "Orolig höst på börsen" (Internet Source).

<sup>9</sup> "Optimism och börsfest slutade med baksmälla" 2000. (Internet Source).

<sup>10</sup> Ännu ett bra börsår tack vare Ericsson" (Internet Source).

summarizes our findings, what conclusions we could draw and suitable further studies. The final two chapters cover our references and supplements to this study.

### ***1.7 Delimitations***

It would be of great interest to study if the flotation method, that is whether the negotiated deal between the IPO-company and the investment bank is based on firm commitment or best efforts, has any significant impact on the first day returns. However we have only been able to find this data for the years 1996 and 1997 giving us an insufficient sample.

## 2. Methodology

### 2.1 Selection of Scientific Methodology

We have chosen to relate relevant theory to our empirical material through a deductive attempt using a quantitative procedure. Employing this approach, we take our starting point in scientific theory, through which we seek to explain our empirical results, using existing hypotheses. One advantage of using deductive reasoning is that we get the data needed, in an effective manner, which we later can compare to previous scientific findings and theories.<sup>11</sup> Hence, the result is that we can easily conclude similarities or deviations between existing empirical findings and our own. Critique raised against this methodology focus on the risk of researchers becoming affected by existing theories and thereby cherry picking the information considered most relevant and completely ignoring deviations or other relevant aspects within the subject. However, through our extensive study of existing literature on the subject, we feel confident that this study is conducted in an objective manner. In order to find an explanation regarding determining factors and first-day return magnitudes, we employ regression analysis. Our need to study significance levels of specific relations resulted in us using a quantitative procedure.

A complete description of our methodological approach will be presented throughout the remainder of this chapter and in Chapter 4. Firstly, we hope that this description will facilitate that a replica study, that is a repetition of our method, will produce the same results as our study does.<sup>12</sup> We believe that a concordant renewal of our study would be possible. Secondly, we present a thorough description of our methodology so that an evaluation will be practicable. The evaluation means that objections can be made to our choice of methodology, but also on their correspondence to our purpose and its convincing capacity for the conclusions and interpretations that we have made.<sup>13</sup>

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<sup>11</sup> Jacobsen, D.I. "Vad, Hur, Varför ? Om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen "(2002) p. 43

<sup>12</sup> Backman, J, "Rapporter och uppsatser" (1998) p.37

<sup>13</sup> *ibid*, p. 37-38

## **2.2 Company Selection**

We use a sample of Swedish IPOs during the time period 1996 to 2004. The time period is primarily motivated by our intention to up-date and contribute to previous research. Secondly, we believe that the more recent the information is, the more accurate it will be in predicting first-day returns of future IPOs. Going back to 1996 provides us with a sample large enough to perform a statistically credible analysis.

We included newly listed firms on the A-, O- and OTC-lists on the Stockholm Stock Exchange (SSE). The reason for excluding smaller lists is that trading volumes on these lists are low, which will affect the reliability of our findings. We only focus on clean IPOs, that is, companies which have not previously been traded on other markets, such as Stockholms Börsinformation (SBI), Innovationsmarknaden (IM) and Nya Marknaden. Further, we excluded spin-offs and equity carve-outs from our sample. By spin-offs we mean subsidiaries that have been transferred to the stakeholders as a dividend and then listed. The term equity carve-out refers to the partial sale of a subsidiary to external investors.

## **2.3 Data Collection**

Our data sample is secondary in its nature. Since we are focusing on many different variables we have had to rely on several data sources. Among these one finds the Stockholm Stock Exchange (SSE), the Swedish Financial Supervisory Authority (FI), annual reports, prospectuses, the SIX-trust system and senior researchers in the field.

We started our data collection at an early stage of our investigation, mostly to ensure that we would not have to change our research objective due to insufficient data. As a result, we also gathered data for which we could not find theoretical support to include in our study. For instance, we excluded variables such as book-to-market and price-earnings ratio (P/e). Our intention was to use these as indicators of the firms' growth potential; however we found it hard to define whether these variables measured growth potential or the fact that the firm had received a high price for its shares. By this we mean that a high P/e-value might indicate a good market-timing of the IPO, instead of high calibre growth potential of the firm.

It became evident to us that it would be very time consuming, and perhaps impracticable, to find all the data we needed only using the data bases available at Lund University. Purchasing the information from an external source would be much too costly. Thus, we started investigating who else had interest in the same type of data that we needed for our study.

Using records from the Information Surveillance Department of the Stockholm Stock Exchange (SSE), we collected information about which IPOs had taken place during the chosen time period, first listing date, list, offer size and industry classification.

From Mattias Hamberg, senior lecturer at the Department of Business Administration at Göteborg University, we received financial data such as sales revenues, operating profits, net profits, and balance sheet information such as size of assets and equity stakes from 1996 until 2002. For the remaining IPOs we collected the corresponding data from the listing prospectuses.

**Panel 2.A An Illustration of Observations and their Sources**

<b>Type of Data</b>	<b>Main Source</b>	<b>Further Comments</b>
Company Selection Industry (GICS) Investment Bank Employed IPO Price	Official records from OMX	Adjusted with prospectuses
Last Paid on Listing Date	SIX-TRUST system	Verified with Affärsdata
Sales Operating Profits	Data from Mattias Hamberg	Complemented with prospectuses
Firm Age Motive for Listing Owner Type Ownership Structure Procedure Time from Setting Price to Listing Date	Prospectuses	Help to determine appropriate classification of data from Martin Holmén.

The post-IPO data, last paid on listing date, was collected from the SIX-TRUST system.

Information regarding firm age, motives for listing, ownership structure prior to IPO date, procedure and whether there was a shift in ownership in conjunction to listing were collected from the prospectuses. Finding all the prospectuses was somewhat of a challenge. Knowing that FI regulates what information must be included in the listing prospectuses, we enquired if they also file the prospectuses. After some mail, and later phone, correspondence we managed to receive scanned copies of the listing

prospectuses for our sample. For this information we especially thank Riitta Kallio, registrar at FI.

After meeting with Martin Holmén, at the Department of Economics, Uppsala University, we received a spreadsheet with data, covering an earlier time period than ours, which he had collected for an article. From this spreadsheet we adopted his classifications of ownership structure and IPO motives.

## **2.4 Data Processing and Definitions**

Data processing was a straight forward procedure, of converting collected data into dummy and logarithmic variables. The exceptions being first-day returns and IPO motive, which may need more precise definitions, since they leave room for interpretation. First-day returns are measured as the difference between last paid on the first day of trading and the offer price, which is then divided by the offer price.

$$1dRET = \frac{LP - OP}{OP}$$

*LP* = Last Price paid on first day of trading

*OP* = Offer Price of IPO

*1dRET* = First-day return

As previously mentioned, we collected data on the motives, for performing an IPO, from company prospectuses. We noted one or several motives for each firm based on the declaration under the heading “*Background and Motives*” in the prospectuses. Accordingly, we did not weigh in any other indications to the possible motives a firm might have for listing.

## **2.5 Validity**

Validity is:

“...the ability of a measuring instrument to measure what is intended to measure.”<sup>14</sup>

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<sup>14</sup> Eriksson, LT, & Wiedershelm, PF, “Att utreda, forska och Rapportera” (2001).



Validity has two dimensions, one internal and one external.<sup>15</sup> The internal validity refers to whether the investigated phenomenon is the same as what was intended to investigate. To ensure the internal validity we have prepared what parameters to include in our regression analysis carefully. Extensive research has been conducted of existing literature and previous studies to facilitate that the selected parameters are relevant with respect to our purpose.

The other dimension of validity, the external, has to do with whether one can generalize from the accumulated information. A generalization of a phenomenon always gives birth, in our minds, to a certain hesitance since it is a simplification of something described and can therefore be questioned. We have chosen to work quantitatively with an as large sample as possible for our time-series in an attempt to improve the external validity. We are, however, well aware of the limitations of generalization and what criteria must be fulfilled in order to make generalizations.

## **2.6 Reliability**

”A high degree of reliability is achieved if different independent studies of the same phenomenon reaches the same or roughly the same results.”<sup>16</sup>

A high degree of reliability will be attained when sound measurements are conducted in addition to careful data processing.<sup>17</sup> We have been able to identify similar studies and can therefore compare our method and results to these. The reliability of our study depends to a large part on the accuracy of the data on which we have done the regression analysis. We cannot guarantee that all figures are correct; however we have tried to minimize the occurrence of erroneous data by having two independent sources for most observations. Thus, we believe that our study has a high level of reliability.

## **2.7 Reference Critique**

Validity of previous findings relating to characteristics of first-day returns, are subject to questioning due to the fact that they, in general, only publish R-squared statistics. This implies that their findings may, or may not be, statistically significant.

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<sup>15</sup> Patel, R & Davidsson, B, ”Forskningsmetodikens grunder: att planera, genomföra och rapportera en undersökning” (1994)

<sup>16</sup> Holme, I. M & Krohn, S.B ”Forskningsmetodik” (2001), p. 163

<sup>17</sup> *ibid*

## **3. Theory**

### **3.1 Motives for Going Public**

#### **3.1.1 Finance Further Growth**

To raise capital in order to finance further growth seems to be the primary reason for going public. For example in a manufacturing company the IPO can provide capital for product development. When a company needs to raise additional funds there are two options, it can choose to either take on debt or sell partial ownership, where the latter option results in the company performing an IPO. Many successful companies reach a point where the need of capital is so great that they must turn to the public stock market in order to finance future growth. Once the Initial Public Offering is carried out, the company gets the opportunity of raising more funds through a Seasoned Equity Issue. One of the most common reasons to why companies choose to go public instead of issuing debt securities is the fact that capital raised through an IPO does not have to be repaid. Whereas debt securities such as bonds must be repaid with interest, there is no doubt that an IPO has a clear advantage over issuing debt in this perspective. Further, if a company finds itself in a situation needing large infusions of external capital, public markets may provide a cheaper source of funds because of the lack of a liquidity discount that private firm investors would demand.<sup>18</sup>

#### **3.1.2 Exploiting a Window of Opportunity**

At some point, stock market investors may be overestimating an industry's prospects which can be used as a window of opportunity by issuing stock at these times. According to Ritter the long run underperformance associated with Initial Public Offerings is due to the fact that companies take advantage of investor exuberance concerning future returns by using these windows of opportunity to issue shares.<sup>19</sup> Stock markets follow cycles driven by investor expectations of future returns. During the course of a cycle, great differences in volume exist between peak and trough. Companies planning to go public often try to time their IPO so that they become listed when investors display optimism regarding future returns. Further, when there have been many successful IPOs in a row, the market for IPOs is considered to be advantageous and more companies tend to go public using this window of

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<sup>18</sup> "Initial Public Offerings" (Internet Source).

<sup>19</sup> Ritter. J., "Investment Banking and Securities Issuance" (2003) p. 278.

opportunity to obtain cheap funding. Although variations will exist, year over year, in the amount of companies going public, the window of opportunity hypothesis is not sufficient in explaining the great divergence in the number of Initial Public Offerings over a cycle.<sup>20</sup>

### 3.1.3 PR-Value

A common secondary reason for performing an IPO is the gain in PR-value followed by an IPO, resulting in increased public recognition, credibility and status. These advantages are especially known to be valuable in negotiations, international business relations as well as for the credit rating of a company. Increased publicity also attracts superior employees.<sup>21</sup>

### 3.1.4 Additional Motives

By performing an IPO the option of financing acquisitions through share offerings, instead of cash, becomes available.<sup>22</sup> Further, using the funds to reduce existing debt is also a common motive. Moreover, performing an IPO enables a way to free up previously tied capital, for existing owners, through the public sale of shares. The shares can also be used in an incentive program for the employees and management recruitment becomes easier by allowing the company to offer stock or option compensation. Finally the shares can be used for other control purposes such as keeping the family ownership of a company.<sup>23</sup>

## 3.2 Drawbacks

There are also drawbacks associated with IPOs, many of which are related to the fact that the ownership structure changes when a firm goes public. For example, current owners of the privately held corporation lose corporate control as they sell ownership stakes in the company.<sup>24</sup> Furthermore, performing an IPO is a very costly process due to expenses such as, for an example, intermediary charges. A rule of thumb states that the explicit costs of an IPO usually amount to 7 percent of the funds raised.<sup>25</sup> However, the final cost is somewhat higher if one factors in expenses such as providing the market with information and increased regulation. Moreover, due to the

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<sup>20</sup> Ibid p. 278.

<sup>21</sup> Bergström C. & Björk T. Från optionsprissättning till konkurslagstiftning (1997) p. 32-36.

<sup>22</sup> Ibid.

<sup>23</sup> "Initial Public Offerings" (Internet Source).

<sup>24</sup> Ritter. J., "Investment Banking and Securities Issuance" (2003) p. 277.

<sup>25</sup> Bodie. Z., Kane. A. & Marcus. A., "Investments" (2005) p. 69.

new owners' demand for dividends and strong returns, decisions not in line with the original owners' long run preferences may have to be taken. Increased publicity can sometimes be harmful to the company, for example in case of a crisis situation such as a corporate scandal or a weak annual result. Furthermore, going public results in increased information sharing requirements.<sup>26</sup> Finally, the existence of underpricing is a waste of current owners' capital. The implication obviously is that companies have to weigh costs and benefits very carefully against each other, before engaging in an IPO.

### **3.3 The IPO Process**

#### **3.3.1 The Regulation of IPOs**

Initially a meeting is arranged between the representatives for the Stockholm Stock Exchange and the company going public. The IPO process, which takes approximately three to six months, is discussed and an inspector is appointed to carry out an investigation. The purpose of the investigation is to examine whether the firm fulfils necessary prerequisites. The firm's liquidity, solidity and profitability together Corporate Governance issues are examined in order for the Stock Exchange Committee to be able to decide whether the company is ready to go public, or not. In the mean time, the company in cooperation with a financial intermediary compiles an IPO-prospectus and necessary preparations are made before the IPO can be approved. A registration statement must be published containing accounting information, information what the capital will be used for, the company's history and its present as well as previous situation. The prospectus contains similar information but is designed to market the company and its IPO. Both the registration statement and the prospectus are thoroughly examined by the Swedish Financial Supervisory Authority (FI) in order to discover incorrect or misleading information. If such information is found the IPO is either completely stopped or postponed.<sup>27</sup>

#### **3.3.2 List Requirements**

The Stockholm Stock Exchange consists of two main indices, the A and O-list. The requirements are different depending on which list a company wants to get listed on. The A-list consists of the largest companies who fulfil the highest requirements. Furthermore, the A-list is divided into one list of most traded stocks and one list for other stocks. The most traded list consists of some of Sweden's largest companies

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<sup>26</sup> "Corporate Governance" (Internet Source).

