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Innovations' impact on political and regulatory institutions

The digitization and deregulation of the Swedish financial market

Master of Science Thesis

in the Management and Economics of Innovation Programme

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Abstract

Title: Innovations' impact on regulatory and political institutions – the digitization and deregulation of the Swedish financial market

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During the 1980's, Sweden's financial market underwent an extreme make-over. It went from highly regulated, with an exchange monopoly held by the Stockholm Stock Exchange, to a deregulated, liberal financial market. The main deregulations were the deregulations of the credit market and international transactions. The exchange monopoly was finally discarded in 1993, and trading volumes grew thousand-fold. A key player in the 1980's Swedish financial sector was Optionsmäklarna, OM. They were the first to introduce call options on stock, but more importantly they were the first to introduce a digital market place. And they managed to do it in a highly regulated environment where the question was if they were even allowed to operate. How was that possible? And what happened to the Swedish financial industry during the 1980's?

This thesis seeks to bring clarity into how the digitization affected the deregulations and the enormous growth of the Swedish financial market during the 1980's. What is found is no linear causality, but rather a self-reinforcing system consisting of three factors; deregulation, digitization and the growth of financial market. And they did not only affect each other, they accelerated each other! The thesis further explains how OM managed to grow and prosper in this heavily regulated environment. OM realized that the key to success was the digital equipment, and the introduction of a digital market place, thus removing the old-fashioned physical auctions. This meant a discontinuous shift in the development of the financial market, as a lot of the old knowledge about trading was rendered obsolete and new knowledge was demanded.

Up until the 80's, the development of the Swedish economy had followed the same trajectory for the better part of the 20th century. The digitization, deregulations and development of the financial sector during the 1980's laid ground for a paradigm shift in Swedish economy. From a development block being based on hundreds of years old mechanical technologies, heavily dependent on natural resources, to a development bloc based on digital technology.

Key words: Swedish Financial Market, Digitization, Deregulation, Institutions, OM, Optionsmäklarna, Economic Development, Development Blocks, Technological Discontinuities

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1 Introduction

In this first chapter I will give a short introduction to this thesis. It will commence with a background, describing the setting and the enormous change Sweden underwent during the 1980's. This is then followed by the purpose of this thesis, and the research questions. Following that is a short description of the limitations, and finally a summary of the report's structure.

1.1 Background

A lot has been written on the impact of institutions on innovations, how they can both spur and suppress them. Conversely, not even near as much has been written about innovations' impact on institutions. Yet it is an important question, how much do innovations, be it financial, digital or some other form, affect regulatory and political institution? In this thesis the focus will be on digital innovation, and the transformation of analogue data and methods into digital data and methods, usually referred to as digitization.

During the 1980's, the Swedish financial sector went through an extreme make-over. Take a look at Figure 1. In 1979, annual trading at the Stockholm Stock Exchange, which then was a regulated monopoly, was around 2 billion SEK. This was, nominally (!), around the same amount as in 1918. In 1993, Stockholm Stock Exchange became the world's first ever profit driven exchange, and just a few years later reaches an annual trading volume of over 1,000 billion SEK. A key player in the 1980's Swedish financial sector was Optionsmäklarna, OM. They were the first to introduce call options on stock, more importantly they were the first to introduce a digital market place. Without the digitization of financial marketplaces, the enormous increase in transaction volumes could never have taken place.

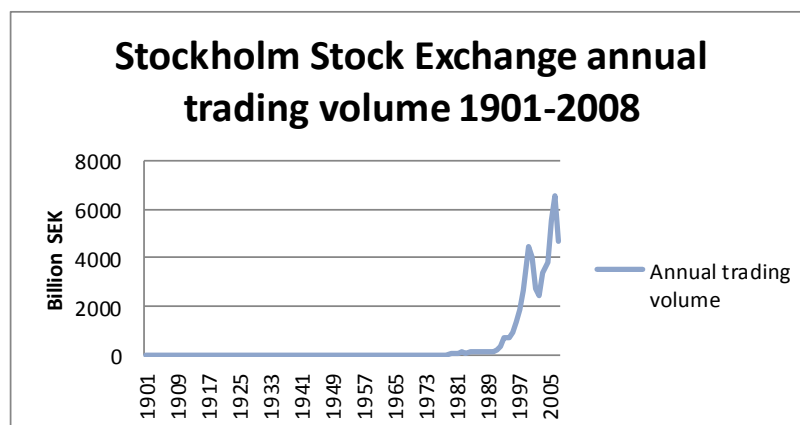


Figure 1 Stockholm Stock Exchange annual trading. Source: Irding (2010)

The development of the financial and digital sector during the 1980's represented a paradigm shift in Swedish economy. From being based on mechanical technology and the dependency of natural resources, to a digital, competence intensive economy with a working financial sector spreading risk and allocating capital. What happened in between is story about the combination of deregulation, growth of the financial market and digitization.

1.2 Purpose

The purpose of this thesis is to shed light on the relationship between digitization and its impact on regulatory and political institutions. In particular, it will focus on the deregulation and growth of the Swedish financial market during the 1980's, and how that was affected by the digitization.

Furthermore, the success of OM will be researched, particularly focusing on how they circumvented the monopoly and the firmly regulated Swedish financial market.

Research questions:

- **RQ1:** How did the digitization affect the growth and deregulations of the financial market in Sweden?
- **RQ2:** How could OM grow and prosper despite the heavily regulated environment?

1.3 Limitations

Even though general conclusions on innovations' impact on institutions will be discussed, the thesis will focus on the digitization and deregulation of the financial market in Sweden during the 1980's.

Furthermore, it will not go into all details concerning the success factors of OM, it will focus on the area connected to circumventing regulations and their digital solution.

1.4 Structure of the report

Following this introductory chapter, the methodology for the creation of this thesis will be presented. Here, the choice of method will be motivated, the work progress described as well as some comments about the data collection.

Subsequently follows an extensive literature review, which constitutes the framework with which the data will be analyzed. The three main building blocks, aligned with the purpose of this thesis are innovation, institutions and financial markets. Before diving deeper into those, Schumpeterian economics will be presented. Schumpeterian economics is a way of looking at economic development as a dynamic process characterized by technological change and disequilibria, as opposed to neoclassical economic theory building on equilibriums and the view of technological change as only an external force.

Following the theoretical framework, the gathered data will be presented. It is divided into a number of sub-parts; the deregulations, the digitization, the effect on governments and subsequently the story about OM. Next, this data will be analyzed with the help of the concepts brought up in the theoretical framework. The analysis part will be constructed based on the two research questions presented above. Finally, a conclusion about the findings will be presented, summing up this thesis.

2 Methodology

This chapter will describe and discuss the methodology used to produce this thesis. It will describe choice of method, work progress and data collection, as well as discuss the validity and reliability of the results.

2.1 Choice of method

There are many different ways in which the choice of method can be explained. One is to conclude what research strategy is used. The research strategy for this thesis can best be described as formal theory, Scandura and Williams (2000) defines it as summarizing literature of research in order to conceptualize models for empirical testing. When reviewing the analysis of RQ1 in chapter 5.1, it is obvious that a few hypotheses are tested in regards to the empirical findings of this thesis. The hypotheses were however created after collecting the data, thus entailing both an inductive as well as a deductive approach (Bryman and Bell 2007). Furthermore, the research strategy is indeed qualitative, as Bryman and Bell (2007, Pp. 28) notes, qualitative research emphasize words rather than quantification in the collection and analysis of data. Very little quantitative data have been used in this study, and when used it is usually for illustrative purposes.

Another way to categorize the choice of method is through the research design. The research design is the framework for collection and analysis of data (Bryman and Bell 2007). The research design for this thesis can be best characterized as a case study. According to Bryman and Bell (2007, Pp. 62), a basic case study entails detailed and intensive analysis of a single case, and is concerned with the complexity and particular nature of the case in question. A case can be an organization, a location, a person or an event. In this thesis, there are in fact a number of sub-cases intertwined into one large encompassing case; the digitization, deregulation and growth of financial markets in Sweden during the 1980's. Some sub-cases are, for example, OM, the deregulation of the credit market, the introduction of a digital market place etc.

2.2 Work progress

This thesis builds on questions raised by Christian Sandström, Ph.D., and discussions with associate professor Jan Jörnmark. They were interested in the reformation of the Swedish financial industry during the 1980's, and the impact it had on the entire Swedish industry. The main focus area was the deregulation and digitization of the Swedish financial sector, and OM's introduction of a digital market place for options trading. This lead up to the research questions presented above. Flick (2011) states that research questions should address a socially relevant issue and the answer of them should lead to some kind of progress through, for example, providing new insights. When reviewing the literature, one can find some written about the deregulations of the Swedish financial market during the 80's, but none that really connects it to the digitization. Thus, I dare to imply, this thesis indeed provides new insight. Flick (2011) further states that research questions should be theoretically based. The research questions stated above are first and foremost based on the theories of innovation and

institutional change, respectively represented by digitization and deregulation. Bryman and Bell (2007) adds that the research question should be clear and researchable, both criteria met by the research questions in this thesis.

After the research questions were established, a conclusive literature review was done on the theoretical topics concerned, as well as a review of what has been written empirically about the digitization and deregulation of the Swedish industry. This is in line with Flick (2011), who concludes that one should begin a research study by finding and reading what has been published so far about one's issue and about the field of the research. The findings are, in this thesis, presented in chapter 3, theoretical studies, and in chapter 4, empirical research. I have chosen to present the literature findings in chapter 4 together with the data collected from interviews, instead of putting them in different chapters, because they complement each other and give a clearer picture when presented together than when presented apart. More on the data collection will be found in chapter 2.3.

The data was then analyzed in accordance with the theoretical framework. In addition, and in line with a formal theory strategy (Scandura and Williams 2000), different hypotheses were tested with the empirical data. The hypotheses were derived from the theoretical framework, as well as from the opinions and theories of some authors and interviewees. The final exhaustive hypothesis was derived from my perception and discussions with my tutor.

2.3 Data collection

As noted above, this thesis is entirely focused on qualitative data, and this chapter focuses on how it was gathered. Scandura and Williams (2000) emphasizes the importance of using more than one variety of method when collecting data, in order to obtain corroborating evidence. This is commonly known as triangulation, an increase in which results in a more robust set of findings. In this study, studies of secondary data in the form of books, articles and government protocols have been combined with primary data in the form of semi-constructed interviews.

2.3.1 Primary data

The primary data was gathered through interviews, probably the most widely employed method in qualitative research according to Bryman and Bell (2007). There are however different forms of interviews. As opposed to interviews used in quantitative studies, qualitative interviewing is a lot more open and focuses on interviewees' own perspectives. Bryman and Bell (2007) states that the two forms of interviews used in qualitative research are unstructured and semi-structured. In the unstructured interview, the researcher uses at most an aide-mémoire as a brief set of prompts to him- or herself to deal with a certain range of topics, while in the semi-structured interview the researcher relies on an interview guide, although the interviewee has a great deal of leeway in how to reply. In this thesis, semi-structured interviews were used, mainly because the same events were discussed with different people, and it was important to get everybody's view on these events in order to triangulate. The

interview-guide was however very flexible, and changed over time, as new information was gathered. Here follows a list and description of the people interviewed.

People interviewed

Ulf Johansson, product manager and key account manager at Accept Data during the 1980's. He was heavily involved in the development of back-end administrative systems for the financial industry.

Sören Olausson, co-founder and Vice President of Accept Data, later Vice President for OMX Technology. Sören was a part of creating the OM-Accept digital trading system. He later joined OM Technology and worked on selling the solution to international exchanges. He described a lot of the reasoning behind OM's decisions and the launch of the digital market place.

Kristian Blixt, Head of Operations at Alfred Berg during the 1980's. Kristian was leading the administrative work at Alfred Berg during the time, and was thus a perfect witness to the change that the digitization brought to the administrative side of the industry.

Kjell-Olof Feldt, Swedish Minister of Finance at the time of the deregulations. Kjell-Olof was the one initiating and carrying out the deregulations during the 1980's, he has supplied invaluable insights into the reasoning of the government.

Ulf Göransson, options broker at Alfred Bergs during the 1980's. Ulf witnessed OM's introduction of digital options trading, and the impacts it had on the industry.

2.3.2 Secondary data

The secondary data is vast, and it was gathered almost exclusively from written documents such as articles, books and reports – a complete list of which can be found in the reference section. According to Bryman and Bell (2007), documents should meet the following criteria; they can be read, they have not been produced specifically for the purposes of the research, they are preserved so that they become available for analysis, and they are relevant to the concerns of the research. This was kept in mind when selecting which articles and books to read. To triangulate, a lot of articles and books cover the same event or phenomena, from different authors. In addition, a lot of the documents are also describing things that have been discussed in interviews, again to triangulate.

