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# **The impact of corporate bond issuances on modern IPO-cycles**

*-Are we facing a structural change?*

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## Abstract

<b>Title</b>	The impact of corporate bond issuances on modern IPO-cycles – <i>Are we facing a structural change?</i>
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<b>Key words</b>	Capital structure, Corporate financing, IPO-cycles, Corporate bonds, Pecking order theory, Trade-off theory, Market timing theory
<b>Purpose</b>	The aim of this study is to empirically investigate the relationship between IPO-activity and volumes of outstanding corporate bonds, issued by non-financial firms, in order to conclude if we might face a structural change that favors debt financing in terms of corporate bonds. In addition, the effects of financial crises on the observed relationship will be examined.
<b>Methodology</b>	The methodology employed in this paper is of a deductive and quantitative nature, examining the relationship between IPO-activity and volumes of outstanding corporate bonds with the use of a variety of panel data regression models.
<b>Theoretical perspectives</b>	The theoretical framework of this study consists of previous research on the matter of IPO-cycles and corporate bond development, as well as main theories on capital structure, namely; Pecking order theory, Trade-off theory and Market timing theory.
<b>Empirical foundation</b>	The empirical investigations of this study are based on historical data collected from a variety of trustworthy sources, including; Thomson Datastream, OECD, The World Bank, European Central Bank and a number of central banks. The examined data covers eight geographically spread countries and a time period of 22 years, 1990-2011.
<b>Conclusions</b>	The performed statistical tests of this study show that the correlation between the two main variables, namely IPO-activity and volumes of outstanding corporate bonds issued by non-financial firms, differs considerably during the examined time span of 22 years. The relationship went from positive in the first years to negative in the following years and finally to an undefined state in the closing time period. These findings were not solely in line with our expectations. A significant negative relationship between the two variables in the last time period would have supported the presented theory of a structural change. However, such a relationship could not be observed. The findings of this study both support and complete previous research on the covered issues.

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# 1. Introduction

## 1.1 Background

Over recent years, there has been a great amount of research interest in how firms raise capital from initial public offerings (IPOs) and stock markets. There are many potential reasons behind this increased attention towards the subject of IPOs. These include the increased competition between national stock exchanges for attention of new firms, like NYSE and NASDAQ in the US and OMX Nordic Stockholm and Burgundy in Sweden, the fact that well-established markets like NASDAQ try to attract foreign firms to list in the USA and the worldwide trend of making state-owned companies private (Heyman, Norbäck & Persson, 2012).

There are numerous reasons to why a firm chooses to go public. Generally, the principal answer is to raise equity capital and to offer the owners access to public markets in which wealth can be converted into cash. Increased publicity and other non-financial factors seem to play a minor role in most cases. Evidence suggests that macroeconomic market conditions are the most important factor in the IPO-decision. The second most important factor seems to be at what stage in the life cycle the firm is. (Ritter & Welch, 2002) The fluctuation in IPO-activity over time is well known; Ibbotson and Jaffe (1975) show that there are distinct cycles in the number of issues but also in the average initial returns.

Many studies try to examine the phenomenon of hot and cold markets with various variables. A common approach is trying to explain the variation with market inefficiency, saying that IPO-volumes are high when equities are overvalued. However, such arguments assume that owners of companies going public are able to spot market mispricing when investors who are providing funds, are not. Lerner, Shane and Tsai (2003) intend that periods of dry IPO-markets represent times when companies face difficulties accessing equity markets on favorable terms, making them enter into other financing alternatives. The results from a study by Lowry (2003) indicate that firms' demand for funds and the level of investor response explain a significant level of IPO-volume fluctuation. Pastor and Veronesi (2005) present a model that instead tries to explain fluctuations in IPO-volumes in the absence of any mispricing, where IPO-volumes are more closely related to recent changes in stock prices rather than to levels of stock prices.

Although there is a widespread amount of studies examining different factors behind IPO-cycles, more of these will be discussed later on, there appears to be limited research focusing on debt financing in terms of corporate bonds as an explaining determinant. Over the last years, this form of capital seems to have gained popularity in Europe, as well as in USA and Asia. In many recent cases, it has been substantially more pleasant being the owner of bonds over equity, issued by the same firm. (Veckans affärer, 20110610)

## **1.2 Problem discussion**

Trading activity and the number of IPOs have decreased over the last years and there are a number of uncertainties and question marks regarding upcoming patterns. Except for a smaller number of list changes, the actions on the matter of IPOs have been rather absent in many countries recently. Looking at Sweden as an example, not a single company decided to go public on the Stockholm Stock Exchange (SSE) during 2012. At the same time, seven companies were delisted. Among these, one can find Metro, fully acquired by the Kinnevik group and Seco Tools, bought off by Sandvik. (Aktiespararna.se, 20130102) Companies have managed to find new sources of financing including corporate bonds, private equity and venture capital firms. Going public does no longer seem to be the given way to finance a growing business. The figure concerning IPOs is as low as in 2009, the year after the breakout of the financial crisis of 2007/2008. It is a proven fact that the number of IPOs is correlated with macroeconomic variables and the market valuation of equity. (Helwege & Liang, 2004) However, it seems like the negative trend was observed even before the recent years of volatility. This fact raises an important question; Is the cold IPO-market of today just a temporary state or are we facing a structural change that favors debt financing like corporate bonds?

According to professor Jay Ritter, sometimes referred to as “Mr. IPO”, the problems and reasons behind the dry IPO-markets of today are all related to a number of general international reforms. The number of structural mergers and acquisitions aside of the stock exchanges has grown steadily at the expense of IPO-volumes. He mentions the fast moving IT-industry as an example; it takes too much time and resources from a young IT-company to grow organically and try to compete with the well-established multinational corporations.



Therefore, many actors actually prefer to be acquired by industry leaders like Apple, Google or Samsung. Two famous examples are Instagram and YouTube, they were both purchased by Facebook and Google respectively, before they reached any stock exchanges. “The bigger, the better” holds especially for the industries of IT and biotech. Structural deals like the ones mentioned above might not be as valuable in other businesses. Hence, there will always be a demand for exchange listings and a number of annual IPOs. During the time period between 1980 and 2000, on average there were 311 IPOs in the US annually. The corresponding number for the last ten years is as low as 99. (Svenska Dagbladet, 20120613)

Jay Ritter claims that the negative development is not only cyclical, he thinks it is unlikely that USA and Europe will face the high IPO-volumes of the late 1990s again, ever. Small and midsize firms make up for major part of the negative trend at the same time as they show higher profitability. (Svenska Dagbladet, 20120613) Looking at the Swedish market, the number of listed companies on SSE has decreased with 46, which means 15%, since the year of 2000. (Svenska Dagbladet, 20120220) The total value of the IPOs performed over the last five years does not even exceed the value of the IPOs performed in 2007, 10 billion Swedish Krona (SEK). The observed pattern, a decreased interest in exchange listing and equity trading, is worrying and definitely worth attention according to Jens Henriksson, CEO of OMX Nasdaq Stockholm. Even though he expresses optimism and thinks that a lot of explanation is to be found in the fear and skepticism based on the dot-com bubble and recent financial and sovereign crises (Dagens Industri, 20110511), he stresses some concerns related to how important the SSE as a marketplace actually has been to the Swedish national wealth during the 20<sup>th</sup> century. In addition, he emphasizes the value of independent financing and the unique openness concerning pricing and supervising that stock exchanges do offer. (Dagens Industri, 20121212)

The dried out IPO-markets negatively affect small savers and private individuals since the available number of stock investment opportunities gets reduced. Many successful companies are kept in the hands of private equity and venture capital firms. Per Strömberg, professor at the Stockholm School of Economics, says that over the last three years it has been more attractive and beneficial to sell a company to a private equity firm than taking it public. This means fewer companies to choose from for small private investors. (Dagens Industri, 20130129)

He also stresses how the increasing levels of volatility create uncertainties and creates risks for both the owners and the investors. (Veckans affärer, 20111208) However, one should notice that many individuals still have indirect access to the unlisted firms. A great number of pension funds, private as well as public ones, have a lot of capital invested in these private equity and venture capital firms. But still, Jens Henriksson finds the trend of today worrying since it reduces the possibility for individuals to get a share of profits of the corporate world. (Dagens Industri, 20130129)

He has no clear solution to the problem but stresses that the pattern can be observed worldwide and that, in line with the reasoning of Jay Ritter, we might never experience the high IPO-levels of 2006 and 2007 again. A reduced number of rules and regulations, like a removed demand regarding quarterly reports, could result in a higher demand for going public. However, this is not necessarily relevant since numerous investors probably would not accept such terms. (Dagens Industri, 20130121)

One of the most important and intuitive reasons behind the present state is that investors do not pay as much as demanded by the owners of the companies. Today, high first day returns and steep price increases cannot longer be observed. The development of IPO-stocks has over the last years been negative, in Sweden as well as globally. Paul Marsch, professor at London Business School, claims that investors are tired of getting into overpriced IPOs. (Veckans affärer, 20111208) As stated previously, deals that are set up outside of the stock exchanges generally generate higher prices than what IPOs would have.

The current situation, where investors outside the stock exchanges are willing to offer higher prices, is remarkable. This is against recognized financial theory. Exchanged listed stocks provide liquidity, they give investors the opportunity to buy and sell whenever they want. In addition, public companies must be open and follow rules and regulations. They must provide financial reports for every quarter and annual financial statements. This means lower risk to the investors. Theoretically, stock exchanges are superior from the perspective of investors. However, fact remains, in the mid 1990's more than 50 Swedish companies performed IPOs annually, today's corresponding number is, as already stated zero (Svenska Dagbladet, 20120610). Turning focus towards the buyout and venture capital markets, one will observe the opposite development.

Even if “venture” has experienced some tough years lately, “buyouts” keep getting more popular and attract more capital every year. During 2011, deals corresponding to a total value of approximately 30 billion SEK took place in Sweden. (Svenska Riskkapitalföreningen, 2011) Nevertheless, there are an additional number of possible reasons behind the current cold interest regarding stock exchange listings and trading that could support the theory of a structural change that favors debt in terms of corporate bonds over equity. Some of these possible explanations will also be examined later on;

**Rules and regulations;** Looking at Sweden as an example, all companies listed on the SSE must, since 2005, follow international accounting standards, IFRS. It is the responsibility of NASDAQ OMX Stockholm to make sure that these rules and standards are succeeded. The sample of the supervision always includes newly listed companies. (NASDAQ OMX, 2011) This oppression of rules means increased expenditures and that focus is taken away from the core business of the firm. However, there are companies that consider these demands as uncomplicated formalities and rather see them as a tool for better internal structure. Even though the financial statements of all Swedish limited companies are public, the exchange-listed companies additionally must provide figures regarding bonuses and compensations to management. (Svenska Dagbladet, 20120610)

**Recent IPO failures;** There have been a number of unsuccessful IPOs during the last couple of years that might make potential IPO candidates stay away. A Swedish example is the wind power company O2 that stopped its IPO plans because of a small interest among investors. (Privata affärer, 20100322) The most globally recognized example is the criticized and well-debated IPO by Facebook. A number of planned IPOs worldwide have been cancelled since the steep price decrease of the stock was observed, Formula1 and the American travel site Kayak are two of these. (Dagens Industri, 20120601)

**The entrance of high frequency trading (HFT);** Since August 2010, preprogrammed computers constitute a major part of the trading activity in the US as well on the SSE. During periods of unstable market conditions they are often accused of causing additional and harmful volatility. This additional volatility is assumed to be one reason to why traditional groups of market actors recently have chosen to stay away from the stock exchanges.

According to the HFT-actors themselves, this is not the case. They claim they provide liquidity and hence make the markets more efficient. (Veckans affärer, 20110929) However, there is recent research saying that HFT causes widespread spoofing, entering orders then cancelling orders to trick the market and manipulate prices. (Zwick, 2012)

**The banks face new conditions;** Brokerage fees have decreased ever since the entrance of online share deposits, offered by companies like the Swedish Nordnet and Avanza. Today, a brokerage service offered by a bank is rather considered as a way of attracting customers than a pure source of income. In addition, there are direct effects stemming from the implementations of Basel II and III. (Veckans affärer, 20110610)

No one would probably argue against that there actually have been a number of major changes in the conditions concerning stock exchanges recently. From the facts and figures given so far, it seems obvious that there has been a weaker interest in equity markets over the last years. Activity dropped during 2011 mainly due to investor concerns about sovereign debt issues in Europe and Standard & Poor's downgrade of USA's credit rating. China might be considered as an exception, still showing relatively high IPO-activity. During 2011, there were 388 deals performed in Greater China, including Hong Kong and Taiwan, which corresponded to 31,7% of the global total number. (Ernst & Young, 2012) Based on the presented facts and figures, from what other sources do firms obtain capital in order to finance growth?

As a consequence of the weak market climate, debt financing in terms of corporate bonds have recently become popular among non-financial companies, as well as among investors. In the aftermath of the recent credit and sovereign crises, European corporations have started to use debt capital markets in a more intensive way. The volumes of outstanding corporate bonds have increased and yields have come down. After reaching record-high issuance levels in 2009, European investment grade corporate bonds experienced their second highest issuance activity in 2012. (Kaya & Meyer, 2013) In Japan and the US, the corporate bond markets have been developed for a long time. Intuitively, corporate bonds seem to be an interesting source of financing to companies, a high-yield alternative to investors and a well needed source of income to the banks. It is highly relevant to examine whether the cold IPO-market of today is a result from cyclical factors or some kind of a structural transformation, related to the increased levels of outstanding corporate bonds.

### 1.3 Purpose

Based on the problem discussion presented above, the objective of this study is to investigate the relationship between IPO-activity and volumes of outstanding corporate bonds, issued by non-financial corporations, in order to find out whether we might face a structural change. In addition, a number of other relevant determinants will be examined. In order to do this, we will study the development of corporate bond and equity markets in a number of different countries worldwide. We will look at the years between 1990 and 2011 in order to observe potential effects by a number of financial crises; these will be defined and presented later on. The research questions examined in this paper are as follows;

- 1. What is the relationship between IPO-activity and volumes of outstanding corporate bonds?**
- 2. What does the impact of financial crises on this relationship look like?**
- 3. Given the other observed relationship, does it seem like we are facing a structural change regarding this matter or does the history repeat itself?**

### 1.4 Limitations

In order to obtain general results and an applicable conclusion, we have selected a set of countries that are geographically spread, of different sizes, both in geographic and economic terms and at different stages in their economic development. The countries included in the study are; Sweden, USA, UK, Italy, Germany, Japan, Australia and Singapore. Apart from outstanding corporate bond volumes, issued by non-financial firms, and the annual number of IPOs, we will study a number of other variables in order to get a sharper indication of whether there actually might be a structural change going on. These determinants are; “Market volatility”, “Stock market index”, “Bank claims on private sector”, “Gross domestic product”, “Interest rate”, “Inflation rate” and “Stock market capitalization”. We have chosen to include data between the years of 1990 and 2011 in order to capture the effects of the following financial crises; the financial crises of the late 1980s and early 1990s, the Asian crisis of the late 1990s, the dot-com bubble of the late 1990s and the financial crisis of 2007/2008. These will be defined and described in the third chapter. Here, the reader will also be provided with descriptions of the economic development and the financial deregulations in each examined country, which may offer explanations to some of the observed trends.

## **1.5 Audience**

This paper addresses anyone who finds the subjects of corporate financing, capital structure and IPO-cycles interesting. Since the examined questions are very actual and relatively unexplored, we believe that the findings of this paper will be valuable to the academic world as well as the corporate world. Readers with an economic degree or with a background in finance will find the text more distinct and readable. Since the examined markets are geographically spread, the paper should attract readers from a wide number of countries.

## **1.6 Thesis outline**

The subsequent chapter of this paper introduces the reader to the applied theoretical framework. The chapter starts by examining the common theories on capital structure. The second part of the chapter examines general theories and previous research on the matter of our dependent variable, IPOs. This part is divided into two subchapters; “Costs and pricing of an IPO” and “Cycles in IPO-volumes and initial returns”. The first subchapter is vital since a knowledge of IPO-related costs and the common pricing processes is necessary in order to understand the reasons behind IPO-cycles, which is the topic of the second subchapter. The final part of the chapter offers knowledge regarding theory and prior research on the issue of corporate bonds, our main determinant. Comparisons between corporate bonds, equity and bank loans, as well as country-specific differences related to bank and legal structures are provided. The third chapter handles the characteristics of the examined economies and crises. In this section we provide descriptions of the financial development and deregulations in each included country. In order to understand the obtained data and the observed trends for each examined country, one must take these facts into consideration. These may offer explanations to some of the spotted patterns. The reader who does not need any further knowledge of the crises nor the respective financial deregulations, could simply skip this chapter. The fourth chapter offers detailed descriptions of the employed methodology, including; research approach, data collection, applied statistical method etc. The fifth chapter contains the empirical findings. These are sorted into three subchapters, one for each examined time period. The empirical findings are analyzed and discussed in the sixth chapter. The seventh and final chapter offers a conclusive summary on all aspects of the paper.

## **2. Theoretical framework**

### **2.1 Capital structure**

In this paper we are focusing on the relationship between volumes of outstanding corporate bonds, issued by non-financial firms, and IPO-activity. However, this is not completely in line with prevailing capital structure theories from a company's point of view since corporate bonds are debt and IPOs are related to equity. According to general capital structure theories, these factors are not interchangeable without affecting other parts of the company as well, for example tax shields, WACC and similar factors. (Brooks, 2012)

When it comes to corporate bonds, the capital structure impact can be mitigated by issuing a special kind of corporate bond, referred to as a convertible bond. The convertible bond starts out as debt when it is issued, but can be converted into equity up on maturity. In this way the company can still use the benefits of debt, but not change the long-term capital structure. (Brennan & Schwartz, 1980) The issue can be analyzed from both the company's and the investor's point of view. The investor primarily seeks return on his investment and is mainly interested in the risks and potential returns. From the company's point of view, the issuance of corporate bonds may, to some extent, replace the traditional bank loans. Both bank loans and corporate bonds are debt, thus a company's capital structure will not change when a company issues more bonds and reduces its bank loans with corresponding amounts.

#### **2.1.1 Perfect market**

The modern corporate finance concepts can be originated back to Modigliani and Miller's (1958 & 1963) conclusions about the irrelevance concerning the mix of a company's debt and equity. No matter how the capital structure is composed, it has no effect on the entity value in their framework. Modigliani and Miller argued that the entity value solely is determined by the risk of its underlying assets and the entity's earning potential. Their framework is based on the assumptions that we live in a perfect market, referring to no existing transaction costs, taxes or financial distress costs and with perfect informational symmetry. Modigliani and Miller developed two famous propositions:

**Proposition I** – With perfect capital market conditions it is the market value of the assets' cash flows that determine the total value of the company, the capital structure is irrelevant.

**Proposition II** – A company's cost of equity increases together with its debt/equity ratio.

Since the market is not perfect in these aspects the model has been modified in different ways due to frictions in the market. In the following sections we will present theories where the Modigliani and Miller assumptions are being relaxed. (Copeland, Weston & Shastri, 2005)

### 2.1.2 Trade-off theory

By adding corporate income tax to the Modigliani & Miller framework, it turned out to be beneficial for a company to hold debt since it would protect some of the profits from taxation. This circumstance encouraged a high debt level for companies, but a high debt level could not only be an advantage. However, when the debt level, in relation to the equity level, increases also the expected costs of bankruptcy, financial distress costs, increases. The more these costs increase eventually they will offset the tax shield's benefit. According to the trade-off theory there is an optimal capital structure and it varies for each company. (Frank & Goyal, 2007)

The theory can be considered as the following calculation:

$$V^L = V^U + PV(\text{Interest Tax Shield}) - PV(\text{Financial Distress Costs})$$

Where;

$V^L$ =Value of levered firm

$V^U$ =Value of unlevered firm

PV=Present value

(Berk & DeMarzo, 2011)

Ogden, Jen and O'Connor (2003) claims that the variations between companies are due to different corporate tax rates and also since companies are affected to a different extent from potential future financial distress costs. Since different aspects affect companies in various ways it is impossible to give a company a general recommendation about their capital structure. However, in general, companies with large taxable income and with more liquid and safe assets should obtain a higher leverage ratio and companies with more risky assets and riskier cash flows should settle for a more moderate level of leverage.



### 2.1.3 Pecking order theory

The principles of this theory can be originated to Donaldson's (1964) study of companies' financial behavior. His results show that the management of a company mainly favors funds that are generated within the company, but also can consider external funds if sporadic inevitable events would occur. The pecking order theory's foundation of how a company should obtain its financing has the following priorities: (1) Internal financing is mainly preferred, where, in line with Donaldson's argumentation, the company's own operations generate cash flows that finance further new investments. (2) The company tries to adapt their dividend payout target to the investment opportunities in order to have internal funds available for investments. This is challenging to set since the dividend policy is sticky and the investment opportunities may vary with major magnitude over time. (3) Since the dividend payouts are sticky and both the investment opportunities and cash inflows may be volatile the internal cash flows may be more or less than what is needed for the investments. If it would be less the company will mainly decrease its marketable securities portfolio or cash balance. (4) If the company do not have the opportunity to finance its operations with internal funds it requires external financing.

When it comes to external financing the company issues securities in safety order, debt is most preferable, then hybrid securities like convertible bonds and similar and as a last option equity is an alternative. This theory does not state a specific leverage ratio for a company; instead focus is mainly on what ratio the external financing has in the company. Depending on the availability of internal funding, this ratio will change as more or less external funding is needed and obtained. Myers (1984) states that it is better to use retained earnings than to issue debt and it is better to issue debt than equity due to the adverse selection problem. The transaction costs for internal funding are the smallest and they increase for every individual step in the pecking order.

### **2.1.4 Market timing**

Baker and Wurgler (2002) describe a different approach to the capital structure view, the hot and cold market conditions, which may be referred to as the market timing hypothesis. The main idea is that the company issues equity when the market conditions are favorable and repurchases equity when they are not as favorable. Favorable market conditions would be when the company's market values are high, compared to book and former market values. By taking this approach the management indirectly changes the company's capital structure and considers the gains from exploiting hot and cold markets greater than attaining an optimal level of leverage, according to Celik and Akarim (2013). However, the market timing impact on capital structure is not straightforward; there is also evidence on markets where no impact is distinct. We will discuss hot and cold markets more thoroughly in the IPO-section.

### **2.1.5 Agency costs**

When it comes to agency costs there are three different kinds that can be referred to regarding the importance of capital structure. (1) Asset substitution effect, the company's management has more incentives to accept riskier investment opportunities if the company has a high debt to equity ratio. This is due to if the investment is successful the equity holders increase their wealth, but if it is unsuccessful the debt holders are facing the disadvantages. The conclusion is that it could be a shift in wealth from debt holders to equity holders. (2) Underinvestment problem, this issue may arise if debt in general is risky. In this case the debt holders would gain from good investments at the expense of equity holders. The result is that management may reject investment opportunities even though they have positive net present value (NPV) and would increase the value of the company. (Berk & DeMarzo, 2011) (3) Free cash flow, if the company's funds increase without being given back to investors the management may use the excess cash on different investment opportunities in order to let the company grow. Managers tend to favor big companies and by accepting negative NPV projects, the firm value would decrease. This issue can be mitigated by increasing the company's debt level. (Jensen, 1986)

## 2.2 Initial public offerings (IPOs)

Traditional stock exchanges serve two main functions; to facilitate the raising of equity capital and to offer trading in shares and other securities. The first function is generally referred to as the primary market whilst the second one is called the secondary market. Both are of vital importance to an economy. If taking a company public is relatively easy and cost-worthy, this will increase the availability of equity finance. The same goes with the secondary market, a liquid and transparent market will endorse investors to participate and should again increase the availability and lower the costs related to equity finance. (Jenkinson & Ljungqvist, 1996)

The two most important functions of an IPO are providing additional finance to companies and to serve as an exit route for the original entrepreneurs and investors (Jenkinson & Ljungqvist, 1996). By going public, a company will get better access to capital through public capital markets, hence the liquidity of the company will be improved. In addition, public companies give their investors the ability to diversify. (Berk, DeMarzo & Harford, 2012) The entrepreneurs behind the firm can exploit the benefits of risk reduction in their personal portfolios by selling at least a part of their shares and use the proceeds for other investments (Ogden et al., 2003).