<sup>27</sup> Holmén M, "Motiv för marknadsintroduktion -underprissättning av IPOs" (Internet Source).

like Pharmacia, Astra Zeneca, Volvo, Investor, Electrolux, Ericsson, ABB and Holmen. The O-list consists of small and average sized companies listed on a most traded stock list (Attract 40) and one for other stocks.<sup>28</sup>

The main requirements for the A-list are as follows;

The Corporation must:

- Have a market value of at least 300 million SEK
- Have been active for at least three years and shall be able to present accounting information for these years
- Fulfill the Stock Exchange Corporate Governance requirements concerning the management and composition of the board of directors, et.c. Further, the company must have capacity to provide sufficient stock market information
- Have at least 2000 shareholders, that own at least 25 percent the shares
- Publish a prospectus

The main O-list requirements are essentially identical to the A-list, with the exception that listed companies requires a minimum of 500 shareholders, holding at least 10 percent of the shares and votes.<sup>29</sup>

### **3.3.3 Financial Intermediaries**

Once the company going public has decided the amount of capital needed in order to, for example finance its further growth, it has to decide which financial intermediary it wishes to employ. Investment Banks are such financial intermediaries that, among other things, provide the services of pricing, market and selling new securities to the public in what is called the primary market. In a competitive bid procedure the company offer a block of its shares to interested investment banks. However this method is only possible for large, well established companies since investment banks do not want to spend money on valuing a small company if they not are sure of getting the deal. A more common procedure is a negotiated deal for which there are two basic methods of issuing securities for cash; Firm commitment and Best efforts.<sup>30</sup>

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<sup>28</sup> Svenska Fondhandlareföreningen "Handla med aktier" (Internet Source)

<sup>29</sup> Stockholmsbörsen "Börsnotering och noteringskrav" (Internet Source)

<sup>30</sup> Holmén M, "Motiv för marknadsintroduktion -underprissättning av IPOs" (Internet Source).

### 3.3.4 Firm Commitment

Under this method, the issuing firm sells its securities to investment banks at a price less than the offering price since the underwriters involved accepts the risk of not being able to resell them to the primary market. In order to minimize this risk, investment banks combine to form an underwriting syndicate. The syndicate typically announces the prospective sale by advertisements in news papers and financial press. The difference between the price at which the securities are sold to the underwriters and the offering price is called a spread and works as the underwriters' basic compensation.<sup>31</sup>

### 3.3.5 Best Efforts

In a best efforts offering the investment banks does not purchase a company's shares. Instead, investment bankers act as intermediaries between the firm and the public, receiving a commission for each share sold. Under this procedure the investment bank does not bear the risk of being unable to resell the securities at the offering price but is legally bound to use its best efforts to sell the securities at the agreed-upon offering price. Hence, the company is not guaranteed that it actually will receive the capital needed.<sup>32</sup> In case of a scenario in which the issue cannot be sold at the offering price it is usually withdrawn.<sup>33</sup> According to a study by Jay Ritter, best-efforts offerings are generally used for small IPOs, whereas firm-commitment offerings are used for large IPOs.<sup>34</sup>

## 3.4 Setting The Offer Price

Since future cash flows are hard to predict, especially for young firms, the process of estimating the offer price is a tedious task. Hence, underwriters normally use many different models to compute a fair price of the issued shares. Comparable firm multiples, Discounted Cash Flow-models (DCF) and industry analysis are used together with underwriters' experiences from previous IPOs and the information provided through the prospectus.<sup>35</sup>

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<sup>31</sup> Ross. S., Westerfield. R. & Jaffe. J., "Corporate Finance" (2005) p. 544

<sup>32</sup> Holmén M, "Motiv för marknadsintroduktion -underprissättning av IPOs" (Internet Source).

<sup>33</sup> Ross. S., Westerfield. R. & Jaffe. J., "Corporate Finance" (2005) p. 545

<sup>34</sup> J. Ritter, "The Costs of Going Public," (1987) p.p 269-281.

<sup>35</sup> E. Pettersson, C. Svetlik: "Att betala rätt pris på aktier vid en börsintroduktion –betydelsen av immateriala tillgångar", (2003).

### 3.4.1 Comparable Firm Multiples

A preliminary price can be computed by using comparable firm multiples. For example, if a company going public has earnings of 2 million and listed firms with similar characteristics sell at a price-to-earnings multiple of 20, then the firm going public should be valued at 40 million. Rather than using historical accounting numbers, underwriters, in practice, use forecasts of current or next year's numbers when computing multiples. This focus has the benefit of making company profits higher, resulting in larger IPO revenues. Different multiples are used depending on industry. Some common multiples used include price-to-earnings, enterprise value-to-sales, enterprise value-to-EBITDA (earnings before interest, taxes and depreciation and amortization) in addition to industry-specific multiples.<sup>36</sup>

### 3.4.2 The Discounted Cash Flow Model

Just as in the case of using comparable firm multiples, the DCF-model strives to determine a company's value. However, a DCF-model aims to do this according to the company's estimated future cash flows. Forecasted free cash flows (operating profit + depreciation + amortization of goodwill – capital expenditures – cash taxes – change in working capital) are discounted to a present value using the company's weighted average costs of capital. Developing a DCF-model demands a lot more work than most other valuation models but in return for the effort, investors get a good picture of the key drivers of share value. In using DCF as a model of valuation, investors do not only have to take micro economic variables but also a number of macro economic variables into account.<sup>37</sup>

### 3.4.3 Book Building

Perhaps the most useful information concerning at what price investment banks can market new securities, is collected from the investing community. After having attracted potential large investors and provided them with information about the IPO, investment bankers examine their interest of purchasing shares. This process is called book building and gathers valuable information about the price since the aggregated demand from the book building works as an indicator of the market's valuation of the company. Large institutional investors usually possess useful insights about the demand for the security as well as the prospects of the company and the industry it is operating within. Hence, based on the important feedback from the investing

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<sup>36</sup> J. Ritter "Investment Banking and Securities Issuance" (2003) p. 278.

<sup>37</sup> B. McClure "Taking Stock of Discounted Cash Flow" (Internet Source).

community it is not unusual that investment banks revise their initial offering price estimates as well as the number of shares offered.<sup>38</sup>

### **3.4.4 Fixed Price vs. Offer by tender**

Finally, the investment banks either determine a fixed price at which investors can sign up for the issue or the price is set through an auction like procedure ending a couple of days before the date of the IPO. Setting the price through the latter alternative is known to minimize the risk of overpricing (or extreme underpricing) especially if the final price is set as close to the date of the IPO as possible. The longer the price is set prior to the IPO the harder it gets, not to say impossible, to take all possible events affecting the price into consideration. Previous findings show that in order to minimize the risk of overpricing, the fixed pricing method contributes to underpricing.<sup>39</sup>

## **3.5 Underpricing**

One major determinant of the magnitude of first day returns from IPOs is the existence and extent of overpricing, or underpricing, where the latter phenomenon is by far the most common. The extent of underpricing is defined as the rise in the stock price during the first day of trade i.e. the difference between the offer price and the closing price.<sup>40</sup> Investors seem to be more willing to speculate and pay more if there recently has been underpriced IPOs and the extent of underpricing vary over time.

Determining the correct offering price is the most difficult task facing the investment bank. If an issue price is set too high, the IPO may fail to attract investors and involved investment banks would lose money since they carry the price risk. On the other hand, should the price be set too low, existing shareholders would experience an opportunity loss and the investment banks involved could have their reputation damaged. Further, the higher prestige the investment bank employed in an IPO enjoys, the lower the magnitude of underpricing, or first-day returns, should be, since the bank's renown would guarantee the soundness of the IPO. In addition, investment banks have the responsibility of pricing fairly. However, several studies indicate that new equity issues typically are underpriced. For an example, Ritter examined approximately 6, 974 IPOs between the years of 1975 -2000 in the United States where he found an average increase in price of 17.8 percent in the first day of trading

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<sup>38</sup> Bodie. Z., Kane. A. & Marcus. A., "Investments", (2005) p. 68

<sup>39</sup> Holmén M, "Motiv för marknadsintroduktion -underprissättning av IPOs" (Internet Source).

<sup>40</sup> Ibid.



following issuance.<sup>41</sup> In Sweden, the corresponding result is 30 percent which is bewildering considering the fact that on every SEK 1 million a company issues, it gives away SEK 300'000.<sup>42</sup> The question why this is made systematically has been discussed in many previous studies with a series of explanations as a result. For an example underpricing is more usual in smaller IPOs with young firms with uncertain future prospects. The increased uncertainty associated with these kinds of companies results in a higher risk. Hence, risk-averse investors can be attracted only if underpricing exists. There are several other possible explanations to underpricing even though there is no unity among researchers as to which explanation is correct. Most likely, there is no single true explanation to the phenomenon; instead the cause differs from case to case. However, there are a few hypotheses and previous studies approaching the problem.

### **3.6 Underpricing Hypotheses**

#### **3.6.1 The Winner's Curse Hypothesis**

Kevin Rock published the Winners Curse Hypothesis in the Journal of Financial Economics (1986).<sup>43</sup> Rock divided the investors who subscribed to the new issues as informed and uninformed, where asymmetrical information exists between the two groups. During IPOs, set amounts of shares are made available to the public. Should demand for shares be greater than the supply, the issue becomes oversubscribed. Investors will during these situations not be able to receive and the underwriters will be forced to allocate the shares. Although previous studies show that most IPOs have positive first day returns, a significant fraction experience a negative first day return.

Therefore, an uninformed investor who subscribes to all new issues may find that he is allotted few shares in IPOs when competing with informed investors while he is allotted the full amount in IPOs where informed investors show less interest. IPOs where informed investors tend to show less interest tend to be the issues that have a higher probability of negative first day returns. Thus, the uninformed investor who "wins" by being allotted the full amount of shares actually loses out due to the negative first day returns.

The Winner's Curse hypothesis focuses on the asymmetrical information between investors with the result of well informed investors knowing the fair value of the company while investors who are less informed do not. The situation results in the

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<sup>41</sup> Ross, S., Westerfield, R. & Jaffe, J., "Corporate Finance" (2005) p. 547

<sup>42</sup> Holmén M, "Motiv för marknadsintroduktion -underprissättning av IPOs" (Internet Source).

<sup>43</sup> Rock, K., "Why New Issues Are Underpriced" (1986) pp. 187-212

fact that there will be a great demand for underpriced IPOs especially among well informed investors while there for overpriced IPOs only will be a demand among investors carrying less or incorrect information. If this systematically would be the case, eventually all less informed investors meeting the Winner's curse would leave the primary market leading to fewer potential IPO investors which in turn would complicate future IPOs. In order to avoid this situation, IPOs are deliberately underpriced on average.<sup>44</sup>

### **3.6.2 The Costly Information Acquisition Hypothesis**

According to The Costly Information Acquisition Hypothesis, investment banks can underprice issues to persuade investors to reveal information during the offer period. The theory suggests that the underwriters do underprice the preliminary book building price so that the institutional investors will get interested of the IPO. Their valuation of the company then facilitates the setting of the final price which however can not be too far from the preliminary book building price. Investors have no reason to disclose positive information about the company until the issue is sold. A study conducted by Hanley (1993) shows that the relation of the final offer price to the range of anticipated offer prices disclosed in the preliminary prospectus is a good predictor of initial returns.<sup>45</sup> Issues that have final offer prices which exceed the limits of the offer range have greater underpricing than all other initial public offerings and are also more likely to increase the number of shares issued.<sup>46</sup>

### **3.6.3 The Cascade Hypothesis**

The Cascade Hypothesis assumes that potential investors consider not only their own information, but also the amount of interest shown by other investors. Even if the investor has positive information about the company, he may decide to not invest due to lack of interest from other investors. In order to counteract this behaviour, investment banks deliberately underprice the issue in order to attract a cascade of investors willing to buy the share no matter what information they have regarding the company.

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<sup>44</sup> Holmén M, "Motiv för marknadsintroduktion -underprissättning av IPOs" (Internet Source).

<sup>45</sup> Ibid

<sup>46</sup> Ibid

### 3.6.4 The Investment Banker's Monopsony Power Hypothesis

The Investment Banker's Monopsony Power Hypothesis states that asymmetric information exists between the investment bank and the company going public.<sup>47</sup> The investment bank uses its superior knowledge of the financial markets to underprice the security in order to spend less time marketing the issue since a lower price will ensure that investors flock to the issue. Although the hypothesis may be somewhat correct, Muscarella and Vetsuypens (1989) found that investment banks underprice themselves as much as any other IPO of the same size.<sup>48</sup>

### 3.6.5 The Signalling Hypothesis

The Signalling Hypothesis was published in the Journal of Financial Economics by Allen and Faulhaber (1989). Underpriced IPOs give positive signals to investors enabling the company and insiders to take out higher prices during future issues. The hypothesis assumes that insiders have access to information regarding the companies' true worth. The company employs a dynamic strategy where the IPO is followed by a Seasoned Equity Issue.<sup>49</sup> Only companies that are sure of a steady growth can afford employing this method.<sup>50</sup>

### 3.6.6 The Wealth Redistribution Hypothesis

This hypothesis states that underpricing could be deliberate if the primary purpose of the IPO is not to raise capital. This type of situation can arise when a government chooses to privatize a state industry. The government deliberately underprices the issue hoping to gain trust among its subjects. Empirical evidence from England and Japan has shown that these types of issues have displayed greater underpricing.<sup>51</sup>

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<sup>47</sup> Baron, D, "A model of the demand for investment banking advising and distribution services for new issues" (1982) pp. 955-976.

<sup>48</sup> Ibbotson R.G & Ritter J.R, "Initial Public Offerings" (1995) pp. 993-1016.

<sup>49</sup> Garfinkel, J. IPO Underpricing, Insider Selling and Subsequent Equity Offerings: Is Underpricing a Signal of Quality, (1993) pp. 74-83.

<sup>50</sup> Holmén M, "Motiv för marknadsintroduktion -underprissättning av IPOs" (Internet Source).

<sup>51</sup> Ibbotson R.G & Ritter J.R, "Initial Public Offerings" (1995) pp. 993-1016.

### **3.6.7 The Stabilization Hypothesis**

Ruud claims that first day returns are overestimated due to investment bank buying, after the IPO, intended to stabilize the issue.<sup>52</sup> IPO deals usually contain an option to sell more shares than initially negotiated. Thereby, investment banks sell a greater number of shares to investors, only to repurchase them during the first trading day. No direct evidence supports Ruud's claim that first day returns are close to zero after discounting investment bank stabilization.