Bryman and Bell (2007) quotes Scott (1990), when suggesting criteria for evaluating documents; *authenticity* and *credibility*. *Authenticity* refers to how genuine the evidence is and that the origin is unquestionable. The documents used as sources for this thesis have all been critically scrutinized, and the main bulk of them come from research journals and large book publishers. A high *credibility* means that the document is free from error and distortion. In this thesis no unpublished books or articles have been used, and thus I am confident with the credibility that comes with the sources and authors of the documents. One should note that some articles have been written by people with strong

political beliefs, which can mean that they tweak or manipulate numbers or facts to make their point. This has been dealt with, again, through triangulation of sources.

2.3.3 Validity and Reliability

Validity of a study can be viewed in different ways; two main ways being internal and external (Scandura and Williams 2000). Internal validity assesses the causality of the results; that the procedures used to gather the data demonstrate that the cause preceded the effect, and that alternative explanations have been discarded. The extensive research on the cause of the growth of financial markets and the deregulations, with triangulation of the data, leaves me confident that the internal validity of the results is high. Multiple hypotheses were tested in accordance with the empirical data, and the concluded hypothesis has an exhaustive width which to a large extent incorporates alternative explanations or renders them obsolete.

External validity refers to the generalizability, and how the result can be generalized across times, settings, and individuals (Scandura and Williams 2000). As the research questions is formulated, one can see that no generalizability is sought in this thesis, it merely aims to explain a certain time-period and setting. Thus, the external validity is low, with nothing else intended. This is in line with Bryman and Bell (2007) who concludes that case study research is, by its nature, not generalizable.

Finally, reliability is concerned with the question of whether the results of a study are repeatable (Brymand and Bell 2007, Pp. 40). The results in this study are derived from documents and interviews. Assuming that the interviewees do not change their mind about what happened and why, the same results should be the outcome of a future round of interviews with the same interviewees. The documents used, and listed in the reference list, are available and easy to access, thus the results from studying them will be the same. The only reliability issue is whether another researcher would interpret texts and events differently. This being a qualitative study, obviously means that a lot of interpretation has taken place, although by triangulating sources I am confident with the data. In addition, I personally have no political interest in the results, and have intentionally kept ideological discussions at a minimum.

3 Theoretical framework

This chapter offers an extensive literature review of the related theoretical topics. Before going deeper into the building blocks of this theoretical framework; innovation, institutions and financial markets, it is important to take a more holistic view and understand the surrounding system in which they operate. Fundamentally, this thesis concerns economic development. Yet, the framework will not follow traditional neoclassical theories of economic development, but rather building on, what I like to call, Schumpeterian economics.

3.1 Schumpeterian economics

Using traditional neoclassical models to analyze economic development imposes a few vital limitations. As Schumpeter (1912) noted, it is not possible to explain economic change by previous economic conditions alone. The economic state of a society does not emerge simply from the preceding economic conditions, but from the preceding total situation. Schumpeter goes on to note that neoclassical economic theory describes economic life as a circular flow, running on in channels essentially the same year after year. Furthermore, he concludes, traditional economic theory emphasize economic systems' tendency towards equilibrium. Instead, as Schumpeter's pioneering theories explain, the development of an economy is entirely foreign to something happening in a circular flow or in the tendency towards equilibrium; it is instead spontaneous and discontinuous change in the flows, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing. Carlsson and Stankiewicz (1991) explain, technology's nature and role can be viewed as a base for economic development.

As an illustrative example, when reviewing a central part in neoclassical economic theory, "the law of diminishing returns", one can see how, in order to explain economic growth, one need to tend to innovation. Barnett and Morse (1963) trace the origins of "the law" back to the thinking of Malthus, Ricardo and Mill in the 1800's, while Cannan (1892), Shephard and Färe (1974), and others credits French economist Turgot. Shephard and Färe (1974, Pp. 69) describes the law of diminishing returns as a proposition asserting that *"as equal quantities of capital and labor are applied successively to a given plot of land, the output resulting from these applications will increase monotonically at first up to a certain point, after which further applications will result in steadily decreasing product increments tending to zero"*. While this concerns agriculture, it can be applied to a modern context as well. In doing so, this implies that the development of an industry or technology, and ultimately the economy, will at first give increasing return on investment, up to a point when the development saturates and every invested production factor will instead yield lower and lower return on investment. The reason that economies do not simply stop developing, and thus the foundation of economic development and growth, Schumpeter (1912; 1942) believes, is innovation. Innovations create a new development trajectory, or alter the existing one, driving economic development. When reviewing the

history, one can view these development trajectories as blocks, with different technologies, or innovations if you prefer, as base.

Development blocks

As mentioned above, the neoclassical models are very concerned with finding equilibriums. In addition to Schumpeter, Nelson and Winter (1982) and Beinhocker (2006) offers the same notions in their theories of evolutionary economics¹, viewing economies as anything but stable, and instead as dynamic and full of disequilibria. Also Dahmén (1989) stresses the disequilibrium nature of economic development. He views the economic development as divided into “development blocks”, defining them as “*a sequence of complementarities which by way of a series of structural tensions, i.e. disequilibria, may result in a balanced situation*”. At the core of each development block is a basic technology, or a technological paradigm. In a more complex development block, the block can consist of a cluster of technologies. From the sequence of disequilibria, the development block inherits a dynamic force, since the disequilibria generate tension within the system, which in turn creates the development potential. Dahmén (1989) illustrates it with the growth of a plant, and the continuous unbalance, disequilibria, between the root system and the part above ground. The unbalance drives the plant to continue to grow, alternately beneath and above ground. However, when the development potential has been fully exhausted, Carlsson and Stankiewicz (1991) explains, e.g. when the underlying technology has reached its maturity, or when its superseded by a new technology, or when the market potential has been fully exploited – the dynamic force of the development block expires, resulting in the dawn of a new development block. This can be well contextualized by looking at the digitization and Moore’s law, which has meant a shift from a mechanical development block to a digital one.

Digitization and Moore’s law

Digitization² is defined as the conversion of data into digital form for use in a computer (Nationalencyklopedin). This often follows a shift in technology, from analogue to digital, and thus digitization in this thesis can sometimes, albeit a bit ambiguous, refer to the transformation of analogue technology into digital. When talking about digitization and technological advancements, not one single innovation is more related to this than the transistor (Jörnmark and Ramberg 2004). A transistor is an electronic component that can enhance analogue signals or switch between two positions as a reaction to a digital signal. These transistors can be placed together in an integrated circuit, or a chip, which with enough processor speed is labeled a microprocessor, which works as a small computer. This is the heart of all digital technology.

¹ Beinhocker calls it complexity economics, but the fundamental notions are the same.

² Sometimes the word digitalization is used. And, even if it can refer to “to digitize”, digitalization is also a medical term for administration of digitalis in the treatment of heart disease. Thus, digitization will be used throughout this thesis.

Since the introduction of the transistor, and in turn microprocessors, industry after industry has been digitized. Jörnmark and Ramberg (2004) describe how traditional industries such as the radio, calculator, typewriter and watch industry were transformed by the transistor. Many of them were considered growing industries before the introduction of the transistor, but they were now being dissolved as large companies were shaken and not unusually terminated (see for example Facit and Hasselblad further down).

What is astonishing with the digitization is how quickly it happened, and is still happening. The traditional way of illustrating this is through Moore's law. In his initial article, Moore (1965) explained how the lowest cost per transistor is reached as, with time, more and more transistors are used on the same circuit. He also argued that there was an optimal amount of transistors at a certain time. Too many transistors will cause higher cost per transistor since more circuits will malfunction due to inferior technology. On the other hand, too few will cause higher costs due to that fixed costs will be covered by fewer transistors. Moore's law stated that this optimal amount would double every other year.

Jörnmark and Ramberg (2004) describe how the law has been revised by others, as well by Moore himself. The doubling is now predicted to take place every 18 months, and is not so much associated with costs as it is with how many transistors that can actually fit on a circuit. Still, Moore's law remains an illustrative way to describe, partly, the amazing speed of digitization, as well as the increasing processor speed available, at a decreasing price.

Even though the transistor indeed was important, one cannot only look at the lone innovations, just as one cannot look at the lone actors behind them. It is important to view them all as a large system.

Systems view

To nuance the neoclassical picture of an economy even further, instead of traditionally looking at firms as individual actors in a micro economic environment, Carlsson and Stankiewicz (1991) take on a systems view and introduce what they refer to as technological systems. A technological system is *“a network of agents interacting in the economic/industrial area under a particular institutional infrastructure and involved in the generation, diffusion, and utilization of technology”* (Carlsson and Stankiewicz 1991, Pp. 94). The implication of this is that neither firms, nor innovations, if viewed individually, can explain economic change. Alternatively, they have to be viewed as part of a larger system.

To summarize, the theoretical framework of this thesis is based on Schumpeterian economics, with focus on innovation and technological change as the basis for economic development. Furthermore, it takes on a systems view, and assumes technological change to happen within technological systems. As seen from the definition above, technological systems are highly concerned with institutional

infrastructure and generation and diffusion of technology. Thus follows a deeper dive into innovations and institutions.

3.2 Innovation

Dorf and Byers (2008) defines innovation as an invention that has produced economic value in the marketplace. It can be a new product, a new process, new services or a new way of doing business.

Rogers (1998) elaborates by stating that innovation is concerned with extracting value from ideas, and, as opposed to an invention, has to be directly associated with commercialization. It is safe to say that innovation is a broad expression, yet the definitions of it usually reach the same consensus: an invention or idea with some economic, or commercial, value.

King et al (1994) takes on a more linear approach and believes innovation can also be characterized as a process of movement through three overlapping stages; invention, innovation and diffusion. An invention is a new idea or product which not yet has any economic value. Innovation, however, implies that the invention has economic value and a usable form. Subsequently, diffusion is the spread of the innovation, and its use in practice.

Sources of innovation

Even if we know what an innovation is, it is perhaps more interesting to understand where they come from. Drucker (1998) offers a comprehensive view. Some innovations do come from a flash of genius. However, Drucker explains, most of the successful ones result from a conscious, purposeful search for opportunities. The sources for these opportunities are either from within or outside the company. The sources within a company can be unexpected occurrences, incongruities, process needs or industry and market changes, while sources outside the company can be demographic changes, changes in perception and new knowledge (Drucker 1998, Pp. 4). If the above is sources for opportunities, Bommer and Jalajas (2004, Pp. 14) take on a different perspective and instead focus on sources of the actual innovation. Internally, the source can be a coworker, internal R&D, the marketing group, top management or manufacturing. Externally, the source can be users or customers, competitors, cooperation with other companies, suppliers, research institutions, consultants, acquisition of new equipment, professional journals and the internet. Needless to say, innovations come from ideas, and not uncommonly the same person generates multiple ideas; the entrepreneur.

Entrepreneurship

In close connection to innovation is entrepreneurship. Although Schumpeter (1912) earns a lot of credit for his take on entrepreneurship, the first one to define “the entrepreneur” was French economist J.B. Say around 1800. He defined an entrepreneur as one that “shifts economic resources out of an area of lower and into an area of higher productivity and greater yield (Drucker 1985, Pp. 21). Drucker (1985) concludes that there are many definitions of entrepreneurship and the entrepreneur, sometimes misleadingly incorporating high-tech, small firms, start-ups etc. An entrepreneur, Drucker (1985, Pp.

28) states, is someone that always searches for change, responds to it, and exploits it as an opportunity, and innovation is the specific instrument of entrepreneurship. This instrument can cause great pain for incumbent firms, through creative destruction.

Creative destruction

Now we have seen what an innovation is and what it come from, but what does it imply for the development of the concerned industry? On a macro level, innovation is a vital part of any economy. As mentioned above, Schumpeter (1942) believed that innovation was the explanation of economic growth. The cornerstone of his theory is what he calls creative destruction, where the creation of new products or services destroys the old ones. This also implies the destruction of incumbent firms, a necessity for the liberation of production factors and space for new actors to operate in an innovative way. Jörnmark and Ramberg (2004) explain how this naturally creates crises in incumbent industries. Innovation creates crises, which in turn leads to a creative response or space for new actors. This is, of course, dependent on the magnitude of the innovation's impact. An innovation might be just a small improvement along the traditional performance trajectories, or it can be a disruptive innovation having a discontinuous impact on a technology or industry.