Even though the “exit route” is one of the major advantages of undertaking an IPO, this feature can also be viewed as one of the major disadvantages that come with an IPO; when owners sell their shares and diversify their holdings, the equity holders of the company become discrete. Eventually, the investor’s ability to monitor the management and operations of the firm will be undermined. (Berk et al., 2012) A third reason for going public could be that, in a takeover situation, the company can now choose to offer new shares in its own company instead of cash to equity holders of the target company. If the victim equity holders refuse to receive shares as compensation, institutions may step in and buy the shares, this is generally called vendor placing. (Valdez & Molyneux, 2010)

Another benefit of having the shares of a company listed on a stock exchange is the potential opportunity to set up employee share option plans. Since it creates valuable incentives, it has for quite a long time been a common way of forming executives' compensations. An additional motive involves reducing levels of debt. There is evidence on how firms that undertake IPOs typically use a considerable amount of the IPO-proceeds to pay off debt obligations. By reducing the firm's level of leverage, the owners reduce the risk in their private portfolios even if they decide not to sell their shares. (Ogden et al., 2003)

Companies can be listed in a number of different ways. The choice of method for going through with an IPO is usually influenced primarily by the size of the firm, the uncertainty regarding its value and the regulations in the country in which the IPO is about to take place. A company considering an IPO often performs a dual track. This is a process in which the management of a firm evaluates an IPO at the same time as at least one other exit option is held open. The increased levels of volatility that have been observed over the last years in the global financial markets are both new and challenging. Even in the implementation phase of an IPO, companies choose to go with dual track processes since the uncertainty regarding medium term development is too high and risky. Lately, it usually ends up with not going public. (Ernst & Young, 2011)

The standard approach in the US market is a method known as "firm commitment offering", and the majority of theoretical work discussed further on takes this as a benchmark. However, it is important to notice that in many countries significantly different arrangements exist for taking a firm public. In a firm commitment offering the lead manager will form a syndicate of banks to underwrite the issue. The syndicate has to take on all of the shares and they must not pre-sell any of them to other investors. Since the potential losses from a failed offer might get huge, this technique requires well capitalized banks. The distribution of the stock portions among the participating banks is set by the lead manager and is not necessarily related to their underwriting positions. (Jenkinson & Ljungqvist, 1996)

The typical firm choosing to perform an IPO is very young and holds a speculative position in a growing industry. Since a firm performing an IPO only has a short earnings history and no record of public valuation, IPOs are considered to be among the riskiest equity investments in the stock market. (Ogden et al., 2003) One of the most widely used methods for valuing firms undertaking IPOs is the use of comparable firm multiples. As mentioned above, an issue is generally brought to market by a bank or a stockbroker. These are also often involved in and will advice on the pricing of the new shares. They have to persuade the market of the merits of the IPO. (Valdez & Molyneux, 2010)

### **2.2.1 Costs and pricing of an IPO**

In order to understand the variation in IPO-volumes over time, which will be examined under the next headline, one must have knowledge of the related costs and the pricing process. For firms performing IPOs, markets are not frictionless. Generally, economists argue that an IPO involves two types of costs, direct and indirect costs. Both components are economically significant with the total costs, expressed as a percentage of the realized market value of the issued equity, averaging between 21,22% and 31,87% depending on the offer arrangement. (Ritter, 1987)

To begin with, there are the direct costs of an issue, including underwriting fees, legal expenses, accounting and auditing fees. The typical underwriter spread for an IPO is 7% of the offering proceeds. (Ogden et al., 2003) In addition, there are always costs in terms of management time and effort, however these are harder to quantify. Since a majority of these costs are fixed, there are considerable economies of scale. The average direct costs of issues raising less than 8 MUSD in the UK is about 10,4% of the gross proceeds, falling to 5,2% for issues raising more than 16 MUSD. Similar patterns have been observed in the US where direct costs on average correspond to approximately 18,2% of small issues raising less than 5 MUSD, dropping to 6,8% for issues raising more than 100 MUSD.

The second category of costs includes the indirect ones. IPOs seem to be substantially underpriced and it is generally argued that initial underpricing constitutes a transfer of wealth from the native company owners to the new equity holders and therefore should be regarded as an IPO-cost. (Jenkinson & Ljungqvist, 1996)

The pricing process starts after setting the preliminary offer price. Positive information regarding investor demand is used to adjust the price upward to arrive at the final offer price. In order to encourage investors to openly reveal their personal demand schedules, the underwriter generally only somewhat adjusts the price. Thus, he or she underprices the shares to reward investors for revealing private information. (Benveniste & Spindt, 1989)

Shiller (1990) argues that the setting of the offer price plays an important role. The results from his survey suggest that most IPO-investors do not thoroughly research the companies they invest in but instead rely on the reputation of the underwriter as a guarantee for fundamental values.

Roosenboom (2007) documents that underwriters regularly use multiples valuation, the dividend discount model and the discounted cash flow model to value equity in IPOs. Further, he finds that underwriters prefer multiples valuation when dealing with technology firms and rapidly growing companies. The dividend discount model is more common when valuing older and well-established firms from settled industries that plan to pay big amounts of their earnings as dividends. The dividend discount model is mainly used when aggregate stock market returns are at low levels. At the same time, the use of the discounted cash flow model and the economic value added method is more frequent when aggregate stock market returns are high.

He also examines the weights that underwriters assign to the values generated from each method when setting fair value estimates. In line with previously presented facts, it is observed that underwriters pay more attention to the value estimations of multiples methods when valuing profitable and fast growing firms in the technology sector. At the same time, more weight is being assigned to the dividend discount model when the IPO-firm plans to pay out a great fraction of future earnings as dividends. As a final topic, he documents the variables of the price discount that underwriters relate their fair value estimates to, in order to arrive at the preliminary offer prices. The discount is applied early in the process and is distinct from the well-observed IPO-underpricing. Other findings include that companies that are expected to be profitable in the current year are less likely to be underpriced and that reputable underwriting firms are linked with lower discounts.

There are some credible reasons to imagine some underpricing on IPOs on average. To begin with, transaction costs are not negligible on any equity market with bid-ask spreads often being a couple percentage points. In order to change his or her portfolio, an investor may require an incentive in the form of an initial discount. The other reason involves the risk that the market price falls below the issue price. If IPOs were priced with zero discount, it is likely that risk averse investors would prefer to buy shares in the after-market. This is due to the fact that there is a limited amount of information allowing them to separate winners from losers. From this perspective, the initial discount on IPOs can be viewed as a return for bearing risk. However, observed initial underpricing is generally too significant to be explained by these reasons. (Jenkinson & Ljungqvist, 1996)

Almost consistently, underpricing is considered as involuntary but unfortunately necessary, even when going with the signaling approach that assumes high quality firms to use underpricing as a signal to lower their cost of capital in succeeding funding rounds: if there was a more cost efficient way to signal quality, presumably companies would choose not to underprice their offerings. The main cost of underpricing is borne by previous owners. Since the old owners have to dilute their stakes more the more underpriced the issue is, they will be losers even if they choose not to participate.

Still, there are reasons to why firms may choose to underprice. A first important potential benefit is the insurance against under-subscription. Underpriced offers are typically oversubscribed. Whether the publicity generated by the oversubscription outweighs the underpricing cost must be considered as an open question, but many experts seem to interpret an oversubscribed IPO as a successful one. A second reason to why a firm would prefer to underprice is that it could help to ensure that control is not given away. As a matter of fact, an excess demand affords the issuer the opportunity to choose a equity holder base of its preference. (Jenkinson & Ljungqvist, 1996)

### **2.2.2 Cycles in IPO-volumes and initial returns**

As shown above, there has been a long history of published articles that have examined the pricing of IPOs. According to most recognized finance literature, the issuance of corporate securities in an efficient market should not generate positive net present value, hence the timing of a financing decision should not matter since all offers will be fairly priced. (Brealey & Myers, 1991)

Based on this fact, one might want to think that IPOs occur randomly over time. However, this is not the case. As discussed in the introduction, observations tell another story. Outside the Anglo-Saxon countries, going public has primarily been a phenomenon of the 1980's and 1990's. The number of firms coming to the markets is not random and shows signs of positive autocorrelation; time periods of high levels of IPOs are likely followed by further substantial IPO-volumes. Even in cases where there is no obvious autocorrelation, IPO-volumes tend to be clustered. (Jenkinson & Ljungqvist, 1996)

Unlike some other form of financing decision, a bond issue for example, an IPO means implications far beyond simply raising funds. Once a company goes public, it has to satisfy a number of requirements and regulations. Due to several corporate scandals during the first years of the twenty-first century, including Enron and WorldCom, tougher regulations designed to address corporate abuses have been implemented. Widely recognized organizations like the Securities and Exchange Commission (SEC) and a number of stock exchanges, including NYSE and NASDAQ, have adopted new sets of standards focusing on more detailed financial disclosure, greater accountability and tougher requirements for the responsibilities of the board of directors. Overall, these new regulations were designed in order to offer better protection for investors. From the perspective of companies, following the new standards is costly and time consuming. (Berk et al., 2012) Because of actualities like these, one can assume that the decision to go public in the first place, has to be a positive-NPV proposition. Thus, the number of companies deciding to undertake IPOs should depend on factors that determine the trade-off between costs and benefits of being a public company. Since these factors do vary over time, so will the number of firms deciding to go public. (Jenkinson & Ljungqvist, 1996)



Over the years 1970 to 2000, there were 8010 US non-financial firms performing IPOs in the US public equity markets. The annual totals range from as few as six in 1975 to a record of 660 in 1996. This means quite remarkable changes in volume from one year to another. Variation in volumes over time are, as mentioned earlier, related to economic and market conditions. The general increase since 1979 partly reflects the development of the venture capital industry. (Ogden et al., 2003)

Furthermore, there is a lot of empirical research suggesting that entrepreneurs time their decisions to go public. Since improved access to funds seems to be one of the most important reasons for undertaking an IPO, it is not very hard to think that the owners want to sell their shares when equity is highly valued. However, there are some studies showing that investments by firms actually decline after an IPO. (Pagano, Panetta & Zingales, 1998) This indicates that the IPO-decision is likely to be driven by other factors as well.

The waves in IPO-volumes are often referred to as “hot and cold issue markets”. These conceptions were defined and discussed by Ritter (1984) in a paper where he examines the hot issue market of 1980, characterized by a high number of natural resource firms going public. This period showed average initial returns as high as 48,4% on unseasoned new issues on common stock, compared to a corresponding level of 16,3% for the previous five years. The article implies that the best time for a company to perform an IPO is during the volatile high-volume period directly following a hot issue market for the industry in question.

That is, firms in certain industries face better investment opportunities during some specific time periods, so that IPOs simply allow for increased fund raising. (Benninga, Helmantel & Sarig, 2005) However, in contrast to this finding, Loughran, Ritter and Rydqvist (1994) find that periods of high IPO-volumes do not match with a subsequent increase in investments. Instead, the study suggests that IPOs tend to cluster during times when firms, already publicly traded as well as those just being issued, are valued relatively high by investors.

Helwege and Liang (2004) find that IPOs in hot issue environments are not more concentrated in particular markets. Instead, both hot and cold market IPOs are overall dominated by the same set of industries that have accounted for most of the issuance in the examined period of 26 years.

Generally, hot issue markets are characterized by firms from industries that also appear widely in the cold issue markets. This finding challenges the idea that hot issue markets are driven by new inventories. The observed pattern of industries rather suggests that industries related to innovative products, like the PC and its associated products in the early 1980s and the Internet in the late 1990s, have long-term routes while the IPO-market moves up and down at a higher frequency. New products may give sparks to hot issue markets, with a big number of firms preparing IPOs, but the market may turn cold even before all these firms manage to raise funds.

Lowry (2003) investigate a number of factors that lead so many companies to go public during some periods, versus so few during other times. His results indicate that companies' demand for capital and the level and investor sentimentality explain a significant amount of the total variation in IPO-volume. An increase of 23 000 new corporations and a 25% decrease in future market returns are each related to approximately 75 more IPOs in 1985, and a decrease of 7,9 percentage points in closed-end fund discount is associated with about 151 more IPOs in 1995. Hence, IPO-volume is positively correlated to companies' demand for capital and the level of investor sentiment. He also shows that adverse selection costs are statistically significant, but not significant in economic terms, suggesting them to be of secondary importance.

Benninga et al. (2005) show that owners of private firms choose to issue equity when the cash flows of their firms are relatively high. That is, times that do match high stock prices since cash flows are cross-sectionally correlated, particularly within industries. For the same reasons that IPOs are grouped, they expect reprivatization waves to be dominated by certain industries and to show higher volumes when share prices are valued low.

Holmström and Tirole (1993) suggest that the IPO-decision is related to the company's viewpoint on the subject of outside monitoring. Once the shares are publicly traded, speculators will start to collect information regarding the performance of the company. This means that the stock price, at least to some extent, should reflect this information. The firm can then choose to use the stock price as an indicator to determine the performance of the firm when compensating the managers.

When it comes to cycles in IPO-returns, there is an extensive amount of articles and studies available. The unadjusted returns indicate positive abnormal returns of 19% at the end of the first trading day and negative abnormal long-term returns, underperforming the market index over the following three years by 23%. (Copeland et al., 2005) Loughran and Ritter (1995) show that newly publicly traded equity underperform benchmark portfolios by roughly 30% over the first five years following the IPO. The same goes for firms that undertake a seasoned equity offering (SEO). The average annual return for firms undertaking IPOs is only 5% during the five first years, the corresponding figure for companies performing SEOs is at a level of 7%.

However, just like IPO-volumes, the extent of underpricing also tends to vary over time in most markets. Generally, the profitability of a “stagging strategy”, that is subscribing randomly to all IPO-offers and selling as soon as trading launches, has been much higher in the early 1980s than in the late 1980s and early 1990s. The new issues in these time periods were rarely overpriced on an annual average, meaning that such a strategy involved relatively low risk. Noteworthy is also the fact that there has been a relatively high persistence in initial returns. Hot issue markets frequently last for several months, this implies that underpricing is highly positively auto-correlated. From an economic point of view this is notable; if underpricing is worrying per se because it contradicts efficient markets, its predictability is even more worrying since it actually implies that a yet more profitable trading strategy than indiscriminate “stagging” exists. (Jenkinson & Ljungqvist, 1996)

Forecasts concerning future initial returns can be estimated in a more precise way if other factors other than past underpricing trends are taken into account. There are a lot of studies suggesting that underpricing is higher in buoyant stock markets. Initial returns tend to be higher following periods of high returns on the market index. Jenkinson and Ljungqvist (1996) state that, relative to USA, Finland and Hong Kong, German IPOs tend to be more heavily underpriced not only when the overall market is doing well but also in macroeconomic upturns, when listed firms issue large amounts of seasoned equity and when stock markets volatility is at a low level.

The degree of initial returns will vary when the fundamental parameters identified in the theoretical underpricing models change. For example, if underpricing functions as an insurance against lawsuits, greater underpricing will be inevitable as the risk of these increases. Still, there is no thorough examination of how and why such constraints change with market conditions, why would actually the risk litigation increase in positive markets?

Another way to reason is to say that, as IPO-costs decrease and benefits increase during certain periods of time, a listing could get so attractive that a company would be ready to accept higher than average underpricing in order to profit from a good IPO-climate. This relates to the previously discussion on cycles regarding IPO-volume; rising stock markets and economic upturns are good times to perform IPOs and thus may result in a greater acceptance of underpricing.

Investment bankers generally tend to prefer an alternative explanation that relates to the availability of funds in the market. As an exceptionally big number of companies decide to enter the equity market, a greater inducement in the form of underpricing must be offered in order to attract investors and make them subscribe for shares. However, this approach is a bit questionable. Most developed countries are assumed to have deep enough financial markets to manage large amounts of new stock on a bait of approximately 10% underpricing discount. This is not the case in emerging markets, where massive oversubscription ratios often can be observed even in times of great IPO-activity. This indicates that investors are more than willing to invest even if offer prices are set higher. Nevertheless, it seems unlikely that the supply of investable funds is highly sensitive to the number of offerings. (Jenkinson & Ljungkvist, 1996)

To conclude, IPO-volume and underpricing cycles are not perfectly correlated. Instead, hot issue markets tend to be followed by periods of high new issue volumes. Why more companies undertake IPOs after times of persistent underpricing is still not clear. An explanation may be that high levels of underpricing act as a signal of investors' appetite for new offerings, making firms go public. Another could be that companies seen to performing IPOs despite high underpricing costs, signal that now must be a good time to go public.

## 2.3 Bonds

The characteristics of a bond depend on the bond's originator. Choudry (2005) is stating four different bond issuers: sovereign governments, local government authorities, supranational bodies (for example the World Bank) and also corporations. The most significant bond markets are the government bond markets. The corporate bond market, which we will discuss more in detail, consists of an extensive range of issuers with different characteristics in order to attract different investors. Bonds are issued in all different kinds of currencies; however in the global market the most common currency is the US Dollar (USD). In order to have as attractive and liquid bonds as possible it is favorable to denominate the bonds in a major currency, that way it can reach a broader investment base.

The government bond markets are the biggest bond markets in the world; especially the US Treasury security market is of significant magnitude. However, we are analyzing the bond market on a corporate level and will mainly focus on its' characteristics. The corporate bonds are more risky than treasury bonds; hence investors are compensated by receiving higher returns on corporate bonds. (Hässel, Norman & Andersson, 2001)

As we have discussed earlier, different kinds of debt are important parts of a company's capital structure. According to Batten and Kim (2000) companies mainly prefer long-term financing and in that way the issuance of corporate bonds is preferable. Investors in general favor investments that pay off in the short run, thus the maturity mismatch problem occurs to corporate bond financing. Choudry (2005) explains that the interest payments a company does on bonds to the investors are tax deductible. If we compare this with dividends to equity holders, the bonds are more favorable since dividends are not tax deductible. However, as we have discussed above, a mix between both debt and equity is preferable since an all debt-financing situation would bring too high financial distress costs.

### **2.3.1 Corporate bonds compared to equity and IPOs**

Endo (2000) is discussing that debt, historically seen, is appealing compared to equity due to factors already discussed in the subchapter concerning IPOs, like fear of ownership dilution and high historical costs of equity financing. Also, one should notice that unlike a corporate bond issue, an IPO means implications far beyond simply raising funds. Once a company goes public, it has to satisfy a number of requirements and regulations. These are generally costly and time consuming.

In general, one can assume that current equity holders do not want their equity stakes to be diluted by raising further external equity capital. From the perspective of the company, equity capital is more expensive than debt in general, mainly due to two factors. First, the risk of an equity investment is higher than for a debt investment, hence the equity investor requires a higher return than a debt investor or lender would do. Second, when it comes to interest payment on debt it is usually tax-deductible for companies, while a company's profit usually is taxed before dividends are retained or distributed to equity holders.

On the other hand, there are a number of valuable characteristics of the IPO-decision and equity as well. The two most important functions of an IPO are providing additional finance to companies and to serve as an exit route for the original entrepreneurs and investors. Another benefit of having the shares of a company listed on a stock exchange is the potential opportunity to set up employee share option plans. An additional motive involves reducing levels of debt. As mentioned previously, there is evidence on how firms that undertake IPOs typically use a considerable amount of the IPO-proceeds to pay off debt obligations. By reducing the firm's level of leverage, the owners reduce the risk in their private portfolios even if they decide not to sell their shares

### **2.3.2 Corporate bonds compared to bank loans**

Two different kinds of loans are common among corporations in general, a bilateral loan where one lender provide the loan to the borrower and syndicated loan where more than one lender provide the loan. The bilateral loan is considered to be a kind of relationship loan; the bank and the corporation have been building up a relation over the years so both parties feel comfortable in covenanting. (Gunnarsdottir & Lindh, 2011) Syndicated loans make it possible for large companies to take on loans that would exceed a single bank's loan limit. There are some similarities to corporate bonds since also the syndicated loans can be traded on the secondary market. (Altunbas, Kara & Marqués-Ibáñez, 2009)

#### **2.3.2.1 Diversification and flexibility**

Debt financing do not have to be seen as either one thing or the other, by undertaking multiple financing options at the same time a company is diversifying its financing risk. Alternative financing options are of big importance, especially with the recent financial crisis of 2007/2008 in mind. Companies cannot rely on banks to the same extent as they have done historically, hence corporate bonds can play an important role. An established effective corporate bond market will also put pressure on banks to provide more beneficial conditions for bank loans since a competitive situation then would emerge. (Fitch Ratings, 2010)

Flexibility is of major importance for companies and corporate bonds would be a more flexible financing alternative for companies than bank loans. When it comes to corporate bonds the company can customize the issuance in a way so it suits the company the best, bank loans also do have more covenants in general. It is harder for a company to influence the conditions of a bank loan. However, big companies that are considered to be major customers of a specific bank can obtain considerable beneficial arrangements, especially if the companies do multiple businesses with the bank. (Gunnarsdottir & Lindh, 2011) Flexibility from monitoring the investments may also differ, banks generally require specific statements of performance and similar while bondholders tend to not supervise the company to the same extent.

Bondholders are naturally also interested in how the company is performing, but generally do not require the same amount of formal information. Companies with more financial flexibility are more likely to be valued higher than companies without this kind of flexibility. (Gamba & Triantis, 2008) The need for financial slack as a buffer against the contingency in internal funds is also increased by financial flexibility. (Billett & Garfinkel, 2004)

### **2.3.2.2 Cost of bank loans and corporate bonds**

Gunnarsdottir and Lindh (2011) state that interest rates between bank loans and corporate bonds differ. The market determines the interest rate of corporate bonds while the rates for bank loans depend on the relationship between the company and the bank. As mentioned above, if a company do multiple businesses with the bank and is a major customer the company can obtain a beneficial interest rate. The interest rate of a corporate bond is the same over the bond's whole life span; the amount depends on the negotiations before the issuance.

The interest rate cost and other costs of a bank loan can be variable over time, depending on at what time the company take on the loan and also other formal technicalities. As mentioned above, the credit rating of a corporation is important when investors/lenders consider their financing alternatives. It is relatively expensive for a company to attain a credit rating, but it is usually an important comparable for investors when they decide where to invest their money. When a bank considers lending a company funds the bank itself evaluates the riskiness of the loan and come up with a kind of credit rating.

Since banks have other kinds of criteria than the credit rating companies, for example relationships to companies, these two ratings may differ. Issuing bonds denotes higher administrative costs than bank loans in general. Endo (2000) argues that issuing bonds in general is an attractive way to borrow in a long-term, large-scale and opportunistic way. Bank loans on the other hand are more suitable for small, short-term and ongoing financing. If we examine the companies balance sheets bonds are appropriate for financing fixed assets and investments while bank loans are suitable to finance inventories and similar current asset accounts.



### **2.3.3 Conditions of the corporate bond market**

Schinasi and Smith (1998) explain that the corporate bond market is developed after the establishment of an effective market for government securities. In their study about corporate bond markets some essential factors that are particularly important concerning the development of a corporate debt securities market is explained have been noticed. We will briefly explain some of those factors below.

#### **2.3.3.1 Developed money markets**

A critical first factor is the presence of a well-functioning money market. The money market is important for financing positions. However, it is also important for developing fixed-income markets since money markets price liquidity, which works as benchmarks for pricing all kinds of fixed-income instruments. In the study, the author claims that the liquidity price anchors the yield curves' short end and thus works as a benchmark when pricing other fixed-income securities that do not have the same liquidity, credit quality and maturity.

#### **2.3.3.2 Regulatory policies**

The regulatory infrastructure is important when it comes to either promoting or obstructing the development of corporate debt security markets. Also an inadequate policy and control of securities markets impedes the securities market's development and progress. The supervision factor is of major importance, it has to be of such feature that investors have confident in the general control and thus will not hesitate to invest in the market. However, on the other hand, it cannot be too complicated and bureaucratic since it would lead to investor frustration and eventually investors would leave that market to others with less complicated regulations. Historically, when the market policies have been too strict this has led to successful "offshore" markets, for example the Eurodollar in London and the Singapore and Hong Kong markets for financial instruments from many Asian countries.

#### **2.3.3.3 Concentration of market power in the financial industry**

The financial industry itself may be a factor that inhibits the development of corporate debt securities markets. In countries where banks are regarded to have a big amount of market power (for example Germany, Italy, Japan and France) this is considered to be the origin of harming their corporate debt securities markets' development.