### **3.6.8 The Ownership Dispersion Hypothesis**

The Ownership Dispersion Hypothesis states that companies planning to go public deliberately underprice their issue in order to create demand, liquidity and owner dispersion making takeovers more difficult.<sup>53</sup>

### **3.6.9 The Divergence of Opinion Hypothesis**

Investors who purchase IPO issues are, according to Miller, the most optimistic.<sup>54</sup> When uncertainties arise concerning the valuation of an IPO, optimistic investors will value the company higher than pessimistic ones. Once investors receive more and better information about the company, differences in valuation will decrease and the share price will decline. Thus, The Divergence of Opinion Hypothesis implies that IPOs under perform equivalent companies over time and that investors periodically have unreasonable expectations concerning a company's future earnings potential.

### **3.6.10 The Impresario Hypothesis**

Shiller (1990) implies that the market for Initial Public Offerings is affected by trends and that investment banks underprice issues in order to generate an over-subscription of companies who are less attractive.<sup>55</sup> According to Schiller's hypothesis, the size of a company's first day return is negatively correlated with the company's long term performance. Thus, companies with large first day returns are usually the companies who tend to exhibit the greatest market under-performance.

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<sup>52</sup> Ruud, J.S., "Underwriter Price Support and the IPO Underpricing Puzzle", (1993) pp. 135-151.

<sup>53</sup> Ibbotson R.G & Ritter J.R, "Initial Public Offerings" (1995) pp. 993-1016.

<sup>54</sup> Ibbotson R.G & Ritter J.R, "Initial Public Offerings" (1995) pp. 993-1016.

<sup>55</sup> Shiller, R.J "Speculative Prices and Popular Models"( 1990) pp. 55-65.

### 3.6.11 Window Dressing

One trend associated with IPOs is that companies tend to go public when they are at most profitable i.e the companies' profitability reaches its highest level close to the IPO and then starts to fall. This pattern may be a result of the fact that some companies manipulate the result in their financial statements in order to attract investors. The method is called window dressing and investors seem to expect the same profitability after the IPO which in turn also increases the magnitude of the underprice.

### 3.6.12 The Cost of Overpricing

Both the company going public and the underwriter have strong incentives not to overprice the IPO regardless if the agreement is based on best efforts or firm commitment. An overpriced IPO means bad publicity both for the company and the investment bank. Thus, in order to simply avoid overpricing the company and the underwriter agree to underprice the IPO. This would also be in line with the publicity motive for performing an IPO.<sup>56</sup>

### 3.6.13 The Efficient Market Hypothesis

The Efficient Market Hypothesis was developed during the 1960s by Eugene Fama. Fama meant that liquid markets, with many investors, leads to assets being priced correctly.<sup>57</sup>

*“An ‘efficient’ market is defined as a market where there a large number of rational, profit-maximizers actively competing, with each trying to predict future market values of individual securities, and where important information is almost freely available to all participants. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on the events which have already occurred and an events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of security will be a good measure of its intrinsic value.”<sup>58</sup>*

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<sup>56</sup> Holmén M, ”Motiv för marknadsintroduktion -underprissättning av IPOs” (Internet Source).

<sup>57</sup> Haugen. R., “Modern Investment Theory”, (2001) Ch 23.

<sup>58</sup> Fama, E.F, Random Walks in Stock Market Prices (1965) p.4.

The Efficient Market Hypothesis effectively states that the possibility to profit by predicting future stock prices is practically impossible and that all changes in stock prices are due to new information.

For the above to hold true, the market must be efficient. The market is efficient when prices respond to new information. Therefore, market prices continuously reflect all relevant information and there is no need to believe that the price today is too high or too low. Thus, market prices change before investors have a chance to take advantage of new information. Efficient markets are created when investors, through competition, try to profit from new information. Competition between investors assures that the possibilities decrease of making arbitrage profits.

The implication of The Efficient Market Hypothesis can be summarized as; securities continuously reflect all relevant information where the price acts as the bearer of information. Arbitrage profits are virtually eliminated as a result of securities being correctly priced on an efficient market.

### **3.7 Previous Studies**

#### **3.7.1 Why Has IPO Underpricing Changed Over Time?**

Ritter and Loughran found that in the 1980s, the average first-day return from IPOs was 7%. The average first-day return doubled to almost 15% during 1990-1998, before jumping to 65% during the internet bubble years of 1999-2000 and then reverting to 12% during 2001-2003. They attribute much of the higher underpricing during the bubble period to a changing issuer objective function. They argue that in the later periods there was less focus on maximizing IPO proceeds due to an increased emphasis on research coverage. Furthermore, allocations of hot IPOs to the personal brokerage accounts of issuing firm executives created an incentive to seek rather than avoid underwriters with a reputation for severe underpricing.<sup>59</sup>

#### **3.7.2 Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?**

Ritter and Loughran feel that one of the puzzles regarding IPOs is that issuers rarely get upset about leaving substantial amounts of money on the table, defined as the number of shares sold times the difference between the first-day closing market price

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<sup>59</sup> Ritter. J. & Loughran. T., "Why Has IPO Underpricing Changed Over Time?" (2004) pp. 5-37

and the offer price. The average IPO leaves millions on the table. This number is approximately twice as large as the fees paid to investment bankers and represents a substantial indirect cost to the issuing firm. They present a prospect theory model that focuses on the covariance of the money left on the table and wealth changes. Their reasoning also provides an explanation for a second puzzling pattern: much more money is left on the table following recent market rises than after market falls. This results in an explanation of hot issue markets.<sup>60</sup>

### 3.7.3 Valuation of Accounting Data

During the years, there has been an extensive research on the value relevance of accounting information for publicly traded stocks. However, there are only a few papers that have examined the relevance of accounting information for firms going public.

Klein (1996) examines the relation between the price per share (at the offer date and at the end of the first day of trading) and various variables for a sample of 193 IPOs from the years 1980-1991. She finds that the price per share is positively related to pre-IPO earnings per share and pre-IPO book value of equity per share.<sup>61</sup>

Kim and Ritter (1999), investigate the relation between firm-level price earnings P/e ratios and the industry-median P/e ratios for a sample of 190 IPOs completed in the years 1992-1993. They find that firm-level and industry-level P/e ratios are positively related. However, the adjusted  $R^2$  of their regression is only five percent. Instead, their explanatory level of their model increases when they use forecast earnings for the next year instead of pre-IPO historical earnings. Thus, one of their conclusions is that industry comparables based on historical accounting information are of limited value for understanding IPO pricing.<sup>62</sup>

However, Beatty, Riffe, and Thompson (2000) question this conclusion regarding the low relevance of historical accounting information in the pricing of IPOs based on their research using a sample of 2,577 IPOs with positive pre-IPO income as well as positive book value of equity between the years of 1987-1998. They find that the explanatory level of earnings, book value, and revenues for offer value is about 14 percent.<sup>63</sup>

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<sup>60</sup> Ritter, J. & Loughran, T., "Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?" (2002) pp. 413-443.

<sup>61</sup> Klein, A., "Can Investors Use the Prospectus to Price Initial Public Offerings?" (1996) pp. 23-40.

<sup>62</sup> Kim, M. & J. Ritter, "Valuing IPOs" (1999), pp. 409-437.

<sup>63</sup> Beatty, R., S. Riffe and R. Thompson, "IPO Pricing with Accounting Information (2000).

Purnanandam and Swaminathan (2003) compare the offer price to sales, and offer price to earnings of a sample of 2,288 IPOs between the years of 1980-1997 and find that IPOs tend to be overvalued on average. This result is very interesting considering the fact that many previous studies suggest that IPOs are underpriced on average. In addition, they find that overvalued IPOs have lower profitability, higher accruals, and higher analyst growth forecasts.<sup>64</sup>

### **3.7.4 Value-Relevance of Accounting Information and the Predictability of IPO Underpricing**

Melnik and Thomas (2003) examine the factors associated with the initial returns recorded for a sample of NASDAQ IPOs in 2000. They study the relationship between the level of underpricing, accounting data and other variables which are in the public domain at the time of the IPO. They find evidence for accounting data being significantly related to levels of first day returns since underwriters appear to make systematic errors by using multiples of historic financial data when setting IPO offer prices. These errors result in the failure of reflecting accounting data in the offer price. Further, they document that underwriter's have significant more negative perceptions of financial risk than those of market participants while their perceptions of the value-relevance of profitability measures appear to be conservative. For smaller firms, underwriters tend to overstate the importance of revenues in setting their offer prices while IPOs with large revenues are more accurately priced. Larger firms proxied by accounting revenues are also more accurately priced and record lower levels of first day returns. By including other factors such as the type of industry, existing market trends and underwriters reputation, their results are robust.<sup>65</sup>

They find a positive relation between first day returns and market conditions, recording higher positive returns in the first day when the broad NASDAQ market is bullish. Further, if an issue is subject to an upward price-revision prior to the IPO it is more likely to exhibit positive first day returns. This finding suggests that such a revision constitute only a partial adjustment and is in accord with the conjecture of Benveniste and Spindt (1989) who argue that potential investors only will disclose indications of their subjective valuation if the offer price is only partially adjusted.<sup>66</sup>

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<sup>64</sup> Purnanandam, A.K. and B. Swaminathan, Are IPOs Really Underpriced? (2003).

<sup>65</sup> Melnik, A & Thomas, D "Value-Relevance of Accounting Information and the Predictability of IPO Underpricing" (2003).

<sup>66</sup> Benveniste, L. & P. Spindt, "How Investment Bankers Determine the Offer Price and Allocation of New Issues" (1989) pp. 343-361.



In line with Baron's (1982) findings, Melnik and Thomas document that the underpricing is positively related to the prestige of the investment bank.<sup>67</sup> Finally, they do not find any evidence of a relation between underpricing and agency problems proxied by the proportion of equity retained. The implication is that any agency considerations appear to have been fully reflected in the setting of the offer price.

### **3.7.5 Predicting First-Day Pops**

Using a sample of 853 IPOs issued on NASDAQ between March 1, 1999 and December 14, 2000 Irv DeGraw (2001) studies the relationship between the actual offering price and the preliminary range as it reflects the degree of pre-IPO demand for the offering. If the range is increased, and/or the actual offering price exceeds the range, pre-offering demand is assumed to be strong and the first-day gains are higher than average. Should the range be decreased or if the actual offer price is lower than the range, pre-offering demand is assumed to be weak and first-day returns are expected to be modest. He finds considerable first-day differences as offering prices exceeding the preliminary range averaged 119.3 percent in first day returns while those in the preliminary range averaged 28.1 percent. Those issued under range averaged 11.5 percent first-day gains. Thus, the implication is that the percent change in offer price is a strong predictor of first-day returns.<sup>68</sup>

### **3.7.6 Determinants Of IPO Valuation**

In this paper from Leeds School of Business, University of Colorado, Sanjai Bhagat and Srinivasan Rangan examine the valuation of financial variables, growth opportunities, insider retention and investment banker prestige for a sample of 1,655 IPOs from three time-periods: 1986-1990, January 1997 through March 2000 (designated as the boom period), and April 2000 through December 2001 (designated as the crash period).

They control for IPO fundamentals (such as, income, sales, book equity, growth opportunities, insider retention, and investment banker prestige) and allow for different valuation of these fundamentals across different time-periods. They find that average valuations of IPOs in the recent boom and crash periods were not statistically different from those of the late 1980s. They also document some shifts in the valuation of fundamentals across time-periods. Further, income of IPO firms is

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<sup>67</sup> Baron, D. "A Model of the Demand for Investment Banking Advising and Distribution Services for New Issues" (1982) pp. 955-976.

<sup>68</sup> DeGraw I, "Predicting first-day pops" On Wall Street, (2001).

weighted more when valuing IPOs in the boom period compared to the late eighties and with respect to inter-industry differences they find that tech firms are valued less than non tech firms after controlling for IPO fundamentals. Internet IPOs were not valued any differently than non-internet IPOs. Finally, they find that income and insider retention are valued more for tech firms. For internet firms, insider retention is valued more, but investment banker prestige is valued less.<sup>69</sup>

### 3.7.7 Corporate Ownership Structure and IPO Valuation

Downes & Heinkel (1982)<sup>70</sup>, Ritter (1984)<sup>71</sup>, and Feltham, Hughes, and Simunic (1991)<sup>72</sup>, among others, provide evidence on a positive relation between IPO valuation and ownership retention.

Leland and Pyle (1977) propose a valuation model in which the current value of the firm is positively related to the percentage of equity retained by entrepreneur taking the firm public. They base their signalling model on the assumption that the entrepreneur knows more about the expected cash flows of the company than do potential investors. Further, by retaining shares in the firm the entrepreneur foregoes the benefits of diversifying his personal portfolio which can be very costly. Hence, the entrepreneur will retain shares in the IPO, only if he is holding inside information that gives him reasons to believe that expected cash flows are likely to be high. Thus, the implication of the signalling model is that a high proportion of equity ownership by pre-IPO shareholders communicates a reliable signal of their expectations about the company's prospects to the underwriter as well as to potential investors, leading to higher IPO values.<sup>73</sup>

The moral hazard theory provides an alternative explanation for this positive relation. Since stock ownership aligns managerial incentives with those of shareholders, thus, the higher the proportion of ownership by managers the harder they will work resulting in higher cash flows. New investors in the IPO anticipate this and therefore, companies with a higher proportion of manager ownership are valued higher than companies with a lower proportion of manager ownership. In addition Ofek and Richardson (2001) explain the positive relation between IPO values and post-IPO

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<sup>69</sup> Bhagat S, Rangan S, "Determinants Of IPO Valuation" (2004) p. 35-36.

<sup>70</sup> Downes D. & R. Heinkel "Signaling and the Valuation of Unseasoned New Issues" (1982) pp. 1-10.

<sup>71</sup> Ritter, J. "Signaling and the Valuation of Unseasoned New Issues: A Comment," (1984) pp.1231-1237.

<sup>72</sup> Feltham, G., J. Hughes, and D. Simunic, "Empirical Assessment of the Impact of Auditor Quality on the Valuation of New Issues," (1991) pp. 375-399.