3.2.1 Technological discontinuities

Innovations can be of different magnitude, as to how much they change an industry or market. Tushman and Anderson (1986) state that technological change is a cumulative process, until it is punctuated by a major advance; a discontinuity in the development. This discontinuity offers an improvement in price-performance to an extent that no increase in scale, efficiency, or design can make older technologies competitive with the new technology. Sandström (2010) makes the distinction of discontinuous and steady-state innovation, where a discontinuous innovation is one that causes a discrete and momentous shift related to a firm's competence base or network. While a steady-state innovation is in line with the current competence base or network. Dosi (1982) explained this with the help of technology paradigms and trajectories. The development of technologies usually follows a certain trajectory, with steady-state innovations, but is sometimes punctuated by a discontinuous change that upsets the current paradigm (compare to Kuhn (1970) and his take on science paradigms further down).

This can be illustrated with technology S-curves. Traditionally used in marketing literature to illustrate market acceptance of new technologies, S-curves can also be used to illustrate technology development and shifts (Brown 1993). What Brown illustrates is how emerging technologies develop slowly in their early stages, until they reach a critical stage in development when performance improves rapidly, albeit with steady-state innovations. This is usually connected to that the technology is more understood and more prevalently used. Finally, a technology reaches its inherent limit, when only marginal improvements can be made. What follows is a discontinuous shift into a new technology, represented by a new S-curve.

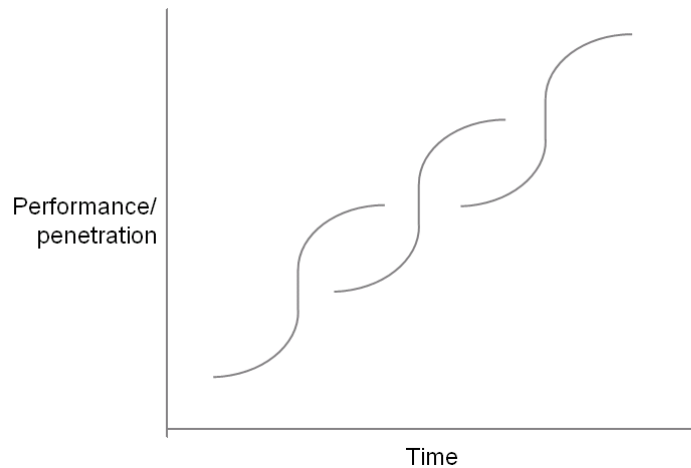


Figure 2 Technology S-curves

Interestingly, the S-curves are overlapping. This illustrates how old technologies do not simply perish the moment a new technology is introduced, they coexist for a while. In fact, old technologies can enjoy an additional boost in performance due to incumbent firms spending heavily in research to stay in the game with their technology, usually referred to as the sailing-ship effect (De Liso and Filatrella 2008).

Christensen (1997) makes the distinction between sustaining and disruptive innovation. While academic work in this field at first largely focused on incumbent firms' capabilities and resources (see core competencies and rigidities below), Christensen instead focuses on the market and firms' value networks. Christensen noted that incumbent firms have a hard time coping with innovations that are not initially demanded by current customers, since the firms lack financial incentive to invest in such innovations. Based on this, Christensen views a disruptive innovation as an innovation which underperforms on traditional performance trajectories, but which brings new performance attributes to the market, while sustainable innovation enhances current performance attributes. Notice the difference to Tushman and Anderson (1986), who viewed the technological discontinuity as something that enhanced current price-performance trajectory. As illustrated in Figure 2, the S-curves show how new technology is usually inferior to old technology on the traditional performance measures.

Sandström³ concludes that technology change, in his example electronic technology, is destroying established structures. Industries are transformed, and turned upside down, and it is not really a matter of debate, it is a fact.

³ Christian Sandström, Ph.D Chalmers University of Technology. Speech at TEDx Gothenburg 2009-11-28.

”It is not debatable, you can like this or not. But, it is. Just like gravity. Are you for or against gravity? Would you vote for or against gravity? It is pointless, it is”
(Sandström⁴).

There are plenty of examples of all the above. Sandström (2011) and Sandström et al (2009) describe the fate of Hasselblad, a once very successful professional camera manufacturer, who failed with the transition from analogue to digital camera technology. Their case studies show that Hasselblad had limited resources to experiment with new digital imaging, and instead focused on their niche strategy of highly professional analogue equipment. The digital imaging was initially of inferior quality, as seen above distinctive for a disruptive innovation, and Hasselblad thought adopting it could harm their brand. The digital imaging technology did however mean a change in performance trajectories, and a discontinuous change to the camera industry, which almost rendered Hasselblad bankrupt. Hasselblad did, however, later on acquire the needed digital resources and survived the disruption. Another example is Facit (Sandström⁵) a world-leading company in mechanical calculators, who failed the disruption and discontinuous move into electronic calculators. These are examples of how core competencies of a firm become core rigidities.

3.2.2 Core competencies and rigidities

Dorf and Byers (2008, Pp. 72) defines core competencies as a firm’s unique skills and capabilities, and is composed of the collective learning in the organization, the skills of its people, and its capabilities to coordinate and integrate know-how and proprietary knowledge. Leonard-Barton (1992) focuses on capabilities and means that they are considered core when they differentiate a company strategically. A comprehensive summary of the meaning is supplied by Teece et al (1990, See Leonard-Barton 1992, Pp. 112), “[core competencies are] a set of differentiated skills, complementary assets, and routines that provide the basis for a firm’s competitive capacities and sustainable advantage in a particular business”. Dorf and Byers (2008) further state that, unlike physical assets, they do not lose value when used and shared, instead they can, through learning, expand and grow over time.

However, core competencies that are deeply enrooted in a company can cause what Lieberman and Montgomery (1988) calls incumbent inertia, when facing changes in the firm’s environment. This means that an incumbent firm can become inflexible and respond poorly to changes in the environment or competitive threats. This is due to that they may be locked in to specific assets or that they may be reluctant to cannibalize on its existing product lines. Leonard-Barton (1992) explains how core capabilities then become core rigidities. Here, managers face a paradox, core competencies are what make the company unique, yet they are also what keep the company on a certain development trajectory. When facing big changes in an industry, do you rely on your core competencies or do you

⁴ Christian Sandström, Ph.D Chalmers University of Technology. Speech at TEDx Gothenburg 2009-11-28.

⁵ Ibid

make the effort to acquire new competencies? Imagine how the managers at Hasselblad and Facit (and Kodak, and Nokia; the list can be made long) have battled this question.

As we have seen, innovation always causes some creative destruction (Schumpeter 1942), as new technologies replace old ones. The same goes for capabilities and competencies, technological discontinuities can destroy existing capabilities and competencies within an industry. Tushman and Anderson (1986, Pp. 442) explain, “*The hallmark of competence-destroying discontinuities is that mastery of the new technology fundamentally alters the set of relevant competences within a product class.*” They distinguish two different competence-destroying discontinuities; product and process. A competence-destroying product discontinuity either creates a new product class, e.g. cars, or substitutes an existing product, e.g. transistors vs. vacuum tubes. Competence-destroying process discontinuities instead change the way a product is made. On the other side, Tushman and Anderson (1986) also conclude that there are competence-enhancing discontinuities as well. These are discontinuities that represent revolutionary improvements in price-performance that build on existing know-how.

Competence-destroying discontinuities are usually represented by a new technology. When being the first actor to introduce this technology, this indeed has some implications.

3.2.3 First-mover advantages

Recall the S-curves from above. When the shift comes from one technology into a new one, there has to be an actor behind it, driving that shift. This is the first-mover, and being one implies a few advantages and disadvantages. Mueller (1997) describes how most industries follow the same scenario. In good Schumpeterian fashion they arise in the midst of an important innovation, i.e. the beginning of an S-curve. Following that logic, Mueller states, all industries thus start out as monopolies. In some cases, the innovation is protected by a patent or trade secret and the monopoly are thus sustained for a long time. In others there are imitators appearing almost immediately. In all cases, however, successful innovators will always be followed by imitators. Needless to say there are both advantages and disadvantages with being first to a new market.

Lieberman and Montgomery (1988) define first-mover advantages in terms of the ability of pioneering firms to earn positive economic profits, i.e. profits in excess of the cost of capital. Dorf and Byers (2008, Pp. 104-105) lists some of the most important ones. First of all, being first usually means a lasting branding impression on customers. (As an illustrative example, try to recall the first persons to walk on the moon. Neil Armstrong and Buzz Aldrin are usually remembered, but poor Charles P. Conrad was the third person to walk on the moon and not many remember his name). Furthermore, being first may enable the tying up of strategic resources, e.g. Starbucks claiming the busiest corner in a new city. Another important advantage is the possibility to set standards and rules.

Lieberman and Montgomery (1988) chose to divide the sources of first-mover advantages into three primary sources:

- i. Technological leadership
- ii. Preemption of assets
- iii. Buyer switching costs

Sustainable leadership in technology (i) relates to the concept of learning curves, i.e. costs fall with cumulative output. This generates a sustainable cost advantage for the first-mover, that is to say if learning can be kept proprietary (see the “appropriability problem” further down) and the firm can maintain leadership in market share. Furthermore, in connection with keeping learning proprietary, pioneers can gain advantage if technology can be patented or maintained as trade secret. This is especially true in pharmaceuticals (Lieberman and Montgomery 1988, Pp. 44). Secondly, preemption of scarce resources (ii) enables the first-mover to gain advantage by controlling assets that already exists, prohibiting competitors from tapping them (see Starbucks example above). Finally, buyer switching costs (iii) can refer to two different costs; either for the customers or for the late entrants. The customers have transaction costs or investments when adapting to the first-mover’s products, and are thus not likely to invest again to switch, whereas the late entrants might have to invest heavily to attract customers away from the first-mover firm.

Mueller (1997) divides the first-mover advantages into either related to their demand structures or to their cost functions. On the demand-side the first-mover can have an advantage simply due to that customers have already tried their product, and thus incurred the sunk set-up costs if any exists (iii above). The most prevalent on the cost-side is the decrease in average cost with output, either by economics of scale or by learning effects (i above).

On the other side, Lieberman and Montgomery (1988) concludes, there are also first-mover disadvantages. One of them, incumbent inertia, has already been introduced above. In addition, the first-mover can be sort of the test dummy for the new market, and be the source of resolution of technological and market uncertainty for the late-movers. This means that the first-mover has to make, and usually pay for, all the mistakes, which then late-movers can learn from. Furthermore, Mueller (1997) explains, the first-mover can in a sense be blinded by the learning curve advantage. The learning advantage, he states, is so powerful that its costs may fall way below those of new entrants, even if it chooses a second best product design or production technique. This enables a late-mover to surpass the first-mover’s product, if it finds a way to overcome the first-mover’s cost advantage.

Scherer (1999) highlights a problem with technology innovation connected to first-mover disadvantages; the spill overs that technological advances cause. Scherer calls this the “appropriability problem”, which refers to the fact that the investors do not appropriate all the value of an innovation. Other parties, who have made no investment what so ever, can still take part of the technological

advancements. Lieberman and Montgomery (1988) highlight the same phenomenon, and refer to it as free-rider effects. They point out that late-movers can free-ride on the first-mover's investment in R&D, customer education and infrastructure development. Here, Scherer (1999) emphasizes, it is important with a rigid patent system in order to prevent a market failure, leaving no investments to be done in new technologies (Scherer 1999). A rigid patent system is only a small piece of what institutions means for industries and innovation. After reviewing the literature for innovation, it is now time to move into the second building block of this theoretical framework; institutions.

3.3 Institutions

Institutions can be defined as the humanly devised constraints that structure political, economic and social interaction. The concept can be divided into two components; informal and formal institutions, an appropriate analogy could be the actual rules of a game and what is considered sportsmanlike conduct. Informal institutions are sanctions, taboos, customs, traditions and codes of conduct, while formal institutions are constitutions, laws, policies and regulations (North 1991, p.97). For this report the focus will be on the later, formal rules. Campbell (2004) adds that institutions also include monitoring and enforcement mechanisms. He further states that institutions reflect the resources and powers of the ones responsible for creating them, and thus in turn affect the distribution of resources and power in the society they exist. Thus, all references to *institution* in this thesis, unless otherwise stated, will refer to the following definition:

Formal rules, such as constitutions, laws, policies and regulation, and their monitoring and enforcement mechanisms.

3.3.1 Institutional change

What is perhaps more relevant for this thesis than institutions themselves, is institutional change. There are multiple factors that drive institutional change. Peters et al (2005) argues that the triggers of change are both political and economic. However, their case studies show that political actors devise solutions that emphasize economic objectives more than catering to the opinions of different political constituencies. Peters et al (2005, p.1296) also stresses the importance of collective institutions as well as individual actors' ideas;

“Ideas do matter a great deal in explaining institutional change. Institutions provide the structures and resources necessary for these ideas to change the course of policy, but it is difficult to conceive of political and institutional change that is not propelled by some set of ideas about political outcomes and the arrangements to reach those goals.”