Two different factors may explain this phenomenon; the banks may adjust loan and deposit rates in a tactic way in order to mitigate the securities markets development and/or by supervising and control the securities markets themselves to make the companies not fund their investments through securities markets.

#### **2.3.3.4 Primary market infrastructure**

When companies are to issue securities there usually is a need for investment banking expertise. This expertise is typically giving advice to the company about timing and conditions of the issuance and to underwrite the issue on either a “firm commitment basis” (underwriter guarantees the price) or a “best efforts” agreement (price is settled by the market). Developing such expertise is rather time consuming and if it is to be obtained externally it would be relatively costly.

#### **2.3.3.5 Secondary market infrastructure**

Corporate bonds are typically listed on an exchange, but mainly the most common way to trade debt securities is over-the-counter, that is between counterparties (OTC). When it comes to the secondary market, an important feature of the corporate securities is that the securities are liquid. The more liquid the security is the more likely it is that it can be traded on the secondary market. Liquidity varies a lot between different bonds and a more detailed examination about bond liquidity will follow under “Liquidity risk” below.

#### **2.3.3.6 The investor base and demand**

The final factor is the need to establish a base for investors in the corporate bond market. However, an investment base is not enough, there also has to be a demand for the corporate bonds. After the recent financial crisis treasury bonds are not considered as safe as they have been before, some treasury bonds have even been downgraded to a non-investment grade. If investors are to seek a higher yield than treasury bonds offer, but to only a slighter increase in risk investment graded corporate bonds are a good option. (Kaya & Meyer, 2013) The trends in corporate debt are the same as in government securities markets in advanced economies; the investor base is international and is to a large extent dominated by institutional investors. Even though non-financial firms and banks have been the main investors in a large amount of commercial paper markets (for example Japan and the UK) earlier, the institutional investors have increased significantly there as well.

### **2.3.3.7 Cost of alternative financing**

In addition, Kaya and Meyer (2013) contends that increasing alternative costs of financing is also likely to be a driver for increasing issuance of corporate bonds. Bank loans are mainly an alternative financing strategy to corporate bond issuance and hence the cost of bank loans is of major importance. The refinancing costs of banks have increased after the recent financial crisis of 2007/2008 due to new market regulations. This implies that the corporate bond market will have a more important role in companies' financing than before.

### **2.3.4 Corporate bond risks**

Corporate bonds, compared to government bonds, are exposed to more risk factors. We will present some risk factors when it comes to evolving corporate bond markets in the following sections that we find important for our thesis. (Choudry, 2005)

#### **2.3.4.1 Liquidity risk**

Liquidity is an important feature for securities in any kind of market where such securities are being traded. In a liquid market there are a number of both buyers and sellers that are willing to trade the security. Also how easily the security can be traded and the spread between buying and selling price, the bid-offer spread, are two major liquidity aspects. The more illiquid a bond is the wider the bid-offer spread will be on the market since it is not very preferable to trade. If a bond is to become illiquid the market will mark up its yield in order to compensate for the riskiness of holding the bond. A good estimation of a bond's liquidity is the difference in its bid-offer spread. Corporate bonds are considered liquid as long as their spread is not wider than 0.10 to 0.50 percent. A wider bid-offer spread is deemed illiquid and if the spread is wider than 1 percent it is considered to be non-tradable. In general government bonds have a bid-offer spread of 0.03 percent or less, which indicates very liquid bonds. (Choudry, 2005) Earlier research on the issue states that bond illiquidity is especially linked positively to a bond's age and maturity, but negatively to the bond's issuance size. (Bao, Pan & Wang, 2011) The liquidity issue is a major component when a corporate bond market is developing. As we have mentioned earlier, the investor interest is increasing with a more liquid market. (Schinasi & Smith, 1998)

#### **2.3.4.2 Event risk**

If an unexpected event occurs the corporate bond's credit risk increases significantly and the bond's yield also increases to a very high level. The event itself can be either internal, for example a merger or acquisition, or external, like a regulatory change, macro environmental alterations or similar. The event risk may affect an industry as a whole, for example a regulatory change, like the adjustments to Basel III after the financial crisis of 2007/2008. With new regulations bonds may not be as safe as they were before and thus the yield spread increases. However, such regulation shifts may also work in the other way, even though bonds might not be considered as safe, but alternative financing might be considered even more speculative. This aspect would work as a sort of event opportunity instead. When it comes to acquisitions, if a company's debt gets downgraded due to the acquisition, the bondholder will suffer a loss in capital value. In order to shield bondholders from such event risks the bonds can have provisions in them that force the acquirers to repurchase the bonds under detailed conditions. Similar conditions can be included in a bond contract, such as the borrower must redeem the bond at par if the issue falls below a specified level of net worth. (Choudry, 2005)

#### **2.3.5 Country-specific differences**

When analyzing the debt markets of different countries one must take into consideration that there are different prevailing financial systems based on traditions and structures in each country.

##### **2.3.5.1 Bank structure**

Rajan and Zingales (1995) declare that on the one hand we have the Anglo-Saxon system, market-oriented (for example USA and United Kingdom) where the banks do not have a major role in financing, instead financial functions originate directly from capital markets. On the other hand we have the Continental system, bank oriented (for example Japan, Germany and Italy) where the banks play an important role on the market of financing. The capital structure of firms in the different systems will be of major differences since the banks' roles are very different. Since bank loans are not especially prominent in the Anglo-Saxon countries there has been more incentives for companies in those countries to develop other kinds of debt systems, like corporate bonds for example.

### **2.3.5.2 Legal structure**

Apart from differences in how dependent companies are on banks in different countries La Porta, Lopez-De-Silanes, Shleifer and Vishny (1997) argue that the different legal structures also are of major importance. There are countries following common law, for example the United States and the United Kingdom and there are countries following civil law, such as Sweden and Germany. The common law countries have a stronger investor protection so it comes more natural for the companies in those countries to rely on a more equity based financing. The civil law countries have the weakest protection for investors and also the least developed capital markets; instead laws are supporting the state's substantial roll in the economic development.

### **2.3.6 Bankruptcy pecking order**

From an investor point of view the option of corporate bonds can be more beneficial than investing in straight equity. If the company would be exposed to a situation of financial distress and bankruptcy is inevitable there is a bankruptcy pecking order to follow that White (1989) describes.

First, the secured creditors have claims to the assets available in the company, those investors, in general banks, have received a secured interest in assets for lending the company money. Secondly the unsecured creditors are in line, those are in general the rest of the company's debt holders. After the debt holders have been compensated, if there still is value left in the defaulted company, the owners of preferred stock make claims. The last category in line is the owners of common stock, since the other three big groups already have made claims on the company's value the chances are not very big that this category receives that much compensation. Since debt holders would be able to put claims on the defaulted company in an earlier stage than equity holders a bondholder position would be more beneficial in this perspective.

### **3. Characteristics of the examined economies and crises**

#### **3.1 Economic development and financial deregulations**

In order to understand the obtained data and the observed trends for each examined country, one must take the general economic development and the respective financial deregulations into account. Remarkable deviations in a separate country may have natural explanations, derived from new financial regulations etc. In this section we provide descriptions of the financial development in each included economy.

##### **3.1.1 Australia**

The major part of the Australian financial deregulation was initiated in the early 1970's and completed more than 25 years ago. At that time, there were extensive controls on the financial system in order to provide the authorities with the possibility to handle the monetary policy of the economy, create a captive market for government securities, limit the risk taking of the banks and maintain a stable exchange rate. There are a number of reasons to why the structural reforms were initiated. First, the controls had a large focus on the banks and weakened their abilities to satisfy the needs of their customers. Second, the regulations started to become ineffective as new, unregulated, intermediaries were established and started to provide financing. In addition, the Australian financial system was relatively unproductive and failed to provide funding to potential creditworthy borrowers. Further, it was characterized by wide interest spreads and little innovation. (Battellino, 2007)

The deregulation implied a liberalization of the interest rates and a floating exchange rate. The removal of interest rate controls was designed to allow banks to compete for deposits and loans. Foreign banks were now also allowed to enter the market. (Battellino, 2007) Rangunathan (1999) concludes that the deregulation served to integrate the Australian economy into the world market. The benefits have been widely documented and include a greater access to external finance, an improved set of investment opportunities and an increased growth rate.

Since the deregulations were completed even before 1990, one might think that they will not affect the examined years of our study. However, it is important to notice that the reform process did not end there. The effects of important changes like these generally take time to observe. New changes in laws under which the financial industry operates have been implemented in order to ensure that the sector stays efficient and competitive.

### **3.1.2 Germany**

The most important task of the German industry between 1990 and 1995 was to form a balanced order between the different federal states that originated from the former East and West Germany. Large cutoffs had a negative impact on the inefficient industries of iron and steel in the eastern part of the country at the same as the large-scale agriculture was converted into smaller private actors. These transformations put extra pressure on the German public debt. At this time, there were important differences between social standards in the two different regions. Even if they have become less significant over the years, they are still observable. There have been a lot of efforts and financial recourses spent on trying to improve the living standard and the infrastructure of the former East Germany. Due to this spending, the German economy showed only moderate levels of growth during the time period between 1990 and 2005. (NE Tyskland) In 2002 Germany entered European monetary union (EMU) and replaced the D-Mark with the Euro. In 2006, the GDP-growth finally reached the relatively high level of 3% as a result of an increased export of heavy industry goods to emerging markets.

Germany has the most fragmented banking sector in Europe. Financial institutions and banks have traditionally faced only a few restrictions on the combining of commercial banking and securities trading. The only exception has been a relatively harsh institutional separation between banking and insurance. However, this regulation has been rather easy to avoid through strategic alliances and cross-shareholdings. Hence, Deutsche Bank and some other private sector banks have become true universal banks. (Hagendorff, Collins & Keasey, 2007)

As the financial crisis struck in 2007/08, Germany was severely affected by the weaker global market climate. A major part of the economy is based on exports and dependent on the financial health of other countries. In 2009 the German car industry faced huge difficulties and had to lower the production with approximately 25%. As a consequence, GDP declined with 4,7%. However, a recovery was observable during the following year. (NE Tyskland) Recently, the Euro crisis has put a lot of pressure on the country.

The debt capital market in Germany as well as in whole Europe has grown after the last financial crises, but corporations seem to rely on bank loans to a less extent. From 2009 and forward, the issuance of debt securities have started to replace bank loans. It seems like a structural shift when it comes to capital debt markets is occurring.. In the beginning of 2000 there was also an increase in issuance of debt securities in general together with a rather weak growth in bank lending. However, there were no definitive structural changes at that time. Also some corporations' dividend yields have become as high as their bond yields, which has not been the case for decades. This may indicate that investors may be turning back to equity markets again.

Researchers at Deutsche Bank have made statistical analyzes about equity, bank loans and debt securities issuances before and after the financial crisis of 2007/2008. The results tell us that equity is being issued to the same extent in both pre- and post-crisis period. The results for bank loans are insignificant and do not contribute with any further information, but when it comes to debt securities issuance the amount post-crisis is larger than pre-crisis. The conclusion of these tests is that corporate bonds, together with other debt securities, are becoming an important option to the traditional bank loans. Whether this is a definitive future change or not, is determined by the outcome of the general interest rate environment, the impact of the banking sector's regulations and market liquidity. (Kaya & Meyer, 2013)



### 3.1.3 Italy

The Italian banking and finance industry has traditionally been characterized by a large number of small local banks on the one side, and large, state-owned institutions holding a majority of the retail deposits, on the other. In order to prepare for the introduction of the Euro, the sector underwent a number of significant changes during the 1990s. The separation between short- and long-term finance was stopped at the same time as a restricted form of universal banking was introduced. The deregulation also imposed a reduction of the share of government-controlled banking assets from 70% to 12% between 1993 and 1999. As a result from the privatization program, the number of savings banks was reduced. Instead, the formation of large commercial banks became more common. (Hagendorff et al., 2007)

In 1995 Italy joined the European system of national and regional accounts (ESA or 1995 ESA). ESA is a globally compatible accounting framework, used for a systematic and detailed description of a total economy, like a country or a region. The ESA puts more focus on the circumstances and data needs of the EU. (OECD Glossary) It is important to realize that this might have effects on the data regarding corporate bond issuances in the country.

In 1999, Italy replaced the Lire with the Euro. Pérez-Caldentey and Vernengo (2012), show that the European crisis of today is, among other factors, the result of the imbalance between core and non-core countries derived from the Euro economic model. Underpinned by the processes of monetary unification and financial deregulation, the core countries applied export-based growth policies at the expense of debt buildups in the non-core countries, like Greece and Italy. During the last decade, the annual economic growth was at a low level of approximately 0,3%. The financial crisis of 2007/2008 had a great negative impact on the Italian economy and forced the Italian government to implement tax raises and budget cuts. Today, Italy has the biggest public debt in Europe. The level of 2011 corresponded to 120% of GDP. (NE Italien)

### 3.1.4 Japan

During the late 1980s, Tokyo was considered the third most important stock exchange in the world, aside of New York and London. The Japanese financial system had undergone extensive changes since the mid 1970s. Frances Rosenbluth (1990) studied three different potential explanations behind the deregulation. He concluded that it was mainly driven by the financial institutions and the Ministry of Finance, in order to construct a new set of rules needed to compete in a changing economic environment.

In the 1980s, US corporations expressed complaints regarding the combination of the cheap Yen and the strictly regulated Japanese financial system, which according to them resulted in a decreased demand for goods produced by American firms. President Reagan and the Japanese Prime minister Nakasone agreed to form the Yen-Dollar Committee, working for a liberalization of the Japanese financial system. Barriers between banking systems and securities were removed as a result of the ongoing internalization at the same time as interest rates were liberalized. (Mabuchi, 1990) In 1989, insider trading, that had for a long time been commonplace and never been considered as unethical, was criminalized. In addition, the exercise of fund managers guaranteeing large clients a set rate and compensating them for losses was banned. (Laurence, 2001)

Due to trends of protectionism in USA and western Europe in the late 1980s, Japanese corporations made large foreign investments in order to keep up the pace gained from the deregulations some years earlier. Despite these efforts, the success burst like a bubble in 1990. (NE Japan) Japan was, in line with a number of other countries, hit by financial worries. The burst of the bubble economy was mainly characterized by the commercial banks' aggressive behavior in credit extensions, the relationship between banks and corporate groups, conflict of interests among the financial intermediaries and authorities etc. (Hossain, 2005) Ever since, there has been complications in the Japanese financial system. The economic growth was tempered and was in 1993 equal to zero. The recovery has been slow and has therefore taken a long time. In the late 1990s, there were a number of deregulations within the financial and administrative systems that have enabled structural changes in order to increase efficiency and reduce overcapacity.

In 1997/1998 Japan was hit by the Asian crisis. (NE Japan) As a consequence, Japan has had interest rates close to zero for the last fifteen years in an attempt to boost lending. The deflationary environment has made borrowers unwilling to take on debt, as the real burden of debt increases when prices drop. (Morgan Stanley, 2012) However, the Asian/Pacific corporate bond markets started to develop for real in the aftermath of the Asian crisis. The policymakers in Asia promoted its development after the crisis in 1997 as it was considered a way to reduce currency and maturity mismatches in the financial system and hence would mitigate future financial crises. Ever since the crisis the primary corporate bond markets have developed considerably, but the secondary markets have in general not seen similar progress. The liquidity issue has recently become a major problem for the Asian corporate bond markets. (Gyntelberg, Ma & Remolona, 2006)

Between 2002 and 2007 there was a steady but moderate annual economic growth of approximately 1,8%. Japan's role in the international market is not as defined today as it was 25 years ago. The country has been positively affected by the successful years of many developing countries, especially China, that has resulted in a higher demand for raw materials like steel. However, lately this fact has meant an increased competition in many markets where Japan used to dominate. (NE Japan)

### **3.1.5 Singapore**

The financial development of Singapore has benefitted from a favorable geographical location, its accessible harbor, the tradition as an international center of trade and a political stability. PAP (People's Action Party) has ruled the country since 1959. Singapore has a competitive, export based industry and a well-developed infrastructure that attracts investors from all over the world. (NE Singapore) Since Singapore is very dependent on its export, it is easily affected by macro economic trends. The country is also considered as an important financial center and many multinational corporations have their head quarters located here.

During the early 1990s, foreign held firms, particularly US- and Japan-based, made up a majority of the added value of the total production. In late 1997, Singapore was hit by the Asian crisis and experienced declining stock prices and a depreciating currency. However, it is important to notice that the negative effects on the financial health of Singapore were quite moderate in comparison with other states in the region.

In the aftermath of the crisis, the Monetary Authority of Singapore (MAS) decided to lower the banks' minimum cash balances and progressively allow more foreign competition in order to form a competitive banking environment. The goal was to provide conditions for further development as an international finance center. (Loong, 1998) However, these requirements have later been strengthened to follow the directions of the Basel committee. Some years later, in 2001, Singapore entered the worst recession in 30 years as a consequence of a declined demand for electronics, their most important export sector. In 2003, Singapore and USA entered a free trade agreement saying that customs fees were to be dropped over a period of eight years. The economy showed growth during the following years but was hit by the financial crisis in 2007/2008. Recently, increased levels of protectionism and less favorable agreements have resulted in less dependency on US- and EU-trade, focus is instead on establishing new markets and agreements. (NE Singapore)

### **3.1.6 Sweden**

The Swedish credit market was deregulated in 1985 and resulted in that the monetary conditions became more expansionary. Simultaneously, the economic activity and the inflation expectations rose and the tax systems favored high levels of borrowing. In the absence of a preventive economic policy, the deregulated credit market fueled a growing stock of debt. The economy became overheated and inflation started to accelerate. The overvalued SEK caused exports to decrease and as a consequence of a reformation of the harming tax system, asset prices fell and economic activity dropped. During the crisis, a bank guarantee was implemented. This was replaced in 1996 with a deposit guarantee, entirely financed by the banks. (Bäckström, 1997) Since the Swedish financial crisis will be more thoroughly presented later on, we will not go deeper into it under this headline.

The structural reformation of the financial system continued in the aftermath of the crisis and the Swedish banking sector, as well as the whole financial industry, is considerably more flexible and dynamic today than back in the mid 1980s. The increased competition, resulting from the deregulation and the internationalization of securities trading are two of the most important factors behind the transformation. (Nyberg, 2000) Just as many other countries, Sweden was negatively affected by the burst of the dot-com bubble in 2001.

However, since the high asset prices in this bubble mainly were built on the speculations regarding the possibilities of information technology and not structural political changes, the recovery came relatively fast. In Sweden, as well as in many other countries, there was room for lower interest rates that contributed to the salvation. (Srejber, 2002)

The impact of the recent financial crisis on the Swedish economy became observable during the fall of 2008. The dried out liquidity markets put pressure on the Swedish banks. On top of this, potential credit losses caused by their operations in the Baltic states, became more obvious. In order to mitigate these harmful effects, the Swedish government expanded the deposit guarantee and implemented new laws that enabled increased financial support to the banking sector. (Ingves, 2012)

### **3.1.7 United Kingdom**

Over recent decades, heavy industries like coal mining and steel production have been replaced by the growing oil and finance sectors. The London Stock Exchange is today one of the world's most important market places and a great number of multinational banks have their headquarters located in London. Structural changes were initiated in the early 1980s and included tax reductions, privatizations and general market adjustments. Even though the first years were characterized by high levels of unemployment and an increasing inflation rate, the deregulations later came to result in a stable inflation and increased production during the 1990s. (NE Storbritannien) As a result of the deregulations, competition among financial institutions started to increase which lowered the costs of bank loans, particularly for households. Since this was the sector that had been most affected by government regulations, consumers were now allowed to react more to changes in their permanent income. As a consequence of the deregulations, liquidity constraints lost some of their importance in this matter at the same as interest rates became more critical. (Bayoumi, 1993)

“The Big Bang” was a package of deregulatory reforms introduced by Margaret Thatcher's government that broke up many of the customs and practices on the London Stock Exchange, implemented on 27 October 1986 (The Guardian, 20111009). The main objective was to eliminate observed anticompetitive practices at the London Stock Exchange and to put London's financial markets in an equal competitive position with its international rivals, particularly the USA.

In addition, the reforms aimed to remove price rigors in the provision of securities transactions and defeat barriers to entry onto the stock exchange. There were two practices that received extra attention: fixed minimum commissions and so-called “single capacity”, which prevented both brokers from trading on their own account and market makers from acting for customers. (Bank of England, 2010)

It is important to notice at least two hazardous trends that originated from the deregulations. To begin with, regulation is often used to separate related activities where one involves advising clients about the use of the other. For example, prior to the “Big Bang”-deregulation, the London Stock Exchange separated the stockbroking and market-making functions (Ingham & Thompson, 1993). Second, as a result of the deregulations, banks began to diversify their operations and grew and gradually became “too big to fail”.

Banks of this size are subject to huge costs if they collapse and therefore frequently get government support when they face financial problems. Such support was observed in the UK as well as in a big number of other countries during the recent financial crisis of 2007/2008. As a response to this, an “Independent Commission on Banking” has been established in the United Kingdom to evaluate a structural reform in the banking sector. Internationally, the “Financial Stability Board” is examining a wide variety of policy options to mitigate the financial stability risks posed by important banks and financial institutions. (Bank of England, 2010)

### **3.1.8 USA**

For almost 100 years, USA has been the biggest economy in the world. In 2011 the American GDP corresponded to 21,7% of the world’s total GDP. The country has for a long time been a pioneer when it comes to research and development in a number of businesses. However, due to an increased competition, mainly from fast growing economies in Asia, USA is about to loose its dominating positions in several of these. Since the early 1990s, China has reached a more attractive position in the global market and has left USA behind in various industries. (NE USA) Still, USA holds a world leading position in finance and the development of financial products.

There have been a number of noteworthy deregulations in the financial sector since the late 1980's. In 1986, the Federal Reserve (FED) ruled that a bank could derive up to 5 percent of gross revenues in investment banking business. This trend continued and in the following year, banks were allowed to handle, among other things, commercial paper, municipal bonds, and mortgage-backed securities. (CEPR, 2009) As the FED kept on loosening restrictions and allowed for bank and other financial institutions to diversify their investment activities, the whole sector was moving in a direction towards more consolidation. The process had already been ongoing for some years but increased significantly after the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994. This rejected previous restrictions on interstate banking and branching. During the years between 1990 and 1998, the number of banking institutions decreased by 27 percent as banks continued to merge. (Heiney, 2011) Many argued that consolidation in the financial sector was an inevitable evolution but the changes postured challenges for market regulators. Since banking, securities and insurance operations could now be performed by the same firm, regulators from several different agencies might be responsible for overseeing different parts of the same institution. The arrangement got confusing and inefficient as regulators fought to keep pace with the innovations in the industry. More specifically, the rapid growth of new types of derivative instruments meant problems for regulators. (Tijoe, 2007)

The most important of these derivatives were credit default swaps, which were effectively a form of bond insurance, where the issuer would pay the loss in the event that a bond defaulted. In the late 1990s, Brooksley Born, the chairwoman of the Commodity Futures Trading Commission, expressed worries about the potential risks of the unregulated markets of derivative instruments. (Washington Post, 20081015)

The US markets for debt securities are larger than those of Japan as well as the ones of Western European countries, both in absolute terms and as of percentage of GDP. The US corporate bond market is by far most developed in the world. Until as late as 1994, US commercial banks were restricted to their home states. Furthermore, under so-called unit banking rules, nearly half of the states required banks to do all their business from one location.

This fact restricted the lending capacity of banks so that they got unable to meet the funding needs of companies expanding nationally. As a result, the corporate bond market, as well as the stock market, could early develop as instruments through which companies could raise capital from across the country, as well as from abroad. (Endo, 2000)

In 2004, the SEC agreed to relax the net capital rule and created the Consolidated Supervised Entities program for investment banks. Brokerage firms would voluntarily submit reports to the SEC regarding their assets and activities. The system of voluntary regulation relied on the internal computer models of these firms, essentially outsourcing the job of monitoring risk to the firms themselves. (New York Times, 20081003)

After the collapse of the dot-com bubble, in 2001, FED Chairman Alan Greenspan continued his policy of interest rate reduction and maintained rates at remarkable low levels. (Forbes, 20090403) The low interest rates and the deregulated financial industry allowed for rising equity prices and the housing bubble that finally burst in 2008 as the investment bank Bear Stearns was liquidated and sold to JP Morgan Chase at a fire-sale price. Since then, financial markets, not only in the USA, have experienced disorder not seen since the Great Depression. (New York Times, 20080915)

## **3.2 The examined financial crises**

### **3.2.1 The financial crises of the late 1980s and early 1990s**

The late 1980s in Sweden were characterized by quick economic growth and great profits among the Swedish banks and financial institutions. As a result from deregulations in the credit markets in 1985, the lending grew at a high rate. As a matter of fact, it almost doubled between the years of 1985 and 1989. Other factors behind the observed trends included an insufficient ability among the Swedish banks to price the increased risks that followed as a result from the boosted lending amounts and a tendency among the banks to focus on portfolio growth and market shares rather than profitability. These issues all together contributed to bubbles in the real estate and stock markets. (Lybeck, 1994)



The severe problems of the banks and financial institutions got revealed as the Swedish economy lost its pace. The unemployment rate rose from 1,1% in June 1990 to 4,6% in June 1992. Simultaneously, short-term interest rates rose to 17%. As a consequence, the banks and financial institutions experienced a decreased demand for loans. The Swedish banks reported credit losses corresponding to billions of SEK at the same time as real estate and equity prices dropped dramatically. (Lybeck, 1992)

However, the other Nordic countries also faced financial difficulties. The Norwegian credit market got deregulated in 1984 when lending regulations were loosened up. The Norwegian banks got into trouble in 1987 as oil prices started to decline. The total loss corresponded to 1,1% of total lending volumes, the exact same number as Swedish banks faced in 1990. The problems of Denmark were of another kind. Danish banks had been facing relatively large credit losses since the early 1980s, not only during the last years of the decade. Denmark had entered a hard currency system and managed to avoid bubbles in the national stock and real estate markets. Hence, the losses of the Danish banks were more disseminated and more related to the problems of the households. It would take a couple of years before the Finnish banks showed signs of distress. A starting point was in 1991 when the fourth biggest bank in Finland, Skopbank, faced problems of huge proportions, forcing the central bank to step in and control the lending activities in order to maintain liquidity and solvency. (Lybeck, 1994)

At the same time, there were worries and issues in the American financial sector. As was the case for the Norwegian banks, many actors on the American financial market suffered from the falling oil prices. Regional banking crises erupted in states characterized by oil production including Texas, Oklahoma and southern California. Almost every single commercial bank in Texas filed for bankruptcy between 1986 and 1992. Wall Street share prices and overall consumption fell but the aftermaths were being tempered by declined interest rates. Federal Reserve provided liquidity instantly by lowering the three-month Treasury bill with 250 basis points. However, new problems arose as the economic growth declined in 1989 and 206 commercial banks had to file for bankruptcy.

A main reason behind the American corporate debt crisis was that neither savings banks nor the commercial banks had had any time to recover from the crises of the early 1980s. Another motive is based on the general deceleration of economic activity, related to the declining inflation rates. A third reason is the debt levels of the corporate sector that reached new highs during the 1980s. These made companies and banks more sensitive to macro economical turns. (Lybeck, 1994)

### **3.2.2 The Asian crisis of the late 1990s**

The Asian crisis was a financial crisis that negatively affected market prices and exchange rates in several Asian countries, mainly Indonesia, South Korea and Thailand. However, as one will notice, it also had a negative impact on the examined countries, specifically Japan and Singapore. At a first glance, the Asian crisis shows a number of similarities with the Swedish financial crisis of the early 1990s; the years prior to the crash were characterized by remarkable price increases in the stock and real estate markets. There had been a high level of economic growth in a major part of the region since the mid 1980s and the most developed economies at that time, South Korea and Taiwan, reached their respective tops as early as in the end of the 1980s. (Kokko, 1999) GDP growth rates in 1996 ranged from 6% in Thailand to more than 8% in Indonesia. The rapid growth was fueled by high rates of savings and investments, sound macroeconomic policies and outstanding rates of export growth. The government budgets were in surplus and economies were profitably restructured along export-oriented lines.

However, there were signs of worry. The growth of export revenues showed downturn in 1996, reflecting slower growth of demand in the regions' primary export markets, a slowdown in the electronics industry and an increased level of competition from China. Thailand's export performance got more and more disappointing and by pegging the Bath to the USD, the Thai authorities allowed their trade-weighted real exchange rate to be pulled up considerably. Even though this policy was not limited to Thailand, only there did investment analysts expect a sustained slowdown in exports. As a result from these expectations, the Thai equity prices fell and the real estate bubble finally burst.

The Thai, Indonesian, Malaysian and Philippine currencies all depreciated by 24%-33% in the third quarter of 1997. Shortly after this, the devaluation of the Taiwanese dollar led to a speculative attack on the Hong Kong dollar and in addition, the crisis spread to South Korea. Early 1998 was dominated by the worsening economic, financial and political conditions of Indonesia. These had strongly negative impacts on investors' prospects for all the crisis economies. On top of this, worse-than-expected economic figures were presented by Japan, which reached the public in the second quarter of 1998. In mid-August the same year, Russia surprised the markets by devaluing the Ruble and simultaneously unilaterally suspending payments on most of its debt. The impact on investor confidence was devastating who had seen Russia as an actor too big and important to fail. These events among others led to fears of a global recession or even a depression. (Eichengreen, 2002)

As a response and to calm the markets, FED cut its lending rates three times and the International Monetary Fund (IMF) provided an unusually large package of financial assistance to Brazil in an attempt to prevent the crisis from spreading further. At the same time, Japan accelerated its banking-sector recapitalization and restructuring and provided additional fiscal stimulus. (Eichengreen, 2002) The state-led restructuring involved temporary nationalization of a great number of banks, mergers and acquisitions by foreign major institutions of banks and the founding of a new Financial Services Agency. In addition, 70 trillion yen, corresponding to 15% of total GDP, of public money was spent to re-capitalize poorly performing institutions. (Langley, 2002)

### **3.2.3 The dot-com bubble of the late 1990s**

In the mid 1990s, marketers at big technology firms including Microsoft, Dell and Amazon, started to convince enough people that the industries of personal computers and online shopping were about to fundamentally change the whole world of business. Anyone who did not get into the growing success of these industries would be left behind. This widespread excitement resulted in blown-up stock prices that missed logical explanation. (Galbraith & Hale, 2004) A well-known example of a stock that performed out of control during this period of time was Netscape, later acquired by the American global brand company AOL.

Historical valuation tools and rules, earnings and common sense were all forgotten, terms like “Dot-com alchemy” were born. (TIME Magazine, 20030331) In 1996, first day returns on IOs averaged at a level of approximately 17%. Three years later, the corresponding number had risen to 73% before decreasing to 58% in 2000. IPO-underpricing reached extraordinary levels. Internet firm IPOs showed an average first day return of spectacular 89% in 1999 and 2000. During the same years, CEO stakes declined dramatically, from 22,7% to 11,6%. Likewise, equity stakes held by investments banks and venture capitalists dropped harshly over the period. This resulted in increasingly fragmented ownership. (Ljungqvist & Wilhelm, 2003)

At the top of the bubble, increasing share prices had drove the American net wealth ratio up to a post-war high of 628,6%. The value of equity held by individuals had increased approximately four times during the 1990s. An enormous group of new investors was drawn in to the stock markets, with almost 50% of the US population owning company shares prior to the crash. (Turner, 2008) By the time the US stock markets had hit the peak in early 2000, prices for consumer durables had fallen for more than four consecutive years. As long as the stock market indices kept rising, wealth effects generated enough demand to persuade the market that deflation was not an issue. However, the first doubts started to come around and were to shake the entire market.

As the bubble finally burst, the losses acted like a snowball and within three years, the net wealth to disposable income ratio had fallen to just 495,5%. The following bear market devastated paper wealth equivalents to more than the annual disposable income of the whole US. (Turner, 2008) Between late 1999 and early 2002, NASDAQ dropped about 57% of its value. The corresponding loss for Morgan Stanley’s Internet index was as great as 89%. (Dagens Industri, 20020319) In addition, the steep fall in equity prices wiped out the share options of many high earners, directly hitting consumer demand. These facts forced Federal Reserve to lower interest rates to 1,0% by the summer of 2003, thus providing room for the run-up in US house-prices. (Turner, 2008) As will be discussed under the following headline, this was going to become the starting point of the US housing bubble, one of the main determinants behind the financial crisis of 2007/2008.

### **3.2.4 The financial crisis of 2007/2008**

In the year of 2000, the US house prices started to rise faster than what was the case in the preceding years. The low interest rate level of the years between 2002 and 2005 was a strong contributing factor. However, changed mortgage-lending practices also provided a lot of fuel to the bubble of house prices. Subprime mortgages are considered to be more risky than average and they became very popular during this time period. The relaxation of lending standards in combination with the increased volume of subprime mortgages made it possible for families that used to be considered as not creditworthy to qualify for mortgages. This meant an increased demand for real estate and increased prices. (Hull, 2011)

Rising house prices eventually turned symbolic, a modern era indicator of wealth and success. House prices got sky-high, people found that the value of their assets had increased and seemed to forget about the increasing debt levels and the fact that real estate inflation in the end is a zero sum game. In the short run, real estate bubbles may boost economic growth since they tend to make people believe that they are wealthier than they actually are. However, over the long term, society as a whole does not benefit from a rise in house prices. (Turner, 2008)

US mortgages are nonrecourse in many states. This means that, in the case of a default, the bank is only able to take possession of the actual house, not any other assets of the borrower. This in turn means that the borrower gets a free American-style put option since he or she at any time can sell the house to the bank for the outstanding principal. In the 2007, the teaser rates were due and mortgage holders faced troubles meeting their mortgage payments. The increased number of houses on the market naturally resulted in falling prices. Some families who had borrowed 100% of the house cost now found themselves with negative equity and the best decision was to exchange the house for the unresolved principal of the mortgage. The lender then tried to sell the house, putting an extra downward pressure on the real estate prices.

Houses in foreclosure were in bad condition and consequently sold at prices far below their values prior to the outburst of the crisis. As a matter of fact, average losses of 75% were reported for mortgages in foreclosure in some US areas. Investors, including financial institutions like UBS, Merrill Lynch, Citigroup and AIG, in tranches that had been formed from the high risk mortgages now faced huge losses. The structured products were rated by agencies that had good experience from bond rating but little or no experience from these relatively new complex products. Investors thought they had found “money machines” and relied fully on the rating agencies rather than forming their own risk analyses. (Hull, 2011)

### **3.3 Vital regulations derived from the crises**

#### **3.3.1 Basel II & III**

As the operations of banks started to become more and more international in the 1980's, a need for common regulations and a global collaboration became more severe. As a result of this, the Basel Committee on Banking Supervision was formed. Banks all over the world are regulated by the Basel Committee on Banking Supervision that provides international standards, which are applied by bank supervisors in each country. The regulations provided by the committee are typically concerned with the amount of capital that banks must keep and certain liquidity requirements. Basel I, a set of rules for the capital banks were required to keep in order to manage credit risk, was published in 1988. (Hull, 2011)

Eleven years later, in 1999, major changes were proposed on how to calculate the capital requirements regarding credit risk and also a capital requirement for operational risk was announced. These were later referred to as Basel II and were introduced just before the breakout of the crisis in 2007. This regulatory framework seeks to better relate regulatory capital with economic risk, sometimes referred to as economic capital. In contrast to the Basel I, the capital charges of Basel II are based on asset quality rather than on asset type. Banks are able to choose from among several approaches. The standardized approach is based on the bank's public ratings by assigning certain risk weights to the respective rating classes. More established banks will be eligible for the two internal ratings based approaches, which permit the use of the banks' own internal rating systems to quantify the creditworthiness of their debtors. (Heid, 2007)

One of the most significant outcomes of the financial crisis of 2007/2008 has been a great wave of new regulations and legislations, included in Basel III. An important lesson learnt from the crisis is that failure of banks and other financial institutions are often caused by poor liquidity. This problem arises from the fact that financial institutions generally tend to select short-term sources of financing; these sources often dry up as the market becomes concerned with the actual health of the sector. Many of the regulations involve calculations on the matter of value at risk, a measure of the size of the loss that could be sustained by a bank. (Hull, 2011)

The essential part of the Basel III implementation is that banks are required to hold more funds that need to be of better quality than earlier and also meliorate liquidity aspects. This implementation is taking place between 2013-2019, but banks may have to adjust to the new regulations even faster because of market pressure. For example, the four main banks in Sweden already fulfilled the new capital requirements of holding more funds in 2011. (Gunnarsdottir & Lindh, 2011) When it comes to the liquidity aspect of Basel III two new ratios are introduced. The banks need to improve both their Net Stable Funding (NSF) ratio and Liquidity Coverage Ratio (LCR). The NSF ratio is a measurement of the proportions between an institution's long-term funded assets and the long-term funding needed for those assets. The LCR states the total high quality liquid assets an institution is holding in order to be able to balance the negative cash flow of an urgent short-term financial stress scenario. (Bank for International Settlements, 2009)

Gunnarsdottir and Lindh (2011) are arguing that it is hard to state today how these new conditions will impact the financial sector in general. But since the liquidity requirements are increasing, lower returns to the banks are likely to arise. If the banks also would obtain an increased funding maturity their borrowing charges will rise as well. In the long run these bank costs can be passed on to their customers, which will mean higher lending costs for companies and citizens. In order for the banks to decrease the size of their credit lines they may also lower the maturity on their lending and decrease their lending in general. The consequences of these new regulations may have an important impact on the companies' financing strategies. An increased cost of borrowing together with a lower provided loan supply and higher refinancing risk could force the companies to find better, less costly sources of debt finance and corporate bonds can be that solution.

### 3.3.2 Solvency I and II

Insurance companies in general and particularly life insurance companies hold substantial amounts of financial assets and are a major part of the financial system. (Sveriges Riksbank, 2010) The Solvency II is a further development of the European Union's directive Solvency I and its aim is to regulate on the amount of capital insurance companies in the European Union must hold in order to reduce their risk of default. (EU Directive 2009/138/EC, 2009)

Under Solvency II, just like the earlier regulations, the insurance companies need to have a capital base that is larger than the solvency capital requirements. The difference between the regulations is that in the former regulation the life insurance companies' solvency capital requirement was mainly based on the commitments of the company. When Solvency II is carried through the insurance risks on the companies' operations and the risks related to their investments in financial assets are determining the solvency capital requirement. A life insurance company that faces a situation with a higher solvency capital requirement than its own capital base can then either choose to increase its capital or reduce its risk exposure. (Sveriges Riksbank, 2010)

According to a report made by the Bank for International Settlements the new regulations might obstruct the life insurance companies to hold, among other securities, long-term or low-rated corporate bonds by making it more expensive for the companies. The insurance companies will not be able to provide long-term risk capital for companies to the same extent anymore. (Bank for International Settlements, 2011) It is not totally clear how the new regulations will impact on the corporate bond market, but they seem to discourage insurance companies to invest in corporate bonds. (Gunnarsdottir & Lindh, 2011)



### **3.3.3 Markets in Financial Instruments Directive**

The Markets in Financial Instruments Directive (MiFID) is an EU directive applied in 2007 in order to integrate the EU financial market. Its main objective is to protect investors and increase the competition in trade of financial instruments in the security market. (European Commission, 2010) The corporate bond market is a main part of this market so the new regulations may be of significant interest whether a shift towards a more use of corporate bonds is constant or not. Along with other regulations, the MiFID proposes to increase the corporate bond market's transparency.

Gunnarsdottir and Lindh (2011) are proclaiming that this new transparency framework would facilitate the work for investors by getting access to material on existing investment opportunities, ease up price formation and to help companies give guidance on the best solution for their clients. Also the post-trading transparency would be increased by releasing information on coupons, maturities, ratings, issuers, currencies, prices, volumes and more, the so called International Securities Identification Number (ISIN) codes. By undertaking such change in transparency there is a potential that investors will become more interested in new smaller corporate bond markets, such as Sweden, which will result in a more liquid market.

However, everybody is not as optimistic about these new regulations. It might also be argued that small corporate bond markets are impeded by too much transparency. Since there only are small numbers of investors, issuers and the size of the bonds it might be easy to find out more information than what is actually needed for the market to work properly. In the end this could harm the market maker's since their positions could be revealed, they would suffer from disadvantageous prices and eventually be reluctant on taking on some positions. Hence the market liquidity could decrease because the interest in being a market maker would not be as attractive anymore.

## **4. Methodology**

### **4.1 Research approach**

The common methods when deciding on a statistical approach are either a quantitative or qualitative style (Backman, 2008). When choosing between these approaches our initial thought was to involve both kinds in the analysis. However, when doing research on earlier papers examining similar subjects, we found out that almost solely quantitative analyses were being used. Since we will focus on numbers from different countries and years the quantitative part is of major interest and we decided to exclude any kind of qualitative part. A qualitative part would not be of a significant contribution to this thesis.

### **4.2 Data collection**

In order to approach the purpose of this study in a satisfying way, the use of both primary and secondary data is needed. By including both kinds of data, Jacobsen (2002) means that the results offer a more trustworthy representation of the situation with more accuracy since both kinds of data are consolidating and monitoring each other. The main part of our data is secondary data and the regression analyses are based on this kind of data.

The data needed in this study turned out to be considerably harder to collect than we initially expected. Some figures could fortunately be obtained through Datastream but a major part of the included data has been raised through contacts with representatives at central banks, investment banks, universities and national statistical bureaus. Obtaining the sufficient data required a great workload. The secondary data was used when performing regression analyses and statistical tests. The generated figures must be considered as primary data since they were not offered anywhere else. The primary data serves as a keystone in the final discussion and conclusion. A great number of scholarly articles, books and other published documents have been used when creating the theoretical framework we are using to generate a meaningful and righteously discussion.

### 4.3 Sample

We aimed to obtain a sample with representation from both emerging and already developed financial markets. In order to acquire decent results and a relevant conclusion, we selected a set of countries that are geographically spread, of different sizes, both in geographic and economic terms and at different stages in their economic development. We also thought it was interesting to include countries of both common and civil law origin. The countries included in the examination are; Australia, Germany, Italy, Japan, Sweden, Singapore, UK and USA. The examined years are 1990-2011.

Since the US and Japan have the largest corporate bond markets in the world and they both are of different legal origin they seemed natural to include in our sample. (Schinasi & Smith, 1998) Together with the US also the UK, Singapore and Australia are common law countries and therefore fit our sample, especially since they are wide spread over the world. When it comes to civil law countries La Porta, et al. (1997) divide them in further categories; French law, German law and Scandinavian law. We thought it would be interesting to include at least one country from each category. Sweden is the biggest country of the Scandinavian law countries and hence appeared as a natural choice. We included Germany since it is one of the central European economies and together with Japan origin from the German law system. It was harder to obtain sufficient numbers for each variable of the French law countries; however, eventually we found all the numbers we needed for Italy and hence included Italy. By including Italy and Germany we might also observe any structural changes related to the introduction of the Euro in 1999.

We encountered some problems trying to include countries in both Africa and South America. Both continents would be very interesting to examine, the South American economies are growing rapidly and would be a good contribution to our material, however the lack of available data turned out to be an impediment. We found all needed data for Brazil, but not longer back in history than to 1998. It was even harder to obtain adequate data for any African country so unfortunately neither of the continents could be represented in the study.

We ended up with eight sample countries of different sizes and at different development stages regarding their corporate bond markets. We consider them as good representatives of the developed world economies. We do not believe that the lack of underdeveloped countries in our sample is a drawback. Since the stock and corporate bond markets of those countries are not adequately developed their representativeness would not be of any greater significance to our research.

## **4.4 Variables**

When analyzing to what extent the number of IPOs are affected by outstanding corporate bond volumes we also thought it would be interesting to obtain the correlations between the numbers of IPOs and some other factors that are likely to explain IPO-fluctuations. The number of IPOs will be used as the dependent variable and eight independent variables will try to explain how the number of IPOs fluctuates. We introduced a number of variables in the introducing chapter and in order to be able to make more advanced statistical tests we wanted to put numbers on them. We have found support for our control variables in earlier studies on the topic.

### **4.4.1 Number of IPOs**

The numbers of Business/IPO-cycles are the numbers of IPOs in all eight different sample countries collected from Loughran, Ritter and Rydqvist's updated article from 1994, Initial Public Offerings: International Insights. This variable will serve as our dependent variable since we are interested in testing how the number of IPOs fluctuates as a result of other variables.

### **4.4.2 Outstanding corporate bonds**

As stated earlier we have not found research on the mentioned relationship with the explanatory variable "Outstanding corporate bonds" and hence this is the variable we are primarily interested in. This variable was also the hardest variable to obtain satisfying data for. Since some countries have a considerable more developed corporate bond market than others, the available information and data has some times been easy to access, but in most cases it has been a struggle for every country. Also the fact that many countries do not have sufficient corporate bond data available from the early 1990s has impeded and limited our analysis.

As mentioned earlier, we have chosen to only include corporate bonds issued by non-financial firms. This is due to the fact that the capital structure of a financial firm generally differs considerably from a non-financial firm. We have scrutinized countries' different statistical databases, central banks' databases and also contacted the people behind them in order to retrieve as correct data as possible. All amounts are stated in billions of USD in order to make the numbers more comparable in between the countries. Since all countries individually state their outstanding corporate bonds amount in their national currency we had to change the currency to US Dollar. The conversion rate for each year and country has been obtained from Oanda's historical yearly conversion rates database.

When it comes to Japan their different outstanding corporate bonds were stated in USD, Euro, British Pound, Deutsche Mark, Swiss Franc and Yen. The same methodology as before was used in order to attain an amount in USD. In Sweden there was a shift in definition in 1995 when it comes to corporate bonds. Since data for the period 1995-1997 is available in both definitions we made estimations for the years before 1995 based on the average ratio between the two values from the period with double observations. The "Outstanding corporate bond" variable was the most notably when we had to restrain our study to only cover eight countries. However, we are satisfied with our sample and believe it will contribute to a sufficient result.

#### **4.4.3 Stock market index and market volatility**

In line with Loughran et al. (1994) and Ritter (1984) we are interested in aspects of the stock markets' performance as variables. Both how each country's stock market index has developed over the three time periods and also how each market's volatility have changed are of substantial interest. The stock market index is rather straightforward and could easily be accessed through Datastream. In order to obtain the market volatility we had to do some basic calculations. We first obtained daily observations of a sample country's stock market index over a specific year; from this we calculated the variance, standard deviation and eventually the annual volatility. This procedure was repeated for every country and year and the result is a measure of how volatile the market is for each individual year. See appendix A for a template extract of the market volatility calculations for the 1990 Australian market.

#### **4.4.4 Bank claims on private sector**

It was harder to put descriptive numbers on the fact that banks face new conditions. Lim, Lim, Zhai and Liu (2012) raise the topic on analyzing bank credit in relation to IPOs. Banks' lending to the private sector may be used for this matter, but these data are not completely sufficient. The new conditions and regulations of the financial crisis of 2007/2008 are being implemented right now hence various countries may already have adapted to the new conditions while others are about to do it. This fact means a time lag when it comes to consequences of this kind of global crises. However, the outcomes of earlier crises should be observable more distinctly so in lack of other more substantial approximations the banks' lending to the private sector will be used as one of the explaining variables in our statistical tests. We obtained the data from International Financial Statistics (IMF) through Datastream.

#### **4.4.5 Less quantitative variables**

Some of the variables that support the theory of a structural change that favors corporate bonds over equity are harder to estimate. These are; rules and regulations, the entrance of HFT, new banking conditions and recent IPO-failures. The former can partly be observed by analyzing bank loans to the private sector, yet these numbers mainly capture the consequence of banking regulations and deregulations, not the effects from implementations of accounting standards like IFRS. We also lack a sufficient method of capturing the potential effects of HFT, however we will include market volatility as an explanatory determinant. HFT-firms and preprogrammed computers are often accused for contributing to increased levels of market volatility that make some groups of investors stay away from the stock markets. Increased volatility also means that it becomes harder to set a fair introduction price, hence IPO-activity should be negatively correlated with volatility. In addition, we find it hard to estimate the effects related to the new banking conditions. One can assume that banks nowadays have greater incentives to promote companies to issue corporate bonds since liquidity requirements of banks recently have increased and since brokerage fees have experienced a steady decline over the last years. The forming of deals and transactions related to corporate bonds should therefore be an attractive field of business. Finally, we find it difficult to examine the true effects of recent IPO-failures. However, it seems reasonable to assume that firms in general become cautious regarding the IPO-decision if there are a great number of recent failures.

#### **4.4.6 Macro environmental factors**

Lim, et al. (2012) propose a number of macro environmental factors that could serve as explanatory variables regarding number of IPOs. Among those we have decided to include long-term interest rate, inflation rate and gross domestic product as control variables in our regression analysis. The “Interest rate” variable should be relatively consistent with the “Banks claims on private sector” variable, but if too much of multicollinearity appears in the results we will adjust the variables for that. Also “Gross domestic product” is one of the initial independent factors; the conjunctures in the different countries’ economy can be evident through this variable.

All data from these three variables are obtained from OECD’s statistical database, apart from the Singapore data and the Italian long-term interest rates for 1990-1991. Gross domestic product of Singapore comes from the Department of Statistics Singapore’s database and inflation and long-term interest rate were obtained from Monetary Authority of Singapore’s database. The Italian long-term interest rates of 1990-1991 originate from Banca d’Italia’s database.

#### **4.4.7 Stock market capitalization**

Loughran et al. (1994) and Ritter (1984) have proclaimed the importance of the stock market’s performance regarding IPOs. By including “Stock market capitalization” as a variable we are taking into consideration that each of the sample countries’ financial markets are of different sizes. The number of IPOs in general is dependent on the size of a country’s stock market and by adding this variable the results of our statistical tests become righteously and reflects the situation in a superior way. The market capitalization data was attained from the World Bank’s database.

#### **4.4.8 List of variables**

- Bank claims on private sector, denominated in billion USD
- Gross domestic product, denominated in billion USD
- Inflation rate
- Interest rate
- Stock market capitalization, denominated in billion USD
- Market volatility
- Number of IPOs
- Outstanding corporate bonds, denominated in billion USD
- Stock market index

## 4.5 Time periods

In order to examine the impact of financial crises on our matter we decided to divide our data into sub-periods. In line with earlier research on effects of financial crises, such as Kim and Shamsuddin (2008) we have identified two relevant time periods during the 1990s and beginning of 2000s, the first period during 1990-1996 and the second period in 1998-2005. However we displaced the second period one year to the years 1997-2004 in order to also involve the year of 1997, the year when the Asian crisis broke out, in the analysis. A few years have passed since the study of Kim et al. (2008) hence we also thought a time period from 2005 up until today would be beneficial to analyze. However the data available for 2012 was insufficient for some of the sample countries hence we decided to exclude 2012. Our third time period comprises the years of 2005-2011. We believe those three periods are of major interest since structural and regulatory changes have been made in the aftermath of the crises. Our hope is to show a difference between the periods, mainly when it comes to the correlation between number of IPOs and outstanding corporate bonds.

## 4.6 Statistical method

In order to test how our independent variables correlate with the numbers of IPOs, we organize all available data into panel data structure. We choose panel data since we would like to observe differences in between countries, but also differences over time. (Saunders, Lewis & Thornhill, 2009) See appendix B for all data we use in the statistical tests and their respective sources. We are using regressions to see if there are any significant correlations between the dependent and independent variables in each stated time period, 1990-1996, 1997-2004 and 2005-2011.

The regressions were carried through with the accepted and usual significance level of 95 percent; we are reducing the risk of type 1 errors to five percent. Type 1 and type 2 errors are the possibilities of rejecting the null hypothesis when it is true respectively to not reject the null hypothesis when it is false (Körner & Wahlgren, 2006). The statistical package Eviews 7 is being used for our regression analyses. It is a reliable econometrics software and is able to handle panel data in a satisfying way.



### **4.6.1 Expected results**

The most satisfactory result would be to see no significant correlation between outstanding corporate bonds and the number of IPOs in the first two periods and a negative significant correlation between the two variables in the last period. This would indicate that a shift is taking place in the aftermath of the recent financial crisis of 2007/2008 and an increasing amount of outstanding corporate bonds contributes to a decreasing number of IPOs. However, these results would not automatically mean that a structural shift is taking place, but it would be an indication of an increasing importance of the corporate bond market compared to taking companies public.

### **4.6.2 Abbreviations in the statistical tests**

In order for the reader to fully comprehend the results of our statistical tests the abbreviations found in appendix C-H are defined as follows:

- Bonds – Outstanding corporate bonds, billion USD
- Capitalization – Stock market capitalization, billion USD
- Claims – Bank claims on private sector, billion USD
- Equity – Stock market index
- GDP – Gross domestic product, billion USD
- Inflation – Inflation rate
- Interest – Interest rate
- IPOs – Number of IPOs
- Residual – Residuals of the regression equation
- Residual\_square – The square of the residuals
- Volatility – Market volatility

The residuals are created to give a clear picture on how the different regressions behave and provide information about normal distribution and similar important matters. In order to test for heteroscedasticity in a panel data regression in Eviews, we have to use the residual squares to go round the limitations of the statistical program.

### **4.6.3 Logarithms of variables**

Since the eight different countries differ heavily when it comes to size of their financial systems and size of the countries in general a straight regression test on the variables could be misleading. In order to mitigate this problem we decided to make logarithms out of our existing variables that are heavily differing. By doing this the size differences are not crucial and also a potential problem with normal distribution is alleviated.

However, making logarithms is not only positive for us. We have four observations of number of IPOs that is equal to zero. By making logarithms of this variable we are eliminating these four observations and are shifting the normal distribution curve briefly.

The observations with number of IPOs equal to zero could be beneficial for us since they represent years where the correlation we are analyzing is as extreme low as it could be. However, the loss is only 2,2% of our total amount of observations so we are gaining more on the logarithms than we are losing. A precluding L in front of the variable indicates that the logarithm of the absolute number has been used in the statistical test. This has been necessary for “Outstanding corporate bonds”, “Stock market capitalization”, “Bank claims on private sector”, “Gross domestic product” and “Number of IPOs” in order to make the variables more comparable. Because of the logarithms in our tests we have received missing data for IPOs for four years, all spread over the three time periods, hence we have unbalanced data for all periods. Since we have unbalanced data Eviews does not allow us to test for random effects in our regression, hence we have to settle for fixed effects even if random effects might be more righteously.

#### **4.6.4 Multicollinearity**

We observed multicollinearity among the variables “Stock market capitalization”, “Gross domestic product” and “Bank claims on private sector” for all time periods. In order to attain a satisfying regression, we eliminated two of these variables to avoid the issue of too high levels of multicollinearity. When deciding on which ones to eliminate, we looked at how all of these three variables interacted with the variable of major interest for us – “Outstanding corporate bonds”. We eliminated the two variables that had the highest correlation with “Outstanding corporate bonds”; those were “Stock market capitalization” and “Gross domestic product”. After eliminating those variables multicollinearity was not a major issue anymore.

#### **4.6.5 Heterogeneity**

In Eviews we have the opportunity to adjust with either random or fixed effects for potential heterogeneity when it comes to panel data tests. We are first trying to adjust for fixed effects in both period and cross-sectional data. In order to check if this is legitimate we are using the Redundant Fixed Effects Likelihood ratio test. If this test is significant we conclude that there is heterogeneity and it is okay to use the fixed effects in the regression. As mentioned before, we are using unbalanced data in all three time periods and do not have the opportunity to use random effects for the adjustments since Eviews does not allow this. A minor problem arises however since we are analyzing three different time periods. The three time periods are not consistent regarding if fixed effects are needed to adjust for heterogeneity in both period and cross-sectional observations. A comparison problem in between the time periods arises when different effects are being used for different periods. However, we are using these effects in order to project a situation that is as true to the real situation as possible and we are confident in our effect choices. We have to keep these effect differences in mind when analyzing our results and not be too confident in our concluding remarks concerning differences in the time periods.

#### **4.7 Reliability and validity**

When it comes to critically viewing the sources of a scholarly study, four important criteria are identified by Torsten Thurén (2005):

- Authenticity of the source – The trustworthiness of the source and the aim of its study.
- Concurrency – The concurrency of the information and data, whether it is appropriate to use for the analyses or not.
- Dependency – A review to avoid that the sources you use are too dependent on other papers and therefore are not sufficient to use of its own.
- Tendency – Issues whether the source has the ability to influence the public or the public's ability to influence the source.

In our study we have thoroughly examined the purposes of the articles we have used and critically analyzed their sources. We have also tried to use as updated studies as possible, but for that matter not neglected the original sources of information those studies are based on.

### **4.7.1 Reliability**

We have taken a critical approach towards all literature, scholarly articles and earlier studies on similar topics, hence we believe the trustworthiness of these sources to be high. We also strongly believe that the results would be the same independently of whoever made the analysis.

Our data have been collected from a number of different sources, but mainly the OECD database has been used. Collecting data from more than one source both has its merits and demerits. It is advantageous to have many sources in case a single one would be incorrect. If the analysis would be based on such insufficient source the final results would be useless. Since we have been using different sources we have constantly checked the numbers with other kinds of sources in order to see if they are consistent as long as it has been possible. Using only one kind of source can be beneficial since you know that all data available has been gathered and presented in a similar way, inconsistency is not a major issue.

### **4.7.2 Validity**

Since our study is not entirely based on any former study made in this area the validity issue is of major interest. This way it is not completely clear that our study is analyzing the issue we are stating in our purpose section. However, we have made a number of different statistical tests in order to receive as accurate results as possible and we have constantly received decent feedback on our thoughts regarding the statistical tests by our adviser and are convinced that our results reflects the true situation.

By not basing our analysis on any kind of interview material we are in this way eliminating the risk of own interpretation of answers in such study where misunderstandings could arise. Since we are using different effect adjustments for the different time periods one may question the validity in comparing the result in the different time periods. However, the adjustments are made in order to reflect the situation as correct as possible so we find it more beneficial to use the different effect adjustments.

### 4.7.3 Sample criticism

As we have mentioned earlier some criticism can be addressed to our sample countries. We are analyzing eight well-developed countries that belong to the wealthy part of the world; hence our study is not representative for the whole world. However our intention with the study is not to represent the whole world, we are examining how the number of IPOs correlates with volumes of outstanding corporate bonds and since a great number of countries do not have a well-developed bonds market they are not of any significant interest for us. Nevertheless, a greater number of sample countries would benefit our analysis, but the problem with available data for all variables restricted us to only examine eight.

### 4.8 Alternative testing

In order to attain a satisfying and well-specified result we also used another kind of test as a compliment to our original one. Since the number of IPOs is stated in integer numbers we used a function in Eviews especially made for analyses with integer numbers, “Integer Count Data”. By doing this we are losing the upside of having all data categorized as panel data, but integer numbers can interfere with the results if they are analyzed through a panel data mode. However, the upsides of using this function may outweigh the downsides. In these tests we did not use logarithms and the results may be somewhat biased because of the countries’ different sizes. When using the integer function in Eviews we are limited to not adjust our results with any kinds of effects to minimize heterogeneity problem. We partly sidestepped this problem by manually creating dummy variables. The introduction of dummy variables is equivalent to doing regressions with cross-section fixed effects. The conclusions of running tests with “Integer Count Data” are the same as we received when running the regressions with panel data and it supports our earlier findings.

We also decided to test the relationship between outstanding corporate bonds and number of initial public offerings in other time periods than the ones we finally used. The burst of the dot-com bubble and the financial crisis of 2007/2008 served as breakpoints between those periods. The three time periods 1990-2000, 2001-2008 and 2009-2011 were examined. The conclusions of these tests were also similar to the results obtained from our main tests and once again do the results support our earlier findings. See appendix F and G for statistical outputs for these tests.

## 5. Empirical findings

We have experimented with different time periods together with different kinds of regression methods and the conclusion is that they all tend to show the same result. We are here presenting data from the main regressions with logarithms and panel data; you can find the sample descriptives and Eviews outputs for each time period in appendix C, D and E. There is also data from the additional tests with modified parameters in appendix F and G and for the entire time period in appendix H. Since the emphasis of the thesis is on the relationship between outstanding corporate bonds and IPO-activity, we are mostly focusing on these variables in this chapter.

### 5.1 Multicollinearity

**Table 1** Average correlation between the variables over the three time periods. In order to avoid the problem with negative and positive observations in different time periods interfering with the average correlations we have used absolute numbers.

	Bonds, log	Stock market index	Capitalization, log	Volatility	GDP, log	Claims, log	Interest	Inflation
Bonds, log	-							
Stock market index	34,1%	-						
Capitalization, log	69,7%	8,4%	-					
Volatility	20,1%	25,4%	20,1%	-				
GDP, log	59,8%	10,3%	89,4%	6,4%	-			
Claims, log	47,0%	9,9%	86,3%	6,3%	94,9%	-		
Interest	21,0%	39,5%	12,6%	13,0%	2,4%	15,8%	-	
Inflation	23,2%	36,8%	17,2%	22,2%	14,4%	11,2%	56,1%	-

Table 1 illustrates a correlation matrix that states the multicollinearity situation on an average basis for all three time periods weighed together. As mentioned in the methodology section we have observed multicollinearity among the variables “Stock market capitalization”, “Gross domestic product” and “Bank claims on private sector” for all time periods. After eliminating “Stock market capitalization” and “Gross domestic product” multicollinearity is not a major issue anymore. However, some values are still relatively high, for example the correlation between inflation and interest is on average 56,1% with a high of 69,6% in the first time period. We should keep this in mind when we continue to analyze the regressions’ features. See appendix C.2, D.2 and E.2 for each period’s individual correlation matrix.

### 5.2 Normal distribution

The residuals’ behavior is a matter of interest in all three time periods. In order to receive a satisfying ordinary least square regression result the residuals have to be normally distributed. When examining the different histograms of the residuals we find their normal distribution sufficient.

An advantage of making logarithms out of some of the variables is that the normal distribution is enhanced and we experience a substantial change in the normal distribution after the variables were changed. When it comes to skewness it is mainly the last period that stands out. A score of -0,50 indicates that the distribution has observations clustered to the right with the tail extending to the left, just like the histogram shows in appendix E.3. The most extreme kurtosis score can be found in the second period, 2,48. A score below 3 means that the curve is flatter than the case is in a normal distribution situation. The Jarque-Bera scores and its probabilities informs us that the normal distribution is sufficient, as long as the probabilities are not significant we do not reject the hypothesis about normal distribution. The conclusion is that the three regressions have rather normally distributed residuals and hence are valid to make further implications from.

### 5.3 Heteroscedasticity

If the variance of the errors is not constant the regression is heteroscedastic. In our case this is the situation only in the first period and we are adjusting for this by using robust standard errors in Eviews, called White period.

### 5.4 Interpretation of regression coefficients

**Table 2** Regression outputs for all time periods. The coefficients of determination for respective time period is 0,77, 0,85 and 0,88 and all indicate a decent and acceptable level. See appendix C.5, D.5 and E.5 for more extensive Eviews regression outputs.

Variables	First time period			Second time period			Third time period		
	Coefficient	Std. error	Significance	Coefficient	Std. error	Significance	Coefficient	Std. error	Significance
C	1,594	0,811	-	8,498	2,362	***	-5,319	5,064	-
Bonds, log	0,371	0,046	***	-0,677	0,164	***	0,261	0,430	-
Stock market index	0,009	0,003	**	0,007	0,001	***	-0,002	0,003	-
Volatility	-4,629	3,248	-	-7,700	1,488	***	3,909	3,329	-
Claims, log	0,321	0,063	***	-0,336	0,302	-	1,083	0,710	-
Interest	-18,899	4,472	***	21,221	13,178	-	-31,772	22,866	-
Inflation	-8,250	8,293	-	-19,400	9,527	*	10,830	10,431	-

Probability	Significance
>0,05	-
<0,05	*
<0,01	**
<0,001	***

The coefficients we attain from the regression analyses are not as uniform in the three different time periods as we would like them to be. None of the variables maintain an either positive or negative coefficient during all time periods. However, neither of the coefficients in the last period is significant, hence the conclusions we make from those results may contain shortcomings.

The only coefficients that are uniformly significant during the first two periods are “Outstanding corporate bonds” and “Stock market index”. The “Stock market index” coefficient is in line with what you can expect – a positive relation to the number of initial public offerings. That is, if the stock market is performing in a positive way more companies are going public.

From Table 2 it appears like the influence of “Stock market index” is not especially substantial on IPOs since the numbers are relatively small compared to the other coefficients. However, we must remember that the “Stock market index” variable is denominated as an index in our regression, with a magnitude of approximately  $10^2$ , hence the observations are considerable greater than the ones of the other variables. In order to not affect the “Initial public offerings” variable too widely the coefficients attain a small number. On the other hand the variables “Interest rate” and “Inflation rate” appear to be the most influential determinants, but the same philosophy applies here. Those variables are stated in the magnitude of approximately  $10^{-2}$  and hence require a greater coefficient in order to affect the dependent variable in a substantial way. The same philosophy also applies on “Market volatility”,  $10^{-1}$ , the logarithm variables are stated in the magnitude of  $10^0$ .

Taking these magnitude differences into consideration we realize that the most influential variable for the number of IPOs is shifting for each examined time period. Among our variables “Stock market index” has the most effect on the dependent variable in the first period, “Market volatility” is most influential in the second period and “Claims on private sector” is the most noteworthy in the last period. If we also involve each period’s second biggest coefficient the picture becomes clearer. “Market volatility” is evident as one of the two most important factors in all three time periods together with “Stock market index” in the first two time periods and “Claims on private sector” in the third period.

The two least influential variables appear to be “Interest rate” and “Inflation rate” when adjusting for the differences in magnitude. Especially the “Inflation rate” variable is noteworthy since it has the smallest coefficient in all three time periods.

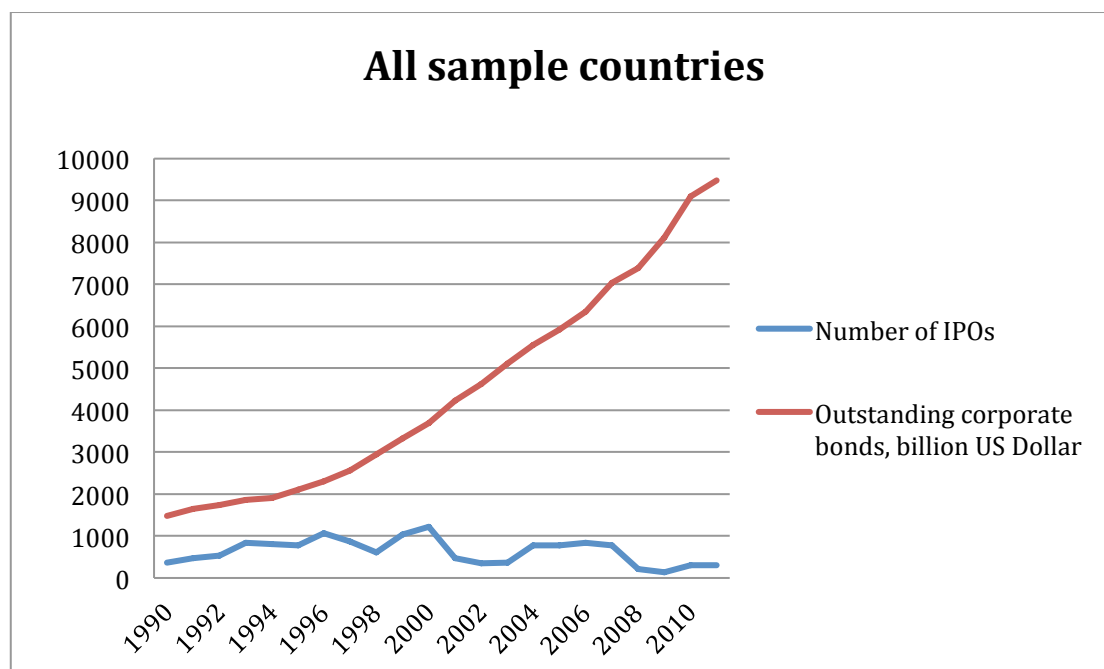


## 5.5 Outstanding corporate bonds and number of IPOs

We are primarily interested in the behavior of the “Outstanding corporate bonds” coefficient and as Table 2 illustrates, the coefficient is shifting between positive and negative numbers over all three time periods and no uniform trend is observable. The implications of this will be discussed thoroughly in the analysis section.

If we examine the level of outstanding corporate bonds and the number of IPOs all countries together we can observe some trends. The volumes of outstanding corporate bonds have increased considerably during our time period and a substantial amount of these numbers originate from the well-developed US corporate bonds market. We especially observe increases in the variable in the years of 1997 and 2008 where the curve attains a steeper shape than before. Both of these shifts can be originated to economical crises – the Asia crisis of 1997 and the financial crisis of 2007/2008. At the same time we can observe a cyclical trend regarding the number of IPOs over our time periods. Two major dips are evident, the first after the burst of the dot-com bubble in 2000 and the second after the financial crisis of 2007/2008.

**Table 13** *Development of the number of IPOs and outstanding corporate bonds in all sample countries over the whole time period.*



## 6. Analysis

### 6.1 Changes in the time periods

#### 6.1.1 First shift

When it comes to the outstanding corporate bonds' influence on IPO-activity, the performed regressions show different results for all our three time periods. In the first period, the coefficient of outstanding corporate bonds is positive, 0,37. This means that an increase of one unit in outstanding corporate bonds increases the number of IPOs with 0,37 units. It is a very significant observation with a p-value of 0,00. In other words, during this time period corporate bond volumes had a positive effect on the numbers of IPOs. The situation changes in the second time period where the coefficient for outstanding corporate bonds turns into a negative value, -0,68. This value is also significant with a p-value of 0,00, hence during this time period an increasing number of outstanding corporate bonds means a decrease in number of IPOs. This kind of drastic change in the impact of corporate bond issuances on IPO-activity may originate from a number of different matters. We have examined structural and regulatory changes in each of the sample countries and some important observations have been made. Since the US and Japanese markets for debt securities are the largest and most developed in the world, it seems natural to mainly base the following discussion on the US and Japanese development.

Due to hard restrictions on the operations of US commercial banks in the early 1990's, there were not enough bank loans to meet the corporate demand for funds and as a consequence, the corporate bond market grew and developed dramatically. This development is clearly reflected in the table presented in appendix B. According to our collected figures, the volume of outstanding US corporate bonds grew with no less than 57% between 1990 and 1996.

As deregulations were implemented in 1994, commercial banks could expand their operations and lending activity to other states, which resulted in an increased supply of traditional bank debt funding. One would assume that these bank loans were used as a substitute to corporate bonds, as well as a fuel to the recovering stock markets. However, it seems like the corporate bond market kept growing during the second time period relative to the number of IPOs. This observation must consequently be considered as unexpected.

Another surprise related to this finding is derived from the fact that equity markets in general experienced some great years before the break out of the Asian crisis and the burst of the dot-com bubble in the late 1990s. It is rational to assume that during booming equity markets, investors generally, attracted by potential capital gains, tend to become indifferent to the risks inherent in equity investments. Simultaneously, it is natural to assume that firm managers will excessively prefer to float equity-linked securities like common shares or convertible bonds. In such an environment, observed in the US as well as in Europe and Asia, few market participants will bother to consider financing with or investing in straight debt securities. Hence, the observed figures and negative relationship must be viewed as unanticipated.

Some explanation to the observed shift can instead be found by studying the financial deregulation of Japan. The Japanese corporate bond market experienced great growth in the early 1990s as a result of the forming of the Yen-Dollar Committee that liberalized the financial system and removed barriers between banking systems and securities. Looking at the obtained figures in appendix B, the volumes of outstanding corporate bonds exploded in the first years of the 1990s. Due to the burst of the Japanese economy bubble and the low equity prices, corporations preferred to issue debt like corporate bonds over equity linked securities. The volumes then dropped to moderate levels as the equity markets recovered. After the outbreak of the Asian crisis in 1997, a similar pattern can be observed. This partly explains the negative coefficient of -0,68 for corporate bonds during the second time period

### **6.1.2 Second shift**

The shift between our second and third time period do not have the same distinction as the first one. We are experiencing a shift from a negative coefficient in the second time period, -0,68 to a positive coefficient in the third time period, 0,26. However, in the last period the coefficient is not significant with the p-value of 0,55. The conclusion of this shift is that it seems like outstanding corporate bonds affect the number of initial public offerings in a positive way again, which would not be in line with our arguing concerning a structural shift. But since the results are not significant we cannot accept this shift as a fact. Nevertheless, it seems like the case is not the same as it was in the second time period so a kind of shift has taken place. We cannot for sure state in what way the shift takes place though.

As a matter of fact, neither of the coefficients in the third period is of any significance so this time period in general appears to be rather undefined. The origination of this is not clear, but the consequences of the financial crisis of 2007/2008 are of great interest when this is analyzed. In the introductory chapter we presented the hypothesis of an ongoing structural change that makes debt financing in terms of corporate bonds more attractive as a source of funding than equity. Different regulations and structural changes have been introduced in the aftermath of the financial crisis, some of them have worked in favor of our hypothesis and some have worked against it. The major question is which of these effects that have been and are predominant.

Concerning the effects that have acted against our hypothesis, we can mainly observe the implementation of Solvency II as a crucial regulation. As discussed earlier, Solvency II affects the financial structure of insurance companies. Even though this paper examines corporate bond volumes issued by non-financial firms, it is important to note that corporate bonds issued in developed economies are mainly bought by insurance companies and other institutional investors. This dominance is due to the fact that long-term debt funds can generally achieve superior risk/return tradeoffs in the hands of institutional investors who specialize in collecting and managing funds of specific characteristics. Since the insurance companies nowadays have to have a more secure financial base due to these regulations, an apparent source of corporate bond investors has lost its investment possibilities. One should keep in mind that Solvency II only affects the European countries of our sample since it is a European Union directive. However, four of the eight sample countries are European, hence the impact of Solvency II on our results is evident.

Turning focus to Basel II, a set of regulations concerning capital adequacy and risk management requirements of banks discussed previously, it is vital to realize and examine the effects stemming from this implementation. Basel II was implemented in 2007, just before the breakout of the financial crisis. Higher demands regarding the capital levels and asset quality of banks worldwide have resulted in more restrictive lending. This fact implies reduced levels of income to the banks.

Additionally, the banks have suffered from the entrance of online stock brokerage firms that offer cheaper services. This fact, together with Basel II, has resulted in a decreased promoting for equity trading and a reduced market demand for traditional bank loans as a direct consequence of higher costs.

In order to compensate for these income losses, banks nowadays have got more incentives to promote and be a part of the corporate bond market, where they can earn money from forming deals and transactions. This fact partly explains the increased observed levels of outstanding corporate bonds. Basel II must therefore be considered as an element that supports the presented hypothesis regarding a structural change.

One must also realize the potential and future effects of Basel III, which will be introduced between 2013 and 2015. Even though this regulatory framework has not been implemented yet, many banks have already adopted the new requirements concerning capital adequacy, stress testing and market liquidity risk. This fact strengthens the effects stemming from Basel II, discussed above.

Finally, potential effects stemming from the MiFID, implemented in late 2007, should be analyzed. The main objective of this directive is, as mentioned previously, to encourage integration between EU financial markets and increase the safety of the individual investor. One can easily assume that the effects from this regulation have had a major impact on the examined European countries and has likely contributed positively both to the exploding interest in corporate bond markets as well as the equity markets by providing increased transparency. Considering the obtained figures on outstanding corporate bond volumes for the third examined time period, it seems apparent that MiFID has played an important role in the positive development of corporate bond markets, not at least in relatively small economies like Sweden and Italy. These regulations must therefore be considered as supportive of our hypothesis.

## **6.2 Remarks on the coefficients**

Even though all observations do not have the right level of significance we can still discuss the size of the coefficients. The impact of outstanding corporate bonds on number of IPOs is neither one of the most influential nor least influential variables in our regressions; instead it is the third or fourth biggest in all time periods. As mentioned in the Empirical findings sections, mainly “Market volatility” and “Stock market index” appear to be the determinants with most impact on our dependent variable. It seems logical that companies are highly affected by these determinants when deciding on going public since it reflects how the market is performing at the moment. What we find rather surprising about the results regarding those factors is that they are changing from positive to negative, respective negative to positive,

coefficients in the last period. However, the standard error for all observations in the last period is rather high. Also the magnitude of the impact of “Bank claims on private sector” in the last period is of a substantial amount. It increased from moderate numbers in the first two periods to a rather high influence in the last period. It is interesting since it is in the last period the banks experienced a rather big distress concerning the financial crisis of 2007/2008.

### **6.3 Differences in the development of the corporate bond markets**

Our sample consists of a relatively widespread country selection in terms of corporate bond market development. Some of the countries’ corporate bond markets are world leading, for example the US and Japanese markets while others are more in the early stage of the developments, for example Sweden. Depending on how developed the different markets are, the impact of new regulations and structural changes differ. If we return to our discussion regarding Solvency II, the impact would most likely have been even greater if it also would have covered USA and Japan since those markets have developed the farthest. However, this is also the case with the kinds of regulations that acts in favor of a greater corporate bond issuance and which of those effects that is predominant is still too early to conclude.

### **6.4 Yet another IPO-cycle?**

As stated above, our statistical tests do not show any significant indication of a potential structural change. However, it is hard to draw any reliable conclusions regarding upcoming trends based on the accessible figures. Even though the relationship between corporate bond issuances and IPO-activity seems to be the opposite of what we initially expected, it is vital to stress that the detected correlation was of no significance. From the obtained figures, one can easily observe steadily increasing volumes of outstanding corporate bonds over time, in Sweden and other European markets as well as in USA, Japan is an exception. There might also be future effects from recent regulations like Basel III and trends that are not fully covered in this study. An increased interest in debt financing would be in line with the reasoning of Myers (1984), debt actually should be more preferable since it mitigates the adverse selection problem. Except for the relationship between IPO-activity and volumes of outstanding corporate bonds, it is also of high importance to take the other examined variables into consideration.

A key explaining factor behind the recent high volumes of corporate bonds could be the exceptionally low interest rate levels that were introduced briefly after the breakout of the financial crisis of 2007/2008. Studying the relationship between this determinant and “IPO-activity” during the last examined time period, one can perceive a large negative correlation. Even though the observation is not significant, it seems logic that the interest in taking a company public decreases as interest rates rise. High interest rate levels are usually implemented in order to cool down overheated equity markets and economies. Except for Japan, the volumes of outstanding corporate bonds have increased steadily since the low interest rate levels were announced.

Two other variables of high relevance when discussing this matter are of course “Stock market index” and “Stock market capitalization”. As mentioned previously, “Stock market capitalization” was excluded from the analysis due to a too high multicollinearity with “Bank claims on private sector”. Studying “Stock market index”, the performed tests show a minimal negative correlation with IPO-activity for the last examined time period, 2005-2011. This is not in line with general theories and prior studies, presented previously. Considering these, the relationship between IPO-activity and “Stock market index” should be positively correlated. Intuitively, it should be more attractive to go public as equities are highly valued. However, this result is not significant and one should be careful when drawing any conclusions.

A last variable worth noting is “Market volatility”. In the introducing chapter, we discussed that a high level of volatility, partly derived from the entrance of HFT, is assumed to be harmful since it hardens the process of setting a fair introduction price. Also, it is rational to think that high volatility makes traditional investor groups stay away from the equity markets. Surprisingly, our tests show a rather strong, positive correlation between IPO-activity and “Market volatility” during the last studied time period. However, it is important to stress that the relationship is not significant. Worth mentioning is also that this observation supports a finding of professor Jay Ritter. His paper from 1984 implies that the best time for a company to perform an IPO is during the volatile high-volume period directly following a hot issue market. According to available figures, the time period between the burst of the dot-com bubble and the financial crisis of 2007/2008 must be considered as a hot market, both in terms of IPO-activity and equity indices.

## 6.5 Investor point of view

Investing in corporate bonds can be more beneficial for investors than investing in straight equity. Like when the issuing company faces financial stress, the bankruptcy pecking order states that different stakeholders have different priorities when making claims on the bankrupt estate:

1. Secured debt
2. Unsecured debt
3. Preferred equity
4. Common equity

Since bondholders are prioritized compared to all kind of equity holders, it is more beneficial for investors to invest in bonds in a scenario where the company would face a default situation. Naturally there are more factors involved for investors when deciding in what kind of instrument to invest. Risk and return are of major importance and usually equity holders experience a higher return than debt holders to the expense of higher risk. The investors' risk aversion determines to what extent the investor is willing to be exposed to risk.

## 6.6 Company point of view

The corporation's view on corporate bonds is mainly divided into two features – one regarding the corporation's capital structure and the other one regarding the costs of debt financing. Depending on which capital structure theory the company mainly adopts the magnitude of this issue differs. The issue can partly be solved with issuance of convertible corporate bonds since this would not affect the company's capital structure in the long run. This way the company could issue more bonds, debt, and temporarily increase its leverage, but upon maturity the bonds would be converted into equity and the capital structure would not be affected in the long run. A more straightforward discussion that is in line with prevailing capital structure theories would be whether corporate bonds might outperform bank loans when it comes to debt financing. As mentioned above, the introduction of Basel III results in possibly more expensive bank loans compared to alternative debt financing. Companies are interested in minimizing their costs and if the cost difference between bank loans and bond issuances decrease it is likely that corporate bonds issuances would increase. The fact that corporate bonds is a more flexible debt alternative than bank loans also acts in favor of choosing this debt alternative.



## **7. Concluding remarks**

### **7.1 Summary & conclusion**

The overall objective of this study included three research questions, all presented in the introducing chapter. As should be known by now, the main purpose has been to examine the relationship between IPO-activity and volumes of outstanding corporate bonds, issued by non-financial companies and determine whether we might face a structural change that favors debt in terms of corporate bonds over exchange traded equity. Except for corporate bond volumes and the annual number of IPOs, we chose to include a number of other variables in the study in order to obtain a sharper indication of a potential structural shift. In addition, we wanted to analyze whether financial crises have had any impact on the matter.

In order to understand the obtained data and the observed trends for each examined country, one must also take the general economic development and the respective financial deregulations into account. The reader was therefore provided with thorough presentations and descriptions of the examined financial crises, as well as the financial development and deregulations in each studied country. Connections between our observations and these were presented in the previous chapter.

Since we wanted to test how the independent variables correlate with the numbers of IPOs, we organized all available data into a panel data structure. We chose to work with panel data because we wanted to observe differences in between countries as well as differences over time. The performed regressions were carried out with the accepted and commonly used significance level of 95 percent.

Our findings both support and complete previous research and literature. The first question handled the relationship between IPO-activity and volumes of outstanding corporate bonds. The performed statistical tests show that the correlation between these variables differs considerably between the three different examined time periods. The relationship went from positive in the first time period to negative in the second period and finally to an undefined state in the closing period. As discussed in the previous chapters, these findings were not solely in line with our expectations. A significant negative relationship between the two variables in the last time period would have supported the presented theory of a structural change. However, such a relationship could not be observed.

The objective of the second research question was to investigate the potential impact of financial crises on the observed relationship. The obtained data was ordered into three different time periods with financial crises as breakpoints. As discussed above, we observed a shift between the first two time periods, 1990-1996 and 1997-2004, where the volume of outstanding corporate bonds' impact on the number of IPOs went from being positive to negative. However, since the last time period does not provide a clear image of the situation, we unfortunately could not observe any general and repeated effects caused by financial crises. Also, when comparing the different time periods one must take into account that different effect adjustments have been made and these might interfere with our obtained results and analyses.

Nevertheless, the results from our regression analysis of the last examined time period suggest that the current relationship between the main determinants as well as the general situation of corporate financing preferences is rather unclear. This leads us to the third and final research question. According to the presented results, it seems to be too early to state how the corporate bond market is affected by newly implemented regulations, trends and market conditions. Since we are still in the middle of a financial crisis, the markets might not have been able to adjust to the new settings and expectations yet. A better understanding of the current situation will possibly be obtained in future studies, when recently implemented regulations and institutional modifications can be analyzed in hindsight.

## **7.2 Suggestions for further research**

An interesting topic for further research would be to analyze the relationship between corporate bond issuances and seasoned equity offerings (SEOs). By doing this, the conditions of companies that are already listed on public stock exchanges would be examined. Further understanding regarding this relationship would contribute to the knowledge fields of the corporate financing decision as well as IPO-cycles in a valuable way, considering the fact that listed companies have actually experienced IPOs and use these experiences in the decision of future fund raisings.

Moreover, further research on this topic would preferably examine markets and economies not covered in the study. As mentioned earlier, our initial intention was to include a greater number of emerging markets. However, due to a lack of documented data in these countries, this intention could not be fulfilled.

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## Appendix

### Appendix A Market volatility calculations (Australia 1990 extract)

<b>Historical market volatility FTSE Australia</b>					
<b>Variance</b>	7,6323E-05	<b>Annual standard deviation</b>	0,141139137		
<b>Standard deviation</b>	0,00873629	<b>Volatility</b>	14,11%		
Days	Date	Closing rate	LN(St/St-1)	LN(St/St-1)-G	(LN(St/St-1)-G)^2
1	1990-01-01	127,42			
2	1990-01-02	127,8	0,002977825	0,003837897	1,47295E-05
3	1990-01-03	130,46	0,020600124	0,021460196	0,00046054
4	1990-01-04	132,24	0,013551787	0,014411858	0,000207702
5	1990-01-05	132,58	0,002567783	0,003427855	1,17502E-05
6	1990-01-08	131,63	-0,00719128	-0,006331209	4,00842E-05
7	1990-01-09	130,9	-0,005561284	-0,004701212	2,21014E-05
8	1990-01-10	130,94	0,00030553	0,001165601	1,35863E-06
9	1990-01-11	131,37	0,003278566	0,004138638	1,71283E-05
10	1990-01-12	132,62	0,009470126	0,010330198	0,000106713
11	1990-01-15	130,21	-0,018339364	-0,017479293	0,000305526
12	1990-01-16	129,73	-0,003693164	-0,002833093	8,02642E-06
13	1990-01-17	130,14	0,003155426	0,004015498	1,61242E-05
14	1990-01-18	129,87	-0,002076844	-0,001216773	1,48054E-06
15	1990-01-19	129,77	-0,000770297	8,97739E-05	8,05936E-09
16	1990-01-22	129,87	0,000770297	0,001630369	2,6581E-06
17	1990-01-23	129,48	-0,003007521	-0,00214745	4,61154E-06
18	1990-01-24	128,86	-0,004799885	-0,003939814	1,55221E-05
19	1990-01-25	129,75	0,006882978	0,00774305	5,99548E-05
20	1990-01-26	130,9	0,008824151	0,009684222	9,37842E-05
21	1990-01-29	130,9	0	0,000860071	7,39723E-07
22	1990-01-30	131,72	0,006244785	0,007104856	5,0479E-05
23	1990-01-31	130,62	-0,008386113	-0,007526042	5,66413E-05
24	1990-02-01	129,81	-0,006220502	-0,00536043	2,87342E-05
25	1990-02-02	129,39	-0,003240744	-0,002380672	5,6676E-06
26	1990-02-05	129,26	-0,001005219	-0,000145148	2,1068E-08
27	1990-02-06	129,11	-0,001161126	-0,000301054	9,06337E-08
28	1990-02-07	127,33	-0,013882613	-0,013022541	0,000169587
29	1990-02-08	127,43	0,000785053	0,001645124	2,70643E-06
30	1990-02-09	126,15	-0,010095519	-0,009235448	8,52935E-05
31	1990-02-12	125,69	-0,003653117	-0,002793046	7,80111E-06
32	1990-02-13	126,05	0,002860096	0,003720167	1,38396E-05
33	1990-02-14	126,78	0,005774647	0,006634719	4,40195E-05
34	1990-02-15	126,99	0,001655042	0,002515114	6,3258E-06
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255	1990-12-21	101,3	-0,004923693	-0,004063622	1,6513E-05
256	1990-12-24	101,05	-0,002470967	-0,001610896	2,59499E-06
257	1990-12-25	101,05	0	0,000860071	7,39723E-07
258	1990-12-26	101,05	0	0,000860071	7,39723E-07
259	1990-12-27	101,85	0,007885699	0,00874577	7,64885E-05
260	1990-12-28	101,8	-0,000491039	0,000369033	1,36185E-07
261	1990-12-31	101,8	0	0,000860071	7,39723E-07
<b>Average</b>			-0,000860071	<b>Sum</b>	0,019843933

## Appendix B All sample data arranged as panel data

## B.1 All sample data

Country	Year	Number of IPOs	Outstanding corporate bonds	Equity index	Market capitalization	Gross Domestic Product	Interest rate	Inflation rate	Market volatility	Claims on private sector
Australia	1990	2	16.84	100.00	109.00	302.47	13.18%	7.33%	14.11%	194.20
Australia	1991	2	18.77	79.89	149.00	312.91	10.69%	3.18%	15.18%	191.42
Australia	1992	54	18.05	103.62	145.00	333.85	9.22%	1.01%	12.27%	195.78
Australia	1993	150	22.13	94.96	204.87	353.03	7.28%	1.75%	12.24%	185.48
Australia	1994	103	25.50	128.32	218.87	379.08	9.04%	1.97%	14.74%	227.64
Australia	1995	36	26.09	115.50	245.22	409.23	13.21%	4.63%	11.77%	245.23
Australia	1996	50	28.50	133.35	311.98	423.11	8.21%	2.62%	12.57%	297.66
Australia	1997	62	27.04	145.82	295.78	449.15	6.95%	0.22%	16.26%	314.10
Australia	1998	31	24.74	160.52	328.95	478.17	5.69%	0.86%	15.88%	286.66
Australia	1999	107	28.57	169.62	427.68	510.46	6.01%	1.46%	12.56%	345.96
Australia	2000	127	30.45	187.35	372.79	537.29	6.31%	4.46%	12.45%	348.29
Australia	2001	26	32.91	195.44	375.13	567.56	5.62%	4.41%	13.72%	317.60
Australia	2002	89	41.65	214.88	378.85	599.26	5.84%	2.98%	12.27%	289.89
Australia	2003	83	37.91	190.21	385.48	636.08	5.37%	1.07%	10.76%	533.95
Australia	2004	169	77.10	205.79	776.40	675.51	5.59%	2.34%	7.10%	617.65
Australia	2005	156	89.25	233.01	804.07	716.53	5.34%	2.69%	10.03%	764.92
Australia	2006	135	97.60	305.56	1093.88	769.32	5.56%	3.56%	13.66%	1422.85
Australia	2007	194	109.88	361.90	1298.43	826.15	5.99%	2.33%	17.53%	1131.29
Australia	2008	57	112.74	407.68	675.62	846.62	5.82%	4.35%	35.88%	1437.22
Australia	2009	33	122.54	241.10	1258.46	881.45	5.04%	1.77%	21.81%	1298.17
Australia	2010	82	132.00	315.22	1454.55	915.82	5.57%	1.59%	15.99%	1422.85
Australia	2011	100	186.35	306.36	1198.16	957.67	4.88%	3.30%	19.52%	1914.13
Germany	1990	28	1.62	100.00	335.00	1469.87	8.71%	2.70%	24.88%	1517.81
Germany	1991	19	1.91	78.10	393.00	1599.71	8.46%	4.03%	20.22%	1632.45
Germany	1992	9	1.91	88.14	348.08	1869.01	7.85%	5.08%	14.28%	1886.61
Germany	1993	11	1.91	86.30	463.48	1688.55	6.52%	4.47%	13.70%	1939.87
Germany	1994	15	1.92	126.68	470.52	1766.48	6.88%	2.69%	16.81%	2131.93
Germany	1995	20	1.92	116.15	577.37	1833.38	6.86%	1.71%	13.03%	2537.13
Germany	1996	14	2.21	125.89	671.00	1898.28	6.58%	1.45%	12.89%	2859.78
Germany	1997	36	2.83	161.55	825.23	1929.71	5.66%	1.94%	24.11%	2390.71
Germany	1998	79	4.56	237.36	1093.96	1982.72	4.58%	0.91%	29.28%	2545.41
Germany	1999	175	6.70	279.41	1432.19	2051.70	4.50%	0.59%	21.93%	2399.06
Germany	2000	142	12.27	377.06	1221.27	2270.22	4.36%	1.40%	23.91%	2344.42
Germany	2001	20	20.02	359.55	1071.75	2199.87	4.80%	1.98%	29.28%	2113.80
Germany	2002	7	34.66	288.21	691.12	2263.79	4.78%	1.42%	40.07%	2475.00
Germany	2003	0	62.34	161.27	1079.03	2340.65	4.07%	1.03%	31.44%	2868.10
Germany	2004	5	91.84	450.69	1194.85	2444.96	3.67%	1.87%	23.38%	3422.99
Germany	2005	24	104.52	239.70	1221.25	2566.00	3.35%	1.55%	12.22%	3032.07
Germany	2006	72	125.03	304.41	1637.83	2759.88	3.76%	1.58%	15.50%	3242.82
Germany	2007	44	131.38	368.67	2105.51	2922.60	4.22%	2.30%	15.52%	3452.11
Germany	2008	44	202.61	450.60	1102.96	3047.86	3.90%	3.63%	33.38%	3534.66
Germany	2009	4	316.56	268.67	1297.57	2918.24	3.22%	0.31%	28.43%	3777.08
Germany	2010	17	332.95	332.75	1429.71	3079.03	2.74%	1.10%	18.42%	3269.54
Germany	2011	15	384.79	360.61	1184.44	3194.44	2.81%	1.44%	39.21%	3592.11
Italy	1990	3	26.72	100.00	149.00	999.59	12.50%	6.66%	18.53%	1622.76
Italy	1991	4	29.50	70.76	159.00	1050.94	12.00%	6.25%	19.41%	685.85
Italy	1992	2	27.97	69.37	129.00	1084.87	13.27%	5.27%	24.27%	765.38
Italy	1993	0	21.63	88.14	136.15	1099.23	14.57%	4.63%	23.76%	695.98
Italy	1994	3	20.26	95.08	180.14	1146.37	10.52%	4.05%	25.78%	610.43
Italy	1995	11	17.06	97.41	209.52	1203.93	12.21%	5.24%	19.15%	632.61
Italy	1996	13	22.09	93.67	258.16	1245.82	9.40%	4.01%	18.69%	887.28
Italy	1997	120	20.90	101.69	344.47	1290.22	8.24%	2.04%	23.84%	491.99
Italy	1998	16	24.35	166.63	596.73	1357.96	4.88%	1.96%	33.44%	705.05
Italy	1999	27	17.90	236.29	728.27	1383.61	4.73%	1.66%	20.65%	812.84
Italy	2000	42	17.61	267.99	768.36	1466.46	5.58%	2.54%	22.64%	859.69
Italy	2001	17	27.29	287.49	827.40	1554.70	5.19%	2.71%	26.61%	818.24
Italy	2002	6	36.98	213.00	480.63	1539.91	5.03%	2.47%	27.02%	1018.12
Italy	2003	4	47.12	159.30	614.84	1571.57	4.50%	2.67%	18.86%	1275.65
Italy	2004	8	65.04	180.86	786.96	1626.45	4.25%	2.85%	10.66%	1454.25
Italy	2005	13	66.36	215.51	798.17	1657.40	3.56%	1.99%	9.94%	1539.34
Italy	2006	21	75.90	244.47	1026.64	1789.41	4.05%	2.09%	12.53%	1948.18
Italy	2007	29	85.57	282.44	1072.69	1902.34	4.49%	1.83%	14.86%	2101.36
Italy	2008	6	86.98	246.03	527.68	1898.73	3.58%	3.89%	27.93%	2439.62
Italy	2009	6	109.55	136.83	317.32	1939.19	4.31%	0.77%	30.17%	2359.32
Italy	2010	10	124.05	160.41	318.14	1940.60	4.04%	1.53%	25.28%	2331.58
Italy	2011	8	119.83	141.89	431.47	1982.53	5.42%	2.78%	32.43%	2798.58
Japan	1990	141	17.65	100.00	290.00	3389.77	6.36%	1.03%	16.66%	5424.67
Japan	1991	135	60.25	60.17	319.00	2536.41	6.34%	3.30%	17.19%	6075.16
Japan	1992	13	46.23	59.51	240.00	2617.91	5.33%	1.71%	24.32%	6745.10
Japan	1993	64	46.91	45.38	299.76	2679.95	4.32%	1.27%	18.69%	7795.73
Japan	1994	116	59.01	49.85	311.91	2759.64	4.53%	0.99%	14.03%	8325.97
Japan	1995	152	15.18	54.11	3667.29	2871.61	3.44%	-0.12%	18.58%	9538.39
Japan	1996	118	20.83	54.76	3088.85	3002.88	3.10%	0.13%	11.89%	8417.59
Japan	1997	102	17.27	51.05	2116.70	3104.90	2.37%	1.76%	21.98%	8144.62
Japan	1998	86	8.83	40.83	2409.76	3037.10	1.66%	1.06%	26.31%	7982.69
Japan	1999	106	16.51	37.72	4546.94	3116.00	1.75%	-0.33%	18.44%	8718.76
Japan	2000	203	15.16	59.77	3157.22	3287.03	1.74%	-0.65%	21.95%	9023.09
Japan	2001	169	19.86	44.55	225.81	3373.50	1.52%	-0.80%	23.63%	4530.00
Japan	2002	124	18.82	35.82	2128.82	3401.74	1.96%	-0.26%	23.80%	4950.00
Japan	2003	121	23.61	29.27	3040.66	3567.73	1.00%	-0.25%	19.83%	4150.00
Japan	2004	175	34.40	36.22	3678.26	3754.63	1.49%	-0.01%	16.32%	4460.00
Japan	2005	158	27.51	39.90	4736.51	3889.58	1.35%	-0.27%	12.58%	4510.00
Japan	2006	188	34.61	188.47	4726.22	4052.92	1.24%	0.34%	18.80%	4560.00
Japan	2007	121	23.84	58.34	4453.47	4267.10	1.67%	0.06%	19.09%	5100.00
Japan	2008	49	14.75	51.21	3220.49	4289.49	1.47%	1.37%	41.98%	4840.00
Japan	2009	19	29.74	49.82	3377.89	4083.03	-1.35%	-2.47%	51.00%	4040.00
Japan	2010	22	29.52	31.50	4099.59	4331.94	1.15%	-0.72%	17.99%	4600.00
Japan	2011	36	21.09	31.19	3540.68	4408.03	1.10%	-0.28%	22.54%	6090.00
Singapore	1990	15	3.72	100.00	34.30	36.38	5.14%	3.51%	21.18%	30.35
Singapore	1991	10	6.78	79.50	47.60	42.15	5.13%	5.15%	15.77%	35.43
Singapore	1992	15	5.38	90.94	48.80	50.23	4.67%	2.36%	10.72%	42.58
Singapore	1993	20	6.48	96.13	132.74	57.51	3.78%	2.18%	11.81%	48.36
Singapore	1994	30	7.28	159.42	134.52	70.72	2.93%	3.13%	17.49%	59.92
Singapore	1995	19	9.04	148.94	149.00	83.13	3.91%	1.70%	13.72%	78.63
Singapore	1996	21	10.29	151.77	150.22	92.46	2.75%	1.43%	12.98%	90.17
Singapore	1997	36	10.10	138.01	106.32	99.55	2.89%	2.00%	20.72%	100.30
Singapore	1998	21	12.03	114.58	94.47	81.62	3.87%	-0.23%	36.84%	91.65
Singapore	1999	50	13.66	95.79	199.41	84.51	3.80%	0.09%	24.14%	88.22
Singapore	2000	78	17.32	195.94	152.83	94.04	3.74%	1.39%	24.49%	92.01
Singapore	2001	35	21.76	141.56	117.34	86.25	3.44%	0.91%	24.53%	101.57
Singapore	2002	28	23.07	113.02	101.90	91.87	3.42%	-0.34%	19.53%	95.69
Singapore	2003	-6	26.32	92.30	225.33	94.93	1.74%	0.45%	19.39%	101.22
Singapore	2004	64	30.77	121.30	277.00	110.59	2.74%	1.69%	12.82%	108.06
Singapore	2005	29	34.08	138.59	316.66	123.73	2.08%	0.44%	10.13%	112.49
Singapore	2006	21	37.77	156.33	276.53	146.45	3.01%	1.00%	14.21%	125.88
Singapore	2007	-9	43.29	204.83	353.49	174.99	3.03%	2.08%	22.75%	152.18
Singapore	2008	29	48.61	238.12	180.02	197.82	2.33%	6.65%	36.04%	197.32
Singapore	2009	24	49.29	120.25	310.25	186.56	1.40%	0.60%	27.98%	188.99
Singapore	2010	28	55.21	196.83	370.79	222.07	1.28%	2.80%	44.26%	222.17
Singapore	2011	30								



United Kingdom	1990	65	40.31	100.00	849.00	938.70	11.80%	6.97%	14.81%	1125.66
United Kingdom	1991	19	54.22	88.48	988.00	959.64	10.11%	7.53%	13.20%	1073.54
United Kingdom	1992	32	59.33	102.91	927.00	965.07	9.06%	4.26%	15.65%	1301.29
United Kingdom	1993	77	69.77	117.49	1151.65	1030.09	7.49%	2.51%	10.00%	1055.69
United Kingdom	1994	114	60.95	141.10	1210.25	1097.51	8.12%	1.98%	13.45%	1150.49
United Kingdom	1995	69	79.97	126.53	1407.74	1155.24	8.20%	2.66%	9.81%	1319.07
United Kingdom	1996	168	83.04	152.28	1740.25	1227.79	7.81%	2.44%	9.39%	1416.90
United Kingdom	1997	135	115.03	170.00	1996.23	1314.89	7.05%	1.78%	15.25%	1619.43
United Kingdom	1998	77	151.98	211.97	2374.27	1367.85	5.55%	1.59%	21.14%	1696.48
United Kingdom	1999	77	184.62	242.81	2933.28	1424.16	5.09%	1.34%	17.92%	1725.07
United Kingdom	2000	228	225.88	286.65	2576.99	1533.51	5.53%	0.79%	19.88%	1898.82
United Kingdom	2001	114	241.58	256.84	2164.72	1627.36	4.93%	1.24%	21.83%	1923.60
United Kingdom	2002	48	311.13	215.35	1864.26	1702.60	4.90%	1.26%	27.53%	2255.09
United Kingdom	2003	30	363.57	162.64	2460.06	1773.60	4.53%	1.36%	19.43%	2680.90
United Kingdom	2004	173	419.14	184.29	2815.93	1897.00	4.88%	1.24%	10.38%	3278.08
United Kingdom	2005	225	466.11	198.72	3058.18	1984.85	4.41%	2.05%	8.74%	3575.70
United Kingdom	2006	212	475.34	231.92	3794.31	2124.84	4.50%	2.33%	12.58%	4172.97
United Kingdom	2007	151	526.67	256.77	3858.51	2188.01	5.01%	2.33%	17.50%	5268.43
United Kingdom	2008	33	482.47	266.62	1851.95	2213.95	4.59%	3.61%	37.89%	6030.75
United Kingdom	2009	7	434.05	183.03	2796.44	2125.44	3.65%	2.17%	23.48%	4896.46
United Kingdom	2010	50	437.51	223.42	3107.04	2197.78	3.61%	3.29%	17.45%	4436.89
United Kingdom	2011	40	464.53	243.23	2903.18	2233.79	3.12%	4.48%	21.29%	4545.28
United States	1990	113	1330.30	100.00	3000.00	5754.80	8.25%	5.40%	16.00%	3143.80
United States	1991	288	1454.60	93.44	4090.00	5943.20	7.86%	4.23%	14.30%	3022.80
United States	1992	412	1557.00	118.02	4490.00	6291.50	7.01%	3.03%	9.72%	2976.00
United States	1993	509	1674.60	123.29	5136.20	6614.30	5.87%	2.95%	8.62%	3042.80
United States	1994	404	1755.60	131.70	5807.02	7038.50	7.08%	2.61%	9.85%	3340.90
United States	1995	458	1950.60	129.96	6857.62	7359.30	6.58%	2.81%	7.80%	3501.70
United States	1996	675	2126.50	174.29	8484.43	7783.90	6.44%	2.93%	11.85%	3735.40
United States	1997	473	2359.00	209.60	11308.78	8278.90	6.55%	2.34%	18.21%	3995.50
United States	1998	284	2708.50	274.60	13453.35	8743.00	5.26%	1.58%	20.84%	4282.30
United States	1999	476	3046.50	347.83	16653.11	9301.00	5.64%	2.19%	18.05%	4556.10
United States	2000	380	3358.40	411.78	15104.04	8998.80	6.03%	3.38%	22.21%	5020.40
United States	2001	79	3836.40	373.59	13854.62	10233.90	5.02%	2.83%	21.39%	5207.10
United States	2002	66	4132.80	334.87	11098.10	10590.20	4.41%	1.99%	25.96%	6498.70
United States	2003	62	4486.50	248.96	14266.27	11089.30	4.02%	2.27%	17.05%	5895.80
United States	2004	174	4801.60	314.63	16323.73	11797.80	4.27%	2.68%	11.09%	6515.90
United States	2005	160	5089.70	340.15	16970.86	12564.30	4.29%	3.39%	10.25%	7205.20
United States	2006	157	5461.90	353.22	19425.85	13314.50	4.79%	3.23%	10.01%	7895.90
United States	2007	160	6065.00	401.33	19947.28	13961.80	4.63%	2.85%	15.99%	8594.40
United States	2008	21	6317.10	415.50	11737.65	14219.30	3.67%	3.84%	41.10%	8795.00
United States	2009	41	6991.90	255.59	15077.29	13898.30	3.26%	4.36%	27.27%	7779.60
United States	2010	92	7902.70	315.53	17138.98	14419.40	3.21%	1.64%	18.06%	7851.30
United States	2011	81	8197.10	359.90	15640.71	14991.30	2.79%	3.16%	23.33%	7860.10

"Outstanding corporate bonds", "Market capitalization", "Gross Domestic Product" and "Claims on private sector" are all denominated in billion USD

## B.2 Data sources

	Number of IPOs	Outstanding corporate bonds	Equity index	Market capitalization	Gross Domestic Product	Interest rate	Inflation rate	Market volatility	Claims on private sector
Australia	Loughran et al. (1994)	Reserve Bank of Australia	Datastream	The World bank	OECD	OECD	OECD	Datastream	Datastream
Germany	Loughran et al. (1994)	Deutsche Bundesbank	Datastream	The World bank	OECD	OECD	OECD	Datastream	Datastream
Italy	Loughran et al. (1994)	Banca d'Italia	Datastream	The World bank	OECD	OECD/Banca d'Italia	OECD	Datastream	Datastream
Japan	Loughran et al. (1994)	Bank of Japan	Datastream	The World bank	OECD	OECD	OECD	Datastream	Datastream
Singapore	Loughran et al. (1994)	MAS	Datastream	The World bank	Department of Statistics Singapore	MAS	MAS	Datastream	Datastream
Sweden	Loughran et al. (1994)	SCB	Datastream	The World bank	OECD	OECD	OECD	Datastream	Datastream
United Kingdom	Loughran et al. (1994)	Bank of England	Datastream	The World bank	OECD	OECD	OECD	Datastream	Datastream
United States	Loughran et al. (1994)	SIFMA	Datastream	The World bank	OECD	OECD	OECD	Datastream	Datastream

Conversion rates for German D-Mark and Italian Lira have been collected from the ECB website, see references.

## Appendix C First time period

### C.1 Sample descriptives

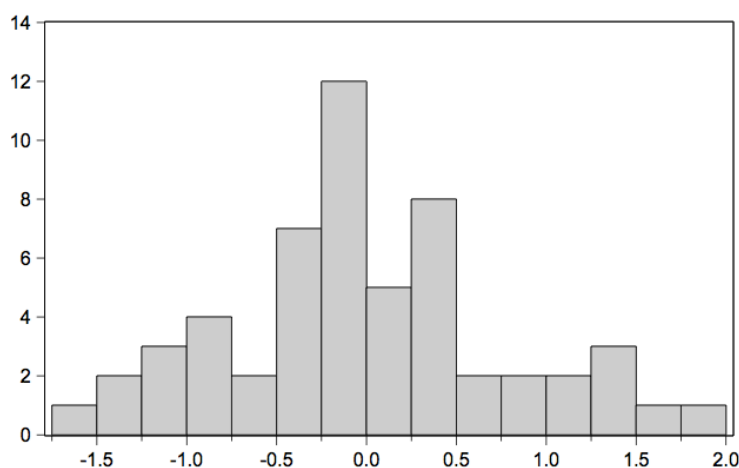
	Number of IPOs	Outstanding corporate bonds	Equity index	Market capitalization	Gross Domestic Product	Interest rate	Inflation rate	Market volatility	Claims on private sector
Observations	55	56	56	56	56	56	56	56	56
Mean	3,35	3,28	101,95	6,17	6,66	7,92%	3,44%	15,59%	6,51
Median	3,04	3,02	100,00	5,80	7,00	7,94%	2,94%	14,52%	6,80
Std. Deviation	1,61	1,88	29,60	1,49	1,45	2,77%	2,15%	4,67%	1,65
Variance	2,60	3,55	876,05	2,22	2,11	0,08%	0,05%	0,22%	2,73

### C.2 Multicollinearity test

Covariance Analysis: Ordinary  
Date: 04/26/13 Time: 10:51  
Sample: 1990 1996  
Included observations: 55  
Balanced sample (listwise missing value deletion)

Covariance Correlation Probability	LIPOS	LBONDS	EQUITY	LCAPITALIZA	VOLATILIT	LGDP	LCLAIMS	INTEREST	INFLATION
LIPOS	2.551623 1.000000 ----								
LBONDS	1.899474 0.631369 0.0000	3.547182 1.000000 ----							
EQUITY	13.49181 0.289625 0.0320	11.39442 0.207456 0.1286	850.4537 1.000000 ----						
LCAPITALIZATION	1.859573 0.786292 0.0000	1.855554 0.665443 0.0000	1.762400 0.040819 0.7673	2.192010 1.000000 ----					
VOLATILITY	-0.034097 -0.464271 0.0004	-0.030413 -0.351221 0.0086	-0.604973 -0.451210 0.0005	-0.017900 -0.262972 0.0524	0.002114 1.000000 ----				
LGDP	1.294246 0.558261 0.0000	1.527003 0.558633 0.0000	-3.450226 -0.081517 0.5541	1.882638 0.876141 0.0000	-0.004318 -0.064714 0.6388	2.106411 1.000000 ----			
LCLAIMS	1.399462 0.529775 0.0000	1.216937 0.390720 0.0032	-10.66750 -0.221195 0.1046	2.158433 0.881569 0.0000	0.001716 0.022564 0.8701	2.268450 0.945141 0.0000	2.734780 1.000000 ----		
INTEREST	-0.021191 -0.485384 0.0002	0.001749 0.033971 0.8055	-0.074509 -0.093483 0.4972	-0.012556 -0.310308 0.0211	0.000332 0.264245 0.0512	0.000145 0.003667 0.9788	-0.006684 -0.147888 0.2813	0.000747 1.000000 ----	
INFLATION	-0.014481 -0.423355 0.0013	0.002067 0.051255 0.7102	-0.094427 -0.151214 0.2705	-0.008669 -0.273448 0.0434	0.000222 0.225708 0.0975	-0.002594 -0.083464 0.5446	-0.005846 -0.165099 0.2284	0.000408 0.696309 0.0000	0.000459 1.000000 ----

### C.3 Non-normality test



Series: RESIDUAL  
Sample 1990 1996  
Observations 55

Mean	-6.76e-17
Median	-0.066703
Maximum	1.817542
Minimum	-1.548269
Std. Dev.	0.780452
Skewness	0.270046
Kurtosis	2.754780
Jarque-Bera	0.806283
Probability	0.668218

**C.4 Heteroscedasticity test**

Dependent Variable: RESIDUAL_SQUARE				
Method: Panel Least Squares				
Date: 04/26/13 Time: 11:12				
Sample: 1990 1996				
Periods included: 7				
Cross-sections included: 8				
Total panel (unbalanced) observations: 55				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.356400	0.869271	-0.409999	0.6836
LBONDS	-0.011089	0.064153	-0.172854	0.8635
EQUITY	0.001228	0.003941	0.311676	0.7566
VOLATILITY	6.267882	2.590838	2.419248	0.0194
LCLAIMS	-0.062671	0.070827	-0.884841	0.3807
INTEREST	12.30300	5.026769	2.447497	0.0181
INFLATION	-19.44487	6.454061	-3.012811	0.0041
R-squared	0.285742	Mean dependent var	0.598031	
Adjusted R-squared	0.196459	S.D. dependent var	0.799502	
S.E. of regression	0.716677	Akaike info criterion	2.290031	
Sum squared resid	24.65407	Schwarz criterion	2.545510	
Log likelihood	-55.97586	Hannan-Quinn criter.	2.388827	
F-statistic	3.200430	Durbin-Watson stat	1.418880	
Prob(F-statistic)	0.010056			

**C.5 Regression**

Dependent Variable: LIPOS				
Method: Panel Least Squares				
Date: 04/26/13 Time: 11:18				
Sample: 1990 1996				
Periods included: 7				
Cross-sections included: 8				
Total panel (unbalanced) observations: 55				
White period standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.594182	0.810807	1.966168	0.0551
LBONDS	0.370597	0.046661	7.942292	0.0000
EQUITY	0.009064	0.003063	2.958928	0.0048
VOLATILITY	-4.629166	3.247591	-1.425415	0.1605
LCLAIMS	0.321247	0.063378	5.068771	0.0000
INTEREST	-18.89944	4.472043	-4.226131	0.0001
INFLATION	-8.249573	8.292844	-0.994782	0.3248
R-squared	0.765627	Mean dependent var	3.350592	
Adjusted R-squared	0.736331	S.D. dependent var	1.612103	
S.E. of regression	0.827795	Akaike info criterion	2.578310	
Sum squared resid	32.89172	Schwarz criterion	2.833789	
Log likelihood	-63.90354	Hannan-Quinn criter.	2.677106	
F-statistic	26.13364	Durbin-Watson stat	1.158908	
Prob(F-statistic)	0.000000			

## Appendix D Second time period

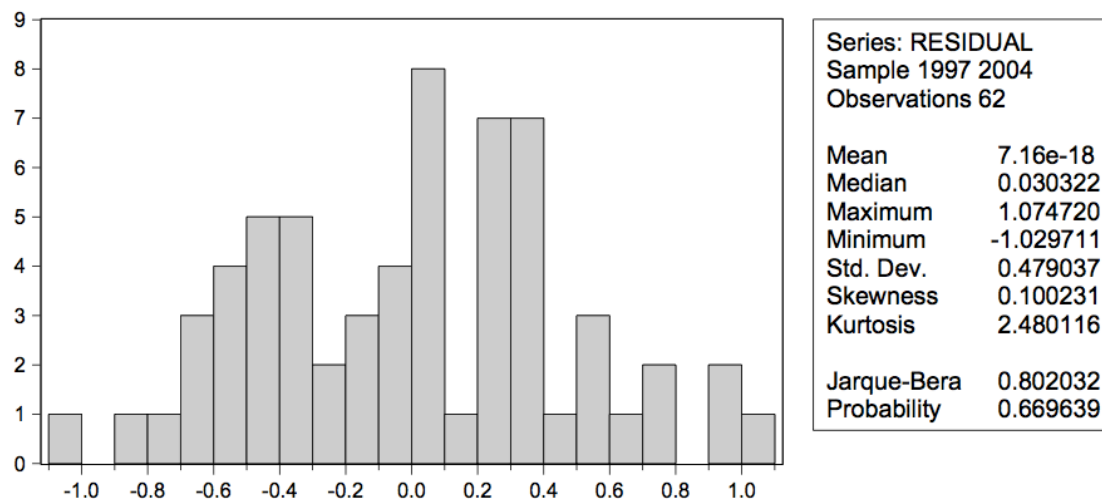
### D.1 Sample descriptives

	Number of IPOs	Outstanding corporate bonds	Equity index	Market capitalization	Gross Domestic Product	Interest rate	Inflation rate	Market volatility	Claims on private sector
Observations	62	64	64	64	64	64	64	64	64
Mean	3,91	4,03	205,26	6,91	7,00	4,51%	1,44%	20,94%	6,90
Median	4,14	3,34	200,87	6,66	7,34	4,88%	1,52%	20,69%	7,33
Std. Deviation	1,22	1,85	101,10	1,40	1,41	1,49%	1,16%	6,55%	1,49
Variance	1,49	3,43	10221,25	1,97	1,99	0,02%	0,01%	0,43%	2,22

### D.2 Multicollinearity test

Covariance Analysis: Ordinary										
Date: 04/26/13 Time: 11:33										
Sample: 1997 2004										
Included observations: 62										
Balanced sample (listwise missing value deletion)										
Covariance	LIPOS	LBONDS	EQUITY	LCAPITALIZA	VOLATILIT	LGDP	LCLAIMS	INTEREST	INFLATION	
Correlation	1.467735									
Probability	1.000000									
	-----									
LIPOS										
	0.882240	3.485944								
	0.390034	1.000000								
	0.0017	-----								
LBONDS										
	-14.49080	76.92246	10354.72							
	-0.117544	0.404878	1.000000							
	0.3629	0.0011	-----							
EQUITY										
	1.047810	1.943480	25.22768	1.978221						
	0.614924	0.740086	0.176267	1.000000						
	0.0000	0.0000	0.1706	-----						
LCAPITALIZATION										
	-0.027722	-0.030122	1.323585	-0.016170	0.004172					
	-0.354265	-0.249778	0.201377	-0.177991	1.000000					
	0.0047	0.0502	0.1165	0.1663	-----					
VOLATILITY										
	0.738175	1.548811	23.19938	1.830790	-0.006056	1.980729				
	0.432935	0.589421	0.161992	0.924887	-0.066616	1.000000				
	0.0004	0.0000	0.2084	0.0000	0.6070	-----				
LGDP										
	0.828392	1.258415	-2.266803	1.852445	-0.005298	1.983718	2.212452			
	0.459701	0.453134	-0.014976	0.885464	-0.055149	0.947612	1.000000			
	0.0002	0.0002	0.9080	0.0000	0.6703	0.0000	-----			
LCLAIMS										
	-0.002035	0.006794	0.897830	-0.001370	-7.50E-05	-0.000385	-0.004598	0.000224		
	-0.112139	0.242941	0.589063	-0.065042	-0.077549	-0.018244	-0.206359	1.000000		
	0.3855	0.0571	0.0000	0.6155	0.5491	0.8881	0.1076	-----		
INTEREST										
	-0.001113	0.007656	0.544838	0.001632	-0.000158	0.003129	0.000674	9.80E-05	0.000135	
	-0.079058	0.352928	0.460820	0.099896	-0.210316	0.191356	0.039027	0.563037	1.000000	
	0.5413	0.0049	0.0002	0.4398	0.1009	0.1363	0.7633	0.0000	-----	
INFLATION										

### D.3 Non-normality test



**D.4 Heteroscedasticity test**

Dependent Variable: RESIDUAL_SQUARE				
Method: Panel Least Squares				
Date: 04/26/13 Time: 11:59				
Sample: 1997 2004				
Periods included: 8				
Cross-sections included: 8				
Total panel (unbalanced) observations: 62				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.106411	0.264835	0.401801	0.6894
LBONDS	0.005423	0.025940	0.209075	0.8352
EQUITY	-0.000477	0.000511	-0.933692	0.3545
VOLATILITY	-0.579382	0.636908	-0.909679	0.3670
LCLAIMS	0.013866	0.028665	0.483736	0.6305
INTEREST	3.979919	3.343986	1.190172	0.2391
INFLATION	2.835209	3.920544	0.723167	0.4726
R-squared	0.106275	Mean dependent var	0.225776	
Adjusted R-squared	0.008777	S.D. dependent var	0.276921	
S.E. of regression	0.275703	Akaike info criterion	0.367019	
Sum squared resid	4.180665	Schwarz criterion	0.607180	
Log likelihood	-4.377603	Hannan-Quinn criter.	0.461312	
F-statistic	1.090027	Durbin-Watson stat	2.354833	
Prob(F-statistic)	0.379945			

**D.5 Regression**

Dependent Variable: LIPOS				
Method: Panel Least Squares				
Date: 04/26/13 Time: 11:43				
Sample: 1997 2004				
Periods included: 8				
Cross-sections included: 8				
Total panel (unbalanced) observations: 62				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.497542	2.361859	3.597819	0.0008
LBONDS	-0.676934	0.164261	-4.121099	0.0001
EQUITY	0.006726	0.001483	4.534555	0.0000
VOLATILITY	-7.700435	1.488412	-5.173591	0.0000
LCLAIMS	-0.335773	0.302257	-1.110886	0.2722
INTEREST	21.22111	13.17768	1.610383	0.1139
INFLATION	-19.39933	9.527275	-2.036189	0.0473
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.846174	Mean dependent var	3.912406	
Adjusted R-squared	0.804513	S.D. dependent var	1.221391	
S.E. of regression	0.540025	Akaike info criterion	1.801276	
Sum squared resid	13.99808	Schwarz criterion	2.281597	
Log likelihood	-41.83956	Hannan-Quinn criter.	1.989862	
F-statistic	20.31087	Durbin-Watson stat	1.487482	
Prob(F-statistic)	0.000000			

## Appendix E Third time period

### E.1 Sample descriptives

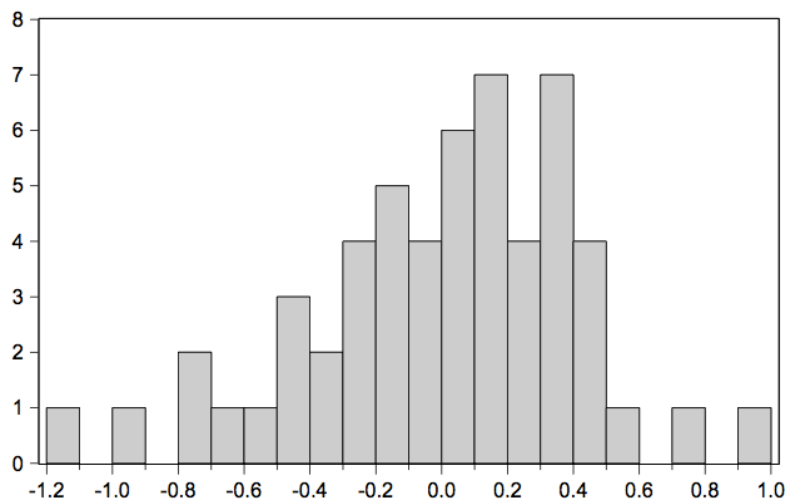
	Number of IPOs	Outstanding corporate bonds	Equity index	Market capitalization	Gross Domestic Product	Interest rate	Inflation rate	Market volatility	Claims on private sector
Observations	55	56	56	56	56	56	56	56	56
Mean	3,51	5,09	260,48	7,30	7,36	3,50%	2,03%	21,40%	7,55
Median	3,37	4,67	256,18	7,12	7,60	3,63%	2,09%	18,96%	7,98
Std. Deviation	1,18	1,67	125,90	1,28	1,32	1,33%	1,55%	8,99%	1,23
Variance	1,39	2,78	15849,56	1,63	1,73	0,02%	0,02%	0,81%	1,51

### E.2 Multicollinearity test

Covariance Analysis: Ordinary  
Date: 04/26/13 Time: 12:04  
Sample: 2005 2011  
Included observations: 55  
Balanced sample (listwise missing value deletion)

Covariance Correlation Probability	LIPOS	LBONDS	EQUITY	LCAPITALIZA	VOLATILIT	LGDP	LCLAIMS	INTEREST	INFLATION
LIPOS	1.365326 1.000000 ----								
LBONDS	0.504655 0.259709 0.0555	2.765538 1.000000 ----							
EQUITY	-21.97990 -0.149467 0.2761	85.97135 0.410774 0.0018	15838.77 1.000000 ----						
LCAPITALIZATION	0.816452 0.552462 0.0000	1.443266 0.686193 0.0000	-5.583115 -0.035076 0.7993	1.599633 1.000000 ----					
VOLATILITY	-0.048459 -0.463033 0.0004	0.000225 0.001513 0.9913	1.231752 0.109275 0.4271	-0.018361 -0.162084 0.2371	0.008022 1.000000 ----				
LGDP	0.436049 0.287191 0.0335	1.395341 0.645720 0.0000	-10.82637 -0.066203 0.6311	1.445453 0.879523 0.0000	0.006893 0.059224 0.6676	1.688469 1.000000 ----			
LCLAIMS	0.342597 0.240973 0.0763	1.147073 0.566897 0.0000	-9.356037 -0.061099 0.6577	1.264728 0.821845 0.0000	0.012250 0.112408 0.4139	1.510200 0.955192 0.0000	1.480453 1.000000 ----		
INTEREST	0.002810 0.181092 0.1858	0.007780 0.352278 0.0083	0.841720 0.503604 0.0001	3.50E-05 0.002086 0.9879	-5.73E-05 -0.048150 0.7270	0.000876 0.050790 0.7127	0.001931 0.119530 0.3847	0.000176 1.000000 ----	
INFLATION	0.001479 0.083711 0.5434	0.007356 0.292482 0.0302	0.938961 0.493356 0.0001	-0.002737 -0.143101 0.2973	0.000313 0.231190 0.0895	-0.003077 -0.156598 0.2536	-0.002427 -0.131925 0.3370	8.49E-05 0.422897 0.0013	0.000229 1.000000 ----

### E.3 Non-normality test



Series: RESIDUAL  
Sample 2005 2011  
Observations 55

Mean	-7.27e-17
Median	0.056838
Maximum	0.937337
Minimum	-1.134268
Std. Dev.	0.408371
Skewness	-0.504177
Kurtosis	3.373883
Jarque-Bera Probability	2.650462 0.265742



**E.4 Heteroscedasticity test**

Dependent Variable: RESIDUAL_SQUARE				
Method: Panel Least Squares				
Date: 04/26/13 Time: 12:15				
Sample: 2005 2011				
Periods included: 7				
Cross-sections included: 8				
Total panel (unbalanced) observations: 55				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.277326	0.260447	1.064809	0.2923
LBONDS	0.048390	0.032514	1.488260	0.1432
EQUITY	-0.000114	0.000381	-0.299926	0.7655
VOLATILITY	0.440618	0.430302	1.023974	0.3110
LCLAIMS	-0.041833	0.041698	-1.003222	0.3208
INTEREST	-1.653744	3.303033	-0.500674	0.6189
INFLATION	-2.408796	3.031168	-0.794676	0.4307
R-squared	0.065024	Mean dependent var	0.163735	
Adjusted R-squared	-0.051848	S.D. dependent var	0.254598	
S.E. of regression	0.261115	Akaike info criterion	0.270700	
Sum squared resid	3.272684	Schwarz criterion	0.526179	
Log likelihood	-0.444247	Hannan-Quinn criter.	0.369496	
F-statistic	0.556366	Durbin-Watson stat	2.349437	
Prob(F-statistic)	0.762604			

**E.5 Regression**

Dependent Variable: LIPOS				
Method: Panel Least Squares				
Date: 04/26/13 Time: 12:08				
Sample: 2005 2011				
Periods included: 7				
Cross-sections included: 8				
Total panel (unbalanced) observations: 55				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.319297	5.064105	-1.050392	0.3007
LBONDS	0.260850	0.430150	0.606415	0.5482
EQUITY	-0.002484	0.002952	-0.841441	0.4058
VOLATILITY	3.908763	3.328996	1.174157	0.2483
LCLAIMS	1.083117	0.710111	1.525279	0.1362
INTEREST	-31.77224	22.86602	-1.389496	0.1735
INFLATION	10.82937	10.43084	1.038207	0.3063
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.880076	Mean dependent var	3.506577	
Adjusted R-squared	0.814975	S.D. dependent var	1.179241	
S.E. of regression	0.507245	Akaike info criterion	1.755642	
Sum squared resid	9.005409	Schwarz criterion	2.485581	
Log likelihood	-28.28015	Hannan-Quinn criter.	2.037915	
F-statistic	13.51856	Durbin-Watson stat	1.833741	
Prob(F-statistic)	0.000000			

**Appendix F** Alternative testing with integer numbers**F.1** First time period

Dependent Variable: IPOS				
Method: ML/QML - Poisson Count (Quadratic hill climbing)				
Date: 05/03/13 Time: 09:47				
Sample: 1990 1996				
Included observations: 56				
Convergence achieved after 7 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	6.786009	0.249321	27.21795	0.0000
BONDS	0.000132	0.000138	0.954039	0.3401
EQUITY	0.009106	0.001165	7.813430	0.0000
VOLATILITY	-1.405520	0.701024	-2.004953	0.0450
CLAIMS	-0.000170	3.16E-05	-5.388329	0.0000
INTEREST	-16.49711	2.872299	-5.743521	0.0000
INFLATION	-10.07744	2.275207	-4.429240	0.0000
DUMA	-1.732468	0.218275	-7.937090	0.0000
DUMB	-2.869456	0.228771	-12.54290	0.0000
DUMC	-3.142071	0.253294	-12.40486	0.0000
DUMD	-0.205996	0.263403	-0.782054	0.4342
DUME	-3.909072	0.260160	-15.02566	0.0000
DUMF	-3.495800	0.251364	-13.90730	0.0000
DUMG	-1.423298	0.224638	-6.335963	0.0000
R-squared	0.963751	Mean dependent var	87.08929	
Adjusted R-squared	0.952532	S.D. dependent var	142.9987	
S.E. of regression	31.15548	Akaike info criterion	15.97128	
Sum squared resid	40767.89	Schwarz criterion	16.47762	
Log likelihood	-433.1959	Hannan-Quinn criter.	16.16759	
Restr. log likelihood	-4510.284	LR statistic	8154.176	
Avg. log likelihood	-7.735641	Prob(LR statistic)	0.000000	

**F.2 Second time period**

Dependent Variable: IPOS				
Method: ML/QML - Poisson Count (Quadratic hill climbing)				
Date: 05/03/13 Time: 09:49				
Sample: 1997 2004				
Included observations: 64				
Convergence achieved after 8 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	6.702629	0.242923	27.59153	0.0000
BONDS	-0.000726	4.64E-05	-15.65410	0.0000
EQUITY	0.006381	0.000300	21.27774	0.0000
VOLATILITY	-9.055035	0.400560	-22.60593	0.0000
CLAIMS	-2.75E-05	1.44E-05	-1.904138	0.0569
INTEREST	29.81635	2.762557	10.79303	0.0000
INFLATION	-20.04855	2.014998	-9.949664	0.0000
DUMA	-3.575590	0.132770	-26.93076	0.0000
DUMB	-3.172517	0.154486	-20.53594	0.0000
DUMC	-4.281623	0.163387	-26.20534	0.0000
DUMD	-0.492935	0.226681	-2.174571	0.0297
DUME	-2.524613	0.176348	-14.31608	0.0000
DUMF	-5.538714	0.176141	-31.44486	0.0000
DUMG	-2.821148	0.125726	-22.43884	0.0000
R-squared	0.897976	Mean dependent var	88.98438	
Adjusted R-squared	0.871449	S.D. dependent var	102.1854	
S.E. of regression	36.63750	Akaike info criterion	18.20601	
Sum squared resid	67115.34	Schwarz criterion	18.67827	
Log likelihood	-568.5924	Hannan-Quinn criter.	18.39206	
Restr. log likelihood	-3126.997	LR statistic	5116.809	
Avg. log likelihood	-8.884256	Prob(LR statistic)	0.000000	

**F.3 Third time period**

Dependent Variable: IPOS				
Method: ML/QML - Poisson Count (Quadratic hill climbing)				
Date: 05/03/13 Time: 09:51				
Sample: 2005 2011				
Included observations: 56				
Convergence achieved after 8 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.989910	0.537658	3.701068	0.0002
BONDS	0.000449	4.80E-05	9.355418	0.0000
EQUITY	0.003627	0.000690	5.253461	0.0000
VOLATILITY	-5.318250	0.356091	-14.93508	0.0000
CLAIMS	-0.000437	4.37E-05	-10.00218	0.0000
INTEREST	66.94923	5.077670	13.18503	0.0000
INFLATION	9.229977	2.833604	3.257328	0.0011
DUMA	-0.975130	0.412332	-2.364916	0.0180
DUMB	0.031806	0.405926	0.078354	0.9375
DUMC	-1.280459	0.417299	-3.068444	0.0022
DUMD	4.492947	0.430636	10.43328	0.0000
DUME	0.075759	0.499811	0.151575	0.8795
DUMF	-2.379310	0.543010	-4.381702	0.0000
DUMG	1.397934	0.314139	4.450052	0.0000
R-squared	0.913705	Mean dependent var	59.39286	
Adjusted R-squared	0.886995	S.D. dependent var	62.88393	
S.E. of regression	21.13917	Akaike info criterion	11.68838	
Sum squared resid	18768.32	Schwarz criterion	12.19472	
Log likelihood	-313.2747	Hannan-Quinn criter.	11.88469	
Restr. log likelihood	-1791.849	LR statistic	2957.149	
Avg. log likelihood	-5.594192	Prob(LR statistic)	0.000000	

**Appendix G** Alternative testing with different time periods**G.1** First time period

Dependent Variable: LIPOS				
Method: Panel Least Squares				
Date: 05/03/13 Time: 09:38				
Sample: 1990 2000				
Periods included: 11				
Cross-sections included: 8				
Total panel (unbalanced) observations: 87				
White cross-section standard errors & covariance (d.f. corrected)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.127375	1.857322	2.760628	0.0073
LBONDS	0.264121	0.251061	1.052018	0.2963
EQUITY	0.002511	0.001151	2.181865	0.0323
VOLATILITY	-2.496880	1.746602	-1.429565	0.1571
LCLAIMS	-0.134510	0.293688	-0.458004	0.6483
INTEREST	-17.02808	6.176626	-2.756858	0.0074
INFLATION	-8.386476	4.584440	-1.829335	0.0714
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.810801	Mean dependent var	3.675186	
Adjusted R-squared	0.777108	S.D. dependent var	1.494486	
S.E. of regression	0.705568	Akaike info criterion	2.286764	
Sum squared resid	36.34135	Schwarz criterion	2.683577	
Log likelihood	-85.47425	Hannan-Quinn criter.	2.446549	
F-statistic	24.06437	Durbin-Watson stat	1.378097	
Prob(F-statistic)	0.000000			

**G.2 Second time period**

Dependent Variable: LIPOS				
Method: Panel Least Squares				
Date: 05/03/13 Time: 09:29				
Sample: 2001 2008				
Periods included: 8				
Cross-sections included: 8				
Total panel (unbalanced) observations: 62				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.106920	2.088785	0.529935	0.5986
LBONDS	-0.584171	0.263676	-2.215486	0.0315
EQUITY	0.007324	0.001557	4.705228	0.0000
VOLATILITY	-7.239337	0.903983	-8.008263	0.0000
LCLAIMS	0.646636	0.354944	1.821794	0.0747
INTEREST	9.615232	16.11749	0.596571	0.5536
INFLATION	-1.997496	7.480319	-0.267034	0.7906
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.892870	Mean dependent var	3.707788	
Adjusted R-squared	0.863855	S.D. dependent var	1.241772	
S.E. of regression	0.458186	Akaike info criterion	1.472598	
Sum squared resid	10.07687	Schwarz criterion	1.952919	
Log likelihood	-31.65055	Hannan-Quinn criter.	1.661184	
F-statistic	30.77327	Durbin-Watson stat	1.720847	
Prob(F-statistic)	0.000000			

**G.3 Third time period**

Dependent Variable: LIPOS				
Method: Panel Least Squares				
Date: 05/03/13 Time: 09:32				
Sample: 2009 2011				
Periods included: 3				
Cross-sections included: 8				
Total panel (unbalanced) observations: 23				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.04839	8.679935	2.079324	0.0762
LBONDS	0.640076	1.097790	0.583058	0.5781
EQUITY	0.004110	0.005797	0.708905	0.5013
VOLATILITY	-5.351887	7.408725	-0.722376	0.4935
LCLAIMS	-2.321037	1.257731	-1.845416	0.1075
INTEREST	17.01423	42.54330	0.399927	0.7011
INFLATION	-42.77085	28.76118	-1.487104	0.1806
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.958388	Mean dependent var	3.047366	
Adjusted R-squared	0.869219	S.D. dependent var	1.000134	
S.E. of regression	0.361685	Akaike info criterion	1.005634	
Sum squared resid	0.915712	Schwarz criterion	1.795543	
Log likelihood	4.435206	Hannan-Quinn criter.	1.204294	
F-statistic	10.74802	Durbin-Watson stat	3.506230	
Prob(F-statistic)	0.001981			



**Appendix H** Alternative testing for the entire time period

Dependent Variable: LIPOS				
Method: Panel Least Squares				
Date: 04/26/13 Time: 12:24				
Sample: 1990 2011				
Periods included: 22				
Cross-sections included: 8				
Total panel (unbalanced) observations: 172				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.478678	1.320409	1.877204	0.0626
LBONDS	0.009664	0.104389	0.092579	0.9264
EQUITY	-0.000957	0.001274	-0.751490	0.4536
VOLATILITY	-2.061801	1.858287	-1.109517	0.2692
LCLAIMS	0.331743	0.188147	1.763210	0.0801
INTEREST	-9.320430	7.694868	-1.211253	0.2279
INFLATION	-7.230533	5.801607	-1.246298	0.2148
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.783540	Mean dependent var	3.602985	
Adjusted R-squared	0.729820	S.D. dependent var	1.360217	
S.E. of regression	0.707025	Akaike info criterion	2.323961	
Sum squared resid	68.48413	Schwarz criterion	2.964440	
Log likelihood	-164.8607	Hannan-Quinn criter.	2.583820	
F-statistic	14.58564	Durbin-Watson stat	0.977083	
Prob(F-statistic)	0.000000			

# Going public – gone away?

Wall Street Journal Lund 2013-05-13

**Stock exchanges worldwide have been facing hard times since the break out of the credit crisis in late 2008 and seem to have lost their attractiveness. Recent figures on the matter of IPOs stress the problem. Simultaneously, corporate bond markets keep developing and are becoming more and more popular. Is the current situation just a cyclical state or are we facing a structural change?**



*Julius Nilsson and Kalle Rundlöf have recently finished their study on the matter of the relationship between IPO-cycles and corporate bond issuances. There have been many hours of hard work at the School of Economics and Management of Lund University.*

Photo by George McDowell

**Not a single company** decided to go public on the Stockholm Stock Exchange during 2012. At the same time, seven companies were delisted. This negative trend captured the interest of two business students at the Lund University School of Economics and Management.

- It is a proven fact that the number of IPOs is correlated with macroeconomic variables and the market valuation of equity. However, it seems like the negative trend was observed even before the recent years of unstableness and volatility. This fact raises an important question; Is the cold IPO-market of today just a temporary state or are we facing a

structural change that favors debt financing like corporate bonds? Says Julius Nilsson and takes a sip of water out of his bottle.

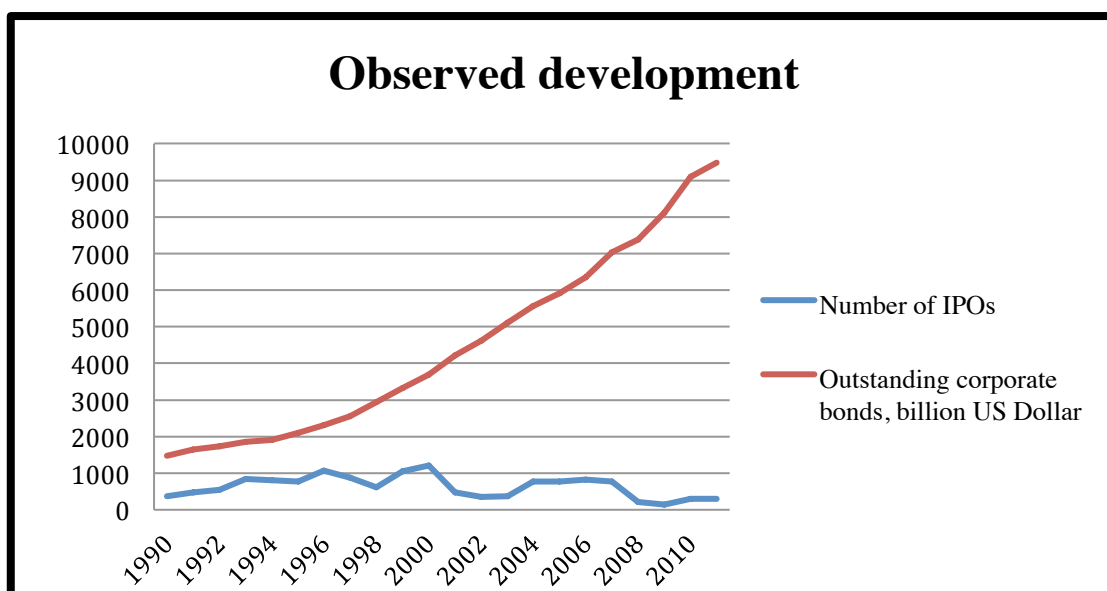
**One of the most important and intuitive reasons** behind the present state is that investors do not pay as much as demanded by the owners of the companies considering going public. Today, high first day returns and steep price increases cannot longer be observed. The development of IPO-stocks has over the last years been negative, in Sweden as well as globally. Facebook is probably the best-known example of a recently failed IPO.

- The current situation, where investors outside the stock markets pay higher prices for equity, is remarkable. This is against recognized financial theory. Exchanged listed stocks offer safety and liquidity, they give investors the opportunity to buy and sell whenever they want. Declares Kalle as he shakes his head and presents supporting figures.

**Although there is an extensive amount of papers** examining different factors behind IPO-cycles, there appears to be limited research focusing on debt financing in terms of corporate bonds as an explaining variable. Debt financing in terms of corporate bonds have recently become popular among non-financial companies, as well as among investors.

**“ This is against recognized financial theory. ”**

As a consequence of the weak market climate, corporate bonds as a way of financing, has gained approval in new markets, including Sweden. In the aftermath of the recent credit and sovereign crises, European corporations have started to use debt capital markets in a more intensive way. In the US, the corporate bond market has been developed for a long time. The volumes of corporate bonds issued by non-financial firms, have increased and yields have come down. After reaching record-high issuance levels in 2009, European investment grade corporate bonds experienced their second highest issuance activity in 2012.



*The countries included in the investigation are; Sweden, USA, UK, Italy, Germany, Japan, Australia and Singapore. Except for outstanding corporate bond volumes, issued by non-financial firms, and the annual number of performed IPOs, the study examines a number of other variables in order to get an indication of whether there actually might be a structural change going on.*

**During the time period between 1980 and 2000**, on average there were 311 IPOs in the US annually. The same number for the last ten years is as low as 99. Jay Ritter, one of the world’s most recognized professors on the subject, claims that the negative development is not only cyclical, he thinks it is unlikely that USA and Europe will face the high IPO-volumes of the late 90s again, ever. Small and midsize firms make up for major part of the negative trend at the same time as they show higher profitability.

**Intuitively, corporate bonds seem to be** an interesting source of financing to companies, a high-yield alternative to investors and a well-needed source of income to the banks, which are in need of new income springs that can replace the vanishing brokerage fees. The big remaining question is; how do they affect the stock exchanges and a company’s decision to go public? Could it be that we actually are facing a structural change that favors debt financing in terms of corporate bonds?

**The statistical tests of the study** do not show any major indication of a potential structural change that favors debt capital in terms of corporate bonds. However, it is hard to draw any reliable conclusions regarding upcoming trends based on the accessible figures.

- Even though the relationship between corporate bond issuances and IPO-activity seems to be the opposite of what could be expected, it is vital to stress that the detected correlation was of no significance. From the obtained figures, one can easily observe steadily increasing volumes of outstanding corporate bonds over time, in Sweden and other European

markets as well as in USA. Japan is an exception. There might also be future effects from recent regulations and trends that are not covered in this study, like the entrance of HFT and the fact that banks in general face new conditions. Says Julius and takes a look at his wristwatch.

**The time is just about to turn 09.00**, which also means that the Stockholm Stock Exchange is about to open. Stocks and funds are about to change owners. Transactions worth billions of SEK are about to take place. The importance of stock exchanges worldwide is still doubtless. Will this be the situation of tomorrow as well? Only time can tell.



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