<sup>73</sup> Leland, H. & D. Pyle, "Information Asymmetries, Financial Structure, and Financial Intermediation," (1977) pp.371-387.

retention in a theory based on the assumption of a downward-sloping demand curve for shares. Under this assumption, the shares become a scarce commodity as a higher retention level means fewer shares available for trading, resulting in a price increase.<sup>74</sup>

### **3.7.8 A Law and Finance Analysis of Initial Public Offerings**

A recent study, covering the Swedish stock market Holmén and Högfeldt (2004) investigates ownership structure and control aspects for IPOs. They use a sample of 233 IPOs between 1979 and mid-1997 and follow each firm three years previous to the IPO and five years after. An interesting finding in their study, is that family-controlled firms trade at a discount due to misallocation of control rights to heirs who is expected to make inefficient decisions.<sup>75</sup>

### **3.7.9 Internet IPO Valuation Studies**

Bartov, Mohanram, and Seethamraju (2002), focus on the valuation of 98 internet IPOs and 98 offer-date and size-matched non-internet IPOs that were completed during 1996-1999. Summarized, they find that internet and non-internet IPOs differ in terms of the impact of financial statement variables on IPO prices. For internet companies, they find that cash flow, sales and sales growth are significantly related to offer prices. The result should be seen in contrast to the fact they also find that earnings, book value of equity and R&D do not bear significant relation to offer prices. Further, by studying first-day closing prices they also find that investors do not value the financial statement variables reported by internet firms with exception of sales growth and R&D per share. For non-internet IPOs they find that offer prices are positively related to earnings, cash flow and sales but no significant relation between first-day closing prices is found for any of the financial variables.<sup>76</sup>

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<sup>74</sup> Ofek, E. & M. Richardson, "The IPO Lockup Period: Implications for Market Efficiency and Downward Sloping Demand Curves," (2001).

<sup>75</sup> Holmén M & Högfeldt P, "A law and finance analysis of initial public offerings" (2003).

<sup>76</sup> Bartov, E., P. Mohanram, and C. Seethamraju "Valuation of Internet Stocks – An IPO Perspective," (2002) pp. 321-346.

## 4 The Multiple Regression Model

### 4.1 The Assumptions of the Model

In the econometric model, assumptions about the probability distribution of the random errors,  $e_t$ , need to be made.<sup>77</sup>

- 1)  $E[e_t] = 0$ . Each random error has a probability distribution with zero mean. Some errors will be positive, some will be negative; over a large number of observations they will average out to zero. With this assumption we assert that the average of omitted variables, and any other errors made when specifying the model, is zero. Thus, we are asserting that the model is on average, correct.
- 2)  $\text{var}(e_t) = \sigma^2$ . Each random error has a probability distribution with variance  $\sigma^2$ . The variance  $\sigma^2$  is an unknown parameter and it measures the uncertainty in the statistical model. It is the same for each observation, so that for no observations will the model uncertainty be more, or less, nor is it directly related to any economic variable. Errors with this property are said to be *homoskedastic*.
- 3)  $\text{cov}(e_t, e_s) = 0$ . The covariance between the two random errors corresponding to any two different observations is zero. The size of the error for one observation has no bearing on the likely size of an error for another observation. Thus, any pair of errors is uncorrelated.
- 4) We will sometimes further assume that the random errors  $e_t$  have normal probability distributions. That is,  $e_t \sim N(0, \sigma^2)$ .

Because each observation on the dependant variable  $y_t$ , depends on the random error term  $e_t$ , each  $y_t$  is also a random variable. The statistical properties of  $y_t$  follow from those of  $e_t$ . These properties are:

- 1)  $E(y_t) = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3}$ . The expected (average) value of  $y_t$  depends on the value of the explanatory variables and the unknown parameters. This assumption is equivalent to  $E(e_t) = 0$ . It says that the average

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<sup>77</sup> Hill, Griffiths and Judge, Undergraduate econometrics (1997), p. 149

value of  $y_t$  changes for each observation and is given by the regression function  $E(y_t) = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3}$ .

- 2)  $\text{var}(y_t) = \text{var}(e_t) = \sigma^2$ . The variance of the probability distribution of  $y_t$  does not change with each observation. Some observations on  $y_t$  are not more likely to be further from the regression function than others.
- 3)  $\text{cov}(y_t, y_s) = \text{cov}(e_t, e_s) = 0$ . Any two observations on the dependant variable are uncorrelated. For example, if one observation is above  $E(y_t)$ , a subsequent observation is not more or less likely to be above  $E(y_t)$ .
- 4) We sometimes will assume that the variables of  $y_t$  are normally distributed about their mean. That is  $y_t \sim N[(\beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3}), \sigma^2]$ , which is equivalent to assuming that  $e_t \sim N(0, \sigma^2)$ .

## **4.2 Regression Variables**

The variables chosen in our regression analysis, for the purpose of determining first-day returns of IPOs, reflect factors possibly influencing the magnitude of under pricing, should it exist. Moreover, the variables are expected to show statistical significance specifying which variables within our formula determine first-day returns.

Any expectations, on our part, as to how variables are expected to behave in this chapter are to be regarded as guesstimates that may or may not be accurate once the empirical study is concluded.

The variables we determined to be most likely having an impact on first-day returns are:

### **4.2.1 Field of Business (GICS)**

Companies whose fields of business differ should exhibit different valuations and expectations. These differences should give rise to industry specific factors affecting IPO's. The period we are studying spawned a number of IPO's whose underlying business was at a cyclical peak, for example the Information Technology sector. These industry specific factors should affect the pattern of initial first-day returns.

Therefore, we found a need to take this aspect into account in our regression analysis. We have chosen to divide the sectors into the Global Industry Classification Standard (GICS) using the following dummy variables:

Our expectations are that the “riskier” the Field of Business the company operates in, the larger the underpricing, or first-day return, should be. Therefore, “risky” sectors should show significantly higher first-day returns than less “risky” sectors. We define risky sectors as Information Technology and Telecommunications.

- Industrials
- Consumer Discretionary
- Consumer Staples
- Health Care
- Financials
- Information Technology
- Telecommunication

#### **4.2.2 Investment Bank Employed**

Although Investment Banks employ similar, if not identical, valuation methods when valuating an IPO does not necessarily equate to identical issue prices. Therefore, we have chosen to include all major Swedish Investment Banks, who have participated in bringing a company to market, as dummy variables in our regression formula.

Our expectations, concerning Investment Bank Employed dummy variables, is for them to, on average, be positively correlated with first day returns. We base this on the fact that IPOs in general show positive first day returns, which should translate into positive values for most Investment Banks Employed although some will undoubtedly be negative.

- Enskilda
- Carnegie
- Handelsbanken
- Swedbank
- Hagströmer & Qviberg
- Alfred Berg / ABN Amro
- Morgan Stanley
- Öhmans
- Aros/Nordea
- Various

### 4.2.3 Previous Owner Type

Theories concerning IPOs generally assume that controlling parties go public as an exit option.<sup>78</sup> Although this may be true in many cases, the motive to go public may significantly differ between different ownership groups. For instance, state owned companies which go public are often sold at a discount to the general public, hoping to gain trust among its subjects.<sup>79</sup> According to Holmén and Högfeldt, family-controlled firms trade at a discount because of the misallocation of control rights to heirs who make inefficient decisions, not because of extraction of pecuniary benefits.<sup>80</sup> Further, many accuse private equity or venture capital firms of “pump and dump” schemes, rather than adding value to the company.<sup>81</sup> Therefore, first-day returns could be significantly affected by the market taking into account whoever previously owned the company. We divided the companies into seven different groups as dummy variables.

Our expectations are for companies previously owned by Venture Capital, Employees and Associated to experience lower first-day returns due to the facts stated above.

- Family
- Entrepreneur
- Venture Capital
- Employees
- Associated
- State or Community
- Public Corporation

### 4.2.4 Shift in Ownership

IPO theory generally states that existing owners use IPO process as an avenue to exit the company. The Shift in Ownership variable is intended show in which companies existing majority stakeholders actually give up control through the IPO process. Companies who still retain the same majority stakeholders after the IPO may show different first-day returns than companies who don't. However, a major critique that can be raised against this variable is that in many cases existing owner are not

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<sup>78</sup> Holmén M & Högfeldt P, “ A law and finance analysis of initial public offerings” (2003).

<sup>79</sup> Ibbotson R.G & Ritter J.R, “Initial Public Offerings” (1995) pp. 993-1016.

<sup>80</sup> Holmén M & Högfeldt P, “ A law and finance analysis of initial public offerings” (2003).

<sup>81</sup> Bjurgert E. & Johanson E. “The Private Equity Industri: share price and operating performance of private equity backed IPOs in Sweden and Finland. (2004).

allowed to sell their stakes until a certain amount of time has passed. We employ two dummy variables:

Our expectation is for the Shift in Ownership variables to be negatively correlated with first-day returns. Owners who wish to surrender ownership are probably aware that the company's outlook may not be promising, whereas companies who use the IPO to raise capital in order to finance further growth should exhibit a higher degree of underpricing.

- Shift in Ownership
- No Shift in Ownership

#### 4.2.5 IPO Motive

A company's decision to go public is a strategic undertaking motivated by a specific purpose. The underlying motive signals to the market whether, for example, the company is expected to grow quickly or if the motive is that existing owners wish to cash in. Thus, different motives should give rise to different magnitudes of first-day returns. We have divided the motives into six different groups as dummy variables and briefly explained the major themes underlying each motive.

Our expectations are that motives which promote growth through reducing debt, increasing share liquidity or publicity should result in positive first-day returns. IPOs conducted with the underlying motive of enabling employee incentives or take-overs should have a negative correlation with first-day returns. Therefore, motives which are intended to increase growth should, on average, be more attractive than motives which promote or enable profligate spending.

- Access to Capital Market  
*Gives additional avenues to fund growth and raise working capital.*
- Take-over financed through Seasoned Equity Offering  
*IPO is used to gain market access whereby purchasing company can pay for take-over using shares.*
- Reduce debt  
*IPO is used to increase capital in order to reduce overall debt.*
- Increased share liquidity  
*Enables existing owners to more easily enter and exit their holdings.*
- Incentives  
*IPO is used to recruit and retain skilled employees as well as give them a stake in the development of the company. Controversial due to effect on shareholders.*
- Publicity



*An attempt to gain prestige, respectability and widespread coverage of the company during the process.*

- Control Aspects  
*Increases ease of transfer of control due to information aspects.*

#### **4.2.6 IPO Procedure**

In our regression analysis we take the offer procedure into account. Offer procedures are conducted through a Fixed Price Offer or an Offer by tender. When an IPO goes public by using a Fixed Price Offer the Investment Bank sets a Fixed Price while selling the issue to interested parties. The second option, Offer by Tender, is conducted by investors bidding for the issue. These different IPO procedures could possibly affect first-day returns significantly which is why we chose to include them as two dummy variables. Further references as to why different IPO procedures may give rise to underpricing is found in Chapter 3, covering underpricing theories.

Our expectations are for issues which are sold through Offer by Tender to be negatively correlated to first-day returns due to the fact that the issue price is set closer to the IPO than a fixed price is. The closer the offer price is set to the day of listing, the lower the risk of the investment is, whereas a fixed price offer tends to be set relatively low in order to attract investors, creating larger first-day returns.

- Offer by Tender
- Fixed Price Offer

#### **4.2.7 Firm Age**

The number of years a company has been in business should affect the first-day return. Our reasoning is that more mature companies, which we define as having been in business longer, should be easier to value and exhibit more moderate first-day returns. In our regression analysis we have converted a firm's number of years in business to the logarithmic value.

Our expectations are for age, as a proxy for *ex ante* uncertainty is negatively correlated with first-day returns. Reason being, the older a firm is, the easier it is to value.

## 4.2.8 Revenue

The size of a company's revenue indicates how large the company is. The larger the company, the smaller the valuation difficulties should be. Hence, we expect companies with larger revenues to exhibit smaller first-day returns. Therefore, we concluded that this was an essential variable to our regression function. The revenue variable has been converted to its logarithm in order to make firm comparisons and regression statistics more reliable.

Our expectation is that the size of a company's revenue should be negatively correlated with first-day returns. Companies who have large revenues should be easier to value and therefore there exists little reason for these companies offering price to significantly deviate after the first-day of trading.

## 4.2.9 Operating Profits

Reporting negative operating profits, can be expected to cause uncertainty about an issue and thereby make the company more difficult to value. Therefore, we have chosen to include and interpret a company's operating profits as either positive or negative, assigned as a dummy variable to our regression function.

Our expectations are for positive operating profits to be negatively correlated with first-day returns. Uncertainty concerning the operating profits will lead to issue being sold at a lower cost than the market will value the issue due to risk.

- Positive Operating Profits
- Negative Operating Profits

## 4.2.10 Omitted Variables

When trying to find a formula through which we hope to find variables that can determine, with somewhat success, the first-day returns of an IPO, there is an endless amount of variables which one can take into account. The variables we have chosen are selected on the basis of covering a wide range of areas which can affect the first-day return.

However, empirical studies are notorious in this regard. It is almost impossible to find a perfect formula determining future events by statistically studying previous events. What we do hope to find is a formula that produces reliable results with respect to the variables we have employed. Should we succeed in doing so, one might find a profitable trading strategy which can be employed. *Cavat emptor!*

### **4.3 Regression Specifics**

The following is intended to shed light on how the regression model was constructed and which purpose the different type of variable served.

#### **4.3.1 Dummy Variables**

Dummy variables allow us to construct models in which some or all regression model parameters, including the intercept, change for some observations in the example. Our method of predicting first-day returns is derived from the assumption that first-day returns are explained as a function of company characteristics, stock market cycle and how the IPO is conducted.

Dummy variables are used to account for qualitative factors in econometric models. They can also be called binary or dichotomous variables as they take just two values, 1 or 0, to indicate the presence, or absence, of a characteristic. That is, a dummy variable is 1 if the characteristic is present and 0 otherwise.<sup>82</sup>

Further, in the regression models we exclude one dummy variable from each set of characteristics, for example telecommunications in the sector denotation variable. This is done in order to sidestep exact collinearity problems. Mathematically it doesn't matter which variable is omitted, we have however chosen to omit the variable referenced last in each dummy variable group.<sup>83</sup>

In this paper, all of the variables except the logarithmic variables and the observation of first-day returns are binary.

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<sup>82</sup> Hill, Griffiths and Judge, *Undergraduate econometrics* (1997), p. 200.

<sup>83</sup> *Ibid* p. 200

### 4.3.2 Logarithmic Variables

The regression models use logarithmic values when computing the age of a firm and the size of their revenue. This is done for two reasons, the first one being that large variation in numbers between firms may skew the data and produce unreliable results. The second is to minimize problems with heteroskedasticity, correlations and so on.

## 4.4 Regression Tests

The following tests are intended to be employed on our data in order to examine the validity, or statistical significance, of the results.

### 4.4.1 The F-Test

The F-Test is used for testing the overall significance of a model by including all explanatory variables. In order to examine whether our function is viable, we set up the following null and alternative hypotheses:<sup>84</sup>

$$H_0 : \beta_1 = 0, \beta_2 = 0, \dots, \beta_k = 0$$

$H_1$  : at least one of the  $\beta_k$  is nonzero

The hypotheses states that every one of the parameters  $\beta_k$ , other than the intercept  $\beta_0$ , is zero. If the hypothesis is true, none of the variables influence  $y$ , and thus the model has no statistical significance. If the alternative hypothesis  $H_1$  is true, then at least one of the parameters is not zero, and thus one or more variables should be included in the model.<sup>85</sup>

### 4.4.2 R-Squared

The R-Squared value tests the goodness of fit. That is, the closer the R-squared value is to 1, the better the regression model fit. R-squared is a measure of the proportion of variation in the dependant variables that is explained by variations in the explanatory variable. The interpretation of an R-squared value of 30% is that 30% of the variations in  $y$  is explain by variations in the variables, leaving 70% unexplained.<sup>86</sup>

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<sup>84</sup> Hill, Griffiths and Judge, Undergraduate econometrics (1997) p.174.