North (1991) sees institutional change as incrementally evolving, connecting the past with the future, just as Peters et al (2005) and Hagberg (2007) who views institutional change as path dependent. Hagberg (2007) describes how the institutional governance of society renders in a system dependency. What this means is that new regulations and organizations is created in line with the current

institutional framework, which in turns cements the existing structure even firmer. Related to this, Peters et al (2005) also draw a parallel between policy changes and replacements of scientific paradigms. Kuhn (1970) describes how development of scientific paradigms follow certain trajectories, and the efforts put in by individuals deeply entrenched in an old established paradigm, or development trajectory, when challenged with new knowledge and theories. This is very similar to the theories of disruptive innovation and incumbent inertia (Lieberman and Montgomery 1988). According to Peters et al (2005) the same thing goes for political change, when policies and ideas are well institutionalized and profoundly defended by incumbent individuals and organizations, they are hard to change. However, Hagberg (2007) adds, there is always a possibility for organizations and individuals to go against current institutional framework, albeit with a substantial included risk. On the other hand, being too system dependent, or too aligned with current institutions, inhabits a risk of becoming rigid and static. So that when the institutions change direction, the organization might be left behind. Again, this is very similar to the theories of technological discontinuities presented above.

In addition, North (1991) views the economic development of any nation dependent on the evolution of institutions, as they define the choice set for actors and therefore determines transaction and production costs and hence the profitability and feasibility of engaging in economic activity (North 1991, Pp. 97). Williamson (1979) follows the line of transaction costs, meaning that an unnecessarily complex regulation for simple transactions incur unneeded costs. Conversely, use of simple regulation for complex transactions invites strain. The concept of transaction costs will be developed further in chapter 3.4.3.

To nuance the picture of institutional change, one can explore in what fashion policy changes are made; as a reaction to the environment and external forces or catering to ones ideological beliefs and ones projection about future development. Calder (1988) employs the concepts of reactive and proactive policy states. In a reactive policy state, policy changes are driven by outside pressure, where reaction prevails over strategy where the two come into conflict. Also, a reactive state fails to undertake major independent foreign economic policy initiatives, even if it has the power to do so. On the contrary, in a proactive state, strategy prevails reaction, and policy changes are driven by inside ideas and own initiatives. Torjman (2005, Pp. 3), thinks in similar terms, and states “*reactive policy emerges in response to a concern or crisis that must be addressed. [...] Proactive policy, by contrast, are introduced and pursued through deliberate choice*”.

When it comes to the change in financial regulation, Brunnermeier et al (2009) suggests that the vast body of financial regulation is mainly incrementally extended to close loopholes which some earlier fraud or financial disaster has exposed. They state that even larger discrete leaps in development of regulation, when reviewed closely, is merely an attempt to harmonize already existing best-practices, as opposed to being results of political fundamental principles or underlying theory.

3.3.2 Institution vs Innovation

Now, institution and institutional change have been discussed we turn our heads towards their connection to innovation. As the title of this thesis rather obviously declares, it concerns innovations' impact on institutions. It is important to understand, however, that it is in no way a one-way influence. On the contrary, a lot is written on institutions' influence on innovation, and a summary of it will be presented below.

Nelson and Soete (1988) conclude that governments play an essential role in monitoring as well as encouraging innovation. The factors affecting innovation come in many forms, King et al (1994) presents a 2 x 2 matrix, acknowledging that institutions can both influence and regulate innovation, and through supply push and demand pull actions.

Table 1 Dimensions of Institutional Intervention. (King et al 1994, Pp 151)

	Supply Push	Demand Pull
Influence	<p>Knowledge building <i>Funding of research projects</i></p> <p>Knowledge deployment <i>Provision of education services</i></p> <p>Subsidy <i>Funding development of prototypes Tax benefits for investment in R&D</i></p> <p>Innovation Directive <i>Direct institutional operation of production facilities for innovation</i></p>	<p>Knowledge deployment <i>Training programs for individuals and organizations to provide base of skilled talent for use</i></p> <p>Subsidy <i>Procurement of innovative products and services</i></p> <p><i>Direct or indirect provision of complementarities required for use</i></p> <p><i>Direct or indirect suppression of substitute products or services</i></p> <p>Mobilization <i>Programs for awareness and promotion</i></p>
Regulation	<p>Knowledge deployment <i>Require education and training of citizens</i></p> <p>Subsidy <i>Reduction in general liabilities for organizations engaging in innovative activity</i></p> <p><i>Modification of legal, administrative, or competitive barriers to innovation and trade</i></p> <p>Standards <i>Establishment of standards under which innovative activity might be encouraged</i></p> <p>Innovation directive <i>Establishment of requirements for investment in R&D by organizations.</i></p>	<p>Subsidy <i>Procurement support for products and processes that facilitate adoption and use</i></p> <p>Standards <i>Require particular products or processes to be used in any work for the institution</i></p> <p><i>Require conformance with other standards that essentially mandate use of particular products or processes</i></p> <p>Innovation directive <i>Require that specific innovative products or processes be used at all times</i></p>

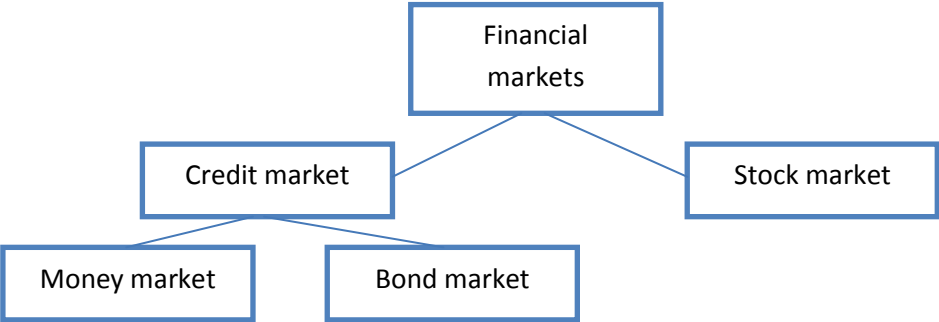
The supply push side refers to actions when the government wants to encourage companies to innovate, and increasing the supply of innovations on the market. On the other hand, the demand pull side refers to actions when the government has a certain innovation in mind, which they intend to increase the demand for. There is no point in digging deeper into the different aspects, since this is

merely a summary of how institutions can spur innovation. However, perhaps the most convenient for this thesis is what is found under regulation and supply push; *modification of legal, administrative, or competitive barriers to innovation and trade*. This is exactly what you do when you deregulate.

Up to now, the concepts of innovation and institutions have been presented. Yet, since this thesis is concerned with the impact on the financial regulations and markets, there is a third, and final, part of this theoretical framework left to introduce; financial markets.

3.4 Financial markets

In order for companies to produce their products and services they need more than labor, they need capital. Capital is available through capital markets, also called financial markets. This is the collective term for markets where capital is supplied and demanded. There are a few ways to decompose financial markets and Eklund (2004) suggests the following.



The credit market is where borrowed capital is traded, whereas the stock market ownership in companies is traded. The credit market is in turn divided depending on the liquidity of the credit instruments. In the money market, capital is available quickly, e.g. deposits in a bank, whilst the bond market include capital with lower liquidity, e.g. long term loans. (Eklund 2004)

3.4.1 Purpose

Swedish Ministry of Finance (SMF) defines the financial sectors’ missions to be the “efficient and reliable mechanisms for transferring and transforming funds between savers and borrowers, for mediating payments and for handling financial risks” (SOU 2000:11, Pp. 15). In general, authors agree financial markets exist for two fundamental reasons; to spread risk and to allocate and channel capital.

Spreading of risk

Saint-Paul (1992) focuses on the earlier; the spreading of risk through financial diversification. He addresses the allocation of capital as well, concluding that the usual emphasized role of financial markets is to channel savings towards investments, but he focuses on the spreading of risk and the financial sector’s link to the real sector. Saint-Paul (1992) draws on the theories by Adam Smith (1776) and the concept of division of labor. Smith concludes that the greatest improvement in productivity is specialization through division of labor. Simply put, specializing in a certain area, task

or technology, albeit by a firm or a single worker, is the most vital source to increased productivity. However, Saint-Paul (1992) adds, a greater division of labor will put increasingly specialized resources at a greater risk. Hence, the role of financial markets is to allow such division of labor by permitting actors to hedge risks by holding a diversified portfolio.

“Financial markets have a positive impact on productivity because they allow a greater specialization of resources. A particular resource (capital or labor) can be specialized into a narrower range of tasks without being harmed through the concomitant increase in risk because financial instruments are used in order to deal with it. Hence, financial markets contribute to growth by facilitating a greater division of labor. Conversely, in the absence of financial markets, diversification will be done through technology. That is to say, firms will choose technologies that are less risky, more flexible than otherwise, but less productive.” (Saint-Paul 1992, p. 765)

On a macro level, this implies that a nation lacking a well-developed financial sector will suffer from limitations to its industries’ productivity. This is because the division of labor will be limited by the risk it implies, when companies are not able to hedge their risk on a financial market. It also implies that in a nation where diversification has been done through more general technologies, there is little need to develop a financial market since technology already provides some insurance. Saint-Paul (1992) addresses this as a “low” equilibrium, as opposed to a “high” equilibrium where risks are distributed via the financial markets and specialization, and thus productivity, is high. Here, he adds, there is a need for government intervention in order to develop a financial market and bring the economy to the higher equilibrium.

Allocation of capital

Wurgler (2000) takes on the other purpose of financial markets, which is the allocation of capital. In countries with an efficient financial market, capital is invested in sectors that are expected to have high returns and withdrawn from sectors that are expected to have lower returns. Allen and Gale (2001) add that the allocation also involves channeling funds from actors with surplus to actors with deficits, i.e. allowing savings to be invested in firms. SMF (SOU 2000:11) elaborates the latter, stating that the allocation and channeling of funds between individuals, companies, industries and geographical areas enables a larger production than otherwise possible, adding to the effect that spreading risks causes presented above. They also add that a vital task for the financial sector is to make sure investors, i.e. lenders, gets paid (SMF SOU 2000:11, Pp. 31).

An interesting point from Wurgler’s (2000) research is that efficiency of capital allocation is negatively correlated with state-ownership. This is likely to be because resource allocation is less guided by profit-maximization in favor of political motive in state-owned firms.

A concept that spans over both the credit and stock market is securities. In fact, in a sense, securities are the back bone of the financial market, and in many ways the primary product of a financial market.

3.4.2 Securities

Securities can be defined as “*a certificate attesting credit, the ownership of stocks or bonds, or the right to ownership connected with tradable derivatives*” (Oxford Dictionaries). The most common securities are stocks and bonds (both shortly introduced above). Stocks, or shares, are certificates of ownership in a company, and in turn proves investment of capital in the company. Bonds are certificates issued by governments or a public company, promising to repay borrowed money at a fixed interest rate during a specified period of time. To put it simple, the securities market allow companies to raise capital, other than through bank loans, either by letting other actors buy a part of their company (bonds) or borrowing money by issuing debt (bonds). The above is done in the so called primary market. However, in order for investors to participate in the primary market, they want to know they can later sell their stocks or bonds. This is done on the secondary market (Irving 2010).

This basically means that securities are first sold when they are issued, and can then be sold again and again, with their value varying over time. Even though stocks and bonds are the most common securities, there are plenty more. One very important for this thesis is options.

Options

During the 80's, OM introduced a new financial product to be traded in Sweden; options. An option is a derivative, which means it derives its value from an underlying asset. There are many different derivatives and they have been increasingly scrutinized in the midst of the 2008 financial crisis. Options as such have however been around for a long time; the first prevalence of options in history dates as far back as 332 BC, when philosopher and mathematician Thales bought options for olive presses. More commonly referred to in historical literature is the trading of tulip bulb options in the Netherlands during the 17th century. (Shao 2011)

An option gives the right, but not the obligation, to buy (call option) or sell (put option) an underlying security, financial asset or commodity, at an agreed-upon price (strike price), during an agreed-upon period of time or specific date (Gyllenram 2012). When trading with options, the underlying asset does not exchange ownership, only the right to buy or sell the asset. An option only exists under a period of time, when the time runs out the owner must exercise the right to buy or sell, or the option expires. In addition to buying options, one can also write an option. When writing an option one takes on the obligation to either buy or sell an underlying asset to the one purchasing the option. This gives four positions when trading with options (Gyllenram 2012): Buy call option, write call option, buy put option and write put option. The four can be summarized as follows:

Table 2 The four positions in options trading

	Write	Buy
Call option	Takes on the obligation to sell an underlying asset at a certain price, anytime during a certain period of time.	Buys the right, but not the obligation, to buy an underlying asset at a certain price, anytime during a certain period of time.
Put option	Takes on the obligation to buy an underlying asset at a certain price, anytime during a certain period of time.	Buys the right, but not the obligation, to sell an underlying asset at a certain price, anytime during a certain period of time.

