Swedish SME Financing

- Evidence from the Game Industry

The department of Business Administration

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Abstract

The objective of this thesis is to examine the capital structure of Swedish small and medium sized enterprises (SMEs). Accounting data from Swedish game developers, combined with the result from a survey, is used to examine their financial conditions and capital structure decisions. We find that non-debt tax shield, firm size, growth opportunities and age are, to various extents, the determinants of capital structure in the game industry, while effective tax rate and asset structure have marginal effects. Our study also implicates that most of the existing capital structure theories can explain SMEs leverage decisions to some extent; however, some adaptation is needed to fit these theories into the SME context. Additionally, we find the existence of a financial gap in the game industry which might need efforts from both demand side and supply side to eliminate.

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KEY WORDS	Capital Structure, Game Industry, SME, Financing, Leverage, Panel Data, Survey
PURPOSE	The aim of this study is to investigate what the main determinants for SMEs' capital structure are and whether the existing capital structure theories can be used to explain SME financing. Further, the study is intended to examine whether there is a financial gap in Swedish SME financing and its possible causes.
METHODOLOGY	We have performed a capital structure analysis by running a panel data regression of various determinants of capital structure on three different measures of capital structure. In addition, a survey of the financial conditions and capital structure decisions has been conducted.
THEORETICAL PERSPECTIVES	The theories used in this thesis are based on the main capital structure theories regarding taxes, financial distress, agency costs, information asymmetry, corporate control, etc.
EMPIRICAL FOUNDATION	Regression results of determinants on capital structure, complemented by data collected from questionnaire.
CONCLUSIONS	Non-debt tax shield, firm size, growth opportunities and age are, to various extents, determinants of capital structure in the game industry, while effective tax rate and asset structure have marginal effects. Most of the existing capital structure theories can explain SMEs leverage decisions to some extent; however, adaptation is needed to fit these theories into the SME context. A financial gap exists in the game industry, and both the demand and supply sides are responsible to its existence.

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1   INTRODUCTION

This introduction chapter provides a background on the importance of SME financing as well as discusses and delimits the underlying research problem of this thesis. Lastly, we provide a thesis outline and a description of the audience of this thesis.

1.1   Background

In March 2000, the Heads of State and Government from the European Parliament, met in Lisbon to form an agreement on future goals of the European Union. The main goal formed is for the European Union to become "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion"[1]. In order to reach this goal, one of the main aspects that the Lisbon strategy addresses is the importance of the development and growth of small and medium sized enterprises (SME)[2], especially those SMEs that are knowledge-based and technology-intensive. The Lisbon strategy is a response to the reduced competitiveness of the European Union in traditional sectors, which is mainly caused by the industrialisation and the fast growth of new economies from other regions of the world, e.g. East Asia and South America. Lower salaries and lower production costs in those regions are forcing European countries to move away from their traditional manufacturing industries and try to find their competitive edges in new sectors that are knowledge-based and technology-intensive. Hence, the prosperity of SMEs in such sectors becomes the crucial driver for the economic development of the European Union. (*Ibid*) This view of developing SMEs in the new sectors, in order to face the challenges and regain competitive edges is shared by majority of the developed economies in the world.

SMEs have been of great importance for Swedish economy. "More than 99% of all Swedish enterprises are classified as SMEs, i.e. they have fewer than 250 employees … In total, three out of five employees in the private sector were employed in SMEs in 2000 … The importance of the SME sector is also reflected in their contribution to the economy. In terms of turnover, the SME sector accounts for approximately three-fifths of total turnover, while firms with fewer than 50 employees generated over one-third of turnover. The SME share of the total value added in the

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[1] The Irish Precidency of the EU, Lisbon strategy:
http://www.eu2004.ie/templates/standard.asp?sNavlocator=5,11,240
[2] SMEs are defined as companies with less than 200 employees. (Cressy & Olofsson, 1997)

Swedish economy is 57% ... When it comes to investment, the SME sector accounted for 66% of net investments in 1998. The SME sector in Sweden is therefore of major importance both in terms of employment and economic contribution" (Jacob *et al*, 2003, pp. 25-26). Sweden is now facing the same challenges from the new economies as the rest of the western economies. Thus, the development of Swedish SMEs in knowledge-based and technology-intensive sectors is considered to be crucial for maintaining/regaining the competitiveness of the Swedish economy. With about 90 SMEs, 1000 employees in total, 1 billion kronor in sales, and several best-selling titles in the world, the Swedish game industry could be one of the knowledge-based and technology-intensive sectors that have the potential to fuel the Swedish economy in the future (Strömbäck, 2005).

For reasons stated above, the interests for SMEs, especially in knowledge-based and technology-intensive sectors, have increased in recent years. Policymakers, regulators and researchers all over the globe are striving to improve the conditions for SME development. Among the questions listed high on the agenda, financial needs of small companies are often discussed to establish how sustainable growth of such companies can be reached. This involves both micro-foundations, e.g. needs at different growth stages, gaps between the needs and supply of funding, and the nature of the private equity and debt contracts, as well as macroeconomic implications of small business finance, e.g. consolidations within the bank sector, monetary shocks, and regulations of venture capital. (Berger & Udell, 1998)

There are several studies within the field of SME capital structure (e.g. Cressy & Olofsson, 1997; Michaelas *et al*, 1999; Hall *et al*, 2000; Hall *et al*, 2004; and Sogorb-Mira, 2005) that have tested different aspects and implications of the capital structure choices of SMEs, as well as their overall financial situation. The studies differ somewhat in their approaches. Whereas some studies focus on country-specific data (e.g. Hall *et al*, 2004), others focus more on a specific industry or specific industries (e.g. Hogan & Hutson, 2005; and Hyytinen & Pajarinen, 2005); and while some studies focus more on the demand side (e.g. Hamilton & Fox, 1998), others focus more on the supply side (e.g. Chittenden *et al*, 1996).

1.2   *Problem Discussion*

Despite the increasing interests in SME financing, the finance researches based on large and established companies still outnumber those based on SMEs. One important explanation is that SMEs do not normally get much public attention, and the fact that it is problematic to get the

information needed to conduct studies since SMEs usually are not listed; thus not obligated to provide the public with detailed financial information. However, financing problems are often more critical in SMEs, due to their limited ability to generate internal funds and their limited access to the external capital market. Financing problem will not just limit SMEs growth potential but also, in many cases, threaten their existence, which stresses the need for more researches dedicated to SMEs.

In finance literature, different theories are discussed to explain the capital structure decisions in a company, e.g. Modigliani and Miller's (1958) optimal capital structure theory and Myers' (1984) pecking order theory. They all intend to explain factors that influence a company's choice between internal financing and external financing, and between debt and equity. Since empirical evidence of these theories has been primarily based on data from large and established companies, the question of how well these capital structure theories fit in the specific context of SMEs arises.

According to Landström (2003), there are three major approaches in SME financing research: in one end of the spectrum, there are those who believe that the existing capital structure theories are applicable to both big and small companies, on the other end there are the researchers who believe that completely new theories are needed to explain the specific situations of the SMEs. The third category of researchers takes a position in the middle and thinks that existing theories can be applicable to SMEs with certain adjustments.

In the field of SME financing researches, there are also constant debates about whether there exists a financial gap in SME financing, referring to the mismatch between demand and supply on the capital market (Landström, 2003). According to Landström (2003), the financial gap does exist and is mainly caused by information asymmetry between financier and entrepreneur. Cressy and Olofsson (1997) found the empirical evidence that SMEs in certain sector have more difficulty to finance their investment needs than others. Is financial gap a common phenomenon among SMEs? What might be the causes to it?

As a part of Swedish SMEs, the game developers' financial conditions and capital structure decisions are judged to be representative for SMEs in Sweden. Furthermore, the Swedish game developers are characterized by high growth and high risks (Strömbäck, 2006). Due to their knowledge-based and technology-intensive nature as well as the high competitiveness in the industry, the game developers are expected to have a low possession of collateralizable assets, and

experience a high degree of information asymmetry. These characteristics are considered to be some of the main determinants of a company's capital structure according to the existing theories in the field. Therefore, it could be argued that the game developers would be expected to show a clear pattern in their capital structure decisions, which makes the game developers a preferable research object for our research purposes.

Sogorb-Mira (2005) studied the determinants of Spanish SME capital structure with a quantitative approach, while Cressy and Olofsson (1997) conducted a qualitative survey to investigate the financial conditions of Swedish SMEs. These two different approaches provide important insights of the SMEs' financing situation from different dimensions. There is no study to our knowledge that has been conducted with a focus on SMEs in Sweden with both quantitative and qualitative approaches. Hence, a study combining these approaches would contribute to this field of research. In addition, this study is among the first, if not *the* first, that has the ambition to examine the financing situation in the Swedish game industry: an industry young and vulnerable, but full of growth potentials. (See Section 2.2)

1.3   Purpose

The aim of this study is to investigate what the main determinants for SMEs' capital structure are and whether the existing capital structure theories can be used to explain SME financing. Further, the study is intended to examine whether there is a financial gap in Swedish SME financing and its possible causes.

1.4   Delimitation

The research will be conducted with a focus on SMEs in the Swedish game industry. Further, the purpose of this study is to evaluate and analyze existing capital structure theories; hence, no new theory will be presented.

1.5   Thesis Outline

Chapter two gives the readers an introduction of the game industry. A short presentation of the global market is followed by a more detailed description of Swedish game developers and the specific characters of the branch will also be discussed.

In chapter three, a theoretical framework in capital structure theories is formed to motivate the hypotheses for the regression, as well as the theoretical foundation for the survey.

Chapter four is designated to the methodology and data used in this thesis. This includes research approach, research method, and research process. Lastly, potential methodological problems in terms of validity and reliability are discussed.

The empirical findings from the regression and the survey are presented and analyzed in chapter five.

Finally, the sixth and last chapter comprises conclusions and proposals for further research.

1.6   Audience

Our study will be of interest for academics in the field of corporate finance and SMEs, professionals in the game industry, practitioners in the financial community, the government and all others that aim to learn more about SME financing and the Swedish game industry.

2 THE GAME INDUSTRY

In this thesis, Swedish game developers are chosen as representatives for Swedish SMEs. It is therefore essential to understand the underlying structures and main characteristics of the game industry. This chapter will provide first a brief description of the global game industry, and then give more details about the Swedish game industry, regarding the opportunities for growth, key success factors, the business model of the industry, and the risks.

2.1 The Global Game Industry

The global game industry have grown in a fast pace over the recent years and the trend is predicted to continue, with an increasing growth rate over the coming years, see Table 1. The growth is explained by new forms of games (e.g. mobile, online, etc), new genres (e.g. serious games and casual games), and new market groups of players with different age, gender and from different regions (Strömbäck, 2006).

Table 1 also shows that the North America and Asia/Pacific are the largest market areas in the world today, followed by Europe, Middle East and Africa (EMEA).

Region	2000	2001	2002	2003	2004p	2005	2006	2007	2008	2009	2009 CAG
United States	6,059	6,479	7,218	7,557	8,198	8,438	10,158	12,762	14,080	15,067	
% Change	*- 2.2*	*6.9*	*11.4*	*4.7*	*8.5*	*2.9*	*20.4*	*25.6*	*10.3*	*7.0*	*12.9*
EMEA	4,003	4,281	5,015	5,315	5,980	6,759	8,656	11,161	13,026	14,312	
% Change	*-3.0*	*6.9*	*17.1*	*6.0*	*12.5*	*13.0*	*28.1*	*28.9*	*16.7*	*9.9*	*19.1*
Asia/Pacific	7,353	7,725	8,448	8,978	10,086	11,108	14,053	17,974	20,657	23,087	
% Change	*0.0*	*5.1*	*9.4*	*6.3*	*12.3*	*10.1*	*26.5*	*27,9*	*14.9*	*11.8*	*18.0*
Latin America	315	324	429	489	531	539	606	724	778	832	
% Change	*-8.2*	*2.9*	*32.4*	*14.0*	*8.6*	*1.5*	*12.4*	*19.5*	*7.5*	*6.9*	*9.4*
Canada	354	390	472	534	611	685	876	1,102	1,221	1,307	
% Change	*-4.3*	*10.2*	*21.0*	*13.1*	*14.4*	*12.1*	*27.9*	*25.8*	*10.8*	*7.0*	*16.4*
Total	**18,084**	**19,199**	**21,582**	**22,873**	**25,406**	**27,529**	**34,349**	**43,723**	**49,762**	**54,605**	
% Change	***-1.7***	***6.2***	***12.4***	***6.0***	***11.1***	***8.4***	***24.8***	***27.3***	***13.8***	***9.7***	***16.5***

Table 1. Video Game Market (US$ Millions). *Source: PricewaterhouseCoopers LLP, Wilkowsky Gruen Associates*

Alain Tascan, vice president and studio general manager at Electronic Arts in Montreal, presented a study on the global concentration of the game industry at Game developer's

conference in London 2005 (Strömbäck, 2005). By looking at the key success factors of regions which have been successful in developing the game industry, the study identifies the prerequisites necessary for a region to develop an internationally successful game industry in the coming 5-10 years, i.e. global "hot spots" (see Table 2).