<sup>85</sup> Ibid p. 81

<sup>86</sup> Ibid p.162.

### 4.4.3 Durbin-Watson Test

The Durbin-Watson test is one of the most important tests for autocorrelation. Autocorrelation is a carryover from one period to another, where the current error term contains not only the effects of current shocks but also the carryover from previous shocks.<sup>87</sup>

Should the Durbin-Watson statistic be close to 2, then one can conclude that the errors are not autocorrelated.<sup>88</sup>

### 4.4.4 Jarque-Bera Test

Hypothesis test and interval estimates rely on the assumption that errors, and hence the dependant variable  $y$ , are normally distributed. Thus when choosing a functional form, it is desirable to create a model in which the errors are normally distributed.<sup>89</sup> This assumption is checked by employing the Jarque-Bera Test.

The Jarque-Bera test for normality is based on two measures: skewness and kurtosis. In the present context, skewness refers to how symmetric the residuals are around zero. Perfectly symmetric residuals will have a skewness of zero. Kurtosis refers to the “*peakedness*” of the distribution. For a normal distribution the kurtosis value is 3.<sup>90</sup>

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<sup>87</sup>Hill, Griffiths and Judge, Undergraduate econometrics (1997) p. 258

<sup>88</sup> Ibid p. 272

<sup>89</sup> Ibid p. 138

<sup>90</sup> Ibid p. 139

## 5 Econometric Study

### 5.1 The Basic Regression Model

The Basic Regression Model contains all observations, within our researched time period, together with all variables, identified as relevant. More specifically, it tests the hypothesis that it is possible to create an all encompassing regression formula, able to predict future returns with statistical certainty, based on past observations without consideration to stock market cycles.

Our basic model is (the usual error term is omitted):<sup>91</sup>

$$\begin{aligned} y_t = & \beta_0 + \beta_1 IB\_ENS + \beta_2 IB\_CAR + \beta_3 IB\_SHB + \beta_4 IB\_SWE + \beta_5 IB\_HQ + \\ & \beta_6 IB\_ALB + \beta_7 IB\_MS + \beta_8 IB\_OHM + \beta_9 IB\_ARN + \beta_{10} S\_IND + \\ & \beta_{11} S\_CDI + \beta_{12} S\_CST + \beta_{13} S\_HLC + \beta_{14} S\_FIN + \beta_{15} S\_IT + \\ & \beta_{16} Ln(FAGE) + \beta_{17} M\_ATC + \beta_{18} M\_TOS + \beta_{19} M\_RED + \beta_{20} M\_ISL + \\ & \beta_{21} M\_INC + \beta_{22} M\_PUB + \beta_{23} P\_FAM + \beta_{24} P\_ENT + \beta_{25} P\_VC + \beta_{26} P\_EMP + \\ & \beta_{27} P\_ASS + \beta_{28} P\_GOV + \beta_{29} OBT + \beta_{30} POP + \beta_{31} SIO + \beta_{32} Ln(REV) \end{aligned}$$

#### 5.1.1 The Basic Regression Model Data

The Basic Regression Model Data conclusively shows that it's not possible to create an all encompassing regression formula, able to predict future returns with statistical certainty, based on past observations without consideration taken to, for example, stock market cycles with the method employed. Statistics show:

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<sup>91</sup> See Appendix 9.1

Dependent Variable: FIRSDAYRETURN  
Method: Least Squares  
Date: 05/28/05 Time: 21:34  
Sample: 1 107  
Included observations: 107

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IB_ENS	-0.861328	0.838746	-1.026923	0.3078
IB_CAR	-0.565656	0.835166	-0.677298	0.5003
IB_SHB	-0.362891	0.874406	-0.415015	0.6793
IB_SWE	1.601742	1.040624	1.539213	0.1280
IB_HQ	-0.288588	0.920428	-0.313537	0.7548
IB_ALB	-0.070152	0.971569	-0.072205	0.9426
IB_MS	-1.944393	1.651082	-1.177648	0.2427
IB_OHM	-1.726702	1.720166	-1.003800	0.3187
IB_ARN	-0.755969	1.047802	-0.721481	0.4729
S_IND	-0.926258	2.191934	-0.422576	0.6738
S_CDI	-0.517238	2.157841	-0.239702	0.8112
S_CST	-2.782994	3.055186	-0.910908	0.3653
S_HLC	-2.308144	2.238441	-1.031139	0.3058
S_FIN	-1.917553	2.302068	-0.832970	0.4075
S_IT	-0.669596	2.167676	-0.308900	0.7583
FAGE	0.523096	0.251049	2.083643	0.0406
M_ATC	-0.510771	0.673970	-0.757854	0.4509
M_TOS	-0.667304	0.547585	-1.218630	0.2269
M_RED	0.361352	0.671849	0.537847	0.5923
M_ISL	0.165814	0.505828	0.327807	0.7440
M_INC	0.230697	0.597381	0.386180	0.7005
M_PUB	0.714821	0.479360	1.491199	0.1402
P_FAM	-1.865507	0.757918	-2.461357	0.0162
P_ENT	-1.282457	0.641662	-1.998649	0.0493
P_VC	-1.202367	0.590397	-2.036541	0.0453
P_EMP	-1.788825	1.362780	-1.312629	0.1934
P_ASS	-2.103937	1.380665	-1.523858	0.1318
P_GOV	0.072253	1.563079	0.046225	0.9633
OBT	0.238357	0.544382	0.437849	0.6628
POP	0.015629	0.594910	0.026272	0.9791
SIO	-0.128531	0.635317	-0.202310	0.8402
REV	-0.474384	0.171856	-2.760354	0.0073
C	3.874608	2.517482	1.539081	0.1280
R-squared	0.325051	Mean dependent var	0.211810	
Adjusted R-squared	0.033182	S.D. dependent var	1.932134	
S.E. of regression	1.899808	Akaike info criterion	4.369441	
Sum squared resid	267.0859	Schwarz criterion	5.193771	
Log likelihood	-200.7651	F-statistic	1.113687	
Durbin-Watson stat	2.064701	Prob(F-statistic)	0.344519	

F-Statistic (1.113687) is too low to reject the null hypothesis:

$$H_0 : \beta_1 = 0, \beta_2 = 0, \dots, \beta_k = 0$$

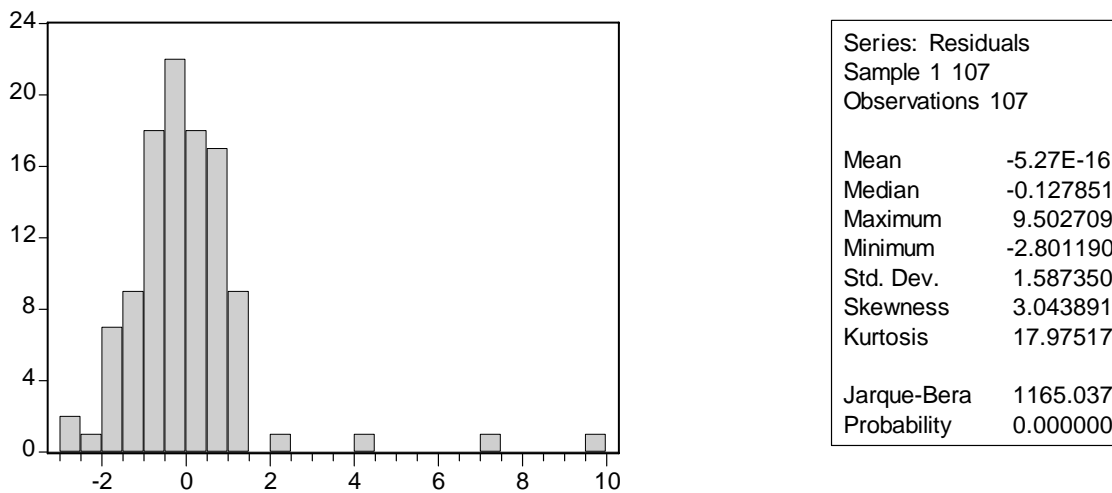
This means that we have to accept that the variables chosen have no effect on the first-day return. Thus, The Basic Regression Model results have no statistical

significance. However, as can be seen in the regression printout t-statistics, certain variables do show significance in relation to The Basic Regression Model.

R-Squared (0.325051) is sufficiently high to be regarded as having a good fit.

Durbin-Watson Statistic (2.064701) is within the acceptable range showing that The Basic Regression Model does not have any problems relating to autocorrelation.

### 5.1.2 Residual Analysis



Residuals from The Basic Regression Model clearly show that the residuals are not normally distributed, Jarque-Bera (1165.037), which is one of our assumptions in the model. Thus, conclusion can be drawn that it is unreasonable to expect the residuals to be normally distributed.

The residual printout shows problems with both Skewness (3.04389) and Kurtosis or *peakedness* (17.97517). These problems are directly related to the four largest first-day return observations.

### 5.2 The Modified Basic Regression Model

The Modified Basic Regression Model is conducted in the exact same way as The Basic Regression Model. Difference being, that we have excluded seven observations in order to correct the problems encountered in The Basic Regression Model. The excluded observations are the four largest first-day returns and the three observations during 2004. The reason for excluding these seven observations is that the first four



observations make the residuals unmanageable, while the 2004 observations exhibit different IPO patterns due to a shift in the stock market cycle. The excluded companies are:

- Daydream Software (1536.43%)
- Cybercom (243.55%)
- Wedins Norden (972.18%)
- Svenska Orient Linjen (682.85%)
- Oriflame Cosmetics (2004)
- Unibet (2004)
- NOTE (2004)

### 5.2.1 The Modified Basic Regression Model Data

The Modified Basic Regression Model has produced results which exhibit statistical significance. That is, a function to predict future first-day returns based on past observations.<sup>92</sup>

Statistics show:

Dependent Variable: FIRSTDAYRETURN  
Method: Least Squares  
Date: 05/29/05 Time: 15:23  
Sample: 1 100  
Included observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IB_ENS	-0.264870	0.166931	-1.586704	0.1173
IB_CAR	-0.128061	0.164715	-0.777472	0.4396
IB_SHB	0.113194	0.173577	0.652125	0.5166
IB_SWE	0.106595	0.224216	0.475415	0.6360
IB_HQ	-0.505660	0.195685	-2.584050	0.0120
IB_ALB	-0.432284	0.199330	-2.168684	0.0337
IB_MS	-0.290128	0.321401	-0.902698	0.3699
IB_OHM	0.332156	0.343507	0.966955	0.3370
IB_ARN	-0.382807	0.206280	-1.855766	0.0679
S_IND	-0.273591	0.421684	-0.648805	0.5187
S_CDI	-0.423066	0.414728	-1.020106	0.3113
S_CST	0.159036	0.601279	0.264496	0.7922
S_HLC	-0.006010	0.420048	-0.014308	0.9886
S_FIN	-0.083380	0.442599	-0.188388	0.8511
S_IT	-0.037228	0.417579	-0.089153	0.9292
FAGE	0.070129	0.049700	1.411034	0.1629
M_ATC	-0.025632	0.130959	-0.195722	0.8454

<sup>92</sup> See Appendix 9.2

M_TOS	-0.034008	0.108864	-0.312388	0.7557
M_RED	0.114451	0.145764	0.785176	0.4351
M_ISL	0.097341	0.099866	0.974710	0.3332
M_INC	-0.158584	0.125268	-1.265955	0.2099
M_PUB	0.071521	0.095507	0.748858	0.4566
P_FAM	-0.153183	0.154433	-0.991907	0.3248
P_ENT	-0.139428	0.126986	-1.097977	0.2761
P_VC	-0.182550	0.117822	-1.549370	0.1260
P_EMP	0.197302	0.270033	0.730658	0.4675
P_ASS	-0.530033	0.268644	-1.972993	0.0526
P_GOV	-0.073251	0.305132	-0.240063	0.8110
OBT	0.134126	0.101419	1.322487	0.1905
POP	-0.154781	0.109697	-1.410982	0.1629
SIO	0.154239	0.127124	1.213290	0.2293
REV	-0.002651	0.023120	-0.114642	0.9091
C	0.165820	0.478166	0.346783	0.7298
R-squared	0.440485	Mean dependent var	-0.119815	
Adjusted R-squared	0.173254	S.D. dependent var	0.400134	
S.E. of regression	0.363824	Akaike info criterion	1.075228	
Sum squared resid	8.868640	Schwarz criterion	1.934934	
Log likelihood	-20.76142	F-statistic	1.648332	
Durbin-Watson stat	1.769685	Prob(F-statistic)	0.043356	

F-Statistic (1.648332) rejects the null hypothesis:

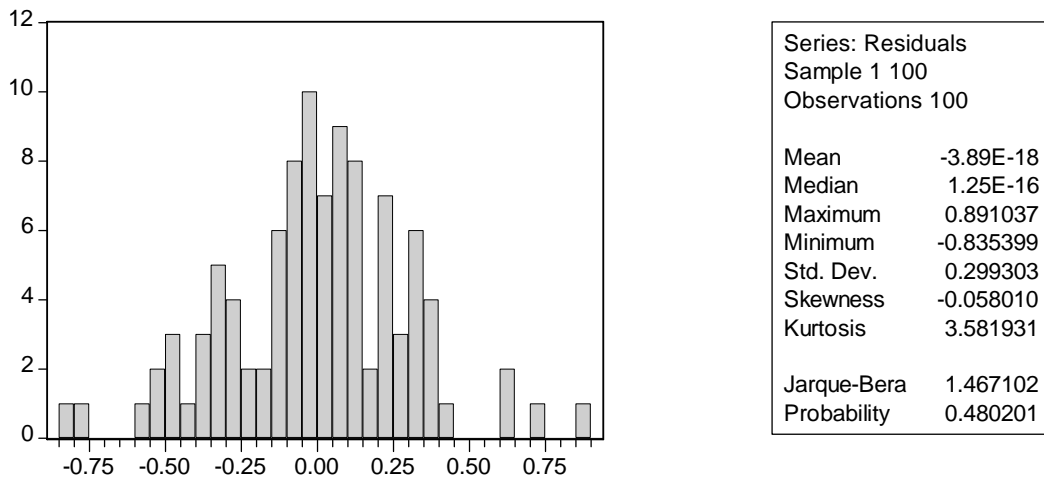
$$H_0 : \beta_1 = 0, \beta_2 = 0, \dots, \beta_k = 0$$

This means that we reject the hypothesis that the variables have no effect on first-day returns. Thus, the F-Test concludes, on the 5% level, that the variables chosen are not rejected as statistically significant determinants relating to the magnitude of first-day returns.