The different positions represent four different ideas of what you think will happen to the underlying asset. In order to make money, you want the underlying asset to either increase or decrease in value depending on your position. The positions' outlooks can be summarized as follows:

Table 3 Positions' hopes and profit possibilities

	Write	Buy
Call option	Decrease in asset value. Profits from the price of the option.	Increase in asset value. Profits from buying an asset at a lower price than the market price.
Put option	Increase in asset value. Profits from the price of the option.	Decrease in asset value. Profits from selling an asset at a higher price than the market price.

When you write an option, you want the buyer to not execute the option due to change in the asset value, to a value that makes the strike price a worse price. E.g. if you write a call option, and the value of the asset decreases, the buyer of the call option will not be willing to buy the underlying asset since the strike price is higher than the value of the asset, and thus let the option expire. Then you as a writer of the option profited whatever the buyer paid for the option (Grythberg 2006). In that case, you can make money on a static or declining market. It is important to note that profits are not only done when options expire. On the contrary, most profits are done when trading with options on a secondary market. They are traded just like stocks, and the value of the options depends on what kind it is and how the market moves in relation to that.

As a final remark, it should be noted that most of the above concerns options trading in financial markets. Shao (2011) concludes that options are available everywhere in our everyday life, and he exemplifies with the help of the film industry; producers can buy the right but not the obligation to dramatize a certain book or script.

An important factor when it comes to trading options, in fact trading of any sort, is transaction costs. Irding (2010) concludes that in order for exchanges to take place, transaction costs should be low. If every actor had to go through the process of gathering information on all available options, evaluate

them, negotiate, and sign a contract, exchanges would not take place at all. Just imagine going to the grocery store and having to negotiate a contract on every product!

3.4.3 Transaction cost economics

Nobel Prize winner R. H. Coase introduced the reasoning around transaction cost economics (TCE) in his article “The Nature of the Firm” (1937). He stumbled across it when trying to understand why companies exist. What Coase figured out was that if the marginal cost of organizing a transaction within a firm was below or equal to the costs of letting the market, or prize mechanism, organize it, the organizing of the transaction will be done under the organization’s authority (Coase 1937, Pp. 404). Shelanski and Klein (1995, Pp. 337) expresses it as follows; “*Simply put, TCE tries to explain how trading partners choose, from the set of feasible institutional alternatives, the arrangement that offers protection for their relationship-specific investment at the lowest total cost*”.

In order to discuss transaction costs more thoroughly, we need an understanding of what they in reality are. Dyer (1997, Pp. 536) decomposes transaction costs into four separate costs related to transacting:

- i. Search costs: Costs of gathering information to identify and evaluate potential trading partners.
- ii. Contracting costs: Costs of negotiating and writing an agreement
- iii. Monitoring costs: Costs of monitoring the agreement to ensure that each party fulfills their part of obligations
- iv. Enforcement costs: Costs of ex post bargaining and sanctioning a trading partner who does not perform according to the agreement

Shelanski and Klein (1995) and Williamson (1979) present the array of different contractual arrangements as a spectrum, going from non-transaction specific to a highly specific arrangement. On one pole there is the anonymous spot market, where trades are done with different actors without any particular relationships. Here, market prices allow for exploitation of profit opportunities, and market participants are swiftly adapting to changing circumstances as information is revealed mainly through prices. Williamson (1979) calls this a non-transaction-specific governance structure. On the other pole, is a fully integrated transaction, where trading parties are within the organization, or at least the structure is highly specific and tailored to the specific needs of the transaction. Here, coordination is fully controlled and information is exchanged within the organization. TCE theory suggests that such a structure offer greater protection for specific investments and provide relatively efficient mechanisms for responding to change where coordinated adaption is necessary. However, as opposed to investments in a spot market, the incentives for profit maximizing might be weaker and it normally incurs additional bureaucratic costs. Which transaction arrangement to choose depends on the nature of the transaction; the current transaction costs, the degree to which relationship-specific assets are involved, the amount of uncertainty about the future and the trading parties’ actions, the complexity of

the trading arrangement, and the frequency with which the transactions occurs (Shelanski and Klein 1995, Pp. 337).

In order to illustrate the above, I would like to give an example:

Consider we have two actors, one is a beet farmer and the other is a producer of beet juice. They both have operational costs within their organizations, and they have transaction costs for buying and selling beets. The beet farmer has transaction costs TC_f ; he has to go to the market, he needs to collect information on what the other farmers' prices are in order to price his own beets right (search costs), and he needs to negotiate deals with different buyers (contracting costs). The beet juice producer has transaction costs TC_j . Just like the beet farmer he has to go to the market, he has to gather information on what the different farmers' prices are in order to get the best deal (search costs), and he needs to negotiate deals with one or more beet farmers (contracting costs). After the deal they both have monitoring costs in making sure that the exact amount of beets gets delivered and the exact price is paid, if this is not the case they will have further transacting costs in the form of enforcement costs.

Remember, this is now done on one end of the spectrum, on the spot market. Consider moving to the other end of the spectrum; the beet farmer and beet juice producer instead created a joint company. Now, they are relieved of all costs that going to the market implied, and instead they do all their transactions in between themselves. They are relieved of costs of going to the market, but it might incur a new internal transaction cost, most likely from added administrative work and coordination, TC_i . Assuming their operational costs stay the same, if $TC_i < TC_f + TC_j$, they are likely to stay as a company. If, however, $TC_i > TC_f + TC_j$, they are better off using the market mechanism. This is what Coase (1937) concluded when explaining why economical organizations, or companies, exist.

It is important to add, as Shelanski and Klein (1995) states, joining together might incur lower incentives for profits. They will no longer be searching for getting the most profitable price for beets. Since all transactions are done internally, there will be no information on the price of their beets. As a final remark, the above shows two opposite poles of the spectrum, there are of course examples of arrangements in between, with joint ventures, long-term contracts etc.

3.4.4 Monopolistic nature

Continuing the example of the beet farmer and beet juice producer from above, it is easy to see how they in the first scenario benefitted from one single market. Without a single meeting point, negotiating prices, arrange transaction and closing deals would be very hard. By the same token, there is easy to see that it is better with just one market, so buyers and sellers do not have to put in the effort and resources to travel around to many different ones. The same thing goes for stock markets. Irding (2010) explains, in theory any two private individuals are free to trade stocks with each other at any price, whenever they desire. However, to find a buyer or seller at any time could be troublesome, thus there are exchanges. In addition, Irding (2010 Pp. 38) explains:

“The product offered in a stock market is not the stock alone, but also an efficient process for transferring ownership. This process will become more efficient as more information becomes available about the security being sold. When all trading occur in a common location, a sharing of information takes place, which is a process that enhances the accuracy of prices and thus improves the quality of the product“.

4 Empirical study

In this chapter, the empirical findings from literature and interviews will be presented, starting with the deregulations and digitization, and ending with the case about OM.

4.1 Deregulations

The deregulation of the Swedish financial industry during the 1980's had huge effects and meant a transformation to a more liberal and open financial market. The most influencing deregulatory actions were the deregulation of the credit market, and the deregulation of international transactions.

4.1.1 Deregulation of the credit market

The Swedish Krona was devalued in both 1981 and 1982, this made Swedish export industry highly competitive towards the rest of the world (Kokko 1999). The devaluation was described as an offensive strategy to increase Swedish export. However, Feldt (2012) claims that it was rather a defensive strategy from the ruling social democratic party (Sveriges Socialdemokratiska Arbetarparti, SAP), to cope with the large budget deficits and an escalating national debt. In 1983 and 1984, Swedish export industry profits doubled, jobs were created and the Swedish economy seemed to grow and prosper. But appearances can be deceptive, in reality the productivity in Swedish industry showed hardly no increase. The incumbent Swedish industry companies, weighted by outdated traditional values, merely strolled on while lacking in innovation and breakthroughs on new markets (Feldt 2012). The companies only used the devaluations to raise prices and earn larger profits; increased inflation was a fact. It did, however, increase liquidity and company surpluses were increasingly invested in financial markets (Kokko 1999). In addition, Jörnmark and Ramberg (2004) add, the market for venture capital was beginning to grow during the late 1970s. Practically it has been around for centuries, but it now did one of the period's strongest come-backs. The most important effect, Jörnmark and Ramberg states, was the capital for expansion was now available outside the incumbent firms institutionalized structures, and a new entrepreneurial culture were born.

Englund (1990) believes it is clear that the rapid development of the financial markets preceded most of the deregulations.

"[...] the basic factor appears to have been the growing financial imbalances with large budget deficits, large financial savings in the private sector and capital inflows from abroad. In this situation the emerging money market facilitated circumventing the regulations, and it became clear that the government deficits could be smoothly financed in the market. Hence, the stage was set for deregulation." (Englund 1990, p.386).

He even goes as far as to proclaim the fast development of financial markets to be the main driving force behind the deregulation, in that the new economic environment with active finance markets contributed to make the regulations increasingly inefficient (Englund 1999). Something that also the Riksbank admitted in the report that announced the deregulations; *"[...] the aim of restricting credit*

expansion is not attained, whereas permanent usage of regulations has a destructive effect on the structure of credit markets” (Sveriges Riksbank 1985, Pp.15). Feldt⁶ develops this destructive effect by pointing out what would have happened if the deregulations had not been carried out; capital would have been continuously moved out of the country, with that also entrepreneurship, and the rationalization of the Swedish industry would have been prolonged even further. Feldt⁷ also addresses the government’s budget deficits; the regulations on the credit market hindered the Swedish government to borrow money to cover budget deficits. It was merely impossible to issue enough treasury bonds with current regulations.

Englund (1990), Larsson (1993) and Feldt⁸ recognized the increased circumvention of regulations preceding the deregulations. One way to circumvent regulations, Feldt explained, was the creation of bank certificate of deposits (CDs). CDs, interest-bearing securities issued by banks, were increasingly traded on a secondary market. The banks created companies who procured bank certificates and in turn could, in practice, lend out money. Furthermore, Larsson (1993) explains, the CDs made it possible for banks to gain capital, on the side of ordinary deposits, and could thus cope with any liquidity quotes the Riksbank demanded. The banks could also act as a broker between lender and borrower, an activity that was difficult to regulate (Englund 1999). Larsson (1993) concludes that the development of the financial markets had made it possible to circumvent practically the whole financial regulatory system. Larsson (1993 Pp. 43) quotes Bengt Dennis, at that time president of the Riksbank: *“just before deregulations started, the banks were capable of coping with any loan ceiling. The techniques to manipulate the system were fully developed and the Riksbank were practically powerless”*.

The deregulation in 1985, popularly referred to as the November revolution, removed ceilings on loans, set the interest rates free, and reduced demands on loan security (Englund 1990). Kokko (1999) means that this led to a shift in strategy for banks and other financial companies; from minimizing risks and maximizing profits to increasing lending volumes and market share. The credit market expanded significantly and in five years the private sectors’ debt increased from 100 to 150 percent of GDP. Feldt explains that the deregulations was done by him and the head of the Riksbank, he did not discuss this with Prime Minister Olof Palme. *“You do what you have to do, I will not understand it either way”* Palme said according to Feldt⁹. The decision to deregulate was seen as somewhat controversial and not in line with the traditional socialistic views of a large part of SAP’s constituency. Blomé (2012) concludes that these, from a socialist point of view *“politically impossible”*, deregulations were now made possible due to the pressure from capital leaving the country. In fact, Blomé states, Feldt together with his secretary of state Erik Åsbrink and head of the Riksbank Bengt

⁶ Kjell-Olof Feldt, ex Swedish Minister of Finance, interview June 14th 2012

⁷ Ibid

⁸ Ibid

⁹ Ibid

Dennis, had clear liberal market ambitions and were aiming to build a financial market that was also internationally competitive.

4.1.2 Deregulation of international transactions

After deregulating the credit market deregulation was still not complete, since international transactions remained partly regulated (Englund 1999). There were restrictions on Swedish residents' portfolio investments in foreign currency as well as foreign residents' portfolio investments in Swedish securities. As described above, the deregulation of the credit market led to an enormous increase in lending. In combination with the large profits in the Swedish industry, where the companies had nowhere to invest their money, it existed an over liquidity on the Swedish financial markets (Feldt¹⁰). This put pressure on the regulations of international transactions, which were gradually deregulated from 1985 and deregulated fully in 1990.

SMF (SOU 2000:11) concludes that the regulations of international transactions used to work as efficient trade barriers. In the report it is concluded that these barriers were being dismantled all over the world, but particularly in Europe. The deregulation created a European financial market, with increased opportunity for financial operations.