Key success factors
Good education institutions
Highly developed IT-infrastructure
Cultural diversity
Competitive living costs
Culturally active region
Proactive support from public and governmant authorities
Entrpreneurial culture witin population and business

Table 2. Key success factors for game developers. *Source: Strömbäck (2005)*

The following regions are expected to meet these criteria in 2005-2015 (see Figure 1).
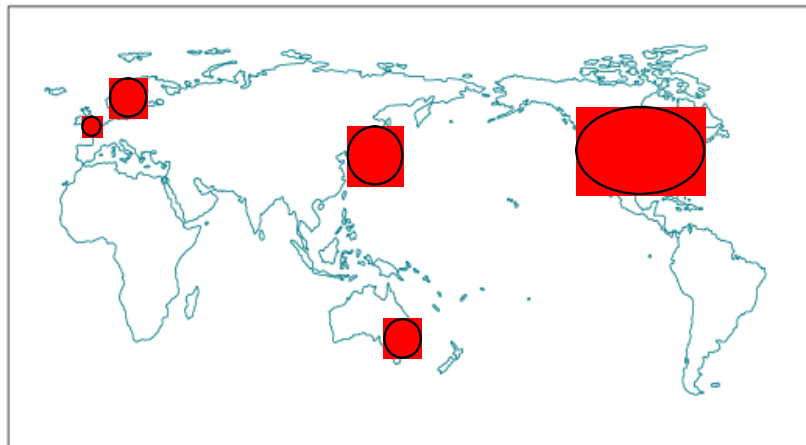
Figure 1. Global hot spots 2005-2015. *Source: Strömbäck (2006)*

The Scandinavian region, according to Tascan, is not qualified as global "hot spots" in 2005, but is included in the forecast for 2010, which indicates a large growth potential of the region. Diginet's Research Director Henriette Moos said that the Scandinavian region fulfils all above criteria, apart from the last two, i.e. public and government support and entrepreneurial culture. (Strömbäck, 2005)

2.2   *The Swedish Game Industry*

The Swedish game developing community consists of about 90 companies, employs around 1000 people and has a total turnover of 1000 million SEK per year (Strömbäck, 2006). The

competitiveness of Swedish game industry is internationally recognized, as there have been several best-selling titles from Sweden, e.g. *Battlefield 1942* developed by the Swedish game developer Digital Illusions was one of the best-selling games globally in 2003 (Strömbäck, 2005). Many of the Swedish game developers have large export share of sales, and the Swedish developers have a large growth potential on the global market (Strömbäck, 2006).

The value creation process in the game industry normally runs in the following way (See Figure 2). Either a game developer or a publisher generates the initial idea to a game. If the idea is generated by a developer, it has to be presented to the publisher with a functioning demo (prototype) to get a contract for the development of the game. If the idea is instead generated by a publisher, the publisher will get a licence on the concept, and choose a suitable game developer to develop the game based on the concept. After signing a contract with the publisher, the game developer will start to develop the game within the time and costs agreed. Normally, the publisher will finance the development of the game by paying part of the order in advance. After the game is completed, the publisher is responsible for marketing and sometimes the distribution of the game, trying to sell the games to the retailers. The customer is at the very end of the value chain in the game industry where the game is sold and revenue obtained. (Dataorspelindustrin 2003, pp 38-39) Thus, the whole value-creation process is accomplished. It is obvious that the publishers play a very central role along the whole value chain. As the principal customers for the game developers, publishers are larger than the game developers both in terms of size and financial capacity, thus in a dominant position in negotiations with game developers.

All parties involved in the above-mentioned value chain will get a portion of the profit for each sold game. The publishers get most of the value created along the value chain at the cost of game developers, owing to their strong bargaining power against game developers. For the games sold in the Swedish market in 2003, the game developers only have a small part of the total revenue from game sales. Only 14% of the revenues are allocated to the game developers, while 35% to the publishers, 22% to the distributors and the remaining 30% to the retailers.[3]

While the value is created along the value chain, the risk is transferred up along the chain (see Figure 2). According to Strömbäck (2005), since the game developers have the lowest bargaining power of all parties involved, they are forced to bear a large part of the risks in the whole value-

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[3]Sveriges Branschförening MDTS – Multimedia, Dator & TV-spel (2003) Fördelning av intäkter
http://www.mdts.se/konsumentpris.asp

creation process. These risks are often operational in nature, which are difficult to transfer to external parties, such as financial markets. It is also very hard for game developers to diversify the risks within the company through driving several projects at the same time, since it is very costly to do so, and as a result there is very few companies in this branch that can afford to manage parallel projects. High retained undiversified risks lead to constant business failure in this branch. Calculations presented by Tobias Andersson Sjögren, in his NGP speech in 2004, estimates that some 30% of game developers go out of business each year (*ibid*).
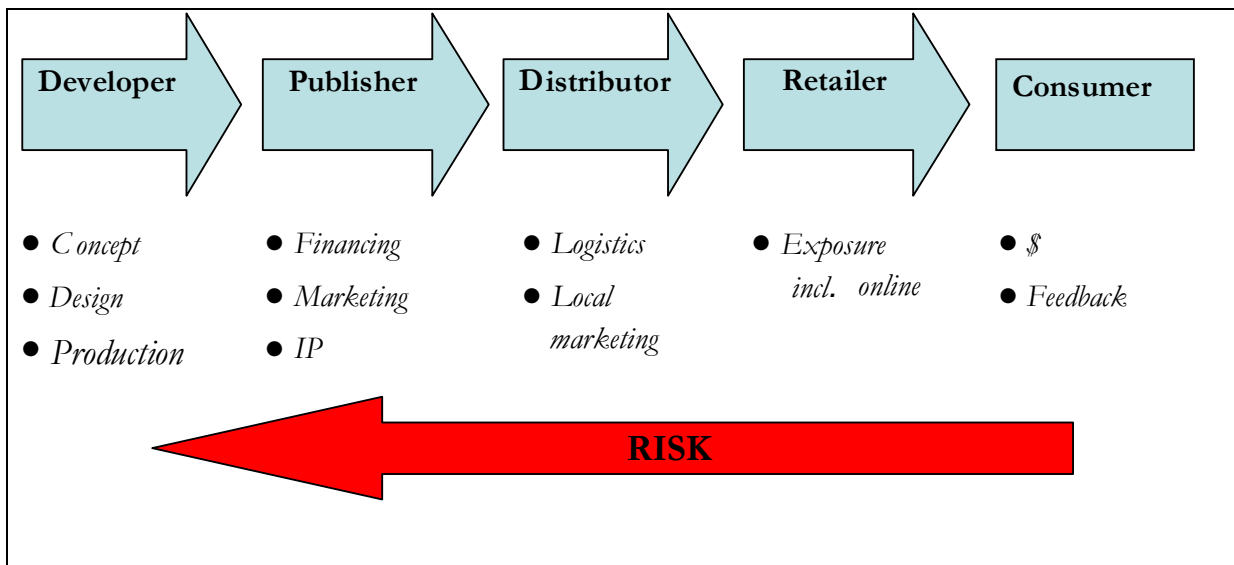
Figure 2. The value chain of the game industry. *Source: Strömbäck (2006)*

An illustration of Swedish game developers in sizes and numbers, as well as their different needs in different stages of development, are shown in Figure 3. The figure shows that the majority of the companies are start-ups and very few companies are well established and profitable companies. Although companies of different sizes and in different stages of development have different needs in focus, financing needs seem to be common for most of the game developers of all sizes and in all stages, except for those few largest established companies.
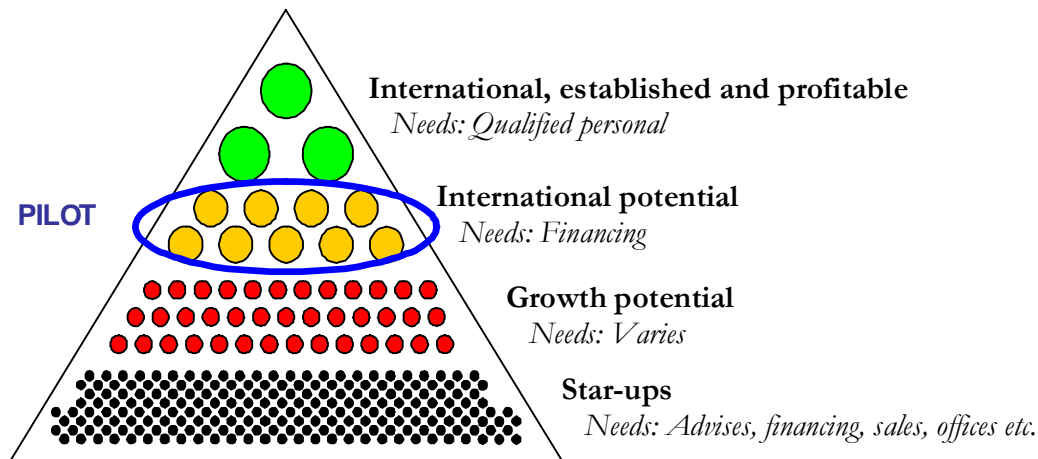
Figure 3. The Swedish game industry and their different needs during maturity-stages.
Source: Strömbäck (2005)

Game development requires a great deal of initial capital investment as early as at the prototype stage, in order to guarantee the high demanded level of quality. Game development is labour-intensive and thus a very costly process. (Strömbäck, 2005) A normal production can cost up to more than 10 million kronor even before marketing and distribution.[4] Furthermore, it often takes several years before a game is ready for release, which contributes to the mismatch between cash inflows and cash outflows, and increases the risk exposure that is already extensive for the game developers through the whole development process. This high risk profile often distinguishes the game industry from more established IT-industry. How to finance game development and limit the risks are major challenges to most of the game developers. (*Ibid*) Additionally, if information asymmetry is common among SMEs, the problem is even more prominent in the game industry, as the keen competitions lead to extra cautiousness among game developers when releasing information.

As mentioned in section 2.1, the Scandinavian/Swedish game developers are believed to have large growth potential and become a global "hot spot" in 2010, although public and government support and the development in the entrepreneurial culture are needed before the full potential can be developed. These two factors are actually interconnected: the lack of external proactive support for the game industry discourages the development of the entrepreneurial culture in this industry, and the lack of the entrepreneurial culture in this industry leads to the lack of attention and support from external parties. The information asymmetry, mentioned earlier,, is considered to play a central role here. This problem is reflected directly in the (lack of) financing of the game developers by external parties, such as government, banks and other players on the financial

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[4] Ny Teknik, "Spelbyggarna har vuxit till sig" (http://www.nyteknik.se/art/18377)

markets. One of the owners to a game developing company expressed, after the recent bankruptcy of his company, "as long as this industry is not regarded as IT-industry, which gives the possibility for more traditional loans or venture capital, neither is it regarded as culture, which gives the possibility for government subvention, Swedish game developers will never be able to be independent (from publishers)".

As an attempt to improve the financial conditions in the game industry, a pan-Nordic funding program, PILOT, is initiated by the Swedish game developer organisation Spelplan-ASGD (Association of Swedish Game Developer)[5]. The main purpose of the project is to help the Nordic game industry to reach a critical mass of sustainable growth and be internationally competitive through a production subsidy. The project is still at a conceptual phase, and the main idea of the project is presented shortly here. Independent game developers in the Nordic region that meet certain criteria can join the program to get a subsidy that funds 50% of the prototype phase of their project. Publishers that are interested in "match-making" with Nordic game developers can join the program by paying an "entry fee", which will be repaid once the publishers invest in the further development of a prototype subsidized by the program. The game developers that obtain the investment from the publishers for further development will then pay the program a proportion of the production fees and royalties. PILOT will be mostly financed through the "entry fee" from publishers, and the rest of the funding will be provided by government and/or private sources. The project is targeted to the prototype phase, which often is considered to be too risky to get any external funding. The design of the project, where prototype development from several game developers are pooled, will largely diversify the risks, thus be able to attract external financier. The syndicate form of the program also guarantees the limited risk exposure of individual financier. The program will not only serve as a funding source for the game developers, but also serve as a platform for contact between game developers and publishers, which encourage the participation of the publishers as financiers. PILOT has also the ambition to improve the Nordic game developers' position against the publishers in a long run. (Strömbäck, 2005)

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[5] 5 Spelplan-ASGD is an interest group and trade organisation for game development companies in Sweden. www.spelplan.se

3 THEORETICAL FRAMEWORK AND EMPIRICAL HYPOTHESES

In this chapter the theoretical framework for the regression hypotheses and the survey is presented. Various capital structure theories and their implications of SME capital structure determinants and financial situation is discussed. In addition, empirical findings of previous SME studies are discussed.

3.1 Theoretical framework for hypotheses

The theoretical framework of a firm's capital structure is established on the basis of the seminal work of Modigliani and Miller (1958), which shows that capital structure, is irrelevant under ideal capital market assumptions. The ideal capital market is described as a frictionless market with atomistic participants that have homogeneous expectations, where the firm's financing and investment program is fixed and known. The development of the theories that followed is mainly focused on the capital structure decisions in reality, thus relaxing the assumptions suggested by Modigliani and Miller (1958). These theories are mainly focused on aspects such as taxes, financial distress, agency costs, information asymmetry and corporate control. (Ogden *et al*, 2003)

3.1.1 Taxes

Taxes are a crucial real world factors in capital structure decision-makings. Modigliani and Miller (1963) conclude that debt is preferable to equity due to the tax deductibility of the interest payments. Based on this argument, the first hypothesis is stated as follows[6]:

> H1: The effective tax rate should be *positively* related with debt.

However, Pettit and Singer (1985) claim that tax deductibility has limited effect on leverage decision for SMEs, as these companies are less likely to be profitable, thus would gain less benefit from the tax shields brought by interest payments. Following this logic, there should be *no* relationship between taxes and debt should be expected.

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[6] The construction of the majority of hypotheses is inspired by Sogorb-Mira (2005).

In addition to tax reduction due to interest payments, there are alternative ways to obtain tax shields, e.g. through depreciation, tax carrybacks and tax carryforwards. It is argued that alternative tax shields will affect the effective use of the interest tax shields since they are to be considered to be substitutes for one another (DeAngelo & Masulis, 1980). Thus, more non-debt tax shields would lead to less use of debt tax shields achieved by high leverage. Hence our second hypothesis is:

<u>H2</u>: Non-debt tax shields ought to be *negatively* related to leverage.

Though, Bradely *et al* (1984) have tested the result of DeAngelo and Masulis (1980) and found contradicting results, which raises doubts about the fact that non-debt tax shields would substitute for interest tax shields. Chaplinsky and Niehaus (1990) have also found a positive relation between non-debt tax shields and leverage, supporting the conclusion of Bradely *et al* (1984). It is argued in these studies that companies with large share of tangible assets should gain large non-debt tax shields from depreciation, and these tangible assets also provide the companies with a larger collateral capacity when borrowing from financial institutions; therefore, there should be a *positive* relation between non-debt tax shields and leverage.

3.1.2 Financial Distress

Financial distress occurs when financial commitments to creditors are not fulfilled or are managed with difficulty. In some extreme situations, financially distressed companies will be forced into bankruptcy (Brealey & Myers, 1991). Expected costs of financial distress are important transaction costs associated with debt financing, thus are considered to be an important aspect in capital structure decisions. The costs depend both on the probability of distress and the size of costs expected if financial distress occurs. The finance literature describes three main types of financial distress costs. The first concerns the loss of competitiveness in the company's product/service market; the second type of costs arise with the need of compensating stakeholders for the additional risk they take when doing business with the distressed company; the last type of costs arise due to the losses of the value of tax shields in the case of distress (Ogden *et al*, 2003).

If a company is forced further into bankruptcy, additional bankruptcy costs will occur, such as: "(1) the direct administrative expenses paid to various third parties involved in the bankruptcy procedures; (2) the 'short fall' in realized value when assets are sold in liquidation or the indirect costs of reorganization; and (3) the loss of tax credits the firm would have received if the firm

would not have gone bankrupt" (Ang *et al*, 1982). Further, bankruptcy costs vary with the type of assets the company possesses, depending on whether they will lose value or not. Intangible assets, e.g. R&D, human capital and brand image, suffer the largest losses in case of a bankruptcy, indicating that industries depending on high degree of intangible assets and/or human capital may use low debt ratios to avoid potential bankruptcy (Brealey & Myers, 1991).

Empirical findings show that larger companies tend to be more diversified and seem to fail less often; hence they are less likely, in comparison to smaller firms, to be bothered by bankruptcy (Warner, 1977; Ang *et al.*, 1982; and Pettit & Singer, 1985). Moreover, small firms have also larger bankruptcy costs in a relative sense since the administrative costs are a concave function of the liquidating values of the firms (Ang *et al.*, 1982). As a result, higher probability for bankruptcy and larger bankruptcy costs may keep smaller firms from using high leverage. Thus our third hypothesis is:

H3: Firm size should be *positively* related to debt.

3.1.3 Agency Costs

Jensen and Meckling (1976) identified two main conflicts of interests in a firm; conflicts between management and shareholders, and conflicts between shareholders and debtholders. These conflicts of interests will induce different agency costs that influence a firm's capital structure decisions. The agency problem between management and shareholders is considered trivial in SMEs, where owners themselves often are the managers of the firms. Even when that is not the case, managers often have less space for discretion in a smaller firm. On the other hand, the agency problem between shareholders and debtholders appears to be severer in a SME context (Ang, 1992). The conflicts between shareholders and debtholders arise when the management, as acting in the shareholders' interest, tend to reduce the value of debt claims in order to increase the value of the equity. Controlling and contracting are the major tools for debtholders to mitigate the debt agency problems. However, these tools are often too complicated and costly to be effective in the case of smaller companies.

One type of agency cost of debt arises as a deadweight cost caused by the underinvestment problem[7]. The underinvestment problem (Myers, 1977) occurs in a situation when a company has

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[7] Also known as Debt Overhang problem

default-risky debt outstanding and a profitable investment opportunity must be financed with equity if it is to be undertaken. This would lead to a situation where the NPV of new project will transfer to the firm's debtholders, and the shareholders' residual benefit may be lower than the projects costs. Managers, who act in the interest of the shareholders, will reject the project even though it is a profitable investment for the company, which causes deadweight costs of debt. As a result, companies that experience large underinvestment problem are expected to have low leverage to avoid such agency cost of debt.

Since the underinvestment problem is expected to be positively related to growth opportunities, expected relation between a company's leverage and growth opportunity should be *negative* (Myers, 1977). Later studies have also provided support for this negative relation (e.g. Jensen & Meckling, 1976; Kim & Sorensen, 1986; Titman & Wessels, 1988; and Chaplinsky & Niehaus, 1990).

Another type of agency cost of debt arises when debtors intend to protect themselves from risk-shifting[8] by demanding a higher cost of debt to compensate for the potential losses, or simply by reducing their supply of credit to the company (Brealey & Myers, 1991). Risk-shifting refers to the behaviour of management to "expropriate" the debtholders in order to benefit the shareholders. Typical examples of risk-shifting are that the management increases leverage by recapitalization and/or increase the riskiness of the debt-financed projects.

Risk-shifting is expected to be positively related to growth opportunities. Companies with large growth potential have an incentive to take extra risks to grow, as shareholders will gain most benefits from the extra value created through their residual claims of the company. Debtholders, on the other hand, will only recover the loan, i.e. they will not be compensated for the extra risks taken (Hall *et al*, 2000). The probability for risk-shifting increases with the maturity length of credits. As a result, companies with many growth opportunities, i.e. have large potential for risk-shifting, are expected to have limited access to long-term credits, which in term leads to their dependence on short-term credits. Thus, the growth opportunities are expected to be negatively related to long-term debt and positively related to short-term debt. Since SMEs mainly use short-term debt financing, the relationship between growth opportunities and total debt are expected to follow the positive sign of the short-term debt. This is consistent with the empirical evidence found among SMEs (e.g. Michaelas *et al*, 1999).

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[8] Also known as Asset Substitution problem

In accordance to the above argument based on agency cost of risk-shifting, and the empirical evidence from SME financing, the following triple hypothesis is tested:

H4: Growth opportunities ought to be *positively* related to firm leverage.

H4-a: Growth opportunities should be *negatively* related to long-term debt.

H4-b: Growth opportunities should have a *positive* effect on short-term debt.

As discussed before, small-scale entrepreneurs usually have large growth potential, thus have a large incentive to take extra risks, hence large potential to shift their risks to creditors. Consequently, the creditors are expected to provide smaller companies with less long-term debts that tend to be more exposed to risk-shifting (Warner, 1977; Ang *et al*, 1982; Titman & Wessels, 1988; Bevan & Danbolt, 2000a; and Hall *et al*, 2000). According to this argument, the hypotheses H4-a and H4-b can be developed further into the fifth double hypothesis:

H5-a: Firm size should be *positively* related to long-term debt.

H5-b: Firm size should have a *negative* effect on short-term debt.

Many studies claim that creditors tend to demand collateral assets to mitigate the agency problem and to protect themselves from risk-shifting, adverse selection and moral hazard (e.g. Myers, 1977; Scott, 1977; and Harris & Raviv, 1990). Tangible assets in a firm are usually considered to be collateralizable assets by the creditors, as these assets are likely to retain value during liquidation if the firm defaults on the creditors. As a result, the firm's debt capacity should be determined by the share of tangible assets in its asset structure[9] (Schwartz & Aronson, 1967; and Long & Malitz, 1985). It is argued that bank financing will typically not be available for small firms due to the lack of tangible assets. Brewer and Genay (1994) and Brewer *et al.* (1997) showed the empirical evidence from small business that intangible assets are more likely to be financed by private equity such as venture capitals, and tangible assets are more likely to be financed by external private debt. However, Berger and Udell (1998) found empirical evidence that young firms are highly financed by external debt from financial institutions, and these loans are either personally guaranteed by one or more of the inside owners with their personal assets, or backed by the insiders' personal assets pledged as collateral. Such intertwining of owner's private economy and the company's economy is one important characteristics of small business financing (Ang, 1992). In this sense, the asset structure of a small company should not be

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[9] Also known as Collateral Hypothesis.

relevant to its debt capacity. Thus, it is important to test if the following hypothesis holds even in a small firm:

<u>H6</u>: The firm leverage ratio should relate *positively* to asset tangibility.

There are other theories that intend to explain the relationship between debt ratios and asset structure. It is observed to be a common practise among companies to match the maturities of their liabilities with the maturity of their assets, i.e. the maturity-matching principle. By matching short-term debt with current assets, and long-term debt with non-current assets, companies can gain benefits such as enhanced financial flexibility, minimized overall financing costs, and reduced risk of default (Brealey & Myers, 1991). Following this logic, since the fixed assets are non-current in nature, they are more likely to be financed by long-term debt rather than short-term. Hence, <u>H6</u> could be enlarged in the following sense:

<u>H6-a</u>: If firms aim to match maturities of assets and liabilities, we should observe a *positive* relationship between fixed assets ratio and long-term debt ratio, while it would be *negative* if leverage ratio were short-term.

3.1.4 Information Asymmetry and Corporate Control

Information asymmetry arises when outsiders, such as investors and creditors, are not as well informed as insiders, such as management, about the true value of a firm's assets or projects. There can be certain competition sensitive information that the management is unwilling to release, but can be crucial for the valuation of the company's assets or projects. In cases of large information asymmetry, investors and creditors will be reluctant to provide the company with funding, thus require more return on the investment to compensate for the additional risk as uninformed investors or creditors (Myers & Majluf, 1984).

It is argued that profitable companies should have higher leverage, due to the fact that the creditors are more willing to provide funding to profitable companies where the default risks are lower. Through signalling low default risks to creditors with high profitability, companies could effectively reduce the information asymmetry and facilitate their access to debts, and at a lower cost. Previous studies within the field of information asymmetry have found leverage to increase with an increase in profitability, e.g. Ross (1977), Leland and Pyle (1977) and Poitevin (1989).

However, Myers and Majluf (1984) have come to a contradicting conclusion in their study, i.e. profitable companies tend to have lower level of leverage. Their explanation is that highly profitable firms tend to finance investments with retained earnings. This is because information asymmetry between investors and management causes a preference hierarchy in financing alternatives, known as Pecking Order Theory: management seems to prefer internal financing to external financing; when external financing is necessary, external debt is preferred to external equity. This preference hierarchy follows the extent of information asymmetry and riskiness of different finance sources. By using internal funds, managers are able to avoid direct and indirect costs associated with information asymmetry. "Financial slack" and unused debt capacity are often used to provide companies with financial flexibility, so that they can pursue profitable projects at any time without the need of external financing. In cases where external financing is needed and information asymmetry is inevitable, shareholders will require a higher rate of return than debtholders, since shareholders bear the residual claims of the company and need to be compensated for the higher risks. As a result, the companies prefer debt financing to external equity financing (Myers & Majluf, 1984; Krasker, 1986; and Narayanan, 1988). Following this logic, profitable companies that have the possibility to use retained earnings, will tend to avoid external financing, thus, have lower leverage. Therefore, our seventh hypothesis is stated as follows:

<u>H7</u>: There should be a *negative* relation between leverage and firm profitability.

The explanation for the preference hierarchy in financing alternatives is not just supply-related, i.e. the order is not just determined by the availability of finance sources due to information asymmetry. It can also be explained from the demand side. Holmes and Kent (1991) have pointed out the corporate control aversion to be particularly true in SME financing where managers usually are shareholders as well. Because of this dual position, they are less likely to put themselves in a position where they could lose both their property and control over the firms (Holmes & Kent, 1991; and Hamilton & Fox, 1998). Hence, external financing is avoided if possible; when external financing is needed, debt will be chosen over equity to minimize the control-loss. Further, it can be assumed that they would prefer short-term debts that have no restrictive covenants to avoid the loss of control (Sogorb-Mira, 2005).

The Pecking Order Theory, discussed above, suggests that companies prefer retained earnings to external financing. The older companies are, the more they are able to accumulate retained

earnings and need less external funds, which also suggest that younger companies without sufficient retained earnings can be forced to borrow. As a result, leverage is expected to decrease with age (e.g. Petersen & Rajan, 1994; Michaelas *et al*, 1999; and Hall *et al*, 2004), hence our last hypothesis is:

<u>H8</u>: There should be a *negative* relation between leverage and firm age.[10]

According to Berger and Udell (1998), small businesses tend to follow a financial growth cycle in which the financial needs and finance sources change as the business grows and becomes older. This is explained by that the older (larger) a company becomes, the more experienced it gets and the degree of information transparency will also increase. Thus, the financial growth cycle theory predicts the following: the youngest/smallest/least information transparent companies rely mostly on initial insider finance, trade credit, and/or angel finance; and as it grows, the company will gain access to venture capital and mid-term loans; and as it grows older, the company consequently gain access to public equity and long-term debt financing.

A company's growth cycle can also explain the relation between age and capital structure from a demand perspective. Younger firms tend to have higher operational risks, thus, have incentives to decrease the financial risks by decreasing the leverage, which predicts a *positive* relation between firm age and leverage (Ogden *et al*, 2003).

3.1.5 Summary of theoretical foundation
In Table 3 below, the hypotheses are listed with the theories and empirical evidence supporting the hypotheses is presented.

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[10] This hypothesis is not discussed in Sogorb-Mira (2005).

	Hypothesises	Supporting
H1-a:	The effective tax rate should be *positively* related with debt.	Modigliani & Miller (1963)
H1-b:	There should *not* exist *any relationship* between debt and taxes in SMEs.	Petit & Singer (1985)
H2:	Non-debt tax shields ought to be *negatively* related to leverage.	DeAngelo & Masulis (1980), Sogorb-Mira (2005)
H3:	Firm size should be *positively* related to debt.	Warner (1977), Ang et al (1982), Pettit & Singer (1985),Sogorb-Mira (2005)
H4:	Growth opportunities ought to be *positively* related to firm leverage	Michaelas et al (1999), Sogorb-Mira (2005), Brealey & Myers (1991)
H4-a:	Long term debt should be *negatively* related to growth opportunities	Michaelas et al (1999)
H4-b:	Short term debt should have a *positive* effect on growth opportunities	Michaelas et al (1999)
H5-a:	Long term debt should be *positively* related to firm size	Warner (1977), Ang et al, (1982), Titman & Wessels (1988) Bevan & Danbolt (2000a), Hall et al (2000)
H5-b:	Short term debt should have a *negative* effect on firm size.	Warner (1977), Ang et al, (1982), Titman & Wessels (1988) Bevan & Danbolt (2000a), Hall et al (2000)
H6:	The firm leverage ratio should relate *positively* to asset tangibility	Myers (1977), Scott (1977), Harris and Raviv (1990), Schwartz and Aronson (1967), Long and Malitz (1985), Brewer and Genay (1994), Brewer et al (1997), Sogorb-Mira (2005)
H6-a:	If firms aim to match maturities of assets and liabilities, we should observe a *positive* relationship between fixed assets ratio and long term debt ratio, while it would be *negative* if leverage ratio were short term	Brealey and Myers (2000), Sogorb-Mira (2005)
H7:	There should be a *negative* relation between leverage and firm profitability	Myers and Majluf (1984), Krasker (1986), Naryanan (1988), Titman and Wessels (1988),
H8:	There should be a *negative* relation between leverage and firm age	Petersen & Rajan (1994), Michaelas et al (1999), Hall et al (2004)

Table 3. Aggregated empirical foundation for the hypotheses.

3.2 Empirical findings of previous SME studies

In a recent study of Sogorb-Mira (2005), determinants of Spanish SME capital structure are investigated, with a purpose to test some of the known capital structure theories and to understand the underlying drivers for leverage decisions in SMEs. Their results imply that size, growth opportunities and asset structure are in general positively related with the leverage level among Spanish SMEs, while effective tax rate, non-debt tax shields and profitability are negatively correlated with the leverage (see Table 4). Their explanations are based, to large extent, on the capital structure theories discussed in the previous section.

Explanatory variable	Expected relation	Actual relation
Effective tax rate (ETR)	+	-
Non-debt tax shields (NDTS)	-	-
Size (S)	+	+
Growth opportunities (GO)	+	+
Asset structure (AS)	+	+
Profitability (P)	-	-

Table 4. Summary of the relations obtained for the capital structure model used by Sogorb-Mira (2005).
Source: Sogorb-Mira (2005)

Sogorb-Mira (2005) comes to the conclusion that the Pecking Order Theory is able to predict the capital structure of SMEs relatively well, however it is uncertain whether it is the demand side or the supply side that is responsible for the result.

In their study, Cressy and Olofsson (1997) presents the financial conditions for Swedish SMEs. The study aims to investigate, through a questionnaire survey, the differences and similarities in financing between companies in the Manufacturing sectors and the Business service sector. The differences and similarities among different size groups are also studied. Their investigating areas includes background characteristics, investment needs and outcomes, equity and control aversion, advantages and disadvantages of different owner categories, finance sources used, and financial conditions and business development obstacles. The study intends to show the financing of Swedish SMEs from both an external funding (supply-side) perspective and an internal attitudes (demand-side) perspective. Their main findings will be presented below with the focus on the results from the Business Service sector, as our sample companies in the game industry fits in their definition of the Business Service sector.

According to Cressy and Olofsson (1997), control-loss aversion is observed among Manufacturing companies, as they are more often family owned and thus less willing to bring in outsiders as new equity holders. Such aversion is however not observed in the Business Service sector, where the expertise of venture capitalists and business angels are highly appreciated among small firms and is considered to compensate for the control-loss by taking in external owners. Retained profits are found to be the most important source of finance among all the size groups. Differences in investment needs between the two sectors are found. While many of the Manufacturing firms expresses investment needs for buildings and land, many firms in the Business Service sector expresses investment needs in product development, market

development and in education and training. It is also found that as much as 40% of the companies in the Business Service sector are not able to realize the needed investments. Overall dissatisfaction with the Swedish financial system is obvious among all companies, and the dissatisfaction seems to increase with size. One of the conclusions from the study is that something needs to be done about the financial gap of SMEs in order to establish sustainable growth and success among such companies. The authors suggest e.g. a government policy where investors who also wish to become business angels would get a tax relief.

In a study of US small businesses (Berger & Udell, 1998), it shows that small businesses tend to follow a financial growth cycle in which the financial needs and finance sources change as the business grows and becomes older, thus more experienced and more transparent. Principal owners, commercial banks and trade creditors are found to be the largest sources of finance, which is consistent with conventional wisdom. However, surprisingly they find that institutional debt appears to be an important source of fund even for very small and young companies, which contradicts conventional wisdom stating that this type of finance is not available to such firms, since they usually do not have tangible assets or track records. The explanation lays in the fact that the entrepreneur's personal economy and credit worthiness are taken into account when evaluating the company's credit worthiness. Berger and Udell (1998) also stress the importance of macroeconomic stability and regulations reducing information asymmetry since it could affect contract structure, contracting costs, and the availability of external finance. Such regulations could be well-defined bankruptcy laws that for example clearly establish the claim priority of stakeholders, or information-rich environments with well-defined accounting standards.

Michaelas *et al* (1999) investigated financial policy and capital structure choice of British SMEs, and they also stress the influence on capital structure of changes in the macroeconomic environment. Their results indicates that both time and industry affect the maturity of debt raised by SMEs, e.g. short-term debt ratios appears to increase during periods of economic recession. On the other hand, on average long-term debt ratios shows a positive relationship with variations in economic growth. Hence, they conclude that government and lending policies targeting small businesses may have to change over time and industry to match the demand side.

4   METHODOLOGY AND DATA

In this chapter we present and motivate our research approach and research method. Lastly, potential methodological problems in terms of validity and reliability are discussed.

4.1   Research Approach

This thesis aims to conduct a study of whether the existing capital structure theories are applicable for Swedish SMEs; hence a deductive approach is used (Patel & Davidson, 1991). In order to describe both the general financing situation of Swedish game developers, and analyze the main determinants of their capital structure in depth, this study uses both quantitative and qualitative data which allow the study to examine the capital structure decision in greater details. The quantitative data gives a more objective picture of the capital structure decisions in these companies, while the qualitative data gives a more nuanced explanation to how these decisions actually are made, and what the considerations and attitudes of the entrepreneurs are when making theses decisions. The combination of these two approaches facilitate the observation of SME financing in different dimensions, thus improve the understanding of the situation.

4.2   Research Method

As mentioned in the previous section, this study is conducted with a combination of quantitative and qualitative approach. In this section, the method applied and the data used to accomplish these two approaches are presented in details.

4.2.1   The Sample

The list with all companies in the Swedish game industry is obtained from the Spelplan-ASGD and there are altogether 128 companies in our preliminary sample. After excluding non-profit organisations, companies that have gone bankrupt or are no longer engaged in the game developing business, the final sample for the survey consists of 86 game developing companies. According to the definition of Cressy and Olofsson (1997), all of the companies in the game industry can be categorized as SMEs.

Accounting data is only available for 78 companies, which makes up the sample for regression analysis. After eliminating all companies that went bankruptcy during the study period, there are 68 companies left for the final regression analysis.

4.2.2   The Data

The *primary* data is collected through a questionnaire survey based on Cressy and Olofsson's (1997) study of the financial conditions for Swedish SMEs (see Appendix A).

The *secondary* data in this study are mainly the accounting data used in the regression analysis. Such data are collected from the database Affärsdata and the companies' annual reports between 2001 and 2004[11]. After adjusted for outliers, the final regression data consists of 201 observations in total.

4.2.3   Panel Data Regression

The standard regression models are widely used in capital structure research, e.g. Petersen and Rajan (1994), Gregory *et al* (2005), and Hyytinen and Toivanen (2005). The model used in this study will therefore be a panel data regression model based on an extended model of the one used by Sogorb-Mira (2005).

The Dependent Variables
There are different methods attempting to measure the capital structure of companies. Since this study is partly be based on the study of Sogorb-Mira's (2005), the same dependent variables are used.

The capital structure of companies is measured by total debt ratio (TDR), i.e. Total debt/Total Assets (also used by Michaelas *et al*, 1999). However, since there are important differences between long-term and short-term debt, there exists a need to examine long-term debt ratio and short-term debt ratio separately (Van de Wijst & Thurik, 1993; Chittenden *et al*., 1996; Barclay & Smith, 1999; and Bevan & Danbolt, 2000a). In their studies of capital structure, Hall *et al* (2000) and Michaelas *et al* (1999) use long-term debt ratio and short-term debt ratio separately as dependent variables. In order to gain a deeper understanding of the capital structure and its determinants, it is judged to be necessary in our study to also examine these two additional measures of capital structure: long-term debt ratio (LDR) measured as Long-term debt/Total

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[11] The choice of interval is due to limited accessibility.

assets, and short-term debt ratio (SDR) measured as Short-term debt/Total assets (Sogorb-Mira, 2005). A summary of the dependent variables is shown in Table 5.

Variables	Description
Total debt ratio (TDR)	Total debt/Total assets
Long term deb ratio (LDR)	Long-term debt/Total assets
Short term debt ratio (SDR	Short-term debt/Total assets

Table 5. Description of dependent variables.

The Explanatory Variables

Seven dependent variables, mostly based on Sogorb-Mira (2005), are used to study potential determinants of a company's capital structure (see Table 6):

Variables	Description
Effective tax rate (ETR)	Taxes/EBT*
Non-debt tax shields (NDTS)	NDT**/Total assets
Growth opportunities (GO)	Intanglible assets/Total assets
Asset structure (AS)	Tangible assets/Total assets
Size (S)	Natural logarithm of total assets
Profitablility (P)	ROA=EBIT***/Total assets
Age (AGE)	Natural logarithm of years since inception

Table 6. Description of explanatory variables.

* EBT denotes Earnings after interest and before taxes. **NDT denotes Non-debt tax shilds. NDT=Operating Income-interest payments-(Observed federal income tax payments/Corporate tax rate). The corporate tax rate during the sample period is 28%. ***EBIT denotes Earnings before interest and taxes.

The variables listed in Table 6 are the most commonly used proxies within the empirical research of capital structure, e.g. Titman and Wessels (1988), Michaelas *et al* (1999), Hall *et al* (2000), Bevan and Danbolt (2000b), Fama and French (2002), and Sogorb-Mira (2005).

Sogorb-Mira (2005), Kim and Sorensen (1986) and Ozkan (2000) use the same definition for the effective tax rate (ETR), which is also adopted in our study. The non-debt tax shields (NDTS) are measured in different ways in previous studies (e.g. Titman & Wessels, 1988; Michaelas *et al*, 1999). Sogorb-Mira (2005) use depreciation in relation to total assets as a measurement for this variable. We choose however to use non-debt tax shields in relation to total assets as a measurement, as suggested by Titman & Wessels (1988), to take into consideration not only the tax shield effect from depreciation, but also effects from other non-debt tax shields, such as tax-carryforward and tax-carryback.

Growth opportunities (GO) is measured by the share of intangible assets in the asset structure, since investment in intangible assets is regarded as a good indicator for the growth opportunities in a company. A similar measure is also used by Long and Malitz (1983), Titman and Wessels (1988), and Michaelas *et al.* (1999). The tangibility of the asset structure (AS) is measured by the share of tangible assets in the asset structure. (Michaelas *et al.*, 1999; and Bevan & Danbolt, 2000a,b) Profitability (P) is measured by return on assets with earning before interest and taxes (EBIT), e.g. Michaelas *et al.* (1999), and Fama and French (2002).

Size (S) is measured by natural logarithm of total assets, and age (AGE) is measured by natural logarithm of age of the companies. The aim with logarithm is to control possible non-linearity and heteroskedasticity problem in the data. (Cardone & Cazorla, 2001; and Fama & French, 2002) The variable for age is not included in Sogorb-Mira (2005), but is considered to be an important capital structure determinant according to many studies in this field (e.g. Petersen & Rajan, 1994; Hall *et al*, 2004; and Berger & Udell, 1998). Therefore, we choose to include this variable in our study.

In the Table 7, a summary of the explanatory variables and their expected signs, according to the hypothesis established in Chapter 3, is presented.

Variables	Expected sign
Effective tax rate (ETR)	+
Non-debt tax shields (NDTS)	-
Growth opportunities (GO)	+
Asset structure (AS)	+
Size (S)	+
Profitability (P)	-
Age (AGE)	-

Table 7. Explanatory variables and their expected signs.

The Regression Model

The following preliminary regression is tested in EViews with respective debt ratios (TDR, LDR or SDR) as the dependent variable, and with all explanatory variables included:

$$Y = \alpha + \beta_1\,ETR + \beta_2\,NDTS + \beta_3\,S + \beta_4\,GO + \beta_5\,AS + \beta_6\,P + \beta_7\,AGE + \varepsilon$$

According to the correlation matrix (see section 5.1.2), there is multi-collinearity problem between the variable for non-debt tax shields (NDTS) and the variable for profitability (P). Therefore, it is judged to be necessary that one of these variables be excluded from the final regressions. The results from the preliminary regressions show that the variable P is only significant at 10% in one of the regressions, while the variable NDTS is significant at 1% in two of them. Leaving out the variable P will also improve the adjusted R-square in all of the regressions.

Consequently, the final regression is constructed without the variable P:

$$Y = \alpha + \beta_1 ETR + \beta_2 NDTS + \beta_3 S + \beta_4 GO + \beta_5 AS + \beta_6 AGE + \varepsilon$$

4.2.4   Survey

In order to get a thorough and more nuanced understanding of the capital structure decisions of SMEs and Swedish game developers, a questionnaire survey is conducted by e-mail. 86 game developers in Sweden received the questionnaire. Companies that we could not find an e-mail address to received the questionnaire by mail instead. All companies which had gotten the questionnaire by e-mail but not answered, received up to four reminding e-mails as well as a phone call. Final data are collected from 21 companies, which leave us with a response rate of 24.4%. Companies that participated in the survey are divided into 3 size groups, as measured by number of employees. The data collected from the questionnaire is analyzed in Excel, showing how companies answered in general, and how they answered within different size groups.

The questionnaire used in this study is a close replica of Cressy and Olofsson's (1997) questionnaire, designed to study the financial conditions for Swedish SMEs, which is found to serve our research purposes well (see Appendix A). However, since Cressy and Olofsson (1997) mainly focuses on comparing the financial conditions between the manufacturing sector and the Business Services sector, our survey is not a complete replica of their study but instead a tailored version that specifically fits our purpose. On the other hand, our sample companies in the game industry fits into Cressy and Olofsson's (1997) definitions of SMEs and the Business Services sector; therefore, it is considered to be appropriate to compare the results of our survey with their results in general, especially their results in the Business Services sector.

The questionnaire includes questions covering the companies' background characteristics, investment needs and outcomes, the firms' equity and control aversion, advantages and

disadvantages of different owner categories, financing used by the company and financial conditions and business development obstacles in the industry.

Comparing the average statistics between companies with and without response to the questionnaire, one can observe certain pattern in these two groups (see Table 8).

	Mean	
	With response	Without response
Age	4	7
Employees	11	7
Sales	3445	6039
Total assets	4408	6674
Total debt ratio	0,6	0,64
Long-term debt ratio	0,1	0,16
Short-term debt ratio	0,5	0,48
Profitability	-0,29	-0,23

Table 8. Comparison between companies with and without response.

The companies that did not respond tend to be older and larger companies in terms of sales and total assets. However, profitability and different debt ratios of these two groups seem to be rather similar, which suggests that there should not exist any fundamental difference in making capital structure decisions. Thus, it is assumed that there should not exist any systematic bias due to the existence of non-respondents.

4.3 Methodological Problems

Within every field of research it is important to evaluate the method used, in order to establish credibility of the results and its contribution to the scientific development in the studied field. There are two main aspects which need to be considered: the first aspect evaluates the ability of the method to measure what it is suppose to measure (validity), and the second evaluates the ability of the method to give reliable and trustworthy results from the data (reliability). The latter stresses the importance that the method used should provide the same result every time it is applied. (Wiedersheim-Paul & Ericsson, 1999)

4.3.1 Validity

It is important to raise the question of whether annually reported accounting data reflects the reality of capital structure decisions. Accounting data from annual reports only report accumulated figures, which leave out the dynamics in the companies during the year. Moreover,

accounting data are often subject to manipulations, which give a biased reality. However, due to the limited size of the companies in the industry, there is no other alternative data source available for an outside study.

The method used both in collecting data and constructing the regression model, is commonly used in the field of capital structure research; hence, the method is judged to be valid. The questionnaire is formed in a similar way as a previous published study of Swedish SME financing. For this reason, the questions are also considered to be valid.

4.3.2 Reliability

All models are tested for OLS assumptions and specification error. The results from the regressions with the total debt ratio (TDR) and the short-term debt ratio (SDR) as dependent variable indicate that OLS is an appropriate model if adjusted for heteroskedasticity and multicollinearity. However, the regression with long-term debt ratio (LDR) yields rather poor result even after adjusting for outliers, heteroskedasticity and multicollinearity. Brooks (2002) recommends to "stick with OLS if possible", since "its behaviour in a variety of circumstances has been well researched". Certain violation of the assumptions, such as the normality assumption, is "virtually inconsequential" for "sufficiently large" samples, "appealing to a central limit theorem" (Page 182). As a result, OLS is applied to all three regressions, consistent with Sogorb-Mira (2005).

The reliability is partly dependent on the number of observations. The regression data consists of 201 observations which is a small number in comparison to other studies investigating SME financing. Though, to our knowledge, all public available data in the game industry are collected, which leaves no room for more observations to be included.

The accounting data used in the regression are collected from companies' annual reports and/or from the database Affärsdata. Thus, the data source is judged to be reliable.

The regression model is commonly used and the calculations are performed in a cautious manner with the econometric program Eviews. The program is widely used for research within the field of finance. Therefore, the results from the regression are considered to be reliable.

When performing a survey by using a questionnaire, some issues needs to be taken into account. The questionnaire is not addressed to a specific employee of the same position within the

company, which could affect the answers. However, because of the limited sizes of many of the participating firms, it can be assumed that all employees have the same understanding of the company's financial condition. Further, certain questions in the questionnaire are considered to be sensitive, which have caused lower response rate. However, no systematic bias is observed due to the existence of non-respondents. Thus, the result from the questionnaire is judged to be reliable.

5 EMPIRICAL FINDINGS AND ANALYSIS

This chapter starts with a presentation of the results from the regression model and an analysis of the capital structure determinants. This is followed by the results and analysis of the survey of the financial conditions for the game developers. Finally, an aggregated summary of the result and the analysis is presented.

5.1 Results and analysis

In order to give more information about the interpretation of the empirical findings in the analysis of the regression results, a section with descriptive statistics and correlation matrix is provided before the results. Further, the answers from the survey are demonstrated in tables and the results are analysed.

5.1.1 Descriptive Statistics

A preliminary study of the sample yields the following descriptive statistics (see Table 9).

	Mean	Median	Std. Dev.	Obs.
TDR	0.48	0.49	0.27	201
LDR	0.08	0.00	0.16	201
SDR	0.40	0.38	0.25	201
ETR	0.15	0.00	0.28	201
NDTS	-0.21	-0.01	1.00	201
GO	0.16	0.00	0.27	201
AS	0.10	0.05	0.12	201
S	7.00	6.73	1.86	201
P	-0.19	-0.03	0.90	201
AGE	1.34	1.39	0.90	201

Table 9. Descriptive Statistics.

The descriptive statistics show that on average 48% of the total assets in the game industry is financed by debt (TDR), with short-term debt (SDR) financing 40% and long-term debt (LDR) financing the remaining 8%. The median of the long-term debt ratio shows that at least half of the companies in the game industry have no long-term debt at all. It provides evidence for game developers are financed predominantly by short-term debt. According to Sogorb-Mira (2005),

SMEs in Spain are also heavily financed by debt, with total debt ratio at 61%, long-term debt ratio at 9% and short-term debt ratio at 52%.

A closer examination of companies' balance sheet 2004 confirms that only 40% of the companies had long-term liabilities, while all companies in the sample had some kind of short-term liabilities. The most popular type of long-term debt is *loans from credit institutions*, which about 16% of the companies have, and 7% of the companies use *check account* as long-term liabilities. The most popular short-term liabilities is *accrued income and expense* (99%), followed by *trade payables* (76%), 10% of the companies have short-term *loans from credit institutions*, and 4% use *check account* as short-term liabilities. (See Appendix B-1)

In terms of share of the total liabilities, the most important sources of liabilities are short-term liabilities, which cover 87% of the total debt. The most important long-term liability is still *loans from credit institutions* (5%). *Convertibles* and *check account* are also important sources, which covered 1% of the total debt respectively. The most important short-term liabilities are *accrued income and expense* (36%), *trade payables* (14%), *payment in advance from customers* (6%). *Check account* and short-term *loans from credit institutions* make up 1% of the total debt respectively (see Appendix B-2). The statistics show the importance of these different financing sources to a game developer. The evidence for use of *check account* indicate there are game developers taking advantages of the financial flexibility provided by unused debt capacity, which enables the companies to invest and continue with their projects at any time needed, even when internal funding is not sufficient. Such financial flexibility has a great value in the game industry where volatile cash flows are prevailing phenomenon.

Effective tax rate (ETR) is around 15% on average, which is rather low compared to the 28% corporate tax rate in Sweden. The median of this variable indicates that at least half of the companies in the sample pay no tax at all. The variable that measures a company's profitability (P) shows that the majority of the companies in this industry is not earning any profit, with a return on assets of -19% on average. That partly explains the low average effective tax rate.

Another possible explanation for the low effective tax rate could be the usage of different tax-shield. However, the variable that measures non-debt tax shields (NDTS) shows a negative mean and median, which indicates that the majority of the companies are not taking full advantage of neither debt and non-debt tax shields. That is to say, the tax advantage of debt does not benefit

most companies in this industry. Low profitability is probably the main cause to the inefficient utility of tax-shield.

The average share of intangible assets in the company (GO) is 16%. The statistics from the companies' annual reports show that only 46% reported intangible assets for 2004. Sogorb-Mira (2005) found the average share of intangible assets is only 3.47% in SMEs, which indicates that game developers have a larger share of intangible assets than SMEs in average. It appears that the most common intangible assets among game developers are R&D. About 35% of the companies have this post in their balance sheet and 10% of the companies have registered patent and brand name as intangible assets (see Appendix C-1). On average, the largest post of the intangible assets are activated R&D expenses, followed by goodwill and patent and brand name (See Appendix C-2).

On average, 10% of the total assets are tangible assets (AS), and the corresponding ratio in Sogorb-Mira (2005) is 44%. This share (10%) also appears to be lower than the share of intangible assets (16%) which further shows the importance of intangible assets for game developers. With 10% tangible assets and 16% intangible assets in the asset structure, it can also be concluded that the majority of the game developers' assets are current assets, such as cash, account receivables and inventory.

5.1.2 Correlation Matrix

A correlation matrix is obtained to control for multi-collinearity (see Table 10).

	TDR	LDR	SDR	ETR	NDTS	GO	AS	S	P	AGE
TDR	1.00									
LDR	0.46	1.00								
SDR	**0.82**	-0.13	1.00							
ETR	0.10	-0.07	0.15	1.00						
NDTS	0.11	0.04	0.09	0.15	1.00					
GO	0.01	0.30	-0.18	-0.09	-0.18	1.00				
AS	-0.03	-0.09	0.02	0.01	-0.17	-0.23	1.00			
S	0.16	0.11	0.11	0.00	-0.09	0.28	-0.27	1.00		
P	0.07	-0.00	0.08	0.18	**0.89**	-0.19	-0.24	-0.07	1.00	
AGE	-0.09	-0.04	-0.07	0.06	0.03	0.00	-0.20	0.31	0.05	1.00

Table 10. Correlation Matrix.

Generally, with two exceptions, there is no high correlation between different variables. The correlation between total debt ratio (TDR) and short-term debt ratio (SDR) is as high as 0.82, which is directly caused by the fact that the companies in the game industry have more extensive use of short-term debt than long-term debt. In most cases, the total debt consists of short-term

debt only, which results in the high correlation between these two ratios and this is consistent with Sogorb-Mira (2005). Since the ratios are dependent variables in different regressions, the high correlation between them will not affect the result of the regressions.

The measure for profitability (P) and the measure for non-debt tax shields (NDTS) seem to be highly correlated as well (0.89), which might be explained by that profitable companies have more use of tax shield. Since these two variables will be independent variables in the same regression, their co-existence will affect the result of the regressions. It is considered that only one of them will remain in the regression to solve the multi-collinearity problem.

5.1.3   Regression

To solve the multi-collinearity problem, the variable measuring profitability (P) is left out of the model, and the regression applied in the final model is as following:

$$Y = \alpha + \beta_1 ETR + \beta_2 NDTS + \beta_3 S + \beta_4 GO + \beta_5 AS + \beta_6 AGE + \varepsilon$$

Adjusted with White heteroskedasticity-consistent standard errors, the regression analysis yields the following result (see Table 11).

	TDR (t-statistic)	**LDR** (t-statistics)	**SDR** (t-statistic)	**Expected**
ETR	0.083 (1.33)	-0.033 (-0.90)	0.116 (1.85)*	+
NDTS	0.032 (2.26)**	0.017 (2.29)**	0.015 (1.19)	-
S	0.034 (2.87)***	0.005 (0.97)	0.029 (2.80)***	+
GO	-0.020 (-0.26)	0.173 (2.76)***	-0.193 (-2.95)***	+
AS	0.028 (0.19)	-0.002 (-0.02)	0.029 (0.20)	+
AGE	-0.050 (-1.97)*	-0.010 (-0.70)	-0.040 (-1.75)*	-
R-squared	0.0710	0.1044	0.0982	
Adjusted R-s	0.0424	0.0767	0.0703	
F (p-value)	2.47 (0.025)	3.77 (0.001)	3.52 (0.002)	
Number of c	201	201	201	

Table 11. Regression Results.

*=statistically significant at 10%; **=statistically significant at 5%; ***=statistically significant at 1%. TDR: Total debt ratio; LDR: Long-term debt ratio; SDR: Short-term debt ratio; ETR: Effective tax rate; NDTS: Non-debt tax shields; S: Size; GO: Growth opportunities; AS: Asset structure.

All the regressions have a significant F-statistics, which suggests that at least one of the coefficients in each model is significant. However, the adjusted R-square indicates that there only

is a small portion of the variance in the debt ratio that is explained by the models. The models in Sogorb-Mira (2005), have also a rather low R-squared ranging from 0.03 to 0.11.

Compared to Sogorb-Mira (2005) who has found a majority of the variables significant at 1%, our result shows about half of the variables significant at 10%. This result can partly be explained by the large difference in the number of observations: Sogorb-Mira (2005) has 32,410 observations, while our sample consists of 201 observations in total.

The coefficient for effective tax rate (ETR) suggests only a weak *positive* relation with short-term debt ratio (SDR), which appears to support the hypothesis H1 suggested by Modigliani and Miller (1963). However, according to our statistics from 2004, *check account* and short-term *loans from credit institutions* appeared to be the most important interest-bearing short-term liabilities in the game industry. With only 10% of the companies that have *loans from credit institutions*, 4% that have *check account* as short-term liabilities, and only 1% of total liabilities are made up of such short-term liabilities respectively, a weak relationship between the effective tax rate and short-term debt is understandable. However, the result in general seems to give more support to that there is *no* relationship between debt and taxes in SMEs, because such companies are less likely to be so profitable that they can take advantages of the tax shields from the interest payment (Pettit & Singer, 1985). Our result does not show any evidence for the negative relationship suggested by Sogorb-Mira (2005).

The result also suggests that non-debt tax shields (NDTS) are *positively* related to total debt ratio (TDR) and long-term debt ratio (LDR), which rejects the hypothesis H2 that suggests the opposite (DeAngelo & Masulis, 1980; and Sogorb-Mira, 2005). However, the result is consistent with Bradely *et al* (1984) and Chaplinsky and Niehaus (1990). They argued that a large share of tangible assets can help companies to gain large non-debt tax shields from depreciation, and at the same time obtain a higher leverage due to the collateralizability of these assets. Though, since no evidence is found that indicates that the asset tangibility (AS) have a relation with the capital structure among Swedish game developers, no evidence supporting the Collateral Hypothesis is found (see explanation later in this section). Therefore, a more likely explanation to the positive relation between non-debt tax ratio and debt ratio could be that companies that are profitable enough to take advantage of non-debt tax shields would need more debt tax shields as well, while those companies that are not making any money do not need tax shields of any kind. There seems to be no connection between non-debt tax shields (NDTS) and short-term debt ratio

(SDR). That is probably caused by the fact that short-term liabilities consists mainly of non-interest-bearing liabilities that have limited impact on a company's tax shields, and that the needs for short-term liabilities often are steered more by the operational considerations than by the tax deductibility. If the theory about the positive relation between debt tax shields and non-debt tax shields holds, no relation between short-term debt ratio and non-debt tax shields should be observed.

The variable for company size (S) appears to be *positively* related to total debt ratio (TDR) and short-term debt ratio (SDR), and the relationships are significant at 1%. The result supports the hypothesis H3 (Warner, 1977; Ang *et al.*, 1982; and Pettit & Singer, 1985), which seems to provide evidence for that higher probability for bankruptcy and larger bankruptcy costs keep smaller firms from using high leverage. However, the result does not support the hypothesis H5-b which suggests a negative relation between firm size and short-term debt (Bevan & Danbolt, 2000b; and Hall *et al.*, 2000). Sogorb-Mira (2005) does not either find any evidence to support H5-b. Even if the variable for size shows a positive sign in the regression with long-term debt ratio (LDR), the result does not seem to be significant, which means the result does not either support the hypothesis H5-a that suggests a positive relation between firm size and long-term debt (e.g. Bevan & Danbolt, 2000b; and Hall *et al.*, 2000). It does not appear to support the theory that the smaller companies depend more on short-term debt, due to the restriction of maturity length from their debtors in fear of risk-shifting.

The result for growth opportunities (GO) is mixed. The variable seems to be *positively* related to long-term debt ratio (LDR), but *negatively* related to short-term debt ratio (SDR), which neither support H4-a or H4-b (Michaelas *et al.*, 1999). The growth opportunities (GO) appears to be negatively correlated to total debt ratio (TDR), which shows, as expected, the same sign as the short-term debt ratio. However, the relation is not significant. Thus, the result neither support the hypothesis H4, that suggests a positive relation between growth opportunities and firm leverage (Michaelas *et al*, 1999); nor does it provide any evidence for any negative relation (e.g. Myers, 1977; and Titman & Wessels, 1988). In other words, there seems to be no evidence for the influence of risk-shifting problem on the leverage decision in game industry; neither can we find any evidence for the influence of underinvestment problem. However, the maturity matching principle seems to provide an explanation for our result: since most intangible assets are of long-term nature, companies are likely to finance such assets with long-term liabilities, rather than short-term liabilities. Sogorb-Mira (2005) shows evidence for the same relationships.

The variable for asset structure (AS) is *not significant* in any of the regressions, which rejects the hypothesis H6, suggested by the Collateral Hypothesis (Schwartz and Aronson, 1967; and Long & Malitz, 1985). However, it supports the finding from Berger and Udell (1998) that the asset structure in a small company is not relevant to its debt capacity, due to the intertwining of owner's private economy and the firm's economy in such companies. The result also rejects the hypothesis H6-a, suggested by the maturity matching principle (Brealey & Myers, 1991). However, that does not suggest that maturity matching principle is not applied in SMEs, but rather reflects the fact that such SMEs as game developers have larger share of intangible assets than tangible assets as their non-current assets; thus, intangible assets will be a better proxy for non-current assets to study maturity matching in the game industry. (See previous paragraph for supporting result)

The variable for age of the firm (AGE) is not included in the original study of Sogorb-Mira (2005), but is considered to be an important determinant of capital structure in many other studies (Petersen & Rajan, 1994; Berger & Udell, 1998; and Michaelas *et al.*, 1999). The result from this variable shows that there is a weak significant *negative* relation between a firm's age and two of the debt ratios: total debt ratio (TDR) and short-term debt ratio (SDR), which supports the hypothesis H8 (Michaelas *et al.*, 1999; Petersen and Rajan, 1994). The result in general supports the theory that young companies tend to obtain more external financing as their accumulated retained earnings are often not sufficient to finance the business, while older ones tend to finance the business with more internally generated capital. The variable also seems to be negatively related to long-term debt ratio (LDR); however, the relationship is not significant. The explanation can be that the game developers are less dependent on long-term debt; thus, hard to find a significant relation.

The variable for profitability (P) is not included in the final regressions, due to the multi-collinearity problem. However, in one of the preliminary regressions (LDR), it is significant at 10% level with a negative sign. This provides some weak evidence for the hypothesis about the relationship between leverage and profitability (H7), suggested by the Pecking Order Theory (Myers, 1984; and Myers & Majluf, 1984). However, the result might be just caused by multi-collinearity.

5.1.4 Survey

The descriptive statistics for each size group of the companies that participated in the survey are listed below (see Table 12)[12].

	0 to 1	2 to 9	10 to 40	Total
Population	7	8	6	21
Share of total population	33%	38%	29%	100%
	Mean			
	0 to 1	2 to 9	10 to 40	Total
Age	4	4	5	4
Employees	1	4	20	11
Sales	218	1596	5833	3445
Total assets	128	1176	8353	4408
Total debt ratio	0,36	0,66	0,58	0,6
Long-term debt ratio	0	0,12	0,11	0,1
Short-term debt ratio	0,36	0,54	0,47	0,5
Export share	0,41	0,5	0,77	0,54
Profitability	-0,02	-0,23	-0,4	-0,29

Table 12. Companies with Response Divided in Size-Groups.

The division of the groups appears to be appropriate, as each group takes up similar share in the total population. The number of employees appears to be a good proxy for firm size, as both sales and total assets seems to increase with the number of employees. However, no age difference between the groups is found. Larger companies tend to have larger export share and higher debt ratios, while smaller firms on average tend to be more profitable (or rather less unprofitable).

In response to the requirement to rank the company's investment needs over the last three years, the participating companies in the survey gave the following answers (see Table 13):

Investment type	0 to 1		2 to 9		10 to 40		Total	
	Pos	Neg	**Pos**	Neg	**Pos**	Neg	**Pos**	Neg
Buildings	**0%**	71%	**0%**	100%	**0%**	100%	**0%**	89%
Production equipment	**14%**	43%	**63%**	25%	**80%**	1%	**50%**	30%
Product development	**29%**	14%	**75%**	13%	**100%**	0%	**65%**	10%
Marketing/market development	**29%**	43%	**57%**	14%	**40%**	20%	**42%**	26%
Education and training	**29%**	14%	**0%**	63%	**0%**	100%	**10%**	55%

Table 13. Investment Needs of the Business over the Last Three Years. Pos: percentage of companies that answered 4 or 5 (*High* or *Very high*), Neg: Percentage of companies that answered 1 or 2 (*Very low* or *low*).

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[12] Companies with 0-1 employees are from now on referred to as "small companies", 2-9 employees as "medium companies" and 10-40 employees as "large companies".

It appears that more than half of the companies consider that they have large investment needs for *product development*, and about half of the companies consider that they have large investment needs in *production equipment* and *marketing/market development*. Most companies have low or very low investment needs for *buildings*. While small companies seem to have less need to invest in *production equipment*, they seem to have larger needs to invest in *education and training*, and the needs for *education and training* seem to decrease with the size. This reflects that larger companies might be more dependent on internal learning process among employees through "learning-by-doing" rather than external trainings and educations. Another explanation could be that companies that are superior in technical know-how are the ones that have the ability to grow in size; thus, there is less need of education and training at these companies. Similar result is found by Cressy and Olofsson (1997) in the Business Service sector.

According to our results, it appears that most of the companies hardly seem to have any problem realising their investment needs for *production equipment*, but seem to have difficulties to finance *marketing/market development*. In general, most companies are able to finance more than half of their investment needs, but only a small proportion of the companies are able to realise all their needs[13]. Cressy and Olofsson (1997) found that as much as 40% of the companies in the Business Service sector are not able to realize the needed investments. Financial gap appears to be prominent in the game industry, especially for financing certain investment needs.

The companies were then asked to rank the three most important sources of finance in recent years (see Table 14).

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[13] Certain caution is needed in interpreting the percentage of investment needs realised, as some of the companies seem to have misunderstood the questions. The statistics are available from the authors.

Source	0 to 1	2 to 9	10 to 40	Total
Company profits	67%	50%	83%	65%
	(0,33%)	(38%)	(33%)	(35%)
Equity from the owners	67%	75%	83%	75%
	(50%)	(38%)	(33%)	(40%)
Risk capital from individuals (not related to the owners)	17%	0%	33%	15%
	(17%)	(0%)	(0%)	(5%)
Risk capital from risk capital funds	0%	13%	50%	20%
	(0%)	(13%)	(0%)	(5%)
Capital from the stock market	0%	0%	17%	5%
	(0%)	(0%)	(0%)	(0%)
Loans from family and friends	33%	0%	17%	15%
	(17%)	(0%)	(0%)	(5%)
Bank loans	17%	0%	17%	10%
	(0%)	(0%)	(0%)	(0%)
Funding from business suppliers	0%	13%	17%	10%
	(0%)	(0%)	(0%)	(0%)
Funding from business customers	33%	38%	33%	35%
	(33%)	(38%)	(17%)	(30%)
Government loans	0%	0%	17%	5%
	(0%)	(0%)	(0%)	(0%)
Regional fund loans	0%	0%	17%	5%
	(0%)	(0%)	(0%)	(0%)
Loans from other sources (NUTEK)	0%	0%	50%	15%
	(0%)	(0%)	(17%)	(5%)
Others	0%	13%	33%	15%
	(0%)	(0%)	(0%)	(0%)

Table 14. The Importance of Different Sources of Finance in Recent Years.

Percent of companies that ranked the source of financing as one of their top three sources, with percentage of companies that ranked the source as the most important one in parenthesis.

Generally, larger companies have more sources of finance than smaller ones. That is probably caused by the higher debt agency costs for smaller companies due to larger information asymmetry, and the higher bankruptcy risks associated with smaller companies. The most important sources of finance, for all sizes of companies, seem to be *company profits* and *equity from the owners*, which is consistent with what Pecking Order Theory (Myers & Majluf, 1984) predicts, and similar result is found by Cressy and Olofsson (1997). 65% respective 75% of the companies ranked these sources as one of the top three most important sources of finance, and 50% of the small companies ranked *equity from the owners* as the *most* important one. 67% of the small, and 83% of the large companies consider *company profits* to be one of the important sources, while only 50% of the medium companies think the same. The explanation might be that the medium companies are at the expansion phase where they have large needs for capital, but are not profitable enough to finance the needs with just the company profit. Therefore, they are more dependent on other sources, such as *equity from the owners*. 35% of the companies consider *funding*

from business customers very important. It seems to be especially important source for small and medium companies, as all of these companies ranked it as the *most* important source of finance. That reflects that publishers, as the customer, play an important role in financing game developers, especially for small and medium companies. Another important finance source for the small companies appears to be *loans from family and friends* (33%).

Only 5% of the companies ranked *capital from the stock market, government loans* and *regional fund loans* as one of the important sources of finance, and these sources, together with *loans from other sources*, seem only to be available for large companies. On the other hand, *risk capital from individuals* and *bank loans* seem to be available even for the small companies in the game industry.

It is also interesting to note that all bank loans with collaterals are backed privately by the owners. The result is consistent with previous SME studies (e.g. Berger & Udell, 1998); thus, support of the proposition that the asset structure of the firm is irrelevant in SME capital structure decisions is found.

In order to observe the extent of general equity-control aversion, the companies were asked to express their opinions about the following statements (see Table 15).

Statement	0 to 1		2 to 9		10 to 40		Total	
	Pos Neg		**Pos** Neg		**Pos** Neg		**Pos** Neg	
New owner-partners are largely advantageous for the development of game developers.	**17%** 17%		**13%** 38%		**17%** 50%		**15%** 35%	
It is better to sell the company than to take on new owner-partners.	**0%** 67%		**13%** 88%		**17%** 83%		**10%** 80%	
The most important reason for new equity partners is financial.	**33%** 33%		**50%** 13%		**33%** 33%		**40%** 25%	
The most important reason for new equity partner is the expertise they provide.	**33%** 0%		**50%** 25%		**50%** 0%		**45%** 10%	
New equity should come from the profits of the company.	**33%** 0%		**50%** 0%		**50%** 17%		**45%** 15%	
It is preferable to borrow from the bank rather than to take on new owner-partners.	**0%** 50%		**25%** 38%		**17%** 83%		**15%** 40%	
The disadvantages of new owner-partners are greater than the advantages.	**0%** 33%		**13%** 25%		**0%** 83%		**5%** 50%	

Table 15. Extent of general equity-control aversion.

Pos: percentage of companies that answered 4 or 5 (*Agree* or *Strongly agree*), Neg: percentage of companies that answered 1 or 2 (*Strongly disagree* or *Disagree*).

Most companies (80%) disagreed with the statement *"it is better to sell the company than to take on new owner-partners"*, and half of the companies disagreed with the statement *"the disadvantages of new owner-partners are greater than the advantages"*. That shows that the majority of the companies in the

game industry see an advantage of having new owner-partners, and the predicted equity control aversion is not very obvious among the these answers. More companies in the survey consider *"the most important reason for new equity partner is the expertise they provide"*, than that *"the most important reason for new equity partners is financial"*; however, the difference is not that large.

It seems that the companies in the game industry prefer to finance their business with retained profits, followed by new equity-partners. Bank loans comes the third. To sell the company seems to be the last resort. This preference of equity to debt shows the needs of risk-sharing for the companies in the game industry, as equity owners take on more risks than debt owners by assuming residual claims of the company. The result shows evidence partly against the Pecking Order Theory (Myers, 1984; and Myers & Majluf, 1984). Nor does it support the theory about equity control aversion. However, the same phenomenon has been observed in some of the studies dedicated to SMEs, such as Cressy and Olofsson (1997). It is argued that companies in the Business Service sector where the expertise of venture capitalists and business angels compensate the control-loss experienced by taking on new owners. Due to the fact that game developers have high retained risks which are difficult to transfer or diversify, there are large needs in the branch for equity to absorb risks and avoid potential bankruptcy. Furthermore, bankruptcy costs are expected to be higher for companies with large share of intangible assets due to the loss in value of such assets in liquidation. (Brealey & Myers, 1991) As a result, the game developers have a large incentive to take on new owner partners to share the operational risks, thus reduce the risks for bankruptcy.

In response to the question if the company has actively search for new owners in last three years, the following answers were given (see Table 16):

0 to 1		2 to 9		10 to 40		Total	
Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
0%	100%	13%	88%	80%	20%	25%	75%

Table 16. Recent Active Search for New Owners.

The statistics show that only 25% of the companies in the sample answers "yes" to the question. However, as high as 80% of the large companies have actively searched for new owners in the last three years, but none of the smallest companies have. The explanation might be that when a company grow to a certain size, there are larger needs for both financing and expertise to run the

business, which in many cases cannot be provided internally. If that is the case, taking in new owners will be an effective solution to the problem.

Interestingly, the answers in the previous section (see Table 15) show that although 83% of the large companies seem to disagree on the statement "*the disadvantages of new owner-partners are greater than the advantages*", half of the large companies seem to also disagree on the statement "*new owner-partners are largely advantageous for the development of game developers*". It seems to reflect mixed feelings of love and hatred towards new owner-partners among large companies in the game industry.

To be able to understand the game developers' view of different type of owner-partners, the companies were asked to express their opinions about the following statements (see Table 17).

Statement	0 to 1		2 to 9		10 to 40		Total	
	Pos Neg		**Pos** Neg		**Pos** Neg		**Pos** Neg	
Risk capital (equity) funds can provide market knowledge of importance.	**0%** 17%		**50%** 50%		**33%** 67%		**30%** 50%	
Risk capital funds lack the knowledge needed to become owner-partners in SMEs.	**17%** 67%		**75%** 13%		**33%** 67%		**45%** 30%	
Risk capital funds have too short a horizon in their investments.	**17%** 33%		**38%** 25%		**17%** 50%		**25%** 35%	
The costs (broadly defined) of having risk capital funds as owner-partners are reasonable.	**17%** 0%		**25%** 25%		**17%** 17%		**20%** 15%	
If one looks for owners with a long term perspective, other companies in the industry are a suitable alternative.	**33%** 0%		**50%** 0%		**50%** 33%		**45%** 10%	
Private individuals with a business background are suitable owner-partners for SMEs.	**0%** 0%		**50%** 25%		**17%** 33%		**25%** 20%	
It is good for business development to have employees as owner-partners in SME.	**50%** 0%		**50%** 0%		**67%** 17%		**55%** 5%	
Going Public is the least expensive way to raise equity for a small company.	**0%** 17%		**0%** 63%		**17%** 50%		**5%** 45%	
Going Public is no alternative for a small company.	**0%** 50%		**38%** 38%		**0%** 83%		**15%** 55%	

Table 17. Relative Merits of the Different Types of Owner-Partners.

Pos: percentage of companies that answered 4 or 5 (*Agree* or *Srongly agree*), Neg: percentage of companies that answered 1 or 2 (*Strongly disagree* or *Disagree*).

About half of the companies seem to agree on that "*it is good for business development to have employees as owner-partners in SME*", and disagree on that "*risk capital (equity) funds can provide market knowledge of importance*" and "*going public is no alternative for a small company*".

The statistics show that *employees* seem to be the most preferred owner-partners, followed by *other companies in the industry*. The companies also seem to be positive about *going public* as an option for

small business, however many of them are also aware of the high costs associated with a public offering. There seems to be a mixed feeling about *risk capitalists* and *"business angels"* among game developers. The medium companies seem to be more negative about the *risk capitalists* than other groups, but more positive about the *"business angels"* than others. However, our statistics show that there is no company in this group registered "angel financing" as one of the three major finance sources (see Table 14). Could this be the explanation for the positive attitude?

The companies' preferences of different types of owner partners might reflect, to some extent, their control-aversion and cost-awareness, as it is least costly to take in employees as new owners as it effectively reduces the agency costs within the company and to avoid the information asymmetry problem that arises when taking in external owners. In addition, to have employees as new owners can serve as an incentive program to keep the key resources of the company, and the best of all: it would hardly affect the company's control mechanism. On the contrast, it is very expensive to take in external owners, such as risk capitalists or "business angels", not to mention going public, due to various agency costs and costs compensating for information asymmetry; and these sources of finance would most likely affect the company's control mechanism tremendously. Lastly, it is also interesting to note that many small companies tend to give neutral answers to most of the questions. One explanation is that most types of the owner-partners are not yet available for such small business. Thus, it is difficult for them to take the side due to limited knowledge on certain type of owner-partners.

In order to find out companies attitudes and relationship with the banks, the companies were asked to express their opinions about the following statements (see Table 18).

Statement	0 to 1		2 to 9		10 to 40		Total	
	Pos Neg		**Pos** Neg		**Pos** Neg		**Pos** Neg	
Banks usually provide the game industry with finance at a reasonable price	**0%** 50%		**0%** 83%		**17%** 83%		**6%** 72%	
The bank is very competent in business matters	**0%** 50%		**0%** 33%		**17%** 67%		**6%** 50%	
Bank's demands for collateral are too onerous	**50%** 0%		**71%** 0%		**67%** 17%		**63%** 5%	
The bank has little knowledge of the game industry	**50%** 0%		**86%** 0%		**83%** 0%		**74%** 0%	
Banks are good at solving financial problems for game developers	**0%** 50%		**0%** 50%		**17%** 83%		**6%** 61%	
Banks should be competing more actively with one another	**67%** 0%		**83%** 0%		**67%** 0%		**72%** 0%	
Banks usually demand too high an equity-debt ratio from game developers	**33%** 0%		**83%** 0%		**50%** 17%		**56%** 6%	
It is desirable for banks to take more of a stake in game developers	**17%** 33%		**83%** 14%		**33%** 33%		**42%** 26%	

Table 18. Business Attitudes to, and Relationships with, the Banks.

<u>Pos</u>: percentage of companies that answered 4 or 5 (*Agree* or *Strongly agree*), <u>Neg</u>: percentage of companies that answered 1 or 2 (*Strongly disagree* or *Disagree*).

All the companies appear to have very strong negative opinions about banks. According to the majority of game developers, banks have little knowledge of the game industry (74%); banks should be competing more actively with one another (72%); banks do not provide the game industry with finance at a reasonable price (72%); bank's demands for collateral are too onerous (63%); banks are not good at solving financial problems for game developers (61%); and banks usually demand too high an equity-debt ratio from SMEs (56%). The negative attitudes are also found in Cressy & Olofsson (1997), but the opinions are not as strong as the ones of the game developers. The result reflects enormous information asymmetry and severe agency problem between the game industry and banks.

While small companies still tend to give neutral answers, larger companies, especially medium companies, expressed strong dissatisfaction with the banks. It probably reflects the frustration from these medium companies that are right in the phase of expansion with large needs for investment and limited sources of finance.

To study the factors that constraints on game developers' development, the companies were asked to state how important the following factors are to their development (see Table 19).

Factor	0 to 1		2 to 9		10 to 40		Total	
	Pos Neg		**Pos** Neg		**Pos** Neg		**Pos** Neg	
Low profits	**57%** 14%		**75%** 0%		**33%** 33%		**57%** 14%	
High debt-equity ratio	**14%** 57%		**50%** 25%		**50%** 33%		**38%** 38%	
Low liquidity	**57%** 29%		**50%** 25%		**83%** 0%		**62%** 19%	
Lack of product development skills	**29%** 29%		**38%** 38%		**17%** 17%		**29%** 29%	
Lack of marketing skills	**43%** 14%		**50%** 38%		**33%** 0%		**43%** 19%	
Inadequate technical know-how	**29%** 29%		**0%** 63%		**17%** 17%		**14%** 38%	
Deficiency of managerial skills	**57%** 29%		**38%** 38%		**67%** 0%		**52%** 24%	
Poor market image due to smallness	**57%** 29%		**75%** 25%		**83%** 17%		**71%** 24%	

Table 19. Constraints on SME Development.

<u>Pos</u>: percentage of companies that answered 4 or 5 (*Great importance* or *Very great importance*), <u>Neg</u>: percentage of companies answering 1 or 2 (*No importance* or *Very small importance*).

Most game developers consider *poor market image due to smallness* to be an important factor that puts constraints on business development (71%). 62% consider *low liquidity* and 57% consider *low profits* to be the largest enemies. Cressy & Olofsson (1997) find that SMEs experience various financial problems to be the worst constraints for their development. It is not a coincidence that the game developers are most concerned about their market image due to smallness, as they compete on an international market where size and publicity are crucial for them to be recognized. There are also 52% of the companies that are worried about *deficiency of managerial skills*. Small companies are concerned about all above mentioned factors, while medium companies are mostly worried about *low profits* and *poor market image*, and large companies *low liquidity* and *poor market image*. This illustrates how different factors affect the development of game developers in different stage of their life-cycles, and the financial issues seem to impose large constraints on the developments of game developers of all sizes.

The companies seem to be least concerned about *technical know-how*. Only 14% think that it is of great importance in SME business development, especially for the larger companies in the industry. This can be explained by the fact that any company in the game industry that cannot keep up with the technical know-how will not have any chance to survive the keen competition, and will be wiped out at a very early stage. Therefore, all the survivors shall have little problem with technical know-how. Compared with the larger companies, small companies seem to have larger concern about inadequate technical know-how, which is consistent with the fact that they have larger investment needs in education and training (See Table 13).

Last but not the least, the companies were asked to express their opinions about their overall satisfaction with the financial conditions in Sweden for game developers (see Table 20).

Factor	0 to 1		2 to 9		10 to 40		Total	
	Pos Neg		**Pos** Neg		**Pos** Neg		**Pos** Neg	
Overall satisfaction with the financial conditions	**0%** 33%		**17%** 50%		**20%** 40%		**12%** 47%	

Table 20. Overall Satisfaction with the Financial Conditions.

Pos: percentage of companies that answered 4 or 5 (*Good* or *Very good*), Neg: percentage of companies that answered 1 or 2 (*Very poor* or P*oor*).

Almost half of the companies have a negative view of the financial conditions, and only 12% have a positive view. This dissatisfaction is once again in line with what Cressy & Olofsson (1997) find in their study. None of the small companies expressed satisfaction with the financial conditions, but most of them have neither a positive view nor a negative view. Almost half of the medium and large companies seem to be negative about the financial conditions. The explanation can be that these companies tend to interact more with external financial environment than smaller companies do; hence, it is easier for such companies to express their opinions in the discussion.

5.2 *Summary*

In order to provide an overview of the analysis previously discussed in this chapter, this section gives an aggregated summary. After summarising the analysis regarding general investment needs and capital structure of the game developers, aggregated analyses of debt and equity follows. Lastly, our findings of the determinants of capital structure are presented.

5.2.1 General investment needs and capital structure

Most of the companies in this branch are not profitable, with an average return on assets at -19%. The total assets consist of 16% intangible assets and 10% tangible assets, and the most common and important intangible assets are R&D. The majority of a company's assets in this branch seem to be of current nature.

The largest investment needs in the industry, for companies of all sizes, are *product development.* There appears to be different investment focus among different size of companies, but far from all companies are able to realise all their investment needs. *Poor market image*, *low liquidity* and *low profits* seem to be the largest concerns for all game developers. It seems that financial problems are prominent for many companies in the industry, but the severity might differ between companies of different size. Generally, the game developers, especially the medium and large companies, have a rather negative view of the overall financial conditions in Sweden.

On average, the game developers have a debt-equity ratio around 1, and larger companies seem to have more sources of finance than smaller ones. The most important sources of finance for all sizes of companies seem to be *company profits* and *equity from the owners*. The game developers seem to prefer retained profits to all other finance sources, and prefer equity to debt, which is not exactly consistent with what is predicted by Pecking Order Theory or the theory about equity control aversion.

5.2.2 Equity

The evidence for predicted equity control aversion is not very obvious, as most game developers seem to value the advantages of having new partner-owners either financially or operationally. The companies in general are more positive about having employees as new partner-owners than others forms of partner-owners, such as risk capitalists/"business angels" and going public, where control aversion might be a decisive factor along with the cost considerations. Only one fourth of the companies have actively searched for new owners in the last three years. However, there is large difference between different size groups: as many as 80% of the large companies have done that, but none of the small companies. The degree of control aversion might vary between companies with different sizes.

5.2.3 Debt

Companies in the game industry use predominantly short-term debt rather than long-term. *Loans from credit institutions* are the most common and most important source of long-term liabilities, and *accrued income and expense* and *trade payables* are the most common and most important sources of short-term liabilities, as well as *payment in advance from customers*. All the companies seem to have very strong and negative opinions about banks, especially among the medium companies. It seems quite common for the companies in the game industry to back their bank loans with private collaterals.

5.2.4 Determinants of capital structures

Effective tax rate appears to have marginal effect on capital structure in the game industry, as most companies in this branch are not profitable enough to take advantage of the tax-shield provided by the interest payment.

Non-debt tax shield seem to be *positively* related to the debt ratios, as companies that are profitable enough to take advantage of non-debt tax shields probably need more debt tax shields as well.

Firm size appears to be *positively* related to the debt ratios, which seems to provide evidence for that higher probability for bankruptcy and larger bankruptcy costs keep smaller firms from using high leverage. However, the result does not support the theory that the smaller companies, suffering from the restriction of maturity length from the lenders, depends more on short-term debt.

Growth opportunities seem to be *positively* related to long-term debt ratio, but *negatively* related to short-term debt ratio. There seems to be no evidence for various influences from agency problem on the capital structure decision in the game industry. The result reflects probably the maturity matching principle as a common practice in the companies.

Asset structure does not seem to be relevant for the capital structure in the game industry, which seems to provide no evidence for Collateral hypothesis. However, the result supports the finding that the asset structure in a small company is not relevant to its debt capacity, due to the intertwining of owner's private economy and the firm's economy in such companies. Our survey also shows that it is common with private collateral for bank loans in this industry.

Age seems to be *negatively* related to the leverage, which confirmed the proposition that young companies with insufficient retained earnings tend to finance the business with external financing, while older ones tend to follow the "pecking order" and finance their earnings with accumulated retained earnings instead.

Profitability seems to have a trivial effect on the capital structure and is not included in our study, due to the multi-collinearity problem.

6 CONCLUSIONS AND PROPOSALS FOR FURTHER RESEARCH

Based on the empirical findings and analysis in chapter 5, we will now turn to discussions about their implications and other concluding remarks. Finally, some ideas on further research are presented.

6.1 Conclusions

The aim of this thesis is to investigate what the main determinants for SMEs' capital structure are, and how well existing capital structure theories can be used to explain leverage decision in SMEs, with a focus on Swedish game developers. Further, the thesis is also intended to examine whether there exists a financial gap and its possible causes.

Our results show that non-debt tax shield, firm size, growth opportunities and age are, to various extents, determinants of capital structure in the game industry, while effective tax rate and asset structure seem to have marginal effects. It appears that the concerns about financial distress and the practice of maturity matching tend to explain the capital structure among game developers. There is also evidence for the influence from information asymmetry and pecking order, but not all aspects of the pecking order seem to be followed strictly by the game developers. The control-loss aversion is not very obvious, but its existence is observed to some extent. However, the tax benefit of debt, agency cost of debt, and Collateral Hypothesis do not seem to predict the capital structure in the game industry. In general, it shows that some of the existing capital structure theories can explain SMEs leverage decisions to some extent; however, adaptation is needed to fit these theories into the SME context.

Our results show that far from all game developers are able to fulfil all their investment needs; hence it could be argued that a financial gap exists between financing demand and financing supply in the game industry. Low profitability of the companies leads to low retained earnings, thus insufficient internal financing. Availability of external financing is also limited for the game developers, especially for those smaller ones, due to problems such as information asymmetry and their high risk profiles. Due to the severe information asymmetry in the branch, external financiers tend to perceive even higher risks of the game industry than their actual risks.

Since the high operational risks in this industry are hard to manage or diversify, reducing the information asymmetry between game developers and the external financiers might be the most effective way to narrow the financing gap. Efforts are needed from both the demand side and the supply side. From the demand side, the game industry must find creative ways to communicate with the financial community, without revealing competition-sensitive information, in order to attract their attention and increase their understanding of the whole industry. Game developers should also try to be innovative in searching for new sources of funds. From the supply side, the financial community should take Swedish game developers more seriously, since they are expected to have large growth potential in the coming years. The Swedish government should also show more interests in this young and promising industry, as they contribute to improve the entrepreneurial climate, to create job opportunities and to increase export. It is important to point out that there are other needs than financial that must be addressed for the game industry to be successful, such as market expertise and contacts. The financial community as well as the Swedish government should be able to tailor financing solutions to fit the special needs and risk profiles of the game developers.

There are already many creative solutions in other countries with the purpose to narrow the financial gap and support the game industry, mostly in the form of public support systems in order to increase the competitiveness of their game developers, e.g. Canada, United Kingdom and France. In Canada, a system of very generous tax credits cover up to 65% of their R&D expenses for the Canadian game developers (Strömbäck, 2005). There is a similar tax credit system in place in the UK. The authorities in the UK, as well as in Canada, work actively to support their game industry through providing industry contacts and general advice. In France, no tax credit system is yet in place[14] but non-financial support such as information, education and business services are provided by regional initiatives (Strömbäck, 2005).

For companies that are not profitable enough to concern about tax issues, the pan-Nordic funding program, PILOT (see Section 2.2), is probably a more effective approach. The innovative design of the program facilitate the communication between the game developers and their financiers, effectively reduce the risks for the financiers, and offer young and small game developers the opportunity to get in contact with the large publishers. PILOT is still at a conceptual phase, and time will tell whether the program will function as designed and meet all

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[14] Dominique de Villepin, the French Prime Minister, announced in 2005 that a new tax credit system, modeled after the Canadian system, will be introduced in 2006.

the expectations. However, the innovative approach of the program will at least serve as a source of inspiration for financial community and the government when tailoring finance solutions for the game industry or other similar industries.

6.2   *Recommendations for Further Research*

Our rather low R-squared suggests that there are other factors that can contribute to explaining the capital structure decision in SMEs. The model can also be tested with a longer study period to take the fluctuations in SME capital structure caused by potential macroeconomic influences into consideration.

This thesis has exclusively examined game developers in Sweden as a proxy for Swedish SMEs. A study in the context of another industry or another country will shed some new light on the issue of SME financing through identifying potential industry-specific or country-specific features.

Finally, a discussion about innovative solutions tailored for SME financing will be highly appreciated by the academics and practioners alike.

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APPENDICES

Appendix A. The questionnaire

1. Company facts:
Year of establishment:

Number of employees:

Turnover, KSEK:

Export share (%)

2. To what extent do you agree with the following statement?
(1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree)
- New owner-partners are largely advantageous for the development of SMEs.
- It is better to sell the company than to take on new owner-partners.
- The most important reason for new equity partners is financial.
- The most important reason for new equity partners is the expertise they provide.
- New equity should come from the profits of the company.
- It is preferable to borrow from the bank rather than to take on new owner-partners.
- The disadvantages of new owner-partners are greater than the advantages.
- Risk capital (equity) funds can provide market knowledge of importance.
- Risk capital funds lack the knowledge needed to become owner-partners in SMEs.
- Risk capital funds have too short a horizon in their investments.
- The costs (broadly defined) of having risk capital funds as owner-partners are reasonable
- If one looks for owners with a long-term perspective other companies in the industry can provide important market knowledge for the companies in which they participate.
- Private individuals with a business background are suitable owner-partners for SMEs.
- It is good for business development to have employees as owner-partners in SMEs.
- Going Public is the least expensive way to raise equity for a small company.
- Going Public is no alternative for a small company.

3. Have you been actively search for new owners in the last three years? Please mark one of the boxes below with an X.

Yes   No

4. To what degree are the following factors constraints on game developers' development?
(1=no importance, 2=very small importance, 3=small importance, 4=great importance, 5=very great importance)
- Low profits
- High debt-equity ratio
- Low liquidity
- Lack of product development skills
- Lack of marketing skills
- Inadequate technical know-how
- Deficiency of managerial skills

- Poor market image due to smallness _____

5. What do you think about the overall financial conditions for game developers in Sweden?
(1=very poor, 2=poor, 3=neutral, 4=good, 5=very good)

_____

6. To what extent do you agree with the following statement?
(1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)
- Banks usually provide game developers with finance at a reasonable price _____
- The bank is very competent in business matters _____
- Banks' demands for collateral are too onerous _____
- The bank has little knowledge of game developers _____
- Banks are good at solving financial problems for game developers _____
- Banks should be competing more actively with one another _____
- Banks usually demand too high an equity-debt ratio from game industry _____
- It is desirable for banks to take more of a stake in game developers _____

7. Rank your company's investments needs over the last three years. Please, fill out the percentage of the investment needs realised.
(1=very low, 2=low, 3=neither high or low, 4=high, 5= very high)

                                                                                        Percentage realised

- Buildings _____
- Production equipment _____
- Product development _____
- Marketing/market development _____
- Education and Training _____

8. Rank your company's three main financing sources by writing the numbers 1, 2 and 3 (1= your main source) in the boxes above the following alternatives. Please, also write the alternative's percentage of your total financing.
                                      Percentage of total financing

☐

Company profits: _____

☐

Equity from the owners: _____

☐

Risk capital from individuals:
(not related to the owners) _____

☐

Risk capital from risk capital funds: _____

☐

Capital from the stock market: _____

☐
Loans from friends and family: _____

☐
                                          - 68 -
Bank loans: _____

☐
Funding from business suppliers: _____

☐
Funding from business customers: _____

☐
Government loans: _____

☐
Regional fund loans: _____

☐
Loans from other sources(NUTEK): _____

☐
Other* _____

* Please specify: _____

9. If you have market bank loans as one of your main financing sources, who is standing behind the collaterals?

The company	*Private*	*No collaterals*

Appendix B-1: Long-term vs. short-term liabilities I

The percentage in the table indicates the share of the companies that used respective type of liabilities in year 2004.

	Type of liabilities	Number	Percent
Long-term liabilities	Loans from credit institutions	11	16%
	Check account	5	7%
	Debt from group companies	2	3%
	Convertible	2	3%
	Other long-term debt	*15*	*22%*
	Total	**27**	**40%**
Short-term liabilities	Accrued income and expense	67	99%
	Trade payables	52	76%
	Tax payables	18	26%
	Payment in advance from customers	10	15%
	Loans from credit institutions	7	10%
	Debt from group companies	7	10%
	Check account	3	4%
	Debt from minority interest companies	1	1%
	Loans from shareholders	1	1%
	EU loans	1	1%
	Other short-term debt	*60*	*88%*
	Total	**68**	**100%**

Source: Annual Reports

Appendix B-2: Long-term vs. short-term liabilities II

The percentage in the table indicates the average share of total liabilities that is financed by respective type of liabilities in year 2004.

	Type of liabilities	Average
Long-term liabilities	Loans from credit institutions	5%
	Convertibles	1%
	Check account	1%
	Debt from group companies	0%
	Other long-term debt	*7%*
	Total	**13%**
Short-term liabilities	Accrued income and expense	36%
	Trade payables	14%
	Payment in advance from customers	6%
	Debt from group companies	5%
	Tax payables	2%
	Check account	1%
	Loans from credit institutions	1%
	Loans from shareholders	0%
	Debt from minority interest companies	0%
	EU loans	0%
	Other short-term debt	*21%*
	Total	**87%**

Source: Annual Reports

Appendix C-1: Intangible assets I

The percentage in the table indicates the share of the companies that used respective type of intangible assets in year 2004.

		Number	Percent
Intangible assets	R&D	24	35%
	Patent and brand name	7	10%
	Goodwill	4	6%
	Database	1	1%
	Other intangible assets	2	3%
	Total	**31**	**46%**

Source: Annual Reports

Appendix C-2: Intangible assets II

The percentage in the table indicates the average share of various intangible assets.

		Average
Intangible assets	R&D	93%
	Goodwill	72%
	Patent and brand name	52%
	Database	9%
	Other intangible assets	100%

Source: Annual Reports