R-Squared (0.440485) is under the circumstances very high and shows that 44.0485% of the variations in first-day returns are explained by the model, leaving approximately 56% unexplained.

Durbin-Watson Statistic (1.769685) is within the acceptable range showing that The Basic Regression Model does not have any problems relating to autocorrelation.

## 5.2.2 Residual Analysis



Residuals from The Modified Basic Regression Model show that the residuals are normally distributed, Jarque-Bera (1.467102). Thus, conclusion can be drawn that it is not unreasonable to expect the residuals to be normally distributed.

The residual printout shows a Skewness value of (-0.058010), which is very close to zero and a Kurtosis or *peakedness* value of (3.581931), which is close to the optimal 3. Pervious problems relating to the four largest first-day returns have now been removed from the residuals.

## 5.3 The Boom-Bust Regression Model

The Boom-Bust Regression Model is intended to see if we can find a higher significance in the model if we take stock market cycles into account by determining any possible change in IPO returns due to the effect of overall market sentiment. We have defined the Boom period to be (January 1996 – March 2000 and all observation during 2004) and the Bust (April 2000 – December 2002). No observations were recorded during 2003. Thus, the 2004 observations are included, but this time as a boom period. When defining the Boom and Bust periods, we defined the Boom period as the period of time when the stock market had a rising trend and the Bust period corresponds to a falling trend in the market. However, the four large first-day return observations are still excluded due to residual problems.

The dummy variable, ( $\beta_{33}BOOM\_BUST$ ), is added in The Boom-Bust Regression Model, taking the value 1 during “boom times” and 0 when stock market stock market sentiment is negative, also characterized as “bust”.

### 5.3.1 The Boom-Bust Regression Model Data

Dependent Variable: FIRSTDAYRETURN

Method: Least Squares

Date: 05/29/05 Time: 16:06

Sample(adjusted): 1 103

Included observations: 103 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAGE	0.046474	0.049230	0.944019	0.3485
IB_ALB	-0.476938	0.202247	-2.358192	0.0212
IB_ARN	-0.407702	0.211059	-1.931694	0.0575
IB_CAR	-0.127498	0.169415	-0.752579	0.4543
IB_ENS	-0.276833	0.170298	-1.625577	0.1086
IB_HQ	-0.378437	0.186263	-2.031740	0.0460
IB_MS	-0.324477	0.327012	-0.992247	0.3245
IB_OHM	0.313374	0.354240	0.884638	0.3794
IB_SHB	0.098046	0.176543	0.555364	0.5804
IB_SWE	0.073379	0.227715	0.322239	0.7482
M_ATC	-0.008334	0.128760	-0.064725	0.9486
M_INC	-0.188476	0.126494	-1.489996	0.1408
M_ISL	0.065005	0.101571	0.639995	0.5243
M_PUB	0.096041	0.096616	0.994044	0.3237
M_RED	0.089232	0.134039	0.665721	0.5078
M_TOS	-0.076267	0.109466	-0.696722	0.4883
OBT	0.093861	0.115077	0.815643	0.4175
P_ASS	-0.493428	0.273528	-1.803941	0.0756
P_EMP	0.182357	0.274769	0.663673	0.5091
P_ENT	-0.131454	0.129341	-1.016337	0.3130
P_FAM	-0.212908	0.150815	-1.411716	0.1625
P_GOV	-0.110144	0.306847	-0.358952	0.7207
P_VC	-0.181540	0.121074	-1.499414	0.1383
POP	-0.087302	0.110225	-0.792034	0.4311
REV	0.007415	0.023283	0.318474	0.7511
S_CDI	-0.496202	0.442367	-1.121696	0.2659
S_CST	0.135325	0.614836	0.220099	0.8264
S_FIN	-0.181047	0.460215	-0.393396	0.6952
S_HLC	-0.078443	0.436984	-0.179510	0.8581
S_IND	-0.355629	0.439673	-0.808848	0.4214
S_IT	-0.151929	0.440279	-0.345074	0.7311
BOOM_BUST	-0.096297	0.110862	-0.868626	0.3881
SIO	0.234374	0.113327	2.068122	0.0424
C	0.306274	0.523114	0.585482	0.5601
R-squared	0.408034	Mean dependent var	-0.113460	
Adjusted R-squared	0.124920	S.D. dependent var	0.396718	
S.E. of regression	0.371112	Akaike info criterion	1.114949	
Sum squared resid	9.502989	Schwarz criterion	1.984665	
Log likelihood	-23.41985	F-statistic	1.441235	
Durbin-Watson stat	1.790156	Prob(F-statistic)	0.101412	

Although previous problems relating to the three returns during 2004 have been solved, the results of The Boom-Bust Regression Model has failed, by a small margin, to deliver results that exhibit statistical significance on the 5- and 10% level.<sup>93</sup> Furthermore, the Boom Bust model states that first-day returns are negatively affected by Boom periods. Statistics show:

F-Statistic (1.441235) falls just outside the rejection range for the null hypothesis on the 10% level.

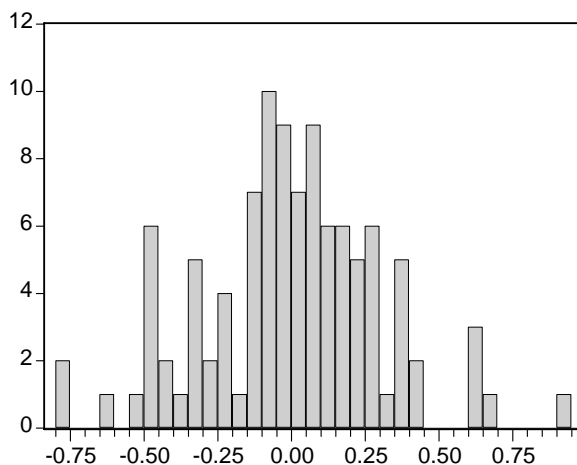
$$H_0 : \beta_1 = 0, \beta_2 = 0, \dots, \beta_k = 0$$

This means that we have to accept that the variables chosen have no effect on the first-day return. Thus, The Boom-Bust Regression Model results have no statistical significance, albeit with a small margin (0.14%). However, as can be seen in the regression printout t-statistics, certain variables do show significance in relation to The Boom-Bust Regression Model.<sup>94</sup>

R-Squared (0.408034) shows a high value for goodness of fit.

Durbin-Watson Statistic (1.790156) is within the acceptable range showing that The Boom-Bust Regression Model does not have any problems relating to autocorrelation.

### 5.3.2 Residual Analysis



Series: Residuals	
Sample 1 103	
Observations 103	
Mean	-3.46E-17
Median	-1.67E-16
Maximum	0.920741
Minimum	-0.766766
Std. Dev.	0.305232
Skewness	0.046942
Kurtosis	3.396507
Jarque-Bera	0.712555
Probability	0.700278

<sup>93</sup> See Appendix 9.3

<sup>94</sup> See Appendix 9

Residuals from The Boom-Bust Regression Model show that the residuals are normally distributed, Jarque-Bera (0.712555). Thus, conclusion can be drawn that it is not unreasonable to expect the residuals to be normally distributed. Thereby, we can not reject the hypothesis that the residuals are not normally distributed.

The residual printout shows a Skewness value of (-0.058010), which is very close to zero and a Kurtosis or *peakedness* value of (3.581931), which is close to the optimal value of 3.

## 6. Analysis

### 6.1 Descriptives

#### 6.1.1 Newly listed firms

Between 1996 and May 2005, 258 new firms registered on the A-, O-, and OTC-lists on the Stockholm Stock Exchange. Out of these 258 firms, 124 were identified as clean IPOs. However, our regressions are conducted on a sample of 107 observations due to data incompleteness. One third of the firms reported as newly listed, are simply transferred from other markets, such as Nya Marknaden, SBI and IM.

#### **Panel 6A. Newly listed firms on the Stockholm Stock Exchange (A-, O-, and OTC-lists) between 1996 and 2004**

	<i>N</i>	%
Newly listed firms 1996 - 2004	258	100
Clean Initial Public Offerings (IPOs)	124	48
Equity carve-outs and spin-offs	43	17
Firms transferring from other lists	78	30
Mergers	7	3
Restructurings	6	2

*Notes.* Data source; the official records from the OMX-group.

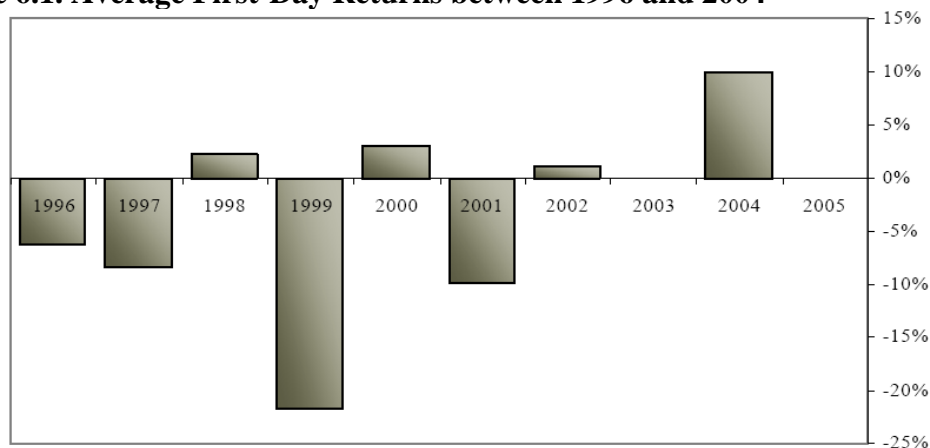
#### 6.1.2 First-day Returns

Previous studies have reported spectacular returns on the floatation day although recent findings indicate lower returns. A student paper from the Gothenburg School of Business and Economics, covering a similar, although smaller, sample than do our study, reported average first-day returns of 11.47 %.<sup>95</sup> This can be compared to the 21.18 % average first day return that we found in our sample. It should be noted that this figure includes some non representative returns.

<sup>95</sup> Andersson E. & Persson L. "Nyintroduktioner -En undersökning av underpris och långsiktig prestation av nyintroducerade aktier på Stockholmsbörsen" (2005).

Figure 6.1 illustrates the yearly average first-day returns. Our sample does not present returns that match the previously reported levels of underpricing. Instead, during many years the yearly first-day returns are negative.

**Figure 6.1. Average First-Day Returns between 1996 and 2004**



*Notes.* During the time period 1996 to 2005:5, 124 clean IPOs were identified. Yearly number of IPOs was 10, 37, 14, 31, 20, 7, 4, 0, 3, 0 respectively. In the chart, three IPOs from our sample were excluded due to abnormally high first-day returns. From the 1997 sample Svenska Orient Linien (1dRET = 682 %) and Wedins Norden (1dRET = 972 %) were excluded. From the 2000 sample Daydream Software was excluded (1dRET = 1536 %). The three IPOs with largest negative first-day returns were excluded to match the omission of above mentioned IPOs.

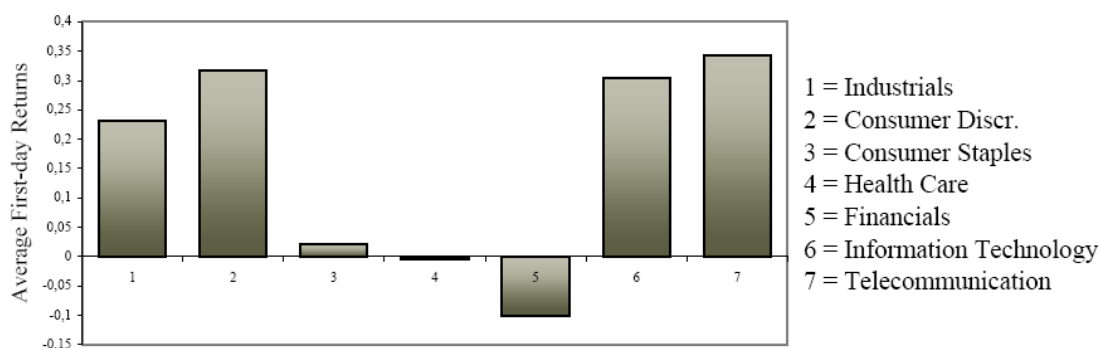
### 6.1.3 Field of Business (GICS)

Figure 6.2 below, indicates that some industries produce higher first-day returns than others. The best investment sector according to this data presentation would be Industrials, Consumer Discretionary, Information Technology and Telecommunications.

However, this presentation is somewhat misleading. First-day returns change over time and this data sample is an average over the researched period. Secondly, the telecommunications sector only has one observation, hardly qualifying it as statistically significant. Furthermore, we have not excluded the very large first-day returns in this sample. For example, Information Technology would exhibit negative returns over the period had it not been for Daydreams first-day return which increased its market value by approximately 1536%. Taking these factors into account we find that the regression results from The Modified Basic Regression Model produce a more accurate account of sector returns.



**Figure 6.2. Average Industry First-day Returns**



*Notes.* The sample consists of 107 firms. No instances of IPOs from firms belonging to Energy or Materials were found, which is why these two industries are excluded from the figure. Industrials ( $N = 18$ ), Consumer Discr. ( $N = 18$ ), Consumer Staples ( $N = 1$ ), Health Care ( $N = 12$ ), Financials ( $N = 9$ ), Information Technology ( $N = 44$ ) and Telecom ( $N = 1$ ).

Firms in comparable fields of business should exhibit similar characteristics. These prerequisites produce cluster-like behaviour, which also affects strategic decisions such as an IPO. Noteworthy from Panel B below, is the high frequency of Information Technology companies performing IPOs between 1997 and 2000.