A noteworthy circumstance is that Sweden was among the last OECD countries to deregulate the credit market and international transactions. (Feldt¹¹)

4.2 Digitization

In a world with almost all information exchange and trading being done electronically, it is hard to imagine that just 20 years ago, trading was done by exchanging actual real pieces of paper. Blixt¹² describes it as an analog world, where trucks drove around with the securities, and there were an actual line of work labeled "liquidity carrier". *"We could have a truck arrive during the day with securities from SEB, just to let the driver know we in turn traded the securities to Carnegie. He had no other choice than to turn around"* (Blixt¹³). The importance of the digitization of financial markets in Sweden is not questioned by anyone. Olausson¹⁴ concludes that the financial market was dependent on digital equipment in order to expand, or even function properly. Johansson¹⁵ agrees and states that without digitization, transaction volumes would never have reached the levels they did and still do today.

The technical development of the stock market in Sweden started already in the 1880s with the arrival of telephones. However, it was first in 1917 that the telephone subscribers exploded, and reached the

¹⁰ Kjell-Olof Feldt, ex Swedish Minister of Finance, interview June 14th 2012

¹¹ Ibid

¹² Kristian Blixt, Head of Securities Operations Söderberg & Partners, interview June 12th 2012

¹³ Ibid

¹⁴ Sören Olausson, ex Vice President Accept Data, interview June 12th 2012

¹⁵ Ulf Johansson, Senior Business Consultant & Founder Mindbanque AB, interview June 11th 2012

staggering number of 216 subscribers. With the number of telephones increasing, information and quotes could be spread quicker and it became easier to place orders and trade (Irding 2010). Subsequently, the next big thing after telephones was the electric marking system introduced at the Stockholm Stock Exchange in 1918. Then, in 1974, computerization of SSE started with communication hubs and an information exchange system (SIX). However, it was not until 1989 that trading became digital, when SSE introduced SAX (Stockholm Automated Exchange), which automatically matched buy and sell orders. Prior to that introduction, all trading had been done on the floors of SSE (Irding 2010). Blixt¹⁶ recalls the digitization of SSE in 1989 as a reaction to the success of the digital exchange systems OM introduced and sold in Europe. This did, however, put SSE far ahead in the digital development of exchanges world-wide, and for a while they even surpassed OM's digital system in terms of automation.

The digitization of SSE was in no way a simple task, there were of course those opposing it, Blomé (2012) states. He quotes (2012, Pp. 18) Thomas Franzén, board member of SSE: *"When you change a structure like this, reducing the need for intermediaries, there are afflicted departments and functions. Old knowledge is no longer worth anything, and new knowledge is needed"*. There were of course departments that were used of making money just because the trading was not done in the most rational way. Before digitization, information was almost a scarce resource, a fact people could use to make money. Olausson¹⁷ agrees, and states that, before digitization information streams were unfair, there were a lot of possibilities for arbitrage, as information were not available to everyone at the same time.

Blixt¹⁸ found the deregulation of international transactions as the real game changer for digitization. The new international possibilities came with a lot of legal issues and information transactions and seeing as the administrative work was done manually it was increasing in magnitude. In addition, the introduction of an options market by OM caused additional strain on the administrative work. The growing financial market caused the manual administration to fall behind. "In one day of work, we only managed 90% of one day's transactions, causing an increasing delay" (Blixt¹⁹). Blixt explains how this created a need for digital systems. He believes that the digitization in that sense was caused by the organizations suffering severe costs from the lacking analog administration. *"Companies did not invest in a digital system in advance; it was not until they suffered from costs that they were willing to invest"* (Blixt²⁰). Olausson²¹ thinks in similar terms, addressing that a growing financial market caused the need for developing new system for security administration to grow enormous.

¹⁶ Kristian Blixt, Head of Securities Operations Söderberg & Partners, interview June 12th 2012

¹⁷ Sören Olausson, ex Vice President Accept Data, interview June 12th 2012

¹⁸ Kristian Blixt, Head of Securities Operations Söderberg & Partners, interview June 12th 2012

¹⁹ Ibid

²⁰ Ibid

²¹ Sören Olausson, ex Vice President Accept Data, interview June 12th 2012

Alfred Berg and Carnegie, two of the most prestigious brokerage companies at the time took part in creating the company Accept Data, which in turn created a system for administrating securities.

Johansson²², Olausson²³, and Feldt²⁴ and all recognize that the digital data industry in itself experienced a tremendous growth in the beginning of the 80's. Feldt describes it as a new dynamic area, which offered possibilities to a lot of industries, not only the financial. Johansson recalls how costs for digital products decreased significantly and that the supply of competencies within the data industry skyrocketed.

Sassen (2000) highlights three properties of the developed digital products and electronic networks that affected the financial markets; speed, instantaneous transmission and interconnectivity. Fundamentally, these are also the factors that Irding (2010) brings up, when describing how the digitization lowered transaction costs. This, together with the globalization of financial markets led to orders of magnitudes of trading much greater than ever seen. SMF (SOU 2000:11) adds that the development of information and communication technology has changed the entire economy, real and financial. New technology has reduced costs, and created new distribution channels. They also conclude that the deregulation was partly happening parallel to the digitization, but in part also as a prerequisite for it to happen (SOU 2000:11, Pp. 27).

4.3 Effects on the government

Feldt²⁵ acknowledges a decrease in the acting space of the government. Already during the 1970's, companies had started to move their capital abroad through subsidiaries and clever book keeping. The internationalization of the Swedish industry had de facto already begun. This meant that the government lost a lot of their power over the Swedish companies. *"The capital has wings; it flies a lot quicker than political decisions"* (Feldt). In addition, the power over financial markets was weakened further in 1993, when SSE's monopoly was removed, and at the same time was privatized.

Sassen (1996, 2000) develops this reasoning and believes in the weakening of government power as a result of the globalization and digitization of financial markets. According to Sassen (1996), state sovereignty and the institutional apparatus in charge of regulating the economy, such as central banks and monetary policies, are being destabilized and even transformed as a result of globalization and new technologies. Sassen (2000) suggests that deregulation of domestic financial markets and the liberalization of international capital flows in combination with the digitization have contributed to an explosive growth in financial markets. This has led to an almost infinite supply of money, not bound to a certain country or region. *"Conceivably a global capital market could just be a vast pool of money for investors to shop in without conferring power over governments."* (Sassen 2000, p. 26). The

²² Ulf Johansson, Senior Business Consultant & Founder Mindbanque AB, interview June 11th 2012

²³ Sören Olausson, ex Vice President Accept Data, interview June 12th 2012

²⁴ Kjell-Olof Feldt, ex Swedish Minister of Finance, interview June 14th 2012

²⁵ Ibid

consequence of this is that the global financial market now constitutes a power that is able to discipline national governments. As an example, the foreign currency market has the power to radically alter exchange rates for some countries leaving the central bank with only futile attempts to defend their currency, as was seen in Mexico 1994-1995, where investors were leaving en masse and took out well over \$100 billion in a short period of time (Sassen 2000).

The deregulation and digitization obviously had tremendous effects on the financial sector in Sweden. One of the key actors in the middle of the turbulent 1980's, and the first to introduce a digital market place, was Optionsmäklarna, or OM.

4.4 OM

The idea of a digital market place for options came from one entrepreneur, "*the start-up guy within the Swedish financial industry*" as Johansson²⁶ describes him; Olof Stenhammar. After working as a stock broker in New York, followed by a session within the Bonnier group and a series of start-ups, Stenhammar wanted to create an option market in Sweden. This was in the beginning of the 1980s, and as earlier noted, at this time, the Swedish financial market was strictly regulated, and SSE enjoyed a regulated monopoly on stock exchange trading (Blomé 2012).

4.4.1 Institutional implications

Before the creation, Stenhammar conducted research on however the creation of an options exchange was feasible in the highly regulated environment (Olausson²⁷). Most people thought of it as "*probably illegal*" and the Bank Inspection Board claimed that an option market would infringe on the regulated stock market monopoly: "*options are futures on stocks and are thus prohibited*" they said (Irving 2010). However, Stenhammar's research showed that no law or regulation was written about options (Olausson²⁸). Together with contacts within his personal network, from SEB, Carnegie and Investor he created OM.

Even though there were no laws against options, SSE still had a regulated monopoly on exchange trading. This meant that OM, on paper, practiced fund commissioning, and they had a securities brokerage license (Blomé 2012). They used their license as a broker to match buyers and sellers, with the help of their unique digital system. Olausson²⁹ recalls, "*OM was running an exchange business in the shape of a brokerage business*". As written in Kommittédirektiv 1987:1987:1 (SMF), options trading were incorporated in the securities market law (lagen om värdepappersmarknaden (SFS 1985:571)), which meant that there were laws concerning insider trading and issuing of contract notes. However, options trading did not fall under the fund commission law (fondkommisjonslagen (SFS 1979:748) or the law for the Stockholm Stock Exchange (lagen för Stockholms fondbörs (SFS

²⁶ Ulf Johansson, Senior Business Consultant & Founder Mindbanque AB, interview June 11th 2012

²⁷ Sören Olausson, ex Vice President Accept Data, interview interview June 12th 2012

²⁸ Ibid

²⁹ Ibid

1979:749). This meant that these laws, that were created to ensure a sound development for stocks and fund trading, were not applicable on stock options. Interestingly enough, this also meant that any official trading with options were not permitted on the SSE. The standardized terms for options trading were stipulated by OM, after consultation with the National Board of Banks.

However, the fact that OM was not an official exchange imposed a few obstacles, or limitations rather. Irding (2010) and Olausson³⁰ both mentions that one of them was the fact that OM was not allowed a direct line to Reuters, the main quotation system for stocks, which meant that prices were not available in real time. Another one was that, in order to write a call option, you had to own the underlying asset (Blomé 2012). The earlier was resolved when the exchange monopoly were deregulated in 1993. The latter was resolved when the “delivery capacity requirement” was deregulated in 1990, which removed the requirement to own the underlying asset. This, Blomé explains, enabled so called short selling, i.e. selling a security without really owning the asset, which in turn created the possibility to make money on securities even when the market was falling. This meant that OM was given the opportunity to demonstrate derivatives role in the spread of risk, especially during the dip in the financial markets during the 1990s caused by the commotion in the Persian Gulf (Blomé 2012, Pp. 24)

4.4.2 The digital system

When OM obtained a securities brokerage license, Stenhammar contacted Accept Data, with whom he then developed the digital system. Stenhammar had no plans to launch an option market without a digital system, Olausson³¹ said. Accept Data was, despite their relative youth as a company, a regarded name in the financial industry. They had developed a digital back-office post-trade system (called ROLF, later updated to CLAES) for Carnegie and Alfred Berg (Johansson³²). The system developed for OM consisted of two integrated systems, thus the basis for its uniqueness. The two systems were a market place system, and a clearing and settlement system. The market place system connected buyers and sellers, quoted options series and prices, and executed trades. Irding (2010) states that the market place system was unique, even by international standards, since it was digital and did not require a physical and geographical spot for the trades to take place. At this time, SSE still held physical auctions for stocks. In the beginning, Göransson³³ recalls, some of the matching between buyers and sellers, when it came to large orders, was done manually via telephone in OM’s system. Interestingly enough, a lot of orders of derivatives are done via telephone today as well.

The clearing and settlement system took care of the post-trade administration, automatically printing contract notes, cancel orders, expiry notes and account and risk lists, but also “told” the market place system at the end of the day to create new options series if necessary. Olausson³⁴ means that the

³⁰ Sören Olausson, ex Vice President Accept Data, interview interview June 12th 2012

³¹ Ibid

³² Ulf Johansson, Senior Business Consultant & Founder Mindbanque AB, interview June 11th 2012

³³ Ulf Göransson, Head Trader Non Nordic Equities SEB Enskilda, interview July 12th 2012

³⁴ Sören Olausson, ex Vice President Accept Data, interview interview June 12th 2012

clearing system was one of the major keys of success for OM. Before the digital clearing system, risk was calculated analogously, which took time and was hard, and thus was only done on a few, large, firm-level accounts. This meant that the requirements for capital coverage were very high. In OM's system, risks and capital coverage could be calculated on individual investor's accounts (Irving 2010). This enabled OM to require significantly less capital coverage from the securities brokers at large. This, in turn, meant that a lot more investors and also smaller securities broker firms were able to trade as well.

4.4.3 The success

After just a couple of months, the options trading at OM had skyrocketed. The Swedish stock market had been a dull market for decades, Göransson³⁵ explains, and the introduction of options was something new and exciting. The interest for financial derivatives had begun to grow, he continues, and the timing for OM's entry was thus spotless. The fact that OM was backed up by large financial actors was of course an advantage, but their concept of options trading without a physical auction was in itself very appealing (Göransson).

OM was not without competition. In the end of 1986, money market broker firm Penningmarknadsmäklarna (PM) Fondkommission AB, disclosed that they, together with a couple of large money market brokers, would launch Stockholm Options and Futures Exchange (SOFE) (SMF 1987). SOFE claimed that its ambitions were not to profit from its operations, and according to Irving (2010) they had the unofficial support from SSE. Blixt³⁶ remember that the competition from SOFE was applauded by the financial industry because it pressured OM's prices. However, SOFE struggled to obtain profitability. In 1987, the Swedish government together with the Swedish Trade Council imposed a sales duty on money market instruments, and doubled the duty on shares. While this caused OM to move their operations to London temporarily (the tax were later removed in 1991, due to that the large decrease in trading caused lower tax incomes than the imposed duty), SOFE maintained their operations in Stockholm and since they were more dependent on money market instrument than OM they were hurt badly, they went out of business in late 1987 (Irving 2010). Another, and perhaps the most substantial, difference between OM and SOFE was that SOFE did not implement digital technology, and instead still went for the traditional physical market place, with a trading floor and auctions. They copied Chicago Stock Exchange's physical auctions (Göransson³⁷). Göransson³⁸ remember that they saw no need in switching to SOFE, since they were already trading at OM and that the concept that OM had was much more clear and appealing.

³⁵ Ulf Göransson, Head Trader Non Nordic Equities SEB Enskilda, interview July 12th 2012

³⁶ Kristian Blixt, Head of Securities Operations Söderberg & Partners, interview June 12th 2012

³⁷ Ulf Göransson, Head Trader Non Nordic Equities SEB Enskilda, interview July 12th 2012

³⁸ Ibid

As for higher up recognition, Feldt³⁹ explains that no particular notice was taken to OM in the government. This was basically because they did not understand the magnitude and ramification of OM's entry to the financial market. Politics is based on real economics, he explains, with focus on industry, company profits, unemployment, productivity etc. Financial markets are too abstract. In large, Feldt believes, this stems from a gap in competences between the private and state financial sector. When the liquidity increased during the 80's, the government thought it was because of the real economic factors, not the financial market. The competencies were in the private financial sector, not in the regulatory institutions. The private sector had better salaries and benefits, which made it almost impossible for the government to hire and retain skilled labor. When it comes to options, Blomé (2012) states that the financial sector was indeed neglected by politicians, and it was not until 1989 the first recruitment of a professional economist to the SMF took place. Furthermore, he believes, before this, politicians had not seen the financial sector as an industry that in itself is vital for the society.

It is safe to say that the story of OM is a success story. At the start, OM had anticipated the trade to be around 400 options contracts a day, after a year that number was 8,000. In 1986, just a year after its introduction, OM made a profit of 150 million SEK. They moved on to later merge with SSE, and acquire a few other Nordic exchanges. In 2007, OM had a turnover of 1.8 billionn SEK, made a profit of 213 million SEK, and had about 1000 employees. At that time, OM merged with NASDAQ, creating what today is the NASDAQ OMX Nordic exchange. (Irding 2010)

³⁹ Kjell-Olof Feldt, ex Swedish Minister of Finance, interview June 14th 2012

5 Analysis

In this chapter, with the research questions stated in the purpose of this thesis as starting-point, the empirical data will be analyzed with the help of the analytical framework. It will commence with RQ1, and discuss the ties between digitization, deregulation and the growth of the Swedish financial market. Subsequently, RQ2 will be analyzed, as a closer look is taken at OM's success, focusing on how they managed to grow and prosper despite the heavily regulated environment.

5.1 How did the digitization affect the growth and deregulations of the financial market in Sweden?

In order to answer this question, I intend to explore four different hypotheses concerning the causal connection between deregulation, growth of financial markets and digitization. First, however, the nature of the deregulation and digitization by themselves will be analyzed, in line with the concepts brought up in the theoretical framework. Finally, I will put the digitization and deregulation of financial markets into the context of the development of the Swedish economy during the 1980s.

5.1.1 The deregulation of the Swedish financial market

First, it is helpful to conclude whether the decisions to deregulate were reactive or proactive and, in close connection, if they were based on political motives based on ideology or based on economic realities and the environment. I believe it is safe to say that the deregulations of the Swedish financial market, especially the deregulation of the credit market and the deregulation of international transactions mentioned above, were of reactive nature. As many sources pointed out, the Swedish regulatory system was not effective as it were, and regulations were already forcing capital flowing out of the country. Furthermore, the fact that Sweden was the last OECD country to deregulate international transactions points to a reactive policy decision. Remember one of the conditions for a reactive policy state, “a reactive state fails to undertake major independent foreign economic policy initiatives, even if it has the power to do so”. Sweden was indeed pressured into deregulating, and in no way was it an independent policy initiative.

Enhancing this view, is the evidence that also points out that this were indeed a decision based on economic realities and the environment rather than political ideology. The decision to deregulate was controversial and not in line with the traditional socialistic views of a large part of SAP's constituency. Remember how Blomé (2012) even goes as far as call the decisions for “politically impossible”, but were made possible due to the pressure from capital leaving the country. Another factor that made the deregulation possible under a socialistic rule was the fact that the financial sector was not seen as such an important sector at all. The leader of SAP, and also Prime Minister of Sweden at the time, Olof Palme, showed no interest in this and did let Minister of Finance Kjell-Olof Feldt, and head of the Riksbank Bengt Dennis, handle the deregulation. Furthermore, the fact that the banks had already found ways to circumvent deregulations, leaving the Riksbank “practically powerless” insinuates

further that this was a decision that were bound to come, rather than a strategic decision based on strategy for the future.

The deregulation in itself was indeed not an incremental development, but rather a discontinuous institutional change, rendering in a new economic environment. Lending increased to 150% of GDP, and the turnover on financial markets grew thousand fold. Even though the deregulations were decisions bound to come during the 1980's, they were not really path dependent, connecting the past with the future, since it was a rather liberal move to be done by a socialistic party.

5.1.2 The digitization of the Swedish financial market

The digitization of the Swedish financial market was not an innovation that can be traced back to a single source. It did come from new knowledge, as the digital data industry was developing, but also from process needs, since the larger trading volume put pressure on the administrative line of work. Indeed, the industry was also changing. The deregulations had created an open and more vital market, and OM had already begun demonstrating how digital technology could change the industry.

The digitization of SSE did without a doubt impose a huge impact on trading. The question remains, however, as to if it was in any way disruptive. It did primarily cater to the same customers (stock brokers, investors, fund commissioners etc.), alongside the same performance trajectories (transaction volumes, transaction speed, information speed etc.), so no matter how hard Christensen would look he would not find an introduction of new performance trajectory. It did incorporate some elements of a disruptive innovation in that it invited new smaller customer groups, smaller investors and day traders, but the primary customer group remained the same.

However, the shift into a digital market place was indeed a discontinuity. It did offer an improvement in price-performance to an extent that no increase in scale, efficiency, or design could make the older physical auction based trading competitive with it. In addition, it was a discrete and momentous shift related to banks and other organizations' competence bases. Remember the words of Thomas Franzén, board member of SSE: "When you change a structure like this, reducing the need for intermediaries, there are afflicted departments and functions. Old knowledge is no longer worth anything, and new knowledge is needed". Indeed, the shift into a digital marketplace did mean a lot of competency destroyed. One can understand how this was not met with great joy from the incumbent industry, as many people had made their living on the old ways of trading, with imbalanced and unfair distribution of information, and the arbitrage possibilities that came with that. The new digital technology not only reduced the importance of the incumbent knowledge, it also enabled a quicker and fairer flow of information.

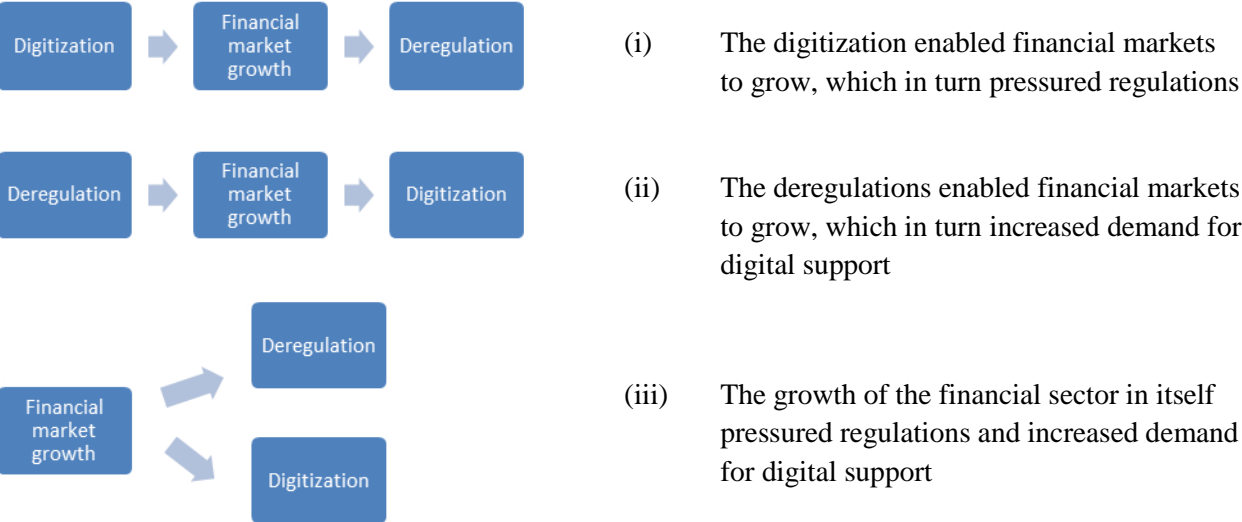
This is partly illustrated by the failure of SOFE, a company created by the old institutionalized structure of physical trading, with extremely competent people in that area. Yet, that became their core

rigidities which in turn lead to a static company not following onto the new digital paradigm and was rendered obsolete.

Lastly, it is clear that the digitization of the financial market lowered transaction costs enormously. Information was now available in real-time, no one had to physically travel to a trading floor, and administrative work, which was earlier a real bottle neck (remember Blixt’s words about only coping with 0.9 days of work in 1 day), was rationalized with the help of digital back-end systems.

5.1.3 Linear causality hypotheses

The first three hypotheses resemble each other in that they assume linear causality between the three factors. They are as follows:



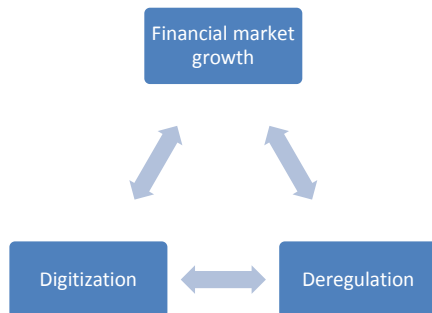
The evidence enforcing hypothesis (i) is the opinions that the financial market could not have grown such enormous transaction volumes without digital technology reducing transaction costs and enabling flow of information. The deregulations were then a reactive decision to the growth of financial markets, where the old regulations were no longer effective.

(ii) can be enforced by the enormous growth in lending and trading as a result of the deregulations of the credit market and international transactions. As seen, this in turn increased pressure on the analogue administrative work in the financial industry, created a demand for digital technology.

The third hypothesis (iii) stipulates that there were no connection between the deregulation and digitization. As noted, there were no talks in the government about the digitization as a driver of deregulations, rather the growth of financial markets. The growth of financial markets did however create the demand for digital technology, as pressure was increased on administrative work.

5.1.4 Self-reinforcing system hypothesis

It is in our human nature to try to find linear causal connections, but sometimes it is too much of a simplification of a much more complex reality. When looking at the evidences in all above three hypotheses, it is necessarily not so that one or more are wrong; instead they can all be true. Thus I here present the fourth, and in my opinion the most accurate, hypothesis:



(iv) The three factors are affecting each other in a self-reinforcing system

Here, the three factors are instead viewed as part of a system, where they are enforcing themselves, and when converging the three reinforces the whole system at an even higher magnitude. The evidence of the above connections is as follows.

The profits in the Swedish industry were growing in the beginning of the 1980's as a result of competitive Swedish export, which in turn was a result of the devaluation of the Swedish currency a couple of years earlier. The financial markets were not particularly developed and consisted mostly of treasury bonds and stocks, thus Swedish companies had limited options concerning capital placement. It existed an over liquidity in the Swedish economy. As banks started to circumvent regulations as lending brokers or with the issuing of CDs, and Swedish companies started moving capital abroad through clever bookkeeping and international subsidiaries, the government started to realize that the current regulations were not effective anymore. What followed were the deregulation of the credit market and later the deregulation of international transactions. This, in turn made the financial markets grow even faster, when money could flow freely and capital were more available. There is no doubt that this testify to the clear link between deregulation and the growth of financial markets.

The digital data industry was in itself growing during the 1980's, and the financial sector became one of the most important areas in which the digitization took place. The growth of financial markets did put a lot of pressure on the analogue working methods of the administrative trading work; remember that trading was done by trading actual paper. Thus, digital systems were developed for administration purposes. The introduction of a digital market place, first by OM and later also by SSE, did however increase trading to astronomical highs as compared to earlier. As many has stipulated, without digital technology, the transaction volumes of today could never have been reached.

The deregulations of international transactions created the money to flow over borders, and it created a need for digital systems. If the deregulation started the internationalization of Swedish financial markets, the technology enabled it to grow and prosper. Also, it put more pressure on the need for digital equipment, as administrative work increased when faced with international transactions. Systems were needed, not only for capital transaction purposes, but for information transaction purposes as well. As information and capital could flow more freely across borders through the use of digital equipment, country borders were in a way erased and government power decreased.

The digitization, growth of financial markets and deregulations were all interconnected, and the timing was spotless. The development seen when the three converged in the middle of the 1980's was light-years away from the development the precedent decades. The core to understand the rapid development during the 1980's lays in that the three factors did not just affect each other; they accelerated each other and the whole system.

5.1.5 Putting it into context

When looking at the digitization and deregulations of the Swedish financial market, it becomes clear that it cannot be traced back to a single source. This emphasizes the importance of having a systems view of the development. Remember, neither firms, nor innovations, if viewed individually, can explain economic change. They have to be viewed as part of a larger system.

The development of a more sophisticated financial market, the growth of the digital industry and the deregulations together led the way for the development of the entire Swedish economy. Up until the 80's, the development had followed the same trajectory for the better part of the 20th century. The, at the time, current development block, consisting of mechanical technologies heavily dependent on natural resources, had reached its peak. As Feldt explained, no real rationalization of the Swedish industry had been done during the decades leading up to the 80's; even though profits were high and exports booming, the investment in production rationalization showed decreasing returns. All signs pointed to the end of a development block.

In addition, as Saint-Paul (1992) explained, the productivity of a nation's industry is limited by the development of the financial sector. The Swedish financial sector was indeed not very developed and transaction volumes were the same, nominally speaking, as it was in the beginning of the 20th century. This prevented the specialization and division of labor, which is perhaps best illustrated by the high prevalence of big conglomerates. To hedge risk, companies tried to diversify and be as general as possible. When the financial sector developed, this gave companies the opportunity to hedge risk through the allocation of capital and risk in financial portfolios, which enabled them to specify in their respective technology, not surprisingly leading up to the subsequent fall of conglomerates.

The reinforcing system of financial markets, digitization and deregulation meant the ending point of one development block, and the starting point for the next, now with digital technology as core. And it

was indeed a disruptive shift. In fact, to be crass, it was a couple of hundred years of technologies coming to an end, and the traditional performance trajectories of higher speed, higher pressure and higher temperatures were replaced by increased data storage, faster information flows and more processor speed. In addition, the environment in which this development block is operating is one of an effective financial market, where risks are spread and capital allocated, and a more open regulatory system, enabling technology as well as finance to grow and prosper at rates not seen before.

5.2 How could OM grow and prosper despite the heavily regulated environment?

OM's introduction is indeed a success story, yet it was carried out during a period characterized mainly by a highly regulated financial sector. A financials sector, that for years had been considered dull, unimportant and a market where no profits were made. Although the above certainly is true, it was also an industry that was about to undergo a tremendous makeover, and OM's timing was exquisite. Below, the reasons for OM's success despite the regulatory environment are presented.

5.2.1 Creative policy circumventions

Even though there were not regulations against options trading, in fact "options" as a financial instrument were not mentioned anywhere in the regulations, there were a regulated monopoly on exchange trading held by SSE. OM chose to go against the current institutions, with the help of some rather creative policy circumventions.

The official label of the company was fund commissioner, and with that they held a brokerage license. A broker is allowed to match buyers and sellers, and that is just what OM did. With the help of their digital market place they matched buyers and sellers of options, as well as writers of new options. Now, even though options later made their way into the regulations concerning derivatives and securities, they were not regulated under the fund commission law (fondkommisjonslagen (SFS 1979:748) or the law for the Stockholm Stock Exchange (lagen för Stockholms fondbörs (SFS 1979:749). This meant that OM's option trading was still not seen as encroaching on SSE's exchange monopoly, as option trading was not regarded as exchange trading. It is obvious when looking at the records from SMF, mainly in Kommittédirektiv 1987:1987:1, that the first entrances of options into the regulations were only actions trying to fix loopholes, instead of doing a large investigation first, as Kommittédirektiv 1987:1987:1 suggests. As it turned out, OM together with the Bank Inspection Board, stipulated the first rules for options trading.

5.2.2 Technology

OM's integrated market place and clearing system was indeed one of a kind. It was an innovation that came from the idea of an entrepreneur, Olof Stenhammar. He had acquired the knowledge concerning options trading when he worked as a broker in the US, he then digitized the concept with the help from experts from Accept Data. It was knowledge intensive, and it was all new knowledge. The data industry had been developing on its own, and by combining the new knowledge regarding options trading, with the new knowledge concerning digital systems, the result was a successful innovation.

The digital market place lowered transaction costs and enabled transaction volumes to reach breathtaking heights, and without it, options trading would never have been as successful as it was. As Olausson said, Stenhammar would never have started OM without a digital solution.

Perhaps the most important factor was the removal of physical auctions. As mentioned above, SOFE were created alongside the old institutional framework and used physical auctions. Even if they had support from big financial actors, and hired top competence, they failed. The competences were old, and instead became core rigidities, and SOFE failed to follow OM, and later also SSE, into the new digital paradigm of financial markets. It is almost as the incumbent industry desperately trying to save their dying ways of doing business. They took the old physical auctions, and tried to make them better and more appealing by introducing options. They failed to realize, what Stenhammar apparently realized; it is not the concept of options trading as such that is the source of success, it is the digital technology that comes with it.

5.2.3 First-mover advantage

Even though SSE was the first, and at the time the only allowed, exchange in Sweden, they did not trade options. In fact, as the concept of options was not stipulated in the the law for the Stockholm Stock Exchange (lagen för Stockholms fondbörs (SFS 1979:749)), they were not even allowed to trade options. Thus, as far as option trading is concerned, OM was indeed the first-mover. The late-mover worth mentioning here is SOFE, and it calls for an interesting comparison of the two.

As we have seen, being first comes with some advantages. OM enabled more investors to place their money, in what was concerned a new and exciting market. This gave them an advantage as customers, the investors, had no incentive to switch to a late-mover (i.e. SOFE). As Göransson asked, why switch to another exchange when everybody was already using OM? Indeed, there were also switching costs for customers, as they would have to learn a new system and gather a lot of information if they were to switch. This also rimes well with the notion on the monopolistic nature of markets, the customers benefit from having all the trading done and information available at one marketplace. More market places will mean more information gathering, which in turn implies higher transaction costs. Furthermore, as a financial exchange views capital as its resources, this can also be viewed as a kind of preemption of scarce resources. A lot of capital was already traded in OM, and thus there were less left for late-movers. Thus, OM did not suffer much from the appropriability problem, but were actually able to appropriate much of the value that the digital market place supplied, without significant spill-over effects. This was made easier since SOFE were not interested in using a digital market place, and thus in that sense were not looking to appropriate any spill-over effects.

The interesting thing with SOFE is that even though they were the late-mover, they were showing more signs of an incumbent firm. As mentioned above, they hired experienced people from the Swedish financial industry, relying on old knowledge and trying to brush up the, already dying,

concept of physical auctions. It is safe to say, that the sailing boat-effects they were looking for were not enough to save them.

As far as learning and competencies goes, OM was the leading body of knowledge concerning options trading in Sweden. This is perhaps best illustrated by the fact that they actually took part in making the rules for options trading. This also illustrates that there was a competence gap between the private and public financial sector.

5.2.4 Competence gap

As the old ways of exchange trading was coming to an end, new competencies were needed more than ever. It is obvious that these were acquirable in the private sector, and not in the public. As Feldt said, the government did not refer to the financial sector as an important one, and they lacked understanding of the magnitude and ramification of OM's entry and the reformation of the financial industry. As the old knowledge was rendered obsolete, and the new knowledge was hard to attain, the government was simply undermined when it came to knowledge about the new financial industry. Illustratively speaking, it is like the referee knowing less about rules and tactics than the players in a soccer game. This, of course, makes it easier for private actors to circumvent regulations. And as Feldt concluded, it would now have mattered if they would have regulated options trading, the private sector, with its extensive knowledge, would have found ways to circumvent them; *“The capital has wings; it flies a lot quicker than political decisions”*.

6 Conclusions

There is no question that Sweden underwent an enormous change in its financial sector during the 1980's. It went from a highly regulated sector with an exchange monopoly to a deregulated sector with the world's first profit driven exchange, with trading volumes growing thousand-fold. This thesis sought to find the connection between the above change and digitization. What was found was no linear causality, but rather a self-reinforcing system consisting of three factors; deregulation, digitization and the growth of the financial market. The deregulations were initiated due to the growth of the financial sector, which in turn was highly dependent on the high profits and over liquidity in Swedish industry. In turn, the deregulations accelerated the financial sector even further. In addition, digital equipment lowered transaction costs and information availability which enabled magnitudes of transaction volumes never accessible before. Conversely, the enormous growth in transaction volumes called for even faster development of new digital equipment to cope with it. It is important to stress here that the three factors did not only affected each other, they accelerated each other!

The growth of the financial market, the growth of the digital industry and the deregulations together led the way for the development of the entire Swedish economy. Up until the 80's, the development had followed the same trajectory for the better part of the 20th century. The, at the time, current development block, consisting of mechanical technologies heavily dependent on natural resources, had reached its peak. During the 80's this development block came to an end, meaning the birth of a new development block, now with digital technology as core. This was indeed a disruptive shift, and in fact, to be crass, it was a couple of hundred years of technologies coming to an end. The old performance trajectories were characterized by higher speed, higher pressure and higher temperature. These were now replaced by performance measures such as increased data storage, faster information flow and agility.

This thesis also sought to explore a case very illustrative for this time period; OM's introduction of a digital market place and a new financial instrument, options. It is illustrative because OM managed to grow and prosper in this heavily regulated environment, with the help of digital equipment. The digital market place helped them use their brokerage license to match buyers and sellers and thus, in practice, running an exchange even if it was not allowed. OM realized that the key to success was the digital equipment, and the removal of a physical market place. Their main competitors, SOFE, did not realize this, and created their business aligned with the old institutional framework, with a physical market place. What they did not realize was that they built their business around old competence that was about to be rendered obsolete. In addition, the new competencies were hard to attain, and the government failed to acquire them, leaving the main bulk of competence in the private sector, creating a big competence gap. Indeed, regulating financial markets is hard when the extensive knowledge is in the private sector; *"The capital has wings; it flies a lot quicker than political decisions"*.

7 Discussion

The events that transformed the Swedish financial market are hard to view as distinguished entities, as concluded in this thesis it is rather a system of multiple factors. Recall Figure 1 from the introduction, the graph characterized by a long time of essentially nothing happening, and then everything changing in just a matter of years. It would indeed be interesting to analyze other countries' development of their financial markets. Is it perhaps possible to recognize systems with identical, or similar, factors as seen in Sweden? Can we see similar graphs illustrating the same swift change in trading volume? If so, when did it take place?

Here, it becomes more obvious to me how important it is with transaction costs. If a country's financial market is characterized by high transaction costs, it will simply not develop. Then, bring in digital technology, which enables free flow of information and automated processes. The result is a strong decrease in transaction cost, pushing them down towards zero. This is happening, all around the world, and has been for decades. The introduction of digital technology into the world of financial market, like Sassen explains, has led to the creation of a global capital market, a vast pool of money for investors to shop in without the permission of a certain government.

As with the development of the financial markets, also the paradigm shift of development blocks would be interesting to analyze on a global level, plotting countries or regions against each other. The shift I mention in my thesis took place during the 1980's, over 30 years ago! Did the shift into the development block with digital technology as its core happen simultaneously around the world? Or can we in fact see countries in less developed parts of the world still battle with this transition today? And to nuance the picture even further, how is the paradigm shift correlated to the development of different regions' financial markets?

The answers to these questions can help us bring even more clarity into the importance of financial markets, the effect of digitization and the impact of changing development blocks. It would also help in the development of the self-reinforcing system hypothesis, if the same factors and patterns could be found in other countries' development of financial markets. Nevertheless, even if the setting of this thesis took place 30 years ago, the importance of understanding digitization and paradigm shifts and the effects they bring, is, and will always be, unquestionable.

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