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# Definitions

**Equity-carve out/ partial spinoff** – A company that sells a small fraction of the shares in a subsidiary through an IPO or rights offer. It is not uncommon that the company will sell their remaining stake in the subsidiary at some point when the stock price has risen.

**Green Shoe provision** – Gives the members of the underwriting group the option to purchase additional shares at the offering price (Ross, Westerfield, Jaffe, & Jordan, 2008).

**Initial Public Offering (IPO)** – When the shares of a company are first offered to the public.

Initial Return – The percentage change between the IPO's offer price and first closing price.

**Investment bank** – in this thesis an investment bank is referred to as the advisor to the issuing company and may also act as underwriter for the issue.

Issuer - the company offering its shares to the public.

**Lock-in period** – the time period after the IPO in which the original owners are not allowed to sell their shares in the company.

Money left on the table – initial return times the number of shares issued.

**Prospectus** – Is a document containing information needed to form a well-founded analysis of the issuing firm and the shares offered. The information should be easy to understand and analyse.<sup>1</sup>

**Rights offer** – An issue of common stock to existing shareholders

**Stagging/flipping** – Buying into an IPO and immediately sell the shares once they start trading.

**Syndicate** - is a self-organizing group of companies formed to transact some specific business.

**Underwriting spread** – The fee charged to issuers by investment banks for underwriting the IPO. It is a negotiated and pre-set percentage of the total capital raised by the bank.

<sup>&</sup>lt;sup>1</sup> Definition from the Swedish Financial Supervisory Authority.

## 1 Introduction

Going public is probably one of the most exiting events in the life of a company. However, issuing an initial public offering (IPO) is associated with high costs, both direct and indirect. Evidence has repeatedly shown that IPOs are underpriced on average resulting in "money left on the table". Leaving money on the table essentially means that the issuing firm could have sold fewer shares at higher a price and still raise the same amount of capital or the same amount of shares at a higher price resulting in more capital raised. On the other hand, underpricing provide great opportunities for investors to earn abnormal returns. Subscribing to an IPO and immediately liquidate the holding once the shares starts trading is called stagging or flipping. An investor following this strategy starting with 100 000 SEK would after investing in 47 IPOs led by Carnegie have generated a wealth of 6 982 692 SEK, assuming that shares are purchased at the issue price and sold at the first day's closing price, that is a 6 883% return the initial investment. In other words, the Swedish IPO market provides great potential to earn abnormal returns.

Jenkinson and Ljungqvist (2001) compiled underpricing studies performed on 35 countries and found that IPOs are underpriced in all those countries. Loughran and Ritter (2004) found that the average underpricing in the U.S. between 1980-2003 were 18.7% and 65% during the Dot-com bubble. Bodnaruk et al. (2008) found that the average underpricing on the Stockholm Stock Exchange between 1995-2001 were 14.2%. Academics measure underpricing as the difference between the IPO's offer price and its first closing price in the stock market.

Internationally IPO underpricing has been given a great deal of attention from many academics. In Sweden, however, the research has been much less comprehensive and the coverage ends after 2001. After 2000 we have experienced two of the century's worst economic crises, which are likely to affect underpricing levels. An updated study focusing on underpricing in the Swedish IPO market is therefore highly relevant. The purpose of the thesis is thus, primarily to examine if Swedish IPOs consistently are underpriced and provide IPO investors with abnormal returns. Secondarily, it aims to identify patterns in IPO pricing that can be used to increase the likelihood of investing in "good" IPOs. Relevant research questions are: Is underpricing present in the Swedish IPO market? Can investors consistently beat the market by investing in IPOs? Have there been any trends in IPO pricing over the sample period? Does IPO pricing differ between segments, sectors and underwriters?

This thesis studies the 185 firms going public through issuing IPOs on Nasdaq OMX Stockholm between 1994 and 2011. The data was originally provided by Nasdaq OMX Nordic but has been verified in several instances. The result shows that Swedish IPOs, on average, are 11.49% underpriced. However, the level of underpricing varies widely between years, segments, sectors and lead managers. For example during the Dot-com bubble initial returns averaged at about 20% whereas after the bubble burst average initial return were negative 2%.

The structure of this thesis is as follows: section 1 presents background information on why firms go public, how firms go public, results from previous studies and why IPOs are underpriced. Section 3 presents the method and data used, section 4 presents and analyses the results and section 5 concludes.

# 2 Background

Why do firms go public? A whole thesis could be written to fully answer this question, however that is not the purpose of this study. The textbook explanations for going public include: raising new capital to finance investments, better access to future financing, improved liquidity and the ability for shareholders diversify their holdings (Berk, DeMarzo, & Hartford, 2008).

A company can raise new capital by offering existing shareholders and/or the public to subscribe for new shares in the company i.e. a rights issue. Raising capital from the current owners is of course not unique to the public company. However, if the owners already have most of their personal wealth invested in the company they may be less willing or able to invest further in the company. Thus the public company has better access to equity financing. Pagano, Panetta and Zingales (1998) also found that public firms have better access to debt financing and are able to borrow at lower interest rates than private firms. Furthermore, the public equity market provides firm owners with a platform for easier diversification. For private companies there is no official market for share trading, therefore the cost of finding a buyer is much higher. In public firms there are usually many owners and as the shares are traded on an exchange shareholders can easily change their holdings. Diversification and liquidity therefore constitutes a major reason for going public. Being publicly traded also lowers the owners monitoring costs since it is easy follow the share value in the stock market. For the private firm it much more complicated to know the value of the shares because specialist may be needed to come up with a reasonable share value and even then investors may not be willing to pay that price. Public firms can therefore easier to convince potential investors and/or creditors of the firm's true value. Moreover, during the going public process firms receives much attention from the analysts, financial press and the public. The increased publicity is likely to result in higher interest for the company; hence going public may have a positive effect on the interest for and sales of the company's products or services.

Ritter and Welch (2002) argues that the main reason for a firm to go public is to raise equity capital and to enter the public equity market in which the owners can exchange shares for cash at a future date. They argue that nonfinancial reasons only play a minor role in going public decision. This is consistent with Zingales' (1995) findings that publicly traded companies are more likely to be identified by potential acquirers than private firms. Thus, going public may facilitate an acquisition of the firm. Further, Brau, Francis, and Kohers (2003) show evidence that being a public company enables the owners to receive a higher price for their shares than in an outright sale. Pagano et al (1998) show that IPOs often are related to change in the control of the firm and that firms tend to go public when valuations for firms in the same industry are relatively high. Rajan and Servaes (1997) and Loughran, Ritter and Rydqvist (1994) also find that firms' take advantage of high firm valuations in timing the IPO. These findings all leads to the conclusion that firms go public to maximize the value of the firm, essentially the owners' personal wealth.

Being publicly traded indeed provides many advantages to a company and its owners but taking a firm public is often very costly. There are both substantial direct and indirect costs associated with the transaction. Examples of direct costs are underwriting, legal and auditing advisory and marketing fees. Indirect costs are the management's opportunity cost and money left on the table resulting from underpricing the company's shares. Leaving money on the table essentially means that the firm could have sold less shares at higher price and still raise the same amount of capital or sell the same amount of shares at a higher price, raising more capital. For investors on the other hand, underpricing makes up great opportunities to earn arbitrage profits by subscribing in IPOs and immediately liquidate the position once the shares starts trading, commonly referred to as stagging or flipping.

Underpricing of IPOs and leaving money on the table have been highly debated over the years. This chapter presents how firms go public, reasons for IPO underpricing, results from previous studies and implications of the efficient market hypothesis.

### 2.1 The Process of Going Public in Sweden

This section is based on Finansinspektionen's (2007) report "Bakgrundsrapport: Processen vid nyintroduktioner och emissioner (2007:11)", Jenkinson and Ljungqvist's (2001) book "Going Public: The Theory and Evidence on How Companies Raise Equity Finance" and Lipman's (2000) book "The Complete Going Public Handbook: Everything You Need to Know to Successfully Turn a Private Enterprise into a Publicly Traded Company". The process of taking a firm public in Sweden has been summarised in figure 1.



Figure 1. The process of going public in Sweden

Before the company can start the work towards going public, its board of directors must approve the IPO decision. Once the decision is made, the company need to make sure that regulations set by the Swedish Financial Supervisory Authority and the chosen stock exchange or unofficial market are met. Involving an advisor i.e. an investment bank already at this stage is normally the case. There are two fundamental ways of selecting advisor. The first method is through a competitive offering in which the investment bank offering the best price is selected. The second is called a negotiated offering where the issuing firm negotiates with several investment banks and may choose advisor for other reasons than the price. Several researchers have found that the fees charged by investment banks are less important than their reputation. Logue, Rogalski, Seward and Foster-Johnson (2002) claim that IPO issuers are willing to pay extra for a reputable investment bank because they are better marketers of the IPO. Further they claim that even though top tier investment banks charge more, the total cost borne by the issuer is lower with a high-quality underwriter, because less money is left on the table. Fernando, Gatchev and Spindt (2005) also found that underwriting spread does not determine the choice of investment bank. Instead they argue that issuing firms choose underwriter based on their reputation because of the more reputable investment banks superior ability to sell the IPO. Ljungqvist, Marston and Wilhelm (2006) show that previous underwriting performance and lending relations are the main factors when issuers choose lead manager. Krigman, Shaw and Womack (2001) found that the main arguments for changing underwriter are to get a more prestigious underwriter and to purchase influential analyst coverage.

Once the issuer has selected investment bank, which also accept the job, the two parts sign an engagement letter, stating the terms of the underwriter's involvement. In many IPOs the parts also sign an underwriting agreement stating that the investment bank commits to purchase unsold shares if investors draw back their offers or the investment bank is unsuccessful in selling all shares. In exchange for the risk carried by the bank they keep commission, a percentage of capital raised known as gross spread. The size of the gross spread varies greatly between different underwriters and IPOs. There are also other costs associated with going public such as the management's opportunity cost, application fees, legal and auditing advisory, etc. If the IPO is of substantial size the responsible investment bank (lead underwriter/manager) may need to put together a syndicate with other investment banks (partner underwriters) to increase the investor network and sales capacity. The partners are normally only involved in underwriting and/or marketing the IPO to potential investors. At this point the lead underwriter can start preparing the firm for listing and to make sure that they meet relevant regulations. Simultaneously they produce the material required by the financial supervisory authority and the market place.

The Swedish Financial Supervisory Authority requires firms going public to produce a prospectus. The prospectus should be written in a way that is easy to understand and contain all information needed to make a well-informed estimation of return opportunity and risk associated with the investment. The prospectus should contain information both about the company, its financial situation and the characteristics of the shares being offered. The official prospectus must be provided on the issuing firm's webpage at the latest one day before the offer begins. (Finansinspektionen [FI], 2007). The exchange or the unofficial market, which the firm aims to quote their shares on, also have extensive regulations that must be met in order to get approved. Since the public knows little about the issuer a due diligence investigation of the firm is performed. The due diligence includes identifying legal contracts (e.g. patents and licensing rights), examining the top management and board's background and a financial audit making sure that the issuer's books are in order.

The listing process varies in time between different market places. Getting listed on the Stockholm Stock Exchange may take up to a year (FI, 2007). Therefore the issuing firm and its advisor evaluate plausible market place to get listed on and apply to get listed as soon as possible. Once the application is received the exchange appoints an auditor who works alongside the lead underwriter auditing the material they produce such as the due diligence and the prospectus.

During the preparations the issuer and the lead underwriter discuss amount of capital to raise, type of shares to issue, to whom the shares should be offered and the value of the company. There are different ways of pricing an IPO the issuer can set a fixed price or a price interval i.e. book-building (see next page). To come up with the final price or price range the lead underwriter's analysts' perform preliminary firm valuations. Valuation method varies widely but the discounted cash flow analysis and peer group analysis are commonly used (Jenkinson, & Ljungqvist, 2001). To find out investors' response to a price it is common to send out a preliminary price and prospectus to potential investors. The prospectus can then be revised depending on the reaction from the investors'. It is important to notice that the underwriter only may advice the issuing firm regarding the price. It is the issuer that sets the final price. Once the prospectus is sent to and approved by the Swedish Financial Supervisory Authority the investment bank starts marketing and to offer IPO

shares to potential investors. Apart from the syndicate's marketing, the issuing firm's top management may go on an IPO road show. During the road show the top management visit and present the company to investors that are considered important to get on board, thus the purpose is to create an interest in the company and the securities offered. However, it is important that the information disclosure does not vary from the already publicly available information. Other forms of marketing that sometimes are used include press briefings and advertising.

The final stage before going public is to set the final price and allocate the shares among the investors. If using a fixed price and the issue is under-subscribed then all offers can be met and the underwriter take the unallocated shares into its own stock. If over-subscribed the underwriter try to put together a set of investors that will contribute to a good liquidity in the shares. The issuer may also have preferences regarding investors and ownership distribution that the underwriter must have in mind. There is no Swedish law regulating the allocation of shares however the exchange or market normally has rules regarding allocation of shareholders. The underwriter reports their suggestion regarding allocation but it is the issuer taking the final decision.

The book-building effort, which normally is used in large IPOs, starts with inviting investors to bid for the shares offered. Bids are accepted within the price range specified in the prospectus. Depending on the demand the lead underwriter may revise the initial price range. If the demand is weak it might be in place to lower the price range and vice versa. At the end of the bidding period the lead underwriter has a pretty good understanding of investors demand at different price levels. The issuing firm sets a price with recommendations from the investment bank and start to allocate shares to desired investors. The chosen investors are then contacted to confirm their bids. This is when the issuing firm first announce the result from the IPO.

Many underwriting agreements include price stabilising actions taken by the investment bank or the whole syndicate. The reason is to ensure that the initial trading price do not differ much from the issue price. If the share price falls the stabilising manager place buy orders to put upward pressure on the price. If there is excess demand for the issue the investment bank may instead exercise the over-allotment option also referred to as a Green Shoe provision. The option gives the underwriter the right to sell more shares than originally planned, normally to a maximum of 15 per cent of the total capital raised and within 30 days from the issue. Other services provided by the investment bank may include market making to improve liquidity and/or analyst coverage to provide investors with information.

### 2.2 Underpricing of IPOs

IPO pricing has been the focus of many studies before this and most of them show evidence for IPO underpricing. Jenkinson and Ljungqvist (2001) show that initial returns are positive in almost all countries<sup>2</sup>. They come to the conclusion that underpricing is typically more than 15% in industrialised countries and about 60% in emerging markets. However most research has focused on the IPO market in the United States and the evidence is less complete when looking outside the U.S.

Essentially, underpricing of IPOs means providing some lucky investors with abnormal returns at the cost of the issuer, "leaving the money on the table". As researchers repeatedly have shown evidence for IPO underpricing, one might ask the question why issuers accept such high underpricing of their shares? Loughran, and Ritter (2002) argue that the owners of underpriced issues do not get upset because they realise that they are much wealthier than they originally thought. Further, an issue's reported underpricing often greatly exaggerates the original owners wealth loss, unless they sell all their shares at the initial public offering. E.g. suppose that an issue is underpriced by 10% and the original owners sell 20% of the company's current shares, thus a secondary offering. Then there is only a 2% wealth loss to the original owners. Loughran and Ritter (2002) also argues that issuers are willing to leave large amounts of money on the table in exchange for influential analyst coverage, which they get with the top tier investment banks. But what is the reason for underpricing of initial public offerings? Over the years academics have presented several possible explanations. Rock (1986) suggests that IPO underpricing is an efficient way to compensate investors for their informational disadvantage regarding the firm's true value. Without underpricing, uninformed investors would rather buy the shares in the after market once the "good" IPOs have distinguished them selves from the "bad" IPOs. Thus, the underpricing may be thought of as return for taking the risk (Jenkinson, & Ljungqvist, 2001). Allen and Faulhaber (1989) believe that firms underprice their IPOs to signal quality to investors. Jenkinson and Ljungqvist (2001) show that underpricing tend to result in good press for the company e.g. broadcast.com heavily underpriced their issue resulting in an initial return of 249% and a very strong media interest. Further, they argue that underpricing insure against under-subscription and that excess demand in an IPO makes it possible allocate fewer shares to each investor, which minimises the risk of diluting the original owners control of the company. Loughran and Ritter (2002) comes to the conclusion that investment banks underprice, which lowers their commission, to attract investors whom will compensate the banks by providing them with business. Chi and Padgett (2005) found that IPO underpricing is at least in part a consequence of low supply and high demand. All in all, even though IPO underpricing is a large cost to the issuer, it may also provide a desired

<sup>&</sup>lt;sup>2</sup> Jenkinson and Ljungqvist (2001) compiled 38 IPO studies covering: Australia, Austria, Belgium, Brazil, Canada, Chile, China, Denmark, Finland, France, Germany, Great Britain, Greece, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Philippines, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey and USA. They found that IPOs are underpriced in all countries with the exception for tender offers in Great Britain.



outcome (Jenkinson, & Ljungqvist, 2001). Some of the explanations will be covered more in-depth later in this chapter.

Table 1 presents results from previous IPO underpricing studies. Most studies focusing on the Swedish market uses old data and therefore needs to be updated. Rydqvist (1997) explains that pre 1990 IPOs were allocated to employees, customers and suppliers as taxefficient compensation. After tax changes were imposed in 1990 underpricing of IPOs dropped significantly. Rydqvist's (1997) 1990-1994 data set and Bodnaruk et al.'s (2008) studies are therefore the best indications of the current IPO underpricing in Sweden. From table 1 it can also be concluded that IPO underpricing tend to be higher in emerging markets compared to developed economies. Most emerging markets have average initial returns above 20%. Brazil, China, Korea and Malaysia have rather extreme underpricing all with average initial returns above 74%. In developed economies average initial is return is typically in the range of 5-30%. However, there are some extreme cases both in emerging and developed markets e.g. the low average initial return of 9% in Chile and high average initial returns of 49% in Greece. Nevertheless, Jenkinson and Ljungqvist's (2001) conclusion that initial returns are higher in emerging markets can be confirmed.

Even though investors need incentives in terms of higher returns to take on more risk, average first day returns of 289% in China<sup>3</sup> (Mok & Hui, 1998) seems very excessive. Chi and Padgett (2005) argues that the extreme underpricing in China is explained by a big gap between IPO supply and demand. Between 1996 and 2000 approximately 800 firms went public by issuing IPOs in China. 800 firms may not sound very low but keep in mind that China's economy is almost 13 times as large economy as the Swedish economy and that the Chinese population is almost 144 times the Swedish population.<sup>4</sup> Thus Sweden has a much higher supply of IPOs with its 101 firms issuing IPOs during the same time period (see appendix 7.1). Because the demand for Chinese IPOs by far exceeds the IPO supply, the shares are distributed using a lottery system but only a small per cent of the subscriptions get allocations (Chi, & Padgett). One might therefore argue that the IPO market is likely to follow the basic economic principles of supply and demand. Then, investors can expect relatively low initial returns when IPO supply is relatively high and vice versa. To which extent this is true depends on the elasticity of supply in the IPO market.

<sup>&</sup>lt;sup>3</sup> It applies to Chinese A-shares, which are sold exclusively to domestic investors and traded in Yuan. Chines B-shares are traded in US dollars on the Shanghai Stock Exchange and in Hong Kong dollars on the Shenzhen Stock Exchange and may also be traded by foreign investors. (Chi, & Padgett, 2005)

<sup>&</sup>lt;sup>4</sup> In 2010 China's GDP was 5878.257 Billion USD compared to 458.725 Billion USD in Sweden. China's population in the same year were 1341.414 million persons compared to the 9.327 million persons in Sweden. (International Monetary Fund, 2011)

#### Table 1. Previous studies

Issue country	Study	Period	Number of IPOs	Average inital return	Note
Austrailia	Finn and Higham (1988)	1966-1978	93	29.2%	
Austrailia	Ritter (2003)	1976-1995	381	12.1%	Compiling study
Austria	Aussenegg (1999)	1984-1999	76	6.5%	
Belgium	Ritter (2003)	1984-1999	86	14.6%	Compiling study
Brazil	Aggrawal Leal and Hernandez (1993)	1979-1990	62	78 5%	
Canada	Ritter (2003)	1971-1999	500	6.3%	Compiling study
Chile	Bitter (2003)	1982-1997	550	8.8%	Compiling study
China	Mok and Hui (1998)	1001-1003	101 (22)	280.2% (26%)	A_Shares (B_Shares)
China	Chi and Padrott (2005)	1006 2000	101 (22)	120 16%	A Sharos
Denmark	lakobsen and Sørensen (2001)	1994-1998	117	5.4%	A-Silales
Einland	Ritter (2003)	1984-1998	00	10.1%	Compiling study
France	Loughran Ritter and Rydgyict (1994)	1982-1997	187	10.1%	Compiling study
France	Bittor (2002)	1082 2000	E71	4.270	Compiling study
Germany	Liupgovist (1997)	1970-1993	180	0.2%	Compiling study
Germany	Liungquist (2002)	1079 1000	407	27.7%	
Groat Britain	Lonkinson and Mayor (1988)	1092 1096	407	27.7%	Placings (Fixed price offers) [Tender offers]
Great Britain	Dittor (2002)	1965-1980	2122	17.40/	Compiling study
Great Britain	Ritter (2003)	1959-2001	3122	17.4%	Compiling study
Greece	Ritter (2003)	1987-2002	338	49%	Compiling study
	Killer (2003)	1980-2001	857	17.5%	Compling study
India	Krisnnamurti and Kumar (2002)	1992-1993	98	35.3%	Consulting study
Indonesia	Ritter (2003)	1989-2001	237	19.7%	Compiling study
Israel	Ritter (2003)	1990-1994	285	12.1%	Compiling study
Italy	Cherubini and Ratti (1992)	1985-1991	/5	29.7%	
Italy	Ritter (2003)	1985-2001	181	21.7%	Compiling study
Japan	Jenkinson (1990)	1986-1988	48	54.7%	
Japan	Ritter (2003)	1970-2001	1689	28.4%	Compiling study
Korea	Ritter (2003)	1980-1996	477	74.3%	Compiling study
Malaysia	Dawson (1987)	1978-1983	21	166.6%	
Malaysia	Ritter (2003)	1980-1998	401	104.1%	Compiling study
Mexico	Aggrawal, Leal and Hernandez (1993)	1987-1990	37	33%	
Netherlands	Ritter (2003)	1982-1999	143	10.2%	Compiling study
New Zealand	Ritter (2003)	1979-1999	201	23%	Compiling study
Nigeria	Ikoku (1995)	1989-1993	63	19.1%	
Norway	Emilsen, Pedersen & Sættem (1997)	1984-1996	68	12.5%	
Philippines	Sullivan and Unite (1998)	1987-1997	104	22.7%	
Poland	Aussenegg (2000)	1991-1998	149	35.6%	
Poland	Jelic and Briston (2003)	1991-1998	140	27.4%	
Portugal	Alphao (1992)	1986-1987	62	54.4%	
Portugal	Almeida and Duque (2000)	1992-1998	21	10.6%	
Singapore	Koh and Walter (1989)	1973-1987	66	27.0%	
Singapore	Ritter (2003)	1973-2001	441	29.5%	Compiling study
South Africa	Page and Reyneke (1997)	1980-1991	118	32.7%	
Spain	Fernández and Rahnema (1997)	1985-1990	71	35.4%	
Spain	Ritter (2003)	1986-1998	99	10.7%	Compiling study
Sweden	Loughran, Ritter and Rydqvist (1994)	1970-1991	213	39,00%	Compiling study
Sweden	Rydqvist (1997)	1980-89 (1990-94)	251	40.7% (8%)	Stockholm Stock Exchange and unofficial market
Sweden	Ritter (2003)	1980-1998	332	30.5%	Compiling study
Sweden	Bodnaruk, Kandel, Massa and Simonov (2008)	1995-2001	124	14.2%	Stockholm Stock Exchange
Switzerland	Kunz and Aggrawal (1994)	1983-1989	42	35.8%	
Switzerland	Drobetz, Kammermann and Waelchli (2003)	1983-2000	120	34.9%	
Taiwan	Chen (1992)	1971-1990	168	45%	
Taiwan	Huang (1999)	1971-1995	311	42.6%	
Taiwan	Ritter (2003)	1986-1998	293	31.1%	Compiling study
Thailand	Wethyavivorn and Koo-smith (1991)	1988-1989	32	58.1%	
Thailand	Ritter (2003)	1987-1997	292	46.7%	Compiling study
Turkey	Ozer (1997)	1989-1994	89	12.2%	
Turkey	Ritter (2003)	1990-1996	163	13.1%	Compiling study
USA	Ibbotson (1975)	1960-1969	120	11.4%	
USA	Ibbotson and Ritter (1995)	1960-1992	10626	15.3%	
USA	Rajan and Servaes (1997)	1975-1987	2725	10.03%	
USA	Carter, Dark and Singh (1998)	1979-1991	2292	8.08%	
USA	Aggarwal, Prabhala and Puri (2002)	1997-1998	174	19.25%	
USA	Loughran and Ritter (2002)	1990-1998	3025	14.07%	
USA	Ritter and Welch (2002)	1980-2001	6249	18.8%	
USA	Ritter (2003)	1960-2001	14840	18.4%	Compiling study
USA	Loughran and Ritter (2004)	1980-2003	6391	18.7%	
Worldwide av	erage initial return	1959-2003	62326	20.69%	

#### 2.2.1 Information asymmetries

As discussed previously one of the firm's main motivation for going public is to maximize firm value and thus the owners' personal wealth. Therefore firms generally go public when firms in the industry receive high valuations. The investors are however, less informed of the firm's true value, which creates an information asymmetry problem that gives an advantage to the issuer. Rock (1986) explains IPO underpricing as a natural consequence of the information asymmetry between the issuer and the investor and that issuers underprice to compensate investors for their informational disadvantage.

Akerlof (1970) first explained the information asymmetry problem with the used car market. He argued that the seller of a used car better knows the value of the car compared to the buyer. Because the buyer cannot distinguish between a good and a bad car he will offer the same price for both the good and the bad car. Hence, owners of good cars will keep their cars since they know their cars superior value to those bad cars. Putting this into the IPO markets context, issuers know the value of their firms but investors cannot distinguish between good and bad firms. Because investors cannot distinguish between good and bad IPOs, they will offer the same price for both IPOs. Then, good firms may be less willing to go public because they have to sell their shares at a discount. The bad firms however, have an increased incentive to go public because their shares are likely to be overpriced. This causes an adverse selection problem were mainly bad firms go public and good firms stay private. This may explain why the average firm going public show long-run underperformance as Ritter (1991), Brav and Gompers (1997), Jenkinson and Ljungqvist (2001) and many more have shown evidence for. However, Rock (1986) argues that there are both informed and uninformed investors in the IPO market. The informed investors know the true value of the IPO whereas the uninformed investor has no information on the true value of the IPO. Since, the uninformed investor is unable to distinguish between a good and a bad IPO he will invest equal amount in all IPOs. The informed investor however, who is able to identify good and bad IPOs will only invest in good IPOs. Because IPOs with good prospects typically are oversubscribed, Rock (1986) argues that the informed investor will register interest for more shares than he is in fact willing to purchase. This is to ensure the allocation he is truly after. The uniformed investor on the other hand, will only subscribe for his desired allocation and is therefore likely to get fewer shares than wanted since good issues tend to be oversubscribed. For IPOs with bad outlook, the informed investor does not register any interest and therefore receives no allocation. The uninformed investor however, subscribes for the same value as in the good IPO case. Because the interest for bad IPOs tends to be lower, the uniformed investor is likely to get his desired share allocation. The uninformed investor will therefore receive a lower average initial return than that for the whole IPO market. The informed investor on the other hand, is likely to receive a higher average return than the total average initial IPO return since he only invests in good performing IPOs.

Because the underwriter's income from an IPO transaction depends on the capital raised they want to minimise the risk of having to take in large quantities of the issuers shares into own stock. Thus, banks may be tempted to set a lower price to ensure the sale of as many shares as possible. But on the other hand they want to set a high price to maximise the total capital raised. Both maximises fees charged. Because the bank has superior knowledge of asset pricing a moral hazard problem arises were it is uncertain whether the bank acts in the best interest of their client or in their own best interest. However, investment banks cannot underprice IPOs too much since it would mean loosing underwriter business on the other hand they must underprice enough to attract investors and not loose business from investor clients (Jenkinson, & Ljungqvist, 2001). Therefore it can be assumed that investment banks looking to stay in business want to underprice moderately.

Signalling is also used as a common explanation for underpricing IPOs. As Ibbotson (1975, p. 264) puts it, issuers underprice to "leave a good taste in investors mouths so that future underwritings from the same issuer could be sold at attractive prices". According to Zingales (1995) owners decide to take their firm public to maximize the revenue of a future sale of the firm. He suggest that equity carve-outs, where the initial owners sell only a small fraction initially and the rest of the company at a future date when the share price has increased substantially, is the most value maximizing strategy when selling a firm in most cases. Pagano, Panetta and Zingales (1998) show that the controlling group had changed significantly three years after a firm's IPO, which to some extent confirm that a future sale of the firm is a reason for taking it public. Allen and Faulhaber (1989) suggest that firms deliberately underprice their IPOs to signal their good prospects to investors. However, because firms with bad prospects cannot recoup the loss resulting from underpricing they cannot afford to send the signal. The good firms share prices will eventually increase as investors realise the firms true value. By only selling a fraction of the company at the IPO the signalling theory can be used to maximise the owners' total gain. When the share price has risen to a satisfactory level and the potential lock-in period (the time period after the IPO in which the original owners are not allowed to sell their shares in the company) has expired the owners can take advantage of a high share price and sell their existing stakes. Signalling by underpricing thus suggest that the initial owners utilities are maximized.

#### 2.2.2 Competition in the IPO market

Several studies have shown that U.S. investment banks tend to charge a higher gross spread than their international competitors. For instance, Chen and Ritter (2000) show that the gross spread for U.S. IPOs is clustered at 7% and that spreads in other countries typically is about half of that. However, Jenkinson and Ljungqvist (2001) argue that underwriters also can compete for business with the offer prices they set. Loughran and Ritter (2002) found that IPOs, on average, leave about twice the size of the gross spread on the table. Ljungqvist, Jenkinson and Wilhelm (2003) find that U.S. investment banks charge higher fees than local banks outside USA. However, they also show that U.S. banks set better offer prices, which results in less underpricing, thus leaving less money on the table. Logue et al. (2002) argues that top tier investment banks charge higher spreads but leave less money on the table. Thus, there seems to be a trade-off between the gross spread charged and the level of underpricing. The direct fees i.e. gross spread charged by banks may seem high but the indirect costs i.e. money left on the table may be even higher. Gross spreads and money left on the table seem to vary widely among different banks, choosing the right lead manager may therefore have great impact on the total cost borne by the issuing firm.

Investment banks openly admit that IPO transactions are very profitable and that there is no price competition because they do not want to make it a commodity business (Chen, & Ritter, 2000). If prices are not set at competitive levels one might ask why do not new firms enter the market and compete on the fees? Then issuing firms would be able to shop around for the bank with the lowest fees. Jenkinson and Ljungqvist (2001) argue that reputation is absolutely crucial in the financial markets, which makes it hard for new entrants to compete with the well-established players. Hence, the IPO market might not be perfectly competitive. Because a large investor network is essential to be successful in the underwriter market the larger banks may have a competitive advantage to their smaller competitors. Nevertheless, Swedish and Scandinavian banks compete with both big European and top tier U.S. banks, which certainly increase the competition in the Swedish IPO market.

#### 2.2.3 IPO risk

The risk of investing in a company's shares is that its value will fall and in worst-case scenario that the security becomes worthless because the company goes bankrupt. Thus, the risk faced by the IPO investor is that the share price will fall below the offer price and/or that the investor are not able to sell the shares due to poor liquidity. The volatility measures standard deviation and variance are the most common way to measure security risk. However because a private company has no record over their historical share prices it is impossible to use volatility to measure risk for a single IPO. The shares track record also provides a benchmark when evaluating if a share is correctly priced. In a rights issue for example, which are underpriced to encourage investments from current shareholders or the public, the historical share price is necessary to conclude by how much the offer is underpriced. Consequently the lack of a historical price makes it harder to estimate whether the IPO's offer price is set over, under or at the true value of the share. Further, there is a risk that there will be low or no trading activity in the shares once they start trading. However, most IPO transactions contain an agreement that requires the lead or a stabilising manager to uphold the share liquidity in the aftermarket. Thus, if the trading activity is low the bank can buy shares to create demand or sell more shares to increase supply. The interest for the IPO during the pre-market may provide some indication of the future demand for the shares.

Even though the risk of a single IPO cannot be estimated using volatility measures, it is possible to come up with the volatility for IPOs in general using a set of previously issued IPOs. This should provide investors with some indication of how much IPOs tend to fluctuate around the mean initial return. To make a more precise estimate of a specific IPO's risk requires a much more complex analyses, involving studying the prospectus, annual reports, the company's and its branch outlooks, etc.

It is well known that there is a positive relationship between risk and return i.e. investors demand and are rewarded with higher returns when investing in risky securities compared to investing in less risky securities. The previous studies listed in table 1 show that initial

IPO returns are, on average, high. Thus, because initial returns in IPOs are high, the risk of investing in IPOs must also be high. Still, investing in a large enough number of IPOs should provide investors with a high average initial return. Some of the IPOs will produce relatively low, or even negative, initial returns whereas other will generate relatively high initial returns. Thus, investors average initial return will move towards the total IPO markets average initial return, as the number of IPO investments increases. Hence, the risk of shrinking the investors' wealth decreases with the number of IPO investments. Diversification is well argued to reduce market risk in portfolio theory. However, investors may not always be able to get share allocation in all IPOs they subscribe for. In undersubscribed issues, all investors of course get allocated since the issuer and the bank want to sell as many shares as possible. In oversubscribed issues on the other hand, there is an excess demand for the shares. Consequently, not all investors get allocation and/or investors get less share allocation than they desire. Hence, the risk that an IPO investor's average initial return falls below the total market average return decreases with the number of investments but increase if the investor is unable to get share allocation.

Jenkinson and Ljungqvist (2001) compile different uncertainty factors that academics have found affects underpricing of IPOs e.g. firm age, width of the offer range, earnings forecast and underwriter reputation. A new started firm is obviously more risky than a firm with established operating relationships and a track record of positive results. Hanley (1993) found that the width of the offer price range indicates the uncertainty about an IPO's true value. A wide offer range indicates greater uncertainty about the true value of the company's shares and vice versa. Clarkson and Merkley (1994) found a relationship between disclosing earnings forecasts in the prospectuses and uncertainty about the true issue price. Namely that disclosing earnings forecast in the prospectus decreases the uncertainty about the true value. As argued previously a reputable investment bank can benefit the issuer in many ways, for example by creating trust among investors. Further, Ritter (1984) argues that riskier IPOs are more underpriced than less risky IPOs.

To conclude, investing in IPOs is riskier than investing in many other securities, therefore IPO investors are on average rewarded with higher returns. Even though there are high risks associated with IPO investing they can be minimised by diversification and firm risk analyses.

### 2.3 Implications of the Efficient Market Hypothesis

An efficient market is "a market where prices at every point in time represent best estimates of intrinsic value. This implies in turn that, when an intrinsic value changes, the actual price will adjust "instantaneously", where instantaneously means, among other things, that the actual price will initially overshoot the new intrinsic values as often as it will undershoot it" (Fama, 1965, p. 94). Thus, in an efficient security market security prices fully reflect all available information. In 1970 Fama developed the three different strengths of market efficiency, weak form efficient, semi-strong form efficient and strong form efficient. If the market is weak form efficient historical prices cannot be used to predict future stock prices. For the semi-strong form to hold all publicly available information is immediately incorporated into stock prices, therefore investors cannot use already public information to consistently earn abnormal returns. If the market is strong form efficient investors private information cannot be used to predict future prices, thus insiders are not be able to consistently earn abnormal returns. (Fama, 1970).

Because empirical evidence shows that underpricing exists in almost all IPO markets, one must either reject the efficient market hypothesis or believe that issuers deliberately underprice their issues. Assuming the latter, the market must at least be semi-strong efficient for the underpricing definition (the difference between the offer price and the first day closing price) to hold. To justify the use of first day's closing prices in the definition, the shares offered must be assumed to have adjusted to their "intrinsic value" at the end of the first trading day, which the semi-strong form of market efficiency assumes. Behavioural finance proponents on the other hand, would oppose the fast adjustment and perhaps use the first week or moth's average price instead. However, the purpose of this study is not to conclude how much money the issuing firm left on the table but to examine if investors can earn abnormal returns by investing in IPOs. Thus, whether the underpricing definition holds in an efficient market or not is somewhat irrelevant.

## 3 Method and Data

This study focuses on numerical data to examine underpricing and differences in underpricing differences in the Swedish IPO market, thus it uses a descriptive quantitative approach. Ritter and Welch (2002) claim that the typical way academics measure IPO underpricing, is by taking the percentage difference between the issue/offer price and the first day closing price. Underpricing of IPOs is therefore often referred to first-day return or initial return. Because this definition is common practice within the field, it is also used when calculating underpricing in this study. The mathematical formula of underpricing is as follows:

$$Underpricing/Overpricing = \frac{First \ day \ closing \ price - Offer \ price}{Offer \ price}$$

The data set is composed of all firms listing on the major Swedish Stock Exchange, Nasdaq OMX Nordic Stockholm (Stockholm Stock Exchange), between 1994 and 2011 though issuing IPOs. Firms listing on the minor official stock exchange, Nordic Growth Market Equity, and unofficial exchanges are not included in this study due to insufficient information. The IPO data consists of secondary data supplied by Nasdaq OMX Nordic, which have been verified in several instances. The issue prices have been confirmed using the Swedish Tax Agency's stock history, prospectuses supplied by the Swedish Financial Supervisory Authority and issuing firms' webpages. First day closing prices has been collected from Nasdaq OMX Nordic's webpage. Information on dead stocks, e.g. firms that have been acquired by other firms or gone bankrupt, has been collected from microfilms of the financial newspaper Dagens Industri; the stock price information from Dagens Industri has also been used to verify the closing prices supplied by Nasdaq. Information on the acting Lead Manager for the issues has been gathered from the issuing firms prospectuses. 185 firms issued IPOs and listed on the Stockholm Stock Exchange between 1994-2011. This study examines all those 185 firms and should therefore provide a good indication of underpricing in the Swedish IPO market as a whole. Table 2 present descriptive statistics for the data. The IPOs were on average underpriced by 11.49% but the initial returns varied greatly and ranged from -22.35% to 241.04%. The high return variation generates a high standard deviation of 25.75% in the Swedish IPO market, which essentially means that IPO returns are highly uncertain. The results are presented further in the result and analysis chapter.

Table 2. Descriptive statistics for the data s				
IPOs on the Stockholm Stock Exchange between 1994-2011				
Number of IPOs	185			
Number of positive initial returns	135			
Number of negative initial returns	50			
Average initial return	11.54%			
Average index adjusted initial return	11.49%			
Highest initial return	241.04%			
Lowest initial return	-22.35%			
Standard deviation of adjusted initial returns	25.75%			
Median	6.56%			
Correlation between initial returns and market returns	0.07			

Figure 2 further illustrates the IPO data set and ranks the IPO observations from the highest to lowest initial return. As can be seen in the figure the highest initial return is more than twice as high as the second highest initial return and is therefore an extreme value. However, it is not excluded from the data set since this thesis aims to investigate all IPOs issued on Nasdaq OMX Stockholm between 1994-2011.



Figure 2. Initial returns for IPOs in the data set

### 3.1 Statistical significance

A null hypothesis is set up to confirm the significance of the results. The hypothesis is tested using a linear regression between initial IPO returns (dependent variable) and the corresponding OMXS30 returns (independent variable).

> $H_0$ : average initial IPO return  $\leq$  average OMXS30 return  $H_1$ : average initial IPO return > average OMXS30 return

The null hypothesis is rejected at  $\alpha = 10\%$ , verifying that positive initial IPO returns are statistically significant. Thus, there is a 90% probability of earning abnormal returns when investing in IPOs. A 90% confidence interval is chosen since the 95% and 99% confidence intervals are unable to prove statistical significance. The regression output is found in appendix 1.

#### 3.2 Cross-sectional study

A cross-sectional study is used to examine underpricing differences between different years, market segments, sectors and lead managers. In the first analysis, IPOs are divided in to 18 subsets depending on which year between 1994-2011 the IPO was issued 1994-2011. In the second analysis, IPOs are divided into 3 subsets depending on which market segment the IPOs listed in. Before Nasdaq acquired the Stockholm Stock Exchange, shares were divided between the three different lists A, O and OTC depending on the trade volume of the shares. Essentially, the largest companies were listed on the A-list, the smallest on the OTC-list and the midsized companies on the O-list. After the acquisition Nasdaq made some changes to the subdivisions of shares creating the three segments Large Cap, Mid Cap and Small Cap. Thus, shares are still divided into groups based on the size of the company. Therefore, three market segments are presented, one large segment including both the A-list and the Large-Cap issues, one medium segment including the O-list and the Mid-Cap issues and finally one small segment including the OTC-list and the Small-Cap issues. This is to create less confusion and to make it easier to follow the reasoning. Keep in mind though that when referring to IPOs issued in the large segment it can be IPOs listed on either the A-list or Large-Cap and the same goes for the medium segment and small segment. The third analysis divides IPOs into 10 subsets depending on the issuing firms sector classifications according to the Global Industry Classification Standard (GICS), also used by Nasdaq. The different classifications and thus subsets are Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Health Care, Financials, Information Technology (IT), Telecommunication Services (Telecom) and Utilities (MSCI, 2010). In the fourth analysis IPOs are divided into 29 subsets, one for each investment bank who acted as lead manager for at least one IPO transaction. In some of the IPOs two or more banks acted as joint lead managers. These IPOs will therefore appear in each lead manager's subset. Some of the banks have acquired other banks that were active in the IPO market. In most cases, the acquired banks will be gathered under the acquiring bank's name. When referring to IPOs lead by Kaupthing it includes IPOs led by the acquired banks Matteus, Nordiska and Aragon. Nordea include Aros, Nordbanken and MNB Maizels. Swedbank include Föreningsbanken and Sparbanken. In 2010 Carnegie acquired HQ but since they were such a big player in the IPO market they are presented separately. Cerdit Lyonnais, Fisher Partners, Kaupthing, Lehman Brothers and S.G. Warburg were also acquired by other banks, however, none of the acquirers have been present in the Swedish market since which is why their original names are used. Finally, the results from the different analyses are compiled to present a general picture of the underpricing in the Swedish IPO market.

In the cross sectional study initial returns are adjusted for movements in the stock market index, OMXS30. If initial returns are positive after the market movement adjustment it can be concluded that IPOs outperform the market. Since closing prices are used when calculating initial returns for IPOs closing prices will also be used when calculating the index return. The stock market movements are calculated as follows.

 $R_{OMXS30} = \ln \left( \frac{Market \ value \ OMXS30_1}{Market \ value \ OMXS30_0} \right)$ 

### 3.3 Granger causality tests

The Granger causality test determines a relationship between two time series. In contrast to correlations, which simply states how strong the relationship between two variables is, the Granger causality test is a statistical hypothesis test that concludes which variable is caused by the other, or if both are caused by each other. Hence, with a significant Granger causality tests have been used to forecast the other variable. Granger causality tests have been used to strengthen the results and analysis by confirming or rejecting relationships between different variables.

#### H<sub>0</sub>: OMXS30 does not Granger cause initial returns

#### H<sub>1</sub>: OMXS30 does Granger cause initial returns

The null hypothesis cannot be rejected for any of the significance levels 90%, 95% or 99%, thus OMXS30 returns does not affect initial returns.

H<sub>0</sub>: Average annual initial return does not Granger cause

no. of IPO issues the following year

H<sub>1</sub>: Average annual initial return does Granger cause

no.of IPO issues the following year

The null hypothesis cannot be rejected for any of the significance levels 90%, 95% or 99%, thus average annual initial return in one year does not affect the number of IPO issues the following year.

H<sub>0</sub>: OMXS30 does not Granger cause no. of IPO issues

H<sub>1</sub>: OMXS30 does Granger cause no. of IPO issues



The null hypothesis is rejected at  $\alpha = 10\%$  and 1 lag for the period between 1994-2011 and at  $\alpha = 5\%$  between 2000-2011. Thus, OMXS30 returns affect the number of IPO issues in the Swedish IPO market.

### 3.4 Criticism of sources

Because the exchange where the firms listed, Nasdaq OMX Stockholm, supplied the IPO data it is considered very reliable. Because the Swedish Tax Agency, Dagens Industri and the issuing firms 'prospectus' have verified much of the information its reliability is further enhanced. However, no matter the thoroughness of the data handling there is always the risk of human errors. The references used are also considered reliable, since the focus has been on work from the most acknowledged researchers within the subject. Furthermore, the oldest and most recent studies have been given less attention on to eliminate the risk of outdated and inaccurate results. Also the results from the study are considered reliable firstly because they are statistically significant and secondly because they are inline with the results from previous studies.

## 4 Results and Analysis

Between 1994 and 2011, 185 firms went public through Initial Public Offerings on the Stockholm Stock Exchange. The average initial IPO return after adjustment for market movements in the OMXS30 index were 11.49%. The result is statistically significant at  $\alpha = 10\%$ , meaning that 9 of 10 IPOs perform abnormal returns. This empirically proves that IPOs issued in the Swedish IPO market are underpriced. Consequently, IPOs provide investors with great opportunities to earn abnormal returns. But as always, in order to achieve high return investors must be willing to accept more risk. The uncertainty of returns measured by standard deviation is much higher for the IPOs (25.75%) compared to that of the market (1.51%). Therefore, IPO investors must expect quite high variation in initial returns. Nevertheless, 73% of the IPOs generated positive initial returns, which puts the odds in favour of the IPO investor. The highest initial return of 241.04% is truly desirable to any investor but not many investors are willing to accept the risk of an initial loss of 22.35%, which is the most negative initial return for an IPO during the period. Thus, stagging is not a perfect investment strategy that always generates abnormal returns.

This chapter will further examines the Swedish IPO market's characteristics and analyse how investors may benefit from the knowledge.

### 4.1 Time trends

The highest initial return of 241.04% is more than twice as high as the second highest initial return (104.84%) and thus an extreme value. The reason for the IPO's extreme underpricing is likely to be described by the timing of the IPO. As can be seen in figure 3, it was issued just before the stock market peaked during the Dot-com bubble. Excluding the extreme value from the data set yields an average initial return of 10.24%, only a modest decrease of 1.25%. The standard deviation, however, is substantially reduced and falls by 6.33%, from 25.75% to 19.42%. Because IPOs outperform the market by far even when excluding the extreme value, it will not be excluded further in the analysis. Also the IPO with the largest initial loss of -22.35% can be explained by the timing of the issue. It was issued in the middle of 2001 after the market had plunged 45% from its all time high at 1539 just over a year earlier. After the IPO was issued the stock market continued to fall for another year before hitting the bottom at 421 in 2002. The stock market had then fallen 73%. Thus the IPO was issued during of one of the worst economic downturns in history. Keeping in mind that the cause of the downturn was a security price bubble, makes it is easy to understand investors' scepticism towards high-risk securities. The ten years following the Dot-com bubble (2002-2011) initial returns did not fluctuate as much and stayed at much lower levels compared to the 90s, see figure 4. The average initial return for the period was 4.36% and the standard deviation for the period was 9.17%, which both are significantly lower than for the whole period.



Figure 3. Index adjusted initial IPO returns and the stock market movement

With the example of extreme initial IPO returns in mind, the relationship between the stock market and the IPO market seems obvious. However, a Granger causality test shows that OMXS30 in fact does not affect initial returns. This is further confirmed by a very low R square statistic, stating that very little of initial returns can be explained by OMXS30 returns<sup>5</sup>. This contradicts the observation that the highest and lowest initial return can be explained by market timing. Figure 4 further illustrates the relationship between initial IPO return and the stock market movement. Only in 9 out of 17 years does both initial returns and the stock market either increase or decrease at the same time from the previous year. Thus, the IPO market moves in the opposite direction than that of the stock market in nearly 50% of the cases, again concluding that stock market returns have little forecasting power over initial IPO returns. However, there are patterns that investors can benefit from knowing. The highest average initial returns and number of IPO issues occurred during the

The line represents the OMXS30 value between 1994-2011 and the dots represent the IPO issued during the same period. The stock market value is measured on the left vertical axis and initial IPO returns are measured on the right vertical axis. The dots highlighted with a number next to them indicate the highest and lowest initial IPO return and the peak and bottom of the Dot-com bubble.

<sup>&</sup>lt;sup>5</sup> The R square statistic can be found in Appendix 1. A correlation of 0.07 between the two variables further indicates a strong independence between initial IPO returns and OMXS30 returns.

Dot-com bubble, 1996-2000. After the Dot-com bubble (2001-2003) and the Global Financial Crisis (2009-2011), initial returns and number of IPO issues was well below average<sup>6</sup>. Ritter and Welch (2002) and Loughran and Ritter (2004) found similar patterns in USA. Thus, when the market is booming, IPO issues and underpricing are likely to increase, providing investors with higher initial returns. During a period of crisis on the other hand, IPO issues and initial returns are likely to fall below normal levels.



Figure 4. Annual average initial IPO returns and the annual average market values

Average annual initial returns are measured on the right vertical axis and the average annual OMXS30 value is measured on the left vertical axis. The bars extending from the average annual initial returns indicate the standard deviation of initial returns for each given year.

Researchers within the subject have long observed and focused research on those cyclical trends in the IPO market. Especially the phenomenon of hot-issue markets i.e. firms tends go public when other firms receive high stock market valuations e.g. Jenkinson and Ljungqvist (2001), Loughran and Ritter (2002) and Allen and Faulhaber (1989). Applied to this data set the relationship cannot be confirmed at first glance. In fact, the linear dependence between the stock market value and the number of IPO issues is -0.25, meaning that there is a negative relationship between the stock market value and the number of IPO issues, the opposite relationship of other studies. However, looking at figure 5 one can see that the two variables clearly move together, at least post year 2000. A Granger causality test proves the relationship and that OMXS30 returns affect the number of IPO issues. The strong linear dependence of 0.72 between IPO issues and the stock market further confirms the relationship. The result is also inline with the findings of previous studies.

<sup>&</sup>lt;sup>6</sup> The initial return was even negative in 2001 and in 2003 and 2009 there were no IPO issues at all.



Figure 5. Yearly number of IPO issues and the annual average stock market value

The average annual OMXS30 value is measured on the left vertical axis and number of IPO issues each year is measured on the right vertical axis.

Another clear relationship within time trends is between a year's average initial return and the number of IPO issues following year. The highest average annual initial return for the period occurred in 1996. The following year (1997), the number of IPO issues reached the highest level for the whole period. The second highest annual average initial return was observed in 1998. It was followed by the year with the second highest number of IPO issues<sup>7</sup>. The same is true for the opposite case. In 1997 initial returns fell drastically to 8% from 32% the year before. The following year (1998), the number of IPO issues fell severely from 36 to 13 IPOs. The relationship between a year's average initial return and the next year's number of IPOs issues is consistent throughout the whole period, see figure 6. A correlation coefficient of 0.88 between average annual initial returns and next year's number of IPO issues confirms the relationship <sup>8</sup>. The linear dependence is close to perfectly positive, which indicates that the relationship is very strong. Consequently, investors can expect the number of IPO issues to increase next year if the average initial return is relatively high this year.

<sup>&</sup>lt;sup>7</sup> Excluding the year 1994 because the average initial return of 1993 is not observed.

<sup>&</sup>lt;sup>8</sup> The Granger causality test however, found that initial returns does not Granger cause the number of IPO issues the following year.



Figure 6. Initial IPO return and the number of IPO issues the following year

Initial IPO return for the years 1994-2010 is measured on the right vertical axis and the number of IPOs issued the following year (1995-2011) is measured on the left vertical axis. For example, the first dot represents the average initial IPO return during 1994 and the first square represents the number of IPOs issued in 1995.

To use this knowledge, think of supply and demand economics, according to which prices fall (rise) as supply increase (decrease). Assuming this is true in the IPO market, which Chi and Padgett (2005) finds evidence for, investors can expect initial returns to fall when the supply of IPOs increases and vice versa. To which extent initial return falls and rises depends on the elasticity of supply in the IPO market. One might argue that an average of about 10 IPO issues per year is a low supply and that the demand should be large enough to meet this level of supply. However, because the volatility in the IPO market is high, riskaverse investors are likely to stay away. Thus, demand for IPO stocks is most likely lower than for regulars stocks. Analysing the data according to the supply and demand theory shows some indication for the relationship, see figure 7. The number of IPO issues was for instance highest in 1997, initial returns on the other hand were relatively low in 1997. In 1996 the numbers of IPO issues were relatively low but average initial returns were relatively high. This relationship is stronger in the beginning of the sample period. Looking at the trendline in figure 7 and whether initial return and the number of IPOs are under respectively over the trendline and vice versa help understanding the relationship. Further, looking at the level of average initial return and number of IPO issues during the immediately surrounding years makes it easier to see if they are relatively high or low. However there is no statistical significance for the relationship.



Figure 7. Annual average initial IPO return and the number of IPO issues

The initial IPO return is measured on the right vertical axis and the number of IPO issues is measured on the left vertical axis. The straight line is the initial return's trendline.

The trendline in figure 7 further illustrates that initial IPO returns are in a falling trend over this period. This may be explained by a prolonged adaption to the tax changes in 1990 that Rydqvist (1997) found affecting initial returns, that investment banks have become better price setters or perhaps most likely that one of the strongest economic booms in history occurred in the beginning of the sample period whereas two of the worst economic crises occurred in the middle and at the end of the period.

### 4.2 Initial return by segment

Figure 8 presents average initial returns for each of the three market segments small, medium and large. The highest average initial return was obtained in the medium segment but the variation in initial returns for those IPOs were also highest. Both the large and the small segment have standard deviations that are about one-third of the medium segment. The higher standard deviation in the medium segment is likely to be explained by the much greater number of observations in the medium segment compared to the large and small segments. A closer look at the medium segment reveals that the 14 IPOs with highest initial returns and the 5 IPOs with lowest initial returns were issued in the segment. It is also found that 38 of the 46 IT sector IPOs were issued in the medium segment. This is an interesting observation because the IT sector had the highest initial return and standard deviation of all sectors, see figure 9. Removing the IT sector IPOs from the analysis lowers the medium segment's standard deviation by 10.56% whereas the change in the small and large segment only is -0.1% and +1.24% respectively. Removing the IT sector IPOs also lowers the medium segment's initial returns by 5.36%, whereas the initial return increased for the small and the large segment by 0.87% and 0.16% respectively. Further, 42 of the 47 IPOs issued during the hot markets in 1996, 1998 and 1999<sup>9</sup> were issued in the medium segment. Seven IPOs satisfies all these three characteristics (producing one of the 14 highest initial returns or 5 lowest initial returns, being an IT sector company and being issued during the

<sup>&</sup>lt;sup>9</sup> 1996, 1998 and 1999 produced the three highest average annual initial returns and standard deviations.

hot markets in 1996, 1998 or 1999), all of them were issued in the medium segment. Removing these IPOs from the data set lowers the medium segment's standard deviation by 10.79% (from 28.86% to 18.07%) and the initial return by 4.06% (from 13.21% to 9.15%). This would lead to a lower average initial return than the large segment at a higher risk.

Even though the high standard deviation in the medium segment can be explained by extreme values, both positive and negative, the segment is truly risky. More than a quarter of the medium segment's IPOs produced negative initial returns. In the small segment the number of negative returns is even higher, almost one third of the IPO produced negative initial returns. Hence, both the small and the medium segment have much higher risk of negative returns compared to the large segment, in which only one tenth of the issues produced negative initial returns. The higher risk in the smaller segments can be explained by the general view that small firms are riskier than large firms. This view can be explained by less comprehensive analyst coverage and media attention, which further leads to lower liquidity in small shares. Large IPOs are more likely to receive more attention from the public and analysts and the uncertainty about the true value is therefore likely to be lower in large IPOs. Thus, investors looking to minimise the risk of encountering bad IPO investments every now and then should stick to larger, and therefore safer IPOs. However, investors engaging in IPO investing ought to be well aware of the risks and would not want to miss out on the 14 IPOs producing the highest initial returns, all over 43%, that were issued in the medium segment. Investors seeking the highest abnormal returns must therefore not be deterred by the high risks of investing in smaller IPOs. Even though the IPOs producing the highest initial returns were issued in the medium segment, the segment itself is not a likely explanation for the high returns. Instead the likely reasons are that the IPOs were relatively small, they were issued during hot markets when the IPO demand were unusually high and that they were IT companies issued before or during the IT bubble. This is consistent with results of previous studies such as Loughran and Ritter (2002).



Figure 8. Average initial IPO return by the market segment for the issue

The large segment presents IPOs issued on the A-list and Large-Cap combined, the medium segment presents IPOs issued on the O-list and Mid-Cap combined and the small segment presents IPOs issued on the OTC-list and Small-Cap combined. The bars extending from the columns represent the standard deviation of initial return.

### 4.3 Initial IPO return by sector

Figure 9 supports that high initial returns are more likely to be obtained by companies in the IT sector. The average IT IPO produced almost twice as high initial return compared to the Telecom sector IPOs, which had the second highest average initial returns. Further, excluding the IT sector IPOs from the data yields an initial return of 7.58% compared to 11.49% for all IPOs. Thus, IT sector IPOs greatly drives the total average initial return. What then is the reason for the higher returns in the IT sector?





In this figure each column present one of the 10 GICS sectors. The number within the parenthesis below the sector names indicates the number of IPOs within the sector and the bars extending from the columns represent the standard deviation of initial return.

During the Dot-com bubble the grand majority of investors were overoptimistic about the future, which was a major reason for the large increase in share prices (Ofek, & Richardson, 2003). Ljungqvist and Wilhelm (2003) reason that if investors were overoptimistic during this period, issuers may have chosen to go public, only selling a small fraction initially, hoping to sell the rest of their shares at much higher levels before the bubble busted. In 1996, 1998 and 1999 initial returns for IT sector IPOs were exceptionally high and many IT IPOs were issued, see figure 10. Looking at the whole bubble period, 1995-1999, initial returns were continuously above the total average and 38 of the 46 IT sector IPOs were issued. After the collapse of the Dot-com bubble in 2000 the average return for IT sector IPOs dropped to -0.25%, compared to 3.77% for the other sectors combined, and the number of IT IPOs almost stopped completely. Only four IT companies issued IPO between 2001-2011. Hence, the IT sector's high average initial return was highly driven by the bullish market in the late 90s. The high initial returns for IT sector IPOs are likely to be explained by their higher risk. Ljungqvist, Jenkinson and Wilhelm (2003) argue that the degree of information asymmetry is relatively high in the IT sector compared to other sectors. A possible explanation is that IT companies generally have a large proportion of "soft assets" e.g. human capital, brands/domain names and reputation, which commonly are not presented in the balance sheet. Perhaps this was especially true during the second half of the 90s when the IT sector was booming and skilled programmers were IT companies' main assets. Industrial companies on the other hand, generally have large asset values presented in their balance sheets e.g. machinery and real estate. Consequently, because investors are more uncertain about the true value of IT companies their IPOs need to be more underpriced. Consequently, there are at least two likely explanations for the heavy underpricing of IT sector IPOs during the second half of the 90s. These are, investor overoptimism and greater uncertainty about the true value.



Figure 10. IT IPOs annual average initial returns

The figure presents the annual average initial return for IT IPOs between 1994-2011. The number next to each column present the number of IPOs issued in the same year.

The IT sector was followed by the Health Care, Financials, Industrials, and Consumer Discretionary sectors in terms of IPO issues, all with average initial returns in the range of 7.40% to 9.22% and standard deviations between 16.31 - 19.79%. Because the IT-boom is a one-time event that already occurred, an average initial return of about 8.5% with a corresponding standard deviation of about 18% is likely to be a better prediction of future returns. The Telecom sector's initial returns were a bit higher (10.75%), Consumer Staples and Basic Materials had lower average initial returns (4.50% and 4.29% respectively) and the Utility and Energy sectors even produced negative initial returns. However, there were only one energy firm and two utility firms going public during the period and the result may have been completely different with more observations.

#### 4.4 Initial return by lead manager

There were 29 different banks leading the 185 IPO transactions<sup>10</sup> between 1994-2011, these are presented in figure 11. This may sound as many underwriters sharing the mere 185 transactions however, 11 banks led at least 5 IPOs, 7 banks led at least 10 IPOs and only 3 banks led at least 20 IPOs. These three were Carnegie with 47 IPO transactions, SEB with 37 IPOs and Handelsbanken with 34 IPOs. Together they held more than half of the total market share and a dominating role in the Swedish IPO market. The 18 banks leading less than five IPOs only had a combined market share of 11.64%. Thus, underwriter reputation

<sup>&</sup>lt;sup>10</sup> For some of the IPO transactions there were more than one lead manager.

is likely to have a great impact in the Swedish IPO market and the markets competitiveness may be questioned.



Figure 11. Average initial return for different lead managers

The figure illustrates the average initial return for the different investment banks leading IPOs in Sweden between 1994-2011. The number within the parentheses after the investment banks names represents the number of led IPOs by the bank and the bars extending from the columns represent the standard deviation of initial return. \* IPOs led by Kaupthing include IPOs led by Matteus, Nordiska and Aragon. \*\* IPOs led by Swedbank Include IPOs led by Föreningsbanken and Sparbanken. \*\*\* IPOs led by Nordea include IPOs led by Aros, Nordbanken and MNB Maizels.

Carnegie, SEB and Handelsbanken all produced higher initial returns than the total average return and lower standard deviations than that for the whole set. Besides being the largest actor in the IPO market, Carnegie also produced the third highest initial return (14.73%) after HQ and Kaupthing<sup>11</sup>. The average initial return for HQ's IPOs was more than twice as high as the total average initial return (23.31% vs. 11.49%). HQ also generated the highest standard deviation of returns, 61.59% compared to the 25.75% for the whole set. However, their high average initial return and standard deviation are greatly driven by the extreme underpricing of the IPO with 241.01% in initial return. Excluding this extreme value leaves HQ with a much lower underpricing of 7.76% and a standard deviation of 13.35%. The Icelandic bank Kaupthing had less than half the standard deviation of HQ (27.13% vs. 61.59%) but their average initial return was just about 3% lower. Investing in the two banks IPOs would indeed, on average, be very profitable, however, none of them are present in the Swedish IPO market today<sup>12</sup>. They will therefore be excluded from further analysis. Then Handelsbanken generated the second highest average initial return (14.41%) just 0.33% lower than Carnegie's. However Handelsbankens standard deviation was more than 3% higher than Carnegies, making Carnegie the preferred alternative. The American in-

<sup>&</sup>lt;sup>12</sup> Kauphting's Swedish branch was acquired by Ålandsbanken in 2009 after the Icelandic government took control over the bank during the global financial crisis in 2008. Carnegie acquired HQ after the Swedish Financial Supervisory Authority filed for HQ's liquidation in 2010.



<sup>&</sup>lt;sup>11</sup> Credit Lyonnais' average initial return was 31.01% but as they only led one IPO the initial return is really not an average.

vestment bank Goldman Sachs generated the third highest initial return. Their average initial return was only slightly lower than Carnegie's (12.94% vs. 14.73%) but they managed to keep the standard deviation much lower (10.69% vs. 21.33%). Thus, Goldman Sachs' IPOs provide even better investment opportunities than Carnegie's when taking risk into account. Goldman Sachs average initial returns were followed by Öhman, which also produced high initial returns (12.11%) relative to standard deviation (10.23%). Also SEB, which closely followed Goldman Sachs' and Öhman's average initial returns had a much higher standard deviation. However, both Goldman Sachs and Öhman led much fewer transactions than Carnegie, Handelsbanken, and SEB, which can explain their low standard deviation, see figure 12. Nevertheless, neither Goldman Sachs nor Öhman led any IPOs that resulted in negative initial returns, whereas 19% of Carnegie's, 29% of Handelsbanken's and 21% of SEB's IPO transaction resulted in initial losses. Alfred Berg and Swedbank generated standard deviations close to Goldman Sachs and Öhman, but their average initial returns were lower. Again the likely explanation is the number of IPO transactions led, both Alfred Berg and Swedbank led more than three times the transactions of Goldman Sachs and Öhman. The larger amount of transactions is also likely to have caused the 18% and 31% of negative initial returns produced by Alfred Berg and Swedbank respectively.



Figure 12. Investment banks that led at least five IPO transactions

Even though the majority of investment banks underpriced their IPOs on average, there were six investment banks that overpriced their IPOs and thus left no money on table, see figure 11. As underpricing is a loss to the company, overpricing actually creates value to the company. Lage Jonason overpriced most, thus creating most value for their IPO clients. Their investor clients on the other hand, were certainly not satisfied as they made initial losses of 12.89% on their investments. However, all banks producing negative average initial returns only lead one or two IPO transactions, more transactions would probably change the situation completely. Instead looking at the most fairly priced IPOs, ABG Sundal Collier's average initial return of 0.57% was closest to the market return. They also produced a remarkably low standard deviation, only beaten by Avanza, which on the other hand only led half as many IPOs. However, ABG Sundal Collier produced negative initial returns for all their IPOs but one. Thus, what appeared to be the fairest price setter was ac-

tually the bank with the highest rate of overpricing IPOs<sup>13</sup>. Nordea produced the second lowest non-negative average initial return but also they had a high rate of overpricing IPOs (40%). Of the banks leading at least five IPOs, Morgan Stanley produced the lowest standard deviation (6.80%), which indicates that the risk of investing in their IPO is lower compared to other banks. However, also they frequently overpriced their IPO transactions, 33%, which is substantially higher than Carnegie's 19%. Taking into account that Carnegie almost produced three times as high average initial return makes the decision easy.

To conclude, less IPO transactions are likely to result in a lower standard deviation. Goldman Sachs' and Öhman's IPOs seem attractive since they manage to keep the average initial return at high levels without producing IPOs with negative returns. However, their low level of led transactions increase the uncertainty about their future performance. Carnegie on the other hand, led most IPOs and also produced the highest initial return<sup>14</sup>. Due to a large number of transactions their standard deviation is higher than Goldman Sachs and Öhman's. However, it is close to that of other banks leading many transactions. Carnegies rate of negative initial returns is also relatively low (19%), which ranges between 18-40% for banks that led at least five IPOs, excluding Goldman Sachs and Öhman. Thus, Carnegie's IPOs are highly attractive since the average initial return is high, standard deviation is relatively low and the risk of negative initial return is low. Goldman Sachs and Öhman are also highly interesting because they have not produced any negative initial returns and still managed to keep initial returns are interesting levels.

#### 4.4.1 Domestic versus U.S. banks

Previous studies such as Ljungqvist et al. (2003) have found that U.S. banks tend to underprice less than domestic banks outside USA. Does this mean that IPOs led by Swedish banks constitutes more attractive investments?

Consistent with Ljungqvist et al. (2003) findings, the U.S. banks underpriced less than Swedish banks, see table 3. In general, the underpricing were 3% lower when a U.S. bank were lead manager compared to a Swedish lead manager. The uncertainty of returns was also significantly less when a U.S. bank led the transaction, 10.6% compared to 25.19% for Swedish banks. European banks outside Scandinavia however, generated the lowest underpricing. Their standard deviation on the other hand is almost 50% higher compared to U.S. banks. Both American and European banks lower standard deviation can again be explained by fewer transactions. It is also possible that U.S. banks charge higher gross spread as argued by many academics e.g. Chen and Ritter (2000). Thus, the gains of using a U.S. investment bank and leaving less money on the table is likely to be at least partly offset by the higher fees charged by the U.S. banks. Even though U.S. led IPOs in general provide investors with lower returns there is one exception, Goldman Sachs. As argued previously Goldman Sachs produced one of the highest average initial returns and managed to keep

<sup>&</sup>lt;sup>13</sup> Banks that only led one IPO transaction excluded.

<sup>&</sup>lt;sup>14</sup> Excluding Credit Lyonnais, HQ and Kaupthing.

standard deviation low and produce positive returns in all their transactions at the same time. This makes Goldman Sachs one of the most attractive lead manager from the investors point of view. Nevertheless, in general Scandinavian banks (including Swedish) produce higher returns than U.S. banks and are therefore more attractive. The risks however, seem to be higher in Scandinavian led IPOs even though it is likely to be explained by the much greater number of IPO transactions.

Investment bank origin	Average initial return	Standard deviation of returns	Number of IPOs	Market share	
Swedish	11.65%	25.19%	193	83.19%	
Scandinavian excluding Swedish	11.70%	23.93%	13	5.60%	
European excluding Scandinavian	7.60%	15.00%	11	4.74%	
U.S.	8.65%	10.60%	15	6.47%	
All non-Swedish combined	9.37%	16.87%	39	16.81%	

Table 3. Average initial return by investment bank nationality

### 4.5 A hypothetical example of IPO investing

As Carnegie has produced one of most attractive average initial returns, consider the following example. An investor has 100 000 SEK initially and subscribes for all IPOs led by Carnegie and sell the shares at the end of the first trading day. Thus, the investor follows the stagging strategy. The profit made in each IPO investment is reinvested in the following IPO. After stagging the 47 IPOs led by Carnegie the investor would have generated a total wealth of 6 982 692 SEK<sup>15</sup>. In-between the IPO investment it is further reasonable to at least expect a risk-free rate of return, which would have increased the wealth further. A buy and hold strategy on the OMXS30 index with the same initial investment would only have generated 251 787 SEK during the same period<sup>16</sup>. However, the stagging strategy would probably not be able to produce such high return since it would not be possible for small retail investors to invest such a large amount in all of the IPOs. Therefore, suppose that the investor instead did not reinvest the profit, then the total wealth after stagging the 47 IPOs would have been 585 778 SEK<sup>17</sup>. This is still twice as high as the buy and hold strategy on the OMXS30 making stagging the preferred investment strategy.

<sup>&</sup>lt;sup>15</sup> Investing 100 000 SEK in the first IPO lead by Carnegie in the sample (1994-01-03). Taking the initial investment plus the initial investment times 1 plus the unadjusted initial return for the first IPO times 1 minus a capital gains tax of 30% equals 118 667. This is the total investment in the second IPO for which the same process starts over. After the 47 IPOs the 100 000 SEK has grown to 6 982 692 SEK. Excluding potential transaction fees and supposing that he can invest his current total wealth in each IPO.

<sup>&</sup>lt;sup>16</sup> Dividends and potential transaction fees excluded.

<sup>&</sup>lt;sup>17</sup> The investment of 100 000 SEK times the average unadjusted initial return of 14.652907% times the number of IPOs in which Carnegie were lead manager (47) times 1 minus a capital gains tax of 30% plus the initial investment of 100 000 SEK equals 587 778. Potential transaction fees are excluded.

### 4.6 A reasonable return for the risk

Because the risk associated with IPO investing is relatively high, investors must also be rewarded with high returns. But the question is, what is a reasonable return for the risk? Table 1 indicates that IPOs in most developed economies are underpriced between 5-30%, on average<sup>18</sup>. As argued previously, IT firms going public during the Dot-com bubble highly drives the average initial return in the Swedish IPO market. Excluding those may therefore provide a better picture of underpricing in the Swedish IPO market. This yields an average initial return of 7.58%. However, because IT companies are likely to issue IPOs also in the future, excluding the years during and after the Dot-com bubble perhaps provides the best estimate of today's underpricing. The IPOs issued between 2002-2011 were on average underpriced by 4.36% and the variation in returns measured by standard deviation was 9.17%. At this level of underpricing the dilution of the original shareholders wealth is relatively low and investors are still rewarded with a solid reward for a one-day investment. However, considering that the variation in returns was relatively high and that 36% of the IPOs issued during this period generated negative initial returns, investors ought to demand higher average returns than 4.36%. A likely reason for the low return and high risk between 2002-2011 is the long period of high economic uncertainty caused by the global financial crisis. Hence, the average initial return of 11.49% for the whole data set actually seems as a more reasonable compensation for the risk taken. This level of underpricing is also closer to that in the U.S., where most IPOs have been studied and initial return averages around 10-20%. As American banks tend to charge higher gross spread (Chen, & Ritter, 2000) and compete with lower offer prices (Jenkinson, & Ljungqvist, 2001) leading to lower underpricing, it could be argued that initial returns should be even higher in Sweden. Even though the reasonable underpricing of Swedish IPOs is argued to be in the range of 10-20%, initial returns are likely to be at lower levels in near future. The main reasons for this are, the high uncertainty about the future economic situation and that the Dot-com bubble and its extreme underpricing is behind us. In the long-term however, it seems reasonable to expect average initial returns in the range of 10-20%.

### 5 Conclusion

The purpose of this thesis was to examine if IPOs in Sweden consistently were underpriced and ultimately if investors could earn abnormal returns by investing in IPOs. Because the risk of investing in IPOs is relatively high patterns were examined to help investors minimise the risk of investing in "bad" IPOs. Differences in average initial returns over time, between market segments, sectors and investment banks were observed. Also supply and demand of IPOs and the stock market's effect on IPO underpricing were examined.

<sup>&</sup>lt;sup>18</sup> Some studies show evidence for even higher underpricing in Japan, Portugal, Spain, Sweden and Switzerland. For the studies on Japan and Portugal the sample periods are very short which is likely to cause the unfair picture of underpricing levels. In Sweden Rydqvist (1997) argues that IPOs were used as a taxefficient compensation to employees, customers and suppliers and that underpricing dropped significantly after regulatory changes.

First and foremost it is concluded that firms issuing IPOs in Sweden generally are underpriced and that there is a 90% probability of earning abnormal returns when investing in Swedish IPOs. Because the average IPO generates abnormal returns, risk neutral investors should prefer investing in IPOs and immediately sell the shares once they start trading over investing in the stock market index. The average underpricing of IPOs for the whole sample period (1994-2011) were 11.49%. However, the average underpricing varied greatly over the years in the sample period with the highest average initial return at 32.55% in 1996 and the lowest at -2.46% in 2001. Underpricing of Swedish IPOs was highest in 1996, 1998 and 1999 during the Dot-com bubble. At the peak of the bubble, underpricing was as high as 241.04%. The exceptionally high underpricing during this period is likely to be explained by overoptimistic investors and greater uncertainty about firms' true values.

The most common segment for firms to enter the stock market was the medium segment. The medium segment also generated the highest average initial return, which is explained by the large number of risky IT firms entering the market during the hot-issue years 1996, 1998 and 1999. Further, the majority (42 of 47) of the firms entering the market during this period were medium sized companies. The by far most underpriced sector was the IT sector, however after the Dot-com bubble underpricing of IT firms dropped below the average level.

A total of 29 investment banks acted in the Swedish IPO market during the period, however the three banks Carnegie, Handelsbanken and SEB had more than half of the market share. Carnegie also generated the highest average initial returns, of the banks still in the market, at relatively low standard deviation. Goldman Sachs and Öhman generated slightly lower average initial returns than Carnegie but managed to keep their standard deviations half as large. Further, they did not lead any IPOs resulting in negative initial returns. Thus, Goldman Sachs and Öhman produce very attractive IPOs from the investors' perspective. However, they only lead five transactions each, which makes the results unstable. Carnegie with their extensive history of producing high returns at relatively low risk is therefore the most interesting lead manager for IPO investors. An investor starting with an initial investment of 100 000 SEK would have generated a wealth of 6 982 692 SEK after having invested, the initial investment plus the capital gains, in the 47 IPOs led by Carnegie. A buy and hold strategy on the OMXS30 index for the same period would only have generated 251 787 SEK. Thus, investors following the stagging strategy in Sweden would outperform the market by far, assuming they do not only get share allocations in "bad" IPOs.

The level of underpricing seem to have great impact on the IPO supply the following year and according to the supply and demand theory, returns should be lower when supply is high and vice versa. Even clearer is the relationship between IPO supply and the stock market, where there is a 95% probability that OMXS30 returns affect the number of IPO issues. It also likely that extreme levels of the stock market has some impact on IPO underpricing e.g. IPOs were more underpriced during the Dot-com bubble when the stock market reached its all time high. However, this is not statistically supported.

Because there are high risks associated with IPO investing, investors must be rewarded with high returns to encourage IPO investments. The underpricing levels in other developed economies typically ranges within 5-30%. In the USA, which due to the large number of underpricing studies provide the most comprehensive IPO underpricing picture, initial returns typically averages at 10-20%. Therefore, 11.49% underpricing seem to be at "normal" levels and is therefore considered to be a relevant compensation for the risk.

### 5.1 Suggestions for further research

An unexplored and interesting area to study further within the IPO field is the appropriate compensation i.e. initial return investors ought to get for investing in IPOs. The competition between investment banks in the IPO market is another interesting area to study further since it only has been given some attention in American studies. The factors causing underpricing is still in large unsolved it would therefore be interesting to run regressions analyses with several factors such as, firm age, firms size, firm sector, lead manager, amount of institutional investors vs. retail investors, discounted cash flows, etc. to identify factors impacting on underpricing levels. Taking the efficient market hypothesis into consideration when measuring underpricing, one can ask the question; is the market really efficient over one day, meaning that share prices adjust to fundamental values in just one day? Instead the market may perhaps be efficient over a week, a month or a six months period. Therefore, the underpricing definition can be questioned, at least from the issuers' point of view i.e. measuring money left on the table. To measure and compare underpricing with different periods would thus be interesting. Form the investors point of view it would be interesting to measure return for different holding periods e.g. one day to six months, in order to find the optimal holding period as this would maximise IPO investors' returns.

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# Appendices

# Appendix 1 – Regression output

Linear Regression								
Regression Statistics								
	0 1258							
R Square	0,1250							
Adjusted B Square	0,0104							
Aujusteu K Squure	0,0104							
5	0,2576							
Total number of observations	185							
	Initial II	PO Return = 0,11	43 + 2,1559 * ON	1XS30 Retu	rn			
ANOVA								
	d.f.	SS	MS	F	p-level			
Regression	1,	0,1952	0,19	52 2,9411	0,088			
Residual	183,	12,1441	0,06	64				
Total	184,	12,3393						
	Coefficients	Standard Error	LCL	UCL	t Stat	p-level	H0 (10%	6) rejected?
Intercept	0,1143	0,019	0,0	0,1456	6,0305	0,	Yes	
OMXS30 Return	2,1559	1,2571	0,07	76 4,2341	1,715	0,088	Yes	
T (10%)	1,6532							
LCL - Lower value of a reliable in	CL - Lower value of a reliable interval (LCL)							
UCL - Upper value of a reliable interval (UCL)								

The complete IPO data set is available on request. Email your request to tobias.henricson@live.se.

Year	Number of IPOs	Initial return	Standard deviation
2011	5	-0.02%	1.68%
2010	3	0.40%	3.62%
2009	0	0.00%	0.00%
2008	1	12.13%	0.00%
2007	6	4.30%	5.07%
2006	9	5.70%	14.19%
2005	5	7.64%	8.65%
2004	3	6.29%	14.54%
2003	0	0.00%	0.00%
2002	4	2.38%	6.89%
2001	6	-2.46%	15.14%
2000	18	10.21%	23.46%
1999	27	21.91%	48.72%
1998	13	23.84%	26.78%
1997	36	8.02%	15.51%
1996	7	31.55%	26.78%
1995	11	9.55%	10.26%
1994	31	9.14%	20.85%

# Appendix 2 – Average initial return divided by year

Sector	Number of IPOs	Initial return	Standard deviation
Consumer Discretionary	32	7.38%	16.31%
Consumer Staples	14	4.74%	6.84%
Energy	1	-12.25%	0.00%
Financials	25	8.89%	18.09%
Health Care	24	8.95%	18.15%
Industrials	29	7.74%	19.79%
Information Technology	46	23.29%	41.17%
Materials	5	4.56%	7.00%
Telecommunication Services	7	11.73%	11.72%
Utilities	2	-1.21%	1.09%

# Appendix 3 – Average initial return divided by GICS

# Appendix 4 – Average initial return divided by Lead Manager

Lead Manager	Number of IPOs	Initial return	Standard deviation
ABG Sundal Collier	4	0.57%	2.80%
Alfred Berg	17	6.64%	11.42%
Avanza	2	-1.32%	1.82%
Carnegie	47	14.73%	21.33%
Catella	1	2.86%	
Citigroup	1	4.19%	
Credit Lyonnais	1	31.01%	
Credit Suisse	1	6.95%	
Deutsche Bank	2	-3.64%	4.64%
Erik Penser	1	4.72%	
Evli Bank	1	-12.89%	
Fischer Partners	1	5.35%	
Goldman Sachs	5	12.94%	10.69%
Handelsbanken	34	14.41%	24.49%
HDR Partners	1	-2.60%	
HQ	15	23.31%	61.59%
Kaupthing*	8	20.34%	27.13%
Lage Jonason	1	-12.89%	
Lehman Brothers	2	10.40%	26.13%
Merchant	3	11.13%	25.37%
Merrill Lynch	1	10.27%	
Morgan Stanley	6	4.95%	6.80%
Nordea***	15	1.95%	15.75%
Ondra Partners	1	2.07%	
S. G. Warburg	1	10.52%	
SEB	37	11.38%	19.66%
Swedbank**	16	6.40%	10.41%
UBS	2	3.49%	5.44%
Öhman	5	12.30%	10.23%

\* Including Matteus, Nordiska and Aragon. \*\* Including Föreningsbanken and Sparbanken. \*\*\* Including Aros, Nordbanken and MNB Maizels. Note also that Carnegie today owns HQ but because they were such a large corporate finance actor before their bankruptcy they are presented separately.