**Panel 6B. IPOs on SSE Categorized by Industry (GICS)**

Year	Industrials	Cons. D	Cons. S	Health C.	Financials	IT	Telecom	Total	Index
1996	2	3	0	3	0	2	0	10	38
1997	7	6	3	4	6	11	0	37	24
1998	6	1	0	2	1	4	0	14	10
1999	2	3	0	1	2	21	0	29	66
2000	1	3	0	2	0	13	2	21	-12
2001	0	1	0	2	1	2	0	6	-17
2002	2	2	0	0	0	0	0	4	-37
2003	0	0	0	0	0	0	0	0	30
2004	0	2	0	0	0	1	0	3	18
Sum (%)	20 (16%)	21 (17%)	3 (2 %)	14 (11 %)	10 (8%)	54 (44 %)	2 (2 %)	124	

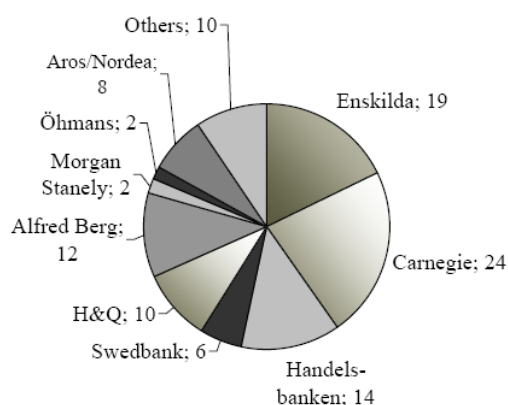
*Notes.* Panel B represents the entire sample of 124 clean IPOs identified between 1996 and mid-2005. The last column ‘Index’, show the percentage change in SX All Share Index over the year.

**6.1.4 Investment Bank Employed**

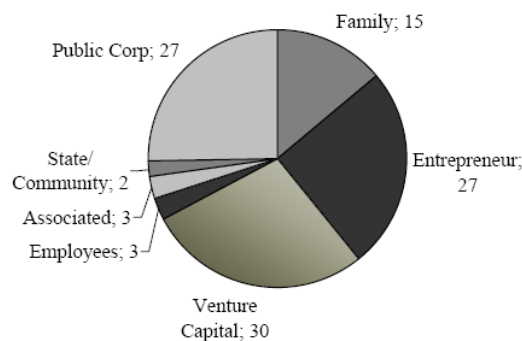
The literature has previously discussed that the higher prestige the investment bank employed in an IPO enjoys, the lower the magnitude of underpricing, or first-day

returns, should be, since the bank's renown would guarantee the soundness of the IPO. This hypothesis, however, is rejected for the Swedish market by Hansson and Larsson.<sup>96</sup> For that reason, we did not investigate the possible impact of the employed investment bank's reputation. However, as discussed in section 3.3.3 *Financial Intermediaries*, the bank plays an important role in the IPO process. Figure 6.3 on the following page reports that the majority (87 %) of the firms chose one out of seven investment banks, namely; Carnegie, Enskilda, Handelsbanken, Alfred Berg, H & Q, Aros/Nordea or Swedbank.

### 6.3. Investment Bank Employed



### 6.4. Previous Owner Type



*Notes.* Both diagrams represent the sample used in our regression analysis ( $N = 107$ ). Figure 6.3. Frequency of IPOs sorted by Investment Bank Employed. The chart reports a fairly fragmented frequency. Figure 6.4. Frequency of IPOs categorized by Owner Type prior to flotation date. The chart shows that the majority of IPOs are made from four owner type groups; Public Corporations, Family, Entrepreneur and Venture Capital.

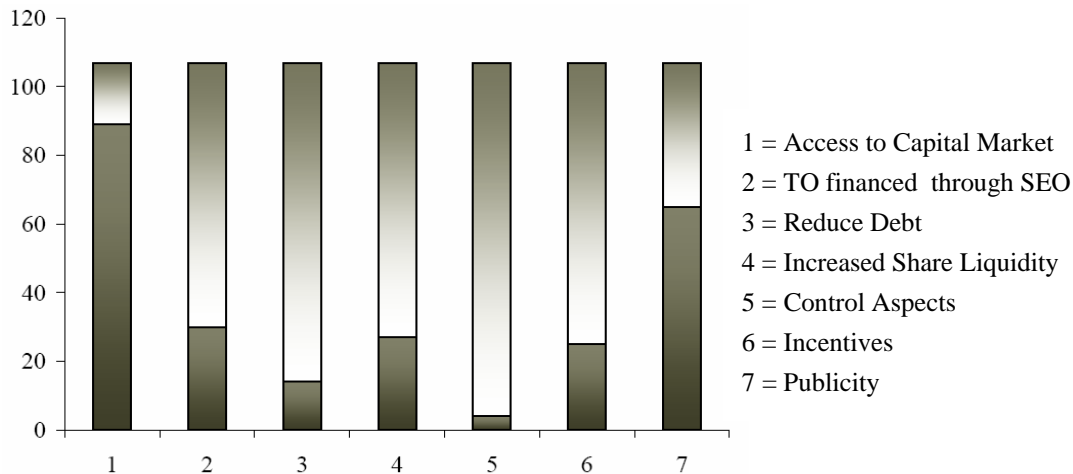
### 6.1.5 Previous Owner Type and Shift in Ownership

As illustrated by Figure 6.4 above, 92 % of the investigated IPOs were made by one of four owner type groups; Public Corporations, Family, Entrepreneur or Venture Capital. In 88 out of 107 cases, the current owners retained control and ownership of the company.

<sup>96</sup> Hansson P. & Larsson, E. "Asymmetrisk information och underprissättning vid börsintroduktioner" (1994).

### 6.1.6 IPO Motive

Figure 6.5. Motive for Going Public



Notes. Some firms had multiple motives for going public. Each bar represents the sample of 107 firms.

The two most common motives, stated by the firms, for performing an IPO was Access to Capital Markets and increased Publicity. This is hardly surprising, given that a company does not reveal any new information in stating these motives. More interesting is the fact that 30 firms noted Take-Over through SEO as a motive, clearly indicating an aggressive growth strategy. Also noteworthy, are the 14 firms that declared debt reduction as a motive for going public. This motive could very well be badly received by investors, since using raised capital to pay off debt implies that the firm does not have any new investments planned, which in its turn means that there is not much growth potential for the invested money.

### 6.1.7 IPO Procedure

In our sample, 60 IPOs were priced using fixed price procedure and 47 firms used offer by tender procedure. After 1999, offer by tender pricing was the dominant procedure.

### 6.1.8 Firm Characteristics for the Boom-Bust Periods

Our time period, 1996 to 2004 can be divided into two periods; Boom and Bust. One might expect differentiations between the two periods. However, the data does not support these expectations. Panel C reports firm characteristics for the entire time period, as well as characteristics divided into the Boom-Bust classification. The large

difference, in the total sample, between mean and median values for sales and IPO offer size, can be partly attributed to Scania's comparatively large values (sales = 34.9 billion SEK and offer size = 18.8 billion SEK).

### **Panel C. Firm Characteristics at the IPO**

	Total sample		Boom sample		Bust sample	
	Mean	Median	Mean	Median	Mean	Median
Firm Age (years)	18.8	11	18.5	11	19.8	12.5
Sales <sup>A</sup> (M SEK)	1179.6	228	989.5	228.0	1667.5	277.5
Operating Profit <sup>B</sup> (M SEK)	59.8	18.3	25.3	19.2	148.1	13.7
IPO Offer Size (M SEK)	691.1	169.4	587.9	127	952.5	379.5
1dRET (%)	21.2	0.8	11.3	0	-4.8 <sup>C</sup>	1.7

*Notes.* Sample consists of the 107 firms, which were included in the regressions. 'Total Sample' refers to all IPOs between 1996 and 2004. Boom sample are all IPOs listed between 1996 and March 2000 and Bust sample includes firms from April 2000 onwards. <sup>A</sup>: Sales reported for the fiscal year prior to IPO. <sup>B</sup>: Operating profits reported for the fiscal year prior to IPO. <sup>C</sup>: From this value, one company, Daydream Software (1dRET = 1536 %), was excluded.

## **6.2 Interpretation of Regression Models**

Regression statistics results are expressed as a percentage change in first-day returns. Dummy variables, which take the value 1 or 0, affect first-day returns by the exact amount stated by the  $\beta$  value, should the dummy variable be 1. Otherwise, first-day return effect of the specific  $\beta$  value is zero. Logarithmic variables affect first day returns by the logarithmic value multiplied by the  $\beta$  value.<sup>97</sup>

Analysis is based on The Modified Basic Regression Model since it is the only statistically significant model. The excluded regression models were not found to be reliable. Hence, any conclusions drawn from them would be subject to unreliability.

<sup>97</sup> See Appendix for complete list of explanations for variables

## 6.3 The Modified Basic Regression Model

### 6.3.1 The complete function of The Modified Basic Regression Model

$$\begin{aligned} y_t = & (0.165820)\beta_0 + (-0.264870)\beta_1 IB\_ENS + (-0.128061)\beta_2 IB\_CAR + \\ & (0.113194)\beta_3 IB\_SHB + (0.106595)\beta_4 IB\_SWE + (-0.505660)\beta_5 IB\_HQ + \\ & (-0.432284)\beta_6 IB\_ALB + (-0.290128)\beta_7 IB\_MS + (0.332156)\beta_8 IB\_OHM + \\ & (-0.382807)\beta_9 IB\_ARN + (-0.273591)\beta_{10} S\_IND + (-0.423066)\beta_{11} S\_CDI + \\ & (0.159036)\beta_{12} S\_CST + (-0.006010)\beta_{13} S\_HLC + (-0.083380)\beta_{14} S\_FIN + \\ & (-0.037228)\beta_{15} S\_IT + (0.070129)\beta_{16} Ln(FAGE) + (-0.025632)\beta_{17} M\_ATC + \\ & (-0.034008)\beta_{18} M\_TOS + (0.114451)\beta_{19} M\_RED + (0.097341)\beta_{20} M\_ISL + \\ & (-0.158584)\beta_{21} M\_INC + (0.071521)\beta_{22} M\_PUB + (-0.153183)\beta_{23} P\_FAM + \\ & (-0.139428)\beta_{24} P\_ENT + (-0.182550)\beta_{25} P\_VC + (0.197302)\beta_{26} P\_EMP + \\ & (-0.530033)\beta_{27} P\_ASS + (-0.073251)\beta_{28} P\_GOV + (0.134126)\beta_{29} OBT + \\ & (-0.154781)\beta_{30} POP + (0.154239)\beta_{31} SIO + (-0.002651)\beta_{32} Ln(REV) \end{aligned}$$

### 6.3.2 Analysis of The Modified Regression Model Variables

Regression values assigned to each  $\beta$  value indicate the effect of each variable on  $y_t$ , first-day returns. The regression intercept value,  $\beta_0$ , is the constant from which all future predictions have their reference point before being manipulated by the variables.

We are aware of the fact that our results are not quite suitable to draw general result due to the fact that most of the variables have little or no statistical significance, whereas the model as a whole had a low F-statistic indicating that the model is statistically significant. These contradictory results are somewhat puzzling. The most

plausible reason for our lack of significance in many variables could be the result of having few observations with regard to our many variables, resulting in some variables only containing one or two observations. However, regression results tended to deteriorate when trying to exclude one or more variables, leaving The Modified Regression Model best suited for our purpose.

The Investment Bank Employed dummy variables assume that if they all take the value zero, an alternate Investment Bank is employed denoted as Various. The Investment Banks that fall under the group Various neither have a positive nor negative impact on IPOs. When examining the Investment Banks effect on first day returns we can clearly detect certain trends. Enskilda, Carnegie, Morgan Stanley, Alfred Berg, Aros/Nordea and Hagströmer & Qviberg affect first-day returns negatively, in relation to Various, between -12 and -50.5%, indicating that it is best to steer clear of any IPOs they handle. However, IPOs handled by Svenska Handelsbanken, Swedbank and Öhman influence the expected first-day returns positively between, 10.6 and 33.2%. Taken together, these results confirm our expectations, that the average IPO would be slightly positively affected with regard to the Investment Bank Employed correlation to first-day returns.

At first glance, first-day returns in all sectors, Consumer Staples excluded, seem very negative. However, this is somewhat misleading since the excluded dummy variable is Telecommunications, which is the first-day returns the other sectors are compared to. Furthermore, Telecommunications only has one observation over the 1996 - 2004 period, Tele1, which had a first-day return of 34.25%, making the other sectors look negative in comparison. Somewhat surprisingly, consumer staples showed a return of 15.9% in excess of that in Telecommunications, which can be explained due to the fact that the sector only has one observation. Looking at the variables we can see that our expectations regarding the correlation to first-day returns were not far off the mark. Sectors with high “risk”, which we defined as Telecommunications and IT, performed admirably compared to less “risky” sectors such as Industrials and Consumer Discretionary.

The age of a company is positively correlated to its first-day return. More specifically, the logarithmic value of the firms age multiplied by the  $\beta$  value (0.070129) results in large positive first-day returns for more mature companies. This observation seems to run counter to rational thought and existing theory since more mature companies should be easier to value and predict first day returns of. This result runs counter to our expectations stated in chapter 4. We expected first-day returns to be negatively correlated with a company’s age. This discrepancy could in some part be explained by older companies having fewer negative first-day returns. However, we are at a loss to explain the discrepancy, especially since the variable, although not significant, has a lower probability value than most other variables.

The motive underlying the decision to go public is Control Aspects unless any of the other dummy variables take the value 1. From the data we can see that firms who choose to go public due to a desire to Access capital Markets are punished with a negative return of 2.56% compared to firms going public due to Control Aspects. Other motives which punish companies seeking to go public are Take-Overs through Seasoned Equity Offerings, -3.4% and Incentives, -15.86%. This last statistic is interesting. Companies who actively seek to go public in order to award employees, or management, with stock option programs are severely punished. This observation seems logical when viewed against the fact that shareholders will bear the brunt of the cost through share dilution. This motive should rightly be punished by the stock market when comparing it against the motive of raising capital to finance expansion. Companies whose motive to go public is due to a need to increase share liquidity, +9.73%, reduce debt, +11.4%, or gain publicity exposure, +7.15%, are generally positively awarded by the market. The reason behind this is rather straightforward. Companies in the second category are generally seeking to grow while companies in the first sector wish to cash out or lavishly spend money on take-overs and employee incentives. These observations more or less exactly how we expected the variables to behave.

IPO theory generally assumes that controlling parties go public as an exit option.<sup>98</sup> Regression data on previous owners excluded the dummy variable Public Corporations, in order to sidestep the dummy variable trap. Looking at the regression, all variables except Employees show negative values in relation to Public Corporations. The negative values all, except Associated, -53%, lie between -7 and -20%. The Associated value can not be regarded as reliable since it only contains two observations, both negative, with one of the observations showing a -98% drop on its first day of trading. The large discrepancy between the Employee variable in relation to the rest may seem remarkable at first until one examines the data with greater scrutiny, revealing only one observation, MSC Konsult, +53%, skewing the data. Due to the fact that the previous owner group Public Corporations, on average, exhibit highly positive returns, making the other previous owner group first-day returns appear dismal. Regression result where approximately what we expected to find, with the exception of the large deviations in Employee and Associated due to small data samples in these groups.

Offering Procedures can be conducted in one of two ways, as covered in chapter 4. The Dummy variable takes the value 1 when the Offer Procedure is conducted through Offer by Tender and 0 when the price is fixed. Regression results show that Offering Procedures conducted by employing Offer by Tender give rise to larger first-day returns. These results run completely counter to what we expected the regression results to show. Our expectations where for the Offer by Tender to show a

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<sup>98</sup> Holmén M & Högfeldt P, “ A law and finance analysis of initial public offerings” (2003).

lower first-day return based on the fact that the final issue price is set at a later date. However, as the regression shows, this is not at all the case and can possibly be explained by the low significance of the variable and fixed price IPOs initially being priced to high.

According to the findings in our regression analysis, companies who have positive earnings when going public exhibit, on average, 15.5% lower first-day returns. Thus, for companies who have positive earnings, the Positive Operating Profits variable is 1. This phenomenon can be explained by the large number of companies listed during the heydays of the IT boom without any profits and posting large first-day returns. These results are in line with what we expected from the regression. Companies who are harder to assess due to negative Operating Profits should rightly be sold at a discount to the market, making them more underpriced. Thereby attracting investors to the issue.

The Shift in Ownership variable takes on the value 1 when there has been a shift in company ownership during the IPO process, otherwise 0. Regression data shows that companies who shift ownership during the IPO process return, on average, +15.4% more. This data is somewhat questionable due to the fact that the selection sample contains only 10% of total observations with some large first-day returns skewing the sample. In light of this we can not draw any real conclusions regarding the regression results compared to our expectations. We did however expect the opposite outcome where a Shift in Ownership signalled that present management knew something wasn't right with the company and wanted to sell out while they could. However, should that be the case, the issue might be sold to the public at a discount. Furthermore, the variable is not statistically significant.

Our final variable in The Modified Regression Model, Revenue, is negatively correlated to first-day returns. That is, higher logarithmic values of a company's revenues more negatively affect first-day returns. This is logical. Companies who have large revenues tend to be easier to value, and therefore have less uncertainty surrounding their IPOs, thereby limiting the upside potential of first-day returns. These results are what we expected to find in our regression model.



## 7. Summary

### 7.1 Conclusions

When a company performs an IPO it is valued by the market for the first time. An overpriced IPO will lead to negative first-day returns and thus bad publicity. On the other hand, a heavily underpriced IPO is equivalent to leaving money on the table. Hence, it is in the best interest of every company considering an IPO to set a fair offer price. However, previous studies find that underwriters appear to make systematic errors in using historic accounting data when setting the offer prices of IPOs. Further, the underpricing and cyclical phenomenon as well as other trends associated with IPOs are of utmost importance to investors and companies considering an IPO. In this paper we focused on the relation between the magnitude of first-day returns and a number of broad factors, including; accounting information, ownership information, underlying IPO motives, the market conditions at the time of the IPO and IPO procedure. Our purpose is to model determinants affecting the magnitude of first-day returns, using a sample that covers 107 IPOs on the Stockholm stock exchange, between 1996 and 2004.

In light of this purpose, we feel that we have found a model, The Modified Basic Regression Model, explaining the determinants of first-day returns. The Modified Basic Regression Model is statistically significant at the 5% level. However, examination of the significance of the individual dummy variables shows that they are not significant. Our model has a conundrum; according to the F-statistic our model is significant, while when looking at the significance of individual variables the model appears somewhat unreliable. Residuals are normally distributed and regression tests show that the data is reliable. Furthermore, our results show that 44% of first-day returns can be explained, leaving 56% unexplained by our model.

Our expectations as to how most variables would behave were correct even though the Shift in Ownership and IPO procedure variables turned out to behave in the opposite manner.

Looking at historical data and trying to find a model which can shed light on future outcomes, one must be aware that our observed period is, to a great extent, an anomaly in time. During our observation period, global stock markets entered a blow off faze, followed by a subsequent bust. The results from this bust have yet to be digested in that the present recovery is largely based on lowered interest rates designed to alleviate effects from the stock market retreat. Our point is, it is difficult

to determine, with a degree of certainty, the magnitude of each variables impact on first-day returns. Having raised this warning, data results still shows that our regression model can be deemed successful, although problems regarding the individual variables significance exist. This revelation is hardly surprising since doing so is virtually impossible. Instead, our findings show, with a high degree of certainty, which behavioural characteristics can be expected during the first-day of trading, given the input variables we have chosen.

## ***7.2 Suggestions to further research***

IPO literature is in large part based on finding hypotheses which can explain the underpricing phenomenon rather than looking at which characteristics give rise to them. Therefore, we suggest that further research efforts be directed at this area.

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## 9. Appendix

### 9.1 Regression Tables

#### 9.1.1 The Basic Regression model

Dependent Variable: FIRSTDAYRETURN

Method: Least Squares

Date: 05/28/05 Time: 21:34

Sample: 1 107

Included observations: 107

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IB_ENS	-0.861328	0.838746	-1.026923	0.3078
IB_CAR	-0.565656	0.835166	-0.677298	0.5003
IB_SHB	-0.362891	0.874406	-0.415015	0.6793
IB_SWE	1.601742	1.040624	1.539213	0.1280
IB_HQ	-0.288588	0.920428	-0.313537	0.7548
IB_ALB	-0.070152	0.971569	-0.072205	0.9426
IB_MS	-1.944393	1.651082	-1.177648	0.2427
IB_OHM	-1.726702	1.720166	-1.003800	0.3187
IB_ARN	-0.755969	1.047802	-0.721481	0.4729
S_IND	-0.926258	2.191934	-0.422576	0.6738
S_CDI	-0.517238	2.157841	-0.239702	0.8112
S_CST	-2.782994	3.055186	-0.910908	0.3653
S_HLC	-2.308144	2.238441	-1.031139	0.3058
S_FIN	-1.917553	2.302068	-0.832970	0.4075
S_IT	-0.669596	2.167676	-0.308900	0.7583
FAGE	0.523096	0.251049	2.083643	0.0406
M_ATC	-0.510771	0.673970	-0.757854	0.4509
M_TOS	-0.667304	0.547585	-1.218630	0.2269
M_RED	0.361352	0.671849	0.537847	0.5923
M_ISL	0.165814	0.505828	0.327807	0.7440
M_INC	0.230697	0.597381	0.386180	0.7005
M_PUB	0.714821	0.479360	1.491199	0.1402
P_FAM	-1.865507	0.757918	-2.461357	0.0162
P_ENT	-1.282457	0.641662	-1.998649	0.0493
P_VC	-1.202367	0.590397	-2.036541	0.0453
P_EMP	-1.788825	1.362780	-1.312629	0.1934
P_ASS	-2.103937	1.380665	-1.523858	0.1318
P_GOV	0.072253	1.563079	0.046225	0.9633
OBT	0.238357	0.544382	0.437849	0.6628
POP	0.015629	0.594910	0.026272	0.9791
SIO	-0.128531	0.635317	-0.202310	0.8402
REV	-0.474384	0.171856	-2.760354	0.0073
C	3.874608	2.517482	1.539081	0.1280
R-squared	0.325051	Mean dependent var		0.211810
Adjusted R-squared	0.033182	S.D. dependent var		1.932134
S.E. of regression	1.899808	Akaike info criterion		4.369441
Sum squared resid	267.0859	Schwarz criterion		5.193771
Log likelihood	-200.7651	F-statistic		1.113687
Durbin-Watson stat	2.064701	Prob(F-statistic)		0.344519



## 9.1.2 The Modified Regression Model

Dependent Variable: FIRSTDAYRETURN

Method: Least Squares

Date: 05/29/05 Time: 15:23

Sample: 1 100

Included observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IB_ENS	-0.264870	0.166931	-1.586704	0.1173
IB_CAR	-0.128061	0.164715	-0.777472	0.4396
IB_SHB	0.113194	0.173577	0.652125	0.5166
IB_SWE	0.106595	0.224216	0.475415	0.6360
IB_HQ	-0.505660	0.195685	-2.584050	0.0120
IB_ALB	-0.432284	0.199330	-2.168684	0.0337
IB_MS	-0.290128	0.321401	-0.902698	0.3699
IB_OHM	0.332156	0.343507	0.966955	0.3370
IB_ARN	-0.382807	0.206280	-1.855766	0.0679
S_IND	-0.273591	0.421684	-0.648805	0.5187
S_CDI	-0.423066	0.414728	-1.020106	0.3113
S_CST	0.159036	0.601279	0.264496	0.7922
S_HLC	-0.006010	0.420048	-0.014308	0.9886
S_FIN	-0.083380	0.442599	-0.188388	0.8511
S_IT	-0.037228	0.417579	-0.089153	0.9292
FAGE	0.070129	0.049700	1.411034	0.1629
M_ATC	-0.025632	0.130959	-0.195722	0.8454
M_TOS	-0.034008	0.108864	-0.312388	0.7557
M_RED	0.114451	0.145764	0.785176	0.4351
M_ISL	0.097341	0.099866	0.974710	0.3332
M_INC	-0.158584	0.125268	-1.265955	0.2099
M_PUB	0.071521	0.095507	0.748858	0.4566
P_FAM	-0.153183	0.154433	-0.991907	0.3248
P_ENT	-0.139428	0.126986	-1.097977	0.2761
P_VC	-0.182550	0.117822	-1.549370	0.1260
P_EMP	0.197302	0.270033	0.730658	0.4675
P_ASS	-0.530033	0.268644	-1.972993	0.0526
P_GOV	-0.073251	0.305132	-0.240063	0.8110
OBT	0.134126	0.101419	1.322487	0.1905
POP	-0.154781	0.109697	-1.410982	0.1629
SIO	0.154239	0.127124	1.213290	0.2293
REV	-0.002651	0.023120	-0.114642	0.9091
C	0.165820	0.478166	0.346783	0.7298
R-squared	0.440485	Mean dependent var	-0.119815	
Adjusted R-squared	0.173254	S.D. dependent var	0.400134	
S.E. of regression	0.363824	Akaike info criterion	1.075228	
Sum squared resid	8.868640	Schwarz criterion	1.934934	
Log likelihood	-20.76142	F-statistic	1.648332	
Durbin-Watson stat	1.769685	Prob(F-statistic)	0.043356	

### 9.1.3 The Boom-Bust Regression

Dependent Variable: FIRSTDAYRETURN

Method: Least Squares

Date: 05/29/05 Time: 16:06

Sample(adjusted): 1 103

Included observations: 103 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAGE	0.046474	0.049230	0.944019	0.3485
IB_ALB	-0.476938	0.202247	-2.358192	0.0212
IB_ARN	-0.407702	0.211059	-1.931694	0.0575
IB_CAR	-0.127498	0.169415	-0.752579	0.4543
IB_ENS	-0.276833	0.170298	-1.625577	0.1086
IB_HQ	-0.378437	0.186263	-2.031740	0.0460
IB_MS	-0.324477	0.327012	-0.992247	0.3245
IB_OHM	0.313374	0.354240	0.884638	0.3794
IB_SHB	0.098046	0.176543	0.555364	0.5804
IB_SWE	0.073379	0.227715	0.322239	0.7482
M_ATC	-0.008334	0.128760	-0.064725	0.9486
M_INC	-0.188476	0.126494	-1.489996	0.1408
M_ISL	0.065005	0.101571	0.639995	0.5243
M_PUB	0.096041	0.096616	0.994044	0.3237
M_RED	0.089232	0.134039	0.665721	0.5078
M_TOS	-0.076267	0.109466	-0.696722	0.4883
OBT	0.093861	0.115077	0.815643	0.4175
P_ASS	-0.493428	0.273528	-1.803941	0.0756
P_EMP	0.182357	0.274769	0.663673	0.5091
P_ENT	-0.131454	0.129341	-1.016337	0.3130
P_FAM	-0.212908	0.150815	-1.411716	0.1625
P_GOV	-0.110144	0.306847	-0.358952	0.7207
P_VC	-0.181540	0.121074	-1.499414	0.1383
POP	-0.087302	0.110225	-0.792034	0.4311
REV	0.007415	0.023283	0.318474	0.7511
S_CDI	-0.496202	0.442367	-1.121696	0.2659
S_CST	0.135325	0.614836	0.220099	0.8264
S_FIN	-0.181047	0.460215	-0.393396	0.6952
S_HLC	-0.078443	0.436984	-0.179510	0.8581
S_IND	-0.355629	0.439673	-0.808848	0.4214
S_IT	-0.151929	0.440279	-0.345074	0.7311
BOOM_BUST	-0.096297	0.110862	-0.868626	0.3881
SIO	0.234374	0.113327	2.068122	0.0424
C	0.306274	0.523114	0.585482	0.5601
R-squared	0.408034	Mean dependent var	-0.113460	
Adjusted R-squared	0.124920	S.D. dependent var	0.396718	
S.E. of regression	0.371112	Akaike info criterion	1.114949	
Sum squared resid	9.502989	Schwarz criterion	1.984665	
Log likelihood	-23.41985	F-statistic	1.441235	
Durbin-Watson stat	1.790156	Prob(F-statistic)	0.101412	

## 9.4 Explanation of variables

IB_ENS	=	Enskilda
IB_CAR	=	Carnegie
IB_SHB	=	Svenska Handelsbanken
IB_SWE	=	Swedbank
IB_HQ	=	Hagströmer & Qviberg
IB_ALB	=	Alfred Berg
IB_MS	=	Morgan Stanley
IB_OHM	=	Öhmans
IB_ARN	=	Aros / Nordea
IB_OVR	=	Övriga (excluded due to dummy variable trap)
S_IND	=	Industrials
S_CDI	=	Consumer Discretionary
S_CST	=	Consumer Staples
S_HLC	=	Health Care
S_FIN	=	Financials
S_IT	=	Information Technology
S_TEL	=	Telecomm (excluded due to dummy variable trap)
FAGE	=	Firm Age (Logarithmic variable)
M_ATC	=	Access to Capital Market
M_TOS	=	Take-over financed through Seasoned Equity Offering
M_RED	=	Reduce Debt
M_ISL	=	Increase Share Liquidity
M_INC	=	Incentives
M_PUB	=	Publicity
M_CON	=	Control (excluded due to dummy variable trap)
P_FAM	=	Family
P_ENT	=	Entrepreneur
P_VC	=	Venture Capital
P_EMP	=	Employees
P_ASS	=	Associated
P_GOV	=	Government
P_PUB	=	Public Corporation (excluded due to dummy variable trap)
OBT	=	Offer by Tendure
FIX	=	Fixed price Offer (excluded due to dummy variable trap)
POP	=	Positive Operating Profits
NOP	=	Neg. Op. Profits (excluded due to dummy variable trap)
SIO	=	Shift in Ownership
NIO	=	No S. in Owner. (excluded due to dummy variable trap)

REV = Revenue (Logarithmic value)  
C = Regression